Shatterproof Oxygen Tanks for Aircraft Are Made In Converted Plant, See P. 38

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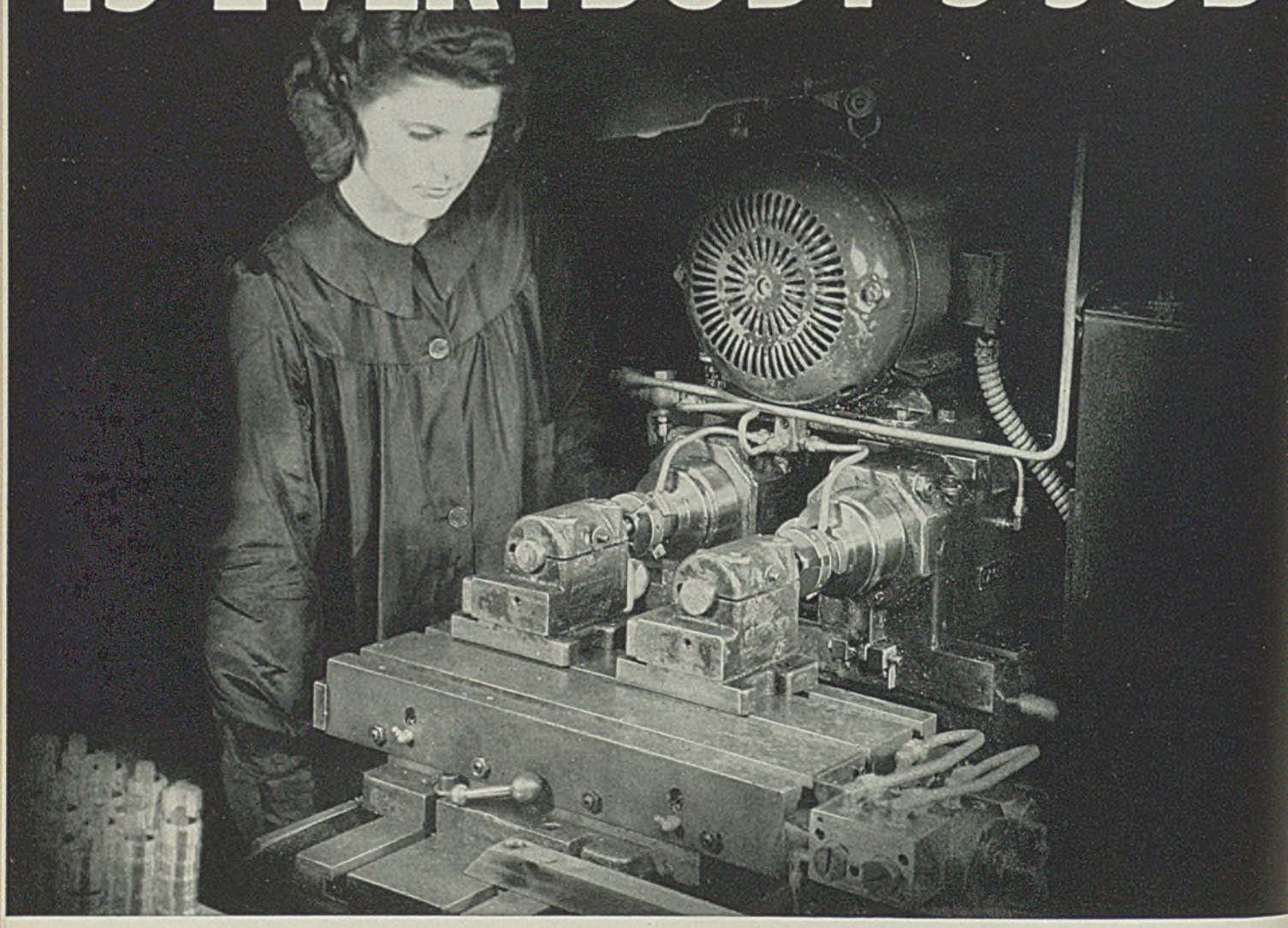
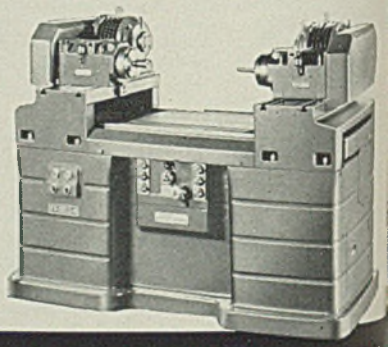
WINNING THIS WAR IS EVERYBODY'S JOB



Thousands of new workers are pouring into factory doors to help produce the billions of dollars' worth of material vitally and immediately needed to win this war . . . sufficient long-experienced operators are just not available . . . it's a time when a modern type of standard machine tool like the Ex-Cell-O Precision Boring Machine can meet the emergency by doing a dual job: its easy control and automatic operating features make it possible to train ordinary operators in an exceptionally brief time to bore, turn, face, groove metal parts to the highest commercial standards of precision in size and finish, with a minimum of operator fatigue; this ease of operation, combined with basically sound engineering design and substantial, rigid construction for which all Ex-Cell-O machine tools are noted, *assures the extreme in production, every hour, every day.*

EX-CELL-O CORPORATION • DETROIT, MICHIGAN

Below: Standard Double-End Ex-Cell-O *Precision* Boring Machine—used for many multiple and progressive operations, on the same part or various parts, to speed up war production.



XLO

EX-CELL-O *means* PRECISION

Precision THREAD GRINDING, BORING AND LAPPING MACHINES
★ TOOL GRINDERS, HYDRAULIC POWER UNITS, GRINDING SPINDLES
BROACHES, CUTTING TOOLS, DRILL JIG BUSHINGS, PARTS

HIGHLIGHTING

this issue of STEEL

PRODUCTION It now is apparent to all that the news about production is on the good side and that the President's goals for 1942 will be met or exceeded. This is indicated by the huge and increasing demand for steel on work bearing high priorities. Last week ingot production was pushed up another half-notch, to 99½ per cent of ingot capacity (p. 45).

But even this rate is not enough. WPB spokesmen last week reported that production of steel in the second quarter is not sufficient to meet all essential demands and that the deficiency will become greater during the second half. They told (p. 42) about the many measures already applied and others in process of development to conserve every pound of steel for the war effort—measures that are going to have drastic effects on many manufacturing operations.

For this reason the subject of conversion of industrial effort to war production is a vital one. Such converting is being speeded up. Last week saw the setting up of the conversion of the industries normally making domestic cooking appliances and stoves other than those operating electrically (p. 44). Even railroad shops (p. 48) are being converted to war work.

In its feature story on conversion STEEL this week (pp. 38-41) describes how one plant was converted from stainless steel beer barrels to oxygen containers for high-flying airplanes.

Otis Steel Co. expansion program has been approved (p. 59); the old Brier Hill plate mill may be moved to the Southwest.

Navy "E" awards (p. 65) and plans such as that of the Packard Motor Car Co. for inspiring competition (p. 68) effectively encourage production at maximum capacity.

Student machine shops at Purdue University have been converted to war production (p. 69).

Alloy iron and steel production will be under WPB melting schedules after June 1 (p. 58).

NEWS WPB has begun decentralizing; 13 regional offices have broad powers (p. 52); it has established a new construction bureau (p. 49); it allows manufacturers of heat-treating furnaces until June 30 to qualify under the Production Requirements Plan; it has restricted use of critical materials in safety devices; it has appointed advisory committees covering industrial instruments, electroplating, large compressors and domestic sewing machines. A revised form of application under the Production Requirements Plan is to be used for third quarter (p. 53).

Many manufacturers find that costs of producing for war are lower than preliminary estimates; they plan to take reductions in contract prices (p. 55).

Iron and steel income is down 26.8 per cent from a year ago, due to higher taxes and costs (p. 70). Carnegie-Illinois Steel Corp. defends its record under the priority system. The steel industry has intensified its long search for a palm oil substitute (p. 69).

Reese H. Taylor is the new chief of the Iron and Steel Branch (p. 43). A. L. Henderson (p. 48) is the new director of the Materials Division.

TECHNICAL Development of procedures for satisfactorily using binary lead-silver solders (p. 74) containing 2.5 to 5 per cent silver places a heavy burden of proof on any user who claims he must persist in using a tin-containing solder.

C. H. Speakman tells (p. 86) how he uses atomic hydrogen welding equipment to repair tool-steel dies. First month's savings pay for equipment, subsequent savings are $6000 or more yearly.

Specially engineered containers reduce shipping costs and damage claims, according to George T. Walne (p. 98). They are constructed of wood, one of the few non-scarce materials.

With the possibility that a few plants may have to handle essential production for an entire industry, the others being converted to war production, a symposium on how to operate a porcelain enameling plant at peak production (p. 108) is timely.

Professor Macconochie discusses (p. 76) important factors involved in raising the efficiency of forging furnaces in Section VIII of STEEL'S series of studies on forgings, forging methods and forging equipment. He indicates that much improvement in forging furnace practice could be made in many forging plants with an important decrease in heating costs.

Strain gages can help in working equipment to its maximum limits without risking breakage, says M. W. Hively, who describes (p. 90) recent gage improvements.

A time meter (p. 92), enables one company to save $3900 by more effectively using existing equipment instead of purchasing additional machines as was first believed necessary.

Reclamation operations at one plant (p. 104) produce 7500 tons of iron and steel briquettes annually, 25,000 gallons of oil, 75,000 pounds of nickel, 35,000 pounds of chromium.

MARKETS OPA last week granted price exceptions which enable some mills to ship to distant points without loss due to abnormal freight charges (p. 135).

Orders for steel products now are not even accepted with priority rating lower than A-1-j. A preponderance of new orders rates A-1-a or A-1-b.

Here is Available Plant Capacity

Contracts or Subcontracts Will Put These Men and Machines into the Fight

Throughout the Middle West are many plants that are available part or all the time for additional war work.

Inland has asked many of these plants with available equipment to prepare brief outlines of their facilities for war work. Some of the outlines are listed below for the purpose of helping these manufacturers make contacts with overloaded "prime" contractors and Government agencies.

Write, or wire, Inland for the names and addresses of any of the following plants. Even if the type of plant you need is not listed, it may pay you to get in touch with us because we have and are continuing to assemble information on additional plants.

IS-28 Mich. washing and ironing machine mfr. emp. 835 workers with complete modern mfg. and shipping facilities. Equip. includes punch presses, welders, benders, bead rollers, cold rolled forming machines, dryer ovens, riveters, sheet rollers, roller levelers, sander discs, slitters, shears, spray booths and complete bonderizing equip.

IS-29 Wis. mfr. of small farm equip. and hardware emp. about 125 men per shift, has approx. 20,000 sq. ft. of fl. sp. plus 11,000 sq. ft. of warehouse. Equip. includes turret and engine lathes, shapers, multiple spindle drill press, many punch and drill presses, external grinders, bulldozers, and wood working equip., blacksmith shop and paint room. Well equipped to machine to reasonable tolerances, and considerable space for floor and bench assembly.

IS-30 Large Iowa mfr. of farm equip. and sheet metal products desires more war work. Facilities include 6, 14" and 16" engine lathes and turret lathes; 15 punch presses up to 90 t.; 3 press brakes up to 3/16"x12'; 2 bulldozers; 5 arc welders; 4 sheet metal shears up to 12 ga. 10'; 11 drill presses up to 30"; complete tool room for dies and jigs; Bonderizing plant; Electro-gal. plant; spray booths and baking ovens; drafting and engineering depts.

IS-31 Wis. stove and range mfr. with over 50,000 sq. ft. of fl. space, emp. 58; has machinery including lathes, shapers, boring mill, presses, brakes, tapping machine, shears, saws, welders, grinders, polishing machines, complete grey iron fdry., core ovens, sandblasting equip., enameling dept. Completely equipped power house. Are financially dependable with ample labor and capable management.

IS-32 Wis. appliance mfr. completely equip. for sheet metal fabrication emp. 1,000, has 500,000 sq. ft. of fl. sp., excellent shipping facilities. Fabricating equip. includes: 129 punch presses (4 to 150 tons), 5 toggle and draw presses, 40 hand folders, 3 box brakes, 5 power seamers, drill presses, power and foot shears, circle shear, metal and wood saws, wire cutters. 30 resistance and 1 electric arc welders. Mach. shop has auto. screw machines, turret, speed and eng. lathes, milling machines, weaving looms, warping machines. Tool room includes: 8 eng. lathes, 3 milling machines, 2 filing machines, 5 shapers, 4 grinders and 1 planer. Plating equip. for nickel, cadmium, chrome and copper including polishing and buffing. Have 3 conveyor and 3 stationary ovens, pressure and spraying tanks, booths and dip tanks, complete porcelain enameling equipment, also cast iron fdry.

IS-33 Large Iowa agricultural hardware and appliance mfr. with 3-acre daylight factory has available punch presses, welders and sheet metal machinery for sub-contracting war work including spot, gun, foot and arc welders, power and hand brakes, power and foot shears, punch, drill and hor. presses, bake oven, spraying booths, rip, cut off, and bank saws, and power hack saws, turning and machining lathes, sanding machines, bulldozers, power hammers, eye benders, shapers, milling machines, radial drills, horizontal and tapping machines, speed and polishing grinders, riveting machines, and air compressors. Plant has available facilities for truck and railroad shipment, incorporated 30 yrs., high financial standing.

IS-34 Wis. steel fabricator of plate and sheet metal products has available 17,000 sq. ft. of production space with equip. including No. 4 vertical punch, high speed power brake, No. 3 shear, 2, No. 6 bending rolls, drill press, and blacksmith forger equip., also air compressor, 11 arc welders, flame cutter, acetylene cutting units, and portable saw rig, 40 productive emp. mfg. dump bodies, frames, chassis parts, rock bodies, etc.

IS-35 Mich. furniture mfr. with over 400 emp. desires contracts or sub-contracts involving sheet metal work. Has modern plant with approx. 8 acres of fl. sp. Equip. includes 7—10', 1—6', 3—4' metal shears, 8—10', 3—8', 1—6', 2—5', 1—4', 1—3' power benders, 17 single action punch presses, 13 inclinable power punch presses, 2 deep gap power presses, 1 arch power press, 38 elec. spot welders, 2 belt sanders, 4 fl. grinders, 3 drill presses, 2 riveting machines, 1 buffing machine, 6 gas welders, 1 arc welder, 1 tumbler, 1 cutting shear, 2 surface grinders, 3 lathes, 2 planers, 3 shapers, 1 milling planer, 3 drill presses, 1 filing mach., 1 screw press, 3 power hack saws, 1 contour saw, and 1 metal band saw.

IS-36 Iowa agricultural mach. and equip. mfr. with 350 emp. working one and one-half shifts, has 96,800 sq. ft. of pl. fl. sp. and two acres available for exp. Transportation facilities from three ry. and six trucking co. Having just comp. Gov. sub-contract work has available equip. including 5 auto. screw machines, 3 bulldozers, 3 hammers, 9 furnaces, 2 forges, 2 forging furnaces, 7 gear hobbers, 13 grinders, 3 key seaters, 22 eng. lathes, 8 speed spinning lathes, 9 turret lathes, 12 milling machines, 7 presses (arbor), 3 draw presses, and 33 drill presses, 10 punch presses, 4 metal saws, 2 shapers, 2 rotary shears, bending roll, bench folder, and sheet shear, threading machines, 5 welders, with complete wood working and misc. mach. shop equip.

IS-37 Wis. toy and stamping mfr. with two factory buildings (300,000 sq. ft.) emp. nearly 1,000, has facilities for war contract work including punch presses (2-ton hydr. to No. 3), cadmium and nickel plating equip., arc, gas, spot and butt welding, spray booths and dipping equip., also complete wood working dept.

IS-38 Large steel furnace mfr. and fabricator of sheet metal products in Iowa with excellent shipping facilities. Total fact. sp. 175,000 sq. ft. including warehouse and storage, emp. nearly 700. Equip. includes 6 power shears, 5 foot shears, 3 special shears, 4 power press brakes, 3 sheet metal brakes, 1 special folder, 8 punch presses, 1 special forming press, 1 special flanger, 3 initial type rolls, 9 riveters, 4 gang punches, 2 bulldozers, 5 sheet metal notchers, 7 single punches, 22 welding machines, 15 drill presses, special machines and pattern shop equip., melting equipment, molding machines, cleaning room and finishing equip. including buffing lathes, 4 spray booths, and a baking oven.

AS THE EDITOR VIEWS THE NEWS

STEEL

May 18, 1942

INDUSTRY'S RECORD WILL BE GOOD; CHERISH IT!

In time of extreme emergency it is the end result which counts. Industrial executives know this; they have experienced numerous instances where management and men have risen to great heights to do the seemingly impossible.

A major breakdown occurs in a manufacturing plant. The superintendent, called out of bed, sizes up the situation and declares everything must be repaired at 8 a.m. -- only nine hours away.

The foremen get busy. The master mechanic cusses at storekeepers who never have repair parts when they are needed. The machine shop foreman blasts the electricians for their delay in restoring power for his machines. Another boss blames the bull-headed pipe fitters for his woes. A fuse blows, the lights go out and everybody fumes until they come on again.

But behind this outward show of confusion and bickering, men have been working at break-neck speed. At exactly 7:28 next morning the master mechanic pronounces everything O.K. The old man's deadline has been beaten by 32 minutes. The headaches and the grief of the few hectic hours are forgotten in the mellow pride of achievement.

The same thing is happening in this nation's war effort. Months ago the President set a goal for 1942 of 60,000 airplanes, 45,000 tanks and 8,000,000 tons of shipping. To date the public has heard much more about wrangling over methods and bitter criticism of slacking self-interest, red tape and wrongdoing than it has about production itself.

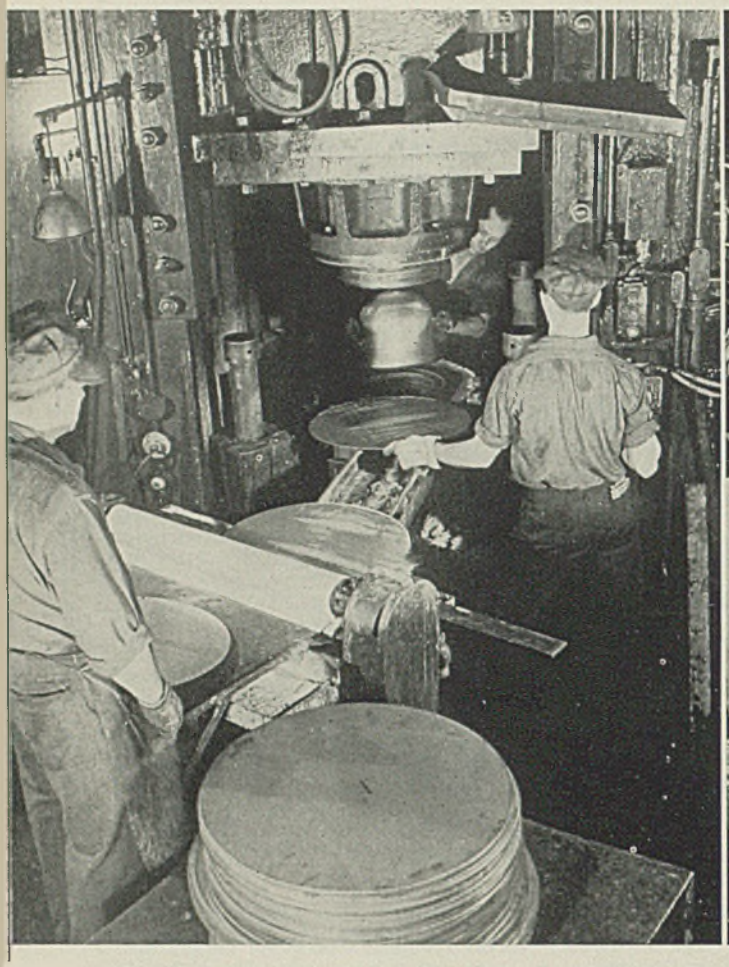
But behind this barrage of invective and recrimination, government and industry have been making great progress. Production is mounting rapidly. The President's goals are going to be met and in some cases exceeded by wide margins. In a comparatively short time it is going to be evident to everybody that American industry has been and is doing a superlative job.

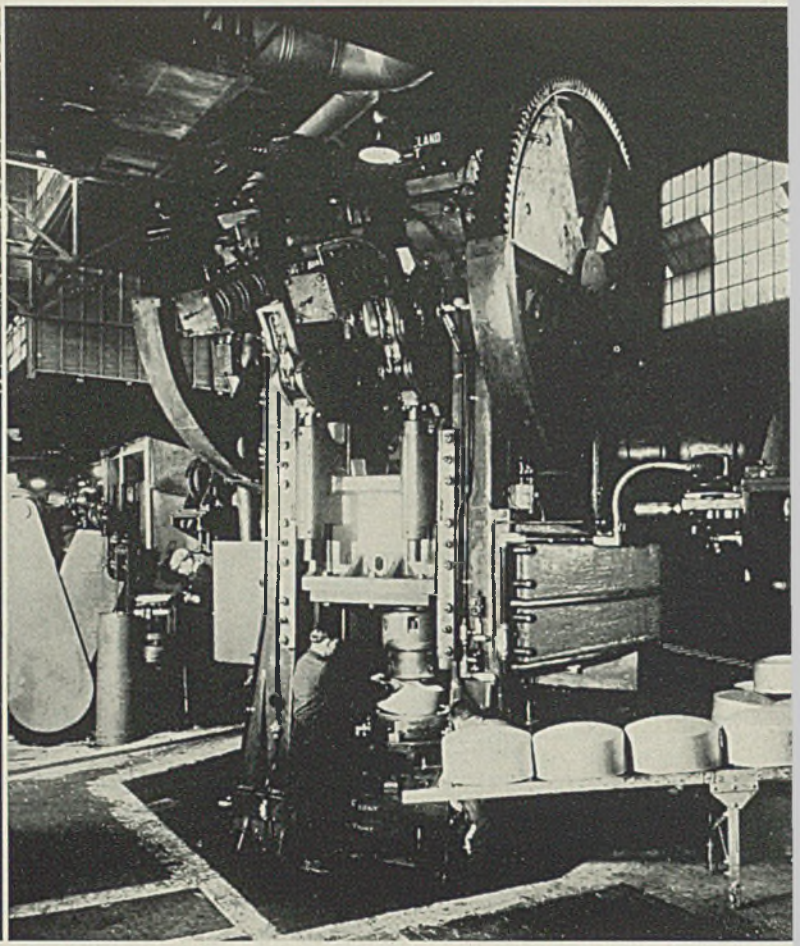
This is not to say that we can be complacent. Greater goals lie ahead. They must be met. But the point is that industry is on the way to establishing a grand record for producing for war.

Every man in industry should cherish this record. Keep it clean. Don't permit it to be marred by ill-advised acts in operations or in public relations.

E. L. Shaner

Editor-in-chief





American Ingenuity

SPEEDS WAR

BECAUSE wire clotheslines are not considered an essential civilian item, John Wood of Birmingham, Ala., is starting to fill orders for 314,000 pokers for army tent stoves. Wood started his wire-products company in 1937 and was prospering. Then came the war, and he realized that when his present stock of wire was gone, there would be no more for him.

So he contacted local officials of the War Production Board's Field Contract Distribution Office (see list, STEEL, April 20, 1942, Section Two, Page 26). No, they had no demand for wire clotheslines, but asked him if he could make stove pokers.

Wood obtained an option on an Army contract for tent stove pokers —20,000 of them. Then he went out, bought a poker and began manufacturing them for 10 cents less per dozen.

He got the contract. A week later, the quartermaster corps awarded him a second contract for 294,000 more pokers. He is planning an output of 3000 a day.

No small manufacturing company need feel it is a "Johnny-come-lately" in war production if it has the special genius of the "P" company. Its usual products were photo-flash synchronizers, special cameras and camera equipment. Last fall the two partners heard that the Signal Corps was interested in buying a quantity of target cameras at a price somewhat less than it usually paid. The partners got their heads together and figured they could produce a camera which could be sold for $70 less than the usual price. A sample camera passed tests and the result was an order for 25.

But with most photo equipment scheduled for inclusion among nonessential products, the sales brains of the company studied the want ads of the local paper and wrote persuasive sales letters to manufacturers who had advertised for "lathe hands". The letter pointed out that the "P" company not only had the lathe hands but also the necessary machines and the supervisory "know how" . . . . "It would be easier for you to let us worry about your present labor shortage," began one portion.

The letter brought in subcontracts from an airplane builder and from a manufacturer of signal equipment. Successful completion of one order amounting to over $3000—sizable enough as a starter for a small shop —later brought in over $20,000 worth of war work.

Some direct selling of a number of government buying agencies resulted in a small order for the machining of a nickel-steel spray valve, drilling small holes as well as boring, reaming and finishing to extremely close tolerances. Since the steel contained some 30 per cent nickel, the firm lost money from excessive wear on bits and drills, but it proved that it could handle a tough job as well as the easier ones —and later obtained a good volume of subcontracts for other machine work.

A sales letter written to a prime contractor making anti-aircraft guns and other war equipment brought the plant's war work up to 90 per cent of its total capacity. The letter pointed out the necessity of

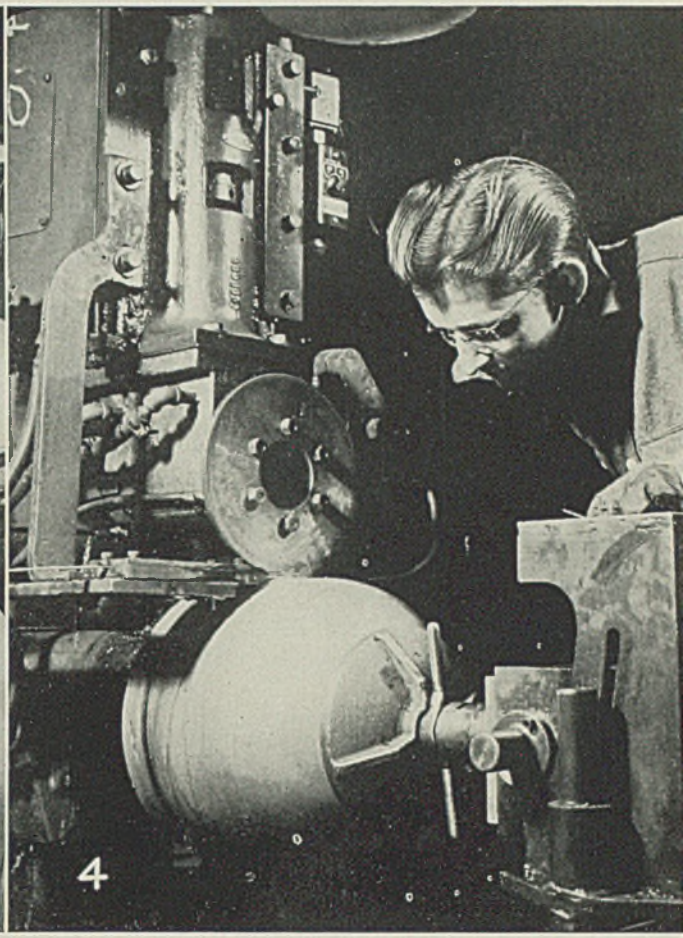


Fig. 1—First step is to stamp out the stainless steel disks seen in the foreground. As they are fed to this 750-ton toggle press for the first draw, drawing compound is applied by passing them between the rollers

Fig. 2—Second operator (right) in Fig. 1 feeds disks into press and operates the controls. A third man stands back of the press and removes the formed half-shells which he places on a conveyor, the delivery end of which is shown here. In a second press, shown here, the shell-forming operation is completed by a second draw

Fig. 3—Now the half-shells proceed to a third press in which they are trimmed to exact dimensions and the hole for the valve is punched in the end. Now the cylindrical domes are ready for application of the reinforcing straps. All photos from Office of Emergency Management, by Palmer

Fig. 4—Four major welding operations are involved in making these shatterproof containers. In the first, the spirally wound reinforcing strap is applied by electric resistance seam welding as is shown here. The dome rotates between two wheel-type revolving electrodes—one inside the sheli, the other outside—while the strap is wound on through the guide at left. The longitudinal straps are applied to each half-shell by a similar operation before the two halves are joined

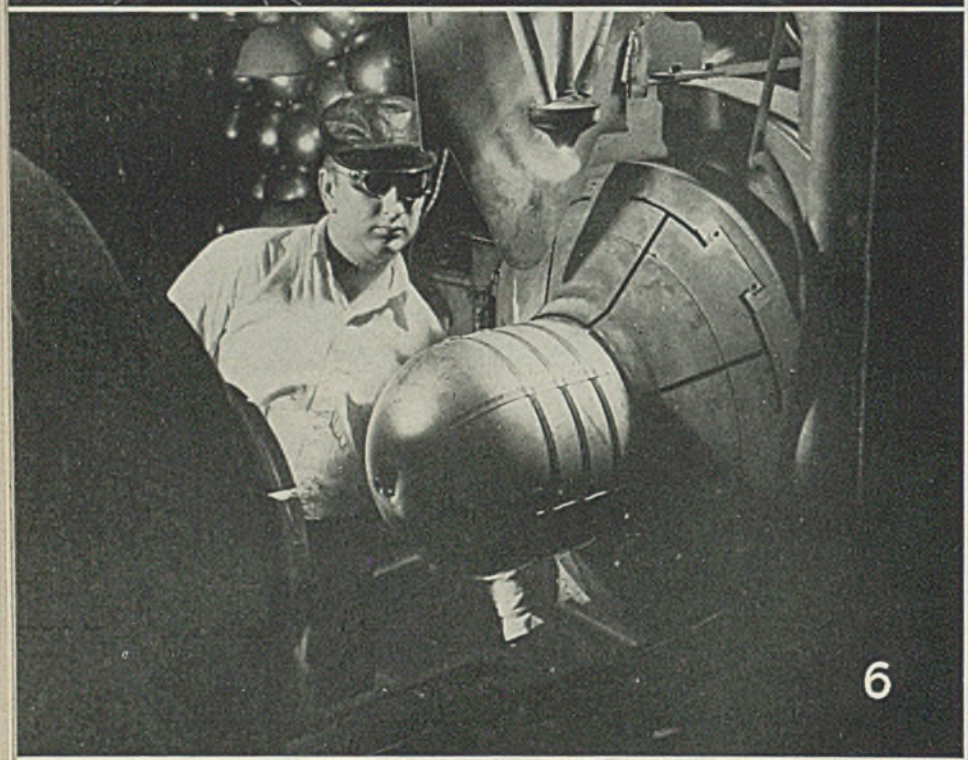
PRODUCTION

. . . . by applying its highly developed sales and engineering services to the problem of converting its manufacturing facilities to war production work. Plant converts from wire clotheslines to stove pokers, another from cameras to anti-aircraft fire-control instruments, still another from beverage containers to shatterproof oxygen cylinders for high-altitude bombers

more production NOW and quoted Army officials to that effect. In addition to this timely and potent sales attack, the company had "war work" references to offer both as a subcontractor and, in a small way, as a prime contractor.

