War Bond sales program gains momentum under stimulus of clever promotion by industries, p. 38

CONTENTS

Volume 111—No. 15 STEEL October 12, 1942

NEWS

FEATURES

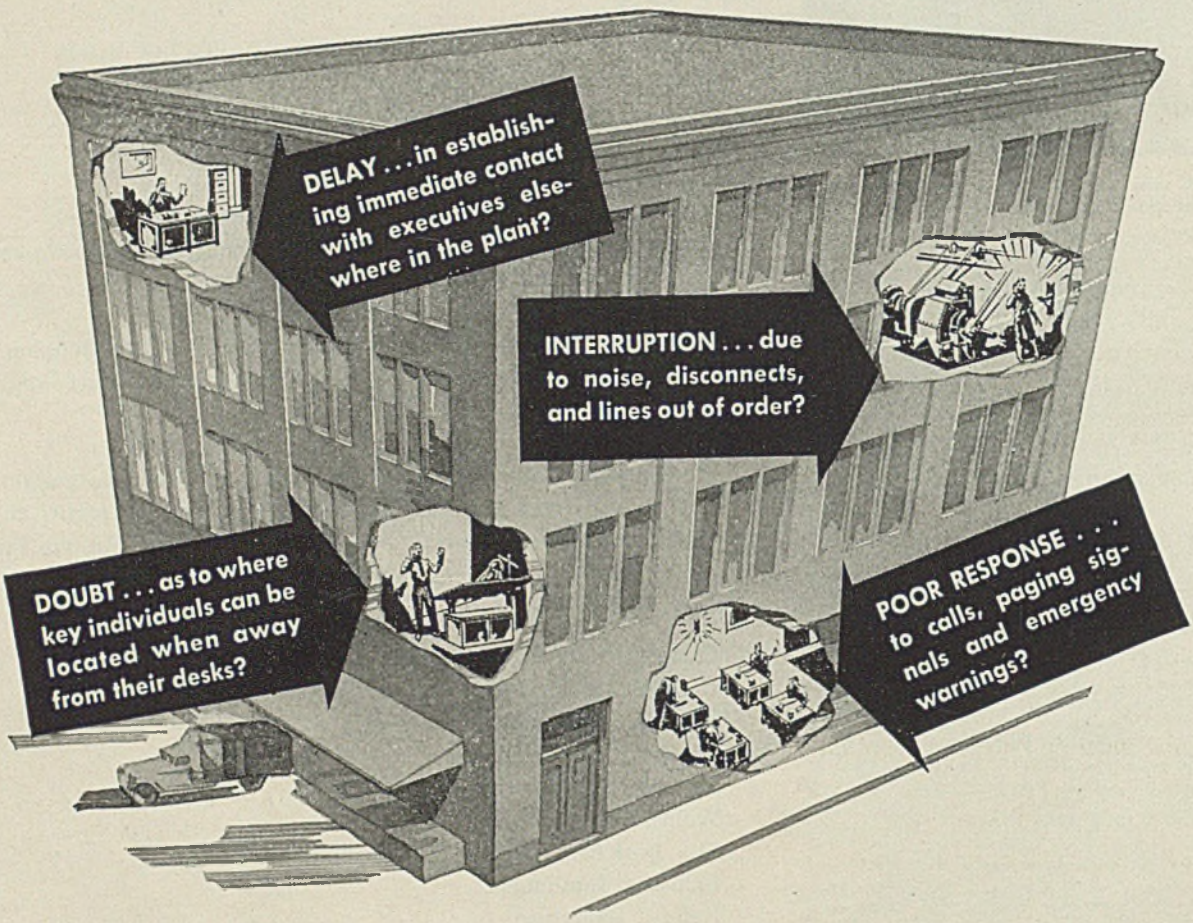
TECHNICAL

PRODUCTION

MARKETS

DOES YOUR PLANT SHOW THESE SYMPTOMS OF

CLOGGED COMMUNICATION?



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HIGHLIGHTING

this issue of STEEL

PRODUCTION Apprehensions among machine tool manufacturers who are catching up with demands for their particular products were relieved last week when they were told that just as rapidly as their unfilled orders are executed their facilities will be diverted to the production of machine tools that still are highly critical. The industry has a backlog sufficient to keep it fully occupied eight months ahead; it was asked to complete this program in six months (p. 42) . . . At the same time, signs are beginning to appear that here and there the tooling-up period is approaching peak so that management will be wise to plan for any eventualities in the near future (p. 50).

The problem of keeping steel warehouses supplied now appears to have been solved as a result of new WPB directives now in process of going out to the mills (p. 47).

Means have been provided to ease the problem of obtaining operating supplies (p. 52) . . . Additional industry advisory committees are functioning (p. 76).

METALLURGY The War Production Board has made provision for getthat they get acquainted with them (p. 51). These steels already have won wide acceptance (p. 55).

W. R. Breeler and W. H. Wills reveal results of ting NE steels into the hands of consumers in order studies with three different types of molybdenum high-speed steels, with special emphasis on heat treatment (p. 95).

Feodore F. Foss adds to the already convincing evidence that there is no proven process for producing sponge iron on a commercial scale (p. 100).

Changeover from brass to steel for all types of fixed artillery ammunition will be complete by the end of this year, says Maj. Gen. Leven H. Campbell Jr. A new cold-forging process is an important factor in the development (p. 43).

W. J. Priestley is the new chief of the Alloy Steels Unit of the Iron and Steel Branch, War Production Board (p. 51).

CONSERVATION All stamping manufacturers should find suggestive values in Section V of the series of articles on conservation and substitution. In it George W. Birdsall, STEEL's engineering editor, describes the trend toward using stampings to replace forgings, castings and parts machined from solid bar stock. Critical materials thus are conserved and the load on critical equipment lessened. Stampings production men are urged to study design possibilities in order that their facilities may be mobilized still further in war production (p. 82).

Because of "overpowering," up to 25 per cent more material and labor are going into electric motors than are required, declares L. A. Umansky. Even more serious is the unnecessary waste of copper in electrical distribution systems. He recommends a plan of corrective procedure (p. 104).

SALVAGE C. R. Stevens outlines measures that would help accelerate the salvage program. He points out economic faults in the price structure and suggests a simpler and more uniform wording in priority and allocation orders (p. 80) . . . Windows of Washington, in a behind-the-scenes account of the drive to get metals out of frozen inventories and get them into war use, describes the philosophy which guided the fixing of government prices on such materials (p. 48).

WAR BOND SALES United States Treasury officials are much pleased with the sale of bonds through payroll deduction plans and are anxious to have such plans set up in all plants. Whereas 20,000,000 individuals now are buying bonds the total is to be pushed to 30,000,000 by the end of this year. Industrial management is urged to help toward this end (p. 38).

ARMY-NAVY AWARDS Important stimulant to greater war *materiel* production has been the recognition given workers by award of the joint Army-Navy "E" pennants and silver lapel pins. Typical scenes of such presentations (pp. 66-71) show how the workers react.

MARKETS In spite of near-capacity production, mills can not keep up with war demand and deliveries are further deferred (p. 119). Iron ore shipments in September kept up the accelerated rate of prior months and to Oct. 1 tonnage is 16.8 per cent over last year to the same date (p. 130).

Answers to Some
QUESTIONS ABOUT SCRAP

Q. Why is scrap used to make steel?

A. It conserves natural ore resources, lightens the burden upon the nation's transportation system, and requires less time to convert into molten metal because scrap used by steel mills has previously been refined into steel.

Q. How is scrap used to make steel?

A. It is charged into open hearth furnaces with pig iron and small quantities of special ores and limestone.

Q. Does scrap make good steel?

A. Yes, the finest steel is made from scrap. Electric furnaces, which produce the highest grades of steel including some alloy steels, operate almost entirely upon scrap.

Q. What kind of scrap is needed by the mills?

A. Any iron and steel scrap is usable, except tin-coated or non-ferrous metals which cannot be used to make steel.

Q. How much scrap do steel mills require in a year?

A. In 1941 the total was 45,600,000 tons. Of this amount about half was steel mill scrap and the remainder came from outside sources.

Q. What are the causes of the scrap shortage?

A. Over 20,000,000 tons of scrap were shipped out of this country during the 30's, and never before in the history of the steel industry has there been such a prolonged period of high steel production. All existing accumulations of scrap have been taken and now it is the remote farm, industrial, and household scrap that must be sent to steel mills.

Q. Why not use ore to replace scrap?

A. Ore mining operations, transportation facilities, ore storage space at mills, and blast furnace capacity are based on the use of scrap and cannot be expanded immediately.

Q. Are steel mills doing anything to help the scrap situation?

A. Yes. They are spending millions of dollars to publicize the seriousness of the scrap shortage. They are building new blast furnaces and ore handling facilities. Inland is building one new 1200-ton blast furnace at its own plant and two more for the Government.

Q. Are the scrap dealers doing their part?

A. Scrap dealers did a marvelous job during 1941. In the first six months of 1942, more scrap was moved by the dealers than ever before in history. The need now is for the general public and general business to move their scrap to scrap yards, where it can be properly prepared and rapidly moved to consuming centers.

Q. Why have mills not accumulated scrap?

A. When war came, mills had normal scrap supplies. But, tremendous demand for steel and small scrap offerings quickly lowered mill scrap stocks.

Q. How much scrap do mills have on hand?

A. The supply averages less than two weeks. Many mills are operating on less than two days' supply, which is virtually on the basis of daily receipts.

Q. What would happen if no more scrap reached mills?

A. Within a few days steel output would drop at least 25%—a calamity in view of the desperate need for steel to carry on the war effort.

Q. Why should scrap be gathered now for use next winter?

A. Cold weather, snow and blizzards reduce collection, preparation and transportation of scrap. Mills normally store extra scrap for use in winter. This year—a critical year—mills cannot accumulate scrap for the winter months because it is not available to them.

Q. How can the scrap shortage be solved?

A. By the segregation and return to mills of all production scrap; by executive authority to scrap old buildings, unneeded equipment, obsolete machinery, dormant and excessive stores, unused dies, tools, fixtures, etc.

Q. How can you help?

A. If you are an executive, use your initiative and authority to designate what can be scrapped. If you are an engineer, metallurgist, superintendent, foreman, storekeeper, master-mechanic, millwright, or workman, call to the attention of your management anything and everything that you believe can be spared and sent to the mills as scrap.

Steel mills must have more scrap so that our fighting men will have the equipment they deserve and need!

STEEL
October 12, 1942

Give People the Facts!

Newspapers in a well-known national chain carry on their mastheads a reproduction of a lighthouse with this caption: "Give Light and the People Will Find Their Own Way." This is another way of saying that a nation of informed people can be trusted to arrive at the proper solution of its problems.

We believe that this premise is sound and that it is especially pertinent today. For instance, one reason why scrap is coming out more freely now than it was in previous drives is that more people really understand that scrap is needed urgently. Previously they had been uncertain. The same formula can be applied to almost every phase of the war effort. The more accurately the individual is informed, the better will be his response.

This point can be capitalized to excellent advantage in stimulating production in individual plants. Everybody has heard the story of the girl in the agricultural implement plant who asked her foreman for a transfer to another department so that she could "get into war work." She thought that the parts she inspected still were being used on farm tractors. When the foreman told her they were going into tanks she was ecstatic. "Just wait until I tell the other girls!" she exclaimed.

Some manufacturers are setting up exhibits so that employes can see for themselves just how the work they are doing fits into an airplane engine, tank turret or anti-aircraft gun.

In one plant making combat weapons, the workmen had been indifferent. A new manager was installed. Shortly thereafter a call came to ship several hundred weapons to a certain port to equip departing troops. The new manager called his employes together and explained the emergency in detail. Every man and woman in the place worked feverishly—disregarding lunch hours, quitting time and everything else—until the guns were on their way.

Give people the facts and they will respond magnificently.

E. L. Shaner

Editor-in-Chief

Industrial Workers Answer Uncle Sam's Plea To "Buy"

Millions authorize deductions aggregating 7.6 per cent of gross payrolls. Few purchasers ask for premature redemption. Company campaigns encourage employe participation

WASHINGTON

THE TREASURY department states that from May, 1941, through September, 1942, twenty million persons purchased War Bonds in the amount of $9,131,102,000. Only one-fourth of 1 per cent of that number of purchasers asked for redemption of bonds.

Treasury officials hope that there will be 30,000,000 subscribers by the end of this year.

They are much pleased with the results of payroll plans. At this time 7.6 per cent of payroll earnings are going into bonds, and it is expected that the proportion will be increased to 10 per cent by Jan. 1.

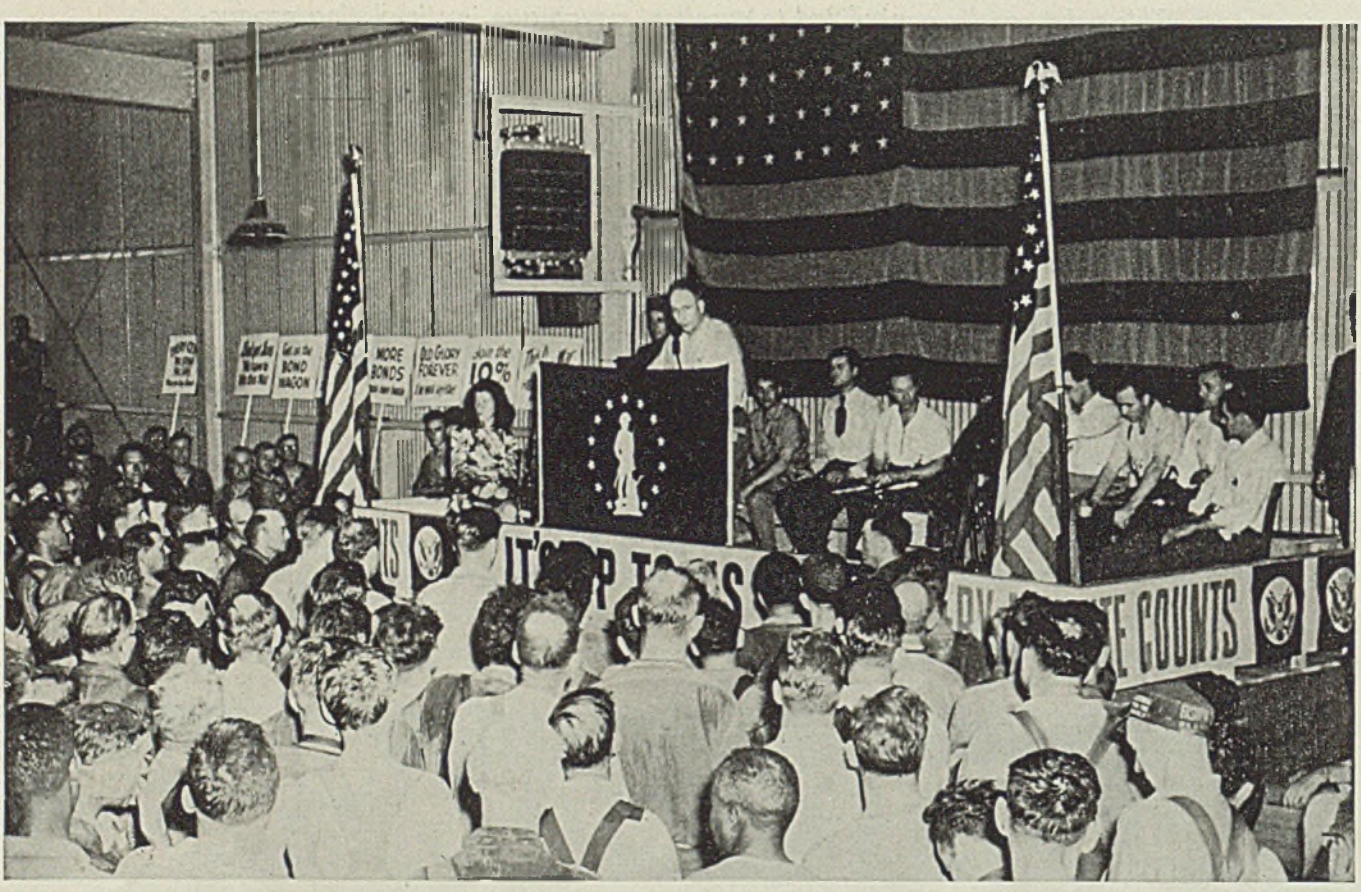
U. S. Steel's Response Typical

Some conclusions as to the effectiveness of War Bond campaigns in industry may be drawn from the experience of the United States Steel Corp. This company with its diverse operations and widely separated plants literally represents a cross section of the United States in its employe personnel. What has been this experience?

The major goal, of course, has been 100 per cent participation on the basis of 10 per cent of individual income. While some plants or departments have reached this goal and in certain cases have exceeded it, and while many, many individuals in other groups have done so, there has been no such average. Nor did many expect that such an average would be reached in a hurry. For instance, it was realized that a flat 10 per cent right across the board was bound to impose greater hardships on some than on others.

All in all, buying probably has not been as good as generally anticipated, not only among steel companies but for the country as a whole. Certainly it has not been as good as desired. But, on the other hand, there is much in the picture as may be drawn from the U. S. Steel position to lend encouragement, for bond purchases are much heavier and momentum appears to be gaining.

In the case of U. S. Steel, and excluding its utilities and railroads, for which comparative figures are not at present available, monthly deletions from payroll for the purchase of bonds have



A gigantic rally climaxed the War Bond drive at the Waukegan, Ill., works of the American Steel & Wire Co., United States Steel Corp. subsidiary. Standing behind the "minute man" flag awarded the plant for 90 per cent participation, Will Corbett, assistant industrial relations supervisor, acts as master of ceremonies

increased since February, this year, when the voluntary monthly plan was adopted, from less than $1,000,000, to a rate now estimated to be approaching $3,000,000, against $2,200,000 for August, the last figure available.

Survey of corporation subsidiaries for August shows three with 100 per cent participation; nine with 90 per cent participation, or better; and seven with 80 per cent, or better—19 in these groups out of 34. Incidentally, two in these groups were companies which employ less than 100 persons each, with one, the Columbia Iron Mining Co., one of the three with a record of 100 per cent participation.

The other two to reach 100 per cent were the Pittsburgh Limestone Corp. and the United States Steel Export Co. In fact, the Limestone corporation achieved the most outstanding record of all corporation subsidiaries, with 100 per cent participation and with 11 per cent of the payroll being subscribed. This does not necessarily mean, of course, that all Limestone employes subscribed at least 10 per cent of their respective incomes through payroll deductions, but, if not, most must have come close to it.

But what of the larger subsidiaries—Carnegie-Illinois Steel Corp., American Steel & Wire Co., National Tube Co., Tennessee Coal, Iron & Railroad Co., H. C. Frick Coke Co., and out on the Pacific coast, the Columbia Steel Co.? Well, in August, more than 80,000 employes of Carnegie-Illinois participated, or 67.30 per cent, with deductions from payroll amounting to more than $700,000. Relatively it appears not so good as some of the other and smaller subsidiaries, but a sharp increase was shown from February, when around 31,000 participated, or 25.67 per cent, deductions amounting to $275,000.

American Steel & Wire started off last February with almost 20,000 participating, or 66.06 per cent, and with deductions amounting to approximately $168,000. In August, the percentage of participation was 79 per cent (more than 24,000), with deductions amounting to more than $241,000. National Tube got off to a fast start with more than 25,000 pledged to purchase bonds, or 91.55 per cent; in August, the number was a trifle higher, equivalent to a percentage of 94.70. However, actual payroll deductions in August—$171,000—were down from $172,000 in February.

Tennessee Coal, the corporation's major southern subsidiary, on the other hand, started slowly, with 14.32 per cent of employes participating in February; however, in August more than 16,500, or 50.60 per cent, were buying bonds through the deduction plan, with collections amounting to $153,000, against $30,170 in the first month. Frick Coke employes boosted their percentage of participation from 46.37 per cent to 84.60 per cent, or about 12,500 in August, with deductions almost $90,000, against more than $52,000. Columbia Steel jumped from 22.87 to 76.40 per cent, or about 5500 employes, with collections gaining from around $9000 to more than $50,000.

Then, too, among some of the other larger subsidiaries, long known in the steel industry, are the American Bridge Co. and the Oliver Iron Mining Co. The number of American Bridge employes pledged to purchase bonds increased from more than 4500 to almost 7500, or from 52.44 to 74 per cent, with deductions gaining from around $38,000 to more than $71,000. Incidentally, American's small brother, Virginia Bridge, increased percentage-wise from 8.77 to 90. Oliver Mining increased from 80.36 to 92.60 per cent, or more than 6000 employes, with deductions gaining from more than $44,000 in February to almost $90,000 in August.

Highlights of the record of the corporation's subsidiaries would not be complete without reference to Federal Shipbuilding & Dry Dock Co. In August its employe participation amounted to 96 per cent, or almost 27,000, against 86.27 per cent, or 19,500 employes, with deductions amounting to more than $360,000, second only in this respect to Carnegie-Illinois. In February, deductions were little more than $51,000, and it is

"CIGARETTE GIRL" sells War Stamps and Bonds: It was a suggestion by E. L. Berry, manager, Link-Belt Co.'s new ordnance plant, that led to the application of the "cigarette girl" sales plan, with considerable success. Leona E. Schreiner, cost department employe, in fetching costume, walks through the plant two hours each day, offering stamps, taking subscriptions for bonds. Ben W. Neuendorf, labor foreman of the steel handling crew, starts the boys on the right road by buying a $50 bond

interesting to note the sharp jump in these deductions since that time, especially in the light of the relatively small gain percentage-wise in the number participating.

When figures are in for September, it would not prove at all surprising if some of the subsidiaries, which have been hovering around the top in point of employe participation, actually hit the top, and perhaps went through it. From all indications there will probably be a gain all along the line, and certainly a gain in the average.

While up to Sept. 1 only three subsidiaries had reached the 100 per cent participation mark, various individual plants and mines had reached this goal. The Annandale mine of Pittsburgh Limestone, in fact, is on a "100 per cent—10 per cent" basis, each employe having invested 10 per cent or more of his pay. Many others had won the Minute Man flag for 90 per cent participation, or better. Then, of course, many individuals throughout the corporation ranks have had and are having well in excess of 10 per cent deducted from their incomes for war bonds. Cases are cited of 30 and 35 per cent; and there may be even higher records.

In addition to payroll deductions, many employes are buying bonds and stamps through other channels, it is pointed out—if not the men themselves, their wives in many cases, through groups and organizations of their own, or through banks from special savings; and children in school, with their weekly stamp purchases; and not infrequently sons in the armed forces, paying what little they can spare, with the bulk coming from the family budget back home. Payroll deductions are not the last word in many, many cases, it is emphasized.

Prior to the adoption of the voluntary monthly plan, put into effect by companies generally at the suggestion of the United States Treasury department, U. S. Steel employes bought bonds through various channels, such as federal credit unions, which are small co-operative loan banks, established by workers and chartered by the Farm Credit Administration. Some of these earlier bond buying connections are still being maintained.

Nor does the U. S. Steel encourage employes to buy exclusively through the voluntary monthly payment plan. That is up to the individual, and whatever the amount and wherever he decides to buy it, it is clearly up to him. The corporation's main job in this respect is the overall job of co-operating in every way possible with the Treasury Department in stimulating interest in war bonds. Through its industrial relations department, it assisted the Treasury Department in drawing up a plan that would be best suited to its employes, and has seen to it that the plan functions smoothly. It co-operates with the Treasury through the use of government posters and other suggested types of promotion, and grants wide latitude to its employes in their own organization of various plant and departmental drives.

The latest issue of *US Steel News* provides an interesting insight into many of these activities, and is in itself an excellent job of war bond promotion.

American Brake Shoe Employes Pass 99% Mark in 4-Day Drive

More than 99 per cent of the employes of American Brake Shoe & Foundry Co., New York, pledged a total of 9.5 per cent of the company's gross payroll to the purchase of War Bonds as result of a recent four-day campaign.

The achievement is remarkable when the problems of organizing such a campaign are considered. This medium size company has 58 plants spread all over the country. The company believed it was important to keep expenses of the campaign at a minimum.

To meet this problem, a set of instructions or "plan book" was prepared by the home office and sent to each of the

The Brake Shoe bond campaign at Oakland, Calif., had a guard of honor from a nearby camp. Note Uncle Sam on the speakers' platform. At the microphone is a Treasury representative. Every employe signed up 10 per cent or more of his pay

Three employes at American Brake Shoe & Foundry Co.'s Jersey City plant watch the local War Bond manager fill in the Victory "V" poster to 9.2 per cent. One hundred per cent of the workers in this plant signed up for War Bond purchases

58 plants and major offices, with a set of key posters. A campaign manager was appointed for each plant and the whole procedure placed in his hands. His job was to adapt the master "plan book" to the situation encountered in his own plant and community.

A key part in the campaign was a 10-minute talk by a field representative of the Treasury Department. Company reports excellent co-operation was received in all districts from the Treasury, and officials believe the campaign was aided by having the War Bond purchase plan explained by government officials rather than by management.

Men selected to do the person-to-person solicitation were selected from the workwmen rather than from foremen or other supervisors wherever practical. In selecting the solicitors, the campaign managers tried to pick men who already were devoting 10 per cent of their income to the purchase of bonds under the payroll deduction plan.

Throughout the entire campaign an effort was made to avoid exerting any pressure on the employes. In fact, the last message from the home office to the 58 campaign managers was a telegram from William B. Given Jr., president, reading:

"In doing a good job on this week's War Bond campaign I know you will avoid putting undue pressure on any individual who may be unable to pledge the full amount requested. Good luck."

The company did not find it necessary to use any incentives in promoting the sale of bonds other than those of patriotism and self interest.

The campaign was aided by articles in the employe paper, *The Brake Shoe News*, and by the award of "minute man" flags, 10 per cent buttons, and similar recognition.

Two issues of the *Brake Shoe News* were devoted largely to promoting the drive. Typical of the inspirational editorials:

"Yes, our ultimate aim is victory.

"Our immediate aim is nothing more colorful or exciting than to save our money.

"We are all doing it now. But we are not doing enough of it. From each of us, Uncle Sam needs 10 per cent of our pay to go into the buying of War Bonds from him. You're right. There isn't the rush of patriotic feeling in the act of saving money that you get when you see columns of service men swinging along to martial music . . .

"But do you know that our part in the war is costing the United States government $1700 for one second? Multiply that by six months—six weeks—or just by sixty minutes . . . And—we have just begun to fight."

Men in this American Brake Shoe & Foundry Co. plant in Chicago listened intently as the War Bond story was told. Then they signed up for an average of 11.8 per cent of gross payroll

More Equipment Needed Now For War Program, Builders Warned

Personnel, materials and renegotiation of contracts loom as major problems at New York convention. . . Employment of women for factory work may alleviate manpower shortage

NEW YORK

RUMORS to the effect that the machine tool industry has completely caught up with all requirements of the war production program, were punctured during the forty-first annual convention of the National Machine Tool Builders' Association, held in Waldorf-Astoria, Oct. 5-6.

Every speaker, whether from the industry or representing the United States government, including the armed services, emphasized that with few exceptions more machine tools are needed and needed immediately. This need for many types of critical machine tools is so great that the facilities of some companies which have nearly caught up with demands for the less critical equipment may be swung over to help those whose backlogs still are so heavy that deliveries are dangerously far in the future.

It was revealed during the meeting that the seriousness of the situation so impressed Lieut. Gen. William Knudsen during a recent swing around the circuit of key war production plants, he returned to Washington with this urgent plea to the machine tool industry: "Put on at once a drive within your industry to clean up every backlog of machine tool orders within the next six months!"

This likewise was the gist of the talk by George C. Brainard, director, Tools Division, War Production Board, at the meeting.

This challenge was accepted in behalf of the association by George H. Johnson, its president. In commenting on the situation, he and several other speakers brought out the fact that from responsible sources within the government have come positive assurances in the event such a drive brings about the threat of idleness, or partial idleness in any machine tool plant, such facilities immediately will be switched to production of war *materiel* if they are not at once utilized by other machine tool builders through subcontracting.

In his address entitled, "Where Do We Stand", Mr. Johnson said: "Washington is considering what will happen to our respective companies when we will have completed the job of retooling America for war and have to settle down to the job of supplying only the machine tools necessary for such new projects as will most certainly develop in connection with the maintenance of the war production program.

"How far off this may be still is a question mark. Right now our industry has a backlog of over $1,000,000,000, representing on the average eight months' output on a full production basis. However, it must be realized that this industry average is not the situation in the case of many individual companies. The changed situation will come in some companies earlier than in others.

Face Manpower Shortage

"It is only reasonable to expect that excess plant capacity, where it develops, will be used for manufacture of parts for planes, tanks, guns or other munitions, or for manufacture of parts for other machine tool builders for whose products there long will continue extreme demands."

Aside from this matter of the future course of the industry as far as production is concerned, the three other most important considerations of the meeting were personnel, materials and renegotiation of contracts. Regarding personnel, it was the consensus of opinion that loss of manpower to the industry through the draft is destined to be far more severe than originally was expected or than many yet realize. Mr. Johnson summed this up when he said: "Our capacity to maintain maximum output already has been seriously handicapped by the draft situation. There appears to be no relief ahead of us in that quarter. In fact, it seems highly probable that as time goes on most of our eligible men under the age of 44—except those in key positions—will be drafted into the armed forces."

That in cases where key men are threatened by the draft, there may be some hope for relief, was indicated by Capt. E. R. Henning, Machine Tool Section, Army and Navy Munitions Board, Washington. However, Captain Henning emphasized that in altogether too many instances machine tool builders neglected to take proper steps early enough with their local and state boards before appealing to higher tribunals for retention of key men.

What should be done, he said, is to present carefully sifted lists of such key men well ahead of their call period, to the local boards; having these boards visit plants if necessary to see exactly what the situation is and what the machine tool industry means in the war program. Then if no satisfaction is gained locally there still will be plenty of time to take it up with the state board or with Washington if necessary. However, if all this is delayed until a man is called up, he will be in the service before anything can be done about it.

Captain Henning urged that lists be compiled of all important employes, giving their exact draft status, so that appropriate action in each case can be scheduled well ahead of call. Don't hope for too much, was the gist of Captain Henning's talk. Train more older men and more women. England is utilizing 35 per cent of women in machine tool plants. The record in the United States, showing less than 3 per cent as yet, certainly indicates a lot of room for improvement.

That women can be utilized effectively in machine tool plants in this country was stated by Wendell E. Whipp, president, Monarch Machine Tool Co., Sidney, O. Mr. Whipp, on the basis of his own experience, suggested that all companies in the industry immediately start to train a competent supervisor of women and to build the rest rooms required by women employes.

Women Help Solve Problem

Early last May, Monarch began to train such a "dean of women", and today—out of a total of 2600 employes—300 are women. They are performing satisfactorily on all but the heaviest work, and are working on all the shifts. As to their general effect, Mr. Whipp said: "I can tell you without any reservations that as far as our plant is concerned, the net result has been the stepping up of the morale of our entire organization."

As far as materials are concerned, assurances were given that insofar as is possible the needs of the machine tool industry will be met. However, when the total capacity of the country to fabricate materials exceeds the total supply of available raw materials, it is obvious that ingenuity in the choice of materials must be exercised and maximum economy in their use must be practiced, especially in the case of alloy steels, copper and zinc. The copper situation demands careful review of all electrical

John S. Chafee
President

Walter W. Tangeman
First Vice President

Fred H. Chapin
Second Vice President

David Ayr
Treasurer

requirements and care must be taken not to "overpower" machines. Needs of the industry for the fourth quarter are now being reviewed and "rationed materials" soon will be issued.

Ralph E. Flanders, president, Jones & Lamson Machine Co., Springfield, Vt., reviewed renegotiation of contracts, that is, recovery by the government of so-called "excess profits" through rebates or lower prices on future orders. He pointed to the danger of bringing about "another 1930" in the industry, if too much money is siphoned out of it through taxes and rebates after its peak period has passed. He made the amazing statement that right now the solvency of the industry rests entirely on its pool orders. Therefore this pool order protection must be preserved by every possible means. The renegotiation situation at the moment is in such a state of flux that until the effect of current operations by the government on a group of "business guinea pigs" is known, not much of positive nature can be said about it.

Freas M. Long, export sales manager, Gisholt Machine Co., Madison, Wis., reported that on a recent trip to England he found widespread appreciation for the great help rendered to Great Britain by the American machine tool industry. Deliveries by British machine tool builders average ten months, but some critical machines are not available before 15 or 16 months. They have jumped production four to one, whereas the American industry has jumped it seven to one. Much more of the British facilities have been needed for direct war production, workers have had to go into the armed forces, and bombing has hampered operations in England.

New officers of the association:

President, John S. Chafee, vice president and assistant secretary, Brown & Sharpe Mfg. Co., Providence, R. I.; first vice president, Walter W. Tangeman, vice president, Cincinnati Milling Machine Co., Cincinnati; second vice president, Fred H. Chapin, president, National Acme Co., Cleveland; treasurer, David Ayr, president and general manager, Hendey Machine Co., Torrington, Conn. New directors: Mr. Tangeman, Mr. Chapin and Joseph L. Trecker, vice president of Kearney & Trecker Corp., Milwaukee.

Value of 29,100 new machine tool units shipped during August was $117,442,000, according to WPB. During July, 28,300 units valued at $113,600,000 were shipped.

Production of machine tools has reached a rate of more than $1,400,000,000 a year. Last year the value of machine tools was about $771,400,000 and the present going rate represents an increase of approximately 83 per cent.

Compared with the same month of last year, the August value of machine tools is also an increase of 83 per cent.

Cold Forging Process Facilitates Change to Steel Cartridge Cases

CHANGEOVER from brass to steel cartridge cases for all types of fixed artillery ammunition will be complete by the end of the year, according to the War Department.

Maj. Gen. Levin H. Campbell Jr., chief of ordnance, Army Services of Supply, credits the Ordnance Steel Cartridge Case Industry Integrating Committee with the accomplishment, which he describes as "amazing."

"This job," he said ,"would have taken from three to four years in peacetime. In war, it's been done in six months."

Every committee member, with the exception of Ordnance Department officer members, is an executive or engineer of one of the more than two score industries manufacturing steel cartridge cases. A majority of these companies is already in mass production of steel cases.

The cases range in size from 20 to 105 millimeters. Larger caliber cannon use separate loading ammunition, wherein the smokeless powder propelling charges are in bag containers.

Substitution of steel for brass in the manufacture of artillery cartridge cases—a major development of ordnance—is part of a broad Army conservation program, made necessary by huge war demands on critical materials.

General Campbell said the United States leads the world in the development of steel cartridge cases. He pointed out that one factor which had speeded the changeover is the perfection, "almost overnight" of a cold-forging process which turns out cartridge cases in a matter of minutes. Only two minor machine operations then remain before the case is ready for shipment to a loading plant.

"The committee," General Campbell said, "has worked this out so you take a disk of cold steel and without heating it at all, in less than half a dozen operations, wind up with a completely forged steel case."

Members of the Steel Cartridge Case Industry Integrating Committee, which has its headquarters in Cincinnati, and industries with contracts for steel cartridge cases follow:

Chairman, Brig. Gen. . E. Hardy; deputy

(*Please turn to Page* 132)

Third Quarter Steel Production Second Highest in History

STEEL production in third quarter reached the second highest quarterly total in history, according to the American Iron and Steel Institute.

The total of 21,449,359 tons produced in the three-month period just ended came within a fraction of a percentage point of the record 21,531,358 tons produced in the second quarter of the year, and exceeded by 827,000 tons, or 4 per cent, output in the third quarter of 1941.

Over the first nine months of this year, 64,019,606 tons of steel have been produced, 4 per cent above production in the corresponding period of last year. The nine-months total for this year exceeds the tonnage produced in any whole year prior to 1940, including the years of World War I.

Output in the month of September 1942 was 7,067,084 tons, equivalent to 96.5 per cent of capacity. In August, a longer month, production totaled 7,233,451 tons, or 95.4 per cent of capacity. Output in September 1941 amounted to 6,811,754 tons, 96.3 per cent of the smaller capacity then available.

An average of 1,651,188 tons of steel per week was produced in September, compared with 1,632,833 tons per week in August and 1,591,531 tons per week in September a year ago.

STEEL INGOT STATISTICS

	Estimated Production—All Companies								Calculated weekly production, all companies	Number of weeks in month
	—Open Hearth—		——Bessemer——		——Electric——		——Total——			
	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	
Based on Reports by Companies which in 1941 made 98.5% of the Open Hearth, 100% of the Bessemer and 87.8% of the Electric Ingot and Steel for Castings Production										
1942										
Jan. .	6,328,128	95.4	490,864	86.0	305,930	96.3	7,124,922	94.7	1,608,335	4.43
Feb. .	5,791,813	96.7	453,543	88.0	275,700	96.2	6,521,056	96.0	1,630,264	4.00
Mar. .	6,574,701	99.1	493,294	86.4	324,916	102.3	7,392,911	98.2	1,668,829	4.43
1st quar	18,694,642	97.0	1,437,701	86.7	906,546	98.3	21,038,889	96.3	1,635,994	12.86
April .	6,346,707	98.8	454,583	82.2	321,023	104.4	7,122,313	97.7	1,660,213	4.29
May .	6,600,376	99.5	454,054	79.5	332,460	104.7	7,386,890	98.2	1,667,470	4.43
June .	6,247,302	97.2	452,518	81.8	322,335	104.8	7,022,155	96.4	1,636,866	4.29
2nd qtr	19,194,385	98.5	1,361,155	81.2	975,818	104.6	21,531,358	97.4	1,654,985	13.01
1st half	37,889,027	97.8	2,798,856	83.9	1,882,364	101.5	42,570,247	96.9	1,645,545	25.87
July . .	6,350,047	95.7	453,684	79.6	345,093	96.3	7,148,824	94.5	1,617,381	4.42
Aug. .	6,420,496	96.6	467,313	81.8	345,642	96.3	7,233,451	95.4	1,632,833	4.43
Sept. .	6,297,201	98.0	437,950	79.4	331,933	95.7	7,067,084	96.5	1,651,188	4.28
3rd qtr.	19,067,744	96.8	1,358,947	80.3	1,022,688	96.1	21,449,359	95.5	1,633,615	13.13
9 mos.	56,956,771	97.4	4,157,803	82.7	2,905,032	99.5	64,019,606	96.4	1,641,528	39.00
Based on Reports by Companies which in 1941 made 98.5% of the Open Hearth, 100% of the Bessemer and 87.8% of the Electric Ingot and Steel for Castings Production										
1941										
Jan. .	6,274,780	99.0	451,806	76.0	195,766	89.1	6,922,352	96.8	1,562,608	4.43
Feb. .	5,669,425	99.1	378,536	70.5	182,393	91.9	6,230,354	96.5	1,557,589	4.00
Mar. .	6,457,641	101.9	460,225	77.4	206,137	93.8	7,124,003	99.6	1,608,127	4.43
1st quar	18,401,846	100.1	1,290,567	74.8	584,296	91.6	20,276,709	97.7	1,576,727	12.86
April .	6,137,613	100.0	395,056	68.6	221,510	104.1	6,754,179	97.6	1,574,401	4.29
May . .	6,362,245	100.4	444,079	74.7	238,241	108.4	7,044,565	98.5	1,590,195	4.43
June .	6,098,171	99.4	458,848	79.7	235,732	110.8	6,792,751	98.1	1,583,392	4.29
2nd qtr	18,598,029	100.0	1,297,983	74.3	695,483	107.8	20,591,495	98.1	1,582,744	13.01
1st half	36,999,875	100.0	2,588,550	74.6	1,279,779	99.7	40,868,204	97.9	1,579,753	25.87
July . .	6,085,100	94.4	489,297	85.0	237,827	85.7	6,812,224	93.3	1,541,227	4.42
Aug. . .	6,244,353	96.6	495,761	85.9	257,382	92.6	6,997,496	95.6	1,579,570	4.43
Sept. . .	6,054,418	96.9	500,768	89.8	256,568	95.5	6,811,754	96.3	1,591,531	4.28
3rd qtr	18,383,871	96.0	1,485,826	86.9	751,777	91.2	20,621,474	95.1	1,570,562	13.13
9 mos.	55,383,746	98.6	4,074,376	78.6	2,031,556	96.4	61,489,678	96.9	1,576,658	39.00
Oct. . .	6,423,329	99.4	533,060	92.4	279,679	100.6	7,236,068	98.9	1,633,424	4.43
Nov. . .	6,194,679	99.0	488,822	87.5	277,384	103.0	6,960,885	98.2	1,622,584	4.29
Dec. . .	6,387,865	99.0	481,813	83.7	280,637	101.2	7,150,315	97.9	1,617,718	4.42
4th qtr.	19,005,873	99.1	1,503,695	87.8	837,700	101.6	21,347,268	98.3	1,624,602	13.14
Total. .	74,389,619	98.8	5,578,071	80.9	2,869,256	97.9	82,836,946	97.3	1,588,741	52.14

The percentages of capacity operated in the first six months of 1941 are calculated on weekly capacities of 1,430,102 net tons open hearth, 134,187 net tons bessemer and 49,603 net tons electric ingots and steel for castings, total 1,613,892 net tons; based on annual capacities as of Dec. 31, 1940 as follows: Open hearth 74,565,510 net tons, bessemer 6,996,520 net tons, electric 2,586,320 net tons. Beginning July 1, 1941, the percentages of capacity operated are calculated on weekly capacities of 1,459,132 net tons open hearth, 130,292 net tons bessemer and 62,761 net tons electric ingots and steel for castings, total 1,652,185 net tons; based on annual capacities as of June 30, 1941 as follows: Open hearth, 76,079,130 net tons, bessemer 6,793,400 net tons, electric 3,272,370 net tons.

The percentages of capacity operated in the first six months of 1942 are calculated on weekly capacities of 1,498,029 net tons open hearth, 128,911 net tons Bessemer and 71,682 net tons electric ingots and steel for castings, total 1,698,622 net tons; based on annual capacities as of Jan. 1, 1942 as follows: Open hearth 78,107,260 net tons, Bessemer 6,721,400 net tons, electric 3,737,510 net tons. Beginning July 1, 1942, the percentages of capacity operated are calculated on weekly capacities of 1,500,714 net tons open hearth, 128,911 net tons bessemer and 81,049 net tons electric ingots and steel for castings, total 1,710,674 net tons; based on annual capacities as follows: Open hearth 78,247,230 net tons, bessemer 6,721,400 net tons, electric 4,225,890 net tons.

Inland Structural Mill Makes New High Mark

Inland Steel Co., Chicago, made new 24-hour and eight-hour records Sept. 22-23 on the 28-inch structural mill at Indiana Harbor, Ind. In 24 hours 12.8 per cent more 12-inch channels were rolled than in any previous similar period. The former all-time record was made June 18. An eight-hour rolling record was also established, 10.6 per cent above best prior performance.

During the same period the finishing department exceeded by 32 per cent its former cutting record for 24 hours and by 30 per cent for an eight-hour period.

J & L Sets New Output Records in September

Jones & Laughlin Steel Corp. set a new record for steel production on its No. 18 rolling mill at the Pittsburgh works in September. In the 30 days of that month production was 12½ per cent greater than the previous high mark made in the 31 days of August.

Other departments set new company records. The Pittsburgh and Aliquippa blast furnace departments had the best daily average performance in the history of the company; the Hazelwood polishing mill at Pittsburgh broke its previous record of March, 1941; the electric casting department at Otis works, Cleveland, broke its prior mark of May, 1942; No. 26 open hearth at Otis works exceeded its July, 1942, production; acid open-hearth department at Lakeside plant of Otis works broke its prior record of April, 1942.

Republic To Light New Stack at Youngstown

Republic Steel Corp. will blow in its new blast furnace stack at Youngstown, O., Oct. 12, Governor John W. Bricker of Ohio to apply the torch. The stack will have capacity for more than 400,000 tons of pig iron annually. This is the first completely new stack built in the Mahoning Valley since 1921, though several have been rebuilt and enlarged since the beginning of the war.

The stack was built by Defense Plant Corp. and leased to Republic, as also

was a stack at Gadsden, Ala., recently lighted.

Production Rally Shows Need For More Coal; Miners Quit

Less than 24 hours after a government-sponsored demonstration showing the need for increased anthracite production, 1300 men employed in the Susquehanna Collieries Co.'s mine at Glenlyon, Pa., refused to take their posts on the grounds that the company was cutting rates.

William Weinick, superintendent, denied the rate-cutting charge. He said due bills had not been accepted in some cases, but adjustments had been made. Referring to another complaint of the miners, that company had discriminated against local applicants for jobs, Mr. Weinick stated that the only men to whom employment had been refused were those seeking special places.

5,000,000 Women Must Enter Industry in 1943, McNutt Says

Over 5,000,000 women must be added to the total now employed by the end of 1943, Paul V. McNutt, chairman, War Manpower Commission, has informed the commission's new Women's Advisory Committee.

Four-fifths of all war jobs can be performed by women and their employment is an immediate necessity in some war production centers because overburdened housing and transportation facilities will not permit further in-migration of outside workers, Mr. McNutt stated.

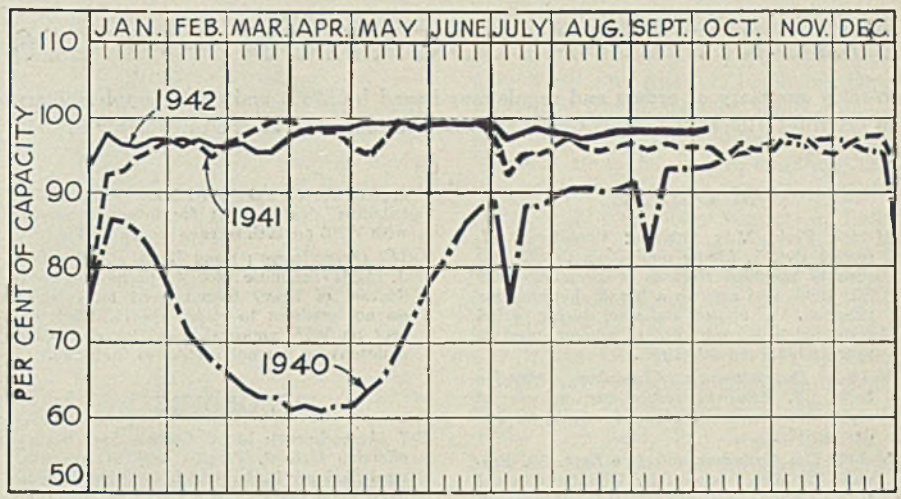
The womanpower problem, he added, goes far beyond signing women up for jobs. It includes training, plant living arrangements for women, and revision of industrial processes to increase the number of jobs they can perform.

The Women's Advisory Committee was appointed early last month to consider important questions concerning the War Manpower Commission program for effective use of women in the war effort.

Taxes vs. Profit

Carpenter Steel Co., Reading, Pa., reports net income for fiscal year ended June 30, 1942, as $1,711,601, after all charges, including $5,162,694 for federal income and excess profits taxes and $800,000 for contingencies. This compares with $2,011,625 in previous year after federal taxes of $2,317,260.

Orders booked by General Electric Co., Schenectady, N. Y., during the third quarter amounted to $474,080,000, an increase of 53 per cent over the same three months last year.



STEEL . . . . . UP

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week advanced ½-point to 98½ per cent. Five districts increased output, two declined and five were unchanged. A year ago the rate was 94½ per cent; two years ago it was 94½ per cent; both computed on the basis of capacity as of those dates.

Chicago—Steelmaking remained at 102½ per cent for the fourth consecutive week, scrap supply being better. Carnegie-Illinois Steel Corp. relighted its South Chicago No. 3 blast furnace Sept. 30 after being out since Aug. 7 for relining.

St. Louis—Relighting of an open hearth after repairs increased production 3 points to 94 per cent.

Detroit—Advanced 1 point to 94 per cent.

Pittsburgh—Small additions to active equipment advanced the rate 1 point to 97½ per cent.

Wheeling— Down ½-point to 84½ per cent.

Buffalo—Continued at 90½ per cent as open hearths taken off for repair balanced those returned to service.

Cleveland—Increased activity by two interests caused the rate to rise 2 points to 94½ per cent.

Youngstown, O.—Three bessemers and 75 open hearths are active, the rate remaining at 95 per cent for the fourth week. Scrap supply is better but the labor situation is acute. Republic Steel Corp. blows in its new 1200-ton blast furnace Monday.

Cincinnati—Advanced 7 points to 95 per cent as the leading interest engaged all open hearths. Another will add to active units this week.

Birmingham, Ala.—Unchanged at 95 per cent with 23 open hearths in production.

New England—Relining and repairs to open hearths reduced the rate 10 points to 90 per cent.

Central eastern seaboard—Sufficient scrap supply maintained production unchanged at 96 per cent.

District Steel Rates

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended Oct. 10	Change	Same week 1941	Same week 1940
Pittsburgh	97.5	+ 1	99	88.5
Chicago	102.5	None	90.5	98
Eastern Pa.	96	None	93	93
Youngstown	95	None	98	88
Wheeling	84.5	—0.5	96	97
Cleveland	94.5	+ 2	98	88
Buffalo	90.5	None	93	90.5
Birmingham	95	None	95	97
New England	90	—10	90	92
Cincinnati	95	+ 7	82	90
St. Louis	94	+ 3	83	82.5
Detroit	94	+ 1	91	96
Average	98.5	+0.5	°94.5	°94.5

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

Lukens Steel's 12-Months' Sales Nearly $40,000,000

Sales by Lukens Steel Co. and subsidiaries, Coatesville, Pa., approximate $40,000,000 for the fiscal year ending Oct. 10, according to Robert W. Wolcott, president. Bookings are now at the rate of $60,000,000 annually, he said.

Orders for steel boilers booked during August numbered 893, compared with 1091 in July and 1244 in August, 1941, the Bureau of the Census reports. Cumulative orders for eight months total 10,948 units, compared with 10,101 in the same period in 1941.

PRIORITIES—ALLOCATIONS—PRICES

Weekly summary of orders and regulations issued by WPB and OPA, supplementary to Priorities-Allocations-Prices Guide as published in Section II of STEEL, July 6, 1942

M ORDERS

M-200: Fluid Milk Shipping Containers, effective Oct. 1. Limits production to 850,000 cans of specified sizes in year ending June 30, 1943, and sets up a broad simplification program. Use of iron and steel during period restricted to 35 per cent of amount used in year ended June 30, 1942.

M-18-b (Amendment): **Chromium,** effective Sept. 30. Removes restrictions on use of chromium chemicals. Limits inventory to 30-day supply.

M-233: Gas Cylinders, effective Sept. 30. Provides for direct control by Director General for Operations until Jan. 1, 1943, after which production will be permitted only as specifically directed. Producers must file PD-662 on 25th of each month showing production and delivery schedules for third following month.

M-115 (Amendment): **Collapsible Tubes,** effective Oct. 6. Reduces tin content in toothpaste tubes from 7.5 per cent to 5 per cent; and in shaving cream tubes from 7.5 per cent to 1.5 per cent, except blanks or tubes which had been completed by Oct. 5.

M-6-b (Amendment): **Nickel,** effective Oct. 3. Restricts use, except where specifically authorized, to implements of war and other products certified by Army-Navy Munitions Board.

L ORDERS

L-41-b (Amendment): **Construction,** effective Oct. 2. Permits certain types of construction using non-metallic materials and equipment designed to insulate buildings without specific authorization, if begun prior to Jan. 1, 1943. Extends to entire country limited exceptions granted to construction necessary to conversion of heating equipment to permit use of fuel other than oil, electricity and gas.

L-64-a: Burial Equipment, effective Oct. 2. Bans sales by manufacturers of caskets of specified measurement which contain more than 25 per cent iron or steel by weight, except for authorized uses. Caskets which permit half or full display of a body are exempt. Manufacturers must file PD-590 by Nov. 15 with WPB.

L-71 (Amended): **Flashlights,** effective Oct. 3. Bans use of aluminum, crude rubber, chromium, cadmium, nickel, tin, copper or copper base alloy zinc, iron or steel in making dry cell batteries or cases, except: tin contained in solder; copper wire for electrical conductors in batteries and brass for plating any electrical contact; zinc for plating and in die cast fittings, electrical contact fittings, battery shells and reflectors; iron and steel in any part of electric railroad lantern or other portable electric light, or in following parts of flashlights and batteries: reflectors, electrical contact fittings, switches, eyelets, rivets, screws, caps, springs, ferrules, lens rings, battery carbon caps, and in grommets and ferrules for containers. Until Nov. 1 copper and copper base alloy in inventory before Oct. 3 may be used in electrical contact fittings; tin plate, terne plate, or tinned copper wire in electrical contacts in batteries; and iron and steel in battery outer jackets and battery top and bottom seals. Cuts civilian production and places deliveries under strict control.

L-182: Commercial Cooking Equipment, effective Oct. 1. Restricts use of iron and steel in production of some types of cooking equipment 75 per cent, based on 1941 total. Production of other specified types is completely prohibited. Sales of both new and used cooking equipment to restaurants, cafeterias, cafes, and similar establishments, is prohibited except with specific authorization applied for on PD-638A. Manufacturers, distributors, dealers must file inventory reports with WPB on 10th of each month on PD-638.

L-157 (Amendment): **Hand Tools,** effective Oct. 3. Adds Schedule No. 4, prohibiting production of heavy forged hand tools which do not conform to stated specifications, except on WPB approval. Parts for repair and maintenance are not subject to limitations.

E ORDERS

E-7 (Amendment): **Metal Cutting Saw Blades,** effective Oct. 6. Permits sale of low-alloy steel hacksaw blades which are used in ordinary hand frames. Hacksaws containing no alloying elements other than specified percentages of molybdenum and tungsten may be delivered without preference rating. Limit on tungsten is 1.25 per cent and limit on molybdenum is 0.75 per cent. Blades cannot be more than 0.025 inches thick or more than 12 inches long.

P ORDERS

P-68 (Amendment): **Steel Plant Maintenance,** effective Oct. 3. Assigns to producers of iron, steel, ferro-alloys and blast furnace coke ratings of AA-2X for operating material consisting of fabricated metal parts, lumber and all metals appearing on revised materials list of PD-25A; A-1-a for all other operating material.

PRICE REGULATIONS

No. 36 (Amendment): **Acetone,** effective Oct. 3. Fixes maximum prices for sales of acetone in containers of 50 gallons or more in the Eastern territory at 7.00c per pound, delivered tank cars; 8.5c in drums, carload lots; 9.00c in drums, less than carload lots.