Today it is machining a score or more of items of bronze, brass and steel including bushings, cam pins, screw shafts, couplings and the like for fire-control instruments for anti-aircraft guns. Its chief worry now is how to maintain its staff of experienced workers but it is already tackling the problem of training new hands. One of those being trained is a bright young girl who enjoys working in an overall and shop apron.

Another conversion involved developing a new design of product and methods to produce it which would allow shifting from peace to war work without creating unemployment and without requiring new machines. The story behind the actual production work goes back many months to the time when engineers of a company making beverage containers of stainless steel began to seek the answer to the problem of how to make an oxygen cylinder that would not explode



when pierced by a bullet.

Such cylinders are essential for high altitude bombers and fighters. The British have shown us that modern bombing and fighting technique at altitudes from 18,000 to 35,000 feet is most desirable, yet 18,000 feet is the absolute ceiling at which a man can breathe normally. While a plane flying at 20,000 feet is above bad weather conditions, the temperature drops to about 10 degrees below zero, the air pressure to only 6.7 pounds per square inch, and a man can remain conscious for no more than 10 minutes without the aid of oxygen.

But tests on conventional oxygen cylinders containing oxygen at 400 pounds per square inch showed that when pierced by a bullet this oxygen caused the containers to explode with as disastrous a result as a direct hit from a powerful anti-aircraft weapon. A safe cylinder that would not explode when punctured and yet would be light in weight was demanded. The engineers found a way to do the job.

As will be seen in the accompanying series of illustrations, the cylinder is formed by welding together two deep drawn cups. It is reinforced by a heavy spiral strap which winds around the outside. Longitudinal

☆

Fig. 5—After the spiral straps are welded, the half-shells are run through this operation in which rough edges of the strap and the accumulated weld scale are removed by twin rotary brushes, one working on the outside of the dome, the other on the inside as shown here. The operator turns the shell against the guide at the left which steadies the work

Fig. 6.—Second major welding operation is welding on the longitudinal straps. Third is welding on the end fittings. Fourth, illustrated here, is joining the two half-shells by means of an automatic atomic-hydrogen welding machine. Note the big "chucks" which grip each of the half-shells and center them for the welding operation. The automatic welding head can be seen raised immediately above the work here, while the near "chuck" has been opened and run back to expose the cylinder

Fig. 7—Once the two halves are joined together, all traces of inside weld scale are removed by pickling. This is followed by a passivating operation. Special chemical solutions are drawn through the cylinder at a controlled temperature

straps also are used. The straps are spot welded to the drawn stainless-steel half-shells before they are welded together to form the cylinders. This provides a vessel that is strong enough to hold the oxygen under high pressure and also one that will not shatter when punctured.

In order to pass Army standards, not one but 10 out of 12 containers must withstand rupture by a tumbling bullet. The cylinders exceed these requirements. Once the cylinder had been developed and accepted, the task of setting up a production line was begun by arranging to transfer over to this war product a line that formerly produced stainless steel beverage containers. The huge 750-ton toggle presses were rearranged to form the spherical domes that constitute the cylinder half-shells. Elaborate automatic welding equipment was quickly adapted to the intricate welding operations required. Baths were designed containing chemical solutions that act as passivating and purifying agents. Ingenious physical and pressure tests were devised to make certain the product met all requirements.

On the same day that the last beverage container for civilian use rolled off the production line, more than 300 skilled workmen began to make this important aircraft accessory. No time was lost by the workmen, and no production was lost while the equipment was being changed over. No new machines were required. Thus this plant shifted to war production on a large scale without creating any unemployment.

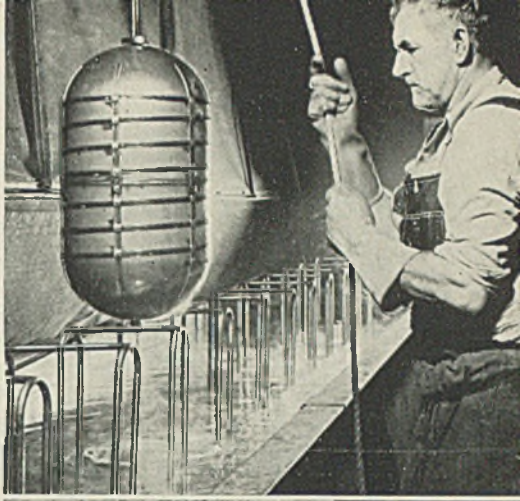
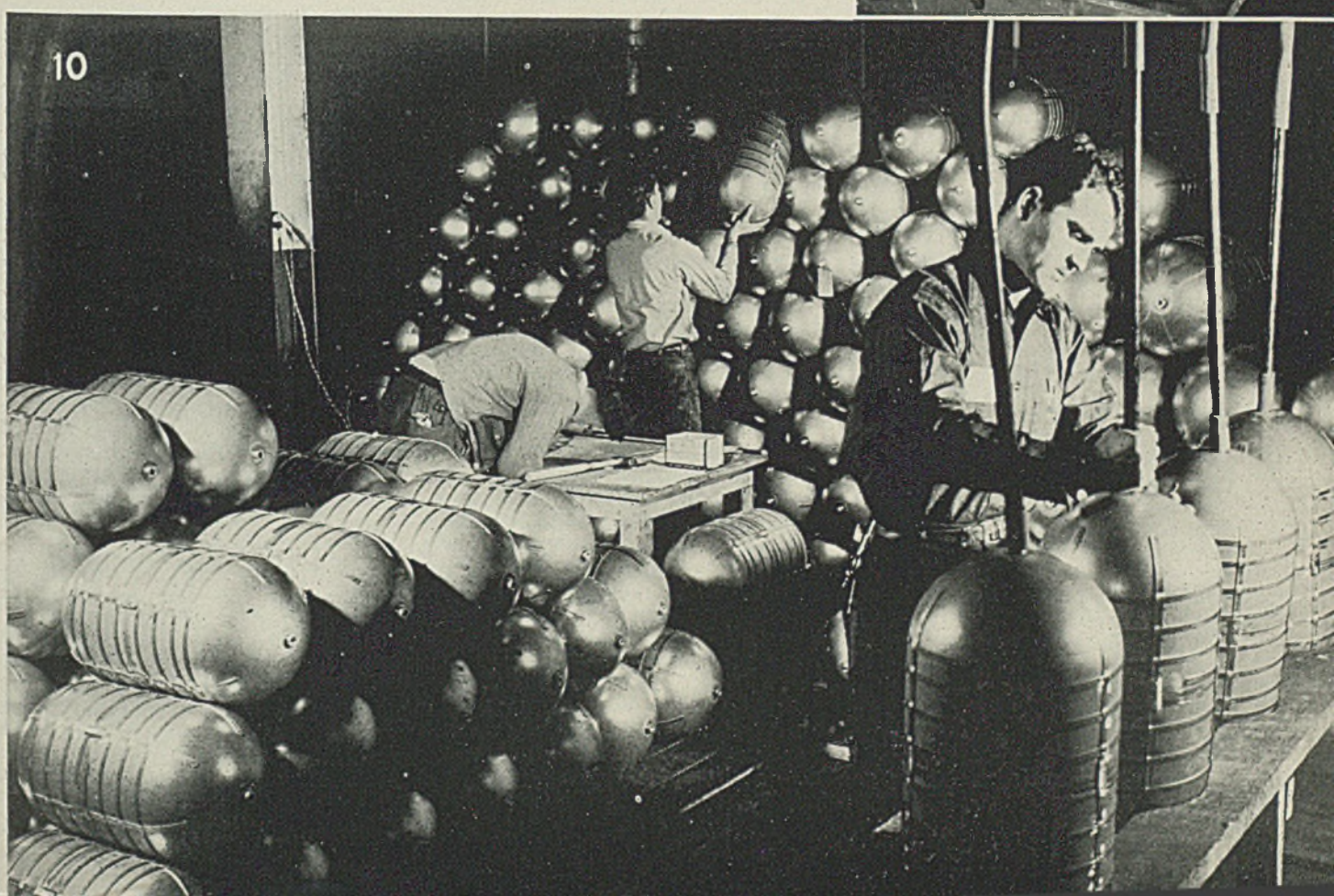


Fig. 8—Great care is taken to see that all foreign matter is removed from the interior of each cylinder. The passivating and cleaning operations include a sequence of rinses, the end result of which is an interior and exterior that is mechanically and chemically clean with a satin-like surface that is sterile, permanent and immune to attack by corrosive or other deteriorating elements

Fig. 9—Every cylinder off the production line is hydrostatically tested at a pressure of 800 pounds per square inch—twice normal working pressure. This checks the strength of the welds. It is then given a leakage test using air at a pressure of 400 pounds per square inch. Here the operator is placing a cylinder in a steel tank filled with water, after which the air pressure will be applied. Then the inspector will rotate the cylinder by means of a hand crank while he carefully examines the joints for air bubbles

Fig. 10—After they have passed all inspections, hot air is blown through the cylinders to remove all traces of moisture that may remain, using the setup at the right here. The cylinders then are sealed, left, and piled into stacks, center, ready for shipment



Rated Steel Demand In This Quarter "117% Over Maximum Production"

✦

Direct war load taking two-thirds of output . . . Requirements will increase during second half of year . . . WPB Iron and Steel Branch experts warn more civilian items are to be added to prohibited list

✦

ESSENTIAL requirements for steel during the current quarter are exceeding production and the deficiency will increase during the second half of the year.

This was emphasized by WPB Iron and Steel Branch officials last week in two meetings called to explain the provisions of the iron and steel conservation order, M-126, to manufacturers. The meetings were held in New York, May 12, and in Chicago, May 13. A third is scheduled in San Francisco, May 18.

Manufacturers were told that the use of iron and steel soon will be prohibited in a long list of items in addition to the more than 400 listed in the original order (STEEL, May 11, p. 59).

Charles Halcomb, assistant chief of the branch, analyzed the iron and steel situation as follows:

"The direct war load, that is for Army, Navy, Maritime Commission and lend-lease, will take 66 2/3 per cent or more of production.

"Allocation programs such as for farm machinery, mining machinery, domestic railroads, other exports—meaning Canada and the Board of Economic Warfare—cut to the absolute minimum will require 14 per cent.

"Industries vitally essential to the war program, such as defense plants for aluminum, steel, rubber, high-octane gasoline, etc., will require 18 per cent of production.

"This means a total of 98 2/3 per cent of the maximum production for this quarter for these three groups.

"In addition, there is demand for other groups of industries carrying ratings of A-10 or higher, but which are not considered as important as the groupings listed, asking for an additional 18 per cent of the steel produced. In other words there is a total rated demand for steel products of approximately 117 per cent of maximum production.

"During the second half of the year there will be a further increase in demand for the direct war load. The Maritime Commission by cutting down time on ways expects to step up requirements for steel by at least 50 per cent.

"There will be more plants, some new ones being built, others being converted, which will be in assembly line production. All over America every possible machine will be chewing up steel at a steadily accelerated rate.

Two Methods of Control

"The situation which I have outlined, made it mandatory for the Iron and Steel Branch to do two things:

"1. Set up a strict control of the production and distribution of every pound of iron and steel through a system that is somewhat analagous to that of bank credit. By means of this control each program will know in advance how much it can have of various types of products, and it will gear its production accordingly. We are down to cutting a piece of pie which is not large enough to satisfy all demands.

"2. To prohibit, through order M-126, the use of one pound of iron or steel for any purpose that is not directly connected with, or vital to, the successful conduct of the war.

"The question today is not 'what civilian uses of iron and steel can be saved?' It is 'what war uses that were considered necessary in the past can be dispensed with today to provide the steel which is necessary for the immediate requirements of the battle front?'

"Offensives are being planned. To make them successful we cannot waste a pound of iron or steel."

Mr. Halcomb traced the development in the pinch in steel supply which he said started in July, 1941, resulting in the original steel order, M-21, being issued in August. As late as Oct. 30, however, only 60 per cent of steel production was being used on ratings of A-10 or higher.

"By Jan. 30, the effect of Pearl Harbor resulted in bringing 90 per cent of steel production capacity into the classification of A-10 or higher.

"This raising of ratings created the necessity for allocation of steel plates when the demand of the A-1 group exceeded the plate-producing capacity. In November, the capacity of mills that were normally classified as plate mills was approximately 550,000 tons, whereas the demand for plates was more than 50 per cent greater.

Strip Mill Conversion Helped

"In the past five or six months conversion of continuous strip mills has resulted in the production of an additional 500,000 tons of plates.

"The war program, as it is now called, instead of the defense program, has brought about a noticeable dislocation in requirements for types of steel, such as plates, reinforcing bars, mechanical tubing, and structural shapes. As most steel mills have approximately 35 per cent more finishing than production capacity, this change, due to the war program, has meant that certain finishing capacities must operate at their maximum, and consequently other finishing capacities, which made types of steel primarily for civilian purposes, can either not operate at all or only operate on greatly reduced schedules.

"To insure the flow of ingots to the types of finishing capacity required by the war program, the Iron and Steel Branch, on March 7, 1942, issued instructions to all steel producers that priority ratings must apply to the ingot. This meant that some types of material having less important ratings cannot be produced unless finishing facilities carrying orders with higher ratings

are working to their absolute maximum capacity.

"The latter part of January saw the introduction of a large number of limitation orders, the purpose of which are to conserve critical materials needed for the war program. It was felt that the most logical way to bring about this conservation was to eliminate the use of these critical materials in the production of all products that did not advance the war program. Another reason was the need for converting production facilities, such as automobiles, refrigerators, washing machines, to war production.

Situation Tighter Each Month

"About Feb. 1 new programs were instituted by the various services, particularly the Army, Navy and Maritime Commission, and it became apparent that the use of iron and steel products would have to be limited absolutely to essential items. The demands from these three branches alone had reached a figure 3½ times that required by them in October, 1941.

"By the end of March, even with limitation orders still tightened and more allocation programs in operation, the demand for some products for vitally essential needs was in excess of capacity.

"For instance on steel plates the actual requests for shipment in April were 150 per cent of the capacity to produce even though that capacity was practically double what it had been in October.

"This meant that the Army, Navy and Maritime Commission and other heavy users of plates had to make very careful studies of their schedules and decide what orders were most important.

"Even between these groups there was competition as to what service needed the plates most.

"To provide for the increasing needs of the Army, Navy and Maritime Commission certain essential programs such as domestic railroads, farm machinery, petroleum, had to be revised downward.

"The Board of Economic Warfare drastically cut its requests. Requirements scheduled by the Army and Navy and Maritime Commission have been carefully reviewed to eliminate inventories."

Despite these measures, Mr. Halcomb concluded, there still is a deficiency in steel supply.

E. Barrett Mason, priority specialist for the branch, said the list of 400 items in M-126 was not all-inclusive. "We are now preparing a list of additional products which will be included in this order."

Mr. Mason told how the branch had been working with the Army, Navy and Maritime Commission to change their specifications to conserve steel wherever possible.

Reese H. Taylor

Reese H. Taylor, former president of the Consolidated Steel Corp., Los Angeles, has been appointed chief of the WPB Iron and Steel Branch.

He succeeds C. E. Adams, chairman, Air Reduction Co. and the United States Industrial Alcohol Co., who has resigned after serving since Dec. 11.

Mr. Taylor resigned as president of Consolidated Steel in 1938 to accept the presidency of the Union Oil Co.

"Furthermore, we have undertaken aggressive action against the unnecessary accumulation of steel inventories. New construction projects for the new synthetic rubber program and all other construction projects have been rigidly stripped of the unnecessary use of steel.

"We in the Iron and Steel Branch have also issued a new order restricting the sale of steel by producers to ratings of A-10 or higher. This in itself will prohibit the sale of steel to industries which are considered unessential to the war program . . .

"Steel requirements of the railroads have been cut down to one-third the quantity originally considered necessary. The farm machinery program has been cut down by more than 50 per cent, and the use of steel by the petroleum industry has been drastically curtailed except for the aviation gasoline program."

Edwin S. Addis, administrator of M-126, promised that appeals from the order's provisions would receive prompt and careful consideration. Field offices of the WPB will act as receiving, form checking and forwarding agents for the administrator, although the latter will make all decisions on appeals.

"In administering the order," said Mr. Addis, "we shall strive to carry out its underlying purposes —conservation of iron and steel and conversion of the metalworking industry to military and essential civilian production. Therefore, any person who files an appeal under Order M-126 must be able to answer the question, 'How would granting this appeal further the war effort?'

"Furthering the war effort is the goal of M-126, and furthering the war effort will be the only standard for considering appeals."

"Sacrifices Not in Vain"

Arthur Harris, assistant chief, Bureau of Priorities, said that in considering an appeal from a manufacturer who wants to complete assembly of inventory on hand, the WPB will place great emphasis on the question of conversion to war work.

"There have been some concerns who have processed large inventories in anticipation of a pending limitation order hoping to get subsequent preferential treatment on an appeal."

Mr. Harris said the WPB does not wish "to condone past violations by granting appeals" or to give any manufacturer an advantage over his competitor.

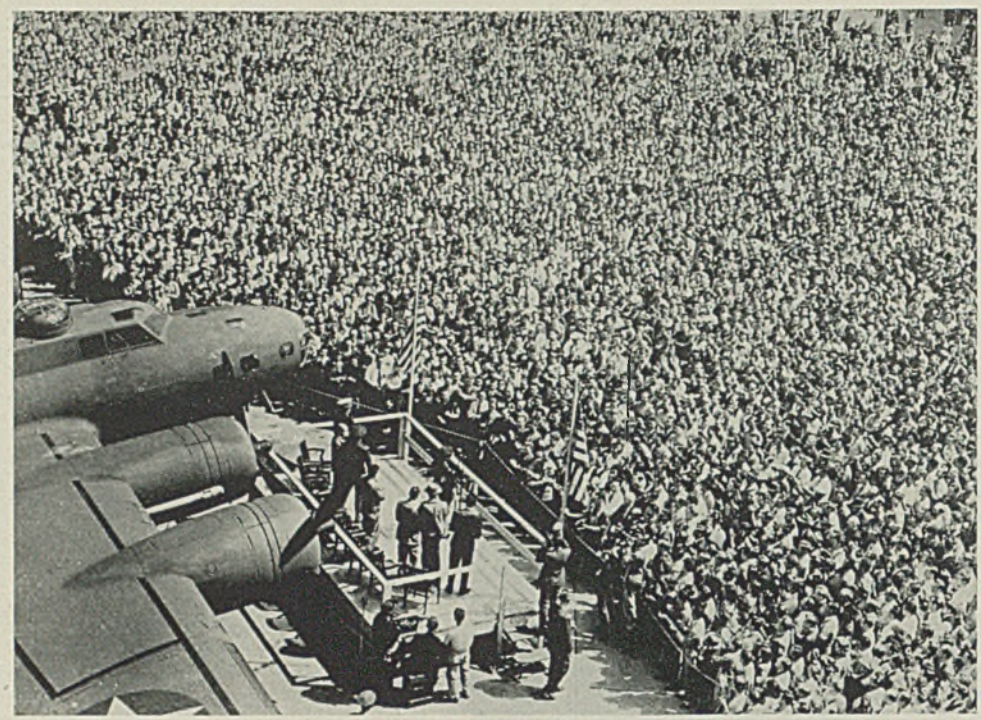
Major Charles Garcide, Army-Navy Munitions Board, assured the manufacturers: "We are not asking industry to make this sacrifice to the end that we may squander steel. You may be certain that no products for the armed services will be made of steel if any other material can be used.

"We assure you that your sacrifices will not be in vain. If you give up the manufacture of non-essential items and convert your genius, your talents, your men and equipment to war production, we shall not let you down."

American Bridge To Build Special Craft for Navy

American Bridge Co., Pittsburgh, has been awarded a Navy contract for construction of special-purpose craft, L. A. Paddock, president of this United States Steel Corp. subsidiary, announced last week.

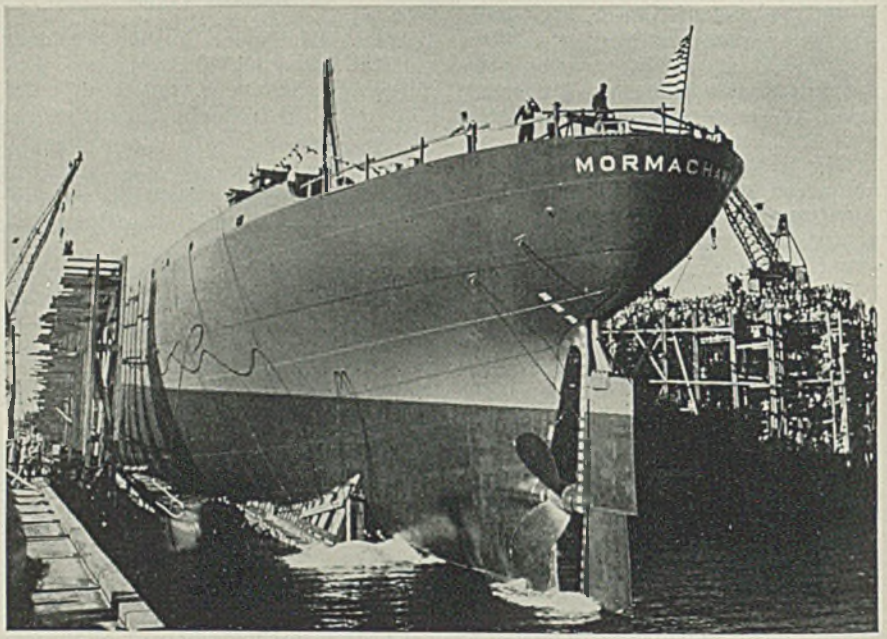
A modern plant for fabricating hulls, including facilities such as shops, warehouses, fitting-out docks and office buildings, are under construction in the Pittsburgh district. Estimated to cost $8,500,000, it will be owned by the Navy and operated under lease by American Bridge.



Action on West Coast

A FLYING FORTRESS (left) just off the assembly line, provides the background for a celebration at which Boeing Aircraft Co. workers in Seattle cheer Capt. Hewitt T. Wheless, air hero recently cited by President Roosevelt in a national broadcast

FIRST of a long line of sister ships to be built at Consolidated Steel Corp.'s Wilmington, Calif., shipyard, the S. S. MORMACHAWK, below, slides down the ways stern first. The vessel is a C-1 type cargo and passenger ship, 417 feet long, displaces 12,900 tons and has cargo capacity of 9000 tons. NEA and Boeing photos



Large Stovemakers "Converted"; Small Units Carry On

WASHINGTON

ADOPTING for the first time the principle of "concentration of production", WPB last week ordered an end to the manufacture of domestic cooking appliances by large producers after July 31. Smaller companies will be permitted to make a limited number of simplified and light-weight models for civilian use.

The order, L-23-c, effective May 15, thus releases the facilities of the larger firms for war production and permits the essential civilian needs for cooking and heating stoves to be met by the smaller firms. In addition, about 350,000 tons of iron and steel, on an annual basis, will be conserved for war needs.

Another unusual feature of the order is the designation of 39 "labor shortage areas" in 15 states. Any firm—large or small—located in these areas must discontinue production of cooking and heating stoves after July 31.

The order covers the entire domestic cooking appliance industry (except electric), and the entire heating stove industry (except electric), and establishes these three classes of manufacturers:

Class A—Those whose factory sales value for the year ended June 30, 1941 totaled $2,000,000 or more.

Class B—Those whose factory sales in the same period totaled less than $2,000,000, and who are located in labor shortage areas.

Class C—Those whose sales in the same period totaled less than $2,000,000 and who are *not* located in labor shortage areas.

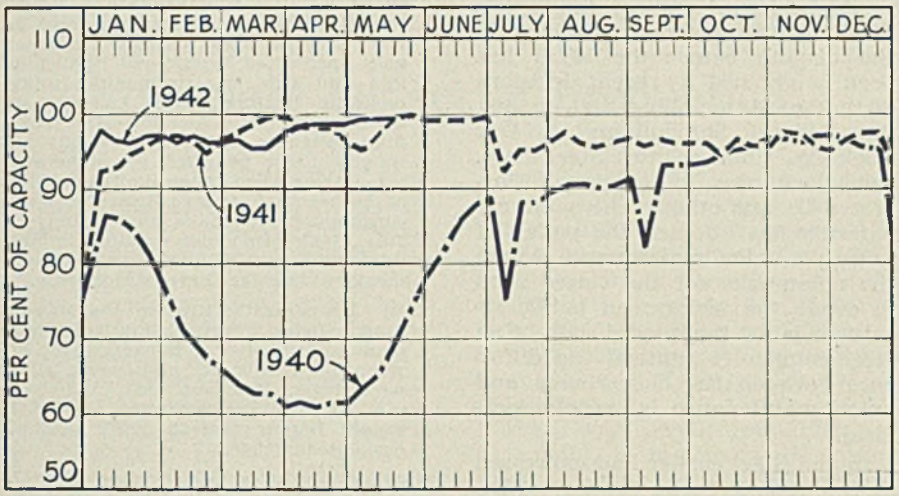
In each case, the factory sale value applies to both domestic sales and exports.

The requirement that all firms in tight labor markets discontinue production in order to relieve a severe labor situation, together with the cessation of stove production by the larger companies is expected to release about 25,000 workers for war industry. The industry as a whole includes a total of 245 companies, normally employs 35,000 persons.

Canmaking Plant Closed Due to Tin Shortage

Continental Can Co. announced last week closing of its Oil City, Pa., can works due to tin shortage. The plant, a small unit devoted exclusively to production of oil cans, will shut down May 27, according to J. R. McManus, manager. Employes and their families will be moved to other company operations.

There is a possibility that the plant will be converted to some kind of war work later, for company does not intend to abandon it, the manager stated.



PRODUCTION . . . . Up

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week was up ½-point to 99½ per cent. Four districts advanced, four declined and three were unchanged. A year ago the rate was 99½ per cent; two years ago it was 70 per cent, both figures computed on the basis of capacity as of those dates.

Chicago — Declined ½-point to 105 per cent as open-hearth repairs became necessary. Two mills increased production, one held steady and three were slightly lower. Scrap supply has improved but is sufficient only for current needs.

Buffalo — Withdrawal of one open hearth by Republic Steel Corp. reduced the rate 2½ points to 90½ per cent. Thirty-nine of 43 open hearths are active.

Cincinnati — One open hearth was taken off for repairs, the rate dropping 4½ points to 84½ per cent. A higher schedule is expected this week.

Central eastern seaboard — Unchanged at 95 per cent.

New England — Completion of furnace repairs and improved scrap supply lifted the rate 7 points to 100 per cent.

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

Pittsburgh — Advanced ½-point to 96 per cent as scrap supply became larger.

Wheeling — Receded 1 point to 81½ per cent.

Detroit — With only one furnace idle for repairs the rate advanced 6 points to 96 per cent, the highest level since November.

Cleveland—Addition of two open-hearths increased operations 6 points to 94½ per cent.

St. Louis — Steady at 93½ per cent, the same as the prior week's revised rate.

Youngstown, O.—With 74 open hearths and three bessemers in production the rate continued at 94 per cent for the fourth week. Nine furnaces are idle, two because of lack of scrap, though supply is better. Schedule for this week will be unchanged.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended May 16	Change	Same week 1941	Same week 1940
Pittsburgh	96	+ 0.5	99	65
Chicago	105	— 0.5	102.5	70
Eastern Pa. ...	95	None	95	60
Youngstown ..	94	None	95	54
Wheeling	81.5	— 1	88	88
Cleveland	94.5	+ 6	95	72
Buffalo	90.5	— 2.5	93	53.5
Birmingham ..	95	None	95	83
New England..	100	+ 7	100	56
Cincinnati	84.5	— 4.5	92.5	61
St. Louis	93.5	None	98	47.5
Detroit	96	+ 6	88	80
Average	99.5	+ 0.5	*99.5	*70

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

Carnegie-Illinois Breaks More Records

Three production records were established in the week ending May 9 by Carnegie-Illinois Steel Corp. plants in the Chicago district. Ingot production by the two plants was almost 500 tons greater than the previous high, made in the second week of April, and represented production at 109.8 per cent of rated capacity. At Gary Works open-hearth ingot production was more than 700 tons greater than the previous high mark made during April, representing 112.3 per cent of capacity. South Chicago Works No. 4 open-hearth department made a new high, breaking the record made in the week of March 21.

Pittsburgh Iron Output Cut by Two Idle Stacks

Pig iron output in the Pittsburgh district will be slightly lower during the next few weeks as a result of two stacks being taken off. Eliza No. 4 of the Jones & Laughlin Steel Corp. is idle following an accident, the lining giving way below the taphole. Repairs are being expedited to return the stack to service as soon as possible.

Duquesne No. 4, of Carnegie-Illinois Steel Corp., was blown out May 9 for a patch and will be idle about three weeks. All other stacks in the district are blowing.

Some curtailment in open-hearth output may result from these stacks being down, though scrap supply is sufficient at the moment to make up the deficiency in pig iron.

600-Ton Ojibway Stack Moved to Sidney, N. S.

Shells of three hot blast stoves, a dust catcher and one stack, which have been standing unlined for many years at the plant of the Canadian Steel Corp. Ltd., Ojibway, Ont., have been dismantled and shipped to the parent company, Dominion Steel & Coal Corp., Sydney, N. S., for assembly.

This stack was one of two 600-ton furnaces built in the early twenties by the United States Steel Corp., but never completed because of unfavorable tariffs. Site and partially completed plant were sold to the Canadian Steel Corp.

Westinghouse War Output 60 Per Cent Above 1941

Officials of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., disclosed recently that production of the company's works there for the first quarter of 1942 was 60 per cent ahead of the same period last year. The announcement was made at a meeting which launched a labor-management co-operation drive.

Output of war goods was reported to be two-thirds higher than last year. Payrolls are up 48.3 per cent, while the plant employs 24.4 per cent more workers. Thus far, 1100 men have left the plant for the armed services.

LABOR

Exclusive Bargaining Elections Underway in U. S. Steel Plants

National Labor Relations Board elections on the question of exclusive bargaining rights started May 12 in plants of subsidiaries of the United States Steel Corp. Present contracts between the corporation and the Steel Workers Organizing Committee grant the union bargaining rights for its members only.

Several months ago the union asked the NLRB that the elections be held in an effort to make the bargaining rights exclusive. The elections, which were consented to by the corporation, will be the largest series ever undertaken by NLRB. They will extend into June.

Early returns indicated union victories, often by heavy majorities.

Inland Steel May Submit Union Security Issue to Stockholders

If the National War Labor Board issues a directive order to Inland Steel Co. to sign a maintenance of union membership contract with the Steel Workers Organizing Committee, the company may submit the question of compliance to the stockholders. This was revealed by Clarence B. Randall, vice president, in a recent Washington press conference.

Probability that such an order would be issued against the "Little Steel" companies now involved in the dispute before the WLB has been heightened by recent decisions of the board, including that against the Federal Shipbuilding & Dry Dock Co., United States Steel Corp. subsidiary, the International Harvester Co. and others. The board apparently has adopted the policy of granting union maintenance where the union asks for the closed shop to evade the widespread public reaction against the "closed shop." The steel companies contend the difference between the closed shop and union maintenance is largely technical.

Inland Steel earlier had expressed its intention to resist the imposition of union maintenance by board decree (STEEL, May 4, p. 65).

Farm Equipment Workers Turn To Caterpillar and Deere & Co.

Having achieved a "maintenance of membership" directive from the War Labor Board against the International Harvester Co., the CIO-Farm Equipment Workers last week moved toward the Caterpillar Tractor Co. and Deere & Co.

From the former the union is asking a 10-cent hourly wage increase, union shop and higher bonuses for night work. In the plants of Deere & Co. the union is launching an "all-out organizing drive" and asking wage increases.

REVISIONS AND ADDITIONS TO

PRIORITIES – ALLOCATIONS – PRICES

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

"M" ORDERS

M-9-a (Amendment): Copper, effective May 7, 1942. Limits shipments of brass mill, wire mill and foundry copper products to orders rated A-1-k or higher, unless authorized by Director of Industry Operations. Amendment to M-9-c, effective May 7, prohibits use of copper and its alloys in additional hundred-odd civilian products; curtails other uses after June 15.

M-9-b (Amended): Copper Scrap, effective May 9, 1942. Adds ingots to restrictions of order. Foundries melting scrap or ingots file PD-459 by 10th each month with WPB.

M-21-a (Amended): Alloy Iron and Alloy Steel, issued May 11. Effective June 1, 1942, restricts filling of orders to A-1-k or higher ratings except for certain National Emergency and other low alloy steels, which take A-3 or higher ratings. Buyers must describe end-use of material ordered. Producers melting 4000 or more pounds of chromium and 500 pounds of nickel monthly file PD-391, PD-391-A and 440 with WPB monthly.

M-60 (Amendment): High Lauric Acid Oils, issued May 11. Permits limited use in manufacture of edible products from June through September.

M-115: Collapsible Tubes, issued May 11. Directs retailers to dispose of used collapsible tin, tin coated and alloy tubes to the Tin Salvage Institute, 411 Wilson, Newark, N. J., or to other duly authorized representatives as agents for Metals Reserve Co.

M-148: Exports of Critical Material, effective May 12. Gives preference to exports of critical materials to other American Republics, within limitations of specific allocations by Requirements Committee of WPB, over other orders for such materials to extent necessary to meet delivery schedules set by board of Economic Warfare and WPB.

"L" ORDERS

L-23-c Stoves, Ranges, issued May 14. Prohibits production after July 31 by manufacturers with factory sales of $2,000,000 or more in year ended June 30, 1941, and by smaller makers in specified labor shortage areas. Effective May 15, small makers not in labor shortage areas permitted to make only "permitted types" and limited in iron and steel use in manufacturing domestic heating stoves to 50% of base period rate, for domestic cooking appliances to 70%. After July 31, weight of iron and steel per stove and per coal or wood range limited to 70% of base period average. Iron and steel consumption to make stoves Jan. 1-July 31 by companies required to quit production July 31 limited to six times monthly average base period rate.

L-30 (Amendment): Kitchen and Household Articles, effective May 9. Permits manufacture of coat hangers made of wood or cardboard and using steel wire hook. Removes restrictions on use of joining hardware, provided weight is not more than 5% that of completed article.

L-111: Hand Trucks, effective May 7, 1942. Eliminates all but most essential uses of rubber tires on hand trucks. Where industrial hazards make rubber tires necessary, buyer must certify to use of such trucks.

L-114: Safety Equipment, effective May 5, 1942. Use of scarce materials in manufacturing such equipment prohibited, except on orders rated A-2 or higher if made from parts manufactured prior to May 5 or for certain specified parts, or within 90 days of May 5 for delivery to Army, Navy or Maritime Commission.

"P" ORDERS

P-19-e (Amendment): Road Projects, issued May 9. Permits application of ratings to material to be used in temporary construction, also to construction materials, including perishable tools and explosives.

P-109 (Amendment): Aircraft Products, effective May 8, 1942. Permits suppliers to use A-1-a rating for operating supplies necessary in processing aircraft parts furnished on ratings assigned by the order, limited to 10% of cost of material from which product is made.

PRICE SCHEDULES

No. 4 (Amendment)—Iron and Steel Scrap, effective May 18. Provides that shipments of mixed grades of scrap shall take a maximum price of that of the lowest priced grade in the shipment. Exempted are shipments involving vessel movements if grades taking different prices are segregated.

No. 6 (Amendment)—Iron and Steel Products, effective May 2. Grants certain exceptions to the schedule to South Chester Tube Co., Chester, Pa.; Sheffield Steel Corp., Kansas City, Mo.; Colorado Fuel & Iron Corp., Denver; Seneca Wire & Mfg. Co., Fostoria, O.; and Follansbee Steel Corp., Pittsburgh.

No. 20 (Amendment)—Copper and Copper Alloy Scrap, effective May 21. Revokes special purpose premiums granted to certain scrap users. These premiums replaced by special use premiums in the revised schedule as amended.

No. 139—Used Household Mechanical Refrigerators, effective May 18, 1942. Establishes maximum prices for various models in "as is" condition; unreconditioned but cleaned, checked and guaranteed for 90 days; and reconditioned.

For additional revisions and additions please stee STEEL of April 27, p. 30, May 4, p. 46, May 11, p. 55.

New Manganese Ore Prices Expected To Stimulate Domestic Production

WASHINGTON

REPRESENTATIVES of manganese producers believe the recent increase in the price of manganese ore will stimulate domestic production, already encouraged by beneficiation plants being built by the government.

Metals Reserve Co. recently announced the new schedule of manganese ore prices which became effective May 4.

The new schedule offers $1 per unit of ore containing 48 per cent and above metallic manganese with lower prices for lower grades. Under the schedule Metals Reserve Co. will purchase ore running as low as 35 per cent metallic manganese.

Beneficiation Plants Projected

Nine new beneficiation plants are now projected with government backing. These are at Crosby, Minn.; Chamberlain, S. D.; Las Vegas, Nev.; Batesville, Ark.; Delta, Utah; Battle Mountain, Nev.; Elizabethton, Tenn.; Cartersville, Ga.; and Phillipsburg, Mont. Further likely mill locations are now being investigated, and more areas worthy of investigation are now being sought by the government.

It is understood that when these new mills are in operation, arrangements will be made for them to purchase carloads or truckloads of any ore that comes within the commercial limits of the mill to which it is offered.

There was considerable difference of opinion in increasing this price to $1 among the government experts because the experienced government people in this field, and those most concerned with the other metals, believed the increase in the domestic price, even to the small producers, would quickly cause a similar rise in the cost of our foreign manganese as well as of all other related metals from this country and abroad. They also pointed out it is known that the price of manganese had had a rise above the prewar level far greater than most other metals.

Government figures available show that while very little domestic manganese is now being produced, in 1918, 247 mines reported 305,000 tons of ore of 35 per cent manganese and above, and during that same year 126 mines produced 916,000 tons of 10 to 35 per cent manganese. Before the new schedule became effective the price for domestic ore was 75 cents per unit.

Mars' Spring Garden

AN EMPTY lot three weeks before this photo was taken, it now contains more than 200 tons of scrap metal. The scene is Coatesville, Pa., where a civic scrap collection campaign was sponsored by Lukens Steel Co. and other organizations. Proceeds from sale of the material will go to the local Red Cross: the metal itself into Lukens' furnaces and thence to Germany and the far Pacific

SCRAP

New Jersey Organizes "Salvage for Victory" Plan

State of New Jersey will be divided into seven scrap regions to coordinate the waste materials industry with a "Salvage for Victory" program. Benjamin Schwartz, vice-president, Schiavone-Bonomo Corp., and former director general of the Institute of Scrap Iron and Steel, presided at the first regional meeting, May 12, in City Hall, Newark.

Other regional meetings are scheduled in Camden, May 19; New Brunswick, May 21; Jersey City, May 26; Trenton, May 28; Netcong, June 2.

Milwaukee Campaign Produces 3570 Tons of Old Metals

As a result of an industrial salvage campaign in Milwaukee, April 24, 341 plants, mainly small units, have accumulated 3570 tons of scrap metals, according to George F. Kull, secretary, Wisconsin Manufacturers' Association. This came from unused dies, foundry flasks, obsolete equipment, and other idle machinery and metals.

Buffalo Barrels Catch Pieces of Household Scrap

Problem facing housewives who have small quantities of scrap is reported as solved in Buffalo by placing "Victory" barrels in front of all fire houses. This has been done by the fire department to help householders contribute bits of metal. Deposits may be made day or night. Barrels were supplied by the street department.

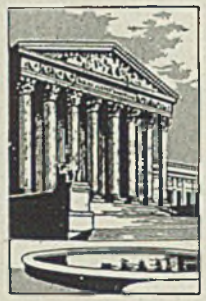
Mixed Iron and Steel Scrap Regulations Liberalized

A new amendment liberalizing the provisions governing mixed shipments of iron and steel scrap was announced last week by OPA.

Amendment, effective May 18, provides that when grades of scrap commanding different maximum prices are included in one vehicle, the maximum price of the scrap in the vehicle shall be that of the lowest-priced grade in the shipment. It provides, however, that this limitation shall not affect shipments involving vessel movement if each grade commanding a different maximum price is segregated in the vessel.

Windows of WASHINGTON

New WPB agency will attempt to eliminate duplication and overlapping in war production organization . . . Railroad shops to be converted to military output . . . Public road construction to be permitted under limitation order . . . W. L. Batt resigns as material director. A. I. Henderson succeeds . . . Lake Carriers Association president appointed ODT lake shipping director



By L. M. LAMM
Washingotn Editor, STEEL

WASHINGTON

WPB Chairman Donald M. Nelson has named Dr. Luther Gulick to direct a permanent Office of Organizational Planning which will advise Mr. Nelson on methods of simplifying and decentralizing the wide administrative operations of the WPB.

The OOP will operate as a staff agency directly responsible to the chairman, and will make recommendations for co-ordinating and simplifying controls over the mammoth war supply program.

Functions of the new office will include a continuous study of the responsibilities and operations of the separate units of the WPB. It will search for possible duplication and overlapping of functions and will suggest any changes deemed necessary.

Tin Salvage Institute To Collect Collapsible Tubes

WPB has announced that the Tin Salvage Institute of Newark, N. J., acting as agent for the Metals Reserve Co., will be the only organization authorized to collect and salvage the tin tubes which have been accumulated by retailers in connection with sales of new tubes of tooth paste and shaving cream.

Conservation Order M-115, issued April 1, required consumers to turn in some kind of used collapsible tin, tin alloy, or tin-coated tube when buying new supplies of tooth paste and shaving cream.

Railroad Shops To Be Used For Military Production

Full use of railroad shop facilities, wherever available, to help in the production of urgent war materials, was unanimously agreed to by railroad management and the railroad shop crafts at a meeting with representatives of WPB, Department of Labor, and the Office of Defense Transportation.

In agreeing to the WPB request for use of the rail shops to aid in vital war output, labor expressed the desire that first consideration be given to the utilization of all available shop facilities for the manufacture of railway equipment, such as new cars and locomotives.

A committee headed by Otto S. Beyer, ODT's Director of Transport Personnel, and composed of two other members representing the government, three from labor, and three from railway management, will be set up to exercise general supervision of the plan to utilize the railroad shop facilities for supplementary war production purposes.

WPB Takes Over Surplus Farm Implement Steel Inventories

WPB has assumed control over surplus iron and steel inventories of farm machinery and equipment manufacturers resulting from Orders L-26 and 26-b restricting requirements and disposition of surplus over such requirements.

Public Road Construction Not Banned by Order L-41

WPB will permit governmental road departments to begin construction of many public roads without individual authorization of each project under provisions of Conservation Order L-41, which places construction of all kinds under rigid control.

Authority No. L-41-600, issued by J. S. Knowlson, Director of Industry Operations, makes it possible for federal, state, county and municipal agencies to continue their spring and summer programs for building essential public roads by simply filing monthly reports of material commitments.

Neither Order L-41, nor the authority issued under it, restricts road construction for which P-19-e Preference rating orders are issued. Although projects that require preference rating orders for obtaining material come under the provisions of L-41, upon issuance of a P-19-e series order, they are automatically authorized to begin construction. For such projects the road departments should make application as in the past for a P-19-e limited highway project preference rating order.

Aluminum Products Prices Cut 1 to 20 Cents a Pound

Aluminum Co. of America will reduce prices on fabricated aluminum products from 1 to 20 cents a pound, effective June 15. Reductions are substantial particularly on 24s sheet and plate forgings entering into aircraft construction. New prices will apply on all deliveries after June 15, including higher priced contracts dated earlier.

Similar action will be requested by OPA of other aluminum companies. Lower prices are made possible by lower production costs due to increased output.

Batt Withdraws as Materials Director for War Board

William L. Batt, director of the WPB Materials Division, has resigned that post. He will be succeeded by A. I. Henderson, formerly deputy director.

Mr. Batt will continue active in the war effort as chairman of the WPB requirements committee, chairman of the United States-Canadian co-ordinating committee, member of the American-British raw materials committee and co-ordinator of the Russian aid program.

Mr. Batt explained he was performing "so many jobs" that it was impossible "to do any one of them decently".

A. T. Wood Named Director of Great Lakes Transportation

A. T. Wood, president of the Lake Carriers Association, Cleveland, for

the past four years, has been appointed director of Great Lakes shipping in the Office of Defense Transportation. Mr. Wood will relinquish temporarily his position with the Lake Carriers Association and most of his duties will be taken over by Gilbert H. Johnson, the association's counsel.

Appointment of Charles M. Schoenlaub as acting chief of the Production Requirements Branch was announced last week by C. H. Matthiessen Jr., chief of the Bureau of Priorities.

Mr. Schoenlaub since March 15 has been special assistant to A. L. Williams, chief of the Production Requirements Branch, and will serve as acting chief of the branch because of the illness of Mr. Williams.

Mr. Schoenlaub formerly was assistant superintendent of the open hearth department of Republic Steel Corp., Cleveland.

Construction Bureau Organized in WPB

Organization of a Construction Bureau consolidating the construction functions of the WPB was announced last week.

William V. Kahler, on leave as chief engineer of the Chicago area, Illinois Bell Telephone Co., and since May, 1941, head of the Construction Branch, Production Division, will be chief of the new bureau. In this capacity he will be a member of the Plant Site Board.

A part of the Production Division, the bureau will:

1. Service all construction essential to the war effort.
2. Recommend construction project priority ratings.
3. Apply the principles of conservation of essential materials to construction projects.
4. Administer Conservation Order L-41 which places all private construction under rigid control.

The consolidation makes it possible for all applications for construction except those of the Army and Navy, to be handled by a single WPB agency. It will permit a central integration of requirements for construction material, information of which is basic to planning building programs. It also will make it possible to study from one point of view the essentiality of any building project.

Machinery Installation Costs May Be Computed on March Basis

Manufacturers who sell machinery on an installed basis may calculate prices of installation on the basis of March, 1942, rates for field labor and outbound freight, instead of Oct. 1, 1941, rates, OPA announced. Equipment must be priced at October levels; it is only the costs of installation which may be computed on the March basis, it was explained.

Permission to compute costs of installation in this manner is granted in Amendment No. 1 to Maximum Price Regulation No. 136, on machines and parts, effective May 18.

The readjustment adopts, so far as possible, OPA officials said, the policy previously followed in the administration of price control programs in the machines and parts field.

The amendment also permits resellers of machinery who made price increases during the month of October, 1941, designed merely to offset increases in prices to them effected in September, to retain such increases in prices to the extent necessary to maintain the same percentage of mark-up. As a condition to such increases, detailed reports of the mark-ups must be made to the OPA.

Used Standard, New Portable Typewriter Rentals Unrestricted

Any person or business needing a typewriter is entitled to rent a used office machine or new portable directly from any dealer, the OPA announced in a clarification of typewriter rationing regulations.

Under the rationing order, new and used typewriters cannot be purchased outright except through rationing certificates. It was pointed out, however, that a supply of machines is available for unrestricted rental, subject only to the right of OPA to recapture rented machines should defense needs later require such a move.

The announcement was made to clear up misunderstandings which have developed since general typewriter rationing went into effect on April 20.

Henderson Warns Warehouses on Hot-Finished Tubing Prices

Price Administrator Leon Henderson has warned jobbers and warehousemen of iron and steel products not to use list prices for cold-finished mechanical tubing in computing their prices on hot-finished mechanical tubing.

Cold-drawn mechanical tubing commands a higher price because of its closer tolerance, different process of manufacture and higher cost of production. However, the administrator has been informed that in some cases cold-finished list prices have been used in computing prices on the hot-finished mechanical tubing.

This is a direct violation of Price Schedule No. 49, Mr. Henderson stated. Prices on hot-finished mechanical tubing must be calculated in the same manner as is provided for cold-drawn mechanical tubing, with the exception that list prices for hot-finished tubing must be used.

Mechanical tubing is used for mechanical, structural, or machining purposes where close tolerances, smooth finish and certain physical properties are important factors. It is used also where tubing is not subjected to external or internal pressure as defined under pressure tubes.

Restrict Use of Critical Materials in Safety Devices

Strict regulations on the use of aluminum, copper, plastics, and several other commodities in the manufacture of safety equipment were put into effect by WPB last week.

Safety equipment, as defined by the order, covers a wide range of devices, signs, etc., used to promote safety, or to prevent accidents, injuries, or occupational hazards.

Included in the definition are guards, shields, containers, harnesses, head gears, belts, shoes, protective clothing or coverings, masks, respirator inhalers, resuscitating apparatus, measuring instruments, indicating instruments, protective creams, treads, warning signs, and all other such safety articles.

Heat-Treating Furnace Rating Extended to June 30

Preference Rating Order P-74, which grants a rating of A-1-c to enable producers to obtain materials for the construction of heat-treating furnaces, has been extended until midnight, June 30. Order was due to expire May 15.

After that date, all holders of P-74 ratings will be expected to qualify under the Production Requirements Plan.

Gray Iron Founders Explain Problems to OPA

Gray Iron Founders' Society Inc., Washington and Cleveland, has presented a brief to the OPA on the subject of price ceilings for gray iron casting.

The presentation was prepared by a national committee selected after a series of district meetings of members. OPA had informed the industry of its intention to freeze prices for castings as of a date between Oct. 1, 1941, and Feb. 4.

The industry's brief calls attention to numerous factors affecting costs which have occurred since Oct. 1. These include higher prices for pig iron in some sections, freight rates, sand, coke and other materials and equipment, increased wages, and lower production due to limitation orders on the products of many former customers.

Faster with each

IT was 1844. Then, as now, the nation faced a crisis. Texas was struggling for independence. Robbins, Kendall and Lawrence, early Vermont predecessors of Jones & Lamson Machine Company, had a contract for 10,000 rifles to deliver in three years. Starting without the necessary buildings, capital or equipment for this work, they built a plant and finished the arms eighteen months ahead of time. Never before had a U. S. Government arms contract been completed so promptly.

NEARLY a century has passed since a group of Vermont machine tool builders first set a new record for fast, accurate work on a national defense contract — ninety-seven years in which these men, and three generations of their direct successors, have never ceased to set new records for rapid, accurate machine tool production — in peace as well as in emergencies.

The significant point today in this unbroken history of hard, exacting work is not alone the length of time it has been in progress, but that the rate of progress has become faster and faster with each successive year.

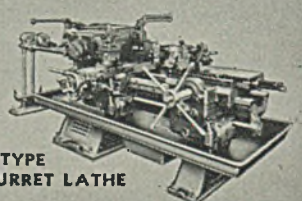
As a result, every machine in the Jones & Lamson line is today a new machine — with more than enough speed, rigidity and useful power to take full advantage of any hard alloy tools now available or in prospect.

As a result, any plant with equipment and production methods planned by Jones & Lamson engineers is in strategic position to meet today's demands for wartime production and still be ready for the hard years ahead.

That is why it pays in more ways than one to put production problems up to Jones & Lamson engineers. Inquiries from large plants or small receive careful study here, and illustrated catalogs are available.

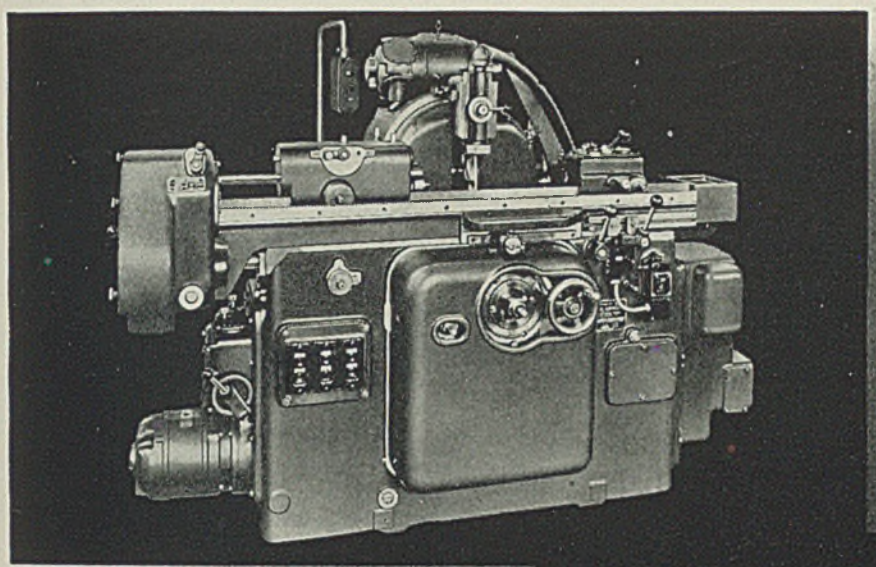
AUTOMATIC THREAD GRINDERS

OPTICAL COMPARATORS

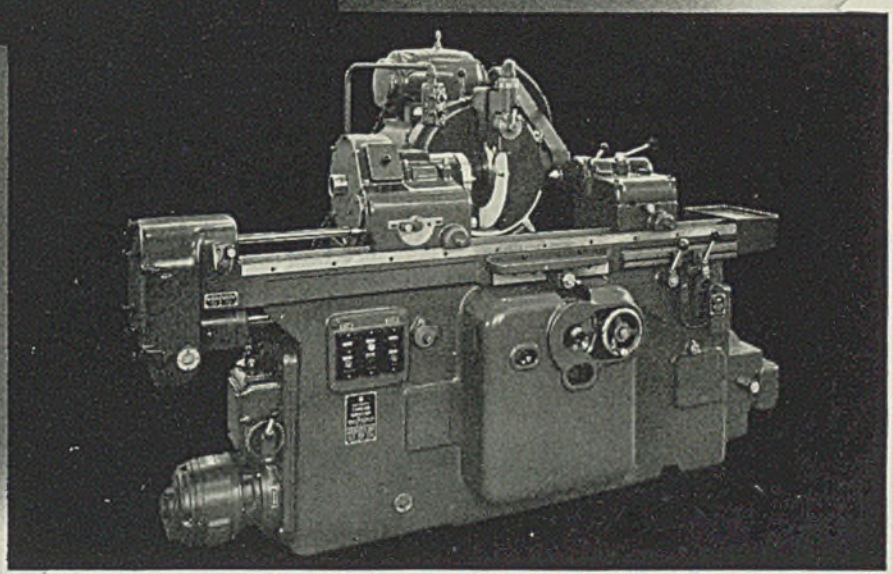


RAM TYPE UNIVERSAL TURRET LATHE

succeeding year!



Jones & Lamson Automatic Thread Grinder, model TG-636 (6 x 36″).



Jones & Lamson Automatic Thread Grinder, model TG-1245 (12 x 45″).

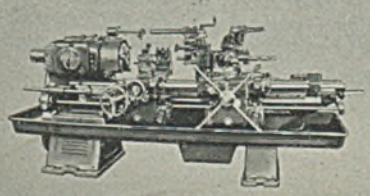
PROFIT PRODUCING
MACHINE TOOLS

JONES & LAMSON

MACHINE COMPANY - SPRINGFIELD, VERMONT, U. S. A.

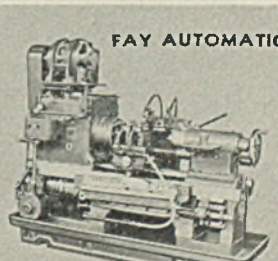
MANUFACTURERS OF: RAM & SADDLE TYPE UNIVERSAL TURRET LATHES . . . FAY AUTOMATIC LATHES . . . AUTOMATIC THREAD GRINDING MACHINES . . . COMPARATORS . . . AUTOMATIC OPENING THREADING DIES AND CHASERS

SADDLE TYPE
UNIVERSAL TURRET LATHE



AUTOMATIC OPENING
DIE HEADS

FAY AUTOMATIC LATH



WPB To Decentralize Activities; Establishes 13 Regional Offices

WASHINGTON

AN IMPORTANT step in the decentralization of WPB activities was announced last week with the issuance of orders and regulations officially setting up 13 regional offices and vesting broad authority in the regional directors.

Duties to be assumed by the regional directors are outlined as follows: "In general, the regional offices shall provide the focal point in each region for all WPB business, and the regional director will be the representative of the Chairman of the WPB within the region.

"It is intended that the decentralization of WPB activities shall be progressively developed to the end that, so far as practicable, the work of the WPB in Washington shall center in policy determination, program planning, the institution of major procedures and general coordination, while the day-to-day operations shall be conducted through the regional offices."

Preliminary organization of the 13 regions was announced previously, but the administrative instructions just issued go much further in giving the regional directors specific and effective authority over WPB activities in the field.