No. 37 (Amendment): **Butyl Alcohol,** effective Oct. 3. Fixes maximum prices for butanol, in cents per pound, delivered in Eastern territory at: 14.5 in tank cars, 15.5 carloads in drums, and 16.0 less than carloads in drums.

No. 136 (Amendment): **Machines and Parts,** effective Oct. 8. Provides pricing method for siren blowers on basis of price determining methods, labor rates, machine-hour rates and material prices in effect on March 31, 1942.

PRIORITIES REGULATIONS

No. 3 (Amendment): Effective Oct. 3. Removes restriction on extension of ratings for only those operating supplies actually consumed in processing production materials to which the same ratings were applied. Permits a non-PRP unit to extend ratings for operating supplies in any month up to 10 per cent of cost of production materials to which the same ratings are extended during the month. Items for repair of production machinery are included in definition of operating supplies.

No. 11 (Amendment): Effective Oct. 3. Grants PRP units privilege of extending ratings served on them, instead of using the rating assigned on their PRP certificates to obtain materials not included in the materials list accompanying the PRP application. Endorsement of this extension method must be made by seventh business day after receipt of fourth quarter PRP certificate. Requires PRP units to reduce outstanding orders to amounts authorized, within five days after receipt of fourth quarter certificate, or on Oct. 10, whichever is later.

No. 12 (Amendment): Cancels permission granted PRP units to revise their own "rating pattern" twice a month on basis of rating appearing on their unfilled orders, effective for each PRP unit when it receives its PRP certificate for the fourth quarter.

Steel Recovery Corp. Moves To Redistribute Idle Inventories

FIRST step in WPB's steel recovery program, involving the purchase and redistribution of millions of tons of iron and steel products, was started last week with the mailing by the Steel Recovery Corp. of the first of 200,000 inventory certification forms to known and presumed holders of steel stocks rendered idle or excessive as the result of WPB orders and regulations.

Much of the iron and steel that soon will be directed into essential war production is available as the result of the series of orders, issued during the past few months, curtailing or eliminating use of these materials in the manufacture of hundreds of articles of everyday use.

The report forms now being mailed are simple one-page sheets on which recipients will indicate whether they hold steel inventories and, if so, the types of iron and steel of which they consist. Following receipt of this information, WPB will mail detailed questionnaire forms to cover each type reported, together with schedules of prices to be paid by the government for material needed for the war effort.

Forms now being mailed must be completed and returned to WPB, Steel Recovery Corp., 5835 Baum Boulevard, Pittsburgh, not later than five days after their receipt.

Officials of WPB's Materials Redistribution Branch emphasize the immediate need of steel in war industries, and point out that owners are permitted by Priorities Regulation No. 13 to sell directly to qualified users. They urge that those holding needed materials in idle or excessive inventories institute an immediate and intensive hunt for such customers.

In cases of direct sale, the owner receives the going price for his property and war industry benefits by speedy delivery of material which can be used

in its present form. In this connection, it was pointed out that while government prices will be considerably above scrap prices, they will not equal the value of fabricated material, if the material must be remelted before it can take its place in the war effort. Scrap metal, as such, will not be purchased by the government and should be disposed of through authorized dealers.

As an aid to direct transfers, the Steel Recovery Corp. will endeavor, wherever practicable, to bring together owner and potential buyer.

The Steel Recovery Corp. will carry out the purchase and redistribution program arranged by WPB and, as agent for Metals Reserve Co., will handle all fiscal matters involved in the thousands of transactions.

For further news of the idle metals recovery program, see Page 48.

Producers Directed To Set Aside Definite Tonnages for Warehouses

WAR PRODUCTION BOARD is sending out directives to producers of iron and steel products ordering them to set aside definite tonnages for shipment to warehouse distributors. Some of the directives, effective Oct. 1, already have been sent out and remainder either are in the mails or will be in the next few days.

Items covered include hot-rolled carbon bars, plates, structural shapes, hot and cold-rolled sheets, cold-finished bars and all qualities of alloy steel. Producers of buttweld and electrically-welded pipe also have been directed to ship supplies to distributors for maintenance and repair purposes on the basis of 1940 shipments.

As explained by an official of the Warehouse Unit of the WPB Iron and Steel Branch, the directives issued to various mills are purely of an emergency character and are designed to "give some relief". The material will be allocated as equitably as possible among warehouses distributing steel to companies busy on war work.

In the case of pipe, distributors will get 25 per cent of the tonnage received in 1940 on the basis of 6¼ per cent per quarter for four quarters beginning Oct. 1, 1942. The percentage setup applies only to distributors handling more than 320 tons annually. Those handling 320 tons or less will receive one minimum carlot of 20 tons where receipts in 1940 amounted to no more than 80 tons, two minimum cars where receipts ranged from 81 to 160 tons, three carlots where the range was 160 to 240 tons and four cars where the range was 241 to 320.

Pipe may be applied against ratings as low as A-10 for maintenance and repair work. Pipe stocks had dropped sharply for the reason that the warehouse basic A-3 rating had not been sufficiently high for stock replacements. In fact, most distributors have been relying on PD-83-g extensions carrying higher ratings for such tonnage as they have been able to obtain.

The problem of keeping adequate supplies of steel in the hands of distributors has been exceedingly perplexing for the WPB as well as the armed services. All the war agencies have become increasingly cognizant of the important position the warehouses hold in the steel distribution picture. Larger as well as smaller consumers draw regularly on the warehouses for material. This was recognized recently in Washington through the appointment of more than a dozen firms as official distributors of earmarked alloy steels for the aircraft industry.

It was emphasized that the new directives now being sent to steel producers will not affect the overall priority status of the warehouse industry. In other words, warehouses will find it necessary to apply steel received under the directives against high-rated orders on their books and the basic rating for replacing stocks is not changed in any way.

Present action supplements measures taken last August when the WPB director general for operations sent directives to steel producers reading in part as follows:

"Orders placed with you by warehouses prior to Aug. 15, 1942 and bearing ratings higher than A-1-k duly extended on Form PD 83-g as authorized by Supplementary order M-21-b are hereby rerated AA-3.

"The foregoing applies to all steel and iron producers except structural shapes and piling, plates, hot-rolled bars (carbon), hot-rolled bars (alloy), cold-finished bars (carbon) and cold-finished bars (alloy) and pressure and mechanical tubes. Receipt of this notice constitutes an effective application of new ratings."

It will be noted that the new directives now being sent out cover items not included above which took a AA-3 rating for August and September.

SCRAP DRIVE EXTENDS EVEN TO BANKS

NEW YORK: Sixteen tons of scrap metal, which included 19 safes, old file cabinets and other odds and ends in the Greenwich Savings Bank, Thirty-sixth and Broadway, were turned over to the scrap collector. Much of the equipment was still serviceable. The national house-cleaning will mean just so much more steel will be required after the war for replacements. NEA photo

WINDOWS of WASHINGTON

Frozen and idle metals stocks will be redistributed by War Production Board. Holders should familiarize themselves with procedure for directing excessive inventories into war channels

ALL holders of idle, frozen inventories or excessive materials should familiarize themselves, if they have not already done so, with the setup created by the War Production Board for liquidating these materials and making them available for use in war production. All of these materials are needed for the war effort and the War Production Board is determined that they be used for that purpose.

The agency created by the War Production Board to locate and redistribute to war use these idle and excessive materials is the Materials Redistribution Branch, with headquarters in Temporary "S" Building, Sixth and Jefferson Drive, Washington. The branch has sent out hundreds of thousands of questionnaires to locate idle and excessive inventories. They are sent to manufacturing and warehousing companies, or to any other agency or individual where a surplus or idle inventory might exist. Just as an example, the branch covers even inventories once destined for export and now frozen in docks and warehouses.

How the branch works in co-operation with other government agencies may be described as follows: For example, in the case of copper, aluminum, magnesium —and some steel—special "recovery" programs are instituted. Under these recovery programs firms holding idle or excessive inventories must report them. Every attempt is then made to move the material in "as is" form at market prices. If no "as is" buyer can be found within a reasonable period of time, the holder is then requested to sell at the official government price schedule.

The business details of the copper recovery program, for example, are handled by the Copper Recovery Corp. acting as agent of the Metals Reserve Co., an RFC corporation. The corporation purchases, arranges the sales of materials for re-melt, and also handles shipping details. The corporation works in co-operation with the Materials Redistribution Branch, and the Copper Branch of WPB. The Copper Branch, for example, directs all allocation, and has a special set up to aid in locating materials in "as is" form for war plants, and arranging special sales, at market prices, with holders.

One-Third Hold Up Reports

Many companies, in the copper program for instance, have not yet reported their frozen and idle inventories. The branch is making an investigation of these cases and it proposes to take action to eliminate these delays.

"About two-thirds of the companies questionnaired reply promptly," says a spokesman for the Materials Redistribution Branch. "The other one-third are slow or inaccurate in their reporting. They quibble for a number of reasons. They say our forms are too complicated, or they object to the government prices. Some companies after reporting complain because we do not take over the material promptly enough.

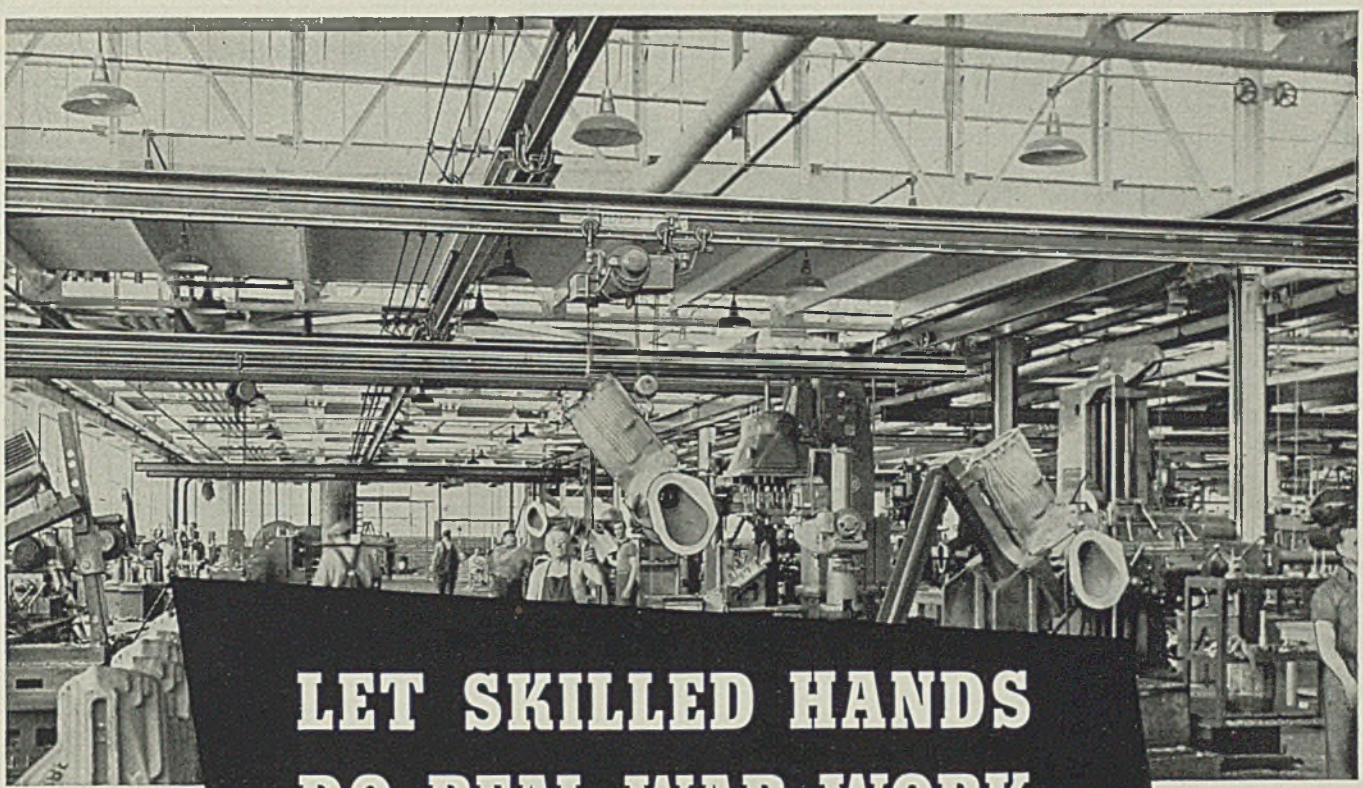
"It is true that we do not always take over all the materials as fast as they are offered. That is because a frozen stock of a fabricated or semifabricated material is not taken until it is found no "as is" user can be located. Our practice is to send copies of these inventories out to all procurement offices that might be interested. As a result, buyers with sufficiently high priorities are found for a large percentage of the items listed. If no buyer for the material "as is" is found within a reasonable period we then offer to buy the material at government prices for remelting to war use.

"As to the forms used: In the case of copper, for example, we have to allow space for the exact identification of the product and the compilation of the metal. Without this detail the reports would be useless. Actually the holders of the idle inventories get a break from these detailed reports inasmuch as the government prices on copper vary in accordance with the forms of the material, so that the holder receives the best prices to which he is entitled. Furthermore, an "as is" buyer cannot be found for a material that is not clear as to detail. It is urgently recommended that holders of inventories fill out forms carefully even though we realize that in many cases it is a burden for them to do so. For example, it is not enough to report that 100 tons of 'copper' are in stock; we have to know what kind of copper and in what form it is. Instructions should be followed carefully. Needless correspondence costs both the government and the holder time and money. Even when a holder does not have an inventory, he must still return the report.

"About two-thirds of the companies that report take a very fine attitude about government prices. Their attitude is substantially: 'Fine; you take over our frozen material at your price and we will write off the loss, if any, as a war loss and forget about it'. But the other one-third are inclined to go slow, or fill out forms carelessly, or fail to file them. Some companies are very patriotic until they find they must take a loss on their inventories.

"The fact is that the government is paying much more for this material than its actual scrap value under war-time restrictions. Our investigations show that the United States is the most liberal country in the war in paying for such material. The Germans, as also the British, are very tough. Government prices

GET THE POINT? Government spokesmen say voluntary co-operation in redistribution of idle stocks will be better than requisitioning, and services of U. S. marshal



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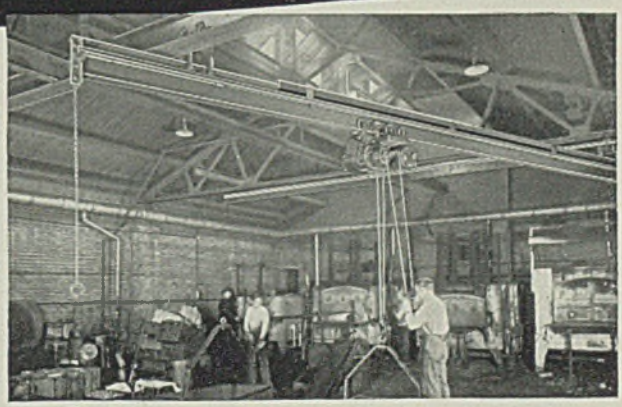

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in the United States on surplus inventories are such as to cause the government to lose, proportionally, several millions more than holders in many instances.

"The case may be mentioned where a quantity of copper sheet cost a company 26 cents per pound. The government bought this sheet at 22 cents. The company complained that this was 'highway robbery'. It did not take into consideration that the government lost 13 cents a pound in this transaction because it had to resell the sheet as scrap at 9 cents.

"The inventory holder can enjoy market prices by selling the stock 'as is' to a war producer under Priorities Regulation No. 13. Or, he can apply to the nearest War Production Board branch office, and if the proposed end-use of the material makes sense for the war program he usually can get approval to move the material.

"The simple fact," continued this spokesman, "is that war brings hardships. The government would go into bankruptcy if it were to attempt to reimburse all losses resulting from the war. In war some people fare very well, some moderately well and some fare very badly. There isn't any way to get around that. Manufacturers who complain about the government prices should look around them. They will see lots of men losing their businesses. They will see many men going from highly paid into low salaried jobs. They will see hundreds of thousands of men leaving good jobs to go into the armed forces. That should give them a more philosophical attitude toward selling surplus materials at government prices. If we don't win the war nothing—including life itself—will have value."

Prefers Voluntary Co-operation

It will be a big help to the Materials Redistribution Branch if manufacturers in reporting their surplus stocks will indicate plainly on the form their willingness to sell at the government prices. While this is not legally necessary, it simplifies matters as the Materials Redistribution Branch does not wish to exercise its requisitioning powers. It prefers to have voluntary, democratic cooperation. In addition, it points out that requisitioning leads to delay and can be costly to all concerned. For example, the services of a United States marshal are necessary and in many cases packing and shipping is done by the government. Even though the government charges these packing and shipping charges against the holder of the material it prefers not to incur these extra complications. Hence there will be no requisitioning unless indifference on the part of inventory holders makes this necessary.

To date some 29,700,000 pounds of copper and copper base alloy material have been cleared out of immobilized stocks. The steel recovery program, soon to be in operation, is expected to move at least 1,500,000 tons of steel to war use. In many instances the transfer of these materials has kept war production lines going when they were within hours of shutdowns.

Steel Procurement More Difficult

There are signs that a large number of manufacturers who up to this time have had right-of-way in the war production program soon will face a red light.

Within the last few days a manufacturer of machine tool collets lost a substantial supply of steel to a munitions manufacturer requiring steel of the same type. A great deal more of this sort of thing is expected.

There are a number of signs that we now are close to the peak of the tooling-up stage of war production. An example of the current trend was reflected in the recent change in the priorities setup to permit re-ratings. It will be recalled that the new AA-1, AA-2 and AAA ratings were reserved to the armed forces and that contractors and subcontractors were permitted to re-rate to AA-3 and AA-4.

Quite a few contractors and subcontractors, even though many of them followed advice given to them by government procurement officers, shortly found themselves in trouble because of re-rating orders not eligible for re-rating. In one case in point a subcontractor had re-rated a turret lathe order from A-1-a to AA3. This gave him a higher rating than that enjoyed by the Army and Navy which had not re-rated turret lathes above A-1-a.

Rerating was made permissible only on material or parts going into guns, ammunition, bombs and vehicles for getting them into action against the enemy. Re-rating was not permissible in connection with machinery and facilities for making such goods.

As another example, a steel company could re-rate an order for an item needed in actually maintaining steel production, whereas it could not re-rate if the item came into the classification of equipment.

Weapons Above All Else

The new system of scheduling in order to have balanced production of all weapons of war automatically guarantees that after our available materials have been earmarked for each munitions program there will be comparatively little left over for other uses even though many of them might be considered as of importance. All old considerations are out the window and production of actual weapons is to be the maximum we can get with the materials to be had. It is for this reason that many producers of industrial equipment are having a continually more difficult problem of steel procurement.

There is another factor that has to be considered. That is that capacity of many plants to produce weapons of war is far above original expectations. Because of this condition there shortly

STABILIZATION CHIEF

APPOINTED Director of Economic Stabilization by the President, Supreme Court Justice James F. Byrnes arrives at the White House to discuss national policy for prices, rents, wages, salaries, profits, rationing and government subsidies. NEA photo

will accumulate in many of these plants a large inventory of idle machines and facilities available for transfer to other work. That condition automatically will reduce the pressure for many new machines and much equipment not yet built.

This picture is one that many industrial managements should examine. Such study should include due consideration of the coming pinch in the labor supply, in transportation, in all sorts of goods and services. Many of them will do well to examine how they too, after the tooling-up peak has been passed, can keep their plants going and their organizations together by converting to something that can be shot at the enemy.

Sample Shipments of NE Steels Permitted

To facilitate the delivery of experimental lots of the new National Emergency steels and other alloy steels covered by Order M-21-a, Ernest C. Kanzler, director general for operations of the War Production Board, has advised 17 alloy steel producers that they are permitted to ship in the fourth quarter of 1942 samples of the steels described in Table I of Contributions to the Metallurgy of Steel—No. 8, published last month by the American Iron and Steel Institute, 350 Fifth avenue, New York.

These samples may be shipped to any manufacturer or laboratory without regard to preference ratings. Such steel is to be shipped direct and may be taken from current production or from stock.

"Each manufacturer or laboratory ordering such steel from you shall certify on his purchase order that such steel is to be used in making tests; that the amount ordered, added to the amounts already received or on order from other sources, will not amount to more than 1000 pounds of each composition; and that the total amount of all compositions of such steel on hand and ordered for testing purposes does not exceed 3000 pounds of steel. The limitation on amounts to any one manufacturer is for the fourth quarter of 1942," reads Mr. Kanzler's letter. "No orders for such steel for testing purposes shall be accepted unless such orders are approved as to composition and amount by your metallurgical staff."

The authority given by this letter is to be in effect until Dec. 31, 1942.

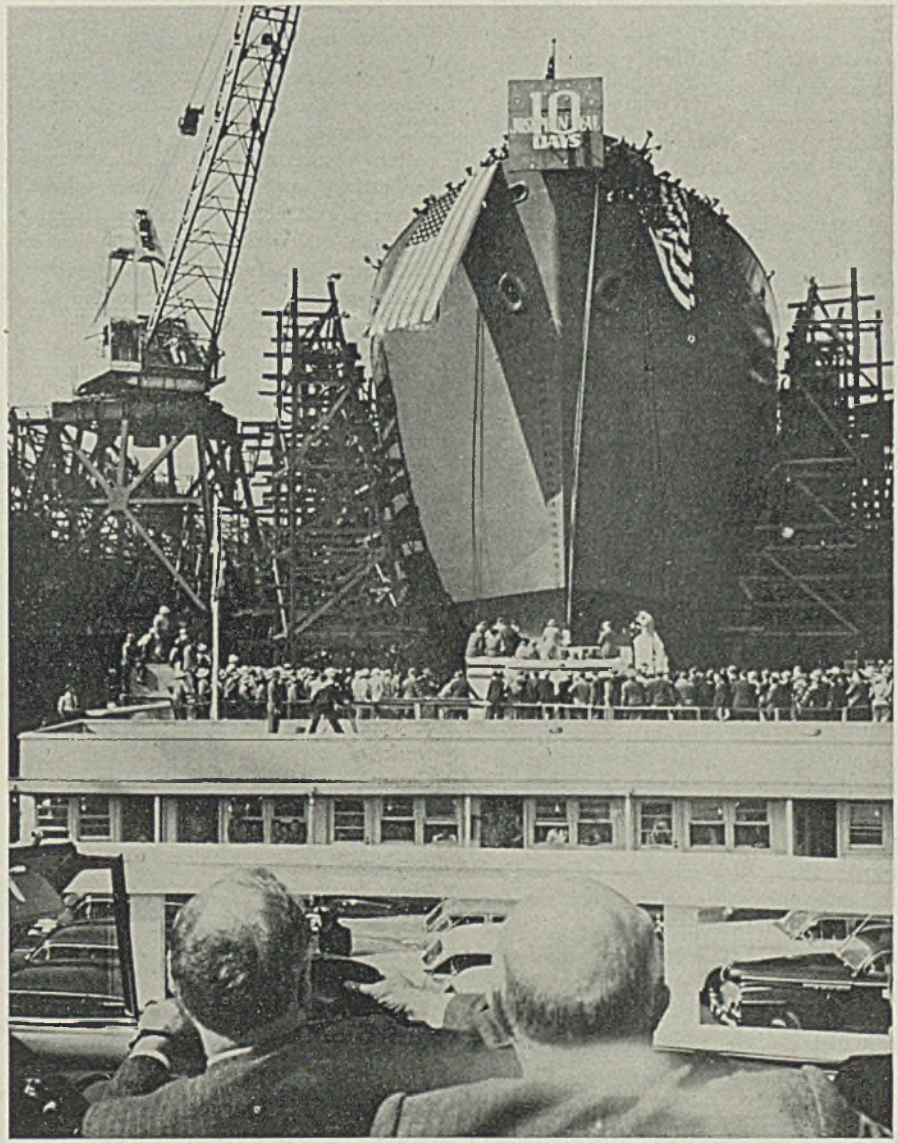
While the War Production Board at the present time is sending the PD-391 form to 61 companies melting alloy steels, Mr. Kanzler's letter was sent only to 17 companies, selected because they are expected to produce the principal tonnage of the new steels. However, any of the other alloy steel producers who did not receive copies of Mr. Kanzler's letter can obtain permission to supply quantities of the NE steels on the same basis by requesting this permission through the Iron and Steel Branch, Materials Division, War Production Board, Social Security Building, Washington.

The complete list of NE steels covered by Mr. Kanzler's letter was published in STEEL of Aug. 31, p. 81.

W. J. Priestly Appointed Chief of Alloy Steels Unit

William J. Priestly, vice president, Electro Metallurgical Co., New York, has been appointed chief of the Alloy Steels Unit of the WPB Iron and Steel Branch. A. Oram Fulton, who has been chief of the unit, will assist Hiland G. Batcheller, chief of the branch.

"BAD BOY" RUNS AWAY TO SEE



Millions read about the Liberty ship JOSEPH N. TEAL which was launched ten days after its keel was laid in Vancouver, Wash., but they didn't know President Roosevelt was there, watching—as this picture shows. The President is in the left foreground; Henry J. Kaiser at his right. Commenting on the trip and the restrictions imposed on the press—so that newspapers did not mention it until his return—the *New York Times* declared they were "outrageous and ominous . . . it is our considered judgment that in two weeks a President of the United States, at a turning point in a great war, has done more to undermine confidence of his fellow citizens than could the gravest disaster or any enemy act."

Careful segregation and identification of alloy iron and steel scrap should be standard procedure in every plant collection program.

1. It helps conserve essential, scarce alloying elements.
2. It helps eliminate wasted time, material and effort in the steel mills.

Alloying elements such as cobalt, molybdenum, nickel and tungsten are readily recoverable from scrap. If their presence in a lot is known, the scrap can be used in making up a charge of alloy steel of the same or similar analysis. The amount of alloying elements that must be taken from stock is reduced.

But, if, through lack of segregation, alloy scrap gets into a charge where no alloys are wanted, such as a plain carbon steel, the alloying elements are utterly wasted. It is also possible that the heat itself will be lost because of failure to meet specifications.

The difficulties of scrap segregation increase with every handling. The source is the best point for segregation. Comparatively little time and trouble taken there will save a great deal of trouble and wasted time at the mill.

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By A. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

Successful adoption of NE constructional alloy steels seems to point way to satisfactory realignment of alloy steel picture, proving old adage "a little goes a long way". . . Salesmen now expediters

DETROIT

WHILE it may be gross misrepresentation of fact to identify the prefix of the NE steels as signifying "Nickel Eliminated," it is still true that shortages of this alloying element motivated the first activity in devising the National Emergency steels. Much, however, has happened to the entire alloy picture in the 15 months since a technical committee of 29 metallurgists began creating a new series of alloy constructional steels.

Some of the changes were reviewed by nationally known metallurgists here last week before 400 members and guests of the Detroit chapter of the American Society for Metals. Leader of the discussion was John Mitchell, Carnegie-Illinois Steel Corp., one of the prime movers behind the NE steels. He paid particular attention to the introduction of the so-called "new" NE steels which, by increasing use of manganese and silicon, reduce the amount of nickel, chromium and molybdenum required in their analyses.

First Series Struck Snags

One of the difficulties encountered with the original series of NE steels was that they were "sold" to industry's engineers and metallurgists before steel mills were ready to supply them in any appreciable quantity. Furthermore, residual alloying elements in scrap charges interfered with the uniformity of the manganese-molybdenum NE steels and interposed steelmaking problems.

The new NE steels, it is pointed out, will show high hardenability and can be made from return alloy scrap, requiring practically no new nickel, chromium or molybdenum. It is understood that allocations are already under way for production of 50,000 tons of these steels and users will be supplied with sample lots of 1000 pounds for experimental purposes, with no priorities involved on such material.

H. Leroy Whitney, technical assistant to the chairman of WPB, and another pillar of strength behind the NE steels, also spoke at the meeting here and made a plea for metallurgists to co-operate in furthering the adoption of the steels, forgetting personalities and competitive differences. He added that what Detroit does will point the way for industry of the entire nation, emphasizing the key position of engineers and metallurgists in this area. Mr. Whitney, who retired from industry several years ago because of poor health, is a heartening example of a patriotic American returning to the service of his country in wartime. He asked for an understanding of the immensity and complexity of the job facing the War Production Board, pointing out that its members were, after all, only human beings and have been faced continuously with the unsavory task of aligning conflicting viewpoints and of attempting to unsell age-old traditions and habits prevalent in the military services.

Incidentally, the latest quip from Washington is to the effect that anyone resigning from the WPB to enter the armed forces is an acknowledged coward.

Among informed metallurgists there appears unanimity of opinion that within certain limits the NE steels are every bit as good as the higher-alloy steels they are designed to replace, and in some cases may even be a trifle better. This opinion is so general as to suggest a rather complete reshuffling of the entire steel alloy picture in future years. If the judicious mixture of limited amounts of manganese, silicon, chromium, nickel and molybdenum in steel, with total amount something under 2 per cent, will yield alloy steels on a par with the higher alloy materials of past years, then the obvious trend will be to make these newer steels a permanent institution and not just of "national emergency" character. Repercussions throughout the entire alloy field can well be imagined.

Russian manufacturers reportedly are making extensive use of chrome-silicon steels similar to the NE 9600 series in a wide range of military equipment and ordnance. There is a lesson in this report for the U. S. military machine which may have been too concerned with sticking to tradition instead of accepting the conservation measures developed by metallurgical experts.

A Metallurgical Achievement

The NE steel project is undoubtedly one of the major achievements of American metallurgy. Working under intense pressure, metallurgists blueprinted this complete series of steels before a pound was ever melted, and then enjoyed the pleasant experience of seeing advance calculations borne out in the steels as they were produced. Much of the credit must go to basic information on steel hardenability developed in recent years by metallurgists of the motor companies, including A. L. Boegehold of General Motors, and W. E. Jominy, formerly with GM and now with Chrysler. This of course is not intended to minimize the yeoman work of the metallurgical committee which in the space of a little over a year laid the groundwork for a revolution in steelmaking and utilization.

A question often asked is: What has happened to the thousands of merchandising experts, sales promotion forces, advertising talent and sales staffs of the motor companies? Certainly their talents are now of little value, since there is nothing to promote, nothing to sell. A good many of these people have been "retooled" into expediters, following up the flow of materials and parts into the motor plants engaged in war production. There are several reasons why this type of personnel has become useful in follow-up work. And there are also reasons why some of these men cause suppliers and subcontractors to tear out their remaining hair.

Uninformed but Useful

Merchandising and promotion personnel generally are of the type that knows how to "win friends and influence people," so they are just the ticket to persuade a distant supplier to redouble his efforts on getting deliveries. From experience, these persons also "know how to travel" and thus can be depended upon to flit about the country to subcontractors' plants with a minimum of delay and waste motion. Furthermore, their lack of knowledge of things technical permits them to ask the impossible in production and, occasionally, to see it come true.

On the other side of the ledger these NE (newborn expediter) personalities often try the patience of experienced manufacturers by calmly demanding something that just cannot be done. If they were trained engineers, they would not presume to be so demanding, but in general they do not know a foundry pattern from a forging die, so it is often necessary for a supplier to take them aside and run through a brief ABC of metalworking operations, if their exorbitant demands are to be tempered.

Several new arms contracts have been announced by Hudson Motor Car Co. One is a wing assembly for Curtiss "helldiver" dive bombers for the Navy, on which production has started in a preliminary way. Another is production of a new type of marine engine for installation on invasion barges, announced last week by A. E. Barit, president of Hudson. No details of the engine have been divulged beyond the fact they will be called "invaders" and will be mounted

on landing barges. Hudson has been in production for several months on rear fuselage sections for the Martin B-26 medium bomber, as well as on gun parts, mine anchors, steel parts for radial aircraft engines and ammunition components. The company also operates the extensive naval ordnance plant here which supplies a variety of naval needs including Oerliken guns and miscellaneous parts.

War production has effectively resuscitated the fortunes of the smaller automobile companies — Hudson, Packard, Nash, Studebaker and Willys. Virtually all of these plants are now operating at a rate far beyond peak peacetime levels and show signs of further increases. On the other hand, the big three manufacturers now are close to or perhaps just a trifle beyond peak peacetime operations.

Inaugurating what is believed to be the first continuous inventory of employes' tires to be conducted by any large industry, Pontiac Motor Division reports that the first survey showed about 70 tires on every 50 cars on one parking lot were in need of recapping, or 28 per cent. In addition, many other tires showed results of under-inflation and bad wheel alignment. Cars with tires in need of recapping will have notices placed under windshield wipers informing the owner of the need, and copies of the notices will be given to the local county tire rationing board which last month had an excess of 1400 recaps. If the owner fails to appear and apply for recapping, it will be recommended that he be denied future application for either recaps or tires.

Decision of the War Labor Board in the General Motors case elicited a letter from C. E. Wilson, GM president, pointing out that while the corporation will comply with WLB directives, this does not mean that the corporation has come into a "mutually satisfactory understanding with the unions regarding the specific provisions of the board's orders." He adds that the WLB ruling on union security is "unreasonable and unnecessary and infringes the rights of employes and the corporation."

A significant paragraph concluding Mr. Wilson's statement is the following: "Throughout the collective bargaining negotiations with the union and the hearings before the panel and the board, General Motors made proposals designed to increase the efficiency of its war efforts, including a proposal for higher pay for those workmen who do more and better work. The proposals were dismissed in the panel's recommendations and in the board's decisions. It is our considered opinion that *additional productivity of* 10-25 *per cent could have been obtained if these proposals had been adopted.* Not only would this have resulted in a greater output of war material, but the government would also have benefited by still lower prices since General Motors' war contracts provide for price renegotiation so that savings achieved through increased production and greater efficiency are passed to the government."

Meanwhile, application of the General Motors wage settlement policy to Chrysler Corp. brought scowls and grumbling from union leaders there who charged their demands had been overlooked completely and that all they received was the 4-cent increase in wage rate. Letters were dispatched immediately to the Washington hierarchy.

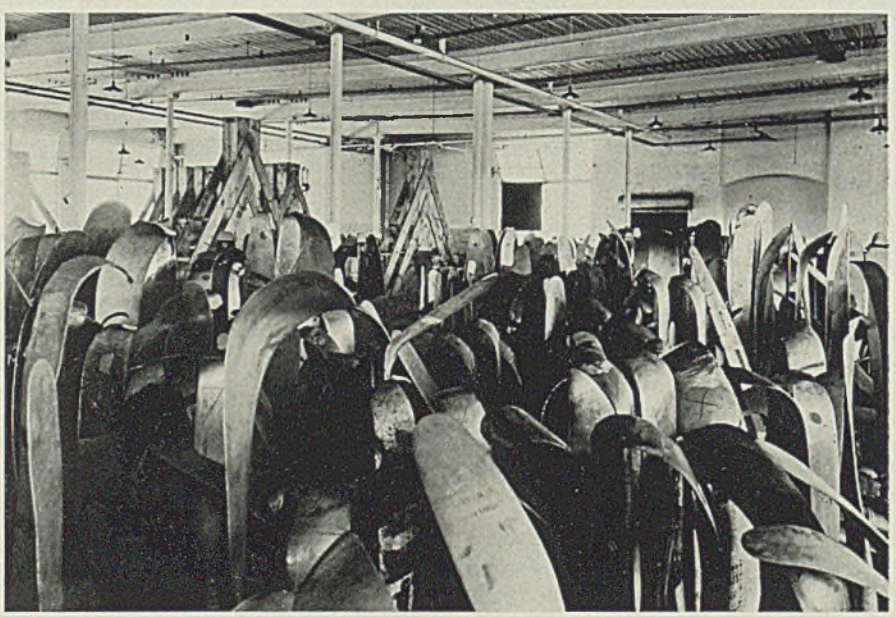
—o—

Department of Rigid Adherence to Specifications: Three days of delay in shipment of finished bomber fuselage sections from the plant of a middle western fabricator were occasioned by inability to obtain a number of small hooks which specifications called for to be made from S.A.E. 2335 steel forgings. This is a 3½ per cent nickel steel, and not the easiest material in the world to obtain these days. But the interesting thing is that the hooks have no other use than to hold microphones on the inside of the fuselage, and might just as well be made of gray cast iron, malleable iron, or even wood.

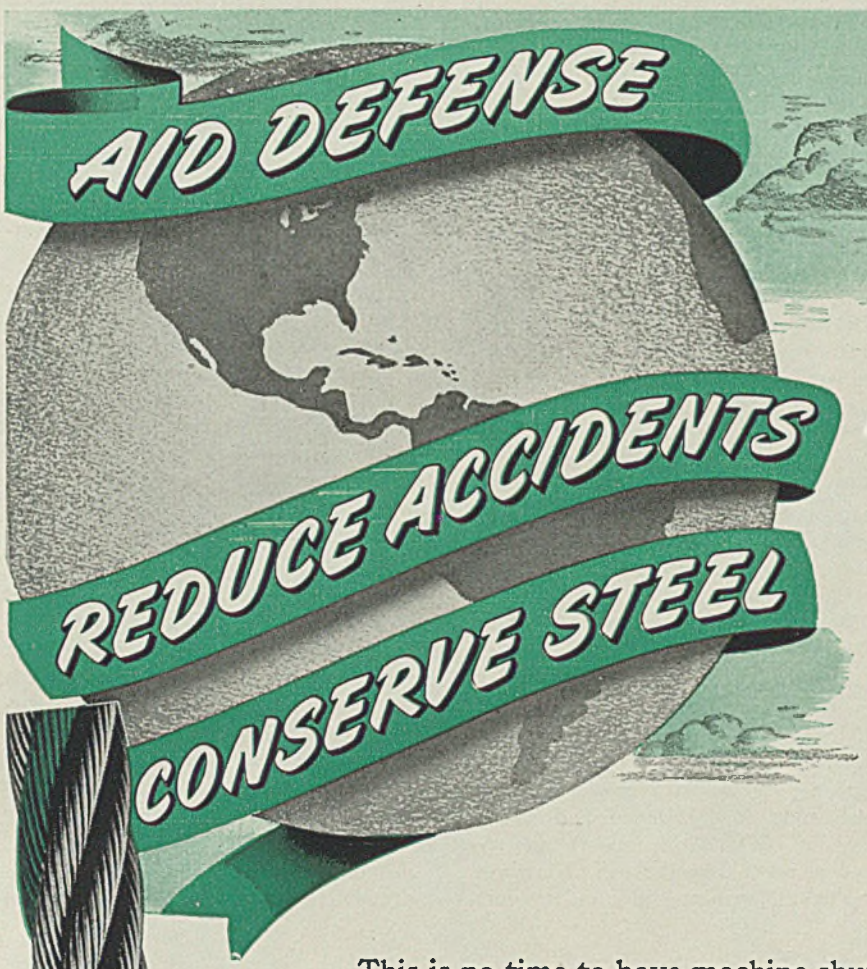
Special Delivery Department: A West Coast plant needed a few thousand screws in a hurry from an eastern manufacturer. After checking through the manufacturer's office in the Middle West to obtain correct part number and other detail, the order was placed and the supplier offered to air express the material as soon as possible. An hour or so later, the coast plant called back and said to take the screws out to a nearby airport and an army bomber would be waiting for them. Sure enough, the bomber was there with motor idling, waiting for the screws which were contained in a carton about the size of two shoe-boxes.

Department of Friendly Competition: Some day an interesting debate might be held between engineers of Boeing Aircraft Co. and the Ford Willow Run bomber plant as to most expeditious methods of assembling large four-motor bombers. Their assembly systems are diametrically opposed, Ford preferring long conveyorized assembly line, subassemblies and parts fed in from the sides, while Boeing boasts its "production density" plan of a final assembly fixture.

80% OF DAMAGED PROPELLER BLADES RETURN TO ACTION



SALVAGING of damaged propeller blades returned from the fighting and training fronts of United States Air Forces is an increasingly important operation at the Pawcatuck, Conn., plant of Hamilton Standard Propellers Division of United Aircraft Corp. About 80 per cent of the twisted or bullet-damaged blades returned to the factory are repairable, 60 per cent being straightened cold. The remainder are heated, straightened, re-hardened and matched in sets of two or three. Check is made for rough edges, finish, tolerances and balance. So well do these blades stand up after straightening that many have been returned after a second crackup, repaired again and sent back for use



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WING TIPS

Increasing bulk and horsepower of radial warplane engines prove worth of propeller cuffs and superchargers, vital accessories to high-altitude flying. . . B-24 bomber redesigned as cargo carrier

PROPELLER cuffs, first designed about four years ago, are now being used on an increasing number of propeller installations, particularly where the ultimate in streamlining and engine cooling is desired. What is a cuff? Essentially it is nothing more than a sheet metal covering or shield which is placed over the propeller blade just outside the hub. It serves to continue the airfoil section of the blade to the hub; without it the blade would taper off gradually into the round shank.

With a cuff in place, air flows in an uninterrupted stream over the propeller blades and thus enters the frontal air-cooling section of the engine. Importance of an uninterrupted stream of cooling air for radial engines is emphasized as the bulk of the engine increases. Radials of 2000-horsepower are now the rule rather than the exception, and it will not be long before engines of better than 2500 horsepower are in mass production.

Cuffs also help to increase propeller thrust by reducing blade shank drag. Thus, they both increase aerodynamic efficiency of the propeller and assist in engine cooling. Obvious question which the layman might ask is: Why not continue the airfoil blade shape right down to the hub and thus eliminate the tapered shank and the necessity for a cuff? The answer is simply that abrupt changes in blade shape would cause material stresses which would wreck the blade in service. On the basis of present knowledge and procedures, it is essential to taper off propeller blades slowly.

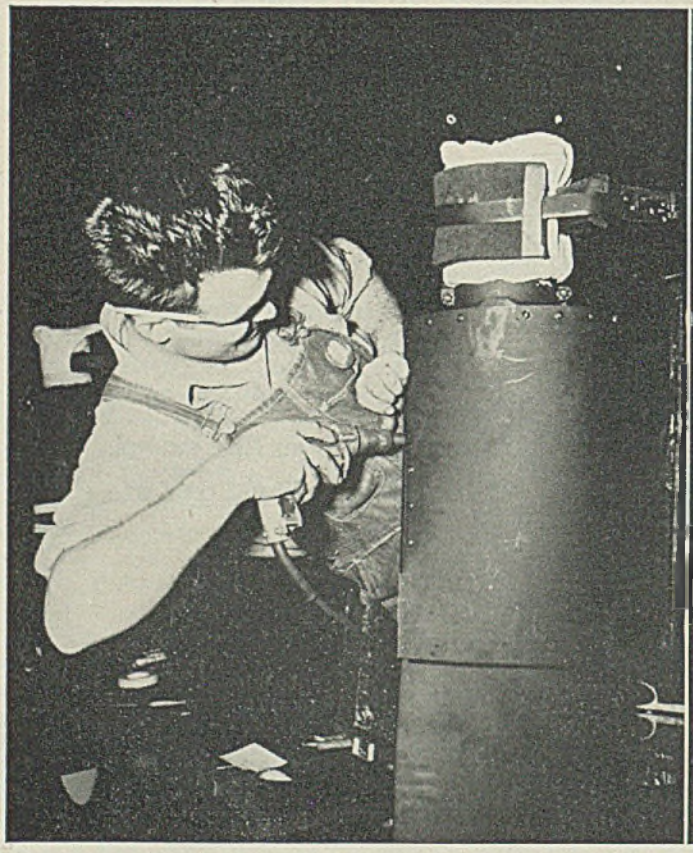
Three Major Parts in Cuff

Through courtesy of the propeller division of Curtiss-Wright Corp. illustrations are presented herewith showing some steps in fabrication and attachment of cuffs. Three major parts are used in assembling the cuff. The sheet, or skin, is the part visible on the completed propeller. Beneath it is the support, or "former," which is clamped around the shank of the blade. It is anchored to the shank by mating with a flange that is an integral part of the shank itself. Thirdly, there is a trailing edge stiffener to which the sheet is attached by self-locking screws.

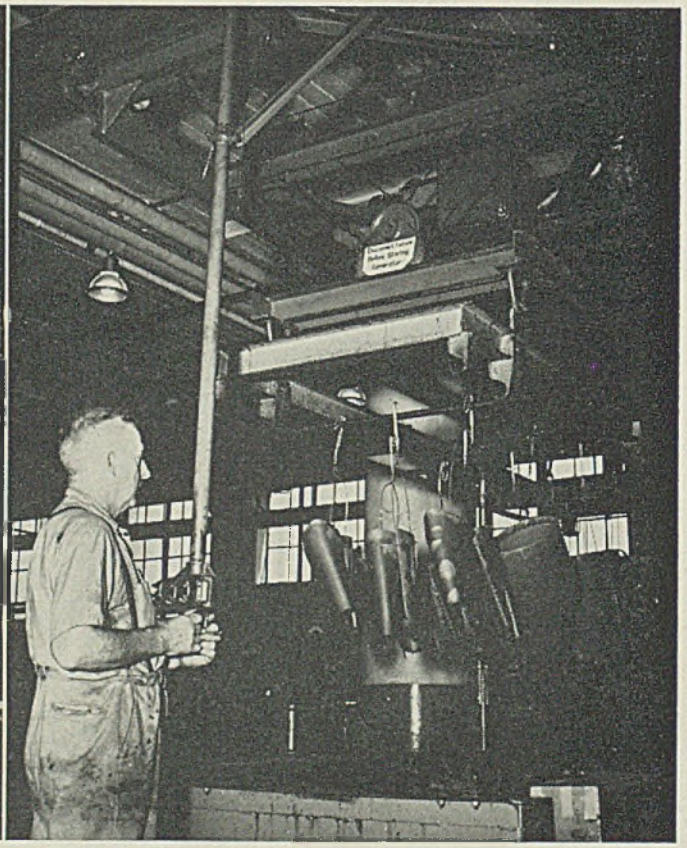
Aluminum alloy skins are partially fabricated when they reach the Curtiss plant. Tailoring them to specifications is a delicate job. A molded chafing strip is riveted to the outer end of the skin to seal the cuff to the blade and to absorb vibration. Supports and stiffeners are machined, routed and ground. Assemblies of skin, support and stiffener are anodized and finally painted before installation on propeller blades.

Distinctive feature on some cuffs is a device through which de-icing fluid flows out to the leading edge of the blade, thus preventing excessive ice formation on the propeller itself. Nearly all propellers built today, whether they have cuffs or not, carry some means for de-icing leading edges. In high-altitude work such precautions are absolutely essential.

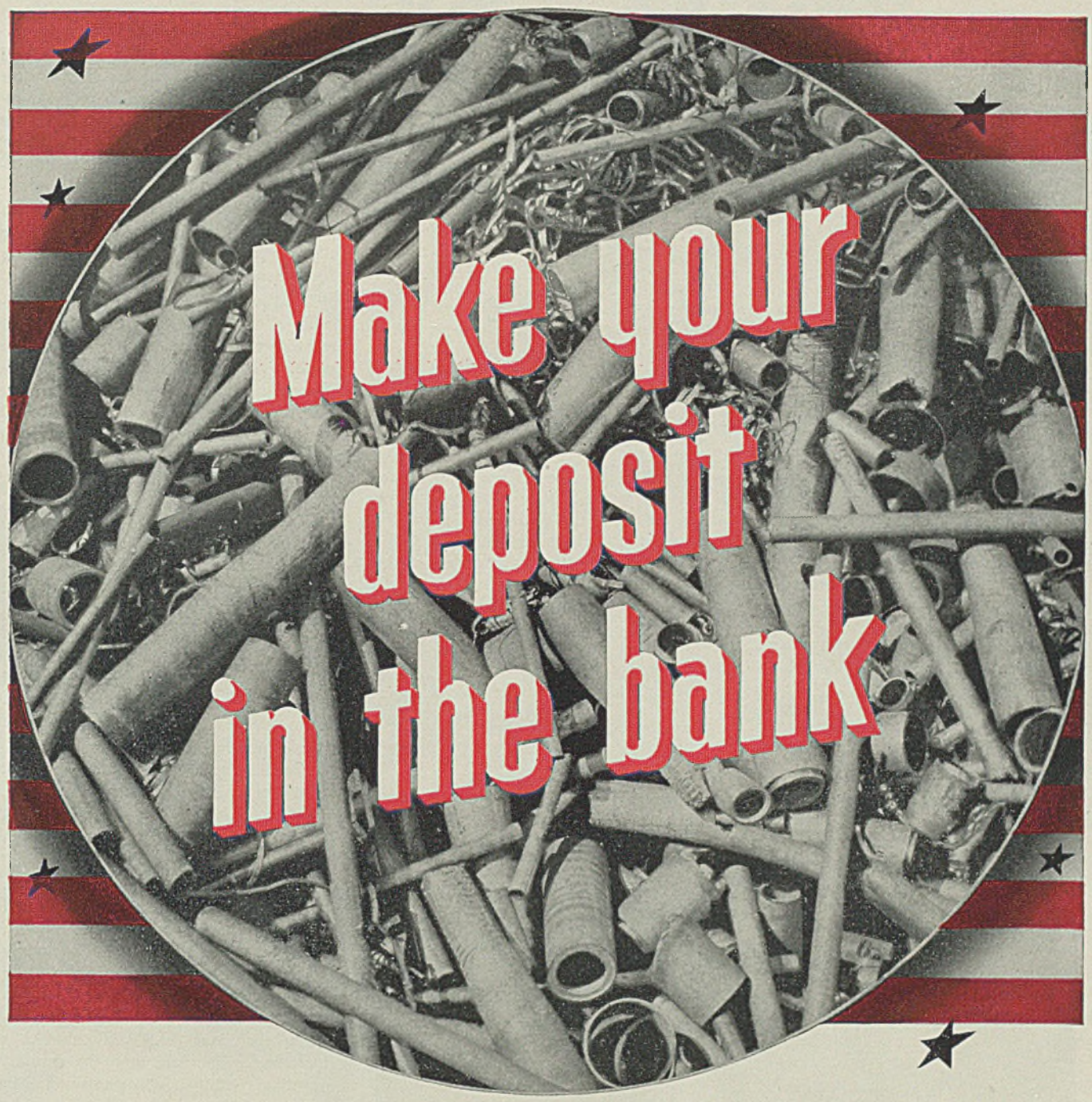
Another vital accessory to high-altitude flying is the supercharger or



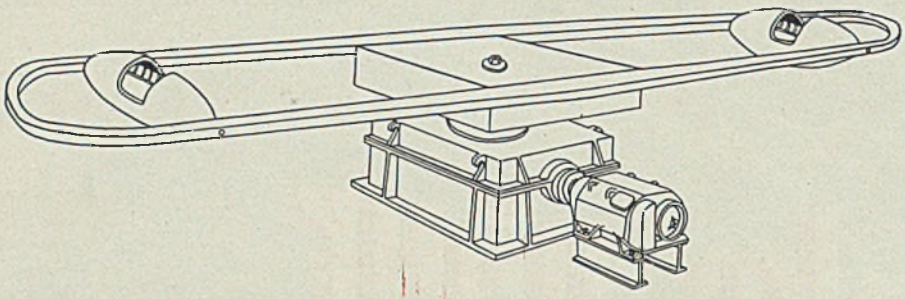
Attaching propeller cuff to propeller blade by means of self-locking screws driven through skin and into former or supporting frame. Note how the cuff continues the airfoil section down almost to the propeller hub



Skins for propeller cuffs here emerge from the anodizing bath at the Curtiss-Wright plant. The company produces both steel and aluminum alloy blades, with an increasing percentage of the former



SCRAP piles are much more than mere collections of trim ends, cuttings, useless machines, parts and junk these days. They're vital national resoures—*American Treasuries*, in fact, in this critical year; because the nation's steel producers will need several million more tons of scrap in 1942 than ever before, if the demands of war production are to be met. • How much can *you* contribute? Not just the usual scrap flow from your operations, but *all* the idle metal around your buildings and yards that it isn't absolutely essential to keep. Your deposit in the scrap bank will pay dividends all over the world—*make it a real one!*



Perspective sketch of "human centrifuge" showing 185-horsepower mill-type motor and speed reducing gear. Cockpits are at 20-foot radius which at maximum speed of 54 r.p.m. provides radial acceleration of 20g

high-speed air pump used on both in-line and radial engines. Internal combustion engines generally burn about 13 pounds of air to each pound of fuel. At sea level, 180 cubic feet of air is enough to supply this weight, but as altitude increases the air becomes less dense and normal engine suction does not supply enough air for perfect combustion. Engine output then grows weaker and weaker, finally reaching a point where it will not lift the plane another inch.

The supercharger overcomes this deficiency in air weight by pulling in great amounts of the rarefied air and compressing it until each cubic foot weighs the same as at sea level. There are two general types of supercharger, one geared to the engine crankshaft, the other—the turbocompressor—driven by the pressure of the engine exhaust. The latter is the newer type and seems to have the better possibilities for improving high-altitude flying. Considerable secrecy surrounds its design and manufacture.

Wright Cyclone engines use a supercharger which comprises a multi-bladed fan or impeller 11 inches in diameter which turns over at speeds of from six to ten times crankshaft speed. At the blade tips the air strikes a "diffuser" plate which directs the flow into the intake manifold and thence to the combustion chambers. Curved passages through the diffuser plate act as a check to the terrific speed of the air, thereby building up pressure.

Even with this design at high altitudes a 6 to 1 ratio of the impeller is insufficient to "pump" enough air to the engine, so a two-speed type of supercharger has been designed, permitting a shift in gear ratio to something like 10 to 1 to be made at the critical altitude where more air is needed.

Higher altitudes and higher speeds in combat flying exert extra demands on pilots as well as on equipment. Pressurized cabins are essential if a pilot is to maintain his ability to fight and fly up where the air is thin. Rate of change of altitude and rate of acceleration are other factors which affect a pilot's normal faculties. Detailed study on rate of acceleration shortly will be investigated by flight surgeons in an eastern laboratory with the help of a "human centrifuge machine," designed to reproduce acceleration conditions corresponding to all known or desired air maneuvers.

The centrifuge machine, for which General Electric Co. is now building an electric drive, consists of a horizontal boom with a driving shaft at its center. Cockpits are mounted near each end of the boom, 20 feet from the center shaft. The boom is designed to turn as rapidly as 54 revolutions per minute, and will be able to reach this speed in only 5 seconds from a standstill start. It will decelerate in the same length of time, thus simulating even more than the severest operating conditions now encountered in a moving airplane.

However, normal tests will average from 15 to 20 seconds running time, with lower values of acceleration, since a pilot would "black out" before reaching 54 r.p.m. in such a short space of time as 5 seconds. A control device will transmit speed changes to the driving motor.