The 13 regional offices established are: Boston, New York, Philadelphia, Atlanta, Cleveland, Chicago, Kansas City, Dallas, Denver, San Francisco, Detroit, Minneapolis, Seattle.

So far, six regional directors have been appointed. They are: Orville H. Bullitt, Philadelphia; Ernest Kanzler, Detroit; Frank H. Neely, Atlanta; John C. Virden, Cleveland; Joseph L. Overlock, Chicago; and Walter H. Wheeler, Boston.

Metalworking Industry Committees Appointed

Industry advisory committees in the metalworking field appointed recently by WPB include:

Industrial Instruments

Charles L. Saunders is government presiding officer.

Members are: E. B. Evleth, Brown Instrument Co., Philadelphia; R. A. Schoenfeld, Wheelco Instruments Co., Chicago; E. M. Jones, Simplex Valve & Meter Co., Philadelphia; Barton Jones, Morey & Jones Ltd., Los Angeles; L. B. Swift, Taylor Instrument Co., Rochester, N. Y.; L. G. Wilson, Precision Thermometer & Instrument Co., Philadelphia; P. T. Sprague, Hays Corp., Michigan City, Ind.; H. Merrill, Manning, Maxwell & Moore Inc., Bridgeport, Conn.; Paul A. Elfers, Fisher Governor Co., Marshalltown, Iowa; H. C. Mueller, Powers Regulator Co., Chicago; J. V. Geisler, Fulton Syphon Co., Knoxville, Tenn.; C. S. Redding, Leeds & Northrup Company, Philadelphia; George Hendricks, Republic Flow Meters Co., Chicago; Rowland Hazard, Bristol Co., Waterbury, Conn.

Electroplating

Robert Beatty is government presiding officer.

Members are: Gustave Cropsey, Gustave Cropsey Inc., New York; Fred Pierdon, Art Metal Finishing Co., Washington; Stan White, Cadmium & Nickel Plating Co., Los Angeles; V. W. Todd, Hanson Van Winkle-Munning Co., Matawan, N. J.; Erwin Sohn, American Radiator & Standard Sanitary Co., Louisville, Ky.; H. Ochs, Economy Plating Co., Cleveland; B. G. Daw, LaSalco Inc., St. Louis; T. W. Kirby, A. T. Wagner Co., Detroit; L. K. Lindahl, Udylite Corp., Detroit.

Large Compressor

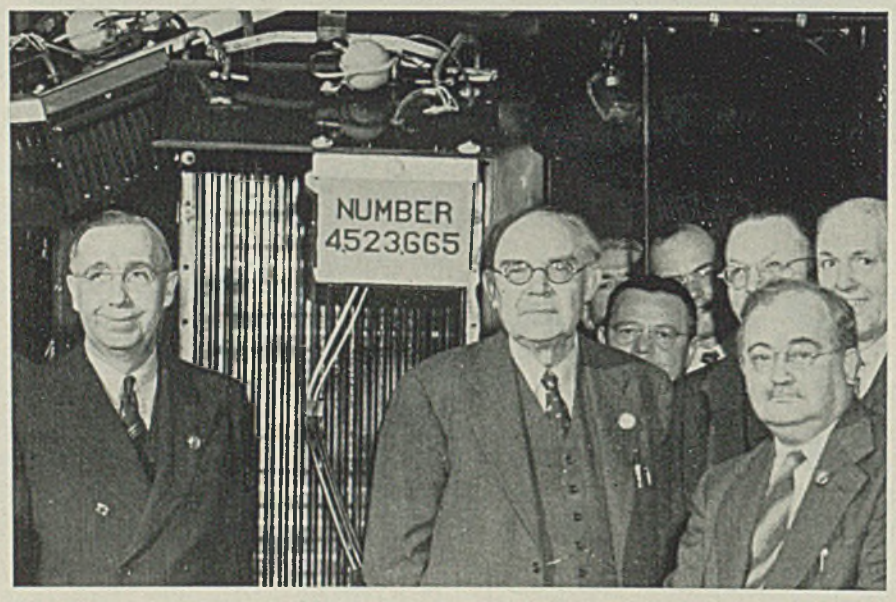
William K. Frank is government presiding officer.

Members are: J. F. Huvane, Chicago Pneumatic Tool Co., New York; J. B. O'Connor, Clark Bros. Co. Inc., Olean, N. Y.; T. F. Hudgins, Cooper-Bessemer Corp., Mt. Vernon, O.; E. F. Schaefer, Gardner-Denver Co., Quincy, Ill.; M. C. Davison, Ingersoll-Rand Co., New York; J. M. Dolan, Sullivan Machinery Co., Michigan City, Ind.; Edwin J. Schwanhausser, Worthington Pump & Machinery Corp., Buffalo; Frederick Pope, Chemical Construction Corp., New York.

Domestic Sewing Machines

Government presiding officer, Louis C. Upton, chief, Consumers' Durable Goods Branch. Committee members: Milton C. Lightner, The Singer Mfg. Co., New York; A. S. Rodgers, White Sewing Machine Corp., Cleveland; Raymond F. List, National Sewing Machine Co., Belvidere, Ill.; Jay Kasler, Free Sewing Machine Co., Rockford, Ill.

Refrigerator Production Ends for Duration



SYMBOLICAL of the change-over to war production in the electric refrigerator industry is this photo of a "reunion" in General Electric's refrigerator department when compressor mechanism No. 4,523,665 came from the assembly line recently and production was terminated for the duration. Christian Steenstrup, Danish-born "father of mass production of electric refrigerators" is in the center of the group; W. B. Hill, left, superintendent of the department; W. L. Merrill, right, head of the GE works laboratory; and others in the department, most of whom were immediately transferred to war work

Death Sentence on Coat Hangers Lifted by WPB

WPB lifted a previously imposed death sentence on coat hangers.

Amendment No. 2 to Order L-30 excludes from the list of restricted household articles coat hangers made of wood or paperboard if their only scarce-material content is a steel wire hook.

Amendment also removes restrictions on the use of joining hardware, such as nuts, nails, bolts and screws, in the manufacture or assembly of kitchen and household articles, provided the weight of such joining hardware is not more than 5 per cent of the weight of the completed article.

Much old refinery equipment which normally would not be torn down at this time is being dismantled by Standard Oil of Indiana, Chicago, to aid its "Get in the Scrap" campaign for 1942. Six of the firm's refineries are participating in the drive, to which the Whiting, Ind. refinery alone has contributed over 2000 tons of steel and iron scrap so far this year.

Revised PRP Application Form Is Adopted for Third Quarter Use

WASHINGTON

A REVISED form of application for assistance under the Production Requirements Plan to be used for the third quarter of 1942 was announced last week.

New instructions to applicants for ratings under the plan will allow them to omit a considerable part of the information which has previously been required. Users of materials will also be able to supply the same reports on PRP applications which they are now preparing in answer to the general metals questionnaire, Form PD-275, and duplication of work will thus be avoided.

The new instructions will simplify the preparation of PRP applications by the many additional companies which must begin operating under the Production Requirements Plan in the quarter starting July 1. In accordance with policy recently announced, most of the limited blanket ratings under which preference ratings have been assigned on an industry-wide basis will be revoked or allowed to expire, and companies which have been using the blanket ratings will be required to apply under PRP.

To assure fair and uniform treatment of applicants under PRP, specific directions for assignment of ratings in accordance with the importance of various products in the war and civilian economy are now being prepared by the industry branches of WPB. These directions will specify the grade of ratings—A-1-c, A-3, etc.—which should normally be granted for the use of each industry or type of production, and will indicate the policy to be followed in determining the amounts of materials to which such ratings may be assigned in each case.

Use of Article Is Paramount

Under the new program, assignment of ratings to PRP applicants will depend increasingly on the nature and use of the applicant's product, less on the pattern of preference ratings on the orders which he has on his books. For example, high ratings would be assigned to a manufacturer of parts which would ultimately be incorporated in military planes or tanks, without his having to prove that 75 per cent of his orders were A-1-a, 15 per cent A-1-b, etc.

This emphasis on the use of the product rather than on the pattern of existing preference ratings on orders to be filled by the applicant makes it possible to eliminate a considerable part of the information which has previously been required from PRP applicants, and constitutes the basis for the new, simplified instructions.

For the present, the revised PD-25A application form for the Production Requirements Plan which was prepared for the April-June quarter will continue to be used, but the instructions specify that many of the columns may be left blank. These instructions are now available in War Production Board field offices, and applications on the simplified basis will be accepted.

Processing directions for assignment of ratings under PRP will, to a certain extent, replace the orders of the "P" series under which ratings have previously been assigned to various industries. The procedure under PRP will be somewhat different from the procedure under the limited blanket ratings, however, because ratings assigned to applicants under PRP may be applied only to a specified quantity of materials or products to be delivered in a calendar quarter. In some cases, applicants may be given a higher rating for limited quantities of specific kinds of scarce materials in this way than they would be entitled to use for all of their requirements under a "P" order.

The processing directions will apply to small firms operating under the modified Production Requirements Plan who apply on Form PD-25X, as well as to firms which use PD-25A.

PRP applications from producers and industries for which a processing direction has not yet been issued will be handled in much the same way as individual applications on PD-1A forms, by concurrence in the ratings and the amounts of materials for which the ratings are assigned between the Production Requirements Branch and the industry and materials branches concerned.

The application form to be used by PRP applicants in connection with the new procedure will be the pink form as revised for the April-June quarter. The headings may be changed so that this form can be used for the July-September, or subsequent quarters, and only those columns need to be filled out which are listed in the new instructions. However, all applicants hereafter will be required to fill out Section E and F Supplement, which has been optional up to now.

The reduction in the amount of information required from applicants under the Production Requirements Plan will make its use easier for many new industries which are expected to operate under the Plan beginning July 1. At the same time, processing of applications in the branches of the War Production Board will be much simpler and faster.

Applicants who must put materials in process during a calendar quarter for delivery in a subsequent quarter may file a second PD-25A application covering the additional quarter.

Price Administrator Explains Policies to Editors

PRICE Administrator Henderson addresses members of the National Conference of Business Paper Editors in the Willard hotel, Washington, soon after issuance of the General Maximum Price Regulation. OEM photo

TOCCO heats shell forgings so fast they can be handled without tongs!

Another vital armament job being speeded and improved by TOCCO Induction Heat Treating:

Here, TOCCO heats the open end of shell forgings—to 2100 degrees F. in 13 seconds—so fast the shell body remains cool and can be handled to the nosing press without tongs. Heat is localized in section to be forged.

Boosts output. Compared to former method, TOCCO speeds up heating and handling. Reduces hazards.

Minimizes scale formation. Increases die life.

Improves operation. TOCCO controls the heating period to 1/10 second, automatically. Assures uniform temperature and uniform length of heated zone.

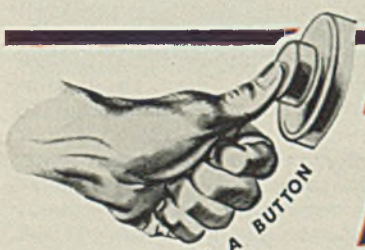
Machine is clean and cool. Occupies space only 7 ft. x 5 ft. maximum. Pre-set controls. Simple push-button operation; doesn't require skilled labor.

TOCCO is a standard unit. Can be adapted to post-war jobs by simply changing work fixture.

Investigate TOCCO today for speeding up and improving your hardening and heating!

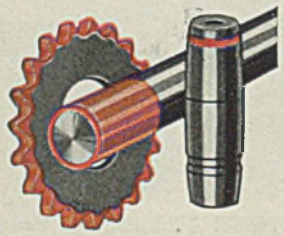
THE OHIO CRANKSHAFT COMPANY
CLEVELAND, OHIO

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



TOCCO

World's Fastest, Most Accurate Heat-Treating Process



Mirrors of MOTORDOM

War production costs being "knocked for a loop" as industry's technicians apply "know-how" to new jobs. Prefer cost-plus method of contracting over firm price bid . . . Independents could beat the "big three" back into auto production . . . Wider knowledge of properties of NE steels essential to their early substitution for higher alloy types

By A. H. ALLEN
Detroit Editor, STEEL

DETROIT

AS WAR production is given the gun throughout the motor industry, one of the first apparent results is the sharp reduction in costs which the industry's technical ingenuity is making possible. Executives are frank to state, "We're just knocking hell out of costs which we first thought reasonable." So important are the reductions that plants here are shying away from firm price bids on war contracts, fearing that once production gets under way they will be hauled down to Washington and strung up for public display as extortionists.

The reason is fairly simple. Undertaking production of a new product with which they are completely unfamiliar, the plants here send their engineers into other plants which are making the product in question. They study blueprints, get figures on labor costs, material costs and other elements, then prepare what seems to be a fair estimate of what their own costs will be, add on 6 per cent profit and submit a bid. Assume the bid is low and is accepted. The job moves into the local plant and at once receives a thorough going over by designers, toolmakers, master mechanics and all the rest of the technical supervisory staff which has been trained for years in getting the last ounce of efficiency out of automotive productive effort.

Changes Suggested

Changes are suggested in this tooling setup or that machine setup. Procedures are simplified, corners are cut, minor design modifications made, occasional switches in material effected, with the result that when production starts, even though the product is virtually a duplicate of what is being built in the "outside" plant, costs go tumbling and the firm price bid is productive of perhaps a 25 per cent profit instead of 6 per cent.

So the preference here now is for the cost-plus method of war contracting, and for renegotiating firm price bids so that what might be considered excess profits can be refunded to the government before any "inquisition" is started.

One might logically ask why the industry's expert engineers, in studying a new product, could not readily detect inefficiencies in production and therefore temper their own cost estimates to be in line with automotive practice. The answer to this seems to be that when a new product is placed in production, so many unforeseen economies appear that engineers almost confound themselves with the cost reductions which are possible. It is a characteristic automotive angle and there is ample opinion even outside Detroit that nowhere in the world but here could such achievements be made. This viewpoint sounds somewhat provincial and self-adulatory, but the records will speak for themselves in the months to come. It is only unfortunate that some specific figures cannot be detailed here to support the case.

Some of the smaller units of the automobile industry, that is, those outside the "big three," are finding their flexibility and compactness a distinct advantage in the war production program. In the first place, they have not been compelled to rip up their plants to the extent that Chrysler and General Motors have. Where new facilities have been required for a war job, the Defense Plant Corp. usually has stepped in and provided them without a nickel's cost to the prime contractor. Furthermore, some of the old and obsolete plants of the independents, earmarked for the graveyard, have been disposed of for a good price to some other contractor, relieving the burden of carrying this deadwood into the postwar period.

New plant facilities provided by the DPC for the smaller auto builders probably can be taken off the government's hands after the war for a fraction of their cost today. Certainly it does not appear likely the government will want to retain and operate any great number of these plants, so they might better be sold off 50 cents on the dollar with the loss written off by taxpayers as the cost of war.

Estimates offered by the operating head of one of the smaller manufacturers indicate this company could be back into the automobile manufacturing business in four to five months, if the war should end tomorrow, at least sufficiently to provide a sampling of new cars to dealers. Facilitating this quick resumption are factors which are not typical of the industry at large. Inventories of parts and supplies, both in the company's own plants and in those of vendors, have not been disposed of as yet, and of course tools and dies for 1942 model production still are on the shelf.

Moving Larger Tonnages of National Emergency Steel

One of the most encouraging prospects for this country's self-sufficiency in respect to alloys for steel lies squarely in greater knowledge and use of the series of N. E. (National Emergency) specifications developed by steel company and industry metallurgists and announced by the WPB on March 5 (STEEL, March 16, p. 72). Carrying relatively small amounts of manganese, nickel, chromium and molybdenum, these steels are suitable substitutions for, and in some cases even surpass, literally hundreds of higher alloy steels.

Detroit metallurgists were told last week by WPB consultants that if industry at large could effect a change to these NE steels in every

instance possible, the available supply of alloying elements—manganese, nickel, chromium and molybdenum—would just about balance the demand as it is sized up now. Here is a real opportunity to squeeze through the "alloy dilemma" in steel, and the only way it can be done is to promulgate a general recognition of where and how to substitute the NE steels. There are signs that such recognition is coming, but it is slow.

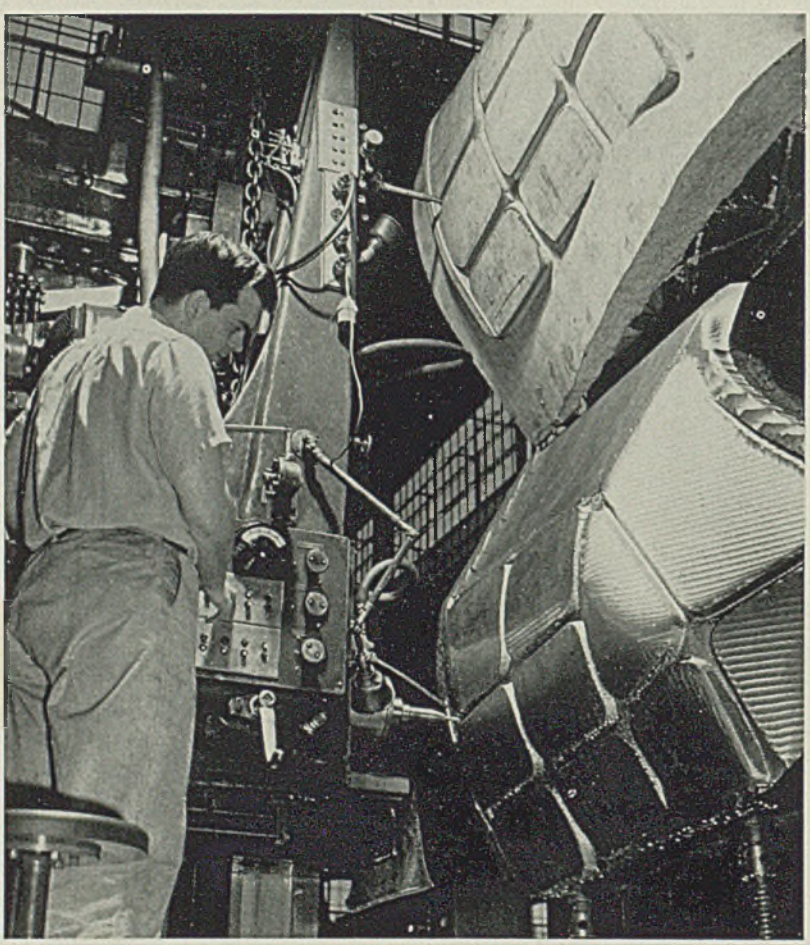
Steel companies are making increasing tonnages of the NE steels, and are supplying test samples to a good many laboratories throughout the country for correlation of properties, including physical characteristics, hardenability, chemistry and the like. Some of the information already has been tabulated, but has not been released by the WPB generally.

One of the serious hitches which industry runs into when it tries to introduce these substitute steels is reluctance—at times even blunt refusal—on the part of the Army, Navy and Air Corps procurement and inspection officials to sanction any change from previous specifications calling for higher alloy steels. These officials representing industry's only customer today, must be educated to the importance of alloy conservation and to what the NE steels offer on a comparative basis.

The alloy crisis cannot be licked by simply changing priorities. Take the case of a truck builder who needed some high-nickel steel for military truck parts. A-3 priority applied to these parts, and when nickel was suspended from all products carrying lower priority than A-1-j, no nickel steel for trucks was available. Instead of considering the possibility of adopting an NE steel substitute, the military procurement officials simply had truck priorities changed to A-1-c. Obviously this solved no problem of alloy conservation since it did nothing but throw schedules completely out of gear in the permissible nickel classifications.

Another complicating factor has been in respect to aircraft steels, where there has been a pardonable chariness of accepting any substitute for the high-nickel material used in crankshafts, rods and other steel parts. This attitude is logical, since no engine builder is going to change to a new steel without full knowledge of its properties, and such knowledge as yet is just not available.

Looking at the matter of the NE steels broadly, the picture is about as follows: Here are steels which will at least mitigate our alloy shortages if widely used, but such acceptance cannot come without full knowledge of properties and performance tests. Solution rests in stimulating production so that supplies can be fed out to a wide range of users through warehouses, plus as much speeding up as is possible in completion and dissemination of test data.



KELLER die-cutting machine at work in a Ford Motor Co. tool and die shop, making a ferrous stamping die for the nose section of a B-24 bomber from plaster pattern above. The tool, well known to automobile builders, cuts large dies in a 3-dimensional operation guided by a tracing finger which follows the outline of the wood or plaster model

How "Swing-over" Has Affected Nash-Kelvinator

Fully loaded with war contracts, Nash-Kelvinator Corp. reports that if schedules are met it will be producing in 1943 at a rate of $500,000,000 per year, compared with gross business of $122,000,000 in 1941. Peak peacetime employment of around 20,000 will be pushed up to better than 40,000 when war production hits its stride early next year. At the moment, Nash-Kelvinator plants are operating at only 40 per cent of this projected peak, principally due to the recent stoppage of all refrigerator production. By December it is believed that operations will be up to 90 per cent of peak level.

Products now being made or in the preparatory stage include aircraft engines, propellers, flying boats, army trailers, binoculars and a wide range of miscellaneous smaller parts, some on a subcontracting basis with other manufacturers.

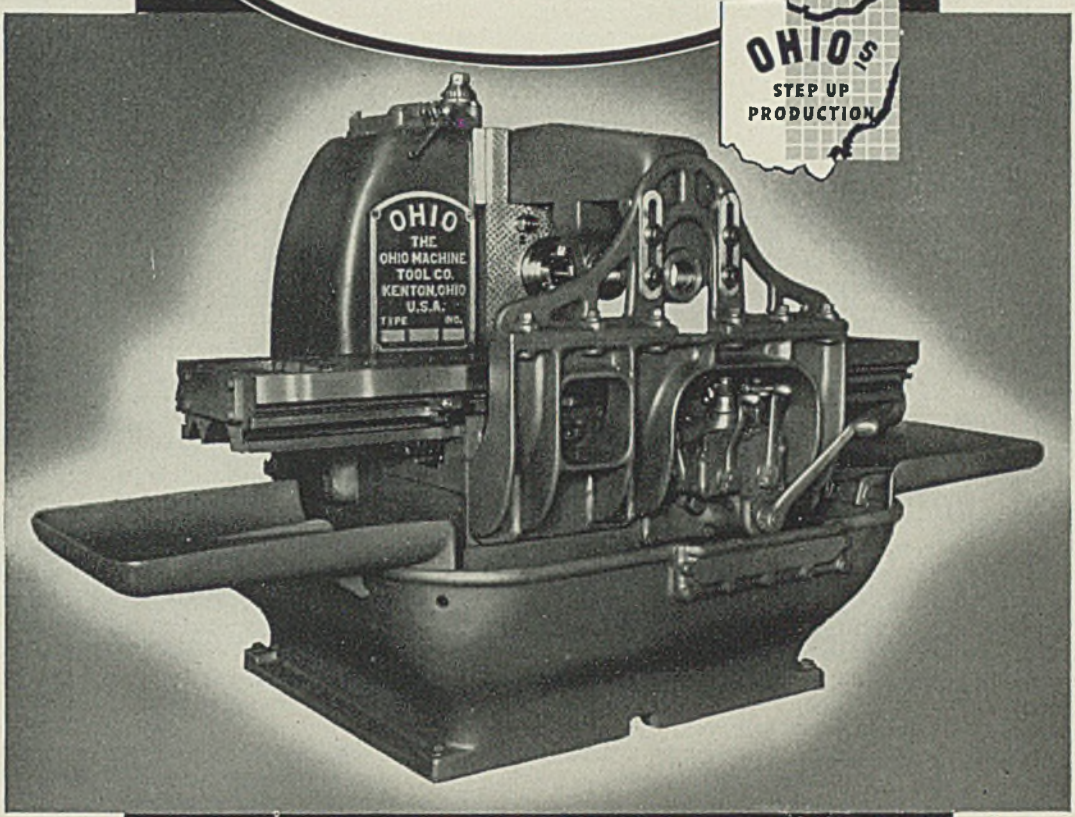
Michigan's furniture industry, including both wood and metal types, with annual production close to one billion dollars, has been practically converted to war production. Airplane trainers and gliders instead of wooden desks, ammunition boxes instead of letter trays and wastebaskets, airplane fuel lines instead of chrome-plated chair legs—these are some of the changes already effected by the industry which now holds prime and subcontracts totaling over half a billion. Facilities continue to be maintained to produce metal furniture requirements of the armed services.

Program of conversion for the furniture industry, mapped by the WPB, also involves the use of machine shops of furniture plants to ease the critical machine tool bottleneck. Construction of such units as screw machines and turret lathes is being undertaken. Conversion section of the WPB furniture branch is in charge of S. H. Arnolt, president of Atlas Steel & Tube Co., Warsaw, Ind.

Addressing stockholders, W. P.

(*Please turn to Page* 147)

OHIO PRODUCTION MILLING MACHINES



Convenience and accessibility make the *Ohio Production Milling Machine* rapid in production, yet easy to set up for short runs. Powerful, true cutter rotation, rigidity, a true plane of travel and positive locked feed enable it to mill equally well *with and against the feed*, making possible continuous milling operations without indexing features. Climb-cutting lengthens cutter life. Various cycles of automatic operation of the feed and rapid traverse are available.

THE OHIO MACHINE TOOL COMPANY, KENTON, OHIO

OHIO DREADNAUGHT

HORIZONTAL BORING, DRILLING AND MILLING MACHINES • SHAPERS • PLANERS

Use of Copper and Alloys Banned In More Than 100 Civilian Products

WASHINGTON

WPB has prohibited the use of copper and its alloys, including brass and bronze, in an additional hundred-odd civilian products; curtailed other uses after June 15, and ordered a number of other restrictions designed to conserve supplies of the red metal.

The action was taken in a revision of Order M-9-c. M-9-c originally was issued on Oct. 21, 1941, and has been amended frequently.

New order maintains the List "A" of the previous order in substantially the same form. Use of copper in the manufacture of articles on this list was prohibited after March 31.

A new list, "A-1," is added. Items on this list must not be manufactured, assembled or finished after May 31.

Probably the greatest dislocation the order will cause will be by the ban on manufacture of the common household pin.

Among other items on List "A-1" are bulbs and neon and fluorescent tubes for advertising and display purposes, bulbs and cords for Christmas trees; dog collars, fountain pens and musical instruments.

Beginning immediately manufacturers may not further process copper, brass or bronze plate, sheet, strip, rolls, coils, wire, rod, bar, tube, pipe, extrusions, ingots or powder to make items on List "A-1" if the materials are in substantially the same form in which they were acquired.

Manufacture with copper of every article not on Lists "A" or "A-1" must stop on June 15 if any copper is used which was obtained before Feb. 28, 1942, unless the article is being made to fill a purchase order rated A-1-k or higher, or its manufacture has been specifically authorized by an application filed on Form PD-426.

If the raw material has been obtained since Feb. 28 and is being used to make articles not on the lists, it is the attitude of WPB that the copper was properly allocated and no further restriction is necessary.

The previous exemption for parts to conduct electricity is removed. If an article appears on List "A" or List "A-1," use of copper in its manufacture is prohibited for any purpose, unless a specific exception is made in the order.

The restrictive provisions of the order do not apply to Army, Navy or Maritime Commission contracts, where the contracts call for copper, brass or bronze, until Aug. 1.

Copper Scrap Order M-9-b Amended To Include Ingots

Supplementary Order M-9-b, which controls copper scrap, has been amended by the WPB to include ingots.

Ingots are defined as shapes for remelting which have been cast primarily from copper base alloy or scrap.

The only other change in the order relates to foundries. Form PD-459 is provided for monthly reports from foundries which melt scrap or ingots. It is due in Washington before the 10th of each month.

M-9-b provides methods for handling copper and brass scrap and ingots to insure maximum recovery of secondary metal and a constant turnover of materials.

300,000 Tons of Copper Saved By WPB Conservation Orders

Three hundred thousand tons of copper and brass, saved for military uses by limitation and conservation orders issued by WPB, soon will be shipped to munitions factories for conversion into war implements. Metal once intended for ash trays, door knobs, roofing, etc. will be used in the manufacture of rifle cartridges, artillery shells, ships and airplanes.

It is estimated that the 300,000 tons of metal will yield 255,000 tons of copper and about 45,000 tons of zinc. The copper tonnage is sufficient for the production of 3½ billion rounds of armor piercing .30 calibre rifle machine gun ammunition, 2 million 75-mm field howitzer shell casings, 33 destroyers, 28 cruisers and 2000 bombers.

In the next few days 20,000 copper fabricators will receive notification from WPB of the method by which the government will buy their inactive stocks of primary and fabricated copper. Eighty thousand other owners of copper inventories will receive similar notices in the near future.

Special Purpose Premiums for Copper Scrap Revoked

Special purpose premiums granted to certain users of copper scrap by Order No. 1 under Revised Price Schedule No. 20, copper and copper alloy scrap, were revoked last week by OPA since they have been replaced by the special use premium in Revised Price Schedule No. 20, as amended.

The revocation becomes effective May 21, 1942.