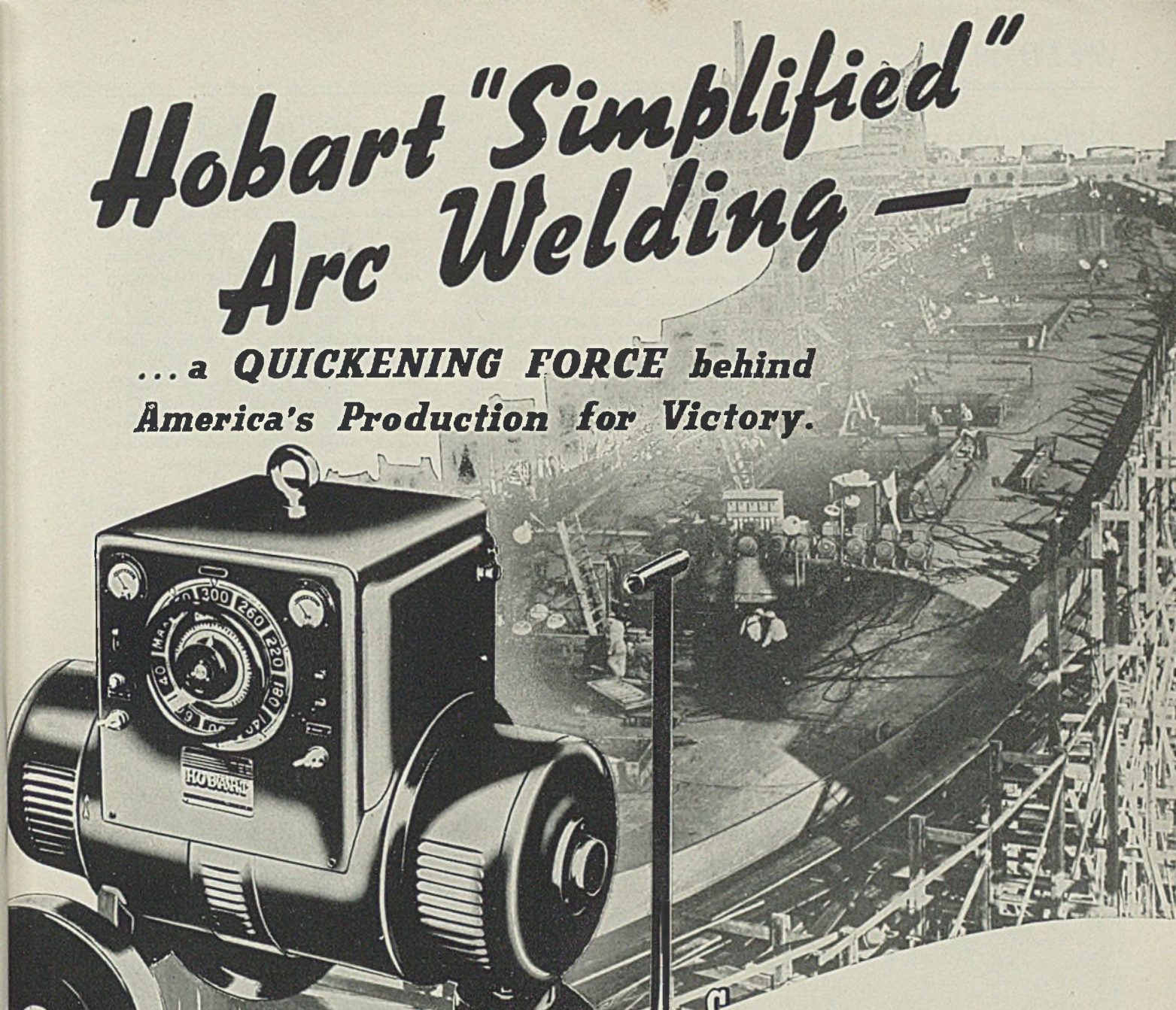
With 25-30 per cent of current production of multi-motor planes being of the cargo-carrying type, it is interesting to note that the Consolidated B-24 bomber has been slightly redesigned for a cargo carrier and assigned the designation C-87. The fact that the B-24 and the C-87 so closely resemble each other will mean that in the main parts of the two planes will be interchangeable. This is a matter of considerable importance when ships are in service perhaps thousands of miles from spare parts depots.

EASTERN WARPLANE BUILDERS FORM COUNCIL

COUNCIL of eastern aircraft manufacturers plans to reach peak warplane production by pooling resources of engineering, research, patents, materials and personnel, patterned on a system followed by California producers. Representatives of companies at their recent meeting in New York are (seated left to right) Glenn L. Martin; G. W. Vaughan, president, Curtiss-Wright Corp.; and Victor Emanuel, president, Aviation Corp. Standing left to right: O. L. Woodson, vice president, Bell Aircraft Corp.; R. S. Damon, president, Republic Aircraft Aviation Corp.; J. Carlton Ward Jr., president, Fairchild Airplane & Engine Corp.; L. C. Goad, General Motors Corp.; and George Chapline, vice president, Brewster Aeronautical Corp. NEA photo

Hobart "Simplified" Arc Welding —

... a QUICKENING FORCE behind America's Production for Victory.



So! You have to build—some ships—some aircraft—some tanks—some ordnance items—a defense plant—or some gadgets on a sub-contract!

No matter what your wartime production problem it's not a gamble when we bet you that Hobart Arc Welders will "quicken" your production and increase your output!

They're in such demand that even fifteen times our normal production enables us to take care of only high priority orders with essential "end use" classifications. But, after the war, Hobart's wartime record can mean only THOUSANDS of new Hobart Users! "Keep Your Eye on Hobart!"

HOBART *With the Exclusive and Original Remote Control*

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Enclosed find $_____ for _____ copies of your new 1942 ARC WELDING MANUAL.

Also send me data on ( ) Electric Welders ( ) Gas Engine Drive Welders. We can furnish _____ priority rating

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SAVE 7%
ON ROD BILLS... HERE'S HOW

7% is pretty good interest! Yet some users of Hobart Arc Welding Electrodes say the saving would be more accurately computed at 14% to 21%.

Hobart Arc Welding Electrodes have the correct "shielding" and are uniformly concentric. The operator can "burn 'em down" to the last precious fraction of an inch.

Write for full information (our production capacity has just been tripled!).

Use the Coupon

5 DAYS *Free Examination*

+ $2.00 POSTPAID

Engineers, Superintendents, Operators, all will PROFIT by using this valuable book on the NEW TECHNIQUE and PROCEDURES in MODERN ARC WELDING. Most complete volume of its kind ever published, 516 Pages - 512 Illustrations!

"One of the World's Largest Builders of Electric

Navy Men Take Grand Award in $200,000 Lincoln Study Program

GRAND AWARD in the $200,000 welding study program sponsored by the James F. Lincoln Arc Welding Foundation, Cleveland, was won by Capt. C. A. Trexel, director of planning and design, and A. Amirikian, design engineer, Bureau of Yards and Docks, Navy Department, the foundation announced last week.

The 2½-year welding study, known as the "$200,000 Industrial Progress Award Program", brought forth reports of welding progress prepared by executives, engineers, designers, architects, production officials and others throughout the industrial field. The study indicated possibilities for large savings in production of goods for war and peace.

"Savings in critical materials and in production costs," said Dr. E. E. Dreese, chairman of the foundation and its jury of award, "reported available by arc welding in the award studies, assume such proportions as to be of vital national significance.

"The figures, based on representative products and structures, show a possible actual cost savings of $1,825,000,000. This includes 7,000,000 tons of steel valued at $271,000,000 and 153,000,000 man-hours of labor. The saving in man-hours will place the industrial manufacturer in a strong position to compete in future world markets.

Reports of arc welding progress in the production of war equipment, including ships, tanks, planes and guns, featured prominently in the awards.

Describe Welded Caissons

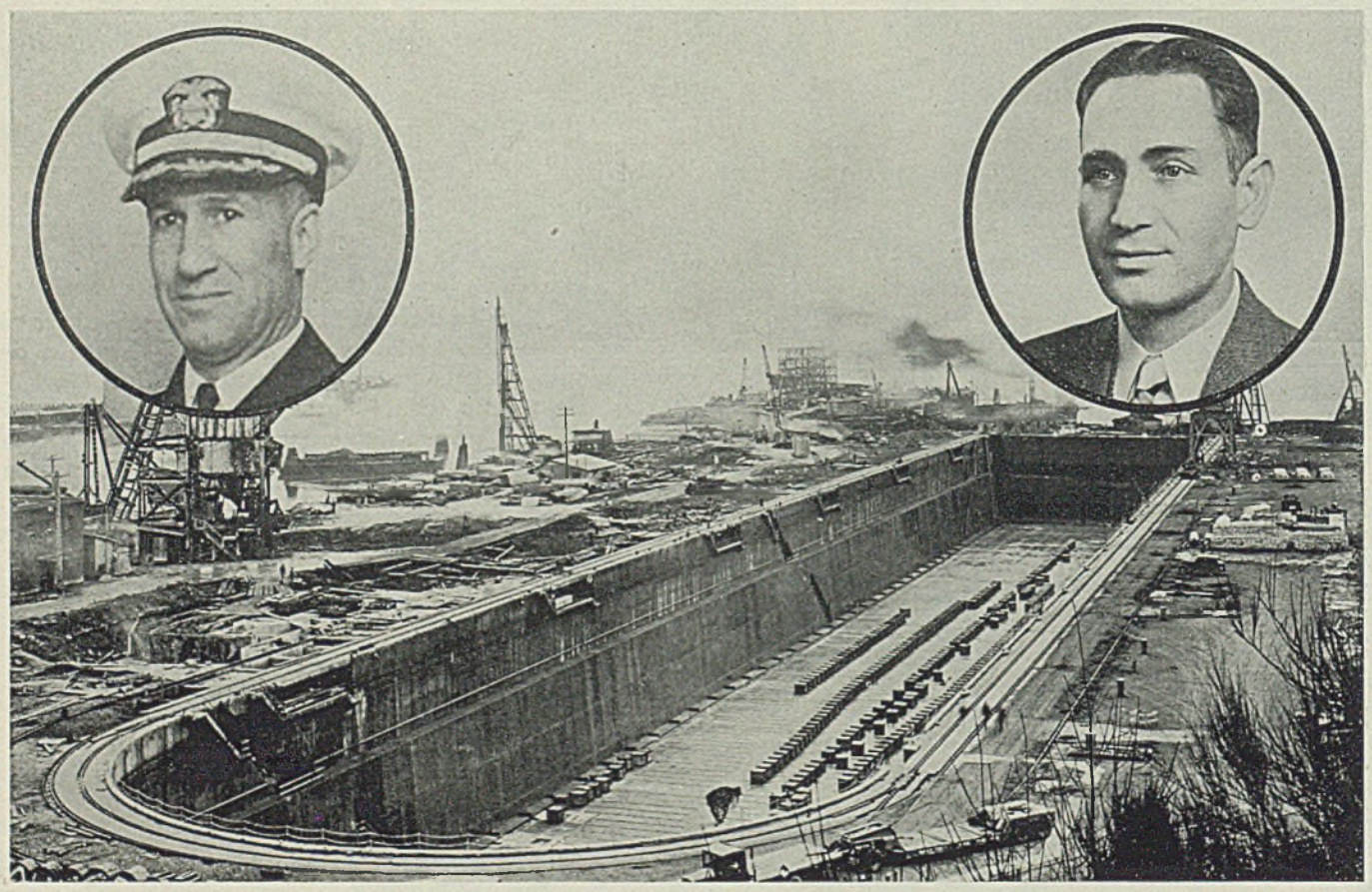
Capt. Drexel and Mr. Amirikian in their grand award paper discussed welding in caissons for naval dry docks. The paper discusses former methods of calculation and design and presents a new elastic slab method which is more applicable to welded construction.

The foundation summarizes their findings:

"Designs were prepared for two large caissons of riveted construction. It was then decided to prepare alternate designs of all-welded construction. These were submitted for bids. Eight contractors participated in the bidding. The low bid for the two caissons for the welded design was $108,030 less than that for the riveted design, amounting to 25 per cent in cost. As a result, the navy department has let a number of other contracts for similar welded structures. Net savings for caissons built and under contract, $1,652,000. Savings on projected construction in the immediate future, $3,540,000. Savings in weight (projects built) 4200 tons and (caissons projected) 9000 tons.

Second grand award went to John L. Miller, chief metallurgist, gun-mount division, Firestone Tire & Rubber Co., Akron, O. Subject matter: Welding the 40-millimeter Bofors antiaircraft gun and how various parts were changed from riveted to welded design. Cost per chassis, welded, was $76.80 less than riveted construction. The total saving with 35,000 units is estimated at $6,000,000.

Third grand award of $8700 was won by H. Thomasson, welding engineer, Canadian Westinghouse Co. Ltd., Ham-



Capt. C. A. Trexel, insert upper left, and A. Amirikian, inset upper right, both of the Navy Department, received the $13,700 grand award. Here they are shown with a view of a modern drydock equipped with an all arc welded caisson which is the closure, or gate, at the far end in the photo. Their paper, which earned the award, described the welded construction of the caisson, which costs 25 per cent less than other methods

John L. Miller

Winner of the $11,200 second grand award, Mr. Miller is chief metallurgist of the gun-mount division, Firestone Tire & Rubber Co., Akron, O.

H. Thomasson

Third grand award of $8700 was presented to Mr. Thomasson, welding engineer, Canadian Westinghouse Co. Ltd., Hamilton, Ont.

ilton, Ont. Subject matter: A new type of large mercury-arc rectifier, called ignitron, which requires extremely high vacuum. On a number of items, an average of 47 per cent was saved in cost by using arc welding instead of an alternate construction. This amounted to $63,000 per year for the company, which, at the same rate, would be $166,000 for the industry.

First award winners, carrying $3700 each, were:

Automotive classification: G. J. Storatz assistant chief engineer, The Heil Co., Milwaukee. Subject matter: An all welded high-speed scoop for earth excavation.

Aircraft classification: Vladimir H. Pavlacka, John K. Northrop, chief of research, and president, respectively, Northrop Aircraft Inc., Hawthorne, Calif. Subject matter: Arc welding magnesium alloys in aircraft construction.

Railroads: J. E. Chandlin Jr., and A. M. Unger, assistant engineer and plant engineer, respectively, Pullman-Standard Car Mfg. Co., Chicago. Subject matter: Major consideration in the gradually-increasing applications of welding to railroad passenger cars.

Miscellaneous Groups

Watercraft: Stanley A. Midnight, American Ship Building Co., Cleveland. Subject matter: The advantage of arc welding applied to ship construction.

Furniture and fixtures: Ernest Reiss, general manager and partner, The Art Chrome Co. of America, Boston. Subject matter: Arc welding of plated tubular furniture.

Commercial welding: Fred H. Drewes, welding engineer, W. P. Thurston Co., engineers & contractors, Richmond, Va. Subject matter: Items that should be considered in establishing and maintaining a welding shop.

Containers: J. O. Jackson, chief engineer, Pittsburgh Des Moines Steel Co., Pittsburgh. Subject matter: A newly developed welded container for the storage of liquefied gas.

Welderies: Virgil Cochran, assistant superintendent, R. G. LeTourneau Co. of Georgia, Toccoa, Georgia. Subject matter: A plant weldery.

Maintenance classification: W. W. McClow, assistant general maintenance foreman, The Pure Oil Co., Toledo refinery, Toledo, O. Subject matter: Corrosion control in refinery presusre vessels by means of arc welded stainless steel lining.

A total of 408 awards went to 458 participants representing many industries.

Awards, arranged by classifications of participation, were made as follows:

Award Group	Number of Awards	Amount of Awards
A-Automotive	27	$14,300
B-Aircraft	9	10,100
C-Railroad	17	13,300
D-Watercraft	15	10,700
E-Structural	42	°25,800
F-Furniture	13	10,500
G-Commercial Welding	13	10,500
H-Containers	24	11,600
I-Welderies	12	10,400
J-Functional Machinery	103	°°34,000
K-Industry Machinery	78	°°°34,100
L-Maintenance	55	14,700
TOTAL	408	$200,000

°Includes 1st Grand Award of $13,700.
°°Includes 3rd Grand Award of $8,700.
°°°Includes 2nd Grand Award of $11,200.

Three-Cycle Welder Aids Armor Plate Output

Novel type of welding equipment developed in Detroit and to be displayed for the first time at the forthcoming National Metal Exhibition in Cleveland, is heralded as having exceptional value in the welding of armor plate, combining both spot welding and subsequent heat treatment of the weld into a single machine. Preset for any specified welding and heat treatment cycle, the equipment automatically is controlled to produce uniform welds in any thickness of material.

Secret of the system is the incorporation of a thermocouple in the lower electrode tip which regulates current flow according to temperature. The machine gets its name, Temp-a-trol, from this feature, design being worked out by Progressive Welder Co. In general, there are three cycles—welding, heating for grain refinement, and tempering. In addition, a water quenching system may be incorporated to speed up cooling.

G. J. Storatz A. M. Unger J. E. Chandlin Jr.

First award in the automotive classification was won by Mr. Storatz, left, assistant chief engineer, The Heil Co., Milwaukee. Mr. Unger, center, plant engineer, and Mr. Chandlin, right, assistant engineer, Pullman-Standard Car Mfg. Co., Chicago, shared the first award in the railroad classification

MEN of INDUSTRY

W. J. Sampson Jr.

N. F. Melville

Henry A. Roemer Jr.

Dr. N. E. Woldman

WILLIAM J. SAMPSON JR., formerly general manager of sales, Steel & Tubes Division, Republic Steel Corp., has been named president, American Welding & Mfg. Co., Warren, O., succeeding the late Howard J. Kaighin. Identified with the steel and steel fabricating industries his entire business career, Mr. Sampson entered the employ of Elyria Iron & Steel Co., Elyria, O., working in the mills and at its Cleveland plant. In 1927 he was made manager of the recently acquired plant of Steel & Tubes Inc., at Toledo, subsequently becoming vice president and president. When Steel & Tubes became a subsidiary of Republic he was made vice president in charge of sales. In 1937 he was named assistant general manager of sales for Republic and in the fall of 1941 returned to Steel & Tubes as general manager of sales.

—o—

Tom O. Duggan, heretofore general manager, service division, Thompson Products Co., Cleveland, has been elected a vice president. He will continue to direct the service division in his new post.

—o—

O. F. Rigley is now purchasing agent of Ryan Aeronautical Co., San Diego, Calif., replacing **F. W. Ford**, who is now assistant vice president in charge of manufacturing.

—o—

James G. Johnston, superintendent of the Endicott, N. Y., plant of International Business Machines Corp., has been made general works manager for all company plants. He will be succeeded as superintendent at Endicott by **William L. Lewis**, formerly his assistant. **Frank H. Welsh Jr.**, head of the factory training program at the Poughkeepsie, N. Y., plant, has been appointed supervisor of training for all IBM plants. **Charles B. Kintner**, supervisor of night operations at Endicott, becomes assistant superintendent; **Walter E. Crotsley**, production manager at that plant, takes a new post in the educational department.

—o—

Henry A. Roemer Jr., manager of sales of steel and wire products, Pittsburgh Steel Co., Pittsburgh, has been advanced to assistant general manager of sales, while **Norman F. Melville**, formerly assistant manager of sales of steel and wire products, has been made manager of sales of that department.

—o—

D. W. Ellison has been named purchasing agent, Cockshutt Plow Co. Ltd., Brantford, Canada, succeeding **W. B. Seace**, retired.

—o—

G. O. Hodge has resigned as traffic manager, Phoenix Iron Co., Phoenixville, Pa., to accept a major's commission in the Transportation Corps, United States Army. **A. M. Willett**, heretofore assistant to Mr. Hodge, has been named traffic manager.

—o—

George L. Randall has been appointed public relations manager, Wickwire Spencer Steel Co., New York. He has been associated with Wickwire Spencer seven years, recently as advertising manager. Mr. Randall will continue in charge of advertising.

James G. Johnston

—o—

Dr. N. E. Woldman, chief metallurgical engineer, Eclipse Aviation Division, Bendix Aviation Corp., Bendix, N. J., has been named head of the newly created Aluminum and Magnesium Division of the American Foundrymen's Association, organized to study foundry practices involved in the casting of aluminum and magnesium alloys.

—o—

William G. Hume has been elected a vice president, Reynolds Wire Co., Dixon, Ill. Mr. Hume was formerly general manager of sales, Pittsburgh Steel Co., Pittsburgh. Immediately before joining the Reynolds company, he had been loaned to the War Production Board and assumed his duties there the day after Pearl Harbor as chief of the Rod and Wire Products Unit of the Iron and Steel Branch.

—o—

H. V. Putnam and **Harry F. Boe** have been elected vice presidents, Westinghouse Electric & Mfg. Co. Both men will continue in their present executive posts, Mr. Putnam as manager of the company's transformer division at Sharon, Pa., and Mr. Boe as manager of the Pittsburgh district manufacturing and repair department.

—o—

George J. Weber has been appointed engineer of tests, Association of Manufacturers of Chilled Car Wheels, with offices in Chicago, to succeed **R. L. Salter**, who has resigned to join the staff of the Southern Wheel Division of American Brake Shoe & Foundry Co., New York. Mr. Weber's experience has included extensive service in nearly all phases in the manufacture of chilled car wheels. He joined the staff of the Association of

Manufacturers of Chilled Car Wheels in 1934, as secretary, and following **F. H. Hardin's** election as president of the association in 1936 he became executive assistant to the president and has since occupied both positions.

—o—

A. W. Thomas, sales manager, Construction Machinery Division, Chain Belt Co., Milwaukee, is now in Washington as consultant for the Construction Machinery Division of the War Production Board. During his absence, his duties will be taken over by **D. A. Kalton,** assistant sales manager, Construction Machinery Division.

—o—

A. O. Thalacker, secretary, Detroit Rex Products Co., Detroit, has been appointed general manager of the metal

A. O. Thalacker

cleaning process firm. He will retain the position of secretary which he has held for five years.

—o—

Thomas H. Miller, mining engineer, metallurgist and an authority on metallic minerals, has been named chief of the Metals Economics Division, Bureau of Mines, Washington. Formerly assistant

Thomas H. Miller

A. W. Thomas

chief of the Metals Economics Division, Mr. Miller has been with the Bureau of Mines since 1928.

—o—

William Gibson Carey Jr., president, Yale & Towne Mfg. Co., Stamford, Conn., has received a commission in the Army Specialist Corps.

—o—

C. M. Beeghly, manager, Strip Steel Division, Cold Metal Products Co., Youngstown, O., has been granted leave of absence to accept a commission as first lieutenant in the Army Air Corps.

—o—

Thomas O. Armstrong, supervisor of industrial relations at the East Springfield plant of Westinghouse Electric & Mfg. Co. for six years, has been appointed manager of industrial relations at that plant.

—o—

Erwin E. Brinkman has been appointed plant manager, Reynolds Wire Co., Dixon, Ill. He formerly was production engineer and consultant for the seven branches of the Line Material Co., Milwaukee.

—o—

Raymond J. Fitness has been named operating manager in charge of manufacturing, Willys-Overland Motors Inc., Toledo, O., succeeding **Vern R. Drum,** resigned. He will direct the manufacture of jeeps, shells, aluminum and steel forgings and other war material. Associated with the automobile industry over 25 years, Mr. Fitness was formerly manager of the automotive department of Willys-Overland.

—o—

Ralph R. Brady has been promoted to manager, commercial engineering department, Westinghouse Electric & Mfg. Co.'s Lamp Division, Bloomfield, N. J., succeeding **D. W. Atwater,** recently named manager of the new illuminating engineering department. Mr. Brady joined the Westinghouse Lamp Division in 1929 as assistant test engineer and in 1934 was made head of all large lamp commercial activities.

—o—

C. N. Kirkpatrick, vice president and general manager, Landis Machine Co., Waynesboro, Pa., has been appointed president of that firm. He will continue his duties as general manager. **G. M. Stickell,** sales manager, has been advanced to vice president. He also will hold his present post.

—o—

Robert W. Renton has joined Lea Mfg. Co., Waterbury, Conn., as field consultant in the furtherance of the use of Lea compound and allied products for burring and polishing in war industries. Mr. Renton has represented the J. B. Ford Sales Co. for several years in the Ohio area and his efforts in his new connection will be in the Middle West, chiefly in the state of Ohio.

OBITUARIES . . .

George S. Davison, 86, Pittsburgh industrialist and civil engineer, died Oct. 3 in Cleveland. Mr. Davison was founder of Davison Coke & Iron Co., now Pittsburgh Coke & Iron Co., and was chairman of the board of the latter company at time of his death. He was a former president, Gulf Refining Co. He also was a past president and honorary member, American Society of Civil Engineers.

—o—

Frank J. Skobis Sr., 84, one of the founders of Skobis Structural Steel Fabricating Co., Milwaukee, died in that city, Sept. 28.

—o—

Arthur C. Tozzer, 63, vice president and director, Turner Construction Co., New York, died at his home in Scarsdale, N. Y., recently.

—o—

August Krastin, 81, veteran mechanical engineer and inventor, died Sept. 28 at his home in Cleveland. He was the founder of the Krastin Mfg. Co., Cleveland, which a number of years ago produced 25 gasoline-powered automobiles. Until 1929, he was associated with Caval Steel Products Co.

—o—

Clarence A. Earl, 67, automobile and radio manufacturing executive, died Sept. 24 at the Mayflower Hotel, New York. After long service with Corbin Screw Division of American Hardware Co., Mr. Earl was made vice president of Willys-Overland Co. He was subsequently president of Briscoe Motor Corp., Earl Motor Co., and National Motor Corp., in the order named.

War Materiel Output Stimulated By Armed Services' Recognition

ONE of the greatest stimulants to increased war *materiel* production has been the pat on the back the government has given industrial workers through awards of the Army-Navy "E" for high achievement.

Proving that "man does not live by bread alone," this recognition of meritorious service has inspired greater effort on the part of workers—and management—engendered friendly interplant rivalries, and prevented many work stoppages.

In recognition of the morale-building resulting from such awards, STEEL herewith presents a series of recent scenes of typical presentations to metalworking plants.

These illustrate the enthusiasm with which workers, their families and neighbors welcome the recognition.

How hope of achieving the "E" pennant spurs war production is cited in the case of Plant "A," a medium-size factory producing vital *materiel*. Plant "A" was closed for 17 days by an ill-advised strike. Soon afterward a neighboring company was awarded the Army-Navy "E." Workers in Plant "A" were jealous. A committee approached a high Army official and asked what would be necessary for Plant "A" to win the award, and pointed out that the plant then was producing at a high rate.

The Army official replied: "You lost 17 days of production during your strike. Now, if you can make up five days' production in September, five days in October, five days in November, and two days in December, you probably can win the award."

The workers intensified their efforts and indications are that the "E" burgee will fly over their plant soon.

Although the ceremonies attending presentation of the award follow a general pattern, individual companies have initiated some interesting innovations.

Micromatic Hone Corp., Detroit, for example, printed individual pictures of all employes in its program.

In Aurora, Ill., the city council proclaimed Oct. 8 as Army-Navy Day and the entire community participated in the ceremonies when the Independent Pneumatic Tool Co. received the burgee.

National Forge & Ordnance Co., Irvine, Pa., now boasts four awards for excellence in production. The Navy "E" pennant was awarded the company Nov. 22, 1941, followed by the All-Navy "E" burgee on April 17, and a white star on May 23. When the joint award was granted the company was privileged to add the white star when the pennant was unfurled.

Other recent recipients of the award:

Rustless Iron & Steel Corp., Baltimore.

American Rolling Mill Co., Middletown, O.

American Machine & Metals Inc., East Moline, Ill.

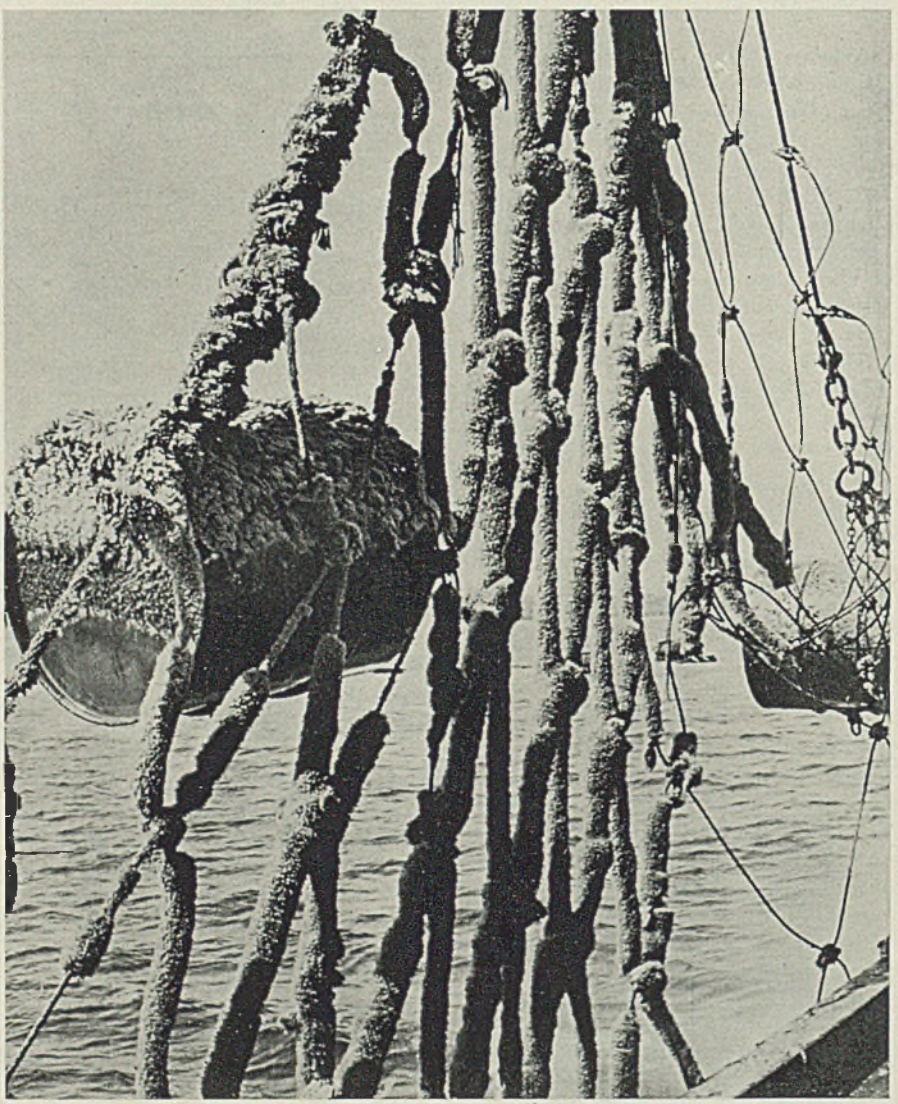
Timken-Detroit Axle Co., Detroit, Waukegan, Ill., and Oshkosh, Wis.

Alliance Machine Co., Alliance, O.

Revere Copper & Brass Inc., Dallas Division, Chicago.

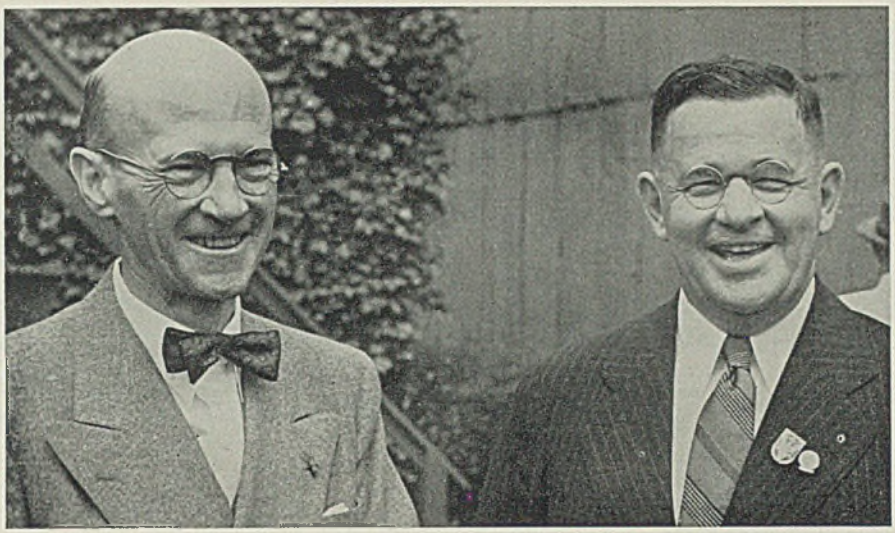
Wickwire Spencer Steel Co., Palmer, Mass., plant, has been awarded the Maritime M Pennant and Victory Fleet Flag.

BARNACLE BILL BOTHERS THE NAVY

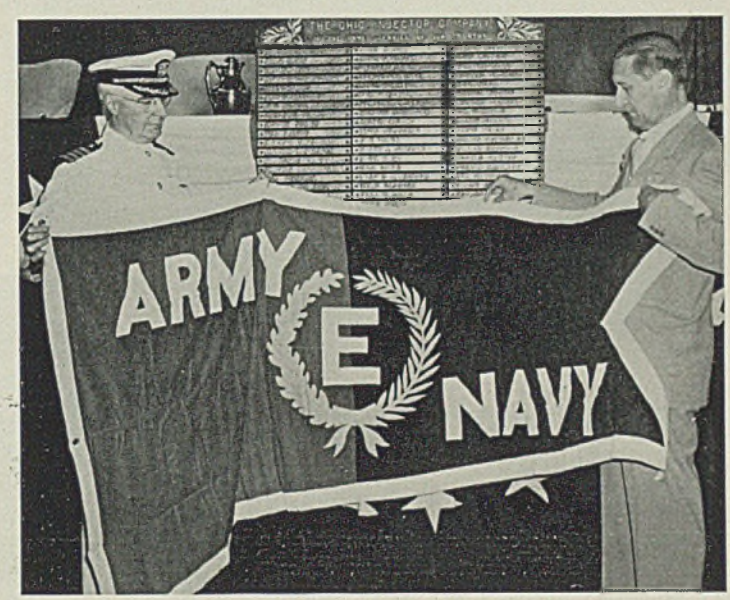


AFTER five months in sea water this submarine net is hoisted to the side of an auxiliary vessel for cleaning marine growths from the strands. A problem is posed for chemists or engineers to devise a method for preventing these accumulations. This is one of few pictures released by the United States Navy showing nets used to keep enemy submarines out of strategic ports and harbors.
Official U. S. Navy photograph

War Production Board has gone on a full 6-day week for the duration. Regular office hours of WPB, both in Washington and in the field, now are from 8:30 a.m. to 5:15 p.m. daily except Sunday. Employes who work on Saturday afternoons are, in accordance with law, granted compensatory leave of four hours next week.

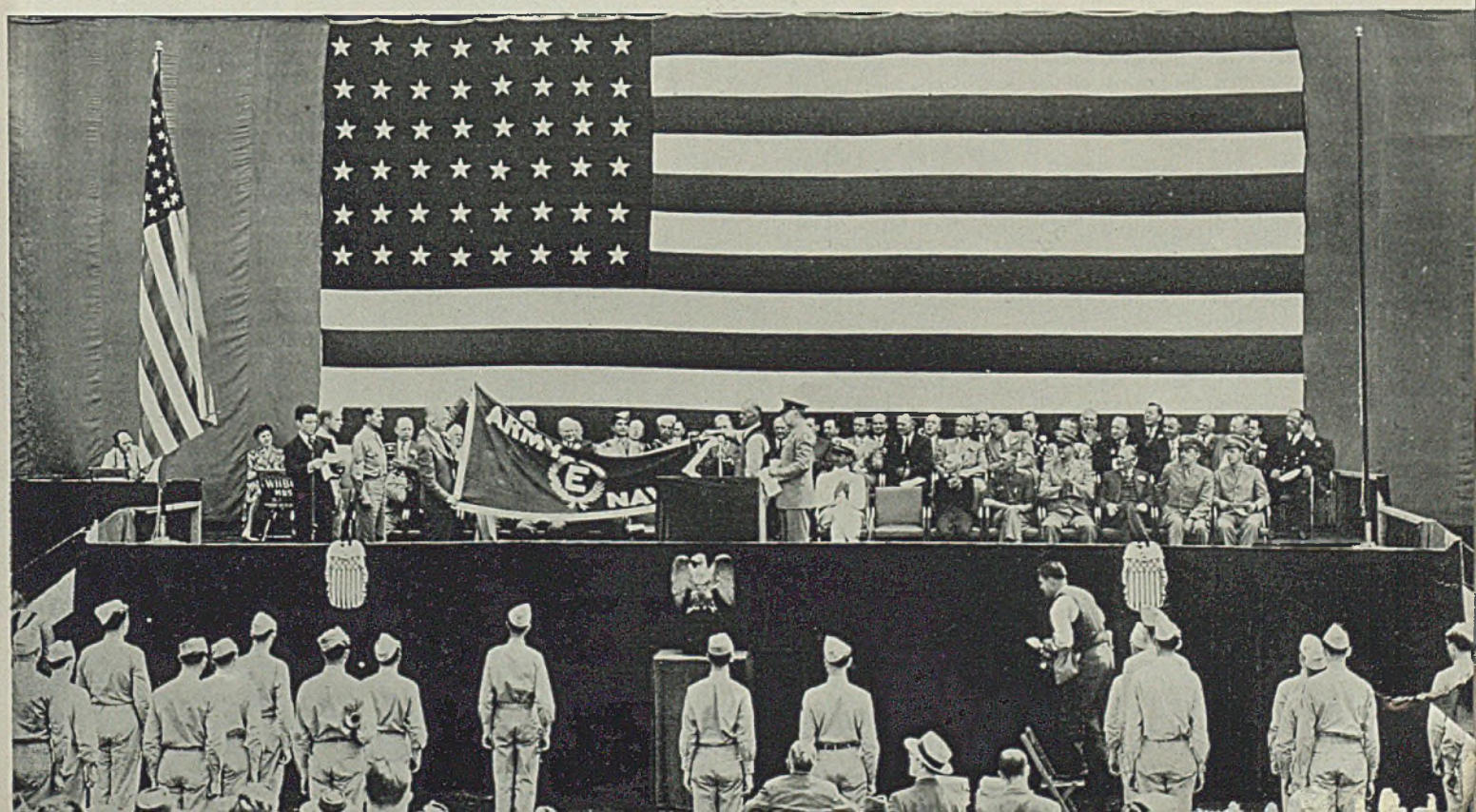


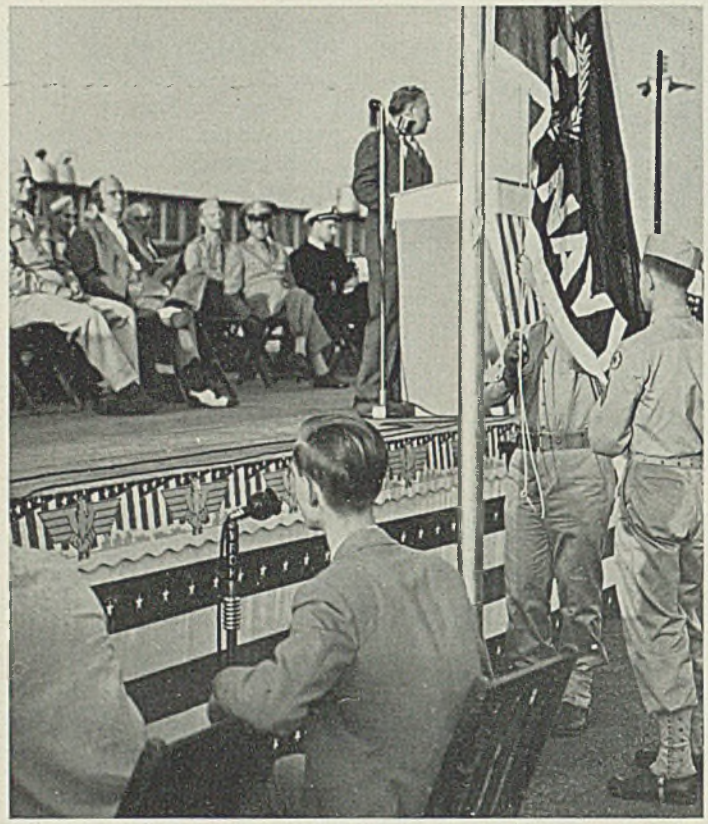
The Maritime Commission's "M" joined the Navy "E" on the lapel of W. F. Perkins, right, vice president of the Koppers Co. and general manager of the Bartlett Hayward division, Baltimore, when J. E. Schmeltzer, technical assistant to the vice chairman of the commission, awarded the "M" pennant for outstanding production of propellers for Liberty ships and tankers



Capt. R. P. Schlabach, Navy, left, and P. M. Arnall, executive vice president, Ohio Injector Co., Wadsworth, O., display the pennant presented to the company, which manufactures bronze, iron and steel valves

Below, Maj. Harry P. Croft presents the award pennant to A. J. Roos, president and general manager, Diebold Safe & Lock Co., Canton, O., and to Emil Gebel, company's oldest employe in point of service. Diebold has been consistently ahead of schedules in the production of armor plate



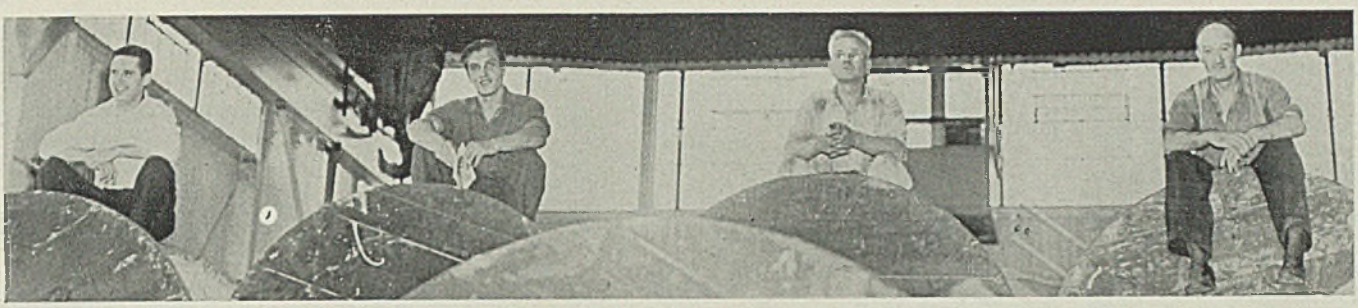


Cone Automatic Machine Co., Windsor, Vt., employes, 2400 strong, above, march to the speakers stand to witness presentation of the pennant and to receive their lapel buttons

Color guard raises the pennant, left, at the Sundstrand Machine Tool Co., Rockford, Ill. Flag was presented to Sundstrand President Hugo L. Olson by Brig. Gen. John M. Willis

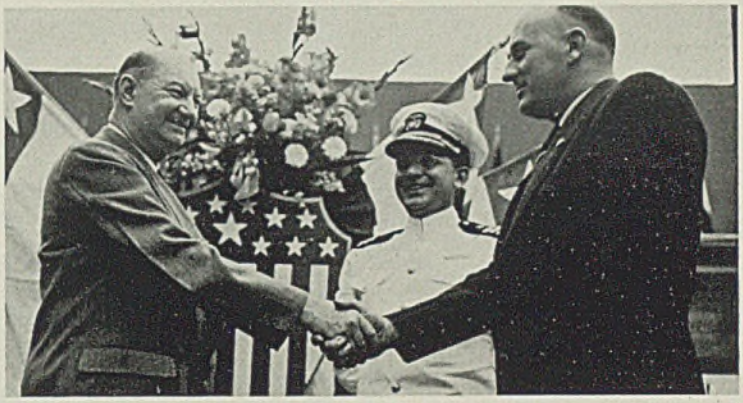
President Herbert H. Pease, New Britain Machine Co., New Britain, Conn., congratulates Robert S. Brown, secretary, as the latter received an "E" button as the oldest member of the management. Occasion was the Army-Navy production award presentation

Representative employes of Axelson Mfg. Co., Vernon, Calif., receive, below, silver "E" pins from Comm. J. C. Arnold, Navy. The company, now 50 years old, produces heavy duty lathes and other metalworking equipment. G. A. Axelson, chairman of the board, accepted the award for the company



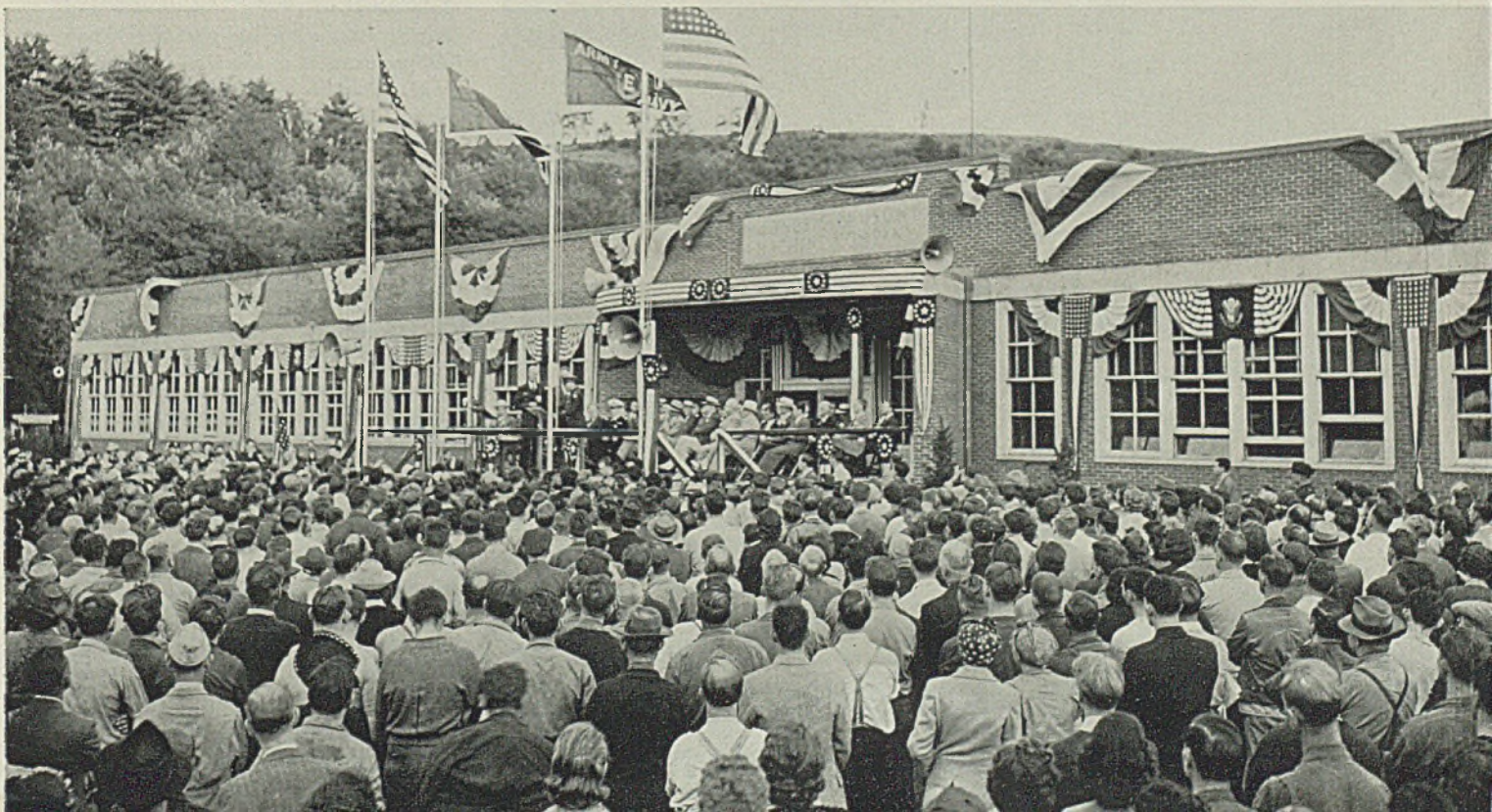
Sitting atop giant reels on which cable is wound, these four workers listen to the presentation of the award to the Yonkers, N. Y., plant of the Habirshaw Cable & Wire division, Phelps Dodge Copper Products Corp.

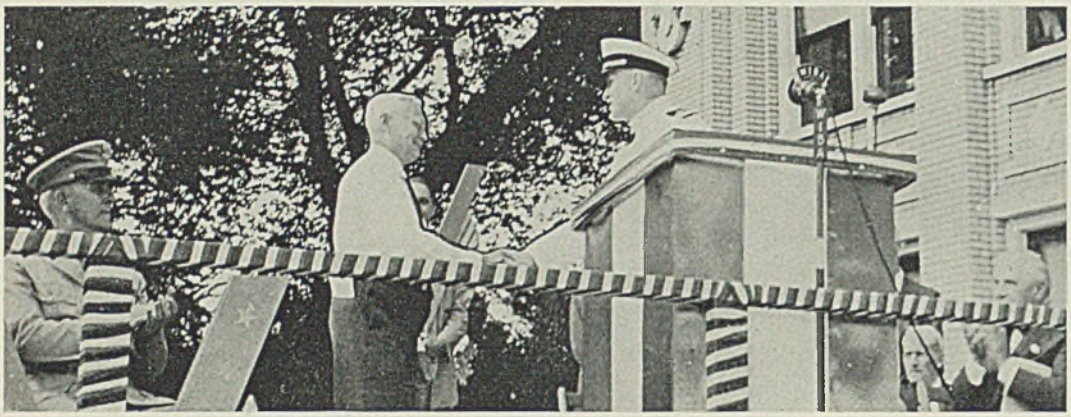
Comm. G. H. Bowman, Navy, beams approval as Jack C. Carlton, left, president of the Carlton Machine Tool Co., Cincinnati, shakes hands with John F. Sadler, president, the Carlton Radial Drill Workers Inc. on occasion of presentation of the joint "E" pennant. Company manufactures radial drills



Brig. Gen. A. G. Gillespie, below, explains the significance of the "E" award presented to Chain Belt Co., Milwaukee, Sept. 19

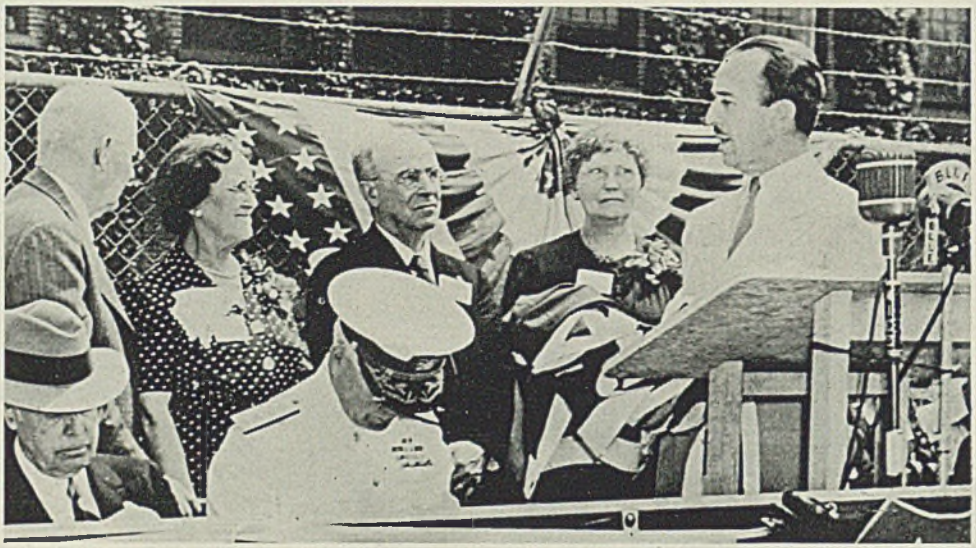
Below, general view of the presentation of the "E" pennant to the Jones & Lamson Machine Co. and the Vermont Foundries Inc. in a joint ceremony at Springfield, Vt. Award was for high achievement in the production of machine tool equipment





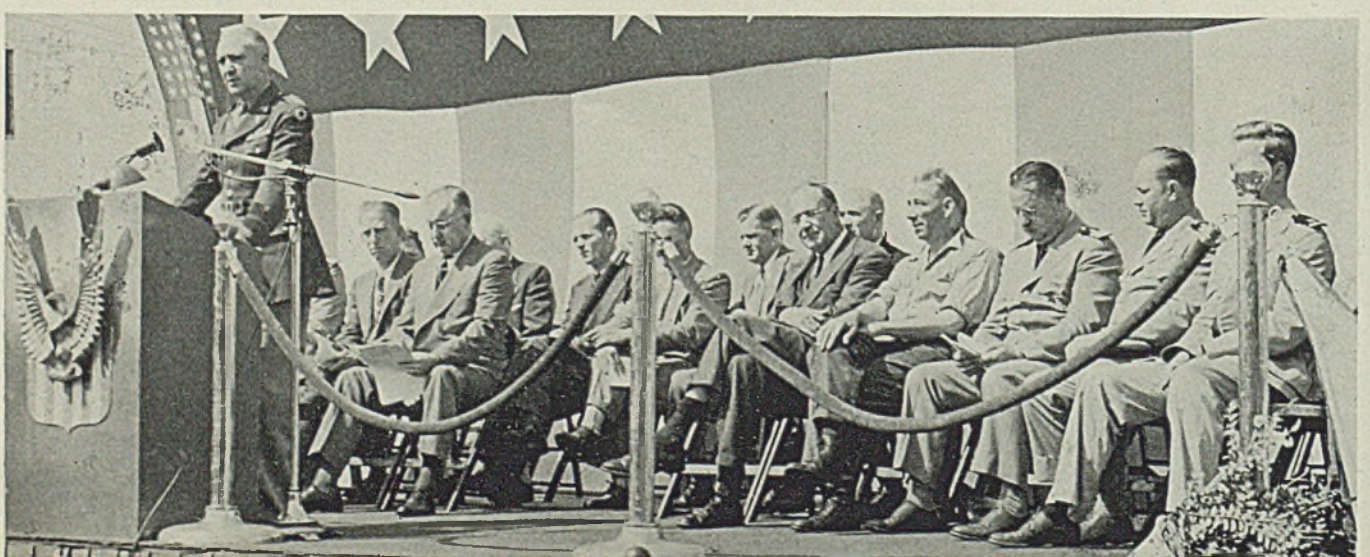
Alfred G. Hansen, for 52 years an employe of Gisholt Machine Co., Madison, Wis., receives, left, the lapel insignia from Comm. E. H. Schubert, Navy, while Brig. Gen. N. F. Ramsey and Gov. Julius P. Heil of Wisconsin applaud. Gisholt on the same day received the Treasury flag for 90 per cent participation in the War Bond program

Four of the oldest employes of Jenkins Bros., Bridgeport, Conn., manufacturers of valves, receive the "E" pennant from Bernard J. Lee, vice president in charge of manufacturing. Seated are Farnham Yardley, 73-year-old president of the company, and Rear Admiral Wat T. Cluverius, who made the presentation

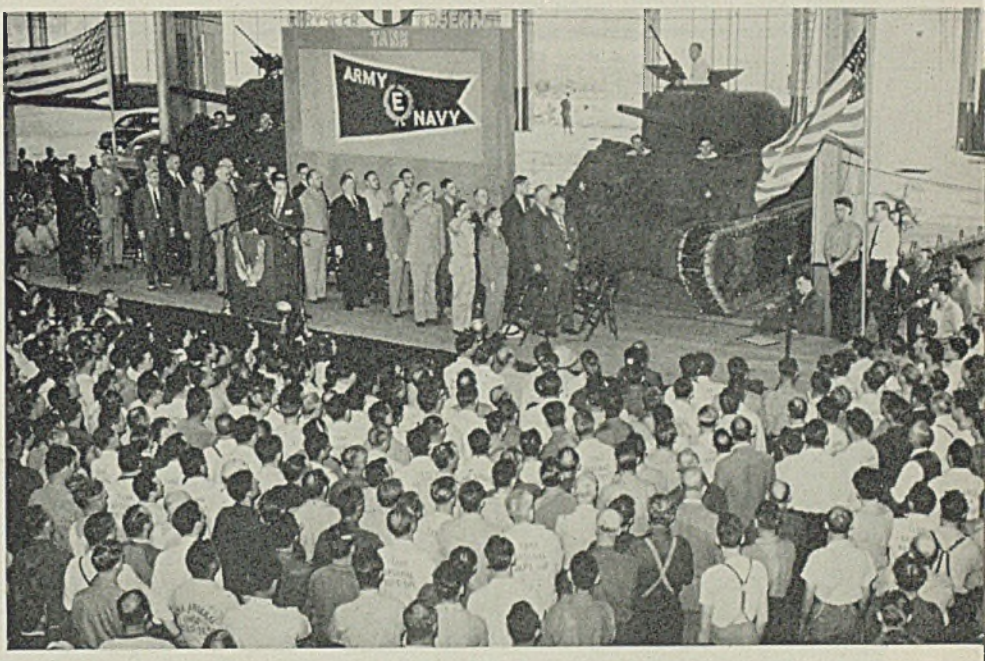


Color guards "present arms" as the pennant is raised above the Westinghouse Electric & Mfg. Co.'s Nuttall gear works, Pittsburgh, below

Only members of the organization and their families witnessed the Army-Navy "E" presentation to the National Broach & Machine Co., Detroit. Photo below shows Col. A. B. Quinton Jr., chief of the Detroit ordnance district, making the presentation address



Col. D. N. Hauseman, chief of the Philadelphia ordnance district, lauds, above, Ford Motor Co. workers of the Chester branch as they gathered for presentation of the joint Army-Navy pennant. NEA photo



Standing at attention to the tunes of the Star Spangled Banner, 5000 employes of the Detroit (Chrysler) Tank Arsenal, right, receive the award for "high achievement in the production of war material". The arsenal recently changed over from the manufacture of General Grants (M-3s) to General Lees (M-4s) without halting production

Admiral E. J. O'Brien Croker, chief of the British admiralty technical commission at Ottawa, congratulates, left, Edgar H. Bristol, president, the Foxboro Co., Foxboro, Mass., on the contribution the company's workers are making to British naval operations, particularly against U-boats. Foxboro is engaged in work of a confidential nature for the Royal Navy

Graham H. Anthony, president, Veeder-Root Inc., Hartford, Conn., and Col. Conrad E. Snow, Army, hold the newly-received burgee aloft, right

Steelmakers Urged To Make Up Shortage in Imports from U. S.

TORONTO, ONT.

SERIOUS shortage of steel threatens Canada's record in production of essential war materials. Despite the utmost effort of domestic steel mills to cope with the increasing demand and almost complete suspension of non-essential use, Canada has had to depend on the United States for about 40 per cent of her steel requirements.

Announcements from Washington in the past few days are taken to mean that in addition to curtailing deliveries of steel in that country they also will affect shipments to Canada. As a result C. D. Howe, minister of munitions and supply, now in England, has wired the following appeal to Canadian steel interests:

"The United States has found it necessary to reduce substantially the allotment of steel to Canada for the next three months. It is urgent that this cut be not allowed to interfere with our war production program. We therefore appeal to the steel workers of Canada to exert a titanic effort to expand Canadian steel output in order that our war production may not suffer from the lack of the basic material, steel."

According to actual steel requirements this appeal means Canadian mills are asked to pour as much steel in 12 weeks as they normally do in 14 weeks, a maximum increase of 175,000 tons. As of last June imports from the United States were on a basis of 2,000,000 tons per year, about one-third of the Dominion's total consumption. On Oct. 1 a reduction of 35 per cent in all strategic materials to American war plants was ordered under the Production Requirements Plan. If the same percentage is applied to quarterly allotments to Canada the loss will equal 175,000 tons on midsummer figures.

To meet this requirement mills will require more help and selective service officials will give priority over all other labor demands except coal and base metal mines. As pig iron production is at 100 per cent and surplus stocks are less than 40,000 tons, much larger scrap supply will be necessary to reach the steelmaking objective set by Mr. Howe.

Increased Output Not Enough

Since the outbreak of the war blast furnace capacity has been increased 35.5 per cent and steel ingots and castings by 63 per cent. Current pig iron production is at an annual rate of 2,123,320 tons and steel castings output is at approximately 98 per cent of annual rated capacity of 3,402,000 tons. These figures indicate there is some doubt of Canada's ability to produce sufficient steel to offset the intimated decline in imports from the United States. Enlargement of blast furnace and steelmaking capacity now under way will give a substantial increase, but this is not expected to be available until the early part of 1943.

The war industry, in which steel and iron are the principal raw materials, has been expanded on a much greater scale than capacity for producing the raw materials. Figures by H. K. Thompson, director general of the contracts division of the Department of Munitions and Supply, show shipbuilding and repair this year advanced 184.5 per cent over 1941; aircraft production 157.7 per cent; mechanical transport, 94.7 per cent; small arms, 980.9 per cent; shells and bombs, 143 per cent; chemicals and explosives, 109 per cent; armored vehicles, including tanks, 857 per cent; instruments and equipment, 1083 per cent.

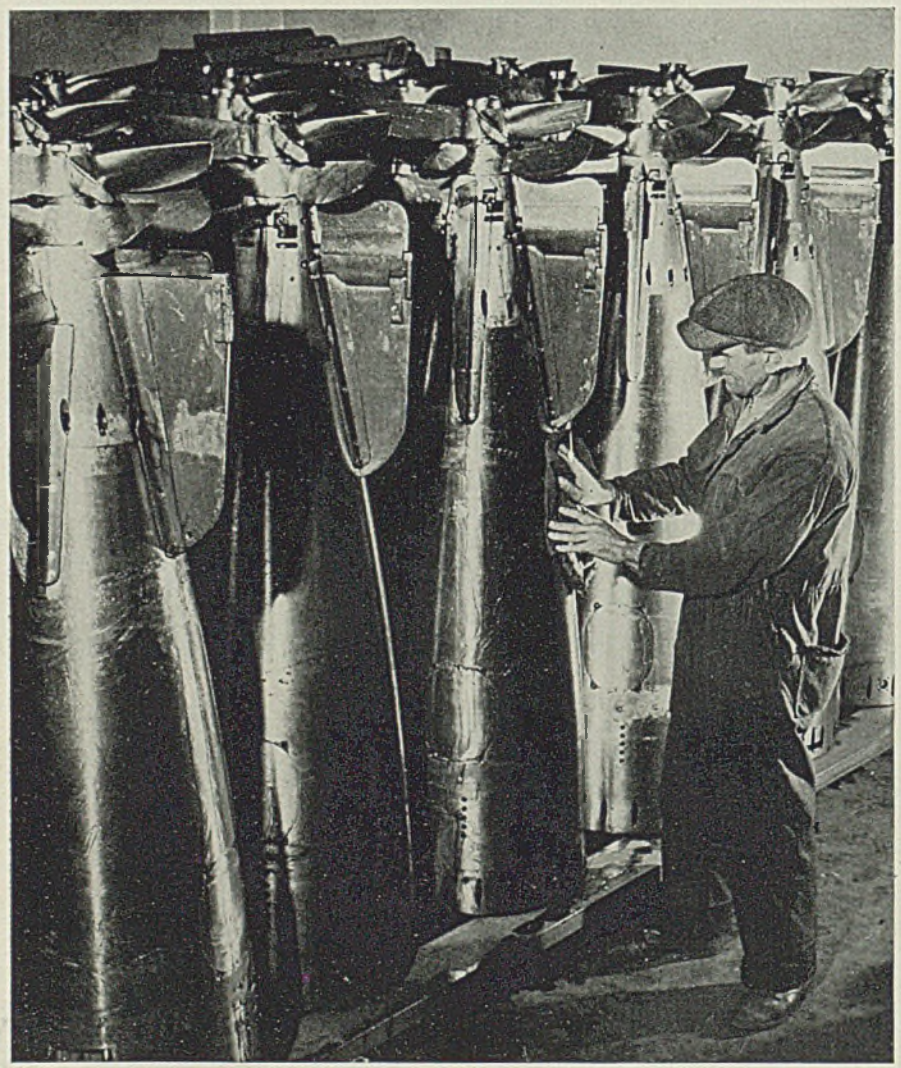
Production figures for the two years are as follows:

	1941	1942
	(000 omitted)	
Shipbuilding, repairs	$ 91.000	$259 000
Aircraft production	104 000	268,000
Mechanical transport	206 000	401,000
Small arms all kinds	21 000	227.000
Shells, bombs	88 000	214.000
Chemicals, explosives	53 000	111,000
Armored vehicles, tanks	21 000	201 000
Small arms, ammunition	16 000	49 000
Instruments, equipment	12,300	145,500

All unnecessary wartime industrial ex-

(*Please turn to Page* 118)

"FISHTAILS" FOR THE AXIS



?KMAN in a Canadian plant puts the finishing touch, a light coat of grease, -ssemblies for the deadly "tin fish"—torpedoes. Their manufacture represents a new industry in the Dominion

Leading Steel Warehouse Interest Had Roots in Small Eastern Forge

Chicago iron store in 1842 grows to plant covering five city blocks and nine large branches. . . Has provided steel through four major wars and many financial depressions

IN NOVEMBER the nation's largest steel warehouse interest will celebrate its centennial. This 100-year period—1842 to 1942—not only embraces the transition from iron to steel, but includes four major wars—Civil, Spanish American, World War I, and World War II. The company's distribution of steel now is channeled completely into the armament and essential industry program.

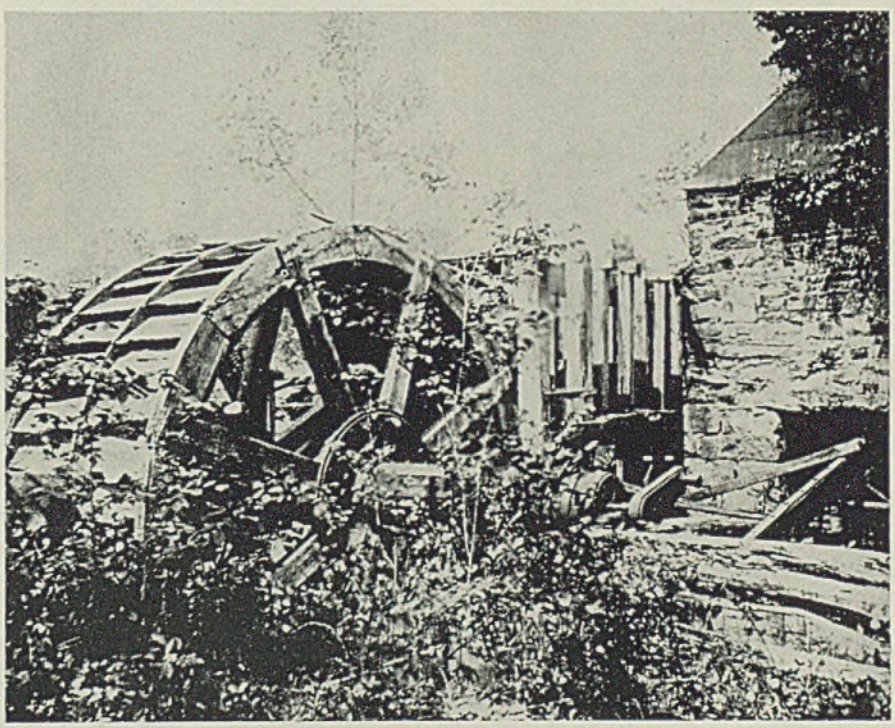
One hundred years ago, an "iron store" was established in a country town and was the beginning of Joseph T. Ryerson & Son Inc. Its founder, Joseph T. Ryerson, at the age of 29, went from Pittsburgh to Chicago and started his small "Pittsburgh Iron Store" on the banks of the Chicago river. The establishment grew from the little shop in muddy pre-railroad Chicago to a nation-wide service in ten key-city plants that measure floor space in acres, spur trackage in miles, and annual shipments in many thousands of tons.

Even in 1842, the Ryerson name was known to the iron business. Back in 1750, members of the family were developing iron ore deposits in Northern New Jersey and making pig iron. The ore was found on property owned by a syndicate, of which George Ryerson was a member. During the Revolutionary war, Ryerson mines and forges furnished some of the iron used in the famous chain which effectively blockaded the Hudson river at West Point, N. Y.

It was from this family that Joseph T. Ryerson departed to start his iron store in the West. An advertisement in the Chicago City Directory of 1844 listed the following items for sale "Flat Bar, Tire, Round, Square, Hoop, Band, Saddle Tree, Horse Shoe, Boiler, Sheet Iron, etc., Plough, Spring, Blister, English and German Steel, Buggy Springs, Axles, Wagon and Dearborn Boxes. Also, Nails, Brads, Cut and Wrought Spikes, White Lead, Glass, etc., etc."

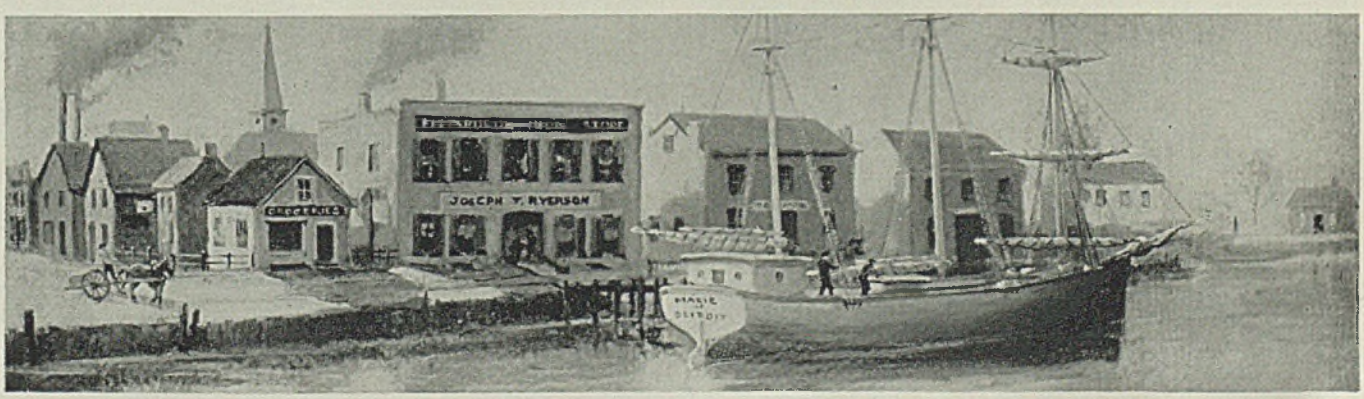
The Ryerson organization has been no stranger to adversity, nor the trials by fire and by disaster which dramatize every saga of successful American business. But the attitude of its founder explains, in part at least, why the organization is not "just another steel jobber" today. Typical is the following statement dictated by Joseph T. Ryerson just before his death in 1883:

"I have passed through the revulsion and panic of 1837, through the failure of two large houses with whom I had served as a clerk; through the panics of 1857 and 1873 and their revulsions; through the years of the war of the rebellion; had



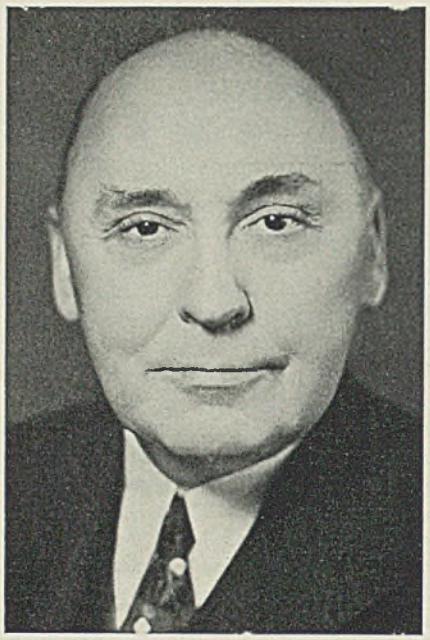
Waterwheel of early Ryerson forge (right). A nearby millpond furnished water to turn the old wheel, supplying power for this early New England venture. Over 150 years ago the charcoal iron smelted in the adjacent furnace and hammered into shape at this forge helped American colonists establish new frontiers. Today, five generations later, the name Ryerson is still in steel

—o—



Chicago's first iron store (below). Exorbitant freight costs and impassable roads of 1842 prompted Joseph Ryerson to locate his Chicago iron store on the river front, handy to shipping. Since most of the iron came from Pittsburgh it was natural for the first Ryerson sign to read, "Pittsburgh Iron Store"

Edward L. Ryerson
Chairman of the board



Everett D. Graff
President

Robert C. Ross
Vice president and secretary

E. L. Hartig
Vice president and treasurer

my warehouse on Water Street break down years ago in the interior from attic to cellar through an architectural defect, and came within five minutes of being crushed myself; had my Lake Street store twice partially burned, and my Water Street store totally destroyed by fire; have had many hard journeys and hard times, but I never knew what it was to be scared of fate or ever to lie down under difficulties. On the contrary, I rather enjoyed fighting them."

In those earliest years, the man who "rather enjoyed" fighting difficulties slept over his store and boarded for $2 a week at the Tremont House, a hostelry sometimes frequented by the young downstate lawyer, Abraham Lincoln. Young Ryerson apparently "rather enjoyed" work too, for he was his own receiving clerk, shipping clerk, salesman and bookkeeper.

Chicago was growing with a rush, and so was the Ryerson business. Within six months of the opening of the first store, new and larger quarters were rented. And just two years from founding of his business venture, Joseph T. Ryerson leased property and erected a two-story brick warehouse in what is now Chicago's Loop, where he added to his stock of nuts, bolts, strap, bar and sheet iron, by installing a line of hardware. He was intent on supplying his frontier customers not only with iron, but with tools with which to work it.

By 1852, Chicago had grown in ten years from 6000 to more than 30,000 population, another expansion came and Ryerson purchased a dock site on what is now Chicago's Wacker Drive.

The Chicago fire of 1871 brought total destruction to the Ryerson property, but immediately a new stock was ordered and business was carried on at a temporary location while a new store was being built. In 1882, as Joseph T. Ryerson's life was drawing to a close, a new three-story building with larger space was built north of the Chicago river on Milwaukee

Ainslie Y. Sawyer
Assistant to the president

H. B. Ressler
Vice president and manager
Jersey City plant

Fred S. Doran
Vice president

V. H. Dieterich
Vice president

avenue, in a new industrial district.

When he died in 1883, Joseph T. Ryerson had seen a prairie town grow into a city of half a million. And he had seen an industrial nation change from iron to steel. When he went to Chicago, the only railroad in the West was advertising "Toledo to Adrian—33 miles—and return the same day!", and rails were made of wood, or flat iron bars, or strap iron on wood. The name "Bessemer" was not to mean anything for another quarter century. By the end of his life, he had seen the continent spanned by rails of steel, the incredible Eads bridge across the Mississippi completed, and the "impossible" Brooklyn bridge begun.

The increasing tempo of the steel industry brought about the incorporation of the business in 1888 under its present name by Joseph T. Ryerson's son, Edward L. Ryerson. A few years later, the company moved to a tract covering about 21 acres at Sixteenth and Rockwell streets, its present Chicago location.

Chairman of the board today is Edward L. Ryerson, grandson of the founder, who also is chairman of Inland Steel Co., Chicago, now the parent company. His brother, Joseph T. Ryerson, who served as president during World War I, is a director of Inland Steel Co. Everett D. Graff, veteran steel executive and 35 years with the Ryerson company, is now president.

Headquarters remain in Chicago, but the organization's expansion includes plants in Jersey City, Boston, Philadelphia, Buffalo, Cincinnati, Cleveland, Detroit, Milwaukee and St. Louis, with sales offices in many other cities.

The company's problem in the 1880's and 1890's and early years of the Twentieth century was two-fold—to keep up with the rapidly increasing demand for greater quantities of steel, and to keep pace with industry in its requirements for

DIRECT BRANCH PLANTS

A. L. Petersen
St. Louis

G. W. Smith
Milwaukee

C. S. Gedney
Buffalo

J. M. Mead
Philadelphia

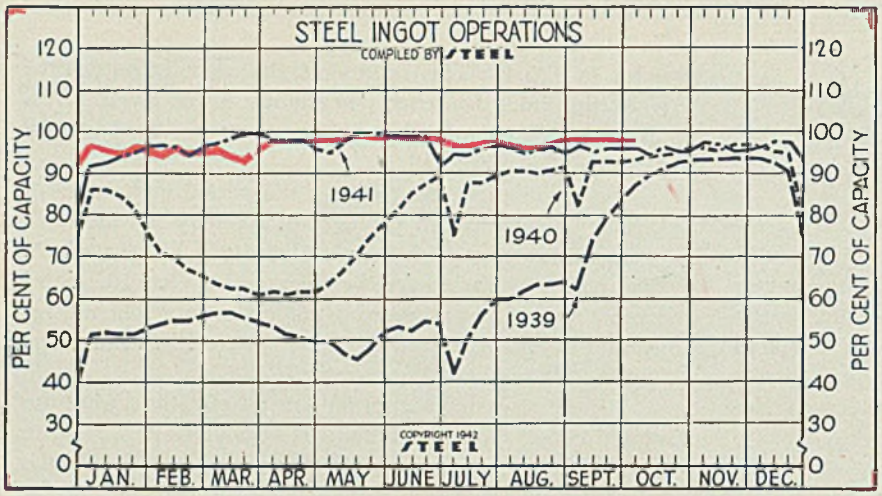
H. C. Wills
Boston

D. L. McCubbin
Cincinnati

E. M. Vehmeyer
Detroit

J. P. McGough
Cleveland

Waterfront home of Joseph T. Ryerson at 218-224 South Water street, Chicago, in the early 1850's



Steel Ingot Operations

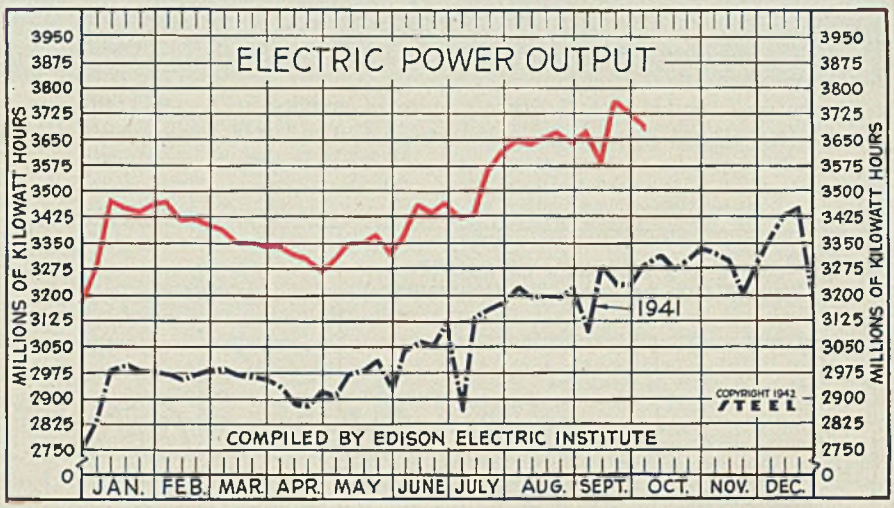
(Per Cent)

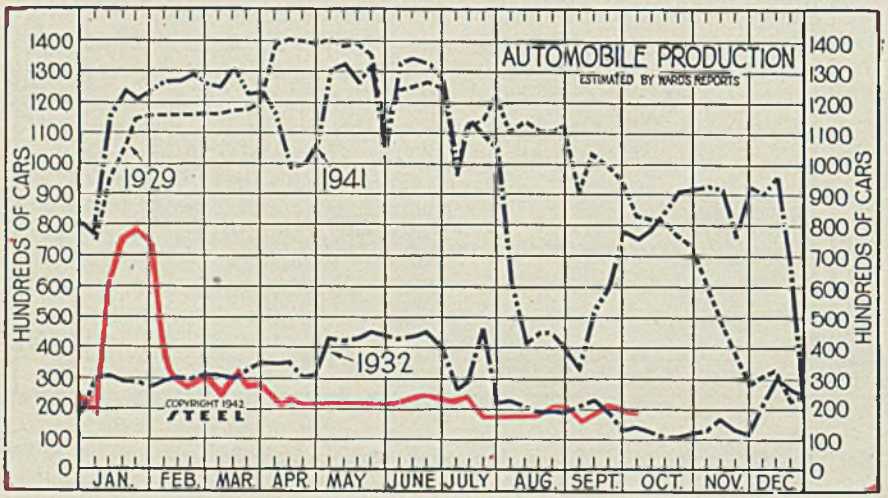
Week ended	1942	1941	1940	1939
Oct. 3	98.0	96.0	93.5	87.5
Sept. 26	98.0	96.0	93.0	84.0
Sept. 19	98.0	96.0	93.0	79.5
Sept. 12	98.0	96.5	93.0	74.0
Sept. 5	98.0	95.5	82.0	62.0
Aug. 29	96.0	96.5	91.5	64.0
Aug. 22	97.5	96.0	90.5	63.5
Aug. 15	97.0	95.5	90.0	63.5
Aug. 8	97.5	96.5	90.5	62.0
Aug. 1	98.0	97.5	90.5	60.0
July 25	98.5	96.0	89.5	60.0
July 18	98.0	95.0	88.0	58.5
July 11	97.5	95.0	88.0	50.5
July 4	97.5	92.0	75.0	42.0
June 27	98.5	99.5	89.0	54.0
June 20	99.0	99.0	88.0	54.5
June 13	99.0	99.0	86.0	52.5

Electric Power Output

(Million KWH)

Week ended	1942	1941	1940	1939
Oct. 3	3,683	3,290	2,792	2,554
Sept. 26	3,720	3,233	2,816	2,559
Sept. 19	3,757	3,232	2,769	2,538
Sept. 12	3,571	3,281	2,773	2,532
Sept. 5	3,673	3,096	2,592	2,376
Aug. 29	3,640	3,224	2,736	2,442
Aug. 22	3,674	3,193	2,714	2,434
Aug. 15	3,655	3,201	2,746	2,454
Aug. 8	3,649	3,196	2,743	2,414
Aug. 1	3,649	3,226	2,762	2,400
July 25	3,626	3,184	2,761	2,427
July 18	3,565	3,163	2,681	2,378
July 11	3,429	3,141	2,652	2,403
July 4	3,424	2,867	2,425	2,145
June 27	3,457	3,121	2,660	2,396
June 20	3,434	3,056	2,654	2,362





Auto Production

(1000 Units)

Week ended	1942	1941	1940	1939
Oct. 3	19.9	76.8	105.2	76.1
Sept. 26	20.9	78.5	96.0	62.8
Sept. 19	21.0	60.6	78.8	54.0
Sept. 12	19.6	53.2	66.6	41.2
Sept. 5	16.9	32.9	39.7	26.9
Aug. 29	21.1	40.0	27.6	25.2
Aug. 22	20.2	45.5	23.7	17.5
Aug. 15	19.2	45.6	20.5	13.0
Aug. 8	19.2	41.8	12.6	24.9
Aug. 1	18.3	62.1	17.4	28.3
July 25	18.3	105.6	34.8	40.6
July 18	17.9	109.9	53.0	47.7
July 11	23.0	114.3	65.2	61.6
July 4	22.7	96.5	52.0	42.8
June 27	22.9	127.9	87.6	70.7
June 20	23.2	133.6	90.1	81.1

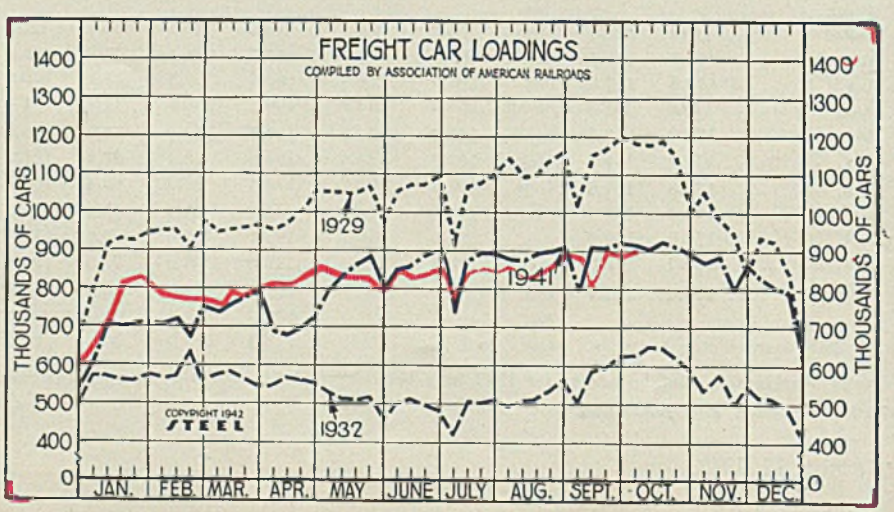
Figures since Feb. 21 last include Canadian trucks and automobiles and United States trucks.

Freight Car Loadings

(1000 Cars)

Week ended	1942	1941	1940	1939
Oct. 3	903†	918	806	835
Sept. 26	898	920	822	835
Sept. 19	903	908	813	815
Sept. 12	815	914	804	806
Sept. 5	888	798	695	667
Aug. 29	899	913	769	722
Aug. 22	869	900	761	689
Aug. 15	869	890	743	674
Aug. 8	850	879	727	665
Aug. 1	864	883	718	661
July 25	856	897	718	660
July 18	857	899	730	656
July 11	855	876	740	674
July 4	759	741	637	559

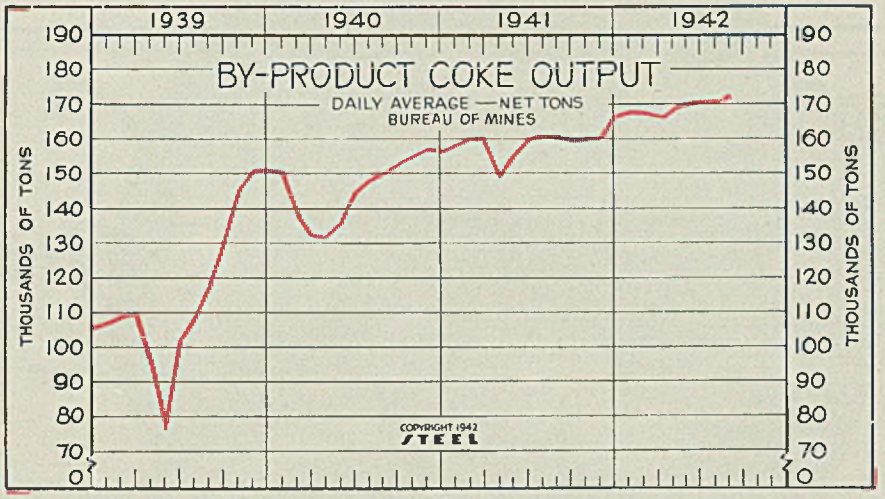
†Preliminary.

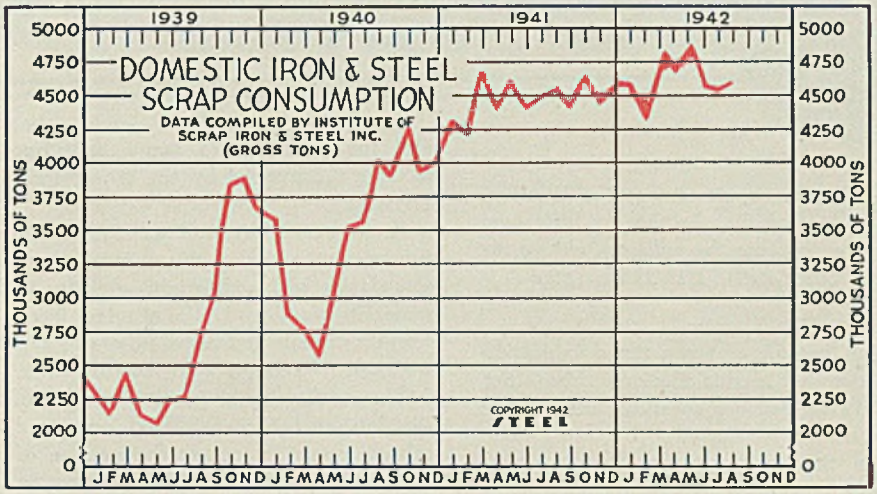


By-Product Coke Output

(Daily Average)

	1942	1941	1940	1939
Jan.	168,508	159,129	151,841	108,611
Feb.	168,414	160,789	138,508	109,923
March	167,733	161,268	133,056	110,921
April	168,960	149,144	132,812	97,155
May	170,187	156,318	136,897	77,304
June	170,593	161,201	145,821	102,991
July	170,244	161,731	149,005	108,542
Aug.	171,443	161,709	151,035	118,260
Sept.	.....	160,193	154,247	130,144
Oct.	.....	160,344	156,118	146,019
Nov.	.....	161,116	158,331	152,219
Dec.	.....	167,304	157,743	152,200
Total	.....	160,037	147,157	117,892





Iron and Steel Scrap Consumption

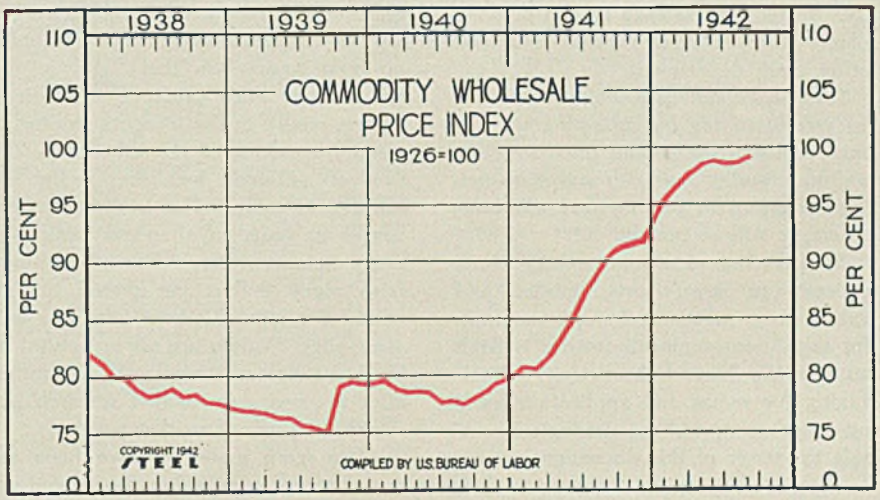
(Gross Tons)

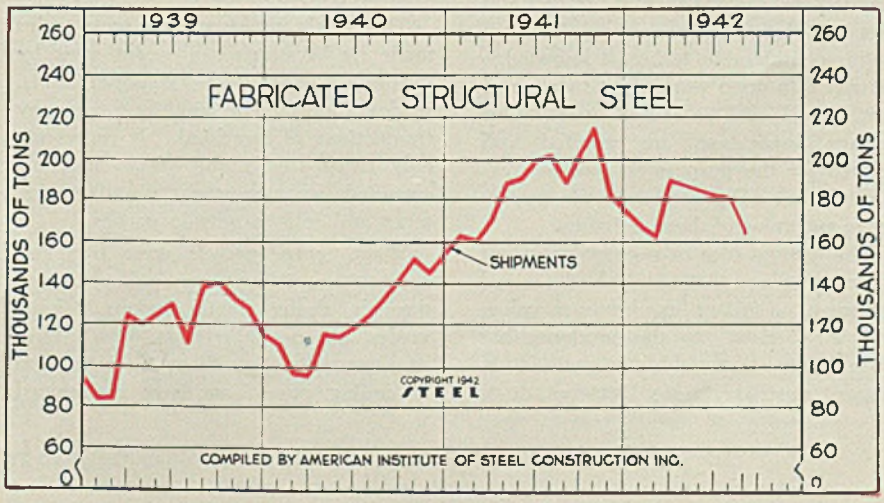
	1942	1941	1940	1939
		(000 omitted)		
Jan.	4,590	4,278	3,581	2,257
Feb.	4,276	4,172	2,812	2,124
Mar.	4,840	4,662	2,728	2,419
Apr.	4,672	4,406	2,548	2,114
May	4,857	4,609	3,061	2,079
June	4,608	4,406	3,482	2,221
July	4,600	4,415	3,526	2,247
Aug.	4,645	4,518	3,968	2,675
Sept.	....	4,392	3,876	3,018
Oct.	....	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

All Commodity Wholesale Price Index U. S. Bureau of Labor

(1926 = 100)

	1942	1941	1940	1939	1938
Jan.	96.0	80.8	79.4	76.9	80.9
Feb.	96.7	80.6	78.7	76.9	79.8
March	97.6	81.5	78.4	76.7	79.7
April	98.7	83.2	78.6	76.2	78.7
May	98.8	84.9	78.4	76.2	78.1
June	98.6	87.1	77.5	75.6	78.3
July	98.6	88.8	77.7	75.4	78.8
Aug.	99.2	90.3	77.4	75.0	78.1
Sept.	...	91.8	78.0	79.1	78.3
Oct.	...	92.4	78.7	79.4	77.6
Nov.	...	92.5	79.6	79.2	77.5
Dec.	...	93.6	80.0	79.2	77.0
Ave.	...	87.3	78.5	77.1	78.6

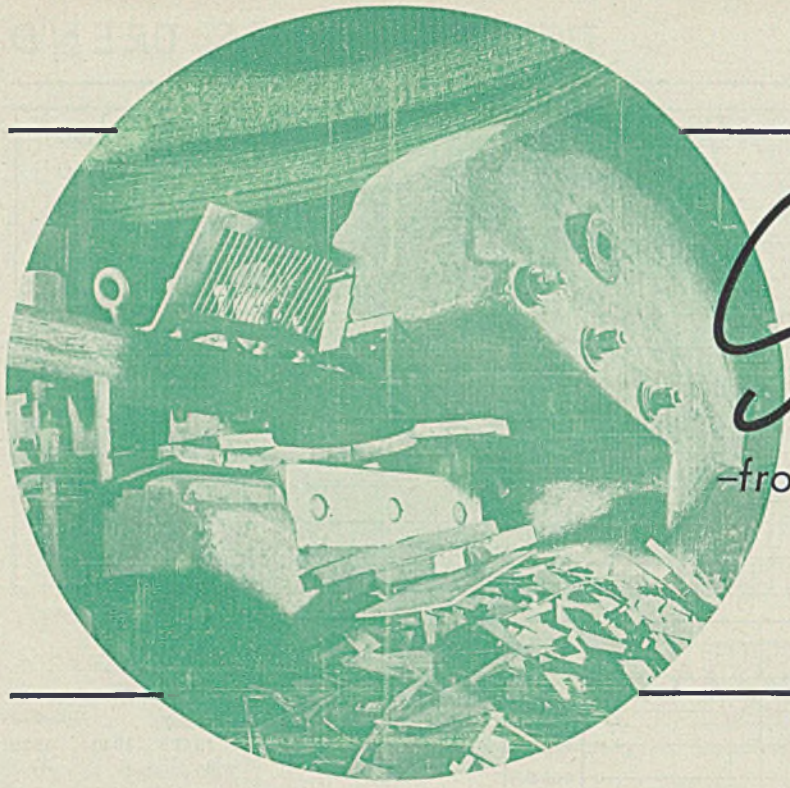




Fabricated Structural Steel

(1000 tons)

	Shipments			Bookings		
	1942	1941	1940	1942	1941	1940
Jan.	167.8	164.6	110.9	183.4	281.2	81.7
Feb.	164.6	161.4	97.2	228.7	173.6	98.9
Mar.	191.3	170.2	95.9	248.3	206.1	128.3
Apr.	187.2	189.8	116.3	314.0	218.0	73.8
May	184.2	191.9	115.6	161.0	179.9	126.8
June	182.7	200.5	119.1	184.5	246.9	109.7
July	182.6	203.0	127.1	113.5	214.8	194.9
Aug.	165.2	189.3	134.9	73.5	158.7	122.5
Sept.	....	204.1	142.8	....	158.8	225.5
Oct.	....	217.7	153.2	....	128.7	233.1
Nov.	....	182.6	147.0	....	184.0	141.9
Dec.	....	176.1	155.5	....	146.4	203.1
Tot.	....	2251.1	1515.5	....	2297.0	1748.1



Salvage

—from a producer's viewpoint

By C. R. STEVANS
Purchasing Department
Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

Whale-like jaws of this shear in the metal conservation department of the Westinghouse East Pittsburgh works chew up 25 tons of steel daily. By making little ones from big ones, value of scrap is increased $3 per ton, because the mills can charge the small sections into the furnace with less work. Shear cuts 5-inch thick sections

SALVAGING of scrap metals and waste materials is daily assuming greater importance as our processing facilities for converting raw materials into war goods leaps forward. Salvage is not only a patriotic duty but a paying activity. In fact, the salvage section of some plants shows a greater profit than any other plant department.

Yet salvage activities could be speeded up greatly simply by correcting uneconomic faults in the ceiling price structure and by adopting a simpler and more uniform wording in priority and allocation orders, as will be pointed out.

That division of salvage activity which collects, prepares, sorts, grades and values scrap metals and waste materials for sale to consuming industries is dealt with briefly here. The activity of salvaging for re-use and application for a producer's own end-use products is outside the scope of this discussion.

Adequately equipped salvage divisions or departments to care for the correct handling of scrap metals and waste materials are found at each of the many Westinghouse plants located in numerous industrial and commercial centers throughout the United States. Incoming scrap items are received by the salvage department, weighed, measured or counted, valued and recorded. From the records, credits are issued to each department for scrap it sends in.

All the costs incidental to the operation of the salvage department, including the full overhead items, are chargeable to the department. Money received from the sale of scrap items to outside parties and credits received from other works or divisions constitute the salvage department's income.

In the Westinghouse setup the difference between costs and income is either a gain or a loss, the objective being to "break even" or operate on a no-profit basis. On that basis, in the case of too much profit of a sustained nature, credits to departments sending in scrap are increased in value. In the case of sustained loss, the credits are lowered in value. The crediting system has as its basis an allowance value for every item sent in. The values range from many dollars per pound to "no value" for some kinds of mixtures and assemblies. Values are set by central or headquarters auditing and accounting after the necessary market research has established correct market prices.

After scrap materials have been received at the salvage department and accounted for, they are sorted, graded and prepared for market re-use. This requires considerable technical knowledge as well as a good working knowledge of commercial and industrial uses. Our salvage supervisors are selected and trained for the purpose as company executives are fully aware of the importance and value of these activities.

The general idea or concept prevalent some years ago that any value received for scrap, no matter how low such value, was all "velvet" to the producer has been quite thoroughly evaporated in some industrial lines. However, it is still too prevalent in many industries as recent canvasses by the writer have revealed.

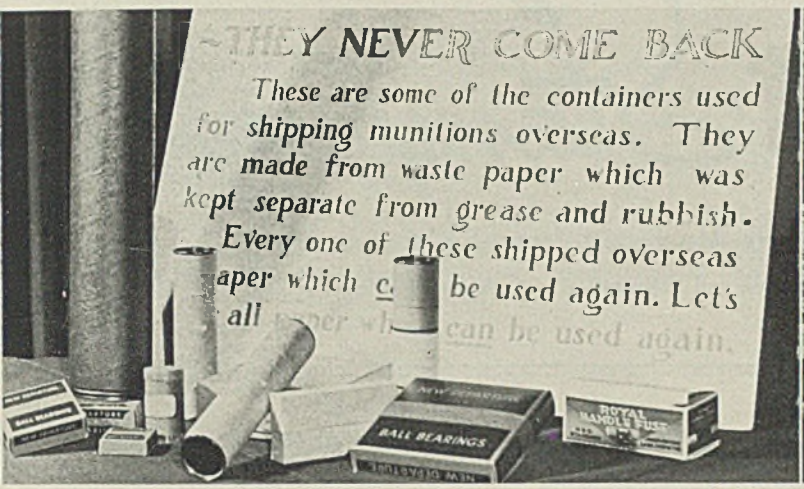
In the general over-all accounting of a producer's business, the income from scrap sales acts as a credit applying to materials purchased. The more intelligently the sale and distribution of scrap are made, the larger the credit becomes.

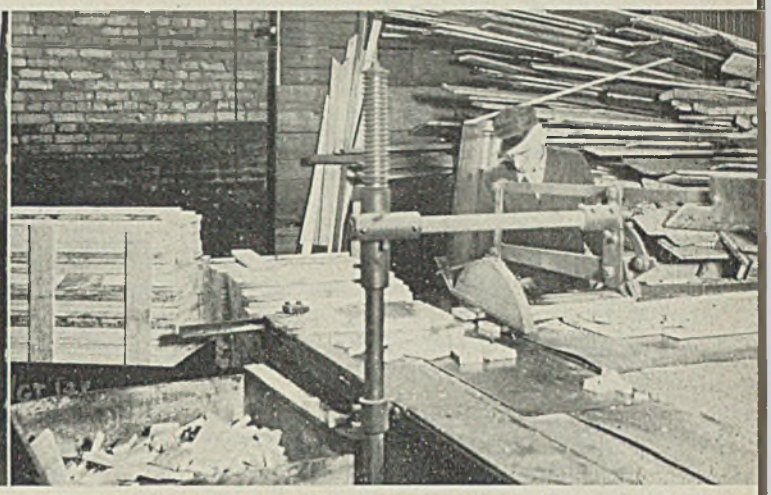
The reader should get a good idea of the business side of a well organized salvage setup by noting the volume of scrap sales made by this company in 1941. While dozens of distinct grades and forms were sold, we have for convenience arranged them into three groups or classification: Ferrous metals, nonferrous metals and miscellaneous.

The ferrous group contains iron and steel and all metals forming carbides. The nonferrous group contains copper and copper-base alloys, aluminum, magnesium, tin, lead and zinc in all forms including alloys and compounds. It includes, also, noble metal scrap. The miscellaneous group contains scrap lumber, cinders, nitrogenous compounds, cotton rags, wool trim, rubber, rope, burlap and paper. It contains, also, items sold by the "piece" such as barrels, drums and other containers. Table I shows the 1941 sales.

The totals represent all scrap sales made by Westinghouse except sales by the manufacturing-service departments. It does not include any inter-company transactions of any kind. It represents only scrap metals and waste materials classified as necessary manufacturing scrap and sold to outside parties.

When scrap markets were free and competitive, it was our policy to sell through dealers and brokers. Some grades, for specific reasons, were sold to consumers directly. Since the imposition of ceiling prices, we have maintained





Left, exhibit shows how waste paper can be reclaimed to make containers for shipping munitions overseas. A two-week campaign at the East Springfield plant of Westinghouse netted enough waste paper to wrap 3,335,000 bullets. Right, packing crates from incoming shipments are sawed into standard lengths for making crates for outgoing material. Nails are not pulled, for it is cheaper to saw off end of board and burn it. Some 15,000 board feet of lumber are reclaimed monthly

our dealer and broker relations in all cases. In fact, we have actually increased the number at the specific requests of consumers to whom we had sold directly on contracts.

Scrap items occuring regularly in carload lots are sold by yearly contracts. The pricing clause is designed so that price changes, if any, become effective on the first day of each month. We reserve, also, the right to allocate any or all scrap sold on such contracts to any of several consumers. Lots in less than carload tonnage are sold by negotiation, each lot by itself. This is also true of nonrecurring lots.

The yearly contract system has been in effect since 1936, and it has functioned perfectly. Its success has aided considerably by making as wide a distribution among dealers, brokers and consumers as the volume in carload lots warranted. Also, the price structure had been designed to get maximum prices as such prices insure the flow of scrap to the correct consuming industry.

The current situation, involving priorities, allocations, reports and ceiling prices, is quite complex. We have been in full accord with the motivating idea, plan and purpose of ceiling prices, priorities and allocations from the beginning. In all fairness, the government has done a wonderfully fine job.

In a spirit of helpful suggestion the writer believes that the time is right to supplement and eliminate obviously uneconomic rules, definitions, methods and prices. In the elimination of such items, it is not enough to consult consumers, dealers and brokers. The informed producer, too, should have a voice as it has been the writer's experience that the other factors in the scrap situation are very well informed, indeed.

A composite industry setup of price ceilings, priorities and allocations shows that all the essentials fair to all parties are only present in a few of them, partially in some and almost entirely lacking in others. This situation is understandable considering the speed that had to be applied at the start and the diversity of abilities and experiences of the personnel engaged in the work.

It should not be a difficult matter to select a representative commodity, prepare the rules, regulations and prices and use it as a basic plan to apply to all price schedules. Premiums for quantity, discounts for mixtures, and the elimination of meaningless grade names by substituting recovery standards would take something from the complexity and furnish uniformity.

Priority and allocation regulations for critical materials need a basic plan or formula so that flow will not be backed up. This can be illustrated by the situation existing in aluminum scrap fit only for metallurgical ingots, mill grades of yellow brass turnings and mixed paper. These three items are becoming increasingly difficult to move in quantity.

Industry could help enormously in the work of having scrap flow steadily into productive channels by establishing alert and competent supervision in the handling of scrap. There is entirely too high a percentage of mixed scrap, particularly that which contains critical materials. Such scrap must be sorted and conditioned somewhere along the flow line. This could be remedied at the source—the production line—and it should be. At the same time, there is no need to resort to extremes at the production lines. Proper segregation of scrap can be handled without complications providing it is planned properly.

All industrial units employing 50 or more people should have a man charged with the responsibility of getting scrap into productive channels. Also, he should be responsible for moving obsolete and surplus materials, unused machinery, equipment and the odds and ends of things stored in out-of-the-way places and forgotten.

In the Pittsburgh area, a committee functioning as a division of WPB has been charged with the responsibility of getting out industrial scrap from units employing 100 people or more. The committee has found many units without a scrap and salvage setup, but in all cases such a setup has been promised, and the promises will be kept.

The specific value of such organized effort is the sustained flow of scrap materials through regular channels, channels designed to carry everything from small junk-wagon lots to carload shipments.

The tremendous and vital program of getting needed scrap into productive

(*Please turn to Page* 114)

TABLE I—Scrap Sales, 1941

	Pounds	Value
Ferrous	198,828,000	$1,568,000
Nonferrous	7,995,000	693,000
Misc.	462,000	62,000
Totals	198,285,000	$2,323,000

Composite Stampings

Replace Forgings, Castings, Parts Machined from Solid Bar Stock

(Section V in a Series on Conservation and Substitution in Ordnance Work)

By G. W. BIRDSALL
Engineering Editor, STEEL

AS POINTED OUT by the Ordnance Department in one of its recent publications, everyone can be proud of the big things that American genius and industry have accomplished to date in ordnance production.

But now we are challenged by shortages in materials that are becoming ever greater obstacles to production for victory. There is no advantage in our producing three times as much steel as the Axis if the Axis makes theirs go three times as far.

Thousands of ordnance items that we are now making from critical materials on critical machines *must be made from less critical materials on less critical machines.* This article proposes to show how American ingenuity and initiative are being employed to do just that.

Saves Huge Volumes of Materials: But first it is important to obtain an idea of what is involved. Ordnance requirements can and do necessitate a huge volume of certain items. When a single contract calls for hundreds of millions, a saving that at first glance appears insignificant comes to assume tremendous importance.

Fig. 1 shows such an example. This primer unit was originally made from a brass tube. Now stamped from steel sheet, "U'd" up and closed, sealed by brazing, no brass is required at all. While this saving is only 0.59-pound per unit, on a single order for 100,000,000 some 29,500 tons of brass will be saved —and that's an important amount of a critical material.

Please note that all the examples shown here have not yet been approved for use in ordnance. Drawings are not complete nor to scale. Any dimensions shown are only approximate.

Saves Critical Machine Time: Besides materials, certain items require much production time on critical machine tools. For example, Fig. 2 is a fin lock nut formerly made as a forging which was machined and threaded. Now it is made as a composite stamping. On an order for 2,000,000 units, this saving of critical machine tool time amounts to 100,000 machine hours. While it only requires 3 minutes to machine one fin lock nut, the saving on this order alone means that 14 critical machine tools will be released for an entire year's work to help relieve any machining bottlenecks.

Saves Time, Increases Production Rates: Equally valuable is the saving in production time, enabling needed ordnance items to be made available to our armed forces sooner—and that, too, is extremely important.

For example, the four fin-crate lock nut assemblies, each requiring the four parts shown in Fig. 3, are now replaced by four steel clips of the type shown. In addition to saving 5.75 ounces (8.7 carloads of steel on a single ordnance contract) on each assembly, the clips can be made 150 times faster since they are stamped out on a high-production press very quickly.