The special use premium of 7¼ cents per pound may be paid only if the following conditions exist:

1. The scrap has been prepared to meet the consumer's specifications and is suitable for his direct use without further preparation, and
2. The scrap is not sold or delivered to a copper refiner, a brass and bronze ingot manufacturer, a ferrous or nonferrous foundry, or a brass mill.

Alloy Iron, Steel Production To Be Subject to WPB Melting Schedules

WASHINGTON

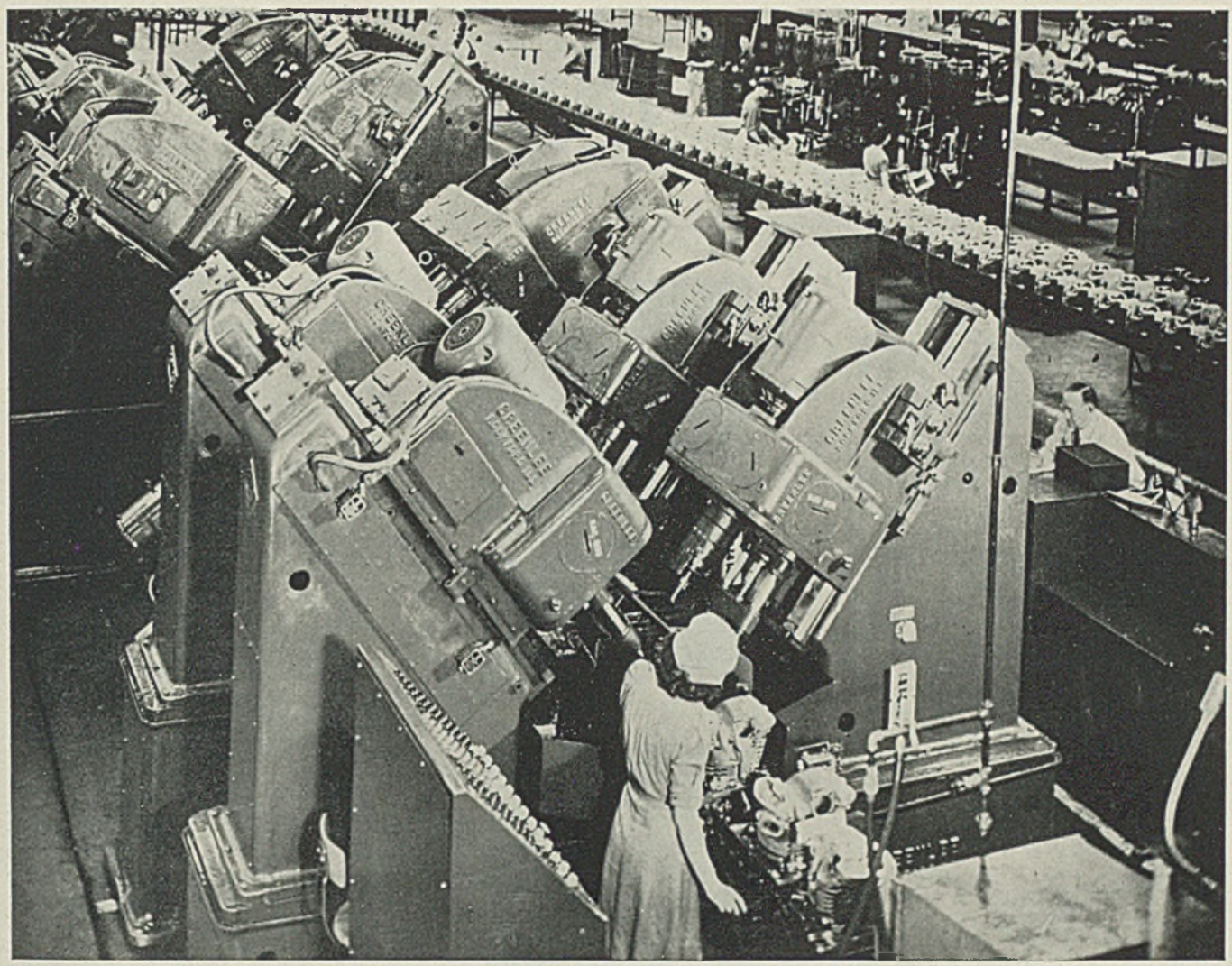
PRODUCTION of alloy iron and steel will be subject after June 1 to monthly melting schedules to be issued by the WPB Director of Industry Operations.

Amendment No. 3 to Supplementary Order M-21-a provides that no iron or steel may be melted or delivered to fill orders with ratings lower than A-1-k, except for certain national emergency and other low-alloy steels, which may be produced for orders down to A-3 ratings.

Purchasers, after June 1, must accompany each order with a statement giving the end use to which the materials ordered will be put, the government contract number, the date on which delivery is needed and a statement that the delivery date is not earlier than necessary for the purchaser to meet the required delivery or production schedules.

Producers must file their schedules monthly with the WPB on Forms PD-391, 391-a and 440. Producers who melt less than 4000 pounds of chromium and 500 pounds of nickel in a month need not file the schedules.

Meltings and deliveries must be made in accordance with schedules approved by the Director of Industry Operations. Meltings may not be made after June 1, except as approved, nor deliveries after July 15. These restrictions apply to iron or steel containing chromium, cobalt, molybdenum, nickel, tungsten or vanadium.



Mechanized Production Concentrated in Huge Machine, with Women Operators

AMERICAN system of manufacturing as applied to the aircraft production program is beautifully illustrated by this Greenlee transfer type machine now in successful operation in an Ohio plant of Wright Aeronautical Corp.

This amazing machine tool—a combination of many individual units exactly co-ordinated with each other and with a built-in conveyor mechanism—is 154 feet long. It carries out, simultaneously, 71 drilling, boring, reaming and tapping operations, turning out engine parts at a rate which only could be equalled by at least 39 individual machines of conventional type.

Thus its ten operators—some of them women—turn out as much or more as would 39 operators of a battery of single machines otherwise required. Control board in foreground detects and locates dull or broken cutting tools at all points in the intricate tooling system, thus insuring immediate replacement before work is sacrificed or time lost.

NEA photo passed by censors

May Move Old Brier Hill Plate Mill to Southwest

Negotiations are reported under way for the sale or lease of Youngstown Sheet & Tube Co.'s old Brier Hill plate mill to another steel company for making ship plates. It is planned to dismantle the mill and reassemble it somewhere in the Southwest, probably Texas.

Among those said to be negotiating for the mill are American International, a subsidiary of American Rolling Mill Co., and the Kaiser Iron & Steel Corp. Both of these concerns recently gave Hetz Construction Co. contracts for obtaining second-hand equipment.

New $25,000,000 Propeller Plant Ready To Operate

Reported virtually completed, the $25,000,000 plant of the American Propeller Corp., Toledo, O., will have its flag raising ceremony May 20, weeks ahead of schedule. Much of the machinery to produce hollow steel propeller blades from seamless tubing is now being put into place.

William F. Wise, executive vice president of Aviation Corp., New York, is president of the new subsidiary, a project of Defense Plant Corp. Wayne Eddy, lately with Lycoming Division of Aviation Corp., is plant manager at Toledo.

Otis Expansion Approved; Additions To Go Up Soon

E. J. Kulas, president, Otis Steel Co., Cleveland, stated last week that War Production Board and Defense

[redacted]

Jones & Laughlin Steel Corp., Pittsburgh, Mr. Kulas predicted favorable outcome of negotiations for expansion, (STEEL, April 27, p. 29).

MEN of INDUSTRY

WALTER GEIST, executive vice president, Allis-Chalmers Mfg. Co., Milwaukee, has been elected president. He succeeds **W. C. Buchanan,** who recently resigned because of ill health. Mr. Geist joined the company in 1909 as an errand boy, advancing through various positions until he became a vice president in 1939. A month ago he was made executive vice president.

♦

L. S. Hamaker has been appointed assistant general manager of sales, Republic Steel Corp. He will transfer his headquarters to Cleveland immediately from the Berger Mfg. Division of Republic at Canton, O., where he has been general manager since 1934. He joined the sales department of Berger Mfg. Co. in May, 1919, later transferring to the advertising department. Subsequently, he became advertising manager, United Alloy Steel Corp.; advertising manager, Central Alloy Steel Corp., and when the latter was acquired by Republic, Mr. Hamaker was transferred to Youngstown as sales promotion and advertising manager. When the Berger organization was set up as a division of Republic in 1934, Mr. Hamaker was made general manager.

♦

George A. Higgins has been appointed manager of sales, bar, strip and semifinished materials division, Carnegie-Illinois Steel Corp., Pittsburgh, succeeding **L. B. Worthington,** recently elected vice president, Scully Steel Products Co., Chicago. Mr. Higgins had been assistant manager of the bar bureau of Carnegie-Illinois since 1938.

♦

Joseph G. Schaefer has been appointed vice president in charge of operations of Wyckoff Drawn Steel Co.'s plants at Ambridge, Pa., and Chicago.

Walter Geist

L. S. Hamaker

George A. Higgins

Gail E. Spain, general sales manager, Caterpillar Tractor Co., Peoria, Ill., has been appointed vice president, with headquarters in San Leandro, Calif. He succeeds the late D. G. Sherwin. **John Q. McDonald** succeeds Mr. Spain as general sales manager. **J. D. Fletcher,** vice president, will assume active direction of export sales in addition to his duties as head of the export department. **C. O. G. Miller,** San Francisco, has been named a director, replacing the late John A. McGregor.

♦

Charles S. Craigmile, vice president in charge of production, Belden Mfg. Co., Chicago, has been elected to the newly created position of executive vice president.

♦

E. A. Reagle, heretofore assistant to the vice president, Sharon Steel Corp., Sharon, Pa., has become vice president in charge of war production, Ingram-Richardson Mfg. Co., Beaver Falls, Pa., effective May 18. He had been associated with Sharon 22 years.

♦

Wiley E. Brown, vice president and general sales manager, Cleveland Tractor Co., Cleveland, has been called to active duty by the Army as a major with the Ordnance Department, Aberdeen Proving Ground, Md.

♦

Hugh H. Johnson, the past nine years in charge of advertising for Buick Motor Division of General Motors Corp., has been named advertising manager, Bell Aircraft Corp., Buffalo.

♦

P. H. McCarthy, formerly president, Vulcan Stamping & Mfg. Co., Bellwood, Ill., has been elected chairman of the board. His son, **Vern I. McCarthy,** heretofore secretary and general manager, has become president.

♦

Samuel F. Beatty, president, Western Austin Co., Aurora, Ill., will retire Aug. 1. He has been with the company 43 years. **McClure Kelley,** vice president and treasurer, will succeed Mr. Beatty as president.

♦

John W. Schippmann has retired as a partner in the Haber Screw Machine Products Co., Chicago, due to ill health. He will continue to serve in an advisory capacity.

Lyle Swartz and **Lorin Swartz** have withdrawn as co-partners in the Haber company.

♦

William A. Minkler has been named sales manager, catalog products division, Young Radiator Co.,

Racine, Wis. He has served as assistant sales manager since 1939, under **M. F. May,** vice president in charge of heating, cooling and air conditioning products. Mr. May will continue to supervise the catalog products sales program and will do special work in connection with war activities of the company.

♦

Edward Noe has been made secretary, Sheffield Corp., Dayton, O. Formerly associated with the patent law firm of Marechal & Noe, he has handled Sheffield's patent problems and in his new position will continue this work. The connection between Sheffield and Marechal & Noe remains the same.

♦

Don Allshouse, advertising manager, Northern Equipment Co., Erie, Pa., has been granted leave of absence to enter service as a first lieutenant, United States Army Air Force.

♦

B. C. Gould, former staff member and partner of Stevenson, Jordan & Harrison, management consultants, has been appointed assistant to **C. W. Avery,** president, Murray Corp. of America, Detroit, in connection with a reorganization of the Murray operations staff.

Charles H. Widman, vice president in charge of sales for over 15 years, has retired from active duty but will continue to promote sales of special products.

♦

Howard M. Schramm, Turner Supply Co., Mobile, Ala., was elected president, Southern Supply & Machinery Manufacturers' Association at its convention in Atlantic City, N. J., May 4-6. Other officers elected were: First vice president, **P. Pidgeon,** Pidgeon-Thomas Iron Co., Memphis, Tenn.; second vice president, **Harry P. Leu,** Harry P. Leu Co., Orlando, Fla.; secretary-treasurer, **E. L. Pugh,** Atlanta, Ga.

Edward Noe

♦

Jesse R. Harlan has been appointed sales manager, Crescent Truck Co., Lebanon, Pa. Since December, 1940, he had been general manager, Mobilift Co., New York, and before that was in charge of sales promotion for Yale & Towne Mfg. Co., Philadelphia.

♦

A. W. Robertson, chairman of the board, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., recently conferred the Westinghouse Order of Merit on **G. Edward Pendray,** assistant to the president in charge of publicity and advertising, and **James Boyd,** eastern district manager. The order is awarded for outstanding contributions to the electrical and mechanical arts and to company progress.

♦

George G. Stoner has been named to the technical staff of Battelle Memorial Institute, Columbus, O., and has been assigned to chemical research. He formerly was associated with Pittsburgh Plate Glass Co., Barberton, O.

♦

A. L. Kress has joined Republic Aviation Corp., Farmingdale, N. Y., as assistant to the president. Recently consultant to the member companies of the Aeronautical Chamber of Commerce on job classification and evaluation problems, Mr. Kress has been assigned to the supervision of Republic's newly organized department of industrial relations.

♦

L. L. White, chief operating officer, and **F. G. Fitzpatrick,** chief traffic officer, Chicago & North Western railroad, Chicago, have been elected vice presidents in charge of operation and traffic, respectively, Chicago, St. Paul, Minneapolis & Omaha railroad, a North Western affiliate. They will continue in their executive capacities with North Western.

♦

Ira A. Terry has been appointed general assistant to **H. A. Winne,** vice president in charge of design engineering, apparatus department, General Electric Co., Schenectady, N. Y. The past two years he has been assistant to **J. D. Harnden,** engineering assistant to the manager of General Electric's largest plant, and he has been succeeded in that post by **Walter C. Heckman,** heretofore associated with the turbine engineering department.

♦

John S. Gulledge, St. Louis district manager, Industrial Products Sales Division, B. F. Goodrich Co., has resigned to enter the Army Air Corps. He is at present serving on the engineering staff at Wright Field, Dayton, O. **George Livermore** has been named district manager at St. Louis to succeed Mr. Gulledge.

♦

William L. Wilson has been placed in charge of the newly organized industrial relations department of Republic Aviation Corp., Farmingdale, N. Y., with the title of director of industrial relations. **Thomas W. Macdonald** has succeeded Mr. Wilson as director of public relations. **E. Trevor Hill** and **Lewis M. Tansky** have recently been added to the company's public relations staff and will function under Mr. Macdonald.

New Westinghouse Electric Vice Presidents

A. H. Phelps — L. E. Osborne — F. C. Reed — W. C. Evans

Elected vice presidents, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., as announced in STEEL, May 11, page 71. Mr. Phelps is general manager of purchases and traffic; Mr. Osborne, manager, steam division, South Philadelphia works; Mr. Reed, president, Westinghouse Electric Elevator Co.; Mr. Evans, general manager, radio, x-ray and broadcasting division

DIED:

John B. Patrick, 63, manager of industrial relations, Oliver Iron Mining Co., Duluth, May 2, in Chicago. He had been associated with the Oliver company 35 years.

♦

Otto H. Siewek, 59, owner, Siewek Tool & Engineering Co., operating plants in Ferndale, Mich., Richmond, Ind., and Hartford, Conn., May 5, in Detroit. He had been active in tool engineering circles 30 years.

♦

Walter B. Rowbottom, 41, secretary, Diversey Foundry Co., Geneva, Ill., in that city, April 10.

♦

Robert M. Bird, 59, New York sales manager, The Midvale Co., Philadelphia, May 8, in Niagara Falls, N. Y.

♦

Harvey G. Baldwin, 77, for more than 30 years head of the order and warehouse department and a director, American Steel & Wire Co., Cleveland, May 7, in that city. He retired in 1933.

♦

William G. Houck, 70, president and treasurer, Buffalo Structural Steel Corp., Buffalo, May 5, in that city.

♦

Harry I. Allen, member since 1907 of the law firm of Knapp, Allen and Cushing, Division Counsel of United States Steel Corp. subsidiaries, in Evanston, Ill., May 11.

♦

Dr. C. Francis Harding, 60, head of the school of electrical engineering, Purdue University, West Lafayette, Ind., April 13.

♦

Louis J. Dolle, 80, senior partner of the law firm of Dolle, O'Donnell & Cash, Cincinnati, in that city, April 20. He was a former chairman of the board, Lodge & Shipley Machine Tool Co., and had served as counsel for that company many years.

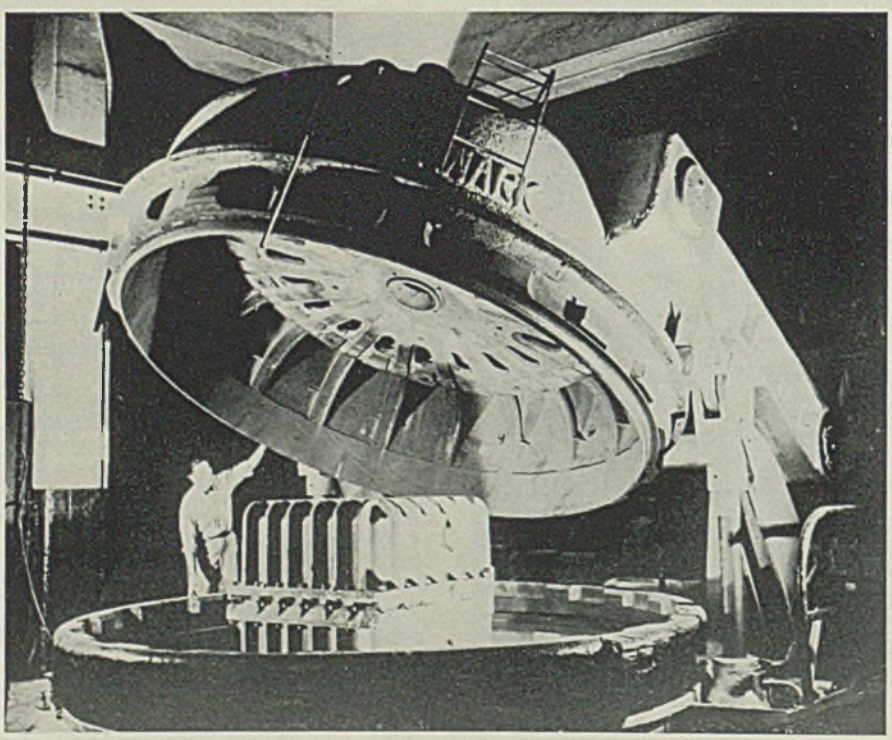
♦

Charles W. Stiger, 77, engineer and industrialist, at his home in Oak Park, Ill., April 22. Mr. Stiger headed the Stromberg Motor Devices Co. and Stromberg Carburetor Co. until both were absorbed by Bendix Products Division of Bendix Aviation Corp. in 1929.

♦

Walter J. Greiner, 52, partner in Ackermann, Steffan & Co., Chicago, saw manufacturer, in Evansville, Ind., April 22.

Vulcanizing Self-Sealing Airplane Tanks



THIS large vulcanizing unit, formerly used in manufacturing tires for earth-moving machinery, is now employed to vulcanize self-sealing gasoline tanks for combat planes. Mold in the center contains the tank. Cover will be closed and heat applied. NEA photo

MEETINGS

Leaders Named for Steel Institute's Roundtables

Leaders for roundtable discussions on operating and metallurgical problems at the American Iron and Steel Institute's meeting in New York, May 21, were announced last week as follows:

John Mitchell, metallurgical engineer, Carnegie-Illinois Steel Corp., "Conservation of Critical Alloying Elements."

E. A. Schwartz, chairman, open-hearth committee, Republic Steel Corp., "Steelmaking Practices."

W. B. Gillies, vice president, Youngstown Sheet & Tube Co., "Steelmaking Raw Materials," discussion.

H. W. Johnson, assistant general superintendent, Inland Steel Co., "Blast Furnace and Coke Oven Operations."

John A. Stevens, director of industrial relations, United States Steel Corp. of Delaware, will give an address on "Greater Production Through Better Industrial Relations."

National Metal Trades Convention Features

Program for the National Metal Trades Association's annual convention, Hotel Biltmore, New York, May 19-20, includes these special features:

Morning Session, May 19

"How To Supervise To Build Morale," by Dr. Donald A. Laird, Rivercrest Laboratory, Middle Haddam, Conn., and "Production in the Aircraft Industry," by J. Carlton Ward, president, Fairchild Engine Airplane Corp., Baltimore.

2:45 p. m., May 19

Panel discussion, "How To Train for National Production," by W. W. Finlay, Wright Aeronautical Corp., Cincinnati; Paul E. Heckel, Cincinnati Bickford Tool Co., Cincinnati; William L. Dolle, Lodge & Shipley Machine Tool Co., Cincinnati; K. R. Wood, Union Special Machine Co., Chicago; S. B. Taylor, Reliance Electric & Engineering Co., Cleveland; and William A. Ruhl, Universal Winding Co., Auburn, R. I.

Morning Session, May 20

"Employe Co-operation," by Joseph E. Moody, Hat Corp. of America, South Norwalk, Conn.; "Wage Negotiations," by C. J. Uhlir, director of industrial relations, N. M. T. A., Chicago; "How To Set Up and Operate a War Production Board Joint Labor-Management Committee," by George A. Seyler, Lunkenheimer Co., Cincinnati, and John B. Goss, Scovill Mfg. Co., Waterbury, Conn.

Donald Nelson To Address National Purchasing Agents

Donald M. Nelson, chairman, War Production Board, will speak on "Production Wins Battles" at the twenty-seventh annual convention

of the National Association of Purchasing Agents, Waldorf-Astoria hotel, New York, May 25-27. Seven papers are scheduled for presentation in addition to three forums covering priorities, inventories, allocations, Production Requirements plan, price administration and rationing. At the banquet, Tuesday evening, May 26, Major George Fielding Eliot will be the principal speaker.

War Production Rally Scheduled for Chicago

A War Production Rally to be held in Hotel Stevens, Chicago, May 26, has been announced by Sterling Morton, president, Illinois Manufacturers' Association, and secretary, Morton Salt Co., Chicago, and William P. Witherow, president, National Association of Manufacturers, and president, Blaw-Knox Corp., Pittsburgh. The two organizations are sponsoring the rally. The nation's leading specialists in every strategic war industry will be brought together in an all-day forum to exchange information on such major issues as improved production methods, plant protection, conversion, wartime taxation, labor supply and priorities.

More than 100 technical papers and reports are scheduled for presentation at the June 22 annual meeting of the American Society for Testing Materials, Chalfonte-Haddon Hall, Atlantic City, N. J.

War-Time Trends for Warehouses Studied at Chicago Convention

COMPLEXION of the steel warehouse industry will be changed for the duration as a result of conditions stemming from the herculean effort being made to satisfy the rising demand for war steel.

This was the consensus expressed by various speakers, several of them representatives of the WPB and OPA, at the thirty-third annual convention of the American Steel Warehouse Association in Drake hotel, Chicago, May 12 and 13.

The convention was the largest in the history of the organization, registration exceeding 300. It was estimated that from 100 to 150 more attended the Town Hall meeting of "Schedule A" distributors at which priorities and price schedules were discussed by government representatives.

J. R. Stuart, chief, Warehouse Unit, WPB, told the delegates demand for steel for the Army, Navy, Maritime Commission, Lend-Lease, and other war consuming channels is so heavy that limitation orders on civilian consumption of steel have been found necessary with the result the warehouse industry's market will necessarily change.

He emphasized that shipments from distributors' stocks must be increasingly in the top-rated brackets for war use.

Discussing Warehouse Order M-21-b, Mr. Stuart said that the industry does have a chance to discuss the various amendments to this regulation before they are issued. It is aimed for the maintenance of existing property and seeks to limit inventories. He said that earmarked stocks are being set up in some cases at strategic points to take care of pressing ship repair work. The government, he said, has established a warehouse at Rochester, N. Y., designed to meet the specific problems of small arms makers who lack steel buying experience in this field. In setting up this warehouse, WPB seeks to avoid delays in getting new small arms plants into production, and it does not necessarily follow that the gov-

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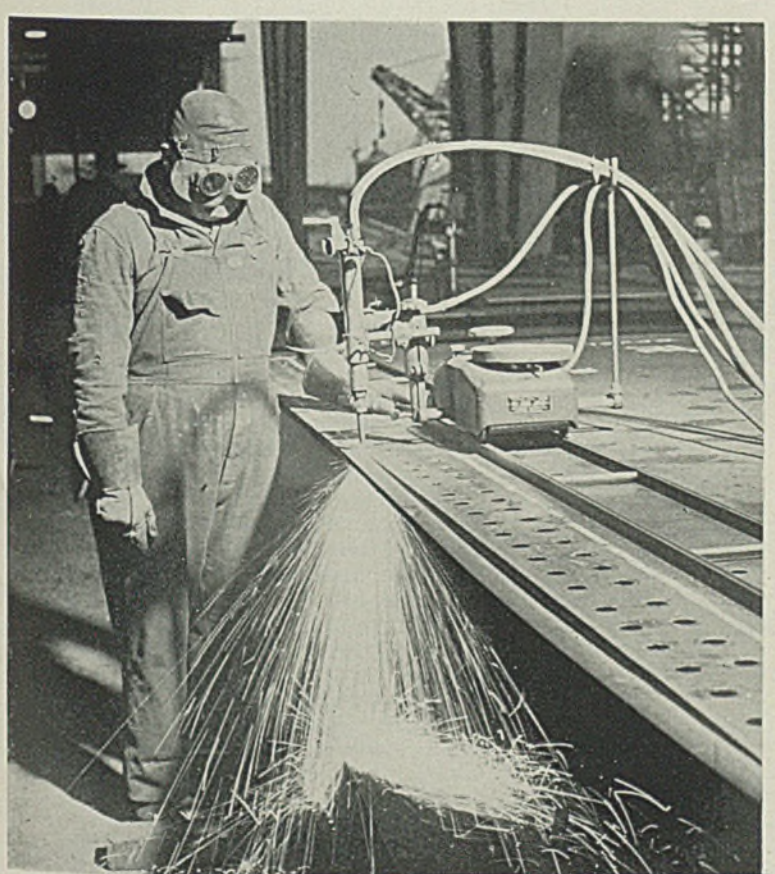
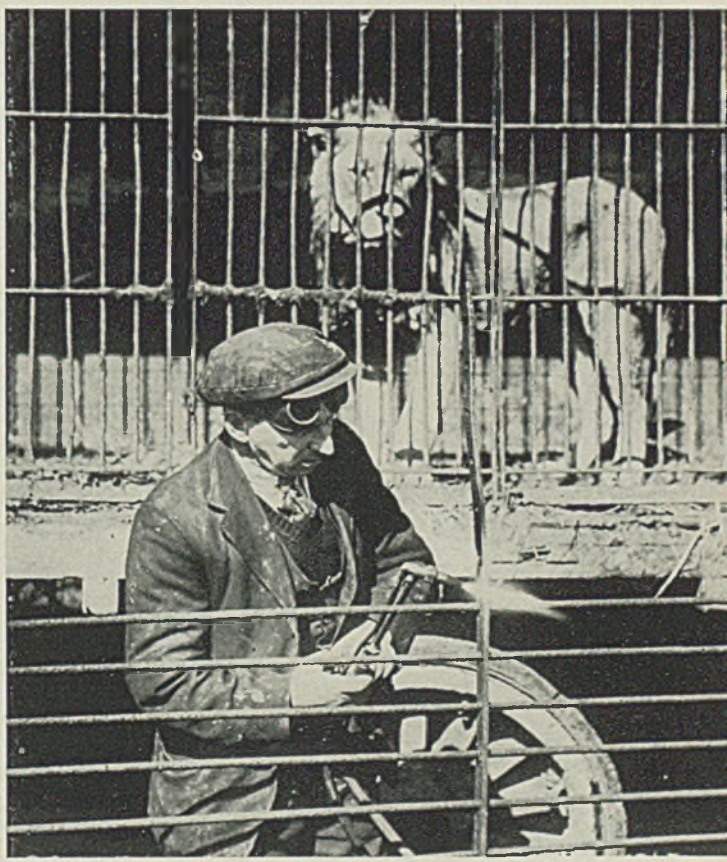
Flames of War

WHILE an automatic oxygen torch is used to trim ship plates to size in a western Canadian yard, left, an English workman finds another use for his torch—cutting up the bars of the lion cages in London's zoo for scrap steel. NEA photos





ernment plans to go into the warehouse business generally. All steel carried at this warehouse will be of special analyses and will be parcelled out as required.

At the conclusion of his formal talk, Mr. Stuart answered questions from the floor regarding the operation of Order M-21-b, which applies to the warehouses.

Joe Tucker, Bureau of Industry Branches, Washington, in his address emphasized the increasing need for recognition of the fact that the war effort demands every ounce of steel available and other materials as well to the exclusion of all but the most essential civilian needs. He declared that while steel production this year may better that of last by possibly 2,000,000 tons, still demand will run in excess of the anticipated 85,000,000 tons production by about 10,000,000 tons. He described the warehouses in the existing supply and demand situation as being "in an awful boat."