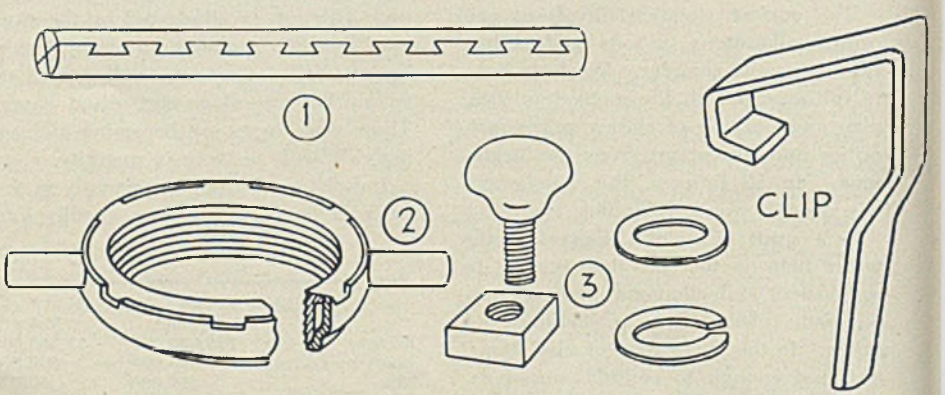
Saves Money: While cost is secondary in filling ordnance requirements, it definitely is an item that is given every consideration. Some of these redesigns save considerable money. None of them costs more than previous methods.

Fig. 4, for instance, shows a suspension guide fitting that formerly was made from three individually machined forg-

Fig. 1—Instead of a brass tube, this primer tube is now made from a sheet steel stamping, U'd up and closed by brazing; 100,000,000 of these will save 29,500 tons of brass

Fig. 2—Fin lock nut, formerly made by machining a forging, is now made as a composite stamping. On 2,000,000 units, 100,000 machine tool hours and steel for 11,500 Garand rifles will be saved as well as $283,000

Fig. 3—Four of these fin crate lock nut assemblies, left, weighing 6.5 ounces are replaced by four stamped steel clips, right, weighing only 0.75 ounce. One contract alone will save 8.7 carloads of steel. And the clips can be made 150 times faster



Much credit is due Col. H. M. Reedall, Capt. Graves Taylor and Lieut. H. C. Wolf of the Cleveland District Ordnance Office for their splendid co-operation in making the accompanying material available. Lieut. Wolf, in charge of this redesign work in the Cleveland district, was especially helpful.

To relieve critical shortages in materials and machines, and to utilize most effectively the production capacity of small metalworking plants, their sheet metal stamping and forming facilities are being brought into the war production program by clever redesigns of many ordnance items.

Advantages include release of important machine tool capacity, substitution of noncritical materials for critical materials, reduction in amount of metal required. Some large savings in production costs also are obtained

ings. Now made from stamped steel parts assembled by copper brazing, the cost has been reduced from $2.35 per unit to only $0.68—a cost reduction of almost 70 per cent.

But in addition to saving critical materials, critical machine hours, time and money, there are other important reasons for redesigning to utilize stamped parts.

Contrary to the belief of some people, the War Department is extremely interested in doing all it can to help small plants remain in business. The fact that large industrial companies got into war work first led many people to believe that the War Department was not interested in working with small manufacturers.

It should be realized that the only reason large plants got into war work first was because it was important to enlist their great production facilities in the war production program as soon as possible to assure maximum output of ordnance. Now that practically all large companies are in war work, the opportunities for small manufacturers to get into war work are multiplying rapidly, for the larger plants increasingly need subcontractors to help fill their contracts. Thus instead of fewer opportunities for small manufacturers, there still remain many opportunities for them to get into war work. Small manufacturers definitely have a place in war production work. See STEEL, June 15, 1942, p. 30, for suggestions and a detailed program for getting war work.

Helps Small Manufacturer: That the War Department is keenly interested in enlisting the facilities of smaller manufacturers is evidenced by its program of redesigning as many items of ordnance as possible so they can be made in the form of composite stampings from sheet metal instead of from forgings or castings. This is a definite help to the small manufacturer for by doing this it is possible for the small metalworking plant, which usually has a number of presses of various sizes available, to get into war production by making some of these stamped and formed sheet metal parts.

To many readers the question will arise, "Why were not these parts and assemblies designed as stampings in the first place? Why was not this design work done long ago?" Here is the answer:

The function of our arsenals is not only to manufacture ordnance in times of peace but also to develop improved designs. This means it is not desirable to freeze designs to permit tooling up for mass production in peacetimes, for full flexibility must be retained in manufacturing processes to permit utilization of improvements as fast as they are developed. Thus conditions imposed upon the designers at our arsenals and in other sections of the Ordnance Department made it necessary to develop designs which lent themselves to production in small or comparatively small quantities.

Small Volume Prohibits Mass-Production Methods: That is the reason so many items of ordnance are designed for machining from solid bar stock or as castings or forgings. Comparatively few parts were designed to be made as composite stampings (two or more sheet met-

Fig. 4—Suspension guide fitting formerly required three individually machined forgings, assembled and welded together. By stamping from heavy sheet stock and brazing, cost is reduced from $2.35 to only 68 cents per unit

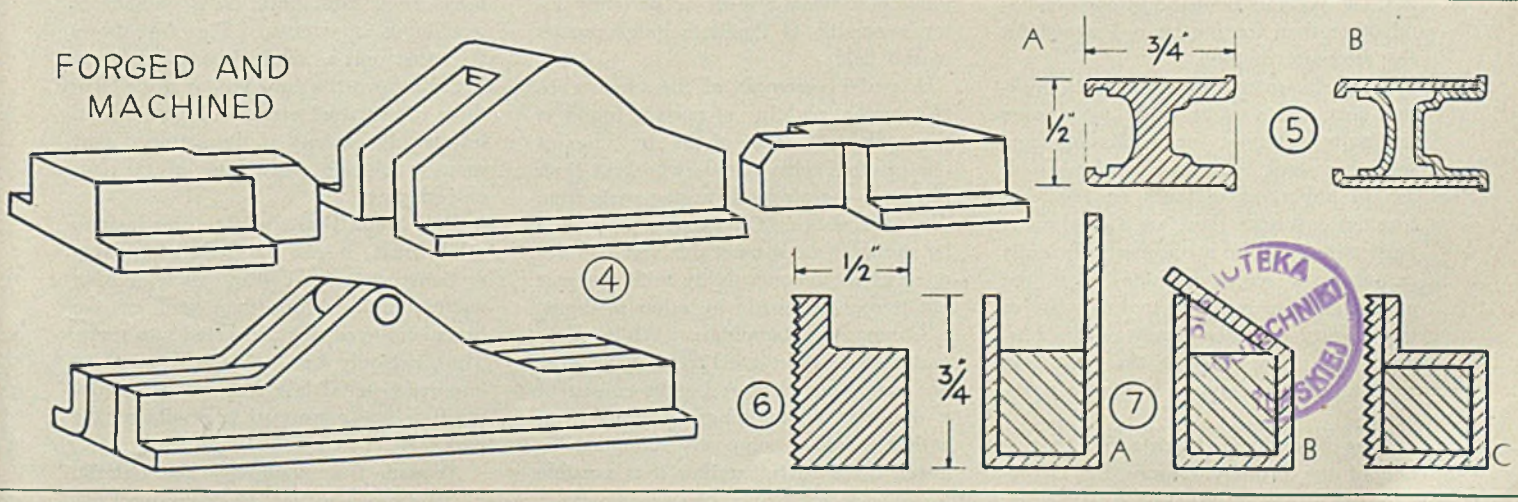
Fig. 5—Primer case formerly machined from solid bar stock as shown at left is now made from three steel stampings, brazed together. This alone will save 23,352,000 pounds of brass on projected ordnance requirements through 1943

Fig. 6—Cross section through typical locking ring machined from a forging, casting or thick-walled tubing

Fig. 7A—One of first stages in making equivalent locking ring by stamping and forming is shown here. In this sectional view, a flat sheet steel ring has been formed with two walls into which a length of rod is placed

Fig. 7B—In subsequent stage, outer wall is closed down against inner wall

Fig. 7C—Now the ring has been completed by closing the outer wall completely around the length of rod and unit has been threaded. This part now replaces that in Fig. 6



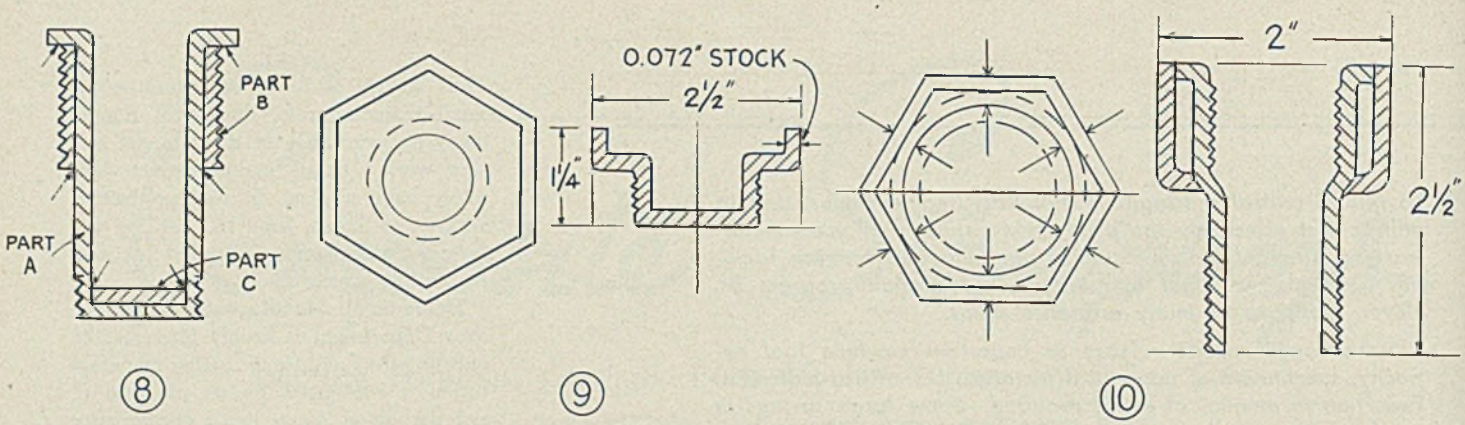


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Fig. 8—Originally made from solid cold-drawn bar stock, this booster adapter now is made from three pieces of sheet steel, a much less critical material. Saving more than 2 pounds per unit, this change will save 210,000 machine tool hours and enough steel for 3060 1-ton bombs on only 1,500,000 adapters. And 25 screw machines will be released for more critical work

Fig. 9—Instead of needing a screw machine to cut this plug from solid bar stock, the stamping design is drawn and formed, the threads applied by a rolling operation. This completely eliminates all machining work

Fig. 10—This adapter is made from two steel stampings joined by spot welds at points shown by arrows. This cuts amount of material need by almost 50 per cent, reduces cost to only 58 per cent compared with machining from solid bar stock

al parts joined together by brazing, resistance welding, or by other means) because the small quantities and frequent design changes made die costs prohibitive.

However, with the change to mass production of ordnance necessary to meet our war requirements, it now has become practical to redesign a good many parts to utilize stampings effectively. Many operating handles and control levers are being redesigned for production from sheet steel stampings in the form of two half-shells welded together, with a nut also welded on for attaching the handle or lever into the control system. These are some fairly obvious and comparatively simple redesigns that are being made. Others are much more complicated.

Efficient Use of Production Facilities Essential: A primary consideration in practically every case of redesigning a part from a forging or castings or from a part machined from a solid piece of metal is to avoid tying up production equipment that could be utilized more effectively on other war work. For instance, gun parts, shell bodies, airplane engine parts, aircraft landing gear parts and many other similar items must be made as forgings in order to obtain the desired combination of high strength, impact resistance, light weight, correct fragmentation or other characteristics. This means a tremendous demand upon all of our forging facilities. To ease the situation, it is important that every part that can possibly be made by some method other than forging be redesigned for the alternate method.

Similarly, many traveling dials, locking nuts and various other parts were originally designed for machining from solid bar stock. Because machine tools are so important to finish castings and forgings and since there are a good many parts which can be made most efficiently in automatic screw machines or similar equipment, the machine tool capacity of the country is under a most severe burden. Thus any redesign that will help to eliminate machining is highly desirable.

Uses Noncritical Machines: That is one of the primary reasons for changing many parts to stampings for, as will be shown, a good many comparatively complicated parts can be made as built up or composite stampings that require little or no machining due to the extreme accuracy to which the stamping and forming operations can be held.

Before examining in detail some typical parts that have been changed over to stampings successfully, it is important to understand the requirements which must be met by any part designed as a stamping.

Redesign Requirements: First, parts made from stampings must be 100 per cent interchangeable with the corresponding parts made as forgings, castings or machined from solid bar stock. This may refer to physical dimensions, gas tightness (pressure resistance), weight, wear resistance, and the like. This requirement can be readily understood since it would not be practicable to change the physical dimensions of the part due to the effect upon corresponding parts of the assembly. Too, all items of ordnance must be perfectly interchangeable to facilitate quick repairs in the field.

A perfect example of the importance of interchangeability of parts is found in the well known case of the defenders of one of our Pacific islands who kept their planes in the air by salvaging parts from damaged planes. Obviously a part made by stamping must meet this first requirement of interchangeability with the part that it replaces made by other methods.

Composite Stampings: While some parts can be redesigned to be made from one stamping, most redesigns consist of a number of stampings assembled together, called a composite stamping. To fasten these parts together it is possible to employ spot or seam welding, furnace brazing, arc welding or other joining methods. However, copper brazing in a furnace is greatly favored because it permits high production rates. A great volume of assemblies can be joined together by copper brazing when put through a furnace having a continuous conveyor hearth.

One of the most important advantages of copper-brazed assemblies is that no further machining need be done since dimensions can be held to extremely close tolerances.

Typical parts which are being found suitable for redesign as stampings include a wide variety of handles and levers for operating and controlling devices, dials of many types, locking rings, closing plugs, small hand wheels, adapter rings, bomb and shell components and many other similar parts.

An example of how stamped parts are made from solid bar stock to eliminate much machining is the shell component shown in Fig. 5. Originally this was made from solid brass by a number of machining operations. Fig. 5A shows the same unit as made from solid brass. Fig. 5B shows the same unit as made from three drawn steel parts. All exterior and interior dimensions of the stamped part exactly coincide with those of the machined part.

Cuts Metal Wasted: When made from solid brass, it can be seen that large sections were machined away during manufacture. More than half of the brass employed was converted into scrap. Thus, not only was a great volume of an important metal lost, but much machining time was consumed in producing the part.

As made from stampings, the material

is steel, thus doing away entirely with copper as a construction material. When considered in millions of parts, this is an important saving of copper which formerly went into the brass. Some 23,352,000 pounds of brass will be saved by this one redesign on projected ordnance requirements through 1943. Against this saving there is a small amount of copper consumed in the copper brazing operation. However, this consumption is extremely small since a pound of copper will braze more than 1000 of these parts.

For the brazing operation, a piece of copper wire is fastened to the part at the two points indicated by the arrows in Fig. 5B. As the assembly is heated in the furnace, the copper melts and is drawn into the joint by the familiar phenomenon of capillary attraction. This produces an extremely strong joint, the final part being fully able to handle the job of the solid brass part.

One type of part which must be made in large quantities is the locking ring for locking together various assemblies. These locking rings vary from 4.5 to 6 inches in diameter. They were previously made as forgings, steel castings or machined from thick-wall tubing.

An extremely ingenious method of making these rings by a series of stamping and forming operations is illustrated in Figs. 7A, 7B and 7C. This particular ring, as shown in Fig. 6, was about 4½ inches in diameter, ¾-inch high and ¼-inch thick at the section shown in Fig. 6.

Ingenious Production Methods: Figs. 7A, 7B and 7C show how an interchangeable equivalent item is produced by a series of stamping and forming operations using a formed sheet metal piece and a length of rod formed into a circle. There are several advantages of this method. It eliminates all machining, except threads and spanner wrench holes. Formerly this required 4.13 minutes per piece. At the same time it enlists the production capacities of small presses. Also it releases forging capacity formerly required to produce the part as a forging.

The cost of the part has been reduced 25 per cent. In addition, a less critical material is being used since sheet steel is readily available in large quantities as compared with forging steel, which is a badly needed material.

The method of making this locking ring, as can be seen from Figs. 7A, 7B and 7C consists of a rather unusual sequence of operations. A flat ring of sheet steel considerably larger than the diameter of the locking ring is first stamped out. Then in a series of drawing operations, two walls are formed as shown in the cross section Fig. 7A. (Note particularly the final equivalent cross sections shown in Figs. 6 and 7C.)

Now a length of rod formed into a circle of the correct diameter is inserted as shown.

In the next operation, Fig. 7B, the outside vertical wall of the ring is bent down, starting to close the sheet metal portion around the solid portion.

In Fig. 7C the outer wall of the ring has been closed entirely around the solid section by being placed between a pair of dies in a press. All of these press operations are fairly simple and can be done at high speed. Too, dimensional accuracy is made high by the dies employed in closing the ring.

Finishing the ring is accomplished by cutting the threads on the inner circumference as shown at Fig. 7C. This is a simple operation which is done at high speed in an ordinary drill press. And only ½-minute is required for the operation. This is against 4.13 minutes required for machining when the part was made as a forging. Thus the same section as in Fig. 6 has been duplicated to meet the physical properties and dimensional requirements, forging and machining capacity have been released, stamping and forming presses and drill presses have been utilized, less critical material has been employed—accompanied by a cost reduction of 25 per cent.

One of the most important developments to be made so far is the shell component shown in Fig. 8. This changeover to a composite stamping is important not only because it saves much material but also because it eliminates much machining time. And since these parts are made by the million, these advantages are particularly significant.

As originally made, this booster adapter was machined from a solid piece cut from a cold-drawn steel bar. Each piece required 3.85 pounds of stock and 0.23 machine hours.

Made as a composite stamping, the part is produced from three pieces of 3/16-inch hot-rolled sheet, a material much less critical than the cold-drawn bar stock. The sheet is SAE 1010 or 1025 material. Since only 1.81 pounds of this stock is required for each composite stamping, a saving of over 2 pounds of metal is made per piece.

It is estimated that the total saving made by this change could easily amount to 25,000 tons yearly. On an order for 1,500,000 units alone, enough steel will be saved to make 3060 one-ton bombs.

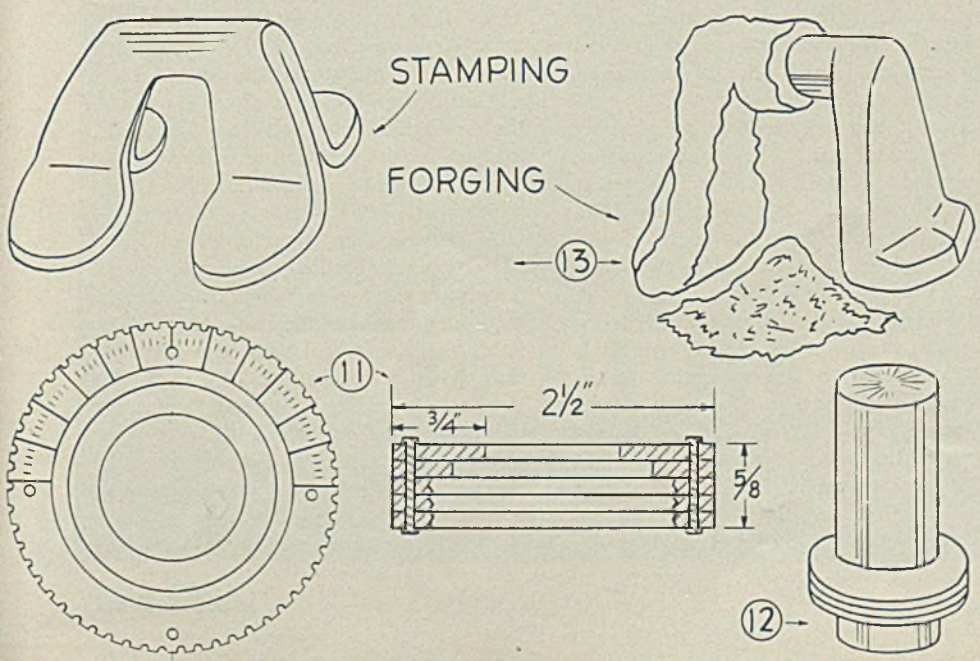
As will be seen by referring to Fig. 8, the composite stamping is made of three pieces. The big cup, part A, is made in three draws. Then the small cup, part B, is made in a single draw. At this point a little trick is employed to conserve an additional amount of metal, for the disk, part C, is obtained by blanking out of the bottom of the small cup, part B. Then it is trimmed to fit inside the large cup, part A, and utilized as the bottom disk, part C.

Next the three units are assembled in a press. Copper brazing rings are applied at the points indicated by the arrows, and the assembly is copper brazed by being placed in a furnace and heated

Fig. 11—Handwheel made by riveting together five laminations blanked from ⅛-inch steel sheet replaces part formerly machined from solid aluminum bar stock

Fig. 12—Instead of machining down from a large piece of bar stock, this dash pot piston is made by brazing a collar onto a small diameter bar; saves 1000 pounds of steel daily on a single ordnance contract

Fig. 13—Suspension lug involved tremendous waste of material in machining from a forging. When made as a stamping, 17,000 pounds of steel and 8000 machine tool hours were saved on a single lot of 100,000



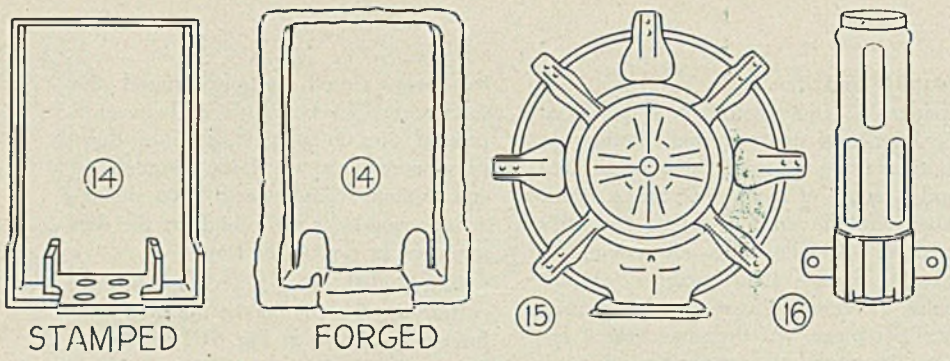


Fig. 14—Original forged trigger cover plate required 29 critical machine tool operations. Made as a composite stamping, these are replaced by 7 noncritical blanking, forming and welding operations

Fig. 15—Supercharger housing weighed 35 pounds when made as an aluminum forging. As a composite stamping in steel, it weighs only 33 pounds

Fig. 16—Forging process requirements necessitated putting 56 pounds of metal into this part to get a finished unit that weighed only 6 pounds when fully machined. By welding a forged base to a drawn sleeve, 42 of the 50 pounds of metal formerly wasted are saved as well as 3 man hours and $18 to $20 per unit

to brazing temperature, which is just a little above the melting point of copper, 1980 degrees Fahr.

Thus in this redesign, a change has been made to use a less critical material by elimination of the cold-drawn bar stock and substitution of the 3/16-inch hot-rolled sheet; the need for 6 or 8-spindle automatics has been entirely eliminated, releasing them for other, more important work; at least 2 pounds of material has been saved on each unit, an estimated saving of some 25,000 tons yearly.

In this instance, only a small cost reduction was made, the importance of the changeover being more in the metal saved and the machine capacity released.

However, Fig. 9 shows a part in which a most important saving in cost was made as well as the release of important machine capacity. This plug was originally made from solid bar stock on a screw machine using 0.95-pound of material for each part. Production time was 1 minute per piece. As will be seen from Fig. 9, this plug has threads on the outside and a hexagon head for applying torque.

When this same part was redesigned for production as a stamping, it was made from 0.150-inch stock, which now was plain SAE 1010 steel. To produce the shape shown in Fig. 9, the part is first blanked out from the sheet, then drawn to the depth desired. Following this it is redrawn to produce the hexagon head, and then it is sized in a final operation.

Then the threads are produced by a rolling operation. In this manner no metal is removed from the cross section, the rolling dies simply forcing the metal to flow up to form the threads. This makes most efficient use of all the steel in the section. And what is more important, it entirely eliminates any need for machining.

Equally valuable is the significant saving in the material. Formerly each part required 0.95-pound of bar stock, a comparatively critical material. Now the part needs only 0.42-pound of sheet steel, a comparatively abundant material. This means a reduction in material of almost 55 per cent.

Cost reduction made possible by this utilization of stamping and rolling equipment and elimination of the need for screw machines amounted to 10 per cent.

Thus in this instance the redesign not only released screw machine capacity, eliminated the need for bar stock, saved important amounts of material and enabled surplus manufacturing capacity in the form of presses and thread rollers to be utilized but also made a reduction in cost.

Fig. 10 illustrates an unusual assembly made by means of spot welding at the points shown by the arrows in the plan view.

It represents an adapter formerly made by machining from solid bar stock. That method required 2.2 pounds of material for each unit and 8 minutes of machining time.

Now the unit is made as an assembly of two stampings. The larger stamping threaded at the two points shown is flanged out at the top and trimmed accurately to fit closely inside the second stamping, which is formed in the shape of a hexagon.

While the cross section shown is taken through the points of the hexagon, it is obvious that a cross section taken through the flats of the hexagon at and opposite two points marked by the arrows in the plan view would show that the flat surfaces of both parts contact each other at the points indicated by the arrows. It is at these points that the two stampings are joined by spot welding.

The large inner stamping is made on medium size presses in a series of six operations, a seventh producing the hexagon head at the top. The outside stamping is also made from flat sheet by a set of four operations. After assembly it is only necessary to cut the threads. At the same time this redesign requires only 1.25 pounds of material, a saving of 0.95-pound per piece. This is almost a 50 per cent reduction in amount of material required.

Equally important is the cost reduction afforded by this design. When made as a composite stamping, the adapter ring costs only 58 per cent as much as when manufactured from the solid bar stock.

It will be noticed that in none of these examples is flash welding or arc welding employed as a method of joining the stamped parts. The reason that flash welding is not utilized is that flash welded parts subsequently must be machined in order to remove the flash. Arc welding is avoided because of the critical alloys required in the welding rod.

Thus brazing and spot welding are the favored joining methods. Brazing is looked upon as generally the most suitable of all especially for comparatively small parts for they can be handled on an extremely high production basis on a conveyor-type continuous brazing furnace or even brazed in large quantities in batch-type furnaces.

However, another method of joining is also advantageous at times and that is the use of pins or rivets. A typical example of this method of joining stamped parts to make a composite is the handwheel built up of laminations and shown in Fig. 11. This handwheel is made up of five laminations blanked out from ⅛-inch stock. The top piece carries a scale as shown, and the outside circumference of each lamination is notched to assure a ready grip.

This unit formerly was made from solid aluminum bar stock on an automatic screw machine. As redesigned for stamping, the five laminations are blanked out on small presses at high speed and at the same time five holes are punched in them for the insertion of five rivets to join the laminations together to form the handwheel.

As will be seen by referring to Fig. 11, changes in section are accomplished merely by varying the inside diameter of the hole punched in the laminations. To finish the handwheel after the laminations have been assembled by riveting, it is only necessary to thread the internal diameter shown.

While this particular example did not succeed in reducing the cost of manufacture, the cost being the same by both

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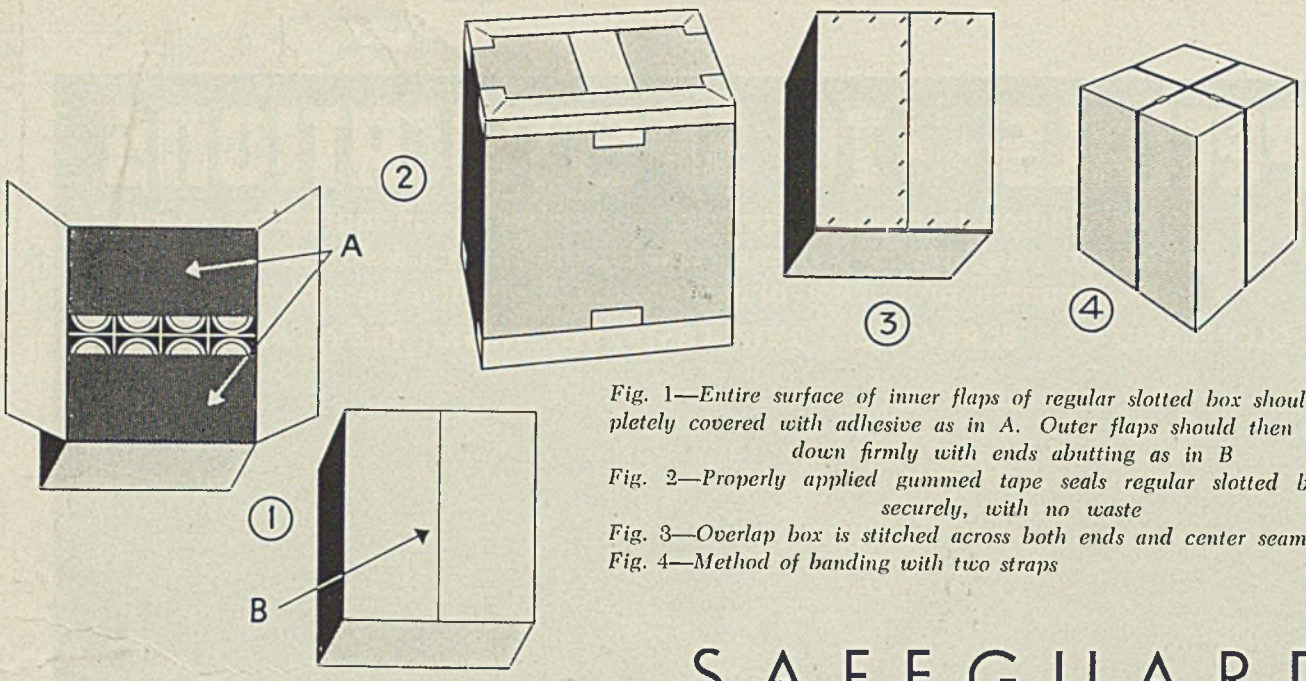

Fig. 1—Entire surface of inner flaps of regular slotted box should be completely covered with adhesive as in A. Outer flaps should then be pressed down firmly with ends abutting as in B

Fig. 2—Properly applied gummed tape seals regular slotted box neatly, securely, with no waste

Fig. 3—Overlap box is stitched across both ends and center seam

Fig. 4—Method of banding with two straps

SAFEGUARD HANDLING

. . . in corrugated boxes by proper sealing to develop full strength of box

SAFE DELIVERY is a job for proper packaging as well as for careful handling. But if packaging is to do a real job for you, there is one operation that can't be overlooked. That is proper sealing. The following recommendations are made by the Hinde & Dauch Paper Co., Sandusky, O.

Package No Stronger than Seal: Regardless of the care with which corrugated boxes are designed and manufactured, they are no stronger than their seal, says the company. For proper protection they must be closed tightly and securely. That is the only way to insure against loss and damage to merchandise in transit.

Proper sealing is a job to be done by the manufacturer's shipping department. It is a responsibility to his customers; it is part of his service and selling program.

Proper Sealing Saves Money: The first saving effected by proper sealing results from the reduction in damaged and lost merchandise. Proper sealing utilizes to the fullest degree the protection built into corrugated boxes, enables them to do the job for which they are designed and delivers merchandise in as perfect condition as when it left the factory. Customers receive goods *as ordered*, without delay, re-ordering or other bothersome circumstances. Goodwill is retained, and costs are cut.

The second saving which results from proper sealing is one of materials. With a volume of shipping, hundreds of dollars can be lost in the use of excess tape, staples, wire, glue and other materials squandered by hit-or-miss sealing methods.

With properly standardized sealing methods there is invariably an appreciable saving in labor time. Unnecessary operations are eliminated, and each worker knows the most efficient, quickest way to do a good job. Operations move even more rapidly as familiarity with those operations increases. Minutes saved add up to man-hours.

Finally, the proper way to seal is by far the easiest way. Once the habit of proper sealing is formed, shipping boxes automatically provide all the protection that is built into them.

It takes less time to seal properly, it's much easier and it's more profitable. That is why it will pay every one who ships in corrugated boxes to review the sealing hints presented here and to adopt those methods most applicable to his packaging operations or methods.

There are four commonly used sealing methods: Adhesives, gummed tape, staples or stitches, wires or straps. When should these different sealing methods be employed?

Adhesives: When shipping in regular slotted boxes an efficient seal is secured with adhesives. A quick-setting firm-holding adhesive should be applied to inner flaps with a wide, smooth, clean brush. Top area of inner flap should be completely covered. See Fig. 1A. "Spot" sealing is unreliable. After application of adhesive, top flaps should be folded down and pressed firmly together, making sure that adjacent ends abut with no open spaces as shown in Fig. 1B. Apply firm, steady pressure sufficiently long to insure a good "set".

Gummed Tape: Regular slotted boxes can also be efficiently sealed with gummed tape. The first requirement is to use a wide, good quality, gummed tape that meets all classification requirements. To seal, cover center of the box with a strip of tape extending 2½ inches or more over ends of the box. Then cover end seams with strips extending 2½ inches or more past corners on either side. See Fig. 2.

Measuring and cutting tape to length is simplified by an efficient machine with measuring and cut-off devices. Tape should be applied firmly—with steady pressure to assure continuous contact.

To counteract extreme drying out of gummed tape supplies resulting from storage in rooms which are too hot or too dry, a small amount of vinegar should be added to the moistening water.

Metal Staples and Stitches: On special overlap slotted boxes, an efficient seal is obtained with metal staples and stitches. There are several advantages to sealing with metal staples and stitches. Operations with modern stapling or stitching machinery are quick and dependable; closures are not affected by weather, and no time is lost waiting for adhesives to "set". Staples and stitches do not obscure the message or design printed on the outside of boxes.

As shown in Fig. 3, boxes should be stitched across either end and along the center seam. Staples or stitches should be broad enough and long enough to clinch securely and should be used in sufficient quantity—properly spaced. For freight shipments rivets, stitches and staples on flaps must not be more than 2½ inches apart.

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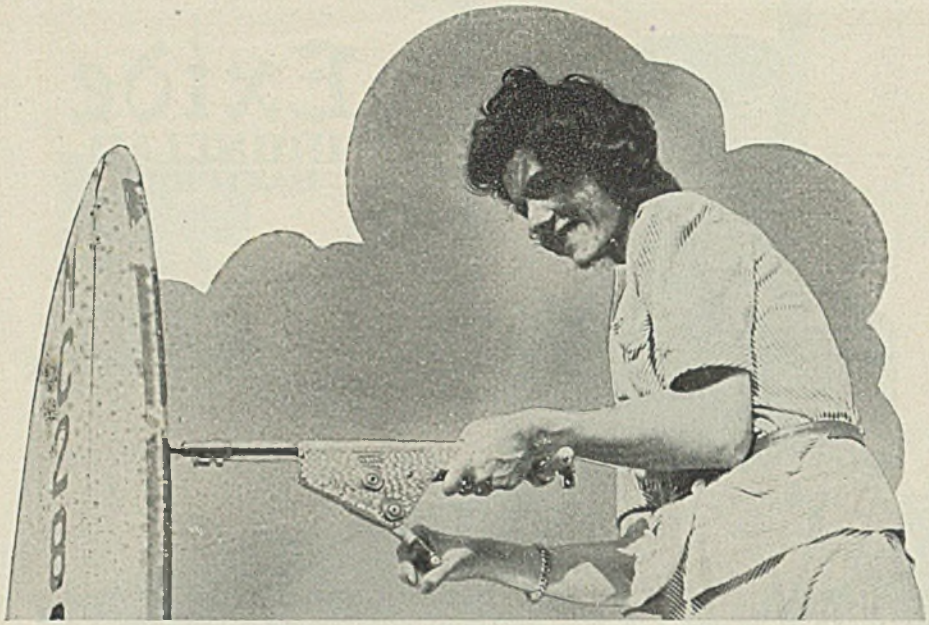


Fig. 1—It is claimed that girl operators can work the gun all day long without undue fatigue because of its effective combination of gears and cams. There is no reason why the gun could not be adapted for pneumatic drive, however, if that appeared desirable

Riveting "Machine-Gun"

—speeds aircraft work
—handles "blind" riveting
—is self-contained, portable
—permits repair of planes in flight

THOUGH KNOWN in Europe for the last few years, the Chobert riveting "machine gun" is quite a novelty to American industry. Any device that can speed up production and reduce assembly time in the manufacturing of aircraft is important. That is the reason why considerable attention is being focused on the riveting "machine gun" as it allows riveting to proceed with great speed since it places the rivets as well as sets them. And it takes care of blind riveting applications as well.

With this tool all the work is done from only one side to complete the entire riveting cycle, no bucking bars are needed, according to Airsealand Aircraft Inc., Long Island City, N. Y. The rivets are ejected from the gun and inserted in the rivet hole almost as fast as a man can locate the hole. Furthermore, the work can be done on unsupported thin sheets of aluminum without bucking the sheet because the reaction that sets the rivet takes place only between the mandrel and the gun. There is not even the slightest pressure applied to the plate itself—on either side. Few clamps are needed as the mandrel tightens the two plates against one another by its own action.

Instead of dismantling a plane to repair bullet holes, a patch is laid on the damaged part, a few holes are drilled and the whole thing is riveted up in a jiffy. Word has come from abroad that this gun has even been used on big bombers to put on patches and make emergency repairs in flight—the rivets being applied from the inside.

As shown in Fig. 2, the riveting "machine gun" is composed mainly of a barrel and a cam. The rivets are hollow and are threaded on a long steel mandrel with an upset head which works as a magazine feed and is used indefinitely. This mandrel is pushed in the gun and clamps in a jaw chuck.

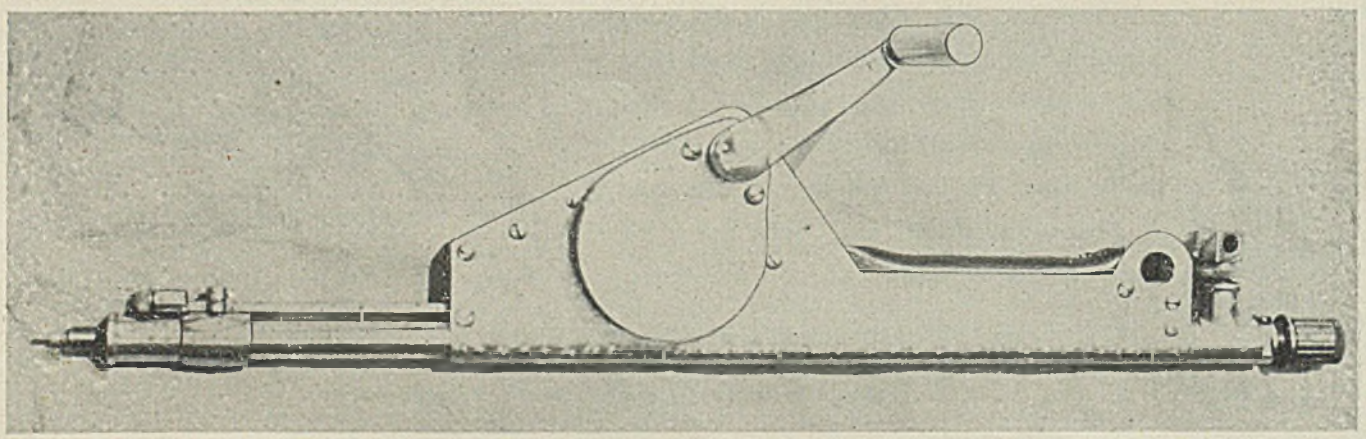
Instead of pushing the rivet out past the mandrel in setting a rivet, what actually happens is that the rivets remain stationary and the two front jaw chucks move forward upsetting the rivet radially by driving it off the reverse tapered mandrel. In reality, this gives exactly the same reaction as if the mandrel were pulled back. The force applied through cam and gear action is more than a thousand pounds, but the action is so smooth that girl operators can handle the gun day in and day out without excessive fatigue.

There is no noise connected with the use of this tool.

To work the gun, all the operator has to do is to make three revolutions of the crank. This completes the operation. Let's follow the action through to see what happens.

With a rivet in place ready to be set, the crank is turned one and a half times, causing a cam to push a cam thrust roller which in turn pushes forward the whole "machine gun" barrel, forcing the

Fig. 2—Riveting "machine-gun" is comparatively small compact tool, is self-contained as it requires no source of outside power. Thus it is particularly suitable for field work and repairs in flight



IT'S THE OFFENSE THAT WINS BATTLES

Since 1940, the Nazis have won battle after battle. Why? Because they've waged one offensive after another.

ALTER EGO: Yes, but they've been able to do that. They started their *war production offensive* 10 years ago so they had a big edge on us in tanks, planes and guns. Then we really started competing.

So competition forces progress. *Look how in two years, our* production offensive *has already surpassed that of the Axis—turning out better weapons and more of 'em. These new arc welded M-4 tanks, for example. They'll soon be in our fighting offensive.*

ALTER EGO: It's thrilling but don't let it get us complacent. Haven't we learned never again to be caught unprepared in war . . . or in *business competition* either?

There you have it! Let's start TODAY waging a planning and designing offensive *so we'll be on the alert with better welded products and lower costs to get the upper hand on our competition the minute the post-war Battle for Business begins!*

Ask your inner self if it isn't the offense that wins battles.

THE LINCOLN ELECTRIC COMPANY
CLEVELAND, OHIO

then I said to myself—

IT'S A GREAT JOB —WELD DONE!

rivet off the mandrel and setting it as this occurs. Once the cam comes to the tip of its rise, it falls down, letting the whole barrel come back. But at that moment a control fork still maintained by the cam keeps the two jaw chucks forward and opens them in such a manner that another rivet is automatically inserted for the next operation.

An ingenious mechanism similar to a free-wheel slide comes forward when the barrel advances but stays in place when it goes backward, thus always pushing the rivets in front of it and feeding them successively into the jaw chuck. All that is required of the operator is to turn the handle of the gun. In the first part of the operation cycle, the rivet is fed out and in the second part another rivet is inserted, thus keeping the gun always ready to operate.

The whole unit is very light, weighing only a few pounds. The reason why it has never been made either pneumatically or electrically driven is that this gun has been devised especially for field work, for which hand operation is quite essential. At the request of aircraft manufacturers, in order not to load too heavily either the airlines or the electrical lines, it has been found more convenient to retain it as a hand-operated device. Thus when used on production basis in an aircraft plant no air or electrical lines are loaded with a machine that can be operated easily even by women for long days without any strain. Obviously for high-production work where ample air line capacity is available, it would not be difficult to adapt the unit to pneumatic operation.

The change from one size rivet to another in the same length takes only 12 to 15 seconds. Likewise to change from one rivet diameter to another requires a little less than a minute, thus making any change simple and fast.

Rivets: In the past five years, the rivets used in the Chobert gun have been steadily improved, starting first with a straight shank with a bulge at the end, then moving on to a tapered inside hole to come to the last set design which has a straight shank, a tapered hole and, of course, a much higher shear tension strength. Fig. 3 shows this rivet both before and after it has been driven.

The history of the development of this latest patented rivet put on the market by Airsealand Aircraft discredits the old saying that "invention is 50 per cent inspiration and 50 per cent perspiration." We were making some of the old rivets when one of the night shift operators became drowsy and instead of having the reamer drill through entirely on the automatic machines, only let it go about half way. Of course, when the inspection department found out about the

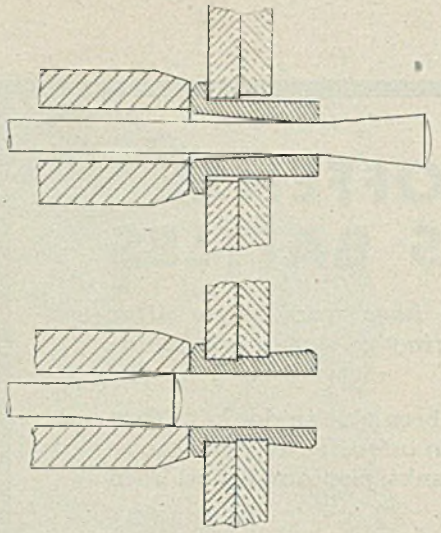


Fig. 3—Upper drawing shows mandrel and jaw chucks of riveting gun as well as the rivet with its tapered inner hole. Lower drawing shows what happens to the rivet when the jaw chucks force it off end of mandrel. Rivet hole left is extremely uniform in size, can be plugged easily to make waterproof connection where wanted

work, the man was thoroughly reprimanded and that production was destined to the scrap pile.

However, some time later they were accidentally tried on the gun and to the astonishment of everyone it was found that this rivet had 10 to 15 per cent greater strength and shear value than the previous ones.

Fig. 3 shows clearly the broaching action of the mandrel as it expands the rivet to fill irregular and oversize holes. In addition, it produces sufficient tail on the rivet to give ample "shear out" values. This tail, though looking small, is said to be still stronger than the head of the rivet in shear. This feature partially compensates for inaccurate drilling or oversize holes as the oversize expansion fills almost any hole, as is shown by Fig. 3, where the two sheets joined are not exactly in alignment.

Contrary to most blind rivets, a variation in sheet thickness from 0.080 to 0.100-inch can be taken care of with the same rivet. Thus the 3/16-inch size can rivet any material from 0.045 to 0.130 in total thickness with the same strength value. This, of course, enables the stock of rivet sizes to be reduced greatly as well as facilitating fast repairs in the field where the workmen may not have a micrometer on hand and where all sizes are not always available.

This also makes it quite convenient for handling repairs in flight when the work is done from the inside, for the operator usually has no means of knowing the thickness of the different sheets he is putting together.

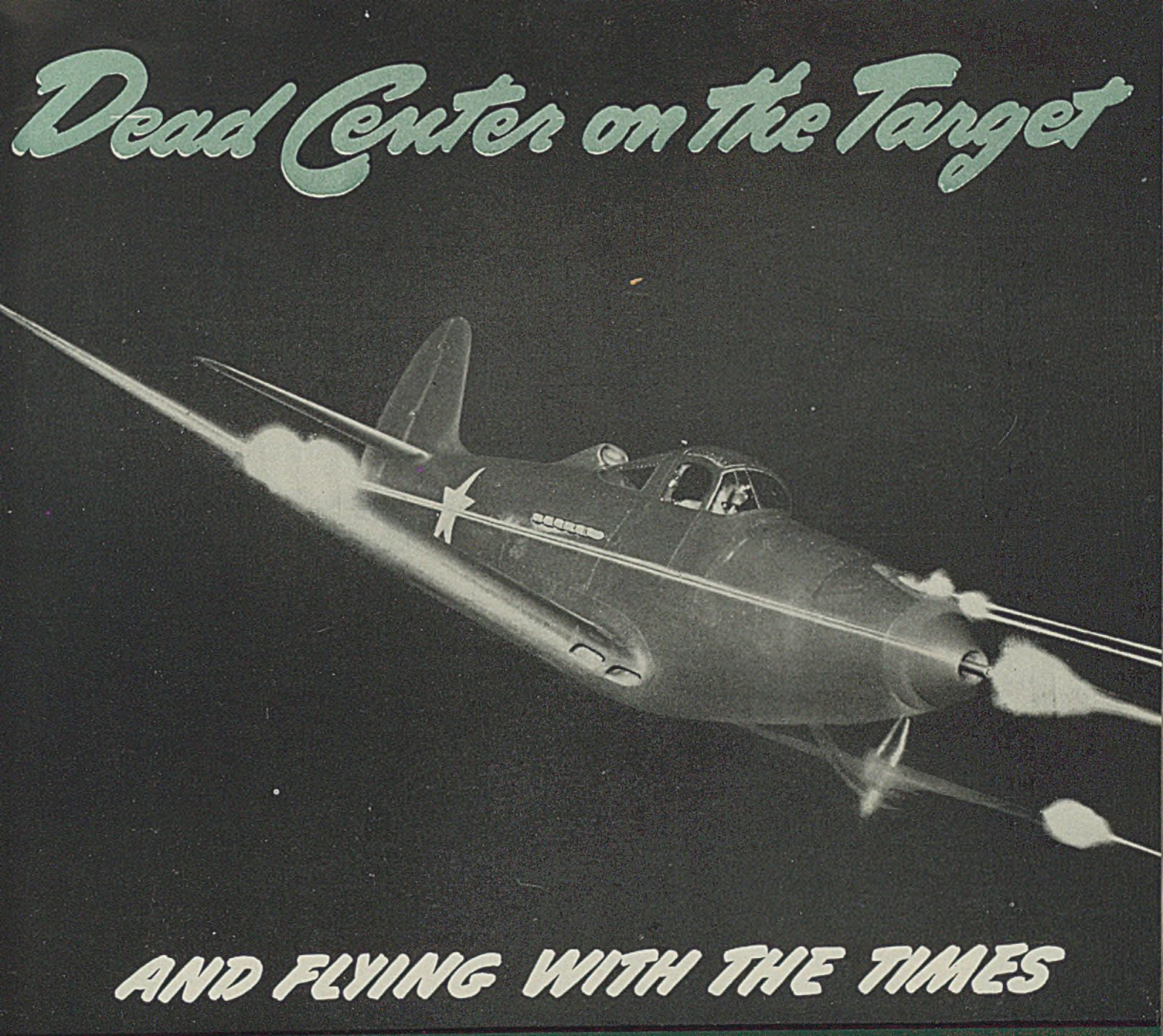
While tightening the rivet, a parallel bore of very precise diameter is produced. This feature enables any one to convert the rivet into the equivalent of a solid type for any practical purpose. Small pins 0.001-inch longer than the diameter of the bore are driven into this bore. They remain watertight, thus allowing this type of rivet to be used even for floats and seaplanes.

The strength of those rivets always remains constant as no internal deformation can take place with the hollow rivet. The driven rivets are always identical due to the fact that the rivet and the mandrel are manufactured within tolerances of 0.001-inch. The rivets are made in snapheads and countersunk heads. The most common sizes are ⅛, 3/16, ¼ and 5/32-inch. For special jobs some ½-inch rivets are being used. As for the length, almost all sizes are available. The materials used mostly, due to aircraft manufacturers' requests, are 17ST which has to be heat treated between 930 and 950 degrees and quenched in cold water before use, and A17S which can be used in the form in which it is received. However, other metals such as monel, brass, steel can be used.

In co-operation with the different aluminum manufacturers, an alloy higher in tensile strength than requested by the United States Army was developed, increasing tensile and shear values of the rivet. To give an idea of the tensile strength of this rivet, note that though resultant tubular section of the hollow rivet is a little over half that of the plain rivet, its shear strength is only one-third less.

The gun is not sold but rented for a period of five years. During that time the owner takes care of the servicing of the gun. The gun itself weighs only a few pounds and can be carried easily in any tool kit.

Dead Center on the Target



AND FLYING WITH THE TIMES

SUPERIOR STEEL CORP.
SUVENEER
1892-1942
CARNEGIE, PENNSYLVANIA
ORIGINATOR OF SU-VENEER CLAD METAL

PHOTO COURTESY BELL AIRCRAFT CORPORATION

THIS IS THE

50TH YEAR

OF **SUPERIOR STEEL'S** SERVICE

TO THE MEN AND INDUSTRIES OF AMERICA . . . AND IN RECENT YEARS, OF THE ALLIED NATIONS ALSO

An open letter to War Producers

(AXIS NEWSPAPERS, PLEASE COPY)

WE HAVE DONE MUCH, GIVEN MUCH...

We will do More!

THE Superior Steel Corporation this year closes its first fifty years of existence. Those who pass through the plant see a busy, modern mill, planned for fast and efficient production.

But Superior Steel is even more than that. In the final analysis, it is a group of *people*—workmen and executives—Americans, first, last and always—striving with every ounce of energy and all of our modest ability to do everything possible to aid in the very urgent and necessary war efforts of the nation.

We have developed new products for the armed forces of the United States and the United Nations. We have devised new and faster methods to produce these vital metals, and have greatly expanded our capacity to make them. And yet not one of us thinks that the job is more than started; we are fully conscious of the fact that time is precious—we must do *more*.

We are working for, and looking forward to, *another* fifty years of existence under the same free, democratic way of life that has enabled us to grow and prosper in the past.

SUPERIOR STEEL CORPORATION
Carnegie, Penna.

Frank R. Fros X

President

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Superior Steel
CORPORATION

CARNEGIE, PENNSYLVANIA

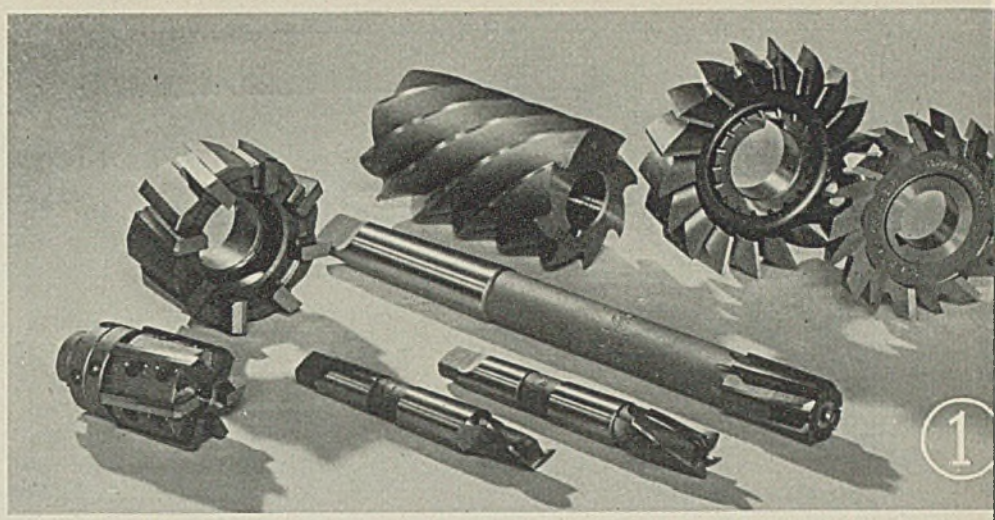


Fig. 1—A group of miscellaneous cutters made from tungsten-molybdenum high-speed steel (Type II) includes end mills, side mills and cutters with removable teeth

HEAT TREATING

Molybdenum High-Speed Steel

By W. R. BREELER
And
W. H. WILLS
Research Department
Allegheny Ludlum Steel Corp.
Dunkirk, N. Y.

TOOL-STEEL manufacturers produced molybdenum high-speed steels as early as 1917, but it was not until 1930 that these steels were considered seriously by industry in general. A steel analyzing 0.68 per cent carbon, 3.50 chromium, 9.50 molybdenum and 1.25 vanadium was tested at Watertown arsenal and reported to give satisfactory performance in 1930. It was the opinion of the arsenal then that molybdenum could be used instead of tungsten if it became necessary with little or no loss of efficiency.

The formation of a soft surface, claimed by some to be due to volatilization of molybdenum at high temperatures, was subsequently found to be due to the loss of carbon and not molybdenum. In 1932, a molybdenum-tungsten high-speed steel was developed analyzing 0.80 per cent carbon, 4 chromium, 1.5 tungsten, 8.75 molybdenum and 1.0 vanadium. But this composition had the same drawback as the first—namely, a tendency toward decarburization under certain treatments.

Between 1932 and 1938, a concentrated effort was made to overcome decarburization difficulties. The addition of boron was tried but involved difficulties in hot working so was abandoned. The addition of cobalt plus boron proved more satisfactory, and a steel is now available containing both these elements in proper proportion.

Other combinations including the use of copper to prevent or retard penetration of carbon were tried but with little success.

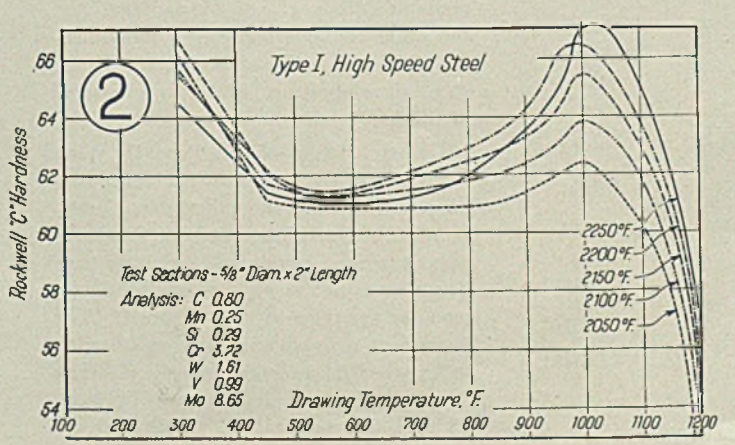
A slightly different ratio of tungsten and molybdenum, however, was found to prevent decarburization and at the same time to perform equally as well as or better than the conventional high-speed steel containing 18 per cent tungsten, 4 chromium, 1 vanadium. During this same period (1932-1938), manufacturers of heat-treating equipment developed furnaces and salt baths which can be used to treat molybdenum high-speed steels satisfactorily. Thus when the government issued general preference order M-14, requiring users of high-speed steels to use as much molybdenum high-speed steel by weight as the 18 per cent tungsten type, many users of high-speed steels already were acquainted with the molybdenum-type and its heat treatment. Incidentally, the government now requires that three times as much molybdenum steel be used as the high-tungsten type.

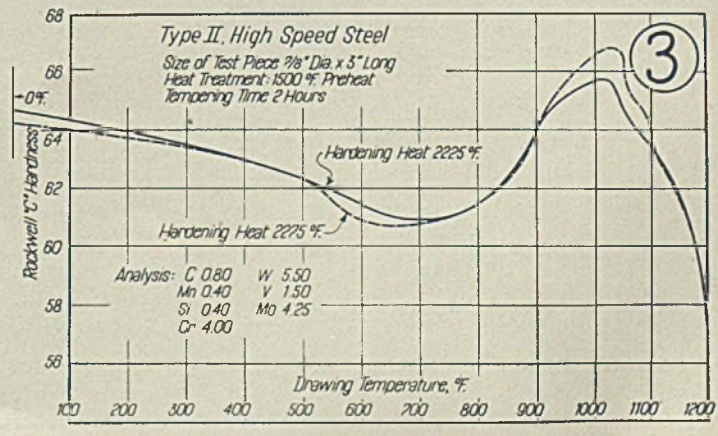
Of the molybdenum high-speed steels developed within the past few years, the three of greatest importance currently used in large quantities to replace the 18 per cent tungsten type are shown in Table I. These three steels are made in large tonnage by leading tool-steel manufacturers and will soon represent more than 75 per cent of the total high-speed steel in use. All three perform equally as well as or better than the 18-4-1 type, and in most cases a change-over can be made with little or no difficulty.

The molybdenum-tungsten steel (Type I, Table I) was the first high-speed molybdenum steel to gain widespread commercial use. Usual carbon content is 0.80 per cent, although it is made in various carbon ranges to suit the application. It weighs 8 per cent less per

Fig. 2—Chart shows hardness resulting in molybdenum-tungsten high-speed steel (Type I) when hardened at the various temperatures marked on the curves and then drawn at various temperatures

Fig. 3—Hardness chart similar to Fig. 2 but for tungsten-molybdenum high-speed steel (Type II)





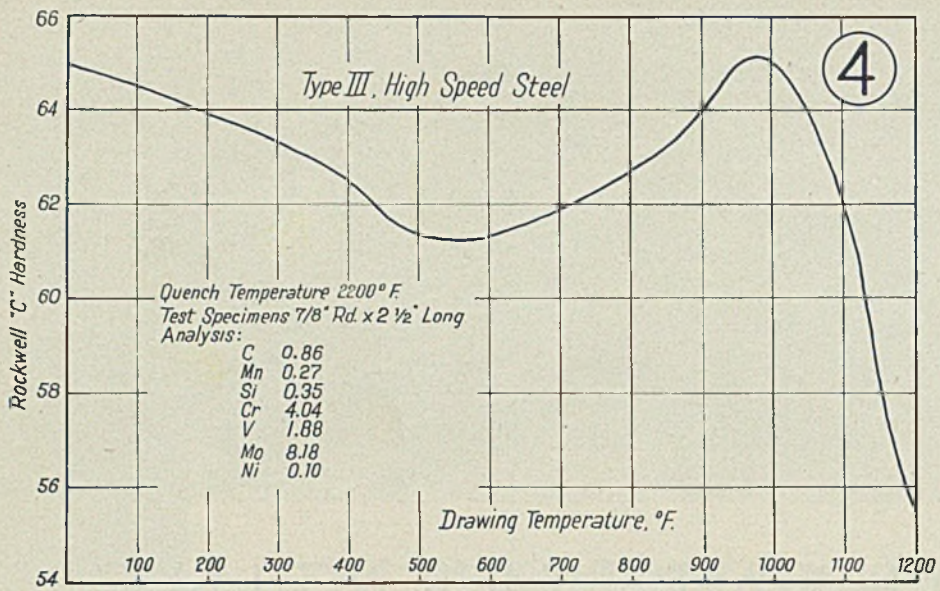


Fig. 4—Hardness chart for molybdenum-vanadium high-speed steel (Type III) showing values obtained after hardening at 2200 degrees Fahr.

unit volume than the 18 per cent tungsten type. Its cost, taking into account the lower weight and lower base price, is about 75 per cent that of the 18-4-1 type. This applies in general to all three of the molybdenum high-speed steel types in Table I.

When this material is ground, the orange sparks that result are easily distinguished from the dark red sparks of the 18 per cent tungsten alloy. Forging of this alloy is performed at 1900 to 2000 degrees Fahr., with slow cooling desirable. Annealing is done in a manner similar to 18-4-1 and at a temperature of 1550 degrees Fahr. Hardness after annealing ranges from 217 to 235 brinell. The steel machines well, a number of reports indicating that it is a little better in this respect than the 18-4-1 type.

This Type I moly steel can be welded to carbon or alloy steel shanks. The welded piece should be cooled slowly and given a full anneal to refine and toughen the weld before hardening. Considerable data have been published on the hardening of this steel, the usual temperature being 2150 to 2250 degrees Fahr., from which point it is quenched in oil or salt. If hardened in a muffle or semimuffle furnace, a protective atmosphere or coating must be used chiefly for taps, drills, tool bits and similar items. Hardness values between 66 and 68 rockwell C can be obtained. The steel can be surface treated with oxide coats, cyanide, etc.

For additional information on the molybdenum high-speed steels and their heat treatments, the reader is referred to the three OPM reports, "Heat Treatment of Molybdenum High-Speed Steel", "Salt Bath Method for Hardening Molybdenum High-Speed Steels" and "Controlled Atmosphere Furnaces for Heat Treating Molybdenum High-Speed Steels," which appeared in STEEL, Sept. 8, 1941, pages 60, 61, 73, 76, and 78. Also refer to the article, "Finds High-Speed Steel Best Opportunity of Conserving Tungsten," STEEL, Oct. 27, 1941, pages 82 and 86. A third article, "Here's How Molybdenum-Tungsten High-Speed Steel Can Be Used To Replace 18-4-1," appeared in STEEL, July 14, pages 58 and 61.

The Type II steel in Table I was developed especially to overcome decarburization. It has about the same weight per unit volume as other molybdenum steels, and the carbon content is maintained at about 0.80 per cent. A hardness of 66 to 68 rockwell C can be obtained. Forging and annealing practices are about the same as for the other molybdenum steels, but the hardening range is somewhat wider and higher.

A spark test will reveal quite red sparks much like those of the 18-4-1 type. This Type II steel has been used on an extremely wide variety of applications including drills, cutters, taps, reamers, and the like.

It can be heat treated in the same furnaces used for the 18 per cent tungsten type. No protective atmosphere or coating is required. Parts of tools can be made to the same blueprints, using the same machining and grinding tolerances applied to the 18-4-1 type. No borax or coating is required when forging cutter blanks or other tools from this material.

The molybdenum-vanadium alloy (Type III, Table I) is found in a number of varieties. Two types are in very wide use, although several other modifications have a limited application. One grade contains 1.9 per cent vanadium, and the other contains 9 per cent molybdenum. Both are a direct outgrowth of the steel developed at Watertown arsenal in 1930.

Carbon content of the Type III steels ranges from 0.80 to 0.90 per cent, running higher than the other two classes. In spite of this higher carbon, the hardness developed at normal hardening temperatures is not as high as can be developed in the Type I and II steels. The 9 per cent molybdenum steel will harden to between 64 and 65 rockwell C. The 8 per cent molybdenum range is between 65 and 66 rockwell C. Both are ex-

TABLE I—General Purpose Molybdenum High-Speed Steels

	Type I (Moly-Tungsten)	Type II (Tungsten-Moly)	Type III (Moly-Vanadium)
Carbon	0.70-0.85	0.75-0.85	0.75-0.90
Tungsten	1.25-2.00	5.00-6.00	.....
Chromium	3.50-4.50	3.50-4.50	3.50-4.50
Vanadium	0.90-1.50	1.40-1.60	1.50-2.25
Molybdenum	8.00-9.50	4.00-5.00	7.50-9.50

TABLE II—Summary of Tests for Decarburization

Series	Furnace	Est. Temp., Deg. Fahr.	Atmosphere	Type I Moly-Tungsten	Type II Tungsten-Moly	Type III Moly-Vanadium
A	Coke Fire	2200	Excess air	No	No	No
B		2200	No excess air	No	No	No
C		2200	Excess air—borax	No	No	No
D	Semi-Muffle	2200	Excess air	Yes	No	Yes
E		2200	Excess gas	Slight	No	Yes
F	Gas	2200	Excess air—borax	No	No	No
N	Globar	2250 (10 min.)	5% CO	Yes	No	Yes
S	Globar	2250 (3 min.)	12% CO	Slight	No	Slight
K	Globar	2250 (3 min.)	5% CO	Slight	No	Slight
H	Globar	2200 (10 min.)	5% CO	Yes	No	Slight
R	Globar	2200 (3 min.)	12% CO	Very slight	No	Very slight
J	Globar	2200 (3 min.)	5% CO	Very slight	No	Very slight
P	Globar	2150 (10 min.)	5% CO	Very slight	No	Very slight
L	Globar	2150 (3 min.)	5% CO	Very slight	No	Very slight

ceptionally tough materials.

There appears to be a trend in the direction of the 8 per cent molybdenum, 1.9 per cent vanadium type (a variation of Type II, Table I) which is used chiefly for drills and taps. Since it contains no tungsten, the spark is a bright orange with little red. Forging, annealing, hardening and tempering are about the same as for Type I. Some users claim it is a little more difficult to grind due to the higher carbon and vanadium content.

The three types of high-speed molybdenum steels, Table I, have about the same microstructure in the annealed condition. Their thermal conductivity is about the same as that of 18-4-1. The Type II steel shows about the same hot hardness as 18-4-1 or 18-4-2 at 1200 degrees Fahr. Type I and III steels have a lower hot hardness.

In the three OPM reports (STEEL, Sept. 8, 1941, p. 60) reference is made to the same three classes of molybdenum high-speed steels as discussed here. Since these reports cover the forging and heat-treating operations recommended for the three grades, it is not necessary to repeat this information.

In these OPM reports, a section was devoted to controlled-atmosphere furnaces. In order to find out more about the heat-treating characteristics of these three steels and to expand somewhat on the information given in the OPM reports, it was decided to make a few simple tests. The results were quite significant, and the information may be helpful in making a choice of molybdenum steel for equipment.

In this investigation, many of the refinements associated with laboratory work were purposely omitted in order to simulate shop conditions and so enable the results to be judged on a shop basis.

Any of the molybdenum steels can be treated in a salt bath without fear of decarburization or in ordinary heat-treating furnaces if coated with borax or special paint. In such salt bath work, temperatures usually recommended for molybdenum steels are lowered about 25 degrees Fahr. These high-speed molybdenum steels also can be hardened without decarburization if a special atmosphere is employed containing 20 per cent or more of carbon monoxide. Such an atmosphere can be generated by burning air and charcoal, followed by thoroughly drying the gas; or a carbon block muffle may be employed. However, the average industrial user does not have this equipment and must heat treat in atmospheres ranging from oxidizing up to 14 per cent carbon monoxide. Even at 10 to 14 per cent carbon monoxide there is still some question as to the surface decarburization that occurs in certain molybdenum steels.

Some simple tests were made using a forge fire, a semimuffle gas furnace and a completely muffled atmosphere furnace in order to find out how the three types of molybdenum steels in Table I react to various atmospheres in various furnaces. Samples were prepared by grinding ⅝-inch round stock to ½-inch diameter and cutting a 4-inch length from this material. Specimens were carefully checked to make sure that no decarburization existed before heat treatment. All three types of molybdenum steels were tested at the same time as a group so they would obtain identical treatments. The test consisted of hardening in the range recommended in the OPM report and fracturing samples to determine grain size and decarburization range. The balance of the sample was filed using a Nicholson XF file as a further check on soft surface.

When it is reported that the sample is file-hard or has no decarburization, this means that a sandblasted curved surface was being tested and that a file might remove up to 0.001-inch and still the sample be reported as file-hard. In samples listed as filed or decarburized, either the fractures showed a crystaline decarburized edge or the grading off in carbon could easily be detected by filing on the surface with little pressure.

The first experiments were made in an ordinary coke forge fire banked with fine soft coal. This does not mean to recommend the heat treatment of molybdenum steels in a forge fire but is of interest since it indicates that any of the molybdenum steels can be hardened without surface protection in one of the oldest pieces of heating equipment known.

Table II presents the results of these tests with details of furnace, temperature, atmosphere and resulting decarburization for the series of 14 tests.

Considerable research is yet to be done on the effect of atmospheres. From the investigations already made, however, certain indications have been noted. Some control of atmosphere appears desirable in hardening any type of high-speed molybdenum steel. With atmosphere-controlled furnaces, the following may be of interest:

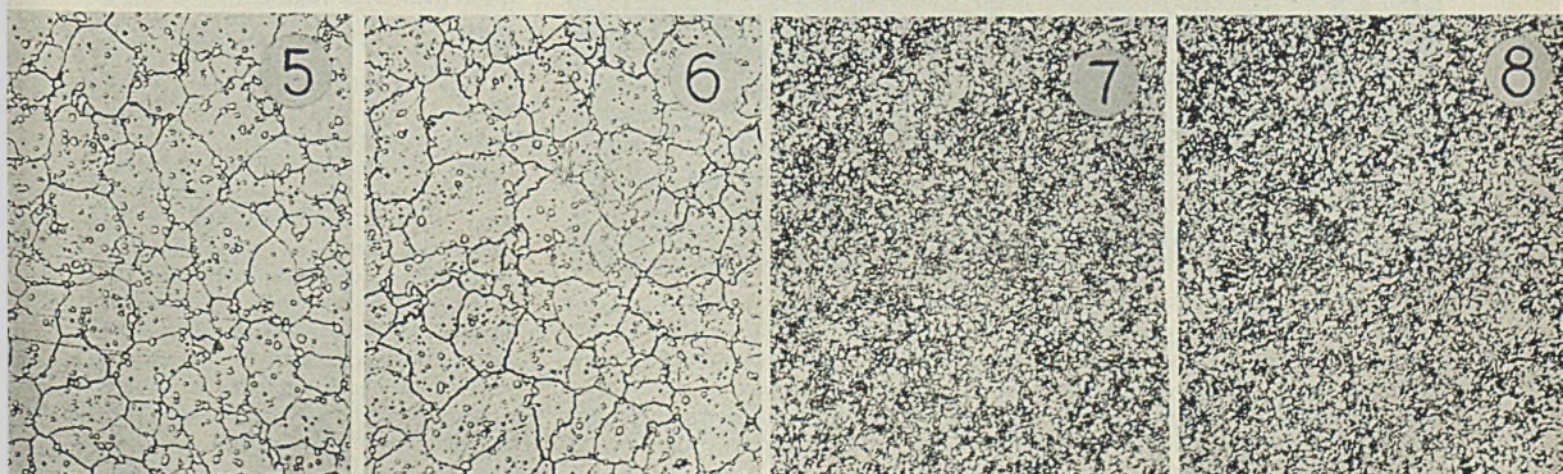
Preheating: The temperature of preheating and the atmosphere employed are important. Ordinarily a temperature of 1500 to 1600 degrees Fahr. is used

Fig. 5—The series of micrographs shows structures of tungsten-molybdenum high-speed steel (Type II) after hardening and drawing at temperatures given. This sample was heated to 2200 degrees Fahr. for 3 minutes, no draw. Grain size is 12.3

Fig. 6—All test pieces were ½-inch rounds, 4 inches long. This is structure of specimen heated to 2250 degrees Fahr. for 3 minutes, no draw. Grain is 10.8

Fig. 7—All specimens were first preheated at 1500 degrees Fahr. Hardening was done in Hayes electric furnace. This specimen was heated to 2200 degrees Fahr. for 3 minutes, drawn at 1025 degrees for 2 hours

Fig. 8—Shows structure of test piece heated to 2250 degrees Fahr. for 3 minutes and then drawn at 1025 degrees for 2 hours



with an atmosphere of 5 to 6 per cent carbon monoxide. This has a neutral or slightly carburizing effect on all three types of molybdenum high-speed steels. With lower percentages of carbon monoxide and with oxidizing atmospheres, noticeable decarburization will be produced on Types I and III, with only a trace of decarburization on Type II.

High Heat: An atmosphere of 6 to 12 per cent carbon monoxide is used by many tool manufacturers at the high heat. Decarburization will be produced on Types I and III unless borax or some other coating is employed. Under the same conditions very little decarburization will be found on the Type II steel.

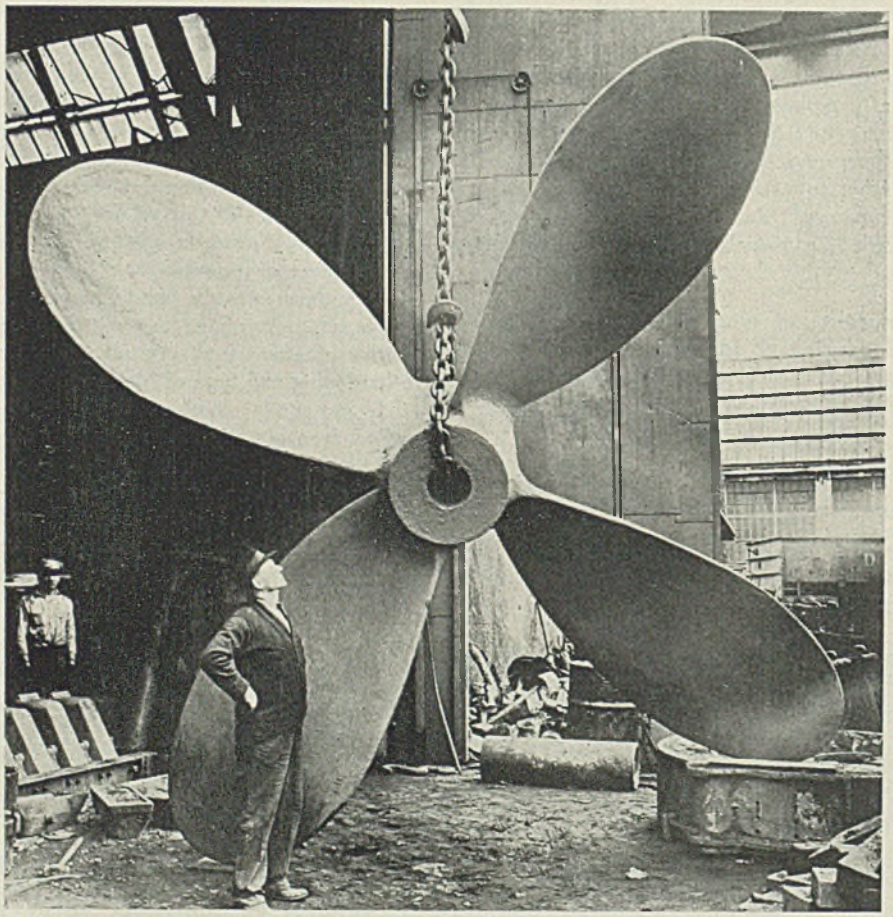
Modifications: Some reference should be made to modifications of the three standard types in Table I. Particularly important are those alloys with cobalt additions and the high-carbon and vanadium alloys. There is also available a cobalt-molybdenum steel to replace various cobalt high-tungsten steels. Increasing the carbon and vanadium in Type III has found limited application but involves some manufacturing and grinding difficulties.

Cutting Tests: Little is to be obtained by any detailed discussion of cutting tests since isolated instances mean almost nothing. However, it can be said that all three types of moly high-speed steels discussed here have been used in sufficient volume to know that they can replace the 18-4-1 high-tungsten alloy without any sacrifice in production. Generally they will give better performance.

All three types of high-speed moly steels can be used for almost all kinds of cutting tools. Whether a certain type is better for any specific application is a question since the variables involved in any cutting operation are extremely complicated.

The choice as to which molybdenum steel should be used appears to depend entirely upon the heat-treating equipment available and whether or not the higher and wider hardening range and freedom from decarburization of the Type II steel has any bearing on the quality or cost of the product being made. In any case, it should be remembered that the molybdenum high-speed steels have not reached their present wide usage because they cost less than 18-4-1 but because they deliver good performance and save valuable alloying materials.

ADOPT MEEHANITE FOR SHIP PROPELLERS



MEEHANITE metal for propellers is helping eliminate production delays created by tin and copper shortages. Recently, the Maritime Commission specified the metal as suitable for cargo vessel propellers and a number of foundries are now producing them. Ship propellers, such as the 10-ton unit shown, cast by Washington Iron Works, Seattle, provide high tensile strength, adequate resistance to cavitation and erosion and good resistance to shock or impact, according to Meehanite Research Institute of America Inc.

Plastic Used for Shoes Repairs Foundry Patterns

A plastic for years used to give strength and resiliency to box toes of shoes now speeds military production in foundries by affording quick, economical repairs and alterations for patterns of metal castings.

A colloid-treated fabric trade-marked Celastic, this plastic is double-napped cotton flannel, similar to a cotton blanket, impregnated with cellulose nitrate and a fire retardant making it slow-burning. Wet down with a solvent, it may be formed into any shape, retaining that shape on drying. It has good adhesive properties, and will stick to wood, metal and other materials.

When a wooden or metal pattern is to be repaired or altered, a piece of Celastic is cut to the desired size and shape. It is then wet with a solvent, and formed into the shape of the pattern with the fingers or a shaping tool. On drying it provides a hard, even surface which may be lightly sanded and shellacked for a smooth surface.

Patterns thus repaired have given satisfactory service for as many as 200 castings in tests at the Worthington Pump Co., and still remained in excellent condition. The material dries in 25 minutes with some solvents, but longer drying periods are recommended. It is produced by Celastic Corp., Arlington, N. J., an organization owned jointly by United States Machinery Co. and E. I. du Pont de Nemours & Co.

Reprints Booklet on Cutting Screw Threads

Recently reprinted, a 21-page booklet, "How To Cut Screw Threads in the Lathe", covering the cutting of screw threads on backgeared screw-cutting lathes is available from South Bend Lathe Works, South Bend, Ind. It describes the setting up of a lathe for thread cutting, and includes data on the use of quick change gear box to obtain the pitch of thread desired. Also complete information is given on the various types of lathe tools employed in cutting screw threads, how to grind them, and how they should be mounted and positioned.

HOW TO GET THE MOST OUT OF YOUR LATHES

No. 2 in a series of suggestions made by the South Bend Lathe Works in the interest of more efficient war production.

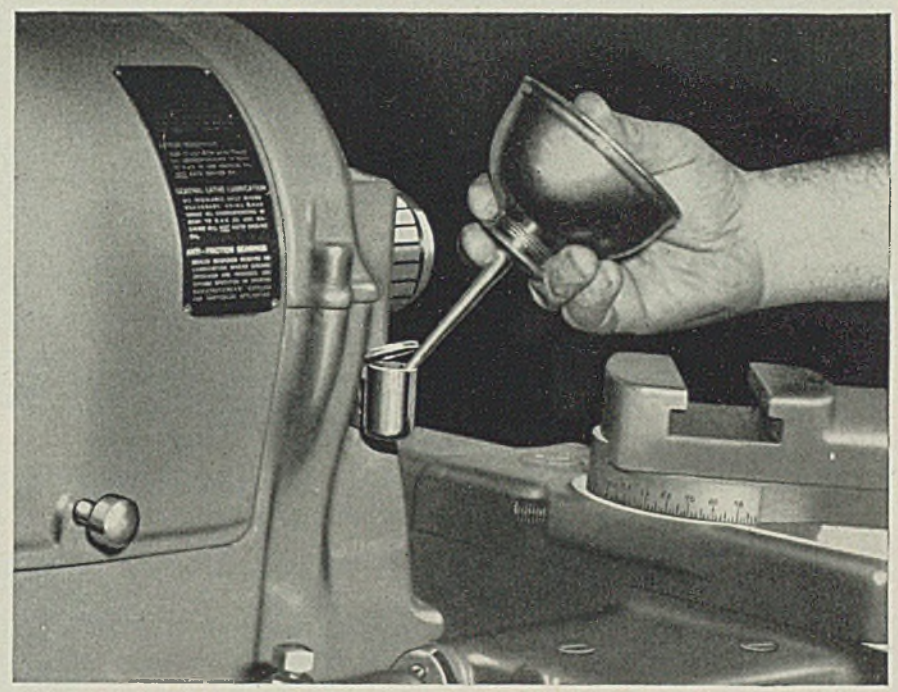
Keep Them Well Oiled

For lack of oil the bearing was lost;
For lack of a bearing the tank was lost;
For lack of a tank the battle was lost;
All for the lack of a film of oil.

Cleverly paraphrasing the ancient rhyme about the horseshoe nail, a young army officer is said to have used the above verse to emphasize the importance of lubrication in mechanized warfare. And this thought is just as applicable to the battle of production in American shops as it is to the tank battles in distant lands.

The proper lubrication of lathes and other machine tools will contribute much to our total war effort by preventing unnecessary interruption of production. It will also save scarce strategic materials and highly skilled technical labor by reducing to a minimum the demand for replacement bearings, parts, and machines.

South Bend Lathes, like other fine machine tools, have large oil reservoirs, felt wicks, and oil retainers to guard against lack of oil due to temporary neglect or oversight. But for best results the lathe should be oiled at regular intervals. Even a camel must have an occasional drink.



All bearings should be oiled at regular intervals

Make Oiling a Habit

All oil holes and oil cups on the lathe should be filled at least once a day — oftener when the lathe operates day and night — or when top speeds and feeds are employed. The best method is to fill each oil hole in a regular sequence so that oiling becomes a habit and no oil holes are overlooked. When the lathe is in service on two or more shifts, oiling the lathe should be the first daily task of each operator.

To help the inexperienced operator find the oil holes, a circle of brightly colored paint may be applied around each oil cup. Different colors of paint can be used to indicate different grades of oil.

Use Correct Grade of Oil

When the correct grade of oil is used in a well designed bearing there is little or no metal to metal contact and practically no wear. However, when the wrong grade of oil is used, or if the oiling is neglected, the oil film will break down and the fine finish of the bearing surface may be damaged in a short time.

The V-ways of the lathe bed, and the dovetails should be oiled as often as is necessary to maintain a good oil film. Touching the bed way with the tip of the finger will indicate whether or not it is coated with a film of oil.

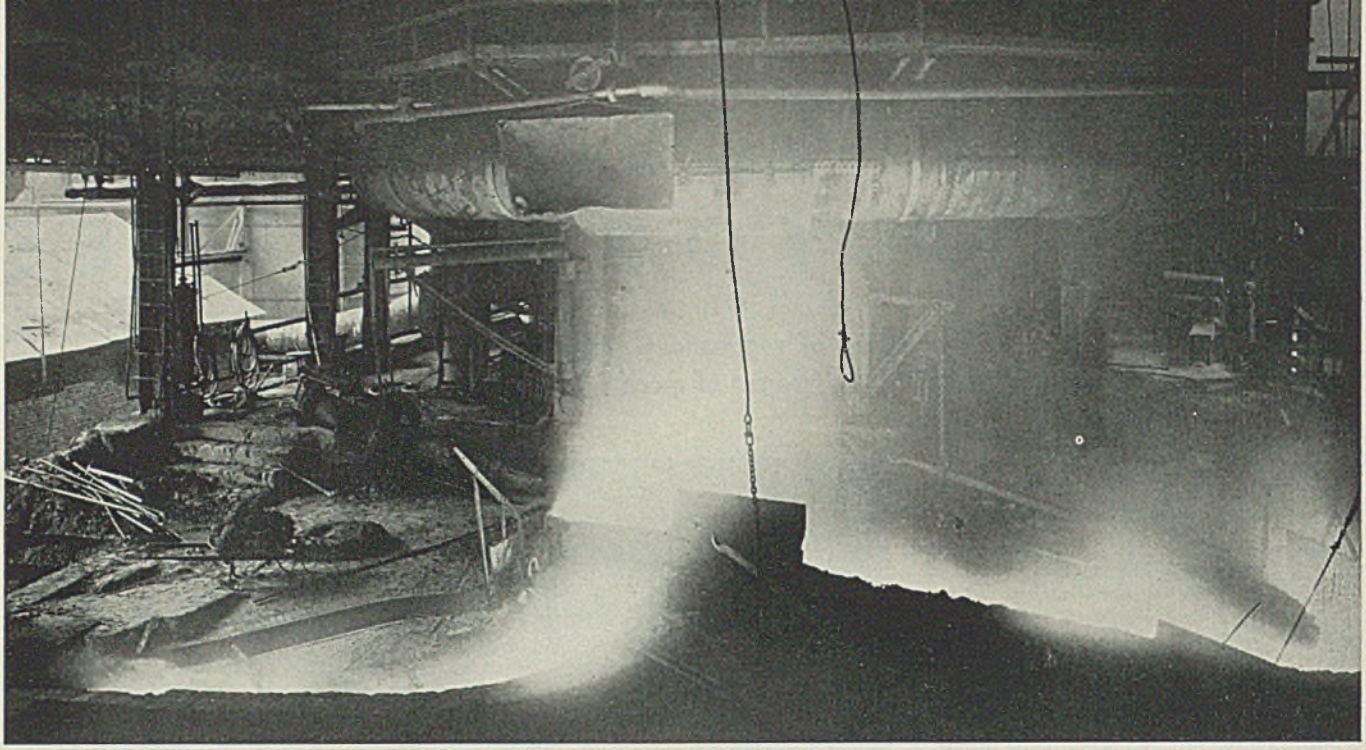
Motors should be lubricated according to the motor manufacturer's instructions which are usually attached to the motor. Care should be taken to avoid getting oil on rubber V-belts or flat leather belts, as it is injurious to both.

Clean Lathe After Oiling

After the oiling has been completed, the excess of oil should be wiped off with a clean cloth. The lathe should be kept clean. Dirt, chips, or rust should not be allowed to collect.

Write for Bulletin No. H2

Bulletin No. H2 giving more complete information on oiling the lathe will be supplied on request. Oiling charts for South Bend Lathes, and reprints of this and other advertisements in this series can also be supplied. State quantity wanted, also serial numbers of lathes for which oiling charts are needed.



Tapping time at one of the country's blast furnaces scheduled on basic iron

Exploding the "SPONGE IRON" MYTH

In Modern Steelmaking Practice

By FEODORE F. FOSS
Wheeling Steel Corp.
Wheeling, W. Va.

SEPARATION of iron from ore by a "direct" process in form of a "sponge" and not in molten condition, as in a blast furnace, recently has been given renewed attention due to the tremendous demand for scrap in steelmaking. A fallacious idea is suggested that iron-making by a "direct" process could be established at a small initial cost at any place where iron is found and that such an installation immediately will give a product which will make up deficiencies in iron scrap.

Such contentions, however, are not supported by knowledge of the present development of the so-called "direct" process, nor by the general principles of iron and steel metallurgy.

In this case, again, as in many other instances, the old adage is true that humanity needs more to be reminded than informed. There is nothing new in the idea. The direct process of iron-making from ore is as old as humanity itself and has been used and tried in many modifications for hundreds of years.

With the exception of meteoric and telluric, all iron made since time immemorial, up to the beginning of the Fourteenth Century, was won from iron ores in the form of a sponge. Every pound of iron, during this long period of two and a half millenniums, was made as a sponge reduced from the ore in a crude form of crucible which, under different names—Catalan, Walloon, etc. forges—was brought up to our time. These forges, still existing in Central Africa, Borneo, China, and other places, have been described by several explorers, like H. M. Stanley, who, in 1872, went to the jungles of Africa to find Livingstone. The "bloomeries" producing sponge iron could have been seen in these United States at the close of the Nineteenth Century and have given us good insight into the way our forefathers produced their iron.

After using these forges for many centuries, the primitive ironworker found that, from time to time, he received in his "hearth" not only the soft malleable sponge but some other substance. When he blew his air too strong and made his hearth too hot, he produced chunks of material which could not be hammered into any useful form and upon hammering would break up into pieces. The forge operator had no use for these particles of iron and threw them away. His forge was in the field, close to his abode; and pigs were around and the angry smith, in throwing out the hard pieces, remarked that such iron was good only for pigs. From that time, the nonmalleable iron product of the forge with high-carbon content has received the name of "pig" iron.

By observing what was happening in his crucible, the forge operator, in time, acquired some knowledge of making "soft" and "hard" iron and began to understand how the most part of the ore charge could be gotten in molten form. By and by, he started to raise the height of his crucible until he created a blast furnace.

The birth of the blast furnace occurred sometime in the Fourteenth Century, and already in the Sixteenth Century, production of iron from blast furnaces in the form of pig iron was considerable. Since that time, experience, common sense and technological science have brought the iron industry—on the basis of the blast furnace process—to the position it now occupies.

Attempts to get better and cheaper iron by the return to the "direct" process, which eliminates ore reduction to the iron-carbon alloy, have their long history. As said before, the "bloomeries" have been with us in different parts of

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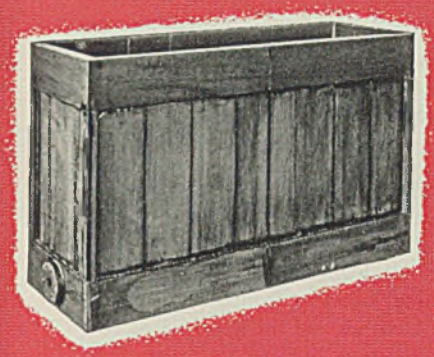

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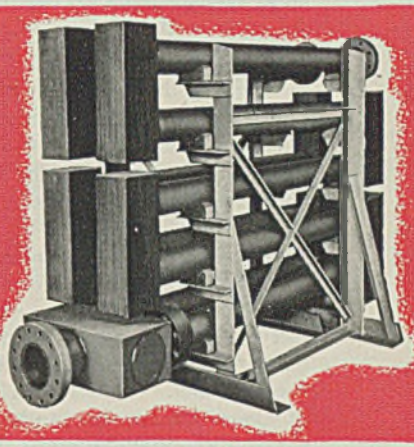

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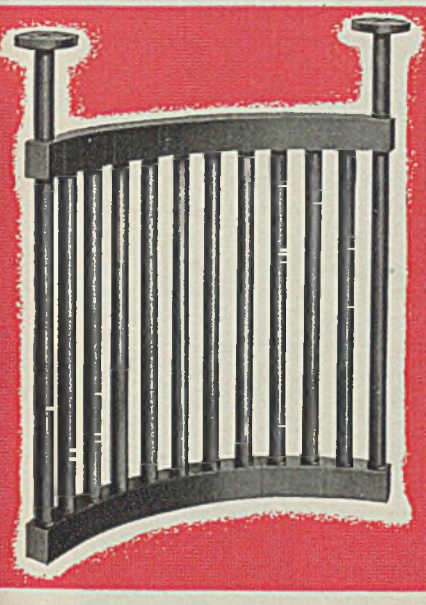

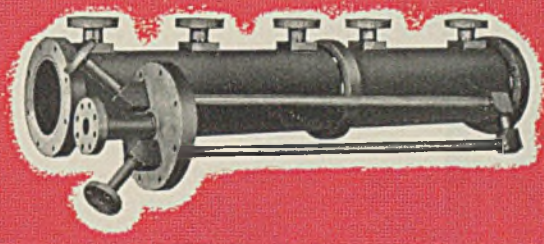

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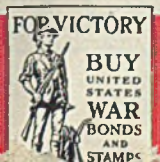
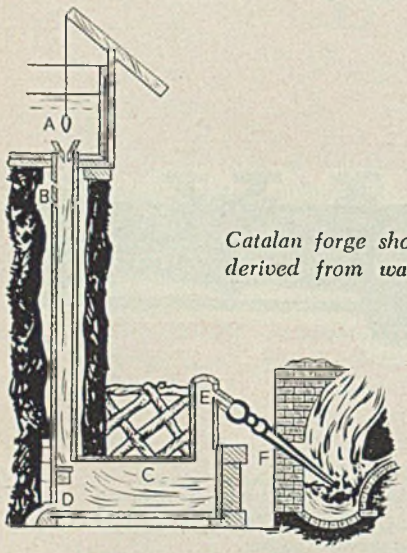


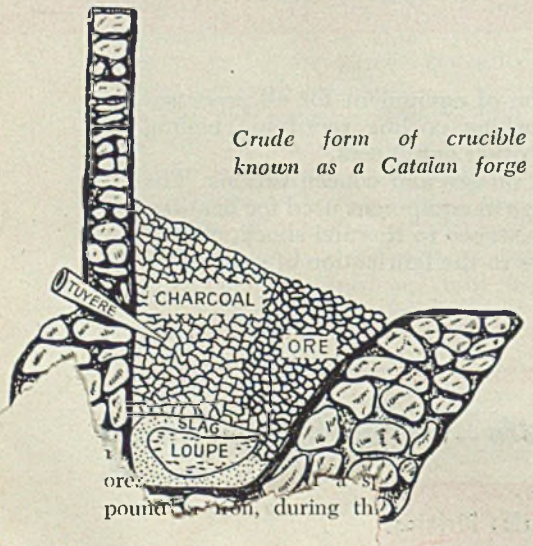
the globe all the time and the desire to avoid the blast furnace operation has never left the human mind completely. With the general development of iron-making technology, attempts to make iron directly from ores took only more impressive forms.

More than 100 years ago, J. H. Harkins took a patent in Great Britain (1836) for a process of direct reduction of iron and, since that time, many hundreds of patents adorn the catalogue of inventions pertaining to the "direct" process. None of these patents, except that described hereafter, succeeded in adapting the sponge iron process to prevailing economic conditions of iron industry, notwithstanding the fact that nearly every iron producing country of the world and many prominent metallurgists have contributed to the development of the "direct" process.

Metallurgical literature of many countries contains abundant material on the direct process and it is interesting to note that American ironmasters have not been behind times. Thomas Blair operated a direct furnace in Pittsburgh (Asinwood) in the early seventies. This plant has been described in *Transactions* of A.I.M.E. Vol. II, p. 175. Another description of the direct process, conducted at that time on a large scale, was made by Prof. T. Egleston of Columbia University in 1880, under the heading "The Bloomery Process for Making Iron Direct from Ore."



Catalan forge showing blast derived from water blower



Crude form of crucible known as a Catalan forge

ore ... a sponge iron, during the ...

Direct process furnaces have been in operation in Maryland, New Jersey, New York and other states. In 1882, the production of United States bloomeries amounted to 48,354 tons.

The U. S. Bureau of Mines has contributed to the study of the "direct" process considerable time and effort. A comprehensive treatise on sponge iron is the publication of U. S. Bureau No. 270. In this book, the most important information about the "direct" process up to 1927 can be found. Reference also might be made to extensive summaries appearing in STEEL, April 10, 1939, p. 43, and Oct. 6, 1941, p. 58.

Interested Various Countries

During the last two decades, the "direct" process has attracted attention of countries which wanted to develop substitutes for scrap. Japan, which, in 1928, produced only 1,500,000 metric tons of pig iron, has experimented with the Anderson and Thornhill direct process for the utilization of titaniferous iron sands. This experiment reportedly was not successful.

Several years later, about 1933, the Fried Krupp—Grusonwerk A. G. in Germany, which has worked on the direct process for decades, improved the Krupp—Rennverfahren to such an extent that sponge iron of conditionally acceptable quality was produced. Its price was higher than that of scrap, but German preparation for autarchy did not consider the cost of the product in this case. Then, as usual, the sulphur content in the sponge was high—much too high for the open-hearth furnace.

The regular Renn product carried sulphur on the average of 0.2 per cent, reaching sometimes 0.32 and even 0.9. With specially-prepared fluxes for ore mixture, the sulphur content was lowered in some instances to 0.03-0.05 per cent, but melting of the sponge in open-hearth furnaces was not successful and the problem of sponge iron utilization was solved by charging sponge lumps into the blast furnace.

To make the long story of latest achievements of Krupp-Rennverfahren short, suffice it to say that, in preparation for self sufficiency in iron products before this war and in organizing the four-year plan, the Germans began construction of a large "Herman-Goering plant" with eight blast furnaces at Watenstedt, south of Brunswick, to use the Salzgitter ore. The project provides 32 blast furnaces and no Rennverfahren furnaces for ironmaking.

At the end of the last decade, the Germans succeeded in selling the Krupp-Rennverfahren to another aspirant for autarchy. In 1938, Japan gave Krupp-Grusonwerk A. G. a contract for 16 Rennverfahren furnaces. According to literature, five of these furnaces were put in operation at the end of 1939.

It is claimed that construction of another plant was started in Japan in 1939 with ten furnaces, and that, with completion of all 16 furnaces, the Japanese iron industry will have covered 30 per cent of its scrap import, which (on the average of 1934-36) amounted to 1,200,000 tons per year. In later years, scrap import into Japan was considerably higher.

The Japanese have been planning to use their low-sulphur anthracites as a fuel and to produce sponge containing sulphur not higher than 0.08 per cent. How these Japanese furnaces are working we have no way of knowing at the present moment but we do know that from 1933 to 1940 inclusive, Japan bought in the United States 11,400,000 net tons of iron scrap and covered, in some years, up to 35 per cent of its ingot production with outside scrap. It is evident that the Japanese did not base the expansion of their iron industry on sponge iron.

Theoretical studies and practical tests of Krupp-Rennverfahren have considerable literature. It was proved that, when the same kind of ores are charged in the blast furnace and in the Renn furnace, the cost of production of 1 ton of metallic iron in acceptable form is always cheaper in the blast furnace than in Renn furnace except when the ore has a high percentage of silica with naturally low content of iron (27 to 30 per cent iron and 25 to 30 per cent silica).

The "direct" process, whatever its type, demands considerable preparation of ore and its mixture with fluxes. It is interesting to note that the most suitable flux for the Rennverfahren with Salzgitter ores contains a considerable part of blast furnace slag.

The Rennverfahren process works in two stages—first the reduction of ore, followed by classification of reduced lumps with the aid of a magnetic separator.

It is to be expected that a plant performing a series of such preparations demands a considerable capital outlay and it is estimated the cost of a complete plant for the direct process (allowing, of course, for different conditions in different countries) must not be very far from the expenditures on a blast furnace for the same daily output. A Renn furnace of modern design, (which has actually performed) puts through up to 250

tons of ore (40 to 100 tons of 90 per cent iron product) per day. The labor cost per ton of Renn product is considerably higher than that per ton of pig iron made in the blast furnace.

Studies of the problem of best utilization of sponge iron tend to show the most economical processing of the "sponge" is in the blast furnace. The open hearth can use the sponge with profit only in exceptional cases when the sponge is low in sulphur and pure in other respects. As actual practice with the Renn product stands at present, it has been found that it is less costly to desulphurize the sponge lump in the blast furnace and not in the open hearth. The electric furnace is not considered here, as it is not comparable on an economic basis with blast furnace or open hearth.

It is pertinent at this point to consider one direct reduction plant which alone in the entire world has succeeded in the production of usable and competitive (to a certain extent) iron sponge. Technological details of this process deserve attention as an illustration of conditions of production and distribution which may favor sponge iron production.

This successful sponge iron producer is located on the East coast of Sweden in Hoeganaes. The Hoeganaes plant of Hoeganaes-Billesholms Aktiebolag has produced sponge iron for more than 30 years, up to 11,000 tons per year. It does not use regular iron ore in its production, but reduces a special magnetic concentrate. Other favorable conditions needed for the success of such metallurgical experiment as low-cost fuel, refractories and labor, and furnaces of adequate design, are also present in this plant.

About 1908, Swedish engineer S. S. Sieurin (pronounced Zheureen) worked for the Hoeganaes company on the briquetting problem of iron concentrates from Gellivare magnetic iron ore. After having failed in following the regular pattern of ore concentrates calcining in a tunnel furnace, he conceived an idea of imitating the method of sponge ironmaking as practiced in Shansi province of China.

Properties of the Hoeganaes company contain a deposit of medium quality coal (0.7 per cent sulphur and 30 per cent ash) which is readily mined, and a seam of good refractory clay, from which the company has made refractory bricks and crucibles for years. Hoeganaes, being on the sea, has favorable shipping rates for iron ore concentrates from ports of northern Sweden. With these concentrates (71 per cent iron, 0.001 sulphur and 0.01 phosphorus), Sieurin started to make sponge iron. High cylindrical crucibles, about 14 inches diameter, were filled with alternating layers of coal, finely crushed limestone and iron concentrate to a height of about 6½ feet and sealed. These crucibles were wheeled into the chambers of a large-sized ring-furnace (used for brick firing) and were methodically heated in regular cycles up to 1800 degrees Fahr. After the cycle was completed in a certain number of days and the cylindrical lumps of sponge iron, about 11 inches diameter and up to 1½ to 2 inches thick, were emptied from the crucibles (actually by breaking the crucibles), the product of this operation gave the following analysis:

Element	Per cent
Iron	96 to 96.5
Sulphur	0.015 (Usually 0.013)
Phosphorus	0.013 (Usually 0.01)
Gangue (mostly silica)	1.5-2.0
Oxygen	1.5-2.0
Carbon	About 0.03
Manganese	Trace

At the time of the writer's visit to Hoeganaes in 1914, the sponge was delivered to steelmakers in Sheffield, England, at a price somewhat higher than high-grade pig iron. For several years before and after the first World War, the Hoeganaes plant worked more or less smoothly depending on economic and political conditions.

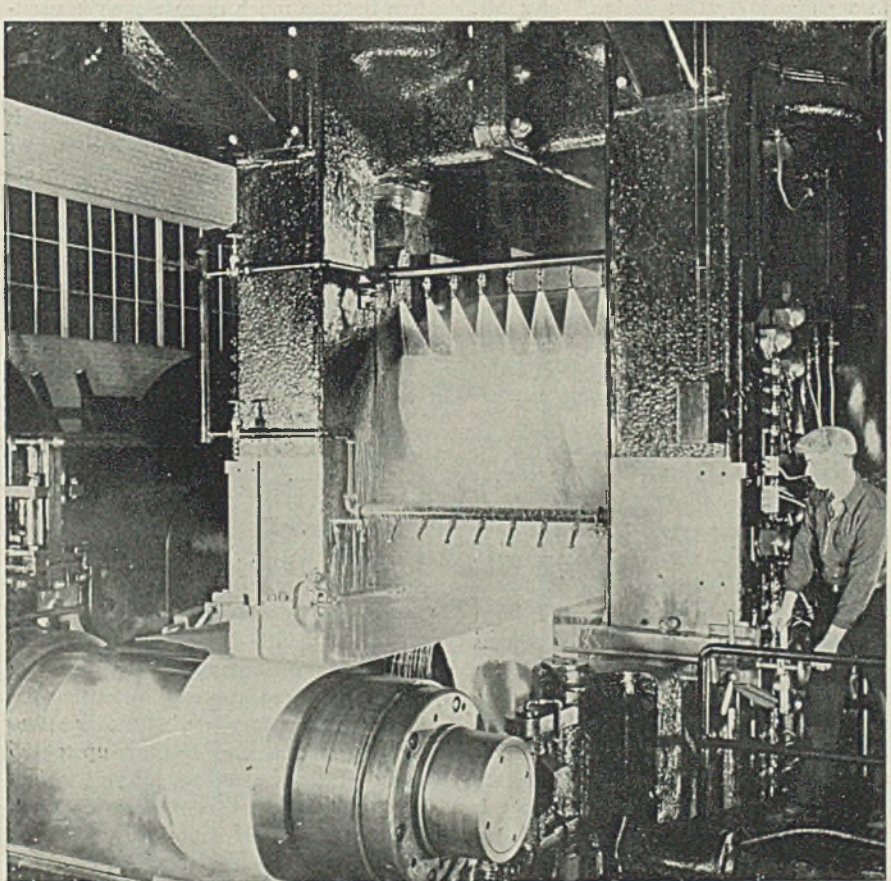
Production of sponge iron reported in official Swedish statistics for the period of 1918 to 1936 was as follows:

Year	Metric tons
1918	6,100
1919	1,332
1920	4,263
1923	2,193
1924	589
1925	3,610
1926	2,610
1927	6,598
1928	6,014
1929	10,253
1932	8,721
1933	1,776
1934	7,418
1935	8,816
1936	11,060

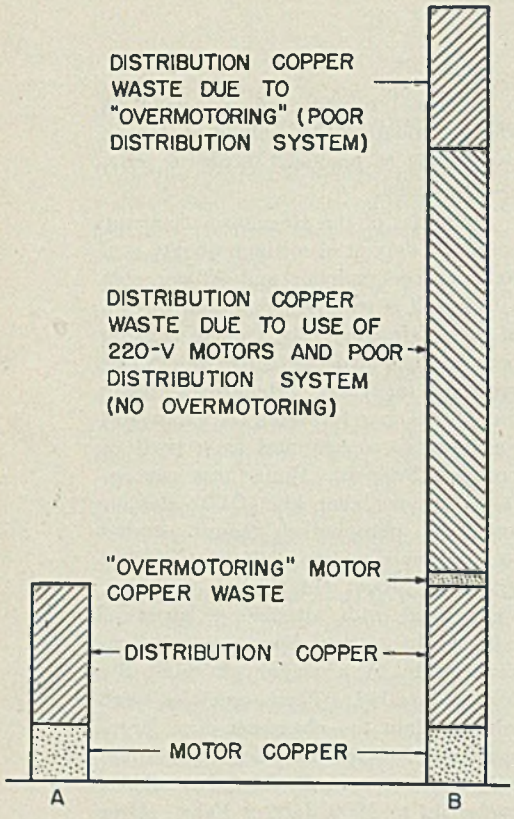
These figures illustrate vividly the position of sponge iron as a material in

(*Please turn to Page* 115)

SPRAY NOZZLES WITH HIGH HITTING POWER



COOLING soda liquid is being sprayed over the metal in view above by this installation of nozzles in a large automotive steel plant. The Rex nozzles used in the arrangement, and supplied by Chain Belt Co., Milwaukee, consist of a single casting designed to produce a spray with maximum hitting value—one strong enough to remove dust and dirt. Nozzles are said to be equally efficient for descaling billets and plates



This bar chart shows at A the amount of copper used in the motors and distribution system of a typical war plant with 440-volt motors (no overmotoring) and with a modern load-center distribution system. At B is a similar bar showing the copper that would be used in the same plant if 220-volt motors, 25 per cent too large, were used along with an old-fashioned distribution system bringing power to utilization points at low voltage. This graphically portrays the importance of using a modern high-voltage plant distribution system and avoiding overmotoring

OVERMOTORING

. . . . a crime against our war economy

"WHEN IN doubt, consider the next smaller rating" is a slogan that might well describe General Electric's campaign to point out how materials can be conserved and motor production increased through the selection of motors closer to their ratings for specific jobs. L. A. Umansky, assistant manager of General Electric's industrial engineering department, points out that because of "overmotoring", up to 25 per cent more material and labor are now going into the production of motors than is needed for the work the motors are being called upon to do.

"Motor users and specifiers can help greatly in conserving critical materials and in helping motor manufacturers produce the maximum number of motors needed to win the war by selecting the motor size on the basis of the actual expected duty without overstress on additional safety factors to take care of unexpectedly heavy loads or to lengthen motor life," says Mr. Umansky.

"Conservation in motor selection, however commendable in normal times, must be discarded for the duration," he adds. "Although modern motors are considerably lighter for the same horsepower than those of a few years ago because of better available materials, they are just as conservatively rated by the manufacturer who has already designed into the motor a margin of safety to meet reasonable overloads.

"Overmotoring" also affects almost everything else in a plant's electric chain including control, distribution and generation since the capacity of the power system is often based on the installed horsepower of motors. "For this reason, in the distribution system lies our greatest opportunity to save copper through careful motor selection and, of course, through good system design," says Mr. Umansky. "In any electrical installation, only a small portion of copper used is contained in motor windings. The bulk is in the distribution system—in the cables, buses, etc. Let us take, for instance, an average industrial plant typical of many now being built for war production. Let's assume that 13,200-volt power is brought to this plant and then stepped down to motor voltage, and that the total installed motor capacity is 10,000 horsepower, mostly in squirrel-cage motors. The plant is designed for 4000-kilovolt-ampere capacity, or 40 per cent load factor.