Time is the big element in the whole distribution picture, Edmund H. Eitel, Chicago Regional Office, WPB, said. He described the activities of the Chicago office which has been set up to save time in the carrying out of contracts. He said these regional offices of WPB have authority to transact much WPB business which formerly had to be acted on in Washington, thus saving the industries' time and removing some of the burden from national headquarters.

Ralph J. Stayman, chief, Distressed Stock Unit, Washington, said large tonnages of surplus steel had been acquired as the result of the cutting off of automobile production. Most of the tonnage acquired by his unit, in fact has been from this industry but with steel conservation order M-126 going into effect, he anticipates much more surplus tonnage will be made available.

Mr. Stayman said that all this surplus material is sold on a mill basis, plus freight, plus $2 per ton handling charge. It is disposed of where it can be best utilized in the war effort. He cited the shipment of a large tonnage to Russia, which meant that mill rolling schedules were not disturbed in order to fill this Russian demand.

Representing the Office of Price Administration, Clair Wilcox, Iron and Steel Division, spoke on the general effort being made to restrain inflation. He said it was absolutely necessary that if we are to avoid an inflationary spiral, unusual controls must be applied and these the government now is putting into effect.

W. H. Heywood, Chicago Regional Office, OPA described the activities of this office.

Patrick M. Malin, Warehouse and Jobber Unit, Washington, told the delegates how the Warehouse Price Schedule No. 49 operates. He said that his division will continue to study the subject diligently and will make revisions whenever such are found necessary.

Most Jobbers On War Basis

E. L. Wyman, Warehouse and Jobber Unit, OPA, answered written questions submitted from the floor on the price schedule.

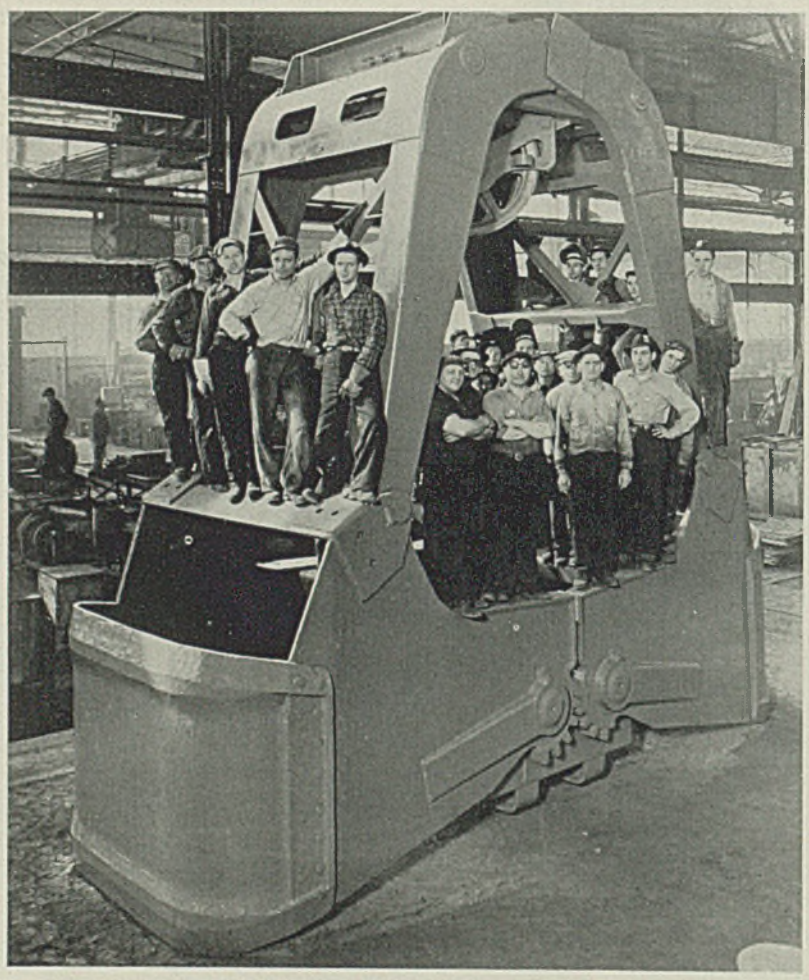
On the opening day of the convention, Walter S. Doxsey, president of the association, in his address, said warehouse steel business has shifted from nearly 100 per cent nondefense orders in May a year ago to 97 per cent war service at present. Reviewing conditions during the past year, he said that unless distribution of steel through warehouse secondary outlets is streamlined there is the possibility the military authorities may establish warehouses. In this connection, he cited the acquiring of a large warehouse in Rochester, N. Y., by the Small Arms Unit of the Army for the stocking of production steels for the arms contractors.

Mr. Doxsey explained in some detail the various steps which have been taken in establishing priority regulations governing distribution of steel through warehouses. The fact that delays have attended institution of some of these measures is evidence of a democracy at work, and, he added: "For every one of these priority orders must satisfy not only the Army and the Navy, but must also meet with the approval of labor representatives, consumer representatives, a Bureau of Research and Statistics, legal specialists, priority experts, a division that prepares the forms, the Office of Price Administration, and others.

He pointed out original proposals are checked and approved by all of these bureaus, divisions and committees, and so likewise are any modifications or alterations interjected by any one of them. In the long run, he said he felt sure most

(*Please turn to Page* 147)

Two Bites—and It Fills a Freight Car



IN ONE bite this bucket grabs 25,000 pounds of iron ore; two bites fill a freight car, and in seven it charges an 800 to 900 ton blast furnace. Believed to be the largest ever built, it weighs 49,000 pounds, and is one of four being shipped by its builder, Blaw-Knox Co., Pittsburgh, for use in a midwestern steel mill

Other recent [illegible] award: Farrel-Birmingham Co., Buffalo; Crane Packing Co., Chicago; Busch-Sulzer Co., St. Louis.

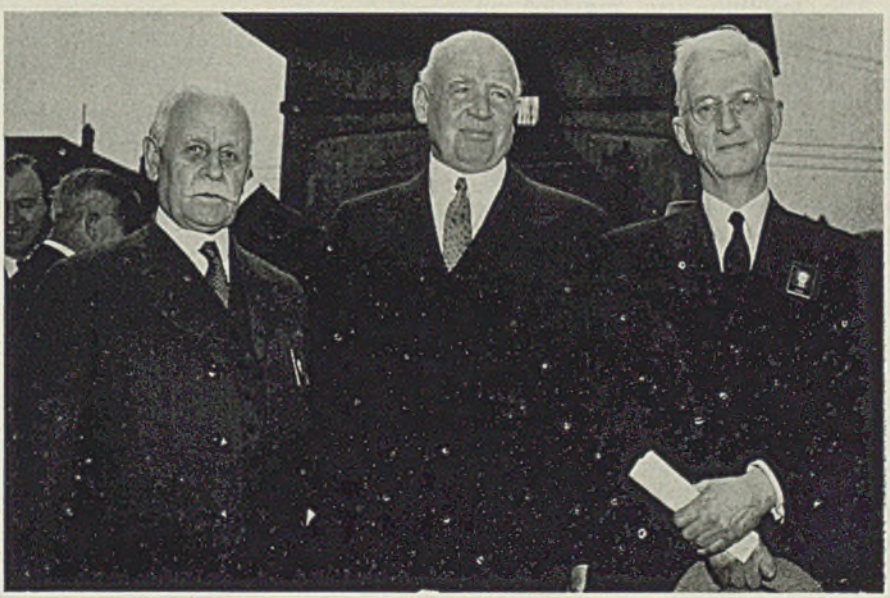
Atha Works of Crucible Steel Co. of America, Harrison, N. J., has been awarded the British "B" for excellence in producing supplies for the British Army and Navy. Award is the first of its kind to an American company.

All Bethlehem employes will be privileged to wear the Navy "E" lapel buttons.

Automatic Transportation Co., Chicago, was presented the burgee in a setting simulating a warship turret in front of the company's plant (see photo, upper left). Company produces industrial trucks.

A "Beat the Schedule" campaign resulted in the award to Harnischfeger Corp., Milwaukee. Center photo shows Walter Harnischfeger, president of the company, pointing to one of the campaign posters as he is congratulated by Rear Admiral Cluverius, who made the presentation.

Three Connecticut plants of the American Brass Co., at Torrington, Waterbury and Ansonia, were honored May 6. Photo at lower right



...resident, Farrel-Birmingham Co., Inc., Buffalo; and L. H. Shrade, vice president, D. O. James Mfg. Co., Chicago.

For the first time Newbold C. Goin appeared before the membership in his new role of secretary-manager. Mr. Goin, who as sales manager of Nuttall gear works of Westinghouse long has been active in the affairs of the association, "took over" on May 1.

The meeting also provided an occasion for many fine tributes to Jackson C. McQuiston, retiring after ten years as secretary-manager following 35 years with Westinghouse. He was presented with a wrist watch; life membership was conferred upon him by the association; and he was given a leather-bound album containing personal messages from hundreds of well-wishers. Mr. McQuiston was guest-of-honor at the annual dinner, at which time the tokens were presented by his long-time associate Ted Miller, chief engineer, Fellows Gear Shaper Co., Springfield, Vt.

Guest speaker at the annual dinner was Dr. Lillian M. Gilbreth, president of Gilbreth Inc., consulting engineers, and Professor of Management at Purdue University. Under the title, "Skills and Satisfac-

John H. Flagg
Elected president of American Gear Manufacturers Association

tion moving pictures in color to show what happens when metals are turned or milled.

Dr. Martellotti's presentation revealed how plastic flow rather than mere wedging action control metal removal and chip formation. He showed how the so-called "built-up edge" instead of adhering to the tool throughout the cut, is sloughed off periodically and merges into the machined surface, thus affecting quality of finish.

He also showed how coolants of various kinds affect finish by causing the tool to remain free of adhesions—his conclusions being that the effect of coolant is not merely physical but also chemical, through inducing coatings on tools and work and having important results on action between tools and materials machined. Joseph B. Armitage, chief engineer, Kearney & Trecker Corp., Milwaukee, explained that through better understanding of this "chemistry of metal cutting", chip formation and surface quality eventually

...San-
...ff of Fel-
..., Springfield,
...r. Sanborn illus-
...y which splines, cams,
...ar arms, square holes, heart-
...aped holes, tooth clutches, etc., can be generated rapidly in gear shapers by reciprocating tools of special shapes.

Ingenuity is involved in these setups, the tools in many cases bearing no visible resemblance to the shapes which they generate so effectively. This process holds wide possibilities in production of gun and aircraft parts.

Recent developments in tooling up gear generators of Farrel-Sykes type were revealed by H. E. Kitchen, design and development engineer, Farrel-Birmingham Co. Inc., Buffalo. These machines cut herringbone teeth in gears and racks without clearance where the two angles meet. Mr. Kitchen showed setups where this faculty was utilized in simultaneous cutting of closely adjoining members of a cluster gear, also in generation of internal gears where in some cases there is little clearance beyond the teeth. He pointed out that internal gears up to 200 inches in diameter are now being generated in these horizontal, reciprocating cutter machines.

An important phase of the technical work is that of standardization, this work having gained such wide recognition that it now literally is true that "A gear standard to be a recognized standard should be an AGMA standard". Since May 1935, T. R. Rideout, section engineer,

Westinghouse Electric & Mfg. Co., Nuttall Works, Pittsburgh, has been carrying a heavy load as chairman of the AGMA General Standards Committee.

Due to increasing pressure of his regular work under wartime conditions, Mr. Rideout has resigned this committee chairmanship. During the meeting at Hershey the officers of the association paid tribute to him for his long and faithful service. S. L. Crawshaw, manager of engineering at the Nuttall Works, was appointed as his successor as chairman.

United States Steel Engineers See Canadian Armor Plate Produced

TORONTO, ONT.

MORE than 350 engineers from various plants in the United States observed at first hand a portion of Canada's war effort on a conducted tour of the Dominion Foundry & Steel Co., Hamilton, Ont., when they attended the annual spring conference of the Association of Iron and Steel Engineers, Royal Connaught hotel, that city, May 11-12. This was the first meeting of the association to be held in Canada.

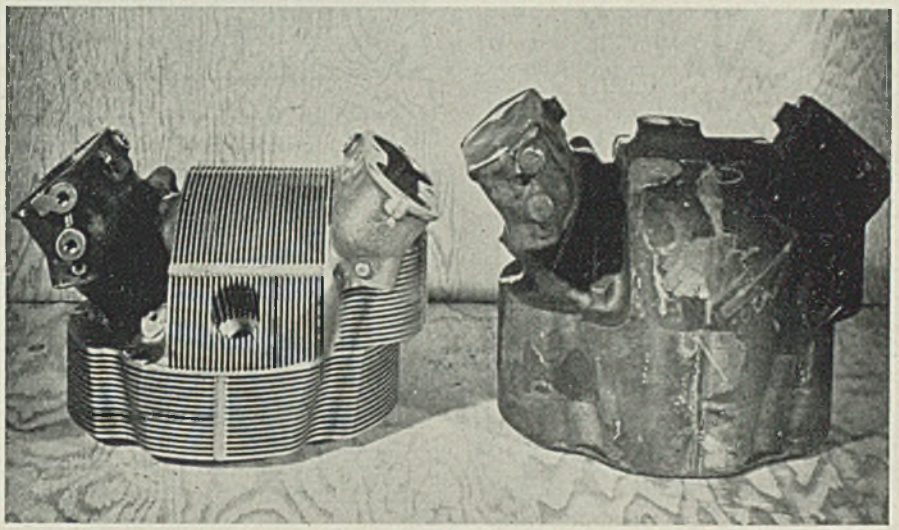
Members and guests of the association were shown various steps in the manufacture of armor plate for corvettes and tanks. The plant, occupying 32 acres, is the only steel foundry in Canada engaged in the production of armor steel castings. More than 25,000 tons of open-hearth and electric steel ingots are poured monthly.

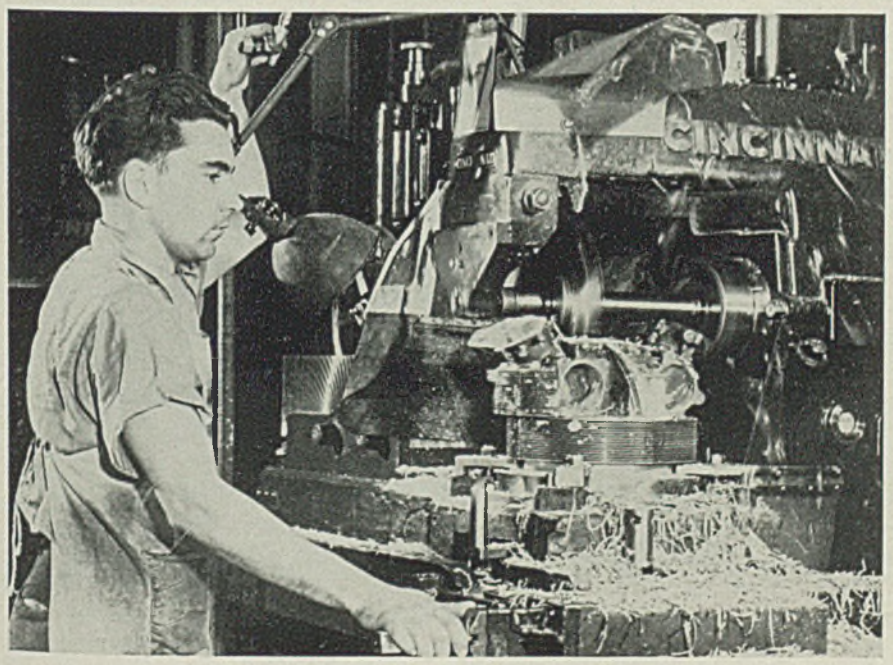
Mayor William Morrison, in speaking at the dinner meeting said: "Here in Hamilton we are producing 55 per cent of the whole steel output of the Dominion. We are making and rolling all the plate being fabricated for corvettes and tanks."

"No other place in the world can mass-produce precision material like the North American continent," L. J. Rogers, chemical engineer, University of Toronto, declared at the technical session Monday evening. He paid tribute to the co-operation of American engineers in the development of Research Enterprises, Leaside, Ont. Lieut.-Gen. A. G. L. McNaughton, Canadian Corps commander, impressed on the Canadian government the importance of making optical glass, Mr. Rogers pointed out. As a result the Research Enterprises was built and since June 1940, the project has developed until optical materials now are being shipped to many of the Allies. The speaker gave a running commentary on a film depicting the growth and production of glass at the Leaside plant.

Following the technical session Tuesday morning members and guests of the association visited the plant of the Steel Co. of Canada Ltd., another important contributor to the war needs of the United Nations.

Forged Cylinder Heads for Aircraft Engines





DEVELOPMENT of a forged cylinder head and methods for producing it speedily in large quantities have been announced by Wright Aeronautical Corp., New York. The company believes the development will give United Nations' planes superiority over present combat aircraft in speed, altitude, load and range, and likens the development in importance to the advent of the radial engine. Top photo shows one of the forged cylinder heads and the rough stock from which it was made from a section of extruded billet. Lower view is a newly designed milling machine which cuts the long thin fins, necessary for cooling. NEA photos

Packard "Work To Win" Competition Inspires Men, Speeds Up Divisions

ONE of the first of the large industries in the automobile-aircraft field to draft a production-drive program, Packard Motor Car Co., Detroit, now has the campaign in full operation in its plants, with the joint backing of management and labor union leaders who developed the details in joint meetings. The program covers all Packard war workers in both marine engine and aircraft engine divisions, now totaling in number 4810 more than the all-time employment peak of the company in peacetime (around 15,000). The campaign has been designated the "Work-to-Win" program. As a pattern of joint management-labor effort in stimulating production, it should be of interest to plants in the metalworking industry, both large and small.

Included in the Work-to-Win program are three main divisions of activity: Promotional publicity to shop workers including a voluntary "best effort" pledge card and pledge pin; recognition awards for outstanding production achievements and suggestions; and a school for training unskilled workers and for "upgrading" others. Purpose of each activity is to stimulate productivity of shop workers by increasing their interest and pride in their jobs.

A Management-Labor Idea

Steering the program is a management-labor committee of six. It includes: For the company, B. C. Budd, chairman, David Livesay and C. E. Weiss; for the union, O. Utley, R. Lux and J. Lindahl. Idea for plan and committee stemmed from a meeting last January in the office of the company's then vice president of manufacturing and now president and general manager, George T. Christopher.

Chief stewards, foremen, company departmental heads, union, Army, Navy and local War Production Board officials previewed the plan at a special dinner and meeting in the Packard plant, May 2.

Donald M. Nelson, unable to attend the preview, sent a telegram reading in part: "I am happy to observe that the managers and workers of the Packard Motor Car Co. are among the first of the automobile firms in the Detroit area voluntarily to launch a war production drive. Packard is making a vital war contribution in combining its efforts with the army of a million free Americans in 700 plants who are setting up voluntary labor-management committees within the pattern of the war production drive. This war must be won in the plants of America before it is won on the battlefields of the world. It must be won with guns, tanks, planes and ships before it can be won with valor and courage."

PLEDGE pin, top; award for good application, center; and "wings award" for particular excellence, bottom, are given employes who participate in the production program

The Packard program is a straight-forward production plan. It is designed to kindle the voluntary eagerness of workers to accelerate production of the high-precision engines they are building for fighting planes and the Navy's torpedo boats. At the same time it stimulates productive activity by emphasizing and rewarding outstanding production accomplishments of individual workmen. Packard union officials refer to the program as "a speed-up of machines and not of men."

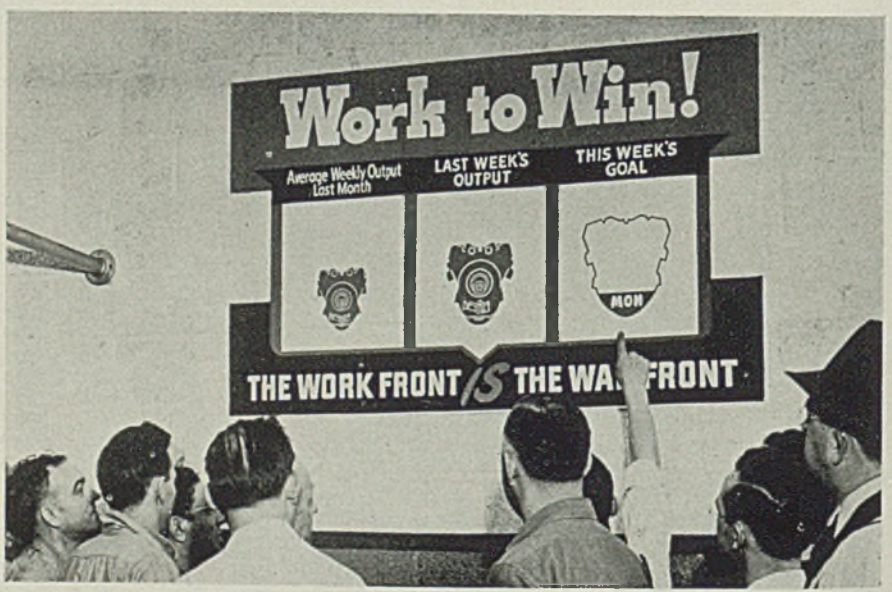
From the employe's standpoint, the start of the program is his voluntary signature on a simple pledge card expressing his willingness and determination to "work to win." Workmen signing the pledge cards get a pledge pin signifying that they are "in" on the program. They are then eligible to qualify for the War Worker pin in the form of a single wing design. Awarded for good application of the program, it establishes the recipient as a soldier of production.

Citation for Excellence

Further production accomplishments brings the Wings award, a double-wing pin for the outstanding war worker. The name of each wearer is inscribed on an honor roll —a citation for production excellence signed by War Production Board officials.

While Packard workers in the company's marine engine division sign the same voluntary pledge and wear the same pledge pin as the aircraft employes, they have their own distinctive insignia fashioned on a marine theme as contrasted with the wings motif adopted for the aircraft workers.

Information booths attended by liaison men are everywhere throughout the Packard plants. They serve as the clearing house for suggestions



STIMULANT to greater production is this poster portraying the job being done and the goal ahead, current week's activity being revised daily

to management, answer employes' questions about the program and disseminate information, literature and similar material.

Departmental and divisional production excellence is also encouraged and recognized by the awarding of citation banners. Those departments that are not up to par in a production way earn the questionable distinction of displaying a "behind the eight ball" banner until they boost their rating.

Among the many devices located in all the plants for recording the progress of the Packard battle of production are numerous giant posters giving each department's scores on the basis of efficiency, schedule, operating costs, output, etc. One of the most interesting of these to the layman are glass-encased miniature battlefields on which divisional "armies" advance or retreat according to productive output.

One Aim Educational

Keynote of the program from an educational angle is the securing of improvement through greater efficiency and more intelligent work rather than through high-pressure tactics. Every effort is made to educate employes to this objective by supplying them with all technical and dimensional data relating to their specific jobs.

An important project developed with this same objective in view is the company's training school for furthering the schooling of newcomers to the expanding army of Packard workers and where veterans are given advanced training.

Slogan suggestions and other Work-to-Win contributions round out the complete program.

MANAGEMENT-labor committee inspects novel production scoreboard—battlefield on which production "armies" of different plant divisions advance toward a monthly goal according to weekly output. Committee includes, left to right: For the company, D. C. Livesay, C. E. Weiss and B. C. Budd, chairman; for the union, O. Utley, R. Lux and J. Lindahl

Search for Palm Oil Substitute Intensified; Reserves Fairly Large

QUARTER-CENTURY search for a substitute for plantation palm oil in the steel industry has been intensified since Pearl Harbor, and a number of leading oil companies are collaborating with steel engineers with this object in view.

Palm oil is used by the industry for a number of purposes. About 60 to 65 per cent is for cooling strip steel while being rolled on continuous cold reducing mills. The greater portion of this is mixed with water in a ratio of 1 part of oil to 40 of water, on the average, which solution is piped to the mills and permitted to drip continuously onto the strip. For the same purpose some mills apply undiluted palm oil directly on the rolls.

Most of the remainder is used by the hot dipping process in production of tin and terne plate. A bath of palm oil floats on top of the molten metal, and as the coated sheet emerges through the bath it receives a thin coat, principal effect of which is to seal the tin or terne coating against oxidation. This type of use will decrease with installation of new electrotinning units in the next 10 to 11 months, since the electrotinning process uses less tin and hence is aimed at conserving our supplies of that metal.

Some palm oil also is used in polishing various metals, including stainless and carbon steels, but this takes only a small portion of the total.

A number of substitutes now are being tried, but individuals concerned are reluctant to express judgment as to their value. In general, nothing so far tried has the all-around merits of palm oil. The substitutes are priced at 8½ to 10½ cents a pound, delivered at mills, compared with the present palm oil price of close to 8½ cents, New York, and a normal palm oil price of 2½ to 3¼ cents.

Substitutes which continue to be tried include petroleum products, soy bean and cotton seed oils and hydrogenated fish oil, alone or in combinations. Tallow and cocoanut oil, which were used during the early days of the tin plate industry, do not fit into modern practice.

African Oil Preferred

African palm oil is the variety preferred by most steelmakers, and shipments continue to arrive even though sharply reduced in volume. Sumatra, source of most of the palm oil used in this country, has, of course, been cut off. Most Sumatra palm oil has been used in making soap. A small portion has been consumed by the steel industry. The supply situation is not uncomfortable as reserves are sufficient to enable the industry to get along for a long time without resorting to substitutes.

Despite this situation, uncertainties as to maintenance of production in Africa and threat of an increasing shortage of shipping are factors making it desirable that one or more acceptable substitutes be found.

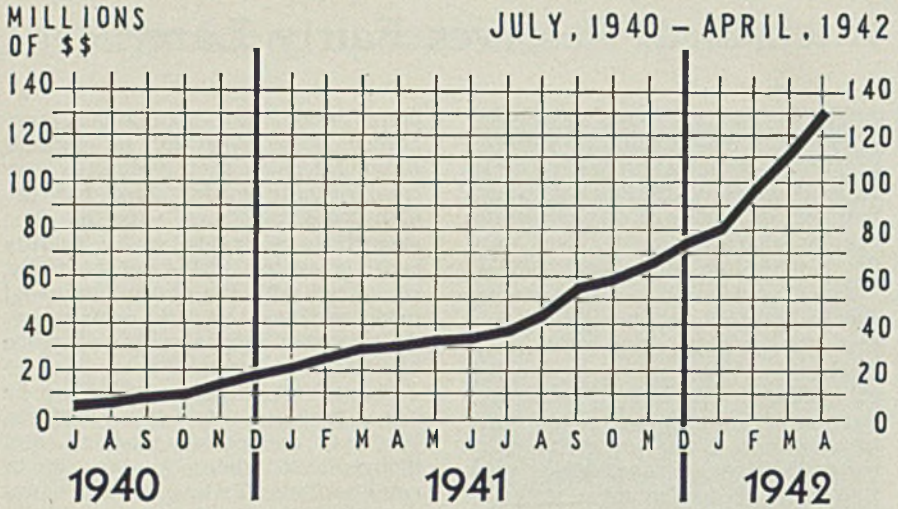
Purdue Shops Work on Westinghouse Contract

Student machine shops at Purdue University, Lafayette, Ind., have been converted into a war production factory under terms of a Westinghouse Electric & Mfg. Co. subcontract, according to R. A. McCarty, vice president in charge of company's subcontracting program.

More than 275 engineering students enrolled in the shop course are working part-time on the subcontract. Together their production is the equivalent of a 75-man machine shop working full time on war materials.

Special stock material required for some parts being made by Purdue students has been supplied by Westinghouse. For the purchase of other materials, the university has received a priority rating from the War Production Board.

War Costs Exceed All U. S. Federal Spending, 1789 to 1941



AVERAGE daily rate of expenditures for war purposes in April increased to $131,600,000, compared with $114,900,000 in March. Total expenditures for the month, including Treasury checks and RFC disbursals, amounted to $3,421,000,000, against $2,987,000,000 in March. Above chart shows how the daily rate of war spending has increased since the start of the emergency

AUTHORIZED government spending for the present war is greater than the total federal expenditures for all purposes from 1789 to 1941—from the inauguration of George Washington as first president until Pearl Harbor.

During these 152 years, Treasury records show, United States spending amounted to $197,180,000,000. The current war appropriations, including a new $35,500,000,000 Army request by the President, totals $197,267,000,000, and the end is not yet in sight.

While the spending of this huge sum will be spread over several years, the actual outlay now is about $1,000,000,000 a week, more money than ever was spent in a year before this country entered the first World War in 1917.

During Washington's administration, the federal government spent a little more than $5,000,000 a year. Today the Treasury is pouring out more than that, for war alone, every hour day and night, weekdays and Sundays.

It wasn't until the Civil war that annual expenditures of the government became as great as today's daily expenditures, more than $100,000,000. The Civil war's most costly year to the Union was $1,297,000,000, less than two weeks' outlay for war alone at present.

Cost of the Spanish-American war was $605,072,000, about a five-day account at present. During the last year of the first World war, the then huge sum of $18,514,000,000 was spent.