"Now," he continues, "an average 7½ to 10-horsepower squirrel-cage motor requires not more than 2 to 3 pounds of copper per horsepower. Under the most ideal conditions—440-volt motors powered from a materials-saving load-center system where power is stepped down near the utilization area—up to 5 pounds of copper will probably be needed for each installed horsepower. If motors are selected 15 to 25 per cent too large, then in addition to needless use of materials and facilities in motor manufacture, the amount in excess distribution copper is apt to be 7500 to 12,500 pounds."

The excess copper used would be much more if the old-fashioned distribution system of carrying the power through the plant at low voltage were used. Worse yet, if 220-volt motors are chosen instead of 440-volt (this has no effect on the amount of copper used in the motors) the distribution copper will go up to 10 pounds per horsepower with the load-center distribution system and up to 18 to 20 pounds with the old-fashioned system because much more copper is needed to carry the lower-voltage power to the motor.

A further evil of "overmotoring" that cannot be overlooked or disregarded is its effect on low power factor—another avoidable waste. Many splendid plants are probably operating at 40 per cent power factor today, primarily because of heavy "overmotoring". All concerned can be of great help to the war effort by adherence to the following principles:

—Select motors closer to their actual duty—avoid piling up "safety margins".

—If in doubt, do not arbitrarily select the next larger rating; perhaps the next smaller rating will do the job satisfactorily.

—Utilize the available service factor wherever possible. For instance, the motor will not be injured if the service factor of 1.15 is used in some cases on the 40-degree Cent. motors, although continuous operations at the resulting 50 degrees Cent. rise may mean that the insulation will last only 10 years rather than 20. Even more loading, up to 125 per cent can be utilized when ambient temperatures less than 40 degrees Cent. are expected. (Of course, always check other factors such as starting or maximum torque, etc. Sometimes these, rather than the continuous rating, determine the motor size.)

—Don't use motors larger than 1 horsepower at voltages less than 440 volts.

—Bring high-voltage power to the load center.

FIRE and how to fight it!

HOW OFTEN SHOULD EXTINGUISHERS BE RE-CHARGED?

Is your plant's fire-fighting equipment in top-notch condition—ready for a sudden emergency?

Even the very finest portable extinguishers cannot retain full effectiveness *indefinitely*.

Some day one of your extinguishers may be called on to save your plant. Insure reliability of your fire-fighting equipment. Follow the simple rules charted below.

 CARBON DIOXIDE	DO THIS ONCE EACH YEAR Weigh to detect leakage. If extinguisher shows loss of weight of less than 10% of rated capacity, *stamped on label*, nothing need be done. Recharge if weight loss shows greater than 10%.	WILL IT FREEZE? no	
 SODA ACID	DO THIS ONCE EACH YEAR Discharge and refill. Mix soda solution outside extinguisher, following manufacturer's instructions. Use lukewarm, not hot water. Wash all parts with water. Examine for clogging or corrosion.	WILL IT FREEZE? yes Do not keep outdoors in cold weather.	
 PLAIN WATER	DO THIS ONCE EACH YEAR Inspect by removing and weighing carbon dioxide cartridge. Replace cartridge if weight loss exceeds ½ ounce. Inspect hose and nozzle for clogging or corrosion, and check the quantity of water.	WILL IT FREEZE? Ordinarily yes, but some water extinguishers are protected against freezing. Label gives this information.	
 FOAM	DO THIS ONCE EACH YEAR Recharge. Mix solution outside the extinguisher according to manufacturer's exact directions. Wash all parts thoroughly with water. Test hose. Examine for corrosion or clogging.	WILL IT FREEZE? yes Do not keep outdoors in cold.	
 VAPORIZING LIQUID	DO THIS ONCE EACH YEAR Test by partially discharging. Pump a few strokes with extinguisher first aimed upward and then downward. Replace lost liquid, as furnished by manufacturer.	WILL IT FREEZE? no	
 DRY COMPOUND	DO THIS ONCE EACH YEAR Remove and weigh carbon dioxide cartridge. Replace if it shows loss of weight of more than ½ oz. for 12 lb. extinguisher or 1 oz. for the 20 lb. size. Check quantity of dry compound and determine that it is free-flowing.	WILL IT FREEZE? no	
 BUILT-IN CARBON DIOXIDE SYSTEM	DO THIS ONCE EACH YEAR Weigh cylinders to check loss of contents. Blow out carbon dioxide lines. Check all releases, thermostats, tubing, switches, pull boxes and electric lines.	WILL IT FREEZE? no	

NOTE: *RECHARGE EXTINGUISHERS IMMEDIATELY AFTER USE, EVEN THOUGH ONLY PARTIALLY EXPENDED.*

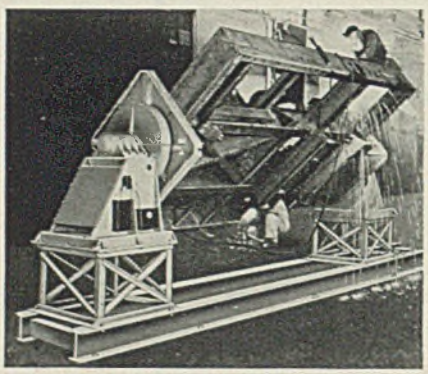
INDUSTRIAL EQUIPMENT

Welding Fixture

Industrial Division, Ransome Machinery Co., Dunellen, N. J., recently developed a rotating welding fixture consisting of a head-stock and tail-stock combination for position-welding of large cumbersome objects. It is being offered in standard sizes to handle objects weighing up to 16 tons.

The head-stock table top is fixed in a vertical position with its spindle shaft turning in double roller bearings. This unit is provided with power for rotating through a pinion in mesh with the table top ring gear. Driving motor and self-locking gear reduction are completely enclosed within the main frame.

The tail-stock, although essentially of the same design as the head-stock, is made variable to accommodate objects of different lengths by mounting it on



heavy I-beams and moving it to accommodate the object to be welded. Height adjustment is made by providing simple sub-bases to suit conditions of service.

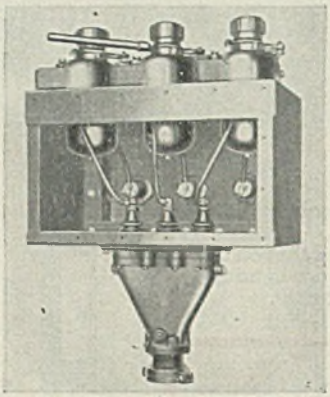
Both head and tail-stock are of heavy all-welded construction and table tops are T-slotted to facilitate clamping. Where a difference in elevation between head and tail-stock units is desired to provide additional downhand welding positions, the main base of the units is pivoted at one end and provided with a hydraulic jack at the other.

Oil Fuse Cutouts

General Electric Co., Schenectady, N. Y., has placed on the market a new metal-enclosed assembly of gang-operated oil fuse cutouts for short-circuit protection and switching. These permit totally metal-enclosed installations, either single or three-phase.

Units are said to save installation time because each is factory-assembled with flexible, insulated cable leads ready for connection to either single or multi-conductor cable. The leads enter the individual cutouts above the oil level, preventing loss of oil. Switching requires merely throwing a lever 90 degrees. Fuse carriers can be removed without disturbing the gang-operating mechanism.

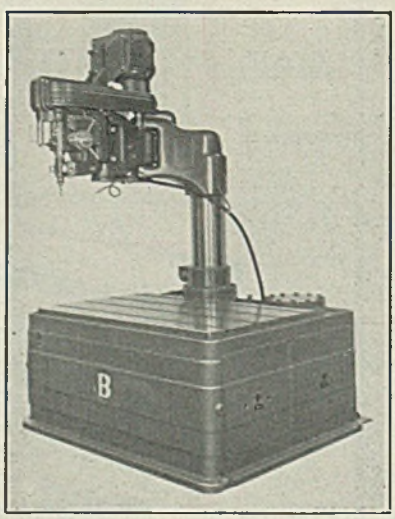
The assemblies are adapted for use



(indoor or outdoor) in industrial plants for branch circuits, individual transformers or banks, motors, control apparatus, and electric-heating and other equipment. They are being offered for wall or direct-to-apparatus mounting.

Radial Tapping Machine

Bakewell Mfg. Co., 2427 East Fourteenth street, Los Angeles, recently developed a radial tapping machine especially designed for securing class 3 or 4 gage fits in one pass in any material where it is more advantageous to move the tap around the work than the work around the tap. Its tapping head and its free floating arm are hydraulically raised



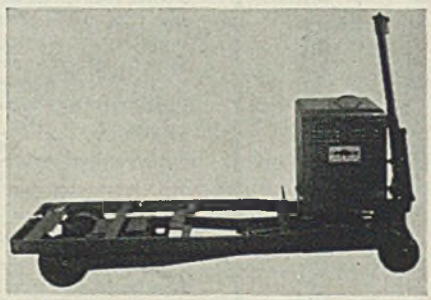
or lowered to suit the operator's convenience by control buttons.

Tap is fed into work by lead screw and guide finger control. The lead screw is supplied with a hobbed upper section which cuts the threads on the brass guide fingers. During the operation the fingers engage the lead screw automatically eliminating any play or backlash. Also incorporated in the machine is a safety clutch which slips when the tap happens to strike an obstacle in the hole.

Lift Truck

Barret-Cravens Co., Chicago, announces a new Power Ox electrically-operated lift truck—the first to be offered by the concern. It really is a combination hand and electric Lift-truck, design being a combination of electric power coupled with the company's NT Big Boy multiple stroke lift truck.

The unit lifts loads by a series of vertical handle strokes. When raised to the desired height, electric power is transmitted to the two rear-drive wheels by twisting a hand control (handle). The hand control can be operated with the



handle in any position. Releasing the forward or backward pressure on the hand control permits it to return to neutral position.

The electric drive is derived from a storage battery capable of 8 to 12 hours continuous service. Drive motors consist of two heavy-duty motors driving off the rear wheels. The motors drive each wheel independently. Two-thirds of the load is always carried on the rear wheels.

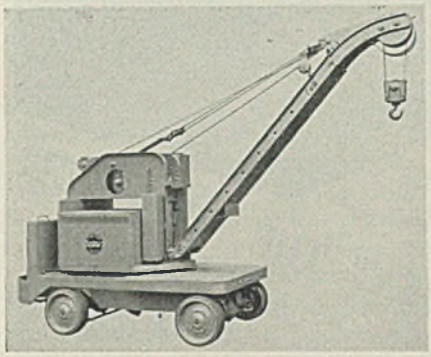
A high frame clearance prevents the unit from "hanging" in going up and down inclines, on and off elevators or in and out of trucks and freight cars. A hydraulic check serves to ease loads to the floor. Weight of the truck is less than the smallest electric unit available, it is said. Its capacity is 4000 pounds, and it is being offered in widths of 19 and 25 inches with platform lengths of 48 and 60 inches.

Heavy-Duty Truck

Baker Industrial Truck Division, Baker-Raulang Co., Cleveland, announces a new type CXF heavy-duty 10,000-pound crane truck for handling heavier unit loads occasioned by the war production program. It is adapted to every industry where heavy loads must be

lifted—for erecting work, for combined lifting and transporting operations, for placing work in machines and other applications.

Hoist units are positioned so they



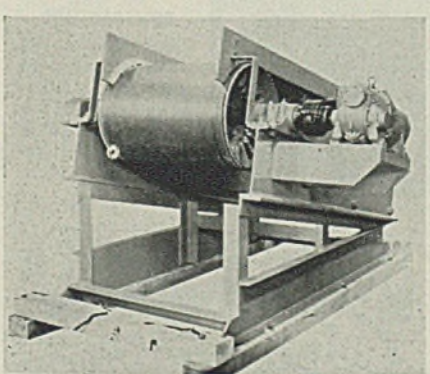
are available as counterweights, resulting in lower gross weight in spite of heavier construction throughout. The mast on which the superstructure slews is a tall member giving two widely separated points of bearing which results in low bearing loads. It also permits a higher position for the topping cable idler sheave than is possible with other designs.

This position gives a more favorable angle of pull when raising the boom from the extreme lowered position. All controls are located on the dash and do not swing with the superstructure. The No-Plug travel controller included makes correct operation compulsory.

Separator

Dings Magnetic Separator Co., Milwaukee, has introduced a new model high intensity magnetic pulley separator for reclamation of steel and iron from foundry and steel mill slag dumps.

The high intensity magnetic pulley incorporated is of the serrated, air-cooled type. There are four pole pieces extending completely around the circumfer-



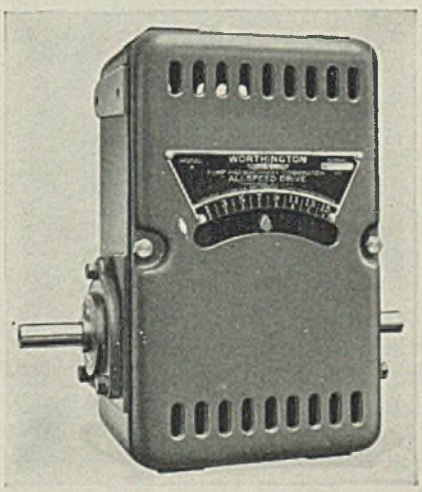
ence of the magnetic pulley, and between these pole pieces are wound the magnet coils. Protecting these coils are heavy bronze coil covers. This feature increases the strength of the magnetic pulley, and allows the magnetic lines of force to extend a greater distance away from the face of the magnetic pulley, increasing both capacity and intensity of the unit, it is said.

The pulley is installed in a steel frame of electro-welded construction. Lips are placed on either end of the frame so that the entire unit may be dragged by means of a tractor, to various scenes of operation. A gear reducer unit is installed integrally with the machine and connected directly to the drive shaft of the magnetic pulley.

Variable Speed Drive

Worthington Pump & Machinery Corp., Harrison, N. J., recently introduced a new Allspeed variable speed multiple V-belt-drive which can be coupled directly to any standard motor. Its output shaft can be run at motor speed, and is flexible enough to be applied to any type of machine within its own power range.

Unit has a horsepower range of 1/3

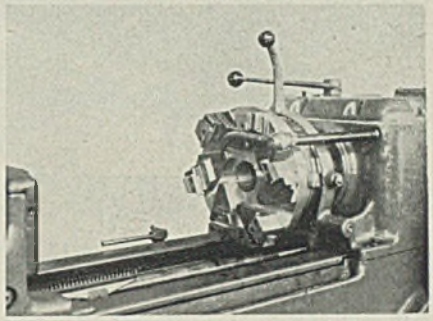


to ¾-horsepower with a speed ratio of 16:1. Feature of the drive is its mechanical, position belt-tensioning device which automatically compensates for increased arc of belt contact which results from changing from low to high speeds. In this tensioning device no springs are required.

Die Head

Landis Machine Co., Waynesboro, Pa., is marketing a special Lanco RXX die head for large diameter fine pitch threads. It is said to have an exceptionally wide range coverage, the unusual capacity being obtained by using an oversize closing ring on the face of the die head to support extended chaser holders.

The die head is equipped with chaser holders and chasers for threading 9¾ inches diameter—8 pitch. However, by employing chaser holders with a still greater seating surface for the chasers,



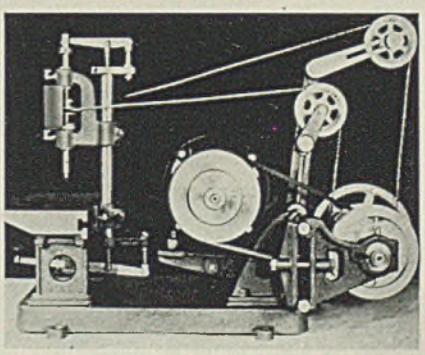
diameters as large as 12 inches can be handled efficiently.

Maximum thread length which can be handled with chaser holders of the type illustrated is approximately 2 inches. Operating parts of the die head are of high carbon steel, heat treated. Chaser holders are steel forgings and since they are supported by the enlarged closing ring, they provide rigid support for the chasers.

Drill Press

Edward Blake Co., 634 Commonwealth avenue, Newton Centre, Mass., announces a new super sensitive drill press for extremely small drills and other tools. It features a standard range of eight speeds from 3000 to 23,000 revolutions per minute, which gives proper surface speeds on drills from 0.004-inch, or smaller, to 1/16-inch in diameter.

Sensitivity is attained by balancing spindle by means of the vertical component of the belt tension. This together



with finger-tip control, reduces drill breakage to a minimum.

Machines with 1, 2, 3, and 4 spindles may be furnished. Each is furnished with an independent finger-tip control

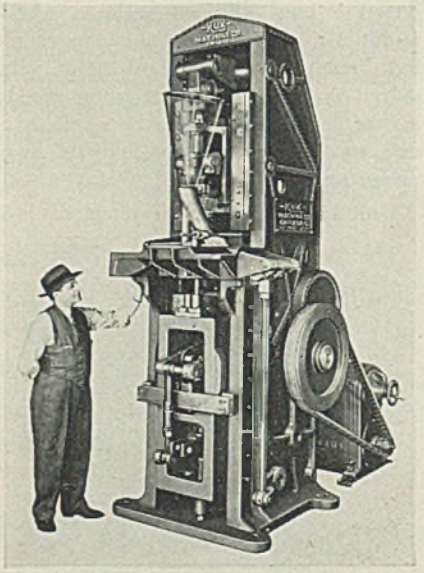
and each may be run at an independent speed to suit the size and type of tool being used and the material to be cut.

Standard equipment includes two spindles for each spindle mount—one for Jacobs chuck, and one with tapered hole for tapered shanks.

Automatic Press

Kux Machine Co., 3944 West Harrison street, Chicago, announces a new model 74 automatic press for producing parts from powdered metals and ceramic materials. It is capable of producing oilless bearings, iron gears and cams, metal filters and metallic electrical contact points.

The machine permits manufacture of odd-shaped parts with complicated, cored holes, protuding lugs and various sectional thicknesses to micrometer accuracy. Pieces are made with uniform structural density throughout, it is claimed.



Applying up to 50 tons total pressure, the machine will produce parts up to 5 inches maximum diameter and has a powder cell, or die fill of 5½ inches maximum. An agitated feeding shoe transmits material from the supply hopper to the powder cell in the die. The die fill, controlled by an adjustment device, can be increased or decreased at will so that wafer thin parts, or parts with thick sections can be made.

Machine is built to use multiple, telescoping punches and movable core rods which apply the pressure to the material being formed. It is designed with separately controlled mechanisms for operating each individual telescoping punch or core rod. Use of upper and lower movable core rods permits the forming of intricate and odd-shaped parts, for additional pressure can be applied to an extending lug, to a counter-

(*Please turn to Page* 117)

Composite Stampings

(*Continued from Page* 86)

methods, it did succeed in substituting steel sheets for aluminum bar stock, thus affording an important economy. At the same time, it released much automatic screw machine capacity for utilization in other critical work.

It will be noted that all the examples of composite stampings described have the same dimensions at those points where the assembly must fit other parts as do those parts which they replace. Quite obviously those surfaces which only "fit the air" need not have the same dimensions as long as they answer the other requirements of interchangeability.

In no instance has the composite stamping fulfiled the purpose of the part less satisfactorily than the original. In a number of instances it actually has been possible to produce a better part than previously.

Examples Only Small Part of Work

It will be appreciated that the examples chosen constitute only a small cross section of the work being done by the Ordnance Department to utilize the stamping capacity of the smaller manufacturers and to eliminate the need for employing critical machine tools and materials.

Quite obviously it is not possible to disclose details of some of the most important examples of this method of redesign. However, it is being widely and most effectively utilized to eliminate many a bottleneck in our ordnance program.

However, it is possible to show a few more examples of the type of work being done. In Fig. 13 is shown a forged suspension lug that is a bomb component. Thousands of bombs were waiting for these forged lugs, which constituted a bottleneck because of the forging and machining capacity required for their production.

Changing the design to a stamping, shown in Fig. 13, made it possible to produce the lugs on otherwise idle stamping presses, saving 8000 machine-tool hours on one lot of 100,000 units alone. In addition, much metal was saved since the waste by stamping was only a small portion of the metal removed by machining the forged design. This item amounted to 17,000 pounds of steel on this same lot of 100,000 units.

The dash-pot piston shown in Fig. 12 was originally machined from a 7.92-pound piece of solid bar stock. Now it is made as a two-piece design from a piece of small bar on which the collar is pressed and brazed. This saves 1000 pounds of steel daily on a single ordnance contract. In addition, machining

operations have been reduced 60 per cent.

The original forging for a trigger cover plate in Fig. 14 required 29 critical machine-tool operations, including milling, profiling and drilling. When designed as a composite stamping, these were replaced by 7 noncritical operations—blanking, forming and welding. In addition, much material was saved.

The supercharger housing, Fig. 15, weighed 35 pounds when originally made as an aluminum forging. Now made from stamped steel parts, enough aluminum is saved on this item alone to provide in one year enough metal for 500 fighter planes. No lightness is sacrificed either, for the stamped steel assembly weighs only 33 pounds. Part of this saving is due to use of welding as a joining method in place of bolts and nuts.

Much Metal Machined Away

Many parts made as forgings require considerable excess metal in the forged blank in order to secure proper forging action and to assure sound metal of highest strength in critical portions of the part. However, this means that in machining the forging, a great amount of material must be removed. This not only is a great waste of important steel but requires much production time on critical machine tools.

As an illustration of the great proportion of steel machined away, examine the spring casing for a gun shown in Fig. 16.

A short while ago it was necessary to machine this 56-pound rough forging down 'till just 6 pounds of metal remained in the finished casing. It is not hard to imagine the lengthy series of machining operations required to remove 50 pounds of metal from this 56-pound forging.

Now the part is made by welding a forged base to a drawn steel sleeve. The result is a saving of 42 pounds of material, 3 manhours and $18 to $20 per gun.

In making cartridge cases, the changeover from brass to steel is exceptionally important for it will save 12,600 tons of brass on only a minute part of our ammunition requirements. Due to the extremely deep draws and the special series of heat treatments involved in making a cartridge case of steel to meet ordnance requirements, numerous large presses and heat-treating facilities are needed. This places such work beyond the scope of many small manufacturers who are fully capable of handling most of the other production of stamped and formed assemblies described here.

But all this is only the beginning for Ordnance Department engineers are applying these production methods to com-

plete assemblies with annual savings like these:

Steel	6,892,000 pounds
Brass	3,870,000 pounds
Copper	1,120,000 pounds
Zinc	100,000 pounds
Machine time	2,637,000 hours
Material savings	$750,000

Applied to larger parts and larger assemblies, the results are expected to be even more startling. With thousands of acres of factory space and thousands of idle machines ready to lift the burden from overloaded machining, forging and casting equipment, this design activity promises one of the most important means of increasing our war output.

Safe Guard Handling

(*Concluded from Page* 88)

The regular slotted box is also effectively sealed with metal stitches or staples. The only variation in method is that the center seam is stitched on *both* sides so that both top flaps are secured to inner flaps.

Metal Straps and Wires: For export shipments, material packed in bales or bundles, for merchandise which is unusually large or when value of contents justifies added precaution against pilferage, sealing with metal straps or wires is advisable. See Fig. 4.

For best results, use a good grade of strap or wire. Sealing equipment should be modern and adaptable with devices to tension, seal and cut quickly, easily and accurately.

Straps should be drawn sufficiently tight to indent but not break corrugated board. It may be advisable to reinforce the edges of the box underneath the straps with pads or with metal protectors made for that purpose. Strapping 0.015-inch thick is recommended. Its width should be between ¼ and ½-inch unless package is extremely heavy or bulky, in which case a size as large as ¾-inch may be advisable.

Of course the regular slotted box can also be effectively sealed by this method.

Points To Remember: First, while the four most commonly used sealing methods have been described as they best apply to certain styles of corrugated boxes, they are to a certain extent interchangeable. The degree of interchangeability depends upon contents, type of box, carrier and distance of shipment.

Second, whether you use only one or all four of the sealing methods here described, you will save money by studying railroad, express and postal regulations governing shipments—and by observing regulations imposed upon different types of packages. By sealing properly and in accordance with those regula-

tions, your packages will not only be "acceptable" for shipment but will earn for you the most economical shipping charges. For example, in shipping by express, savings can sometimes be effected by strapping or wiring together packages "forwarded by one shipper at the same time to one consignee".

Reference to three publications—*Consolidated Freight Classifications, Official Express Classifications* and *Postal Laws and Regulations* will provide you with the necessary data for economical shipping by carrier standards. Copies of these publications should be kept handy in every shipping department and consulted whenever there is any doubt about proper classification.

Publishes Eighth Edition On Transformer Standards

A revised edition of the transformer standards, publication No. 42-73, superseding the handbook issued in 1932 is announced by National Electrical Manufacturers Association, 155 East Forty-fourth street, New York. It includes, in one section, general standard dealing with the principles on which the temperature limits are based in the rating of electrical machinery and apparatus.

Other sections contain transformer ratings, performance and manufacturing standards and information on lead markings and connections for constant potential transformers. Standards for single phase pole type distribution transformers are included in addition to definitions and comprehensive index. Price of each copy is $3.00.

Shakeproof Condenses Line for Duration

Spring washers have been discontinued by Shakeproof Inc., Chicago, and its line of locking and plain terminals has been greatly condensed for the duration, in accordance with an overall company product simplification and standardization program.

Only a few of the many types and sizes supplied in the past will be carried, according to the company. In selecting sizes and types of terminals to be maintained, extreme care was exercised to provide parts suitable for about 90 per cent of all applications. The fact so many of the concern's parts are interchangeable paved the way for satisfactory substitutions.

Orders for superseded parts will be filled until present supply is exhausted. Delivery, however, of all special items, will be dependent upon the availability of material, priority rating and production schedule.

National Graphite Offers Two Cutting Lubricants

Two new cutting lubricants—one for use in conjunction with automatic screw machine work and high speed operations on softer metals and shallow cuts, and another for use in machining tough, tool-resistant steels are announced by National Graphite Co. Inc., 17 John street, New York. These are known as Konag water soluble caster oil jelly and transparent cutting oil respectively.

The first is produced by the Paluszek process which removes completely all gum formations and other substances in the raw castor oil. Its usual ratios of dilution vary from one part jelly to 20 or more parts water depending on the preference of the operator. The solution is noncorrosive, sudsless and free from scum formation. It does not produce a smell or smoke.

The transparent cutting oil for steel also is produced by the Paluszek process. The resultant pure product is then combined with a mineral oil in which is dissolved a high percentage of sulphur. Besides being transparent the coolant is said to possess extraordinary power of penetration and greater cooling properties.

Salvaging Scrap

(*Concluded from Page 81*)

channels has reached a stage where simplification and standardization are a necessity—first, by correcting un-economic faults in the ceiling price structure, and, second, by getting uniformity and simplicity in the priority and allocation word structure. The third necessity is industry's responsibility. Each unit of industry must see to it that its scrap and salvage activity is organized and that capable man is charged with all the responsibility and authority needed to carry on the sustained flow of scrap into productive industry.

"Sponge Iron" Myth

(*Continued from Page 103*)

the economics of iron industry and show the character of demand for this product.

With all favorable conditions for its production, however, Hoeganaes sponge iron has been profitably used only as raw material for high-grade steelmaking where the purity of a "sponge" cake is at a premium. With knowledge of the present status of "direct" methods, we may come to the conclusion that several modifications of the principle of iron ore reduction without melting can be applied more or less successfully to certain iron ores of special composition. To get the best economical result, the final product of the direct furnace should be charged in a blast furnace. It can also be used in the open-hearth or electric furnace, provided the sulphur content of the sponge is low. Even in such cases, the problem of nonmetallic inclusions may present a rather serious obstacle in making high grade steel.

In any case, regular sponge iron cannot be used in the open-hearth or electric furnace on an equal basis with iron scrap, technically and economically, even under emergency conditions.

Summing up, the direct process, as developed up to the present time, must be classified as one of the rather complicated processes of iron ore preparation for further use in the blast furnace.

After having found characteristics of the "direct" process, which might determine the proper place for it in the line of metallurgical processes of ironmaking, some additional light must be thrown on the purely theoretical question of which process—blast furnace or sponge iron,—is actually *direct* and most economical.

The "indirectness" of the blast furnace process is characterized by the fact that, for the purpose of getting reduced iron ore in molten form, the element of iron is alloyed with carbon. Pig iron in the blast furnace, with about 4½ per cent car-

bon, melts at a temperature about 800 degrees Fahr. lower than low-carbon (0.1 per cent) steel. When converting pig iron into steel, this 4½ per cent of carbon must be eliminated from the iron-carbon alloy by oxidation. This item of saturation of iron with carbon and further elimination of carbon from the iron in the processing is held against the blast furnace process as an indication of economic paradox.

So we see the blast furnace process adjudged uneconomical because a certain element previously added by the same process must be burned out during the next processing, whereas this "drawback" does not occur in the direct process, sponge iron supposedly being "pure" iron. This, of course, is completely in error, as sponge iron is not "pure" and does not represent a finished product. It usually contains a considerable amount of carbon, a large (in metallurgical sense) percentage of sulphur and silicates, which appear in form of nonmetallic inclusions in steel and are particularly difficult to eliminate.

In this respect, pig iron can be considered more of a finished product than sponge iron, since it is used in the form of castings without any appreciable change of its composition. Critics of the blast furnace process must understand that, in its economic evaluation, one should take into consideration the steelmaking cycle in its entirety and not single out separate phases of it and compare things which are not comparable.

Blast Furnace Efficient

It must be understood that, without carbon, against the pressure of which in pig iron there is such strong objection, further processing of pig iron in the open-hearth furnace or in the bessemer converter would be impossible. Furthermore, the blast furnace puts into the pig iron manganese and silicon, the presence of which is imperative, for steelmaking. With sponge alone, which contains no appreciable amounts of manganese or silicon, steelmaking in the open hearth or bessemer would not be possible.

When the metallurgist has phosphor-bearing ore, as occurs in most parts of Europe, the blast furnace brings into the pig iron phosphorus which, in the form of phosphor-bearing slag, is used as fertilizer and covers the cost of converting the pig iron into steel.

If we add to the foregoing the fact that the blast furnace, as a heat producing and reducing furnace, is one of the most efficient and economical instruments, we may easily come to the conclusion that the blast furnace, as it takes part in conversion of iron ore into the finished iron product, is the most economical *direct* process. It is the only process known which assures mass production of steel and gives the largest quantities of steel in the shortest time, with the least expensive method of conversion.

If prophesying in present conditions is permissible, we suggest that the American iron mining and metallurgical industry, which has reached levels of technology and production surpassing those of any other iron-producing country in the world, is not going to revert to sponge iron. The American iron industry will move toward further achievements in quantity, quality and lower cost of production, far more likely by special preparation of iron ore and by an extensive application of manufactured oxygen and electrical energy in smelting and reducing processes than by resurgence of sponge iron.

Approves Standards for Steel Pressure Vessels

Three standards governing specifications for steel for stationary boilers, boiler rivets and pressure-containing parts have been approved by the American Standards Association, 29 West Thirty-ninth street, New York.

The first standardizes specifications covering carbon-steel plates up to 4 inches, inclusive in thickness, for stationary boilers and other pressure vessels; the second set of specifications covers rivet steel and rivets for use in such boilers, and the third covers carbon-steel castings for valves, flanges, fittings, and other pressure containing parts for high-temperature service.

The specifications, which were developed under the leadership of the American Society for Testing Materials, apply to such aspects as: Process, heat treatment, temperature control, chemical composition, ladle and check analysis, tensile and bending properties, tests, workmanship, finish, marking and inspection.

Handbook Lists Uses of Colloidal Graphite

"A Guide to Increased Production" is the title of a new plant engineer's handbook on colloidal graphite recently published by Nassau Laboratories, Hackensack, N. J. It is of particular value to engineers in "trouble shooting" on lubrication problems, especially when used in conjunction with the folder accompanying it, as one lists the uses and the other describes the product.

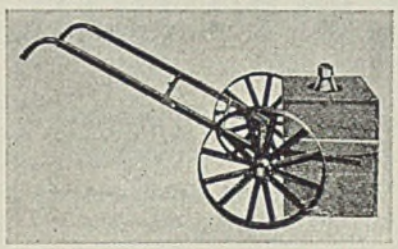
(*Continued from Page* 108)

sunk hole, or to a heavier section where the additional pressure is required to obtain uniformity of density.

The lower movable core rod mechanism also is necessary for proper ejection of the formed part from the die cell without breaking or cracking the piece. The die, in which the formed piece is made, is locked in the die table which is mounted to an extension of the main frame. Both upper and lower punches held in flange type punch holders are mounted to heavy steel punch carrying slides which operate in adjustable V gibs.

Carboy Truck

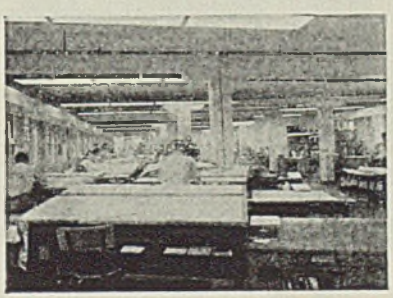
Industrial Products Co., 2820 North Fourth street, Philadelphia, announces a new carboy truck designed to handle



carboys with safety. Its shafts are adjustable for any size carboy and the 24-inch diameter wheels of the unit are large enough to carry the load over rough floors.

Fluorescent Ballast

R. & W. Wiley Inc., 777 Hertel avenue, Buffalo, recently developed a new method of ballasting to give positive, instantaneous starting. With this method,



fluorescent lamps come on at the turn of the switch just as in incandescent lighting.

Other features of the new method are positive starting at lower atmospheric temperatures and lower voltage, no radio interference and satisfactory tube life. Units are being offered for all applications, continuous or separate units, in close to ceiling or suspended mounting, open reflector or louvered models.

Canadian Steelmakers Urged To Replace U. S. Imports Lag

(*Concluded from Page 72*)

pansion is to be eliminated and all applications to the War Contracts Depreciation Board must be accompanied by certificate of necessity from the Department of Munitions and Supply. The ruling does not apply to projects undertaken prior to Oct. 1.

No person may manufacture any kind of aircraft in Canada except by permit. An order by the aircraft controller of the Department of Munitions and Supply limits aircraft manufacture or assembly to fulfillment of orders placed by the Canadian government and other orders approved by the controller. The order also provides that no repair or overhaul contractor may employ government facilities for repair or overhaul of aircraft not covered by his contract.

The Canadian shipbuilding industry has delivered into service the fifty-first cargo vessel of 10,000 tons capacity, all but one of which have been delivered this year. While the average has been one freighter every five days current production is three each week. British Columbia yards lead in speed of production and number of ships built.

The government, through the Wartime Prices and Trade Board, is considering production quotas for farm machinery in 1943 as a means of further reducing use of metals for civilian consumers. It is believed 1943 production quotas will take into account special requirements caused by changes in agricultural production brought about by the war. Meanwhile farmers are urged to make best possible use of the equipment they now have.

All construction involving use of high grade materials is virtually banned by an order by C. Blake Jackson, construction controller. Under the order it will not be possible to install two or more bathrooms in any dwelling, to build a steel fire escape or roof a farm building with metal.

Foundry Equipment Sales Index Lower in August

Foundry Equipment Manufacturers' Association, Cleveland, reports index of net orders closed on new equipment in August was 536.7, compared with 909.1 in July and 884.4 in June.

Total sales index was 510.8 in August, 800.8 in July and 774.0 in June. Index for repairs in August was 433.0, in July 474.0 and in June 441.5.

Indexes are percentages of monthly averages of sales to metalworking industries, 1937-39.

Steel Backlogs Grow as Demand Exceeds Production

High priority orders deferred to first quarter. . . PRP forms for next quarter due soon. . . Ingot output close to highest quarterly mark. . . Scrap picture grows brighter

DEMAND
Heavier for war needs.

PRODUCTION
Advanced ½-point to 98½ per cent.

PRICES
Maintained on all lines.

IN ONE of the longest periods of sustained production, close to capacity, steelmakers still are unable to reduce backlogs or keep abreast of record-breaking demand for steel products.

That some districts have noted a decline in new orders is of little significance as this can be offset suddenly by new directives and allocations. With plates well distributed under complete allocations pressure continues to increase on bars and sheets, on which delivery promises now extend several months on new business and congestion in top priorities grows.

Current orders for bars with AA-1 and AA-2 ratings are deferred to first quarter, especially in larger rounds and flats. Specifications are heavy against alloy bar contracts and directives are frequently applied against new orders for urgent material. Consumers in need of small lots to fill in have great difficulty as warehouse stocks are low and broken. Forging shops with aircraft orders are heavily loaded.

• • •

Steel consumers operating under PRP are informed they soon will be called on to fill out forms for first quarter, to be filed by about Oct. 27 so that quotas may be set up before the beginning of the new period, instead of repeating the present situation, with some consumers only now receiving their quotas, several days after the beginning of the period in which they apply. Proposed issuance of first quarter forms appears to set at rest doubt as to further use of PRP, as apparently it will be operative at least until second quarter.

After holding at 98 per cent for six weeks steelmaking operations last week advanced ½-point to 98½ per cent, highest since the first three weeks of June, when it reached 99 per cent. Changes were small. Pittsburgh advanced 1 point to 97½, Cleveland 2 points to 94½, St. Louis 3 points to 94, Detroit 1 point to 94 and Cincinnati 7 points to 95. Wheeling receded ½-point to 84½ and New England 10 points to 90 per cent. Rates were unchanged at Chicago, 102½; Buffalo, 90½; Youngstown, 95, Birmingham, 95 and eastern Pennsylvania, 96.

Scrap is being brought forth from its hiding places in large volume under the national drive, which promises well in regard to the winter supply. A lag is developing in getting the scrap to consumers; facilities for collecting and processing leaving much to be desired. In many cities volunteer trucks are relied on to collect what householders offer or to pick up concentrations by civic and other groups. Yard preparation is also slowed by lack of experienced labor, as considerable inroads have been made in working forces by the draft and the lure of higher wages in war work. The main effort is to get the scrap out and collecting and preparation can lag without harm. Current deliveries to melters are sufficient to maintain the high rate of steelmaking and some small progress is being made in piling reserves for winter. One effect of the drive probably will be to increase yard stocks, until they can be worked over and prepared for mill use.

Provision for financing salvage of materials in buildings, bridges and abandoned rails, through War Materials Inc. promises to release large tonnages previously out of reach because of high costs, sometimes double and triple the ceiling price for the prepared scrap. In New York city approximately 50,000 tons of such material is available under government financing, and in New England 50,000 tons of abandoned rails await action to absorb cost of salvage.

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Steel ingot production in third quarter was second highest for any quarter in the history of the steel industry, 21,449,359 tons, compared with 21,531,358 tons in second quarter, which was the record. September production was 7,067,084 tons, compared with 7,233,451 tons in August, a longer month. In September, 1941, ingot output was 6,811,764 tons.

Iron ore movement in September maintained the increased rate that has marked prior months, a total of 11,847,919 gross tons being shipped, an increase of 1,536,402 tons, 14.9 per cent, more than in September, 1941. For the season to Oct. 1 the total movement has been 72,441,453 tons, a gain of 10,417,225 tons, 16.8 per cent, over the season to Oct. 1, 1941.

Limited by ceiling prices steel and iron composite prices are steady and unchanged from previous levels. Finished steel composite is $56.73, semifinished steel $36.00, steelmaking pig iron $23.05 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	Oct. 10	Oct. 3	Sept. 26	One Month Ago Sept., 1942	Three Months Ago July, 1942	One Year Ago Oct., 1941	Five Years Ago Oct., 1937
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$62.18
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	16.00

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

	Oct. 10, 1942,	Sept. 1942	July 1942	Oct. 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	2.49	2.49	2.49	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.22	2.22	2.22	2.22
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	5.00	5.00	5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pittsburgh	2.00	2.00	2.00	2.00

Pig Iron

	Oct. 10, 1942,	Sept. 1942	July 1942	Oct. 1941
Bessemer, del. Pittsburgh	$25.19	$25.19	$25.19	$25.34
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.39	25.39	25.39	25.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.47	24.47	24.22
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.30	24.30	24.30	24.06
No. 2X, del. Phila. (differ. av.)	26.265	26.265	26.265	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	31.54	31.54	31.34
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.65	140.65	140.65	125.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	17.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke

Connellsville, furnace, ovens	$6.00	$6.00	$6.00	$6.25
Connellsville, foundry, ovens	7.25	7.25	7.25	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table.

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. $36.25; Duluth (bll.) $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. $42.25; Duluth, $42.00.

(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points.)

Open Hearth Shell Steel: Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $52.00; 12-18 in., $54.00; 18 in. and over, $56.00.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34.00.

(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, $0.27. Pacific Coast $0.50 on water shipment.

Bars

Hot-Rolled Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.51c; Phila. del. 2.49c; Gulf Ports, dock 2.52c, 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. Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced on its 8-inch mill.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c Detroit, del. 2.82c.

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	0.15
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, del. 3.47c.

Turned, Ground Shafting: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.27c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila del. 2.28c; 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. 3.17c; 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. 2.22c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)
Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.
Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.
Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb.. 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.
Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.
Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.
Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.
Roofing Ternes: Pittsburgh base per package 112 sheets, 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.30-2.55c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c.
(Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill. Central Iron & Steel Co. may quote plates at 2.20c, f.o.b. basing points.)
Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.
Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.
Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.28c; Phila., del., 2.22c; Gulf ports, 2.47c; Pacific ports, 2.75c.
(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points and 2.50c, Phoenixville, for export.)
Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

Bright basic, bessemer wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Wire Products to the Trade:

Standard and cement-coated wire nails, polished and staples, 100-lb. keg	$2.55
Annealed fence wire, 100 lb.	3.05
Galvanized fence wire, 100 lb.	3.40
Woven fence, 12½ gage and lighter, per base column	67
Do., 11 gage and heavier	70
Barbed wire, 80-rod spool, col.	70
Twisted barbless wire, col.	70
Single loop bale ties, col.	59
Fence posts, carloads, col.	69
Cut nails, Pittsburgh, carloads	$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	56	33	½	24	3½
¼ & ⅜	59	40½	¾	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	61	49½	1¼	23	3½
2½-3	64	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.
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., ⅝ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex.	U.S.S.	S.A.E.
⅞-inch and less	62	64
½-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo	2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*$6.00
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

Operators of hand-drawn ovens using trucked coal may charge $6.50, effective Aug. 12, 1942.
† $12.75 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do. less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls. to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

Pig Iron

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 phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

High Silicon, Silvery

6.00-6.50 per cent (base)	$29.50		
6.51-7.00	$30.50	9.01- 9.50	$35.50
7.01-7.50	31.50	9.51-10.00	36.50
7.51-8.00	32.50	10.01-10.50	37.50
8.01-8.50	33.50	10.51-11.00	38.50
8.51-9.00	34.50	11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton. Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (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. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

Refractories

Per 1000 f.o.b. Works, Net 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., Md., Mo., Ky.	46.55
Alabama, Georgia	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, f.o.b. Ill., Ky., net ton, carloads, all rail $23.00-25.00
Do., barge 23.00-25.00
No. 2 lump 23.00-25.00
(OPA May 11 established maximum at Jan. 2, 1942, level.)

Ferroalloy Prices

Ferromanganese: 78-82%, carlots, gross ton, duty paid, Atlantic ports, $135; Del. Pittsburgh $140.65; f.o.b. Southern furnaces $135; Add $6 per gross ton for packed carloads $10 for ton, $13.50 for less-ton and $18 for less than 200-lb. lots, packed.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36.

Electrolytic manganese: 99.9% plus, less ton lots, per lb. 42.00c. Ton lots 40.00c. Annual contracts 38.00c.

Chromium Metal: Per lb. contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: 66-70%; per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

	Car loads	Ton lots	Less ton	Less 200 lbs.
2% C.	19.50c	20.25c	20.75c	21.00c
1% C.	20.50c	21.25c	21.75c	22.00c
0.20% C.	21.50c	22.25c	22.75c	23.00c
0.10% C.	22.50c	23.25c	23.75c	24.00c

Spot is ¼c higher

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybdic Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrophosphorus: 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

Ferrosilicon: Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

	Carloads	Ton lots
50%	$ 74.50	$ 87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

Spot prices ¼-cent higher.

Silicon Metal: Contract basis per lb., f.o.b. producers' plants, freight 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 $135; ton lots $147.50. Spot $5 per ton higher.

Silico-manganese Briquets: Contract basis in carloads per pound, bulk freight allowed 5.80c; packed 6.05c; ton lots 6.30c; less-ton lots 6.55c; less 200-lb. lots 6.80c. Spot prices ¼-cent higher.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium: ton lots $1.23; less-ton lots $1.25. Spot 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: Technical grade, 88-92 per cent V_2O_5; contracts, any quantity, $1.10 per pound V_2O_5 contained; spot 5 cents per pound 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 11.00c, less ton lots, 11.50c.

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials. As of April 16, 1942

	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	7.60	5.70	....	5.75	....	....
Los Angeles	4.35	4.90	6.70	4.90	4.60	7.15	4.95	7.15	5.95	....	6.60	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	L	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—

		L	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	8.87	2	4	0
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	
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	13.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

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%	28.50
3:1 lump, 48%	38.00

Manganese Ore

(Nominal)

Including war risk but not duty, cents per unit cargo lots

Caucasian, 50-52%	
S. African, 48%	80.00-86.00
Indian, 50%	80.00-86.00
Brazilian, 46%	78.00-84.00
Cuban, 51%, duty free	85.00
Domestic, 48%, f.o.b. mines	$1.00

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

	OPEN HEARTH GRADES*	Machine Shop Turnings	BLAST FURNACE GRADES*	ELECTRIC FURNACE AND FOUNDRY GRADES: Low Phos. 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

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. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, tube scrap $3 over, auto springs, crankshafts, $1 over No. 1 heavy melting. Blast Furnace Grades refer to mixed borings and turnings, shoveling turnings, No. 2 busheling and cast iron borings.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $2.50 less (railroad grades $3.50 less; material from which Nos. 1, 2 and 3 bundles made is $4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grades of prepared scrap." Graveyard autos not considered unprepared scrap.

Remote Scrap: Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

Sheets, Strip . . .

Sheet & Strip Prices, Page 120

Sheet mills operating at highest capacity possible under present allocations of semifinished steel are unable to make headway against backlogs of high-priority orders. Schedules keyed to steel supply range from 50 per cent of capacity upward. Delivery dates are not being shortened but are not being deferred as rapidly as recently.

Substantial tonnages offered recently were given no better delivery promise than first quarter. The situation is becoming as tight as in plates and bars, with allocations and directives applied to most urgent requirements.

Narrow cold strip shipments with some producers are down slightly, due to unbalanced production, incoming volume exceeding deliveries largely for that reason. Stainless and alloy demand is not sufficient to maintain capacity, annealing furnaces for stainless operating unevenly in some cases. Efforts are directed toward elimination of alloys where possible and alloy melting schedules are slow in being approved. High carbon activity is at capacity, new volume for the most part covered by AA-2 ratings or better, with hot strip closely geared to high priorities based on end use.

Fabricator inventories are also widely spread, some having substantial stocks while others are not taking in steel as rapidly as expected because of delays in tooling and equipping for new operations. Directives are applied to some hot strip orders. Refinement of the mill quota and requirements plan is favorably viewed by most producers, who expect shortly to know more definitely what and how much they can produce over a given period; rerollers are hopeful this will ease the semifinished situation.

Negotiated Navy contracts for steel drums have been closed with eight fabricators: Wilson & Bennett Co., Chicago; Perfection Metal Co., Cleveland; Wheeling Steel Co., Portsmouth, O.; National Enameling & Stamping Co., St. Louis; Draper Mfg. Co., Cleveland; Bennett Mfg. Co., Chicago; Rheem Mfg. Co., Washington, and National Steel Co., Chicago. Requirements supplement a heavy demand for drum stock.

Plates . . .

Plate Prices, Page 121

Lack of inquiries for fabricated plate products reveals the competition that develops for small steel tanks with high priority ratings. Shops normally building fuel tanks for the civilian gasoline storage trade have none of this work in sight. With gasoline rationing covering the entire country present small-tank storage capacity is more ample. Inquiries for tanks for government storage, notably airfield fuel systems, bring a rush of bidders.

Heavier requirements for two new shipyards in New England, rapidly approaching peak schedules, increase plate allotments above earlier months. Large tonnages for initial schedules at these yards have leveled off. Repairs are taking substantial tonnages of plates in addition to regular construction and considerable volume of plate tonnage is coming from the midwest and even Birmingham, Ala., supplementing deliveries from eastern mills. Structural shops working on war subcontracts tend to require relatively larger plate tonnage than plain shapes. Available plates for fill-in needs are made up of odd sizes from overruns, mainly from wide strip or sheet mills, and to obtain these AA ratings are required. A recent contract involves 900-ten-ton pontoons for United States engineers.

Bars . . .

Bar Prices, Page 120

Carbon steel bar shipments are more extended, deliveries on current orders for larger rounds and flats with AA-1 or AA-2 ratings extending into first quarter. Specifications against alloy bar contracts are heavy and directives frequently are applied against new orders.

Makers of large bolts and nuts are harder pinched for bar material than those using smaller rods. Fabricators, including shipyards, have difficulty buying fill-in lots and jobber stocks are depleted, replacements having been meager for weeks.

Forge shops with aircraft orders are at capacity to the extent of available steel, but in most cases heavier specifications are well met. Some subcontracting is being done but available open capacity is limited. Reduction in the number of types of heavier forged hand tools and standardization of 357 types remain-

ing from 1150 is expected to have small effect on production.

Increase in forging demand for steel is indicated by the case of a central Massachusetts shop, which is forging more than 5000 tons per month, against less than 500 tons before the war, part of the increase being in aluminum. A shop at Worcester, Mass., is building its sixth addition in two years, a warehouse and factory building.

Cold-drawn bar deliveries are more extended, on an average a week to ten days. Since the first of the month cold drawers have not been receiving hot carbon material on a full allocation basis and effective Nov. 1 they will receive alloy steel on a similar basis. With application of this system, it appears that the plan of providing cold drawers with hot bars for specific processing for warehouses has been dropped. This plan became operative in August, with mills called on to provide certain minimum amounts. However, with mills now under allocation called on to supply a tonnage for all approved needs, cold drawers are processing and delivering according to sequence of ratings.

Pipe . . .

Pipe Prices, Page 121

Pipe distributors are assured 25 per cent of their fourth quarter quota, under a directive, a move likely to give some relief, although most expect a reduction during the quarter, due to limited supply of semifinished steel allotted to mills. Higher priorities are required for pipe replacements, including black, demand for which is lagging. Competition continues keen for top-rated inquiries, including lap-weld, with some price shading. Most of this inquiry carries priorities high enough to warrant hope for replacements and involves direct mill shipments in most cases.

Wire . . .

Wire Prices, Page 121

Wire specialty requirements are steadily being concentrated in fewer items under pressure of war demand, individual orders tending larger. Needs for the aircraft industry, mostly alloys, are heavier under an expanding program. Alloys in other directions are increasingly influenced by substitute analysis, some of which continue in the experimental stage. At the moment mills are pressed to meet heavy requirements of rope mills, the latter having large backlogs of highly rated rope tonnage, supplemented by balloon barrage cable, the latter in fine sizes down to 0.007, galvanized and annealed. Coatings are required on most netting tonnage being booked.

Fabricators of novelties made of wire, baskets included, are restricted by limited volume carrying high enough ratings to obtain steel. Users of tag and binding wire in some casts have secured priorities to warrant 50 per cent operations, but more small novelty fabricators are out for the duration on regular lines. Rods are tight and even integrated producers sometimes require directives for a car or two for alloy specialties.

Rails, Cars . . .

Track Material Prices, Page 121

Domestic freight car awards in September involved 1863 cars, bringing the total for nine months to 25,893 units, compared with 108,362 in the corresponding period in 1941. Other comparisons follow:

	1942	1941	1940	1939
Jan.	4,253	15,169	360	3
Feb.	11,725	5,508	1,147	2,259
March	4,080	8,074	3,104	800
April	2,125	14,645	2,077	3,095
May	822	18,630	2,010	2,051
June	0	32,749	7,475	1,324
July	1,025	6,459	5,846	110
Aug.	0	2,668	7,525	2,814
Sept.	1,863	4,470	9,735	23,000
9 mos.	25,893	108,362	39,270	35,456
Oct.	.....	2,499	12,195	19,634
Nov.	.....	2,222	8,234	2,650
Dec.	.....	8,406	7,181	35
Total	.....	121,499	66,889	57,775

St. Louis-Southwestern railway has applied to the federal court at St. Louis for an order for three 1000-horsepower diesel switchers, costing $78,000 each, placed with Baldwin Locomotive Works, Eddystone, Pa., for delivery as soon as possible. These are in addition to three locomotives of the same type placed earlier in the year on which delivery will be completed this month.

Structural Shapes . . .

Structural Shape Prices, Page 121

Structural shapes are easier, deliveries by some producers being promised in about seven weeks, involving some ratings down to AA-4. This is attributed

largely to lack of projects carrying higher priorities.

Fabricating shops have worked out a large part of their backlogs and are turning to subcontracting work where it is obtainable, notably for prefabricated ship parts. New ore docks at Escanaba, Mich., are expected to supply midwestern shops with considerable tonnage. Requirements for bearing piles and sheet piling also are expected to be large.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 121

National emergency specifications for design of reinforced concrete buildings have been established by WPB in directive No. 9, ordering that its manual of specifications be followed on all buildings constructed, financed or approved by governmental agencies after Dec. 4, 1942. The manual was prepared under direction of the specifications branch of the conservation division.

Estimates place savings of reinforcing bars at about 25 per cent of former quantities. Although effective date is Dec. 4 contracts entered into before that date will conform to the manual wherever possible.

Pig Iron . . .

Pig Iron Prices, Page 122

Most consumers of pig iron having converted largely to war work where possible, requests for November tonnage about equal aggregate October deliveries, but the range in priorities tends higher with about 85 per cent A-1-K or better. Foundries in a few cases could handle more work, but are handicapped by equipment deficiencies. Others with machine shops are relatively busier in that department than in the foundry proper and some war contracts require less pig iron than castings normally produced. However, on the whole, this is made up in other directions and pig iron requisitions each month have leveled off at the current high rate.

Production by the New England furnace is absorbed each month with no accumulation of reserves as was the case during the first quarter this year, when the necessity of a break in production loomed for repairs.

November applications submitted by pig iron consumers last week are largely in the higher priority brackets, a leading seller reporting that 90 per cent of applications carried A-1-k or better. Some melters submitting lower ratings, especially below A-4-a, complicate their chances of getting iron by failure to provide sufficient end-use information, supplying only the end-use symbol. Indications are that WPB is insisting more strongly on full compliance in this respect.