Carnegie-Illinois Files Answer to Government

"Any failures in priorities administration were due not to our noncompliance, but to defects in the system itself or in the method of administering it." This was the answer of Carnegie-Illinois Steel Corp., United States Steel Corp. subsidiary, to a complaint filed in federal district court of New Jersey charging the company with "repeated, deliberate violations" of priorities regulations.

J. L. Perry, Carnegie-Illinois president, issued the following comment of his company's refutation of the charges:

"The Carnegie-Illinois Steel Corp. filed its answer in the government priorities suit today, within a week after receiving the complaint, which was not filed in the United States District Court of New Jersey until May 5, although a press release was issued on Sunday afternoon, April 19, charging the Carnegie-Illinois Steel Corp. with 'repeated, deliberate violations' of priorities continued down to that date.

"The complaint excused its failure to allege a single specific violation of priorities by the Carnegie-Illinois Steel Corp., by the claim that, on account of its widespread operations, a thorough investigation had been impossible.

"In a single investigation covering a period of at least ten days in March, 1942, the WPB had 18 investigators, consisting of lawyers, economists, and accountants at the corporation mills in the Pittsburgh District, examining the corporation records, interviewing its officers and employes, and observing mill operations."

Highest April Shipments For U. S. Steel Corp.

Finished steel shipments by United States Steel Corp. subsidiaries in April were the highest for that month in the corporation's history, 1,758,894 net tons. This was 22,044 tons, or 1.3 per cent, less than 1,780,938 tons in March. The increase over April, 1941, was 71,220 tons, 4 per cent.

(Inter-company shipments not included)

Net Tons

	1942	1941	1940	1939
Jan.	1,738,893	1,682,454	1,145,592	870,866
Feb.	1,616,587	1,548,451	1,009,256	747,427
Mar.	1,780,938	1,720,366	931,905	845,108
Apr.	1,758,894	1,687,674	907,904	771,752
4 mos.	6,895,312	6,638,945	3,994,657	3,235,153
May		1,745,295	1,084,057	795,689
June		1,668,637	1,209,684	807,562
July		1,666,667	1,296,887	745,364
Aug.		1,753,665	1,455,604	885,636
Sept.		1,664,227	1,392,838	1,086,683
Oct.		1,851,279	1,572,408	1,345,855
Nov.		1,624,186	1,425,352	1,406,205
Dec.		1,846,036	1,544,623	1,443,969
Total, by Mos.		20,458,937	14,976,110	11,752,116
Adjustment			†37,639	*44,865
Total			15,013,749	11,707,251

†Increase. *Decrease.

Reports Iron, Steel Income Off 26.8%

Increased taxes and higher labor, material and other operating costs are among factors noted by National City Bank of New York as contributing to a reduction of 26.8 per cent in first quarter 1942 net incomes of 24 companies classified as "iron and steel." The comparison is with net in the first quarter of 1941.

STEEL'S compilation, May 11, p. 78, of first quarter statements by 21 major steel producers showed a decline of 32.8 per cent.

Earnings of most industrial groups are tabulated as follows:

No. of Companies	Group	Per Cent Change
19	Machinery	—22.3
24	Iron and Steel	—26.8
8	Building Equipment	—12.6
9	Petroleum Products	— 7.7
21	Chemicals, Drugs	—18.1
7	Automobiles	—62.7
17	Auto Equipment	+ 9.6
8	Railway Equipment	— 4.1
21	Misc. Manufacturing	—23.1
231	Total Manufacturing	—26.2

The *BUSINESS TREND*

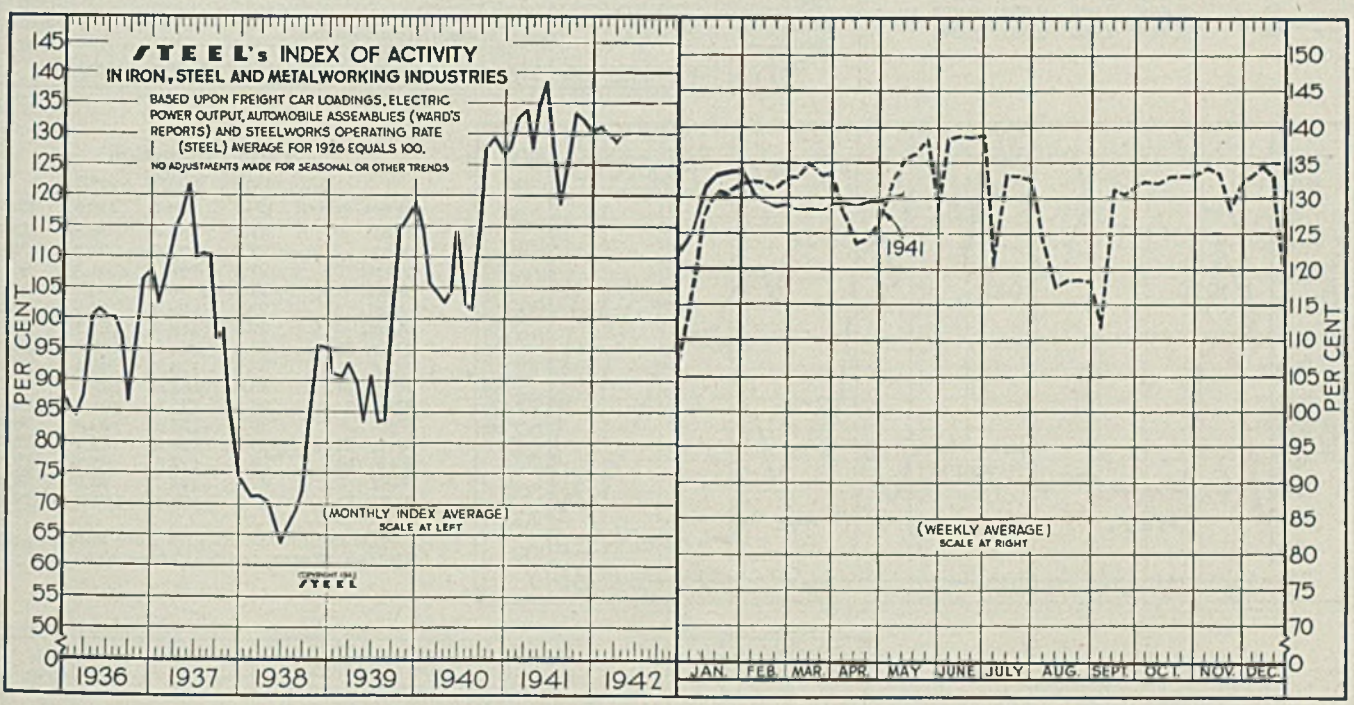
War Industries Record Further Expansion

Over-all industrial production continues to advance steadily, despite recent sharp contraction in civilian goods lines. Encouraging gains in output to peak levels have been recorded in most of the key war industries with further expansion in activity to a new high plateau indicated over the coming months.

STEEL'S index of activity in the iron, steel and metalworking industries again advanced during the period ended May 9 to the 130.4 level. This represents a gain of 0.4 point over the preceding week's index figure.

The national steel rate held steady at 99 per cent of capacity in the week of May 9. Output is well sustained by heavier steel scrap shipments to mill yards. Barring necessary furnace repairs steel production should hold at the current peak level throughout the summer months at least.

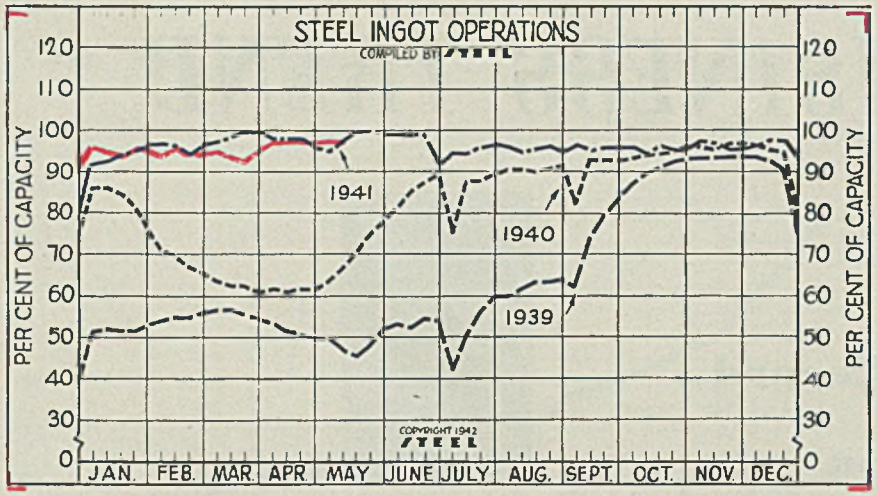
Electric power consumption recorded a moderate gain to 3,351,126,000 kilowatts during the latest period and is currently 11.6 per cent above the like 1941 week. Revenue freight car loadings declined to 839,253 cars.



STEEL'S index of activity advanced 0.4 point to 130.4 in the week ended May 9:

Week Ended	1942	1941
Feb. 21	129.0	131.2
Feb. 28	129.1	133.0
Mar. 7	128.3	133.1
Mar. 14	128.3	135.0
Mar. 21	128.1	133.5
Mar. 28	129.1	133.9
April 4	129.6	128.9
April 11	129.2	123.8
April 18	129.4	124.2
April 25	129.3	126.5
May 2	130.0	132.6
May 9	130.4	135.9

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



Steel Ingot Operations

(Per Cent)

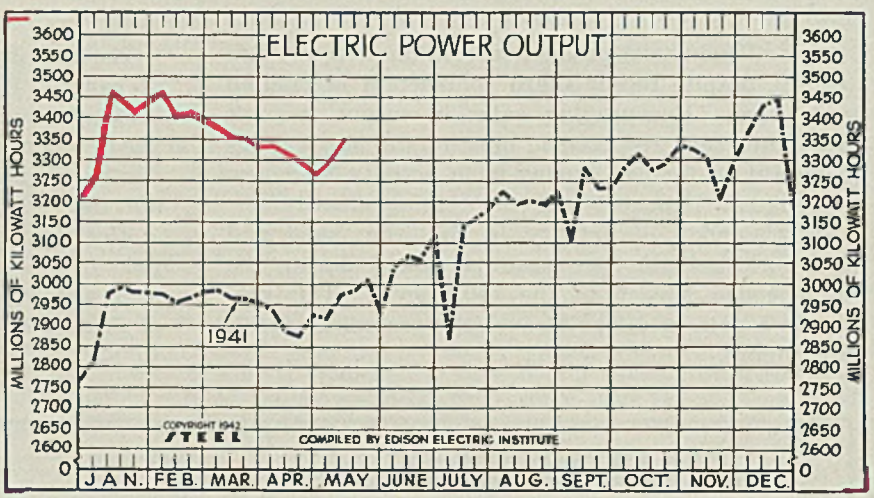
Week ended	1942	1941	1940	1939
May 9....	99.0	97.5	66.5	47.0
May 2....	99.0	95.0	63.5	49.0
April 25...	98.5	96.0	61.5	49.0
April 18...	98.5	98.0	61.5	50.5
April 11...	98.5	98.0	61.0	51.5
April 4....	98.0	98.0	61.5	53.5
Mar. 28....	97.5	99.5	61.0	54.5
Mar. 21....	95.5	99.5	62.5	55.5
Mar. 14....	95.5	98.5	62.5	56.5
Mar. 7.....	96.5	97.5	63.5	56.5
Feb. 28....	96.0	96.5	65.5	56.0
Feb. 21....	96.0†	94.5	67.0	55.0
Feb. 14....	97.0	96.5	69.0	55.0
Feb. 7.....	96.0	97.0	71.0	54.0
Jan. 31....	97.0	97.0	76.5	53.0

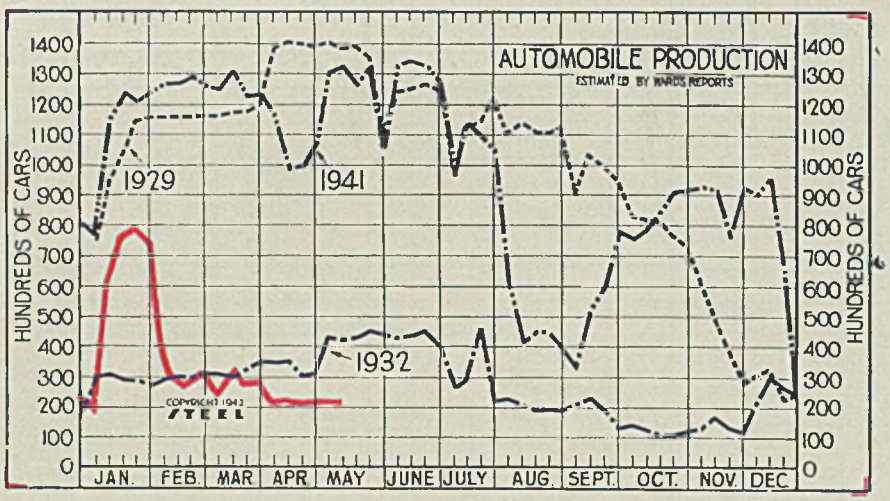
†Since Feb. 21 rate is based on new capacity figures as of Dec. 31 last.

Electric Power Output

(Million KWH)

Week ended	1942	1941	1940	1939
May 9.....	3,351	2,975	2,516	2,239
May 2.....	3,305	2,915	2,504	2,225
April 25.....	3,299	2,926	2,499	2,244
April 18.....	3,308	2,874	2,529	2,265
April 11.....	3,321	2,882	2,530	2,235
April 4.....	3,349	2,938	2,494	2,244
Mar. 28.....	3,346	2,956	2,524	2,272
Mar. 21.....	3,357	2,964	2,508	2,258
Mar. 14.....	3,357	2,965	2,550	2,276
Mar. 7.....	3,392	2,987	2,553	2,285
Feb. 28.....	3,410	2,982	2,568	2,294
Feb. 21.....	3,424	2,968	2,547	2,269
Feb. 14.....	3,422	2,959	2,565	2,297
Feb. 7.....	3,475	2,973	2,616	2,315
Jan. 31.....	2,468	2,978	2,633	2,327
Jan. 24.....	3,440	2,980	2,661	2,340





Auto Production

(1000 Units)

Week ended	1942	1941	1940	1939
May 9 ...	21.5	132.6	98.5	72.4
May 2....	22.0	130.6	99.3	71.4
April 25...	21.9	108.2	101.4	86.6
April 18...	21.7	99.9	103.7	90.3
April 11...	23.0	99.3	101.9	88.1
April 4....	22.3	116.3	101.7	87.0
Mar. 28....	28.9	124.2	103.4	86.0
Mar. 21....	28.9	123.8	103.4	89.4
Mar. 14....	30.6	131.6	105.7	86.7
Mar. 7.....	24.5	125.9	103.6	84.1
Feb. 28....	30.1	126.6	100.9	78.7
Feb. 21....	25.7†	129.2	102.7	75.7
Feb. 14....	29.8	127.5	95.1	79.9
Feb. 7.....	37.1	127.7	96.0	84.5
Jan. 31....	73.3	124.4	101.2	79.4

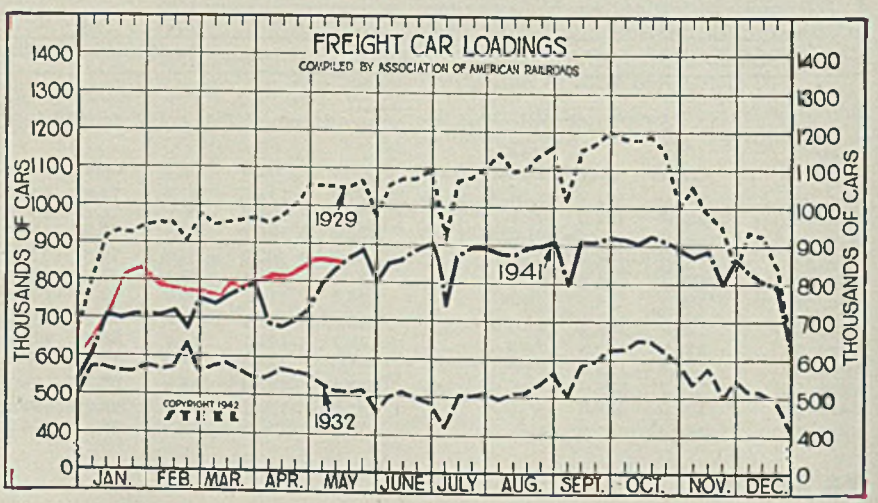
†Canadian trucks and automobiles and United States trucks, since Feb. 21.

Freight Car Loadings

(1000 Cars)

Week ended	1942	1941	1940	1939
May 9.....	855†	837	681	555
May 2.....	859	794	666	573
April 25.....	855	722	645	586
April 18.....	847	709	628	559
April 11.....	814	680	619	548
April 4.....	829	683	603	535
Mar. 28.....	805	792	628	604
Mar. 21.....	797	769	620	605
Mar. 14.....	799	759	619	595
Mar. 7.....	771	742	621	592
Feb. 28.....	781	757	634	599
Feb. 21.....	775	678	595	561
Feb. 14.....	783	721	608	580
Feb. 7.....	784	710	627	580

†Preliminary.

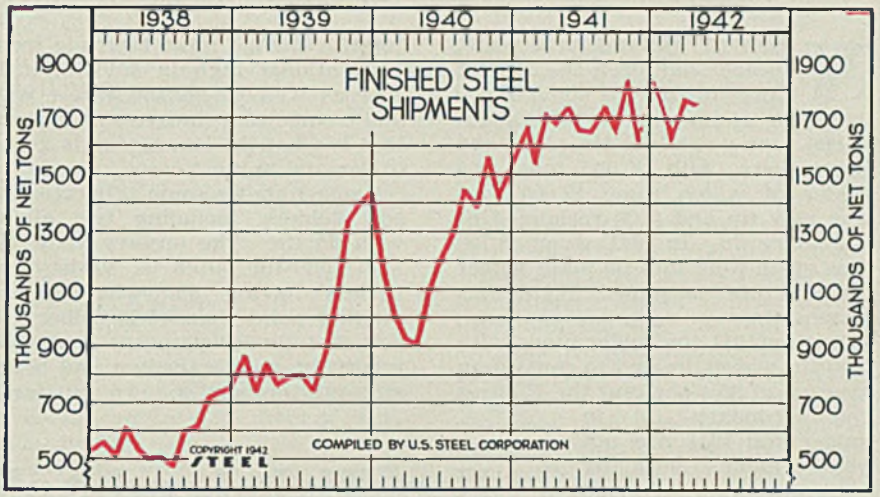


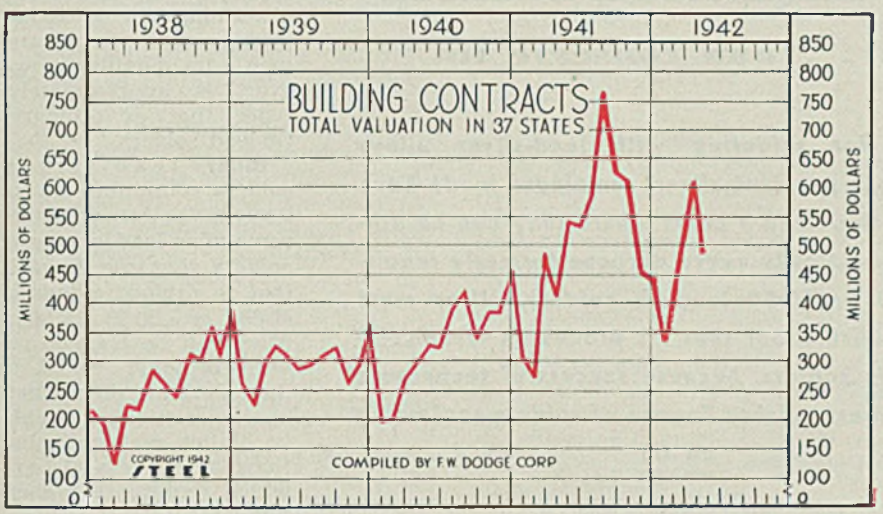
Finished Steel Shipments
U. S. Steel Corp.

(Unit 1000 Net Tons)

	1942	1941	1940	1939	1938
Jan.	1738.9	1682.5	1145.6	870.9	570.3
Feb.	1616.6	1548.5	1009.3	747.4	522.4
Mar.	1780.9	1720.4	931.9	845.1	627.0
Apr.	1758.9	1687.7	907.9	771.8	550.5
May	.....	1745.3	1084.1	795.7	509.8
June	.....	1668.6	1209.7	807.6	525.0
July	.....	1666.7	1296.9	745.4	484.6
Aug.	.....	1753.7	1455.6	885.6	615.5
Sept.	.....	1664.2	1392.8	1086.7	635.6
Oct.	.....	1851.3	1572.4	1345.9	730.3
Nov.	.....	1624.2	1425.4	1406.2	749.3
Dec.	.....	1846.0	1544.6	1444.0	765.9
Tot.†	.....	15,013.7	11707.3		7315.5

†After year-end adjustments.





Construction Total Valuation In 37 States

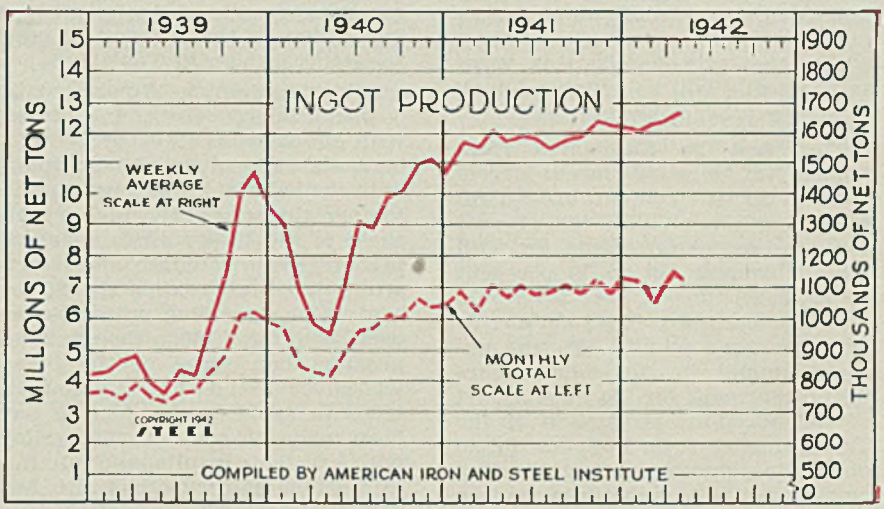
(Unit: $1,000,000)

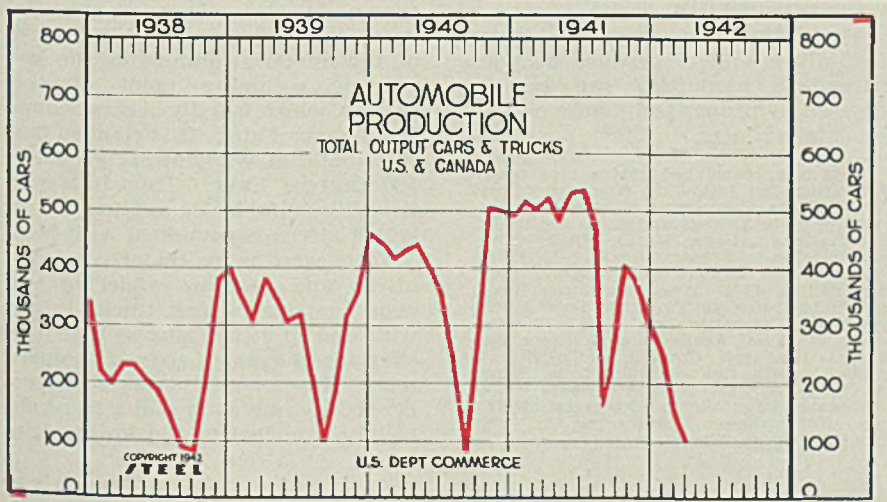
	1942	1941	1940	1939	1938
Jan.	$316.8	$305.2	$196.2	$251.7	$192.2
Feb.	433.6	270.4	200.6	220.2	118.9
Mar.	610.8	479.9	272.2	300.7	226.6
April	498.7	406.7	300.5	330.0	222.0
May	.....	548.7	328.9	308.5	283.2
June	.....	539.1	324.7	288.3	251.0
July	.....	577.4	398.7	299.9	239.8
Aug.	.....	760.3	414.9	312.3	313.1
Sept.	.....	623.3	347.7	323.2	300.9
Oct.	.....	606.3	383.1	261.8	357.7
Nov.	.....	458.6	380.3	299.8	301.7
Dec.	.....	431.6	456.2	354.1	389.4
Ave.	.....	$500.6	$333.7	$295.9	$266.4

Steel Ingot Production

(Unit 100 Net Tons)

	Monthly Total		Weekly Average	
	1942	1941	1942	1941
Jan.	7,124.9	6,922.4	1,608.3	1,562.6
Feb.	6,521.1	6,230.4	1,630.3	1,557.6
March	7,392.9	7,124.0	1,668.8	1,608.1
April	7,122.3	6,754.2	1,660.2	1,574.4
May	.....	7,044.6	.....	1,590.2
June	.....	6,792.8	.....	1,583.4
July	.....	6,812.2	.....	1,541.2
Aug.	.....	6,997.5	.....	1,579.6
Sept.	.....	6,811.8	.....	1,591.5
Oct.	.....	7,236.1	.....	1,633.4
Nov.	.....	6,960.9	.....	1,622.6
Dec.	.....	7,150.3	.....	1,617.7
Total	.....	82,836.9	.....	1,588.7





Automobile Production

(Unit: 1000 Cars)

	1942	1941	1940	1939	1938
Jan.	260.1	524.1	449.3	357.0	227.1
Feb.	154.3	509.3	421.8	317.5	202.6
March	114.7	533.9	440.2	389.5	238.6
April	.....	489.8	452.4	354.3	238.1
May	.....	545.3	412.5	313.2	210.2
June	.....	546.3	362.6	324.2	189.4
July	.....	468.8	246.2	218.5	150.4
Aug.	.....	164.8	89.9	103.3	96.9
Sept.	.....	248.8	284.6	192.7	89.6
Oct.	.....	401.4	514.4	323.0	215.3
Nov.	.....	373.9	511.0	370.2	390.4
Dec.	.....	302.5	506.9	469.0	407.0
Ave.	.....	.....	391.0	311.0	221.3

Use High-Lead Solders

. . . . and conserve tin

Methods for soldering with lead-silver alloys (2 1/2 to 5 per cent silver, remainder lead) have been developed to a point where they can be utilized for practically every purpose formerly requiring 40-60 or 50-50 lead-tin solders. User must now establish proof that his processes technically require tin solders, because successful techniques have been established for use of solders containing no tin

NEXT TO tin and terne plate, solder has been the largest user of tin. Of some 90,000 long tons of tin used in 1937, about 40,000 tons went into tin plate and terne plate, with 20,000 tons into solder of which some 12,000 tons was new tin and 8000 reclaimed or secondary tin. In 1941, when 48,700 tons of tin went into tin plate, solder manufacture consumed 18,420 tons of new tin.

During 1941 the solder made with new tin was estimated to contain an average of 36.4 per cent tin. Figures for secondary tin in solder for 1941 are not yet available. Normally solder accounts for 20 per cent of the total tin consumption, with tin plate accounting for around 50 per cent. Thus tin in solder is extremely important.

Since 1941 the situation has changed, for civilian automobile production has been stopped and tin-containing body solder for repair work has been banned, leaving the can-making industry as the largest remaining user of solder. Because can making is done at such a high rate—350 to 400 per minute — automatic soldering of the side seam of a food can is about the most difficult soldering task that is attempted. Obviously a solder that will handle this work satisfactorily will be suitable for almost any other soldering task.

Tin Must Be Eliminated from Solder, Not Merely Reduced: Merely cutting the tin content of lead-tin solders will not fulfill the present conservation requirements for with the tin content cut to 30 per cent some 12,000 tons of new tin would still be required in 1942—a terrific drain on our stockpile. To use any such amount in succeeding years would represent far too huge a part of the hoped-for production of the Texas smelter from Bolivian tin, so obviously something must be done and promptly to substitute tin-free for tin-containing solders.

As far back as a year ago, a solder containing 97.5 per cent lead with 2.5 per cent silver was found suitable for can soldering. A solder containing 97.25 per cent lead, 2.5 per cent silver and 0.25 per cent copper has been used for electrical equipment. Also a solder with 95 per cent lead and 5 per cent silver has been used for radiator tipping where operating temperatures were too high for the lead-tin solders.

While the addition of tin and bismuth to these lead-silver alloys has been considered, it affords some disadvantages. These low-tin solders have little place in the picture today, for if a change must be made from conventional high-tin solders, it is just as well to go the whole way and change to a tin-free solder since that is what the emergency is going to demand in most cases.

Table I shows some properties of soft solders, including two alloys with no tin. The ternary alloys of lead-silver-tin offer a variety of solders having somewhat higher melting point than 40-60 solder (40 per cent tin, 60 per cent lead) but relatively good spreading and bond-strength properties. An outstanding improvement in the silver-bearing solders is the increase in creep resistance shown in Table I.