Scrap . . .

Scrap Prices, Page 124

A reason for thousands of tons of steel scrap in buildings, bridges, abandoned car lines and similar places not being available for steelmaking is found in the cost of demolition and salvage. A close estimate of such scrap in New York city shows 49,330 tons, with cost of demolition set at $2,723,000, an average of $55.20 per ton. Additional expense would result from preparation, grading and transportation, making the cost delivered to nearby mills about $60 per ton. With ceiling prices on No. 1 heavy melting steel $20 per ton, delivered at Pittsburgh, and $18.75 per ton at Chicago and in eastern Pennsylvania, the excess is too great to be handled except by the government.

War Materials Inc., organized to finance such scrap and get it into trade channels, will furnish funds for salvaging these high-cost tonnages, which probably run to large totals in the country as a whole.

It is announced from Washington that automobile wreckers are producing about 20 per cent of all the steel and iron scrap being used by the steel industry. The 20,000 yards normally moved about 150,000 cars per month but currently are moving about 140,000 cars, with the rate steadily increasing. Under pressure the time required to move a car through a yard has been cut from about 60 days to an average of 45 days, with some wreckers using only 24 days.

In the St. Louis district the drive is bringing out more scrap than had been expected and current receipts are increasing, halting drafts on inventories but not sufficient to add to stock piles. Movement of the collections to scrap yards is not rapid but volunteeer trucks are taking up the work and accumulations promise to be moved by the end of the month. Local melters fear some of the scrap may be diverted from steel-

makers in the district, for shipment to other consuming centers.

Buffalo yards are receiving larger shipments but are handicapped by labor difficulties in preparing and shipping the material. The draft and higher wages in war plants have depleted crews and inferior labor is the only sort available.

In the Cincinnati district flow of scrap has increased under the drive, with some tonnage being laid down for reserves, though not sufficient for normal winter supply. Much cast now being gathered is of inferior grade and better material is being sought for foundries. Efforts to recover abandoned rails are being continued.

In eastern Pennsylvania sufficient scrap has been received to allow some accumulation for winter use, though far less than normally carried.

Chicago district dealers are preparing and shipping about 4000 tons per day and about 3000 tons more are required from outside sources to provide mills with the 7000 tons needed each day.

It is estimated that 50,000 tons of abandoned steel rails are available in the New England states, in addition to the 45,000 tons already taken up. War Materials Inc. has let contracts for removal of 6250 tons at Lowell and Dracut, Mass. Through this agency much heavy steel is expected to become available as high salvage costs are absorbed.

Bids on miscellaneous scrap being collected in public campaigns in New York brought out dealer quotations of $4.48 to $5.26 per ton, lower than expected. Preparation cost will be higher than at first estimated and most will have to move through yards equipped with presses. Efforts are being made to spread the tonnage over as many yards as possible, with most dealers asking a limit be placed on tonnage to be handled daily.

Warehouse . . .

Warehouse Prices, Page 123

While steel supply to warehouses is smaller than demands on their stocks, some are receiving more from mills than they had expected. One distributor of a diversified line reports that receipts to Oct. 1 have averaged 70 per cent of his quotas and that this showing was helped by material improvement within the past two months. On the other hand, some sheet specialists find they are not getting nearly as much as their quotas call for.

Restrictions on inventory, limiting it to 1 1/3 times the quota for a given product, has worked hardship on distributors having heavy stocks of slow-moving odd-lot plates.

Pacific Coast . . .

San Francisco — The United States Maritime Commission awarded, last March, 34 Liberty ships to W. A. Bechtel Co., Sausalito, Calif. Due to the increased production rate of Liberty ships it has made it possible to divert some of the shipbuilding facilities for Liberty ships to tankers and the Maritime Commission has rescinded the contract for 22 Liberty ships to the Bechtel Co. and has awarded a contract for 22 large tankers. This company will complete 12 of the Liberty ships contracted for. The change over has resulted in 37,366 tons more plates being needed, although the tonnage of shapes has been reduced by 8162 tons.

Backlogs on books of most fabricating shops are becoming smaller and new business is expected to develop only from national defense projects and from prefabrication for shipyards.

The only private inquiry for cast iron pipe involves 100 tons for Pittsburg,

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

Calif., bids on which will be opened Oct. 6. To date no favorable priority has been obtained. No action has yet been taken on 547 tons for Kirkland, Wash., though it is expected that cast iron pipe will be purchased. It is reported that 236 tons of 2 to 8-inch pipe for Annapolis, Wash., probably will be placed on a transite pipe basis.

The largest reinforcing bar inquiry of the year, on which no action has yet been taken, calls for 40,000 tons for reinforced concrete barges to be built in the northern part of California. Little tonnage is now being used in highway paving although occasionally small lots of railroad steel are specified. Backlogs are still heavy and run far into next year.

Seattle—Major defense construction in the Pacific Northwest and Alaska is well along and this with the policy of the government to restrict use of steel as far as possible accounts for the marked decline in demand for reinforcing materials. Rolling mills still have sizeable backlogs and are taking on only small orders. New construction is mostly of a temporary nature and requires little steel. However, merchant bars dominate the situation, largely due to ship construction and mills have heavy backlogs of this item. The situation is reversed, as normally reinforcing orders lead those for merchant bars.

Fabricating shops report little relief from pressure of recent months backlogs extending to the end of the year. It is expected to have the decks well cleared early next year as with heavy construction jobs approaching completion, future business is not promising. Pacific Car & Foundry Co., Seattle, has taken 900 tons involved in two defense projects.

Steelmakers are getting poorer grades of scrap but are not complaining, as their immediate needs are satisfied. Washington Manufacturers Association announces its August drive exceeded by 12 per cent its 17,000-ton quota. It is intimated that idle and obsolete equipment in non-war industries will be requisitioned if necessity arises during the winter.

R. C. Cole, manager of the Ohio Ferro-Alloy plant at Tacoma, Wash., has appealed to the regional manpower commission to stabilize labor, stating his plant may have to close because of losing essential employes to other industries and to the army. Tacoma has canceled a $348,903 contract with Strong & McDonald for relocation of 14 miles of railroad and other work incident to the Nisqually power project, because of the labor and equipment crisis. The job has been relet to the same contractors at $25,000 fee plus maintenance and other costs, forced labor basis, contractors to furnish machinery.

Paul J. Raver, Bonneville Power administrator, announces Coulee's daily revenue is more than $12,000, Bonneville's about $9000. Coulee is generating 375,000 horsepower and 75,000 horsepower will be added in November when the first of three smaller generators, diverted from the Shasta project, goes on the line.

Renton, Wash., has awarded a $199,000 contract to B. H. Sheldon, Corvallis, Oreg., for construction of treatment plant, tanks, digester, filter and other equipment. Demand for cast iron pipe is restricted by regulations and little new business is developing. Awards of 250 tons at Bremerton and 500 tons at Kirkland, Wash., are still pending.

Construction interest centers in projects supervised by U. S. engineers at Seattle and Portland. Last week of 23 major contracts placed in the Pacific Northwest 19 were awarded by the engineers.

Canada . . .

Toronto, Ont.—C. D. Howe, minister of munitions and supply, has issued a request to steel workers in Canada to speed up production, to offset an anticipated decline of 175,000 tons in imports from the United States over the next three months. In order to take care of this shrinkage in imports, Canadian mills are called upon to increase production by about 60,000 tons a month. With existing production capacity, it would be impossible to attain this additional quota, and unless some new arrangements are made with the United States, there is a good possibility that Canada's war effort will have to suffer, and the industry that will be the most affected is shipbuilding. Canada's current production rate for steel ingots and castings is somewhat under 275,000 tons a month, while the total rated capacity for the country is approximately 283,500 tons. Thus by maintaining capacity production and even stepping above the rated tonnage, it is hard to believe that Canadian steel output could be increased by more than 20,000 tons a month.

While orders for sheets continue to appear, producers are showing little in-

terest unless delivery instructions are received from the steel controller. No sheets are available for consumers other than those directly associated with the war effort. Both sheet and plate mills are operated in excess of rated capacity.

Demand for bars is increasing at a much more rapid pace than production and an acute shortage has developed in some sizes. Sharp curtailment in civilian use of steel has not brought any substantial relief as far as supply is concerned, and mills are producing to the limit of raw material supply. Some mills are declining orders for sizes other than those that can be produced in large volume by continuous run.

Merchant pig iron sales for the week were approximately 8000 tons, about evenly divided between foundry and malleable grades. Basic iron sales have dropped to less than 200 tons per week, but this tonnage is expected to rise sharply under any shortage of scrap supply. Production of pig iron is being sustained at 100 per cent.

Government interests are asking for greater co-operation in an effort to increase deliveries of steel and iron scrap. More aggressive campaigns are planned to bring out as much scrap as possible before winter.

Local dealers state that receipts have been gaining during the past three weeks and many yards are now heavily stocked, awaiting sorting and shipping to consumers. Mill interests report increased consumption of scrap, and while present receipts are sufficient to take care of current demands any falling off in deliveries will mean drawing on stock piles for the daily melt.

Steel in Europe . . .

London—(*By Cable*)—Heavy pressure is being exerted in Great Britain for delivery of steel plates for war purposes and demand for colliery steel is increasing. Steel sheet demand and production are steady at a high rate. Greater activity is shown in structural steel, much being in demand for shipbuilding.

Iron Ore . . .

Iron Ore Prices, Page 123

Iron ore movement on the Great Lakes in September totaled 11,847,919 gross tons, 14.9 per cent greater than the 10,311,517 tons moved in September, 1941, according to statistics of the Lake Superior Iron Ore Association, Cleveland.

Comparisons of shipments in September, this and last year, are as follows:

	Sept., 1942	Sept., 1941
	Gross Tons	
Escanaba	662,283	583,711
Marquette	518,589	614,271
Ashland	578,195	582,596
Superior	4,065,914	3,791,412
Duluth	3,312,943	2,558,205
Two Harbors	2,642,522	2,112,688
Total U. S.	11,780,446	10,242,883
Michipicoten	67,473	68,634
Grand total	11,847,919	10,311,517
Increase from year ago	1,536,402	

Cumulative shipments to Oct. 1 were 72,441,453 tons, 10,417,225 tons or 16.8 per cent greater than in 1941 to the same date. Comparisons by ports for this and last year are as follows:

	To Oct. 1, 1942	To Oct. 1, 1941
	Gross Tons	
Escanaba	4,753,850	3,590,277
Marquette	3,662,838	4,328,656
Ashland	5,104,588	5,045,660
Superior	25,743,135	21,972,413
Duluth	18,405,005	15,415,417
Two Harbors	14,383,500	11,308,527
Total U. S.	72,052,916	61,660,950
Michipicoten	338,537	363,278
Grand total	72,441,453	62,024,228
Increase from year ago	10,417,225	

Control over all commercial vessels operating on the Great Lakes was assumed last week by Joseph B. Eastman, director, Office of Defense Transportation. General Order No. 25 requires that permits be required, with certain exceptions, for the movement of all such vessels. The order, effective Oct. 19, was issued to make available sufficient cargo space for the movement of iron ore and other war materials.

H. G. Heedy Dead

H. Glen Heedy, 54, the past 12 years in charge of the ore sales department of Pickands, Mather & Co., Cleveland, died at his home in Shaker Heights, O., Oct. 7. A native of Youngstown, O., Mr. Heedy had formerly served as assistant to vice president, Youngstown Sheet & Tube Co. He was a graduate of Yale University and a member of Delta Kappa Epsilon fraternity, the Union Club and the Tavern Club, Cleveland.

Nonferrous Metal Prices

Oct.	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper 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. Spot, N.Y.	Nickel Cathodes
1-8	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 and 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, l.c.l.	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

Brass

No. 1 composition	8.50- 9.00
Yellow brass castings	5.50- 6.00
Auto radiators	6.12½-6.62½
Red brass, borings & turnings	8.00- 8.50

Zinc

Old	4.75- 5.00
New clippings	6.00- 6.50

Aluminum

Clippings	9.75-10.25
Cast	8.75- 9.25
Pistons	8.50- 8.75
Sheet	8.75- 9.25

Lead

Heavy	4.75- 5.25
Mixed babbitt	5.35- 5.50
Electrotype shells	5.00- 5.50
Stereotype, Linotype	6.00- 6.75

Tin and Alloys

Block tin pipe	44.00-46.00
No. 1 pewter	32.00-36.00
Solder joints	7.75- 8.50

SECONDARY METALS

Brass ingot, 85-5-5-5, l.c.l.	12.50
Standard No. 12 aluminum	14.50

MAGNESIUM

(12 pound rod, 4 in. diam.)

99.8% ingot, carlots	22.50
100 lb. to carlots	24.50
Extruded sticks, ¼ to 2 lb.	
Carlots	32.00
100 lb. to carlots	34.00

OLD METALS

Dealers' Buying Prices

(In cents per pound, carlots)

Copper

No. 1 heavy	9.25-10.00
Light	7.25- 8.00

Nonferrous Metals...

New York—Production of copper, lead, zinc, chrome, tungsten and other strategic metals will gain as a result of WPB's order requiring gold mines to cease operations at the earliest possible date (not later than Dec. 7) and to stop breaking out new ore after Oct. 15. The order covers all mines in which gold is produced, except certain small mines and those to which serial numbers have been assigned under preference rating order P-56.

It is estimated that 3000 to 4000 men will be made available for other work. For each miner who leaves a gold mine and goes to work in a copper mine, nearly four tons of refined copper will be added to the country's war supply.

Alaska Juneau Gold Mining Co. is negotiating a contract with a government agency for conversion of its domestic milling facilities for treatment of chrome ore. The company has taken options on chrome leases in California. For several months Homestake Mining Co. has had engineers searching for properties with deposits of strategic minerals.

H. O. King, chief WPB Copper Branch, stated that the monthly copper supply has attained a new record high of 200,000 tons, of which approximately 31 per cent is obtained from old and reprocessed mill scrap. Despite this large supply, it is estimated by Mr. King that essential requirements for 1942 are over 8 per cent in excess of maximum present visible supply while estimated requirements for 1943 are some 25 per cent in excess of maximum present visible supply.

The supply situation remains tight in zinc while easing considerably in lead. A liberalized lead conservation order is still in the formative stages.

Steel Cartridge Cases Now in Production

(*Concluded from Page 43*)

chairman, Lieut. Col. H. R. Turner; assistant chairmen, C. L. Patterson, president, Corcoran-Brown Lamp Division, Electric Auto-Lite Co., Cincinnati; H. B. Stoner, Stoner Mfg. Co., Aurora, Ill.; W. J. Gazey, Chase Brass & Copper Co., Cleveland; E. Taylor, Briggs Mfg. Co., Detroit; Ed Turnquist, Guide Lamp Division, General Motors Corp., Anderson, Ind.; J. N. Gehred, Metal Specialties Co., Cincinnati.

Committee Members: William Halker, Corcoran-Brown Lamp Division, Electric Auto-Lite Co., Cincinnati; Bert Leucke, Revere Copper & Brass Co., Rome Mfg. Division, Rome, N. Y.; H. M. Heckathorn, Mullins Mfg. Corp., Warren, O.; A. R. Middleton, Buick Motor Co., Flint, Mich.; Ed Turnquist, Guide Lamp Division, General Motors Corp., Anderson, Ind.; W. C. Husted, Chase Brass & Copper Co., Waterbury, Conn.

Company members of the committee:

Aluminum Goods Mfg. Co., Manitowoc, Wis.; Aluminum Specialty Co., Manitowoc, Wis.; American Fork & Hoe Co., Cleveland; Armstrong Cork Co., Lancaster, Pa.; Bossert Co. Inc., Utica, N. Y.; Bowen Products Corp., Detroit; Bridgeport Brass Co., Bridgeport, Conn.; Briggs Mfg. Co., Detroit; Buick Motor Co., Flint, Mich.

A. S. Campbell Inc., Detroit; Chase Brass & Copper Co. Inc., Waterbury, Conn.; City Auto Stamping Co., Toledo, O.; Conlon Corp., Cicero, Ill.; Corcoran-Brown Lamp Division, Cincinnati; Defiance Pressed Steel Co., Marion, O.; Dura Division, Detroit Harvester Co., Detroit; Eastern Rolling Mill Co., Baltimore; Edison Electric Appliance Co., Chicago.

Florence Stove Co., Gardner, Mass.; Frankford Arsenal, Philadelphia; The Frost Co., Kenosha, Wis.; Guide Lamp Division, General Motors Corp., Anderson, Ind.; Globe Machine & Stamping Co., Cleveland; Gorham Mfg. Co., Providence, R. I.; Ingersoll Steel & Disc Division, Borg-Warner Corp., Chicago; Kewaskum Aluminum Co., Kewaskum, Wis.; Knapp-Monarch Co., St. Louis.

McCauley Metal Products Inc., Buffalo; Metal Specialty Co., Cincinnati; Moore Enameling & Stamping Co., West Lafayette, O.; Mullins Mfg. Corp., Salem, O.; National Enameling & Stamping Co., Milwaukee; Northern Engraving & Mfg. Co., LaCrosse, Wis.; Northwestern Corp., Morris, Ill.; Norris Stamping & Mfg. Co., Los Angeles.

Proctor & Schwartz Inc., Philadelphia; Revere Copper & Brass Inc., New York; Rockwood Sprinkler Co., Indianapolis; Schlage Lock Co., San Francisco; Schwitzer-Cummins Co., Indianapolis; Scovill Mfg. Co., Waterbury, Conn.; Servel Inc., Evansville, Ind.; Stoner Mfg. Corp., Aurora, Ill.; Wisconsin Metal Products Co., Racine, Wis.

OPA Approval Unnecessary For Army, Navy Articles

An amendment to price regulation No. 188 will be issued shortly whereby on new articles for the army and navy, manufacturers will not have to wait fifteen days for OPA approval of prices. In other words, they can start production on such orders at once.

This was revealed today by officials of the Building Materials and Consumers Goods Price Branches at a press conference called especially to clarify various phases of the price regulation No. 188 and to emphasize the importance of filing full reports with OPA concerning prices of new products and of obtaining official approval of them. It is important because failure to do so may prove irritable boomerang to manufacturers later; also direct buyers from manufacturers are warned to make sure that such reports have been filed before purchasing for they are equally liable where they have paid prices not officially approved.

Various regulataions applying to individual lines are being set up with possibly 40 more in the Building Branch alone contemplated before the end of the year. One speaker said price regulation No. 188 is being whittled down, with the ruling serving as a bridge between the general price regulation and these individual regulataions. However, this in no sense minimizes importance of studying regulation 188 closely.

Baldwin Locomotive To Pay $4,000,000 Wage Increase

Employes of Baldwin Locomotive Works, Philadelphia, will soon receive an estimated $4,000,000 wage increase stipulated in a contract recently ratified by the company and the United Steelworkers of America, CIO. Announcement of the wage contract was made by Michael Harris, sub-regional director for the union, who said that most of the increases will be in the locomotive and ordnance branches of the plant.

Plant Expansion, Construction and Enterprise, Government Inquiries, Sub-Contract Opportunities, Contracts Placed and Pending

SUB-CONTRACT OPPORTUNITIES

Data on subcontract work are issued by regional offices of the War Production Board. Contact either the office issuing the data or your nearest field office. Write, don't telephone, and mention key letters and numbers appearing before each item to assure prompt attention and avoid delay.

Chicago office, Contract Distribution Branch of WPB, 20 North Wacker Drive, is seeking contractors for the following:

Exhibit No. 264: Retainer. 3⅜-inch bar capacity turret lathe. Material, X4130 seamless steel tubing furnished by sub. Tolerance, minimum .002. Quantity, 2000. Production, 100 per month. Number of parts, three. AA-1 priority.

Exhibit No. 251: Carburetor fittings. ⅞-inch capacity automatic screw machine, multiple spindle. Material, ⅞-inch No. 303 stainless steel, furnished by prime. Tolerances, close. Quantity, 74,000 pieces. Number of parts, two. No threading required. Prime will furnish gages and tools.

Exhibit No. 133: Right cap. 62-inch vertical boring mill with 8-pitch thread equipment, 16-inch slotter. Material, steel castings, furnished by prime. Tolerances, minimum .002. Quantity, no definite amount, will be continued for the duration. Prime wants the 11.811-inch and 11¼-inch openings finish bored, also the 12-8NS-2 opening bored, faced and threaded. Slots to be rough slotted.

Exhibit No. 254: Rotor blades. (No. 2 Toledo). B. inclinable punch press; No. 2 B & S magnetic plate surface grinder; straddle grinder, radius grinder. Material, SAE 4615 steel, heat treatment, furnished by sub. Tolerances, minimum, .0005. Quantity, 10,000 pieces of each item. Number of parts, three.

Exhibit No. 215: Lower and upper pinion (2). Machine facilities require Swiss-type screw machine. Material, stainless steel, furnished by prime. Quantity, 20,000 each. Production, 2200 each per month, beginning Nov. 1. Number of teeth, 23. Size of part, .145-inch O.D., .669-inch long. Restricted blueprints on file.

Exhibit No. 262: Turret. 78-inch Betts vertical boring mill or equal, No. 2 Rockford horizontal boring mill with rotating table, or equal, 10-foot radial drill press, 6-inch radial drill press. Material, armor steel casting furnished by prime. Tolerances, liberal. Production, 30 per day. Weight 900 pounds rough.

Exhibit No. 256: Trunnion. 1¼-inch bar capacity 4 or 6-spindle automatic screw machine. Material, screw stock Spec. 654, furnished either by prime or sub. Tolerances, minimum .001. Quantity, 150,000. Production, 2000 daily, several subcontractors required. Requires smooth finish and plated.

Exhibit No. 258: Fuse body. 2-inch capacity automatic screw machine. Second operation chucking, hand screw machine. Material, chrome-molybdenum steel, bar stock. Cadmium plates furnished by prime. Tolerances, minimum .006. Quantity, 200,000. Production, 15,000 per month. Internal and external threading.

Exhibit No. 265: Plug. 1½-inch bar capacity single spindle automatic screw machine. No. 1 horizontal milling machine. Material, WD-X1315 cold-rolled steel, furnished by prime. Tolerances, liberal. Quantity, 2500 to 15,000. Number of parts, seven. Prime wants quotations on lots of 2500, 5000, 10,000 and 15,000.

Exhibit No. 43: Gun parts. No. 00, 0 and 1 B & S automatic hand screw machines or equal, 3½-inch capacity hand screw machine, bench lathes, drill presses up to ¾-inch capacity. Precision hand milling machine, No. 2 horizontal milling machine, small and medium size, vertical milling machine, external, internal, face and centerless grinder, punch press. Material, drop forging, round, square and flat steel bar. Quantity, 1500 to 2000 pieces of each part. Number of pieces, 49. Tolerances, .008 to .003 minimum. Some parts require considerable form milling.

Exhibit No. 242: Track plates. No. 1 milling machine, ½ and ¾-inch capacity drill press. Material, SAE 3140 steel forging furnished by sub. Quantity, 100,000 at 1000 per day. Number of pieces, three. Tolerances, minimum .007. Subcontractor to procure forgings and make delivery of completely machined parts.

Exhibit No. 244: Hydraulic cylinder assemblies. Requires variety of machine operations and adapts itself to shops equipped with milling machine, screw machines and lathe equipment of various types. Close machine work is required and parts are to be delivered completely assembled. Three types of cylinder assemblies are required. Quantities to be determined. Blueprints and specimen parts at Navy exhibit.

Exhibit No. 245: Gages, ring, plug, profile, width and snap. Toolroom machinery, No. 2 horizontal milling machine with vertical milling attachment or vertical mill of equal size, 6 and 10-inch swing tool room lathe, medium size drill press, contour band saw, surface, internal and external grinders. Material, gage stock, tool steel, furnished by prime. Quantity, 32. Number of pieces, 15. Tolerances, minimum, .0002. Turning, plain milling, contour sawing, contour milling, drilling, grinding and lapping.

Exhibit No. 240: Fuze seat. 1½-inch hex chucking capacity automatic screw machine or hand screw machine. Second operation 1½-inch hex bar machine for first operation when of steel. Material, malleable iron, alternate material steel, furnished by prime. Quantity, 160,000. Production 2000. Tolerances, minimum, .001. External thread, 1.15-12NF-1. AA-1 priority on 105,000, balance A-1-a.

Exhibit No. 248: Gyro instrument fitting. Wire size No. 0 and 00 B & S hand screw machine, bench milling machine, bench thread cutting lathe, 48 pitch gear cutter, external grinder on centers, centerless grinders. Material, stainless steel, chrome carbon steel 17ST dural, Mag. alloy, drill rod. Some parts heat treated. Quantity, 500 each. No. of pieces, 40. Tolerances, minimum .003.

Exhibit No. 246: (A) Pinion and shaft. ⅝-inch capacity automatic screw machine, bench lathe, hand milling machine, 32 D.P. spur gear cutter, external grinder on centers. Material, SAE 4640 furnished by prime, heat treated after machining. Quantity, 8000. Tolerances, minimum .0003. (B) Center leg shaft. ½-inch capacity automatic screw machine, small vertical milling machine or horizontal milling with vertical attachment. Material SAE 3120 steel, furnished by prime. Quantity, 8000. Tolerances, minimum .002.

Exhibit No. 131: (A) Front wheel knuckle. 14-inch swing over cross slide W & S turret lathe, two chucking operations. Single spindle drill press, 2-inch capacity multiple spindle drill presss 3 $\frac{5}{16}$-inch holes. Single spindle drill press ½-inch capacity. Material, cast steel furnished by prime. Quantity, 250, 750, 1000. Tolerances, minimum .001. (B) Pinion. 3⅝-inch capacity bar turret lathe, rough turn; 10-inch engine lathe, finish turn on centers; No. 1 milling machine; Fellows gear cutter; external grinder. Material, SAE No. 3250 steel, furnished by prime. Quantity, 250, 750, 1000. Tolerances, minimum .0005.

Exhibit No. 255: (A) Nut fin lock. 5¾-inch chucking capacity turret lathe when part is forged; 6-inch capacity bar turret lathe when material is steel tubing; ⅜-inch capacity drill press. Material, WD 1035 steel drop forging, alternate material steel tubing furnished by prime. Quantity, 50,000. Tolerances, minimum .009. (B) plug base. 5¼-inch chucking capacity turret lathe and 10¼-inch chucking capacity turret lathe, bench drill press. Material, steel drop forging, alternate material, steel casting furnished by prime. Quantity, 50,000. Tolerances, minimum .009.

Exhibit No. 226: (A) Rear arm. 48-inch planer, 3 to 4-inch horizontal boring mill and 4-foot radial drill press. Material, fabricated steel. Quantity, 50. Production, three per week. (B) Stand. 60-inch planer with side head and 6-foot radial drill press (both casting and machining). Quantity, 50. Production, three per week. Casting weighing 625 pounds; base 24½ inches x 35½ inches, height 55½ inches.

New York office, Contract Distribution Branch of WPB, 122 East Forty-Second street, New York, reports the following subcontract opportunities:

D-49: Long Island aircraft manufacturer seeks subcontracting facilities for production of large quantities of precision gears and shafts for aircraft engines. Gears vary in size up to 7 inches and 63 different kinds are wanted, including bevel, spur and internal spline gears. Material, steel bar stock and forgings. Tolerances, fine. Machines needed, gear cutting, gear hobbing, heat treating, carburizing and grinding facilities. Samples on display at New York office.

S-3596: New York City manufacturer seeks steel casting facilities as follows: Dimensions, ¾, 1½ and 10-pound 22 inches long. Quantity, 125,000 of each size; can be cast horizontally; permanent molds, no core work.

S-3217: New Jersey manufacturer requires subcontracting assistance for the production of 10 steel castings weighing approximately 1400 pounds, pattern supplied by prime contractor.

S-3986: New Jersey manufacturer of aircraft hardware is seeking automatic hand screw machine capacity for the manufacture of fifteen wire terminals; turnbuckles sleeve type, seven sizes; sleeve type two sizes; cable fork, two sizes; cable eyes, four sizes. Material, stainless steel, which can be purchased from prime contractor. Dimensions, from diameters .160-inch to 1.334-inch, in lengths 1.818 to 4.349-inch. Tolerances, precision. Quantities, lots of 2000, 5000 and 50,000. Orders may be placed on any single item from 1000 to 50,000. Machines needed, automatic screw machines, drill press, milling machines, grind-

ing and polishing equipment. Parts require polishing and passivating, which may be done by an outside plating concern. Drawings, specifications and samples at New York office.

S-3981: New York City manufacturer seeks facilities to fabricate 100,000 pieces of each of seven required items, delivery to start at once. Material, 7/8 and 1 5/8-inch free turning hexagon stainless steel and ½-inch free turning round stainless steel. Equipment, minimum of two multiple spindle automatic screw machines. Quantity, 300,000 pieces, ½ and ¾-inch free turning stainless steel, delivery to start at once. Equipment required, turret lathes and production millers, at least three lathes to each miller.

S-3770: Long Island manufacturer seeks hydrogen annealing facilities; bright finish in atmospheric controlled furnace; 16-hour cycle. Dimensions, 5 to 7-inch diameter x .014. Material, steel. Quantity, 2000 pounds per week.

S-3906: Upstate manufacturer wants gearmaking facilities capable of producing ring gears, 2 feet 10 inch pitch diameter; internal spur, 16 pitch; 544 teeth 7/8-inch long; back lash plus .000, minus, .002. To be rolled to diameter and flash welded. Material, steel, SAE 4140, to be furnished by subcontractor and heat treated before machining. Quantity, 4000. Delivery, eight in November, stepping up each month to 400 per month in June.

Minneapolis office, Contract Distribution Branch of WPB, 334 Midland Bank building, is seeking contractors for the following

S.O. No. 273: Sources to manufacture various ring and plug thread gages urgently required. Largest size 2¼-inch.

S.O. No. 276: Minneapolis manufacturer needs capacity on 4 or 6-spindle automatic to machine 150,000 trunnions from 1¼-inch round stock. Tolerance, .001.

S.O. No. 277: Several very small screw machine parts in quantities of 2000 to 50,000. Material, brass. Closest tolerance is .001. Sizes from .09 to .75-inch. Prints and sample parts at Minneapolis office.

S.O. No. 278: Machining of 50,000 to 100,000 adaptors from 3-inch WD-115 steel, to be furnished by subcontractor. Closest tolerance .015. Deliveries to start as soon as possible. Screw machines required. Price, 50 cents each. Pennsylvania contractor.

S.O. No. 271: Cleveland prime contractor wants forging capacity, production basis, large quantity of shifting levers. Drawing at Minneapolis office.

S.O. No. 249: Chicago prime contractor seeks subcontractors for 30-calibre A.P. bullet cores. Requires minimum of three 00 Brown & Sharpe automatic screw machines or 5/8-inch or larger multiple spindle automatics. Tolerances, fairly close. Full time production for duration.

Boston office, Contract Distribution Branch of WPB, 17 Court street, is seeking contractors for the following:

SC-1: Fractionating columns for distillation and separating of turpentine into component parts. High priority.

1-A-213: Multiple spindle screw machines required to work on seven parts, three of round copper silicon stock from 7/8 to 1 1/8-inch and four of hexagon dural material (17 st.) from 1 1/8 to 1 3/8-inch. Profiling machines also required for second operation on first three parts. Lengths of seven parts range from 1 1/8 to 7/8-inch. Quantity, 100,000 of each part. Material supplied by prime contractor.

1-A-214: Machining facilities for work on diesel engine bases and blocks. Parts to be worked on are of two sizes, one approximately 12½ x 4 x 3½ feet, the other approximately 11½ x 3 x 3½ feet. About 24 of each required at rate of one per week. Only firms experienced in this class of work will be considered.

1-A-221: Forging, milling and drilling facilities, variety of items aggregating 250,000 pieces ranging from 1⅛ to 2¼-inch long by 3/8 to 1¼-inch wide, drilled holes from 5/16 to ⅜-inch. Milling can be done on No. 2 machine or smaller. Liberal tolerances.

SHAPE AWARDS COMPARED

	Tons
Week ended Oct. 10	1,128
Week ended Oct. 3	3,900
Week ended Sept. 26	200
This week, 1941	23,150
Weekly average, 1942	18,560
Weekly average, 1941	27,284
Weekly average, Sept., 1942	3,290
Total to date, 1941	1,151,047
Total to date, 1942	760,955

Includes awards of 100 tons or more.

STRUCTURAL SHAPES . . .

SHAPE CONTRACTS PLACED

800 tons, defense project in Puget Sound area to Pacific Car & Foundry Co., Seattle.

228 tons, various refinery jobs in Indiana and Illinois, to Vincennes Steel Corp., Vincennes, Ind.; M. W. Kellogg Co., New York, contractor.

100 tons, unstated project in Seattle area, to Pacific Car & Foundry Co., Seattle.

REINFORCING BARS . . .

REINFORCING STEEL AWARDS

2200 tons, Panama, sch. 6534, to Youngstown Sheet & Tube Co., Youngstown, O.; bids Sept. 17.

336 tons, defense plant, Catlettsburg, Ky., to West Virginia Rail Co., Huntington, W. Va.; Lummus Co., New York, contractor.

192 tons, flood wall, Paducah, Ky., for United States engineer, to Laclede Steel Co., St. Louis, Hoefkin & Tilman, contractors.

125 tons, sewage treatment plant, army training and housing facilities, Lewistown, Ill., to Joseph T. Ryerson & Son Inc., Chicago; Joseph J. Duffy, Chicago, contractor; bids Sept. 22.

RAILS, CARS . . .

CAR ORDERS PLACED

Norfolk & Western, 100 seventy-ton gondolas to Pressed Steel Car Co., Pittsburgh, and 25 seventy-ton flats, to Greenville Car Co., Greenville, Pa., subject to Washington approval.

Columbia Steel Co., ten fifty-ton gondolas to Pressed Steel Car Co., Pittsburgh.

LOCOMOTIVES PENDING

Central of Georgia, five to eight steam locomotives.

BUSES BOOKED

A.c.f. Motors Co., New York: Twenty-seven 37-passenger for Santa Fe Trail Transportation Co., Chicago; four 37-passenger for Carolina Coach Co., Raleigh, N. C.; four 45-passenger for A.B. & W. Transit Co., Alexandria, Va.; two 37-passenger for Vermont Transit Co., Burlington, Vt.; two 37-passenger for Rio Grande Motor Way Inc., Denver; two 37-passenger for Denver, Colorado Springs, Pueblo Motor Way Inc.; one 37-passenger for Edwards Motor Transit Co., Williamsport, Pa.

CONCRETE BARS COMPARED

	Tons
Week ended Oct. 10	2,853
Week ended Oct. 3	873
Week ended Sept. 26	4,341
This week, 1941	7,720
Weekly average, 1942	8,359
Weekly average, 1941	13,609
Weekly average, Sept., 1942	4,708
Total to date, 1941	597,984
Total to date, 1942	342,739

Includes awards of 100 tons or more.

CONSTRUCTION AND ENTERPRISE

MICHIGAN

DETROIT—Campbell Construction Co. has been awarded contract for alterations to factory of Flex-O-Tube Co.

DETROIT—Talbot & Meier Inc. has general contract for factory and office building for Cogsdill Twist Drill Co. Paul Sewell, Detroit, architect.

DETROIT—Federal Mogul Corp., 11031 Shoemaker avenue, has let contract for one-story, 120 x 460-foot machine shop, 40 x 150-foot power house to W. J. C. Kaufmann Co., 10610 Shoemaker avenue. Estimated cost $350,000.

FLINT, MICH.—Defense Plant Corp. officials report that a $250,000 plant will be built here for Air Reduction Corp.

MASSACHUSETTS

HINGHAM, MASS.—Air Reduction Sales Co., 60 East Forty-second street, New York, will let contract soon for a two-story brick acetylene plant, costing about $40,000.

LYNN, MASS. — General Electric Co., 920 Western avenue, has let contract to E. C. Blanchard Co., 940 Western avenue, Lynn, for boiler plant. Estimated cost $45,000.

CONNECTICUT

BRIDGEPORT, CONN.—Harry Maring Jr. Inc., 556 Lindley street, Bridgeport, has been awarded contract by industrial company for plant units, estimated to cost $125,000.

BRIDGEPORT, CONN.—Department of public works plans sewage disposal plant at Seaview avenue and Walker street, and additional expansion at Boswick avenue plant. Estimated cost $3,000,000.

BRIDGEPORT, CONN.—General Shaver Division, Remington Rand Inc., 2 Main street, will build two-story 130 x 150-foot plant addition, costing $150,000. Fletcher-Thompson Inc., 211 State street, engineer.

DANBURY, CONN. — Machlett Laboratories Inc., 1063 Hope street, Springdale, Conn., has let contract for steel plant alterations and addition to W. J. Barney Inc., 101 Park avenue, New York. Estimated cost $60,000.

HAMDEN, CONN.—High Standard Mfg. Co., 1337 Dixwell avenue, has awarded contract for plant additions, boiler plant and forge, to Dwight Building Co., 67 Church street, New Haven. Estimated cost $45,000. Douglas Orr, 96 Grove street, New Haven, architect.

HARTFORD, CONN. — Bartlett-Brainard Co., 103 Woodbine street, has contract from industrial company for manufacturing unit estimated to cost $1,000,000.

SEYMOUR, CONN.—Seymour Mfg. Co., 15 Franklin street, will soon let contract for one-story 60 x 165-foot factory. Fletcher

Thompson Inc., 211 State street, Bridgeport, engineer.

RHODE ISLAND

PROVIDENCE, R. I.—Liberty Tool & Gage Works Inc., 235 Georgia avenue, has awarded contract for one-story factory to C. I. Bigney Construction Co., 44 Franklin street. Estimated cost $40,000.

NEW JERSEY

NEWARK, N. J.—Work will be started soon near here on a site of 125 acres for the initial unit containing 75,000 square feet of operating space, of a plant which will become the main research and manufacturing plant of the International Telephone & Telegraph Co. in the United States.

OHIO

CANTON, O.—Ohio Power Co., 305 Cleveland avenue, plans station on Georgetown road. Estimated cost $500,000.

CLEVELAND—Star Welding & Engineering Co., 4615 Superior avenue, plans to purchase mill-type building of 5000 square feet for machine shop and electrical welding. Present shop will move to new location at 5140 Superior avenue if board of zoning appeals grants permission.

CLEVELAND—Cleveland Tungsten Inc., 10200 Meech avenue, has applied for priorities to add to office and factory space. Erwin O. Oberdick is president and manager.

CLEVELAND—Hickok Electrical Instrument Co., Wilburt H. Eberle, secretary, is erecting an $8000 addition to factory building at 10514 Dupont avenue.

CLEVELAND—Metal Finishers Inc., V. R. Sutjak, president, is putting in a mezzanine floor and otherwise altering its present building at 1725 East Twenty-seventh street.

CLEVELAND—Kindt-Collins Co., 12651 Elmwood avenue, plans factory expansion program which will afford 3000 square feet of space.

CLEVELAND—Stotter Smelting Co., 7700 Bessemer avenue, has let contract to Master & Mullens Construction Co. for alterations to buildings.

CLEVELAND—Pal-Vin Machinery Co., 1419 East Fortieth street, has let contract to Mitzel Co. for an addition to provide boiler room and warehouse space.

NEWARK, O.—City plans election to vote bonds for sanitary sewerage system costing between $40,000 and $50,000.

VANDALIA, O.—Board of public affairs plans pumping station and installation of motor turbine pumping units and accessories in connection with extensions in waterworks. George Steller, U. B. building, Dayton, O., consulting engineer.

YOUNGSTOWN, O.—Heller Murray Co., 222 West Rayen avenue, Youngstown, has been awarded contract by a Pennsylvania industrial company for rehabilitating its manufacturing plant.

PENNSYLVANIA

ERIE, PA.—J. H. Williams & Co., 225 Lafayette street, New York, is having preliminary sketches prepared for manufacturing plant here. United Engineers & Constructors Inc., 1401 Arch street, Philadelphia, engineer.

PHILADELPHIA — Philadelphia Electric Co. has contracted with local United States District Engineer Office for extensions in transmission and distributing lines, including power substation facilities.

ILLINOIS

CHICAGO—Quaker Oats Co. Inc., 141 West Jackson boulevard, has contracted with government for construction and operation of plant in Tennessee for production of chemical products used in connection with synthetic rubber manufacture. Complete electrical equipment and facilities will be installed, including power substation. Entire project to cost over $2,000,000.

CHICAGO—Republic Drill & Tool Co., 312 South Green street, will start work soon on addition to machine shop. Ralph Renwick, 210 North Wells street, is engineer.

INDIANA

HAMMOND, IND.—Hammond Brass Works has let general contract for addition to foundry to A. L. Jackson Co., 161 East Erie street.

LAWRENCEBURG, IND.—Jos. E. Seagram & Son Inc., Lawrenceburg, has sketches by Smith, Hinchman & Grylls, Marquette building, Detroit, for plant.

MARYLAND

BALTIMORE—Western Electric Co. will erect temporary building at 2800 Broening highway costing $10,000.

GEORGIA

AUGUSTA, GA.—International Minerals & Chemical Corp., 20 North Wacker drive, Chicago, has begun work on plant here for production of magnesium sulphate.

KENTUCKY

LOUISVILLE, KY.—Mengel Co., 1122 Dumesnil street, has let contract for one and two-

story, 253 x 600-foot frame and asbestos siding plant to Wittenberg Construction Co., 2214 South Floyd street. Tietig & Lee, West Sixth street, Cincinnati, architects.

LOUISIANA

BATON ROUGE, LA.—Guy B. Panero will be project manager for the H. K. Ferguson Co., Hanna building, Cleveland, for design and construction of synthetic rubber plants for Firestone Tire & Rubber Co. at Baton Rouge and Lake Charles.

VIRGINIA

DUBLIN, VA.—FWA, 606 State Planters Bank building, Richmond, Va., receives bids Oct. 13 for waterworks facilities, including pump house, installation of electric connections, heater, blower, deep well turbine pump and chlorinating and water softening units. Federal allotment of $36,900 has been authorized.

MISSOURI

ST. LOUIS—Murch-Jarvis Co. has contract for addition to factory at 4171 Bingham street for Alligator Co. Estimated cost $50,000.

WISCONSIN

APPLETON, WIS. — Appleton Wire Works, 600 East Atlantic street, has given contract for one-story, 45 x 95-foot factory addition to Hoffman Construction Co., 1519 North Oneida street.

MILWAUKEE—Hunzinger Construction Co., Station K, Milwaukee, has contract for one-story, 100 x 100-foot factory.

MILWAUKEE — Eclipse Plastic Industries, 5148 West Twenty-third street, has let contract for one-story, 73 x 89-foot factory to V. Schramka, 4603 North Bartlett avenue. U. F. Peacock, 3200 West Wisconsin avenue, architect.

MILWAUKEE — Crucible Steel Casting Co., 2850 West Twentieth street, plans one-story 100 x 125-foot foundry building. Giffels & Vallet, Marquette building, Detroit, architects.

MINNESOTA

SAVAGE, MINN.—M. F. Zeller, village clerk, plans water supply system, including tank, tower, distribution lines, also sanitary sewerage system, disposal plant. Estimated cost $150,000. H. A. Davis, 800 Simpson street, St. Paul, engineer.

TEXAS

MERCEDES, TEX.—Missouri Pacific Railway, C. S. Kirkpatrick, chief engineer, Houston, Tex., will rebuild packing plant at 19 Ohio street.

FORT WORTH, TEX.—Tarrant County Water Control and Improvement District No. 3, J. R. Meeker, president, has plans and will call bids about Oct. 20 for sewer improvements costing $224,725. Joe J. Rady, engineer, Majestic building, Fort Worth.

NEBRASKA

COLUMBUS, NEBR.—Consumers Public Power District has plans maturing for one-story building at Sidney, Nebr., for equipment storage and distribution.

IOWA

GRINNELL, IOWA—Town council plans installation of turbine unit and centrifugal pumping equipment for waterworks station.

CALIFORNIA

LOS ANGELES—Building permit has been issued for addition to plant of Keystone Tool & Supply Co. at 7720 Maie avenue.

SAN FRANCISCO—Matson Navigation Co., 215 Market street, has let contract for one-story industrial building and altering machine shop to Swinerton & Walberg Co., 225 Bush street. Estimated cost $152,000. K. Theill, 580 Market street, engineer.

OREGON

THE DALLES, OREG.—City will vote next month on bond issue to assist Pointer Willamette Co. in establishing plant here for construction of steel barges for the government.

WASHINGTON

SEATTLE—Puget Sound Power & Light Co. plans construction of substation at 949 North Eightieth street.

CANADA

HAMILTON, ONT.—Dominion Foundries & Steel Ltd., Depew street, has given general contract to Frid Construction Co. Ltd., 126 King street East, and structural steel contract to Hamilton Bridge Co. Ltd., for addition to foundry and foundry finishing shop on Homer street, 57 x 220 feet, to cost about $1,100,000 with equipment. Dominion Foundries also is having plans prepared by Prack & Prack, architects, Pigott building, for further plant extensions at main plant on Depew street and the new site on Homer avenue, estimated to cost with equipment, about $500,000.

HAMILTON, ONT.—Hamilton Bridge Co. Ltd., 231 Bay street North, will start work soon on additions at its Nos. 1 and 2 shops here at cost of about $116,000, with equipment.

LONDON, ONT.—Central Aircraft Co. Ltd., W. S. Goodeve, manager, in association with Department of Munitions and Supply, Ottawa, H. H. Turnbull, secretary, has given general contract to Frontenac Construction Co. Ltd., C.P.R. building, King and Yonge streets, Toronto, for plant addition to cost about $375,000, with equipment.

OTTAWA, ONT.—National Research Council of Canada, Sussex street, C. J. MacKenzie, acting president, has given general contract to Foran Construction Co. Ltd., 78 Bank street, for additions to buildings on Montreal road to cost about $275,000, with equipment.

OTTAWA, ONT.—Hughes Owens Co. Ltd., 1440 McGill College avenue, Montreal, has extended contract given to Ross-Meagher Ltd., 7 Echo drive, to include further addition to plant on Hamilton avenue to cost $50,000.

OWEN SOUND, ONT.—Wm. Kennedy & Son Ltd., First avenue West, has given general contract to Wells & Gray Ltd., 17 Queen street East, Toronto, and placed subtrades for naval machine shop here to cost about $50,000.

TORONTO, ONT.—Dominion Bridge Co. Ltd., 1139 Shaw street, has given general contract to Anglin-Norcross, Ontario Ltd., 57 Bloor street West, for addition to plant to cost about $15,000.

TORONTO, ONT.—Research Enterprises Ltd., Eglington avenue East, Leaside, has extended general contract given to Milne & Nicholls Ltd., 57 Bloor street West, to include hydrogen building at cost of $15,000.

TORONTO, ONT.—John Inglis Co. Ltd., 14 Strachan avenue, has extended general contract given to A. W. Robertson Ltd., 57 Bloor street West, to include addition to machine shop costing about $25,000, equipment extra.

MONTREAL, QUE.—Lawson Machine Works, 1070 Bleury street, will start work immediately on alterations and additions to machine shop at 949 St. Dominique street.

MONTREAL, QUE. — Northern Electric Co. Ltd., Shearer street, has had plans prepared for addition to plant here to cost about $20,000.

MONTREAL, QUE.—Continental Can Co. of Canada Ltd., Ouimet avenue, has had plans prepared and will start work soon on alterations to building purchased earlier this year, and also build addition, to cost about $125,000, with equipment.

MOUNT ROYAL, QUE.—Canadian Marconi Co. Ltd., 2440 Trenton road, has received bids and will let contracts soon for addition to plant here to cost about $75,000 with equipment.

EDMONTON, ALTA.—Edmonton power plant department is considering plans for addition to power plant and installing new equipment to cost about $370,000.

HARMONY MILLS, N. S.—Nova Scotia Power Commission, Provincial Administration building, Halifax, has plans for power development project to cost about $100,000.

SACKVILLE, N. B.—Canadian Broadcasting Corp. Ltd., 1231 St. Catharine street West, has plans for short wave broadcasting station here at cost of approximately $800,000.

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Multi Speed Motors 3 Phase 60 Cycle

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15/5	Westinghouse	1150/565
7	Gen. Elec.	1800/1200/900/600
6	Gen. Elec.	1800/1200/800/600
3¼	Gen. Elec.	1800/1200/900/600
2-1½-1-3/4	Louis Allis	1200/900/600/450
2-1 1/3-1-2/3	Fair Morse	1800/1200/9007600

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Statement of the ownership, management, circulation, etc., required by the act of congress of Aug. 24, 1912, and March 3, 1933, of STEEL, published weekly at Cleveland, Ohio, for Oct. 1, 1942. State of Ohio, County of Cuyahoga, ss. Before me, a notary public in and for the state and county aforesaid, personally appeared Geo. O. Hays, who having been duly sworn according to law, deposes and says that he is the Business Manager of STEEL, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of Aug. 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, to wit: 1.—That the names and addresses of the publisher, editor, managing editor, and business manager are: Publisher, The Penton Publishing Co., Cleveland, O.; Editor, E. C. Kreutzberg, Cleveland, O.; Managing Editor, A. J. Hain, Cleveland, O.; Business Manager, Geo. O. Hays, Cleveland, O. 2.—That the owners are: Names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock: Acly Co., Pittsburgh, Pa.; Edwin C. Barringer, Washington, D. C.; Sam'l E. Bool, Cleveland, Ohio; Richard M. Bourne, Cleveland, Ohio; Dorothy L. Cole, Long Island, N. Y.; County National Bank & Trust Co. of Santa Barbara, Santa Barbara, Calif.; J. R. Dawley, Cleveland, Ohio; Ernest C. Dempsey, Richard Anglis & Central National Bank of Cleveland as Trustees under agreement with John A. Penton, dated Feb. 16, 1924, Cleveland, Ohio; The Fulmer Manufacturing Co., Cleveland, Ohio; Geo. O. Hays, Cleveland, Ohio; Russell C. Juenke, Cleveland, Ohio; S. H. Jasper, Pittsburgh, Pa.; A. L. Klingeman, Cleveland, Ohio; E. C. Kreutzberg, Cleveland, Ohio; J. D. Pease, Mount Dora, Florida; L. E. Penton, Los Angeles, Calif.; Earl L. Shaner, Cleveland, Ohio; Charles J. Stark, Cleveland, Ohio; Penelope M. Stark, Cleveland, Ohio; Edith L. Werner, Cleveland, Ohio; Grace Whelan, Santa Barbara, Calif. 3.—That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: John Hancock Mutual Life Insurance Co., Boston, Mass. 4.—That the two paragraphs next above, giving the names of owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stocks, bonds, or other securities than as so stated by him. Geo. O. Hays. Sworn to and subscribed before me, this 1st day of October, 1942. (Seal) F. S. Fraser. (My commission expires March 10, 1944.)

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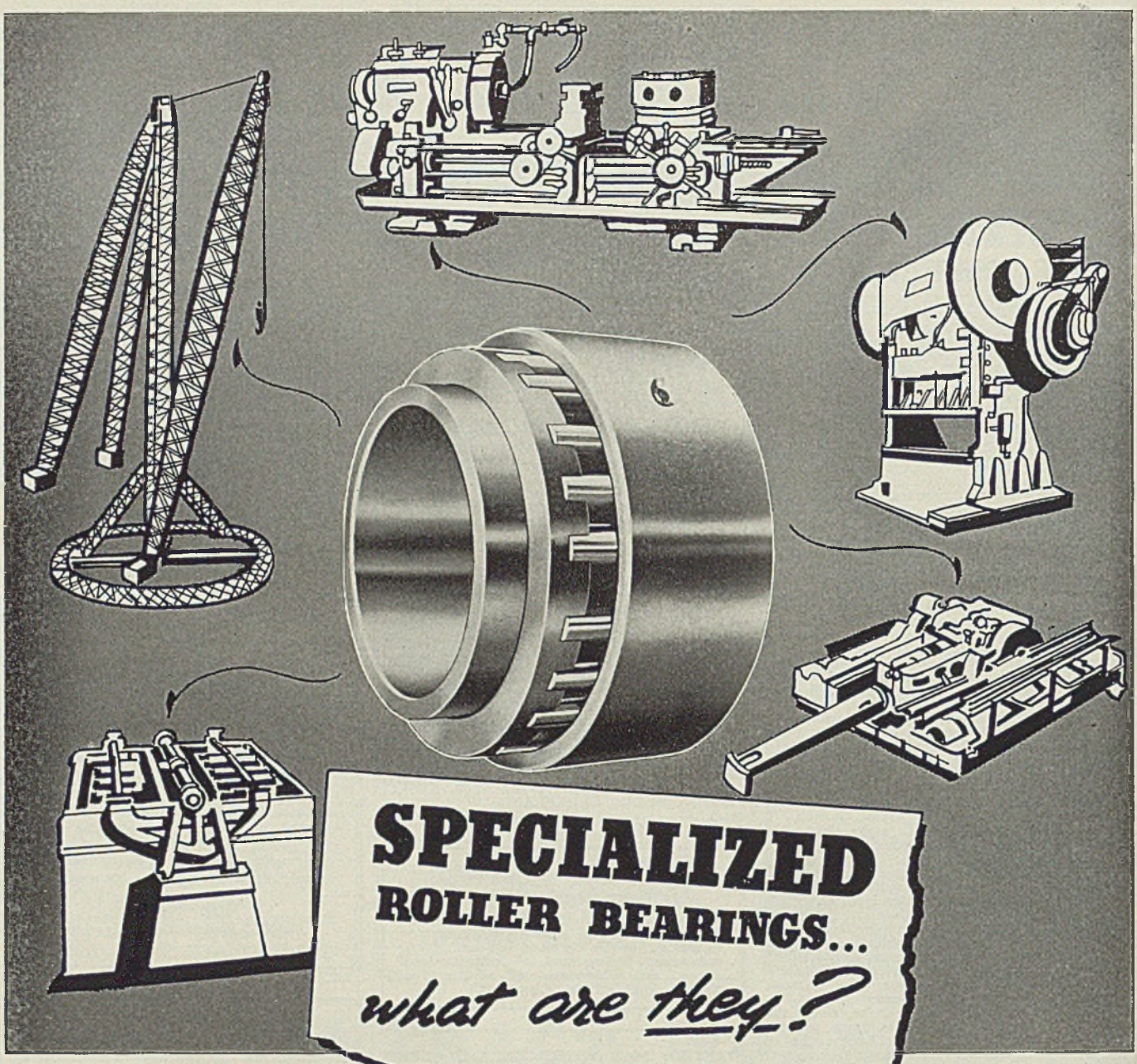

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