Alloys containing 15 per cent tin, 5 bismuth, 1.5 silver, 1 antimony with the balance lead—or 20 tin, 3 bismuth, 1.5 silver, 0.5 antimony with the balance lead—have liquidus temperatures slightly higher than those of the 40-60 solders, markedly higher tensile strength and a bond strength of approximately 80 per cent. The spreading properties are less than for 40-60 although much greater than those of the binary lead-silver solders. Commercial trials in rapid hand soldering have been made on some of these alloys with excellent results, and automatic machine soldering has also been done satisfactorily.

The difficulty in using the binary lead-silver solders because of poor spreading properties can be decreased by proper techniques as will be detailed later.

This is a correlated abstract of material from the following sources: "Low-Tin Solders Containing Silver and Bismuth", by S. Turkus and A. A. Smith Jr., *Metals and Alloys*, March, 1942; "Conserving Tin in Solders" by A. J. T. Eyles, *Sheet Metal Industries*, January, 1941; Report No. 45 to War Production Board on "Substitutes for Tin in Solders" by the Advisory Committee on Metals & Minerals, National Academy of Sciences, National Research Council. To this is added information obtained from Prince & Izant Co., Cleveland representative of Rochester Lead Works, Rochester, N. Y.; also from Fusion Engineering Co., 1836 Euclid avenue, Cleveland.

Cadmium Alloys: Much work has been done in the substitution of cadmium for tin in solders. Many cadmium solders have been made and tested on a practical scale, indicating that cadmium is a promising substitute for part of the tin in solders, if not all. A solder containing 90 per cent lead with 10 per cent cadmium has been found suitable for some applications. Other cadmium solders include one containing 80 per cent lead, 10 per cent cadmium and 10 per cent tin. A third cadmium-solder employs 1.5 per cent zinc with 3 per cent cadmium and 90.5 per cent lead. The tensile strength of the solder containing tin is about 5800 pounds per square inch. Its ductility, however, is approximately twice that of ordinary tin-lead solders.

Binary lead-silver solders containing 2.5 to 5 per cent silver with the remainder lead *are good solders that can be utilized to replace standard* 40-60 *or* 50-50 *solder.* They can be handled with ordinary solder flux. Perhaps their chief characteristic is a slightly higher melting point than lead-tin solder, which requires a higher temperature of application. Occasionally the silver content is increased to 7 per cent or more when additional strength is desired.

According to Prince & Izant Co., Cleveland, one such binary lead-silver solder melts at 582 degrees Fahr. and has considerably more strength than ordinary solders. As made by Rochester Lead Works, Rochester, N. Y., the solder contains 2.5 to 5 per cent silver with the remainder lead. This is said to be a good general purpose solder that can replace ordinary high-tin solders.

Another silver alloy solder which contains no tin and which can be substituted for ordinary high-tin solders is known as Silver Fuse H. T. made by Fusion Engineering, 1836 Euclid avenue, Cleveland. As shown in the accompanying diagram, the temperature cooling curve of this material eliminates the low eutectic softening point of soft solders, which usually occurs around 362 degrees Fahr. It is claimed that this material will not soften below 500 degrees Fahr. Thus it is particularly suitable for applications in which stress is combined with heat.

Tests were made under combined stress and heat by soldering two copper strips ⅛-inch thick, 1 inch wide and 10 inches long so that they overlapped over an area of 1 square inch. The assembly was then suspended by one strip and a 50-pound weight attached to the lower strip.

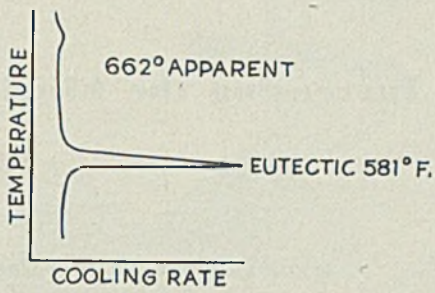
Then with a thermometer placed in the upper strip, an electric current was passed through the two strips until the joint failed. Several tests using different solders resulted in the following: A 42 per cent tin, 58 per cent lead solder failed at 350 degrees Fahr. A pure tin solder failed at 412 degrees Fahr. A 3.5 per cent tin, 96.5 per cent lead solder failed at 460 degrees Fahr. The Silver Fuse alloy failed at 565.

The high electrical conductivity of this material also makes it suitable for electrical joints. Thus this class of lead-silver solder is suitable for making electrical connections on commutators and retaining bands on armatures of rotating electric equipment.

Since lead-silver solders (2.5 to 5 per cent silver, remainder lead) have a melting point around 580 degrees, a temperature of application of 675 to 775 degrees Fahr. is required. To avoid even this small difference in technique of application, several substitute low-melting solders have been developed. One of the best of these and one alleged to be the favorite German substitute contains 90 per cent lead, 8 per cent cadmium, 2 per cent zinc—or slight modifications of this analysis. This is similar to the cadmium alloys reported above.

However, the supply of cadmium is limited as it is obtained solely as a by-product of zinc production. Navy requirements for cadmium plating leave little for other uses so it would be necessary to shift to zinc plating, which is almost always a usable substitute before enough cadmium could be released to affect the solder situation. Thus use of cadmium involves striking a balance between various uses of the material.

Bismuth-containing solders have been suggested as "intermediate solders", but since from 10 to 20 per cent tin is usually required, they will not be discussed here.



This is a typical temperature cooling curve of a high-lead solder containing silver but without tin. Its melting point of around 580 degrees Fahr. eliminates the low eutectic point at which softening occurs near 362 degrees Fahr. in conventional lead-tin soldiers. Curve shown applies to Silver Fuse H.T. solder, made by Fusion Engineering Co., Cleveland

Taking all things into consideration, use of the straight binary lead-silver solder appears to be the best way of eiminating tin in solders. The fact that the 2.5 per cent silver solder is cheaper than a 70 per cent lead 30 per cent tin solder is also a point.

While the addition of 0.25 per cent copper to the 2.5 per cent silver 97.25 per cent lead alloy slightly improves the soldering characteristics on copper, it does not appear desirable for soldering tinned surfaces.

Since the 97.5 per cent lead 2.5 per cent silver alloy is close to the eutectic, the solder freezes sharply at its melting point without a freezing range. To afford a slight freezing range, the silver may be raised to 5 or 6 per cent as specified in SAE Aircraft Material Specification 4755 for dipping solder. This increase in silver raises the strength of the joint somewhat, but it is doubtful if an increase of over 4 per cent silver is ever justified.

Lead-Silver Technique: Once the technique of applying lead-silver solder is understood and adopted, it is likely that because of its cheapness and availability the term "solder" will come to mean this alloy rather than lead-tin solder. Properly made lead-silver joints are stronger than those of lead-tin. The solder appears somewhat darker, like lead rather than bright like tin.

The lead-silver solder requires active fluxing. Resin is not satisfactory, and the organic amines that are effective noncorrosive fluxes for lead-tin and lead-cadmium-zinc solders are rather too strongly decomposed at the necessary application temperature, which may range up to 775 degrees Fahr. Zinc chloride is an effective flux, particularly when it can be used conveniently in the fused condition such as in a layer over the molten solder in dip soldering. Since zinc chloride leaves residues that are soluble only with difficulty in water, washing the flux from the finished joint is done with dilute hydrochloric acid, followed in turn by water, dilute sodium carbonate and water.

The solder itself as well as the metal to be soldered must have a clean surface.

To Promote Spreading: For years the lamp department of General Electric Co., Cleveland, has been using high-lead solders with excellent results. To avoid surface oxidation and to promote spreading (a difficulty often experienced with high-lead solders), small, pointed fires which heat both the work and the solder at points of soldering are used. With a 97.25 per cent lead, 2.5 per cent silver and 0.25 per cent copper soldering alloy, it has been found that natural gas fires do not produce satisfactory spreading. However, by adding hydrogen to the gas-air mixture, this solder can be made to spread satisfactorily. Also, this practice works well with 95 per cent lead, 5 per cent tin solders.

Since most artificial gas contains

(*Please turn to Page* 121)

TABLE I—Some Properties of Soft Solders

Composition, Per Cent					Liquidus	Solidus	Tensile Strength,	Bond Strength of Lapped Joints,	Spread of ½ Gr.	Creep Rate in Per Cent per Year at 30 Deg. C.			
Lead	Tin	Silver	Bismuth	Antimony	Deg. C.	Deg. C.	P.s.i.	P.s.i.	in Sq. In.	200 P.s.i.	400 P.s.i.	600 P.s.i.	800 P.s.i.
60	40	....	...	...	238	183	5660	6270	1.30	10.9	92.0	300	...
97.5	..	2.5	...	...	304	304	4980	3740	0.19	0.10	0.15	...	0.50
95	..	5.0	...	...	375	304	4915	4340	0.20	0.18	0.22	...	0.45
90	10	....	...	...	298	183	4850	4960	0.27	2.5	12.0	...	....
87.75	10	2.25	...	...	290*	...	4950	5000	0.41	....	2.3	8.0	....
80	20	....	...	...	275	183	4940	5680	0.37	6.7	18.7	...	....
78	20	2.0	...	...	267*	...	5620	5550	0.57	....	....	...	....
70	30	....	...	...	257	183	5390	5770	0.83	10.0	50.0	...	....
69	30	1.0	...	...	251*	...	8810	5620	0.86	....	4.0	20.0	....
78.5	15	1.5	5	...	264*	...	4960	5310	0.47	....	....	...	....
77.5	15	1.5	5	1.0	258*	...	8000	5090	0.29	....	....	...	....
74.85	20	1.5	3	0.5	258*	...	8120	5380	0.39	....	....	...	....

Note: Bond and spread tests were made on copper sheet.
Tensile and creep tests were made on chill cast strips of the alloys.
*Determined in this investigation from cooling curves—other temperatures from literature.

Increasing the Efficiency of THE FORGING

. . . . involves an understanding of the essential facts of furnace design as well as the problems of burning and overheating, safe rates of heat absorption, nature of the combustion process, gases that produce scale, modes of heat transfer, combustion and temperature control methods—all of which are discussed here

Section VIII in a Series on Forgings, Forging Methods and Forging Equipment

By ARTHUR F. MACCONOCHIE
Head, Department of Mechanical Engineering
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University Station, Va.
And
Contributing Editor, STEEL

WHILE considerable progress has been made, especially in recent years, in rendering the forge furnace more efficient, there is still room for effecting large economies through improvements in design and the more extensive application of automatic control.

Familiar concepts die hard, however, and none less readily than the concept of a furnace as a pile of firebrick tied together in some fashion to prevent it's falling apart and equipped with burners at either end of the rectangular space above the hearth. Charging is normally accomplished through a slot in the side through which the products of combustion and commonly much unburned gas belch forth in a smoky flame to the distress of the forging crew.

Where conditions of this sort existed, the absence of any serious attempt to apply simple physical principles to the solution of the problem was only too painfully in evidence in the shape of excessive fuel consumption, failure of refractories, spoiled work and the general discomfort of the operators. While such furnaces, where they still exist, accomplish the desired end after some fashion, close analyses of all the factors involved will generally establish their retention as something of a luxury.

Efficient Design Possible: If we consider carefully just what we desire to achieve, and have at our command a few well known facts concerning the metallurgy of steel and the principles of combustion and heat transfer, the problem of designing an adequate and efficient furnace capable of raising the steel to forging heat is not beyond the wit of the average engineer. Among those facts relating to the nature of the steel itself which must be known are the rate at which heat may be "pumped" into the steel without injury arising from differential strains, the injury arising from "burning" of the steel and the chemical action of the furnace gas upon the outer skin.

As regards the first, the total heating time should be just sufficient to raise the center of the bar or billet to forging heat, and the rate of heating for plain carbon steel under 0.5 per cent carbon should not exceed 20 minutes per inch of thickness if injury to the steel is to be avoided.

"Burning": Much confusion exists concerning the meaning of the term "burning" as opposed to "overheating". If for steel of any given carbon content the temperature exceeds that at which the more fusible elements melt and run, leaving voids between the grains, the steel is said to be "burned." This can and does occur without union of the heart of the steel with the oxygen of the furnace atmosphere. However, burning takes place at a somewhat lower temperature in the presence of free, turbulent oxygen.

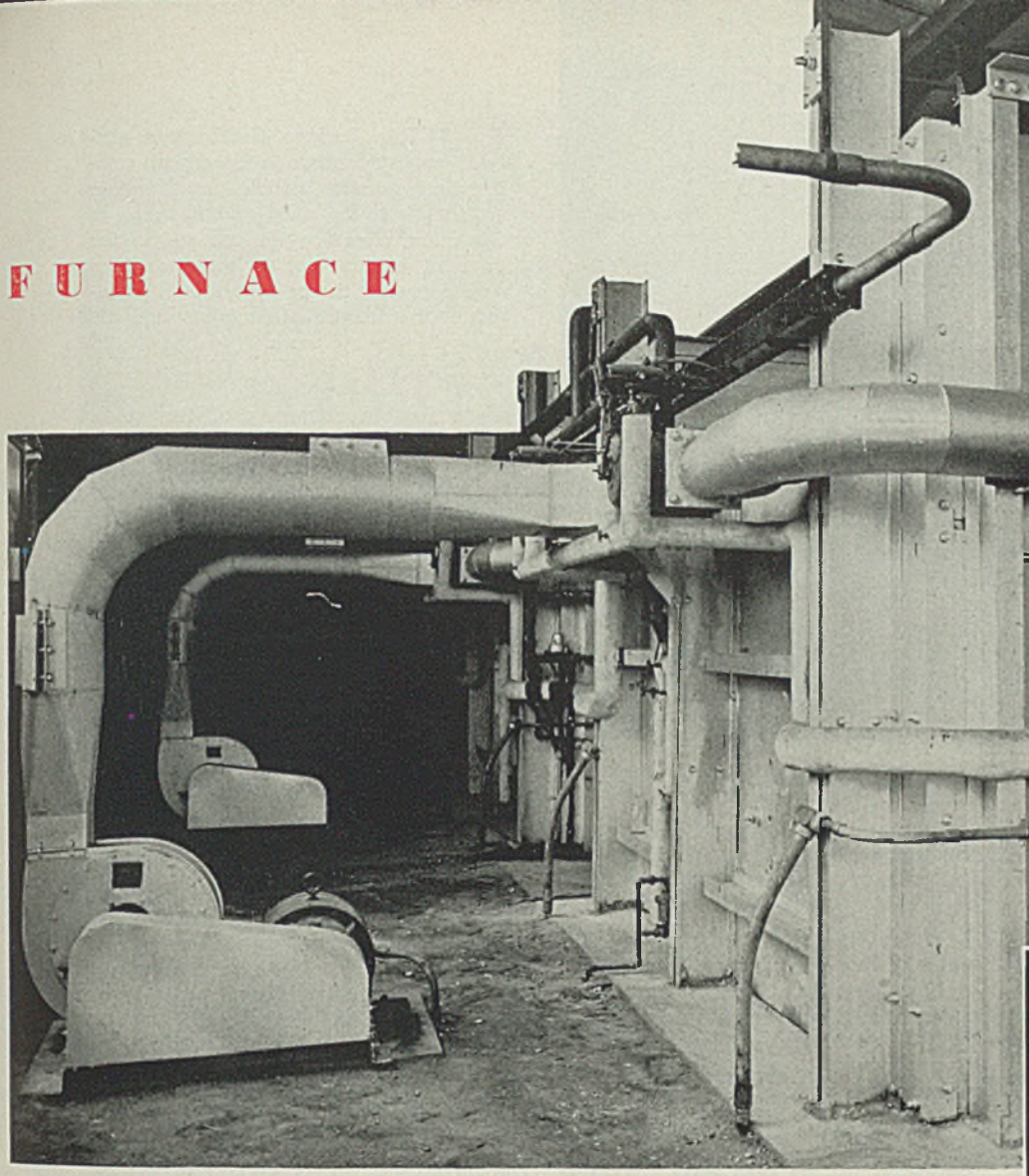
This type of injury may be avoided by limiting the forging heat to some temperature below the region of the solidus. Since this curve on the iron-carbon equilibrium diagram has a negative slope, the safe forging temperature diminishes with increase in the carbon content of the steel. No direct impingement of the flame on the metal should be permitted since spot burning may result. Further, jets of air should not be allowed to play upon the steel. *Once steel has been burned, it is irreparably injured and is only fit for remelting.*

Overheating, on the other hand, may be defined as an acute case of grain growth resulting from high forging temperatures, a condition which may be remedied by proper mechanical or thermal treatment. Steels of all carbon contents are subject to rapid grain growth as soon as the temperature rises above the upper limit of the critical range, where the grain assumes the finest form attainable by heat treatment. The further the steel is heated above this temperature, the larger the grains become. In the normal course of events, however, these large grains are broken up under the hammer or the press as the temperature falls during the forging process. Thus if forging has been continued to a sufficiently low temperature (but not, of course, below the upper limit of the critical range) the ill effects of grain growth are to a large extent dissipated. In cases of severe overheating, it is desirable to reheat the steel from below the lower limit of the critical range to just above it and hold there for some time until all pre-existing grain structures are obliterated.

Overheating and burning of the steel both in the smaller and also in the larger types of slot furnaces results from the necessity of operating the furnace at several hundred degrees above the forging temperature required in order to obtain the production rates desired. In fact, the upper limit of furnace temperature is frequently determined by the melting point of the refractories lining the furnace. This condition is most commonly the result of inadequacy of hearth area and of furnace volume since, just as in the case of the furnace underneath a boiler, satisfactory results can only be secured when sufficient space is provided for complete combustion of the fuel.

By way of a specific example, if mild steel is being heated, its forging temperature should lie somewhere between 2000 and 2200 degrees Fahr. Since the danger point for this steel lies in the neighborhood of 2500 to 2550 degrees Fahr., depending on the nature of the furnace atmosphere, the furnace temperature should never exceed 2400 degrees Fahr.

Furnace Ratings: A figure which may be of some assistance in determining furnace capacity indicates that in batch-type forging furnaces from 50 to 100 pounds of steel may be heated per square foot per hour; while a rate of 120 pounds may be maintained if the furnace temperature is high. This latter rate, however, is generally regarded as excessive on account of the wear and tear on refractories and the danger of overheating the outside of the steel before the center has reached forging heat. We might amplify this recommendation by suggesting a figure nearer 35 pounds for under-fired furnaces, 70 pounds for side-fired and 100 pounds for direct-fired.



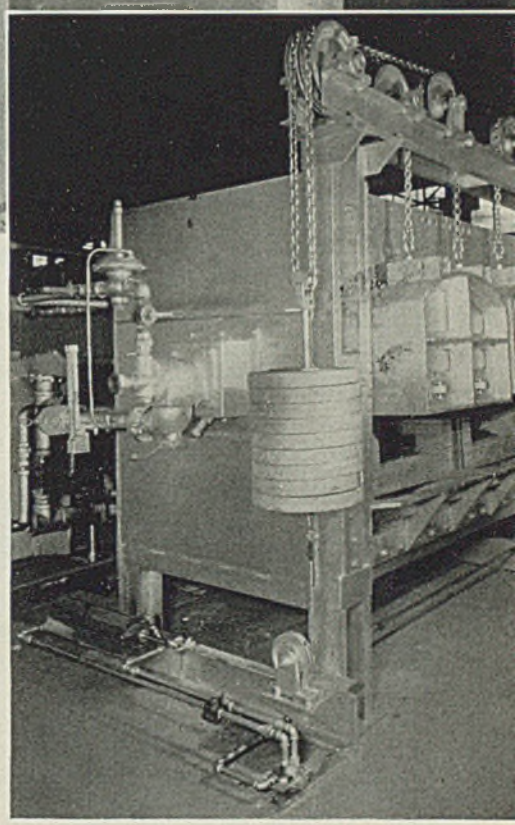


Fig. 1. (Above)—This is a side and rear view of two double-compartment forge furnaces of the solid hearth type built by Amsler-Morton Co., Pittsburgh, for Dominion Foundries. Note the heavy fuel and air lines

Fig. 2. (Immediate right)—This forge furnace was recently installed in Rock Island Arsenal. It has a maximum work temperature of 2700 degrees Fahr. and is used to heat miscellaneous bar stock for forging. Rated capacity is 300 net pounds heated from cold to 2700 degrees Fahr. per hour. Furnace is fired with two luminous flame burners equipped with rotary air valves so flame lengths can be duplicated quickly and accurately. Unit made by Surface Combustion Co., Toledo, O.

We may gain some idea of the rate of heat absorption through the surface of a steel billet by considering any particular case, such as a 4-inch square 1 foot long. The weight of this piece is about 54.4 pounds, and a mean value of its specific heat between 50 and 2150 degrees Fahr. is not far from 0.143. Hence the heat absorbed by the billet would be 16,400 B.t.u. If the billet were laid on its side the heat absorption per square foot would be around 13,400.

Since this billet is 4 inches thick, we allow 80 minutes for heating. Hence the hourly rate of heat absorption per square foot of surface exposed to the radiant heat of the furnace is very close to 10,000 B.t.u. If the hearth of the furnace were loaded with 70 pounds per square foot, the heat usefully applied would be 21,000 B.t.u. per hour. Thus, knowing the area of the hearth and the efficiency of the utilization of heat, the amount of fuel required and the number of burners of given capacity can readily be found.

Heat Distribution: The total heat generated by the fuel is spent in five rather well defined ways. First, of course, there is the heat put into the steel itself. Then there is the principal loss by way of the furnace gases as they pass into the atmosphere. Radiation, which varies with the temperature of the furnace and with the design of the wall; black body loss, or heat radiated from the interior of the furnace through all of the openings in the furnace walls; and heat lost in the water employed to cool skid pipes and castings account for the remainder. On account of the considerable variation in furnace design, only general indications of the overall effect of these losses can be offered here.

For example, a rough rule would be to take the number of pounds of steel heated in a batch-type furnace per hour, multiply this quantity by

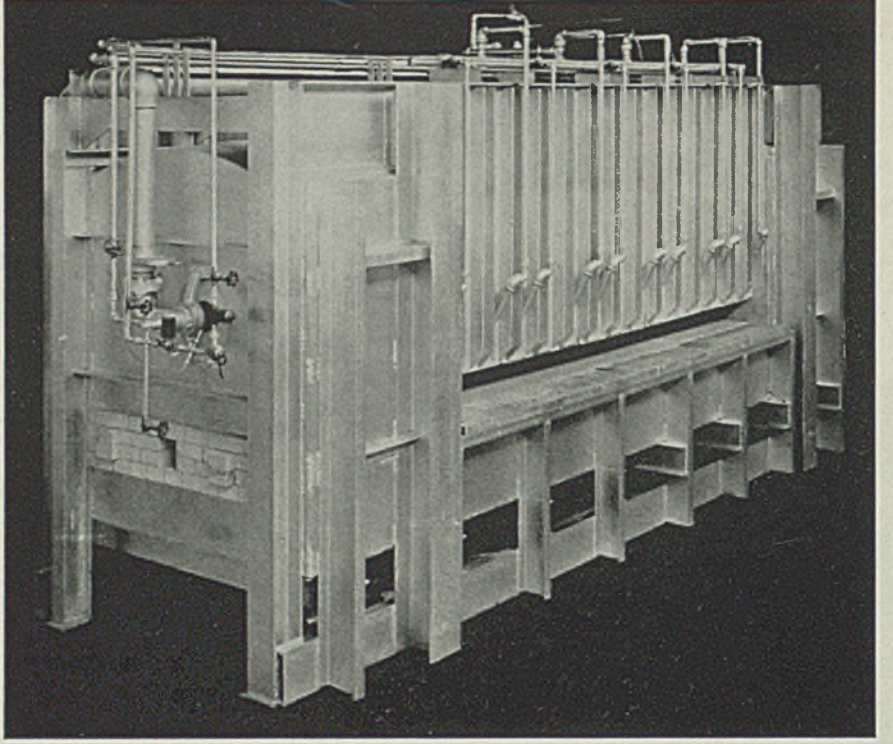


Fig. 3—This Surface Combustion slot-type forging furnace is fitted with combination burners which permit either gas or oil to be used as the fuel. In operation, sheet covers are suspended in front of the slot to conserve heat and to protect the operators from radiated heat from furnace interior and the work

2 and divide by 100 in order to get the number of gallons of fuel oil which must be supplied. Thus a furnace having a capacity of 600 pounds of steel per hour requires about 12 gallons of fuel oil. Incidentally, if the calorific value of fuel oil is taken as 140,000 B.t.u. per gallon, the overall efficiency, or the ratio of heat entering the steel to heat liberated by the combustion of the oil, is just under 11 per cent.

Combustion: The nature of the action which takes place when either liquid or gaseous fuel is burned in the furnace has an important bearing not only upon the design of the furnace itself but also on what happens to the steel exposed to the products of combustion. All fuels, being principally composed of carbon and hydrogen, require a certain minimum and perfectly definite quantity of air (oxygen) for their complete combustion. Thus from the standpoint of operating economy, no more air than is absolutely necessary to insure this should be admitted since any "excess air" merely serves as a vehicle for the carrying away of heat up the stack or into the atmosphere of the forge.

However, maximum fuel economy may not be of prime importance for variations in the fuel-air ratio produce important effects—most important of which is the amount and type of scale produced on the work. Depending on whether there is a sufficiency or a deficiency of air, the atmosphere of the furnace will be "neutral" or "reducing", while if excess air is present, there will be "oxidizing" tendencies. Thus in addition to carbon dioxide, nitrogen and water vapor (largely from the combustion of the hydrogen), we may have carbon monoxide if the air supply is restricted and free oxygen may be present at one and the same time. The situation may be further complicated by the presence of free hydrogen.

Controlling Scale: Those gases which exhibit oxidizing effects are carbon dioxide, free oxygen and water vapor, all of which are capable of giving up oxygen; while hydrogen, carbon monoxide and any unburned hydrocarbons avidly seek it. The so-called neutral atmosphere resulting from the correct proportioning of the air-fuel ratio often has a strong tendency to produce scale on account of the presence of carbon dioxide and water vapor. Nor is it practically possible to so arrange matters that the effects of the scaling constituents will be more than offset by those of opposing tendencies. Even to reduce the scaling of carbon steel by a half requires prohibitive percentages of carbon monoxide, and hence our aim must be to produce that type of scale which is most readily dealt with both in and out of the furnace. There is the further problem of decarburization—best solved by using a slightly oxidizing atmosphere. Such an atmosphere has of necessity a lower percentage of carbon dioxide and produces a type of scale which offers protection against the decarburizing influences of water and moist hydrogen. If scaling must be avoided completely, we have no resource but to provide a truly neutral atmosphere in the furnace or muffle in order that no oxidizing action whatsoever takes place.

"Internal Scaling": By way of further clarifying the meaning of burning in the light of the above references to scale formation, we might perhaps define this term as "internal scaling" made possible by the melting and running out of the more fusible elements of the steel. (Presumably, in the absence of scale-forming gases, the steel might be heated up to and above burning temperatures—might even partially melt and still not "burn" although it would, of course, be badly overheated.) The effect of this "internal scaling" is to break up the metallic continuity of the steel—rendering it hot short and causing it to fly to pieces in subsequent forging. Or perhaps the breaking-up process may be delayed until the piece is in service, failure then occurring through a coarsely crystalline fracture.

From a consideration of the iron-carbon diagram, it might be anticipated that injury would be done immediately on passing the solidus. Actually, however, some little delay in the inception of the action occurs, the danger line passing from a level of around 2730 degrees Fahr. for low-carbon steels to about 2550 degrees Fahr. for medium steels and under 2400 degrees for high-carbon steels.

Heating Requirements: The stage is now set for a consideration of ways and means of producing the desired results. Thus we might summarize the basic requirements of an effective forge furnace as follows:

First, the heat must be imparted at the desired rate; second, heating must be uniform; third, the scale must be of the kind and in the amount desired; fourth, the condition of the billets must be such that die wear and hammer injury must be at a minimum; fifth, furnace costs, including fuel and maintenance, must be as low as consistent with the necessities of production.

How Heat Travels: Heat, it may be recalled, is transmitted from one body to another in three distinct ways: First, by convection, which in this case involves contact between the circulating furnace atmosphere and the steel; then, by conduction, on which we are entirely dependent for the transfer of heat from the surface to the interior of the forging; and last, but by no means least important, by radiation from the glowing refractories and from the burner flame itself if of the luminous type. Hence, for any particular furnace and furnace temperature, the maximum rate of heat absorption will occur when radiation, convection and conduction are all

Fire Away

with your questions about

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- **What ANNEALING TEMPERATURE is best ?**

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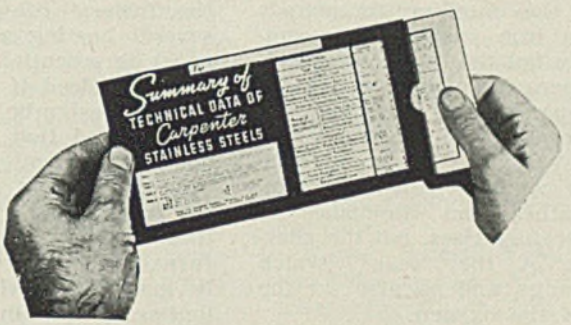

THE CARPENTER STEEL CO · 139 BERN ST · READING, PA.

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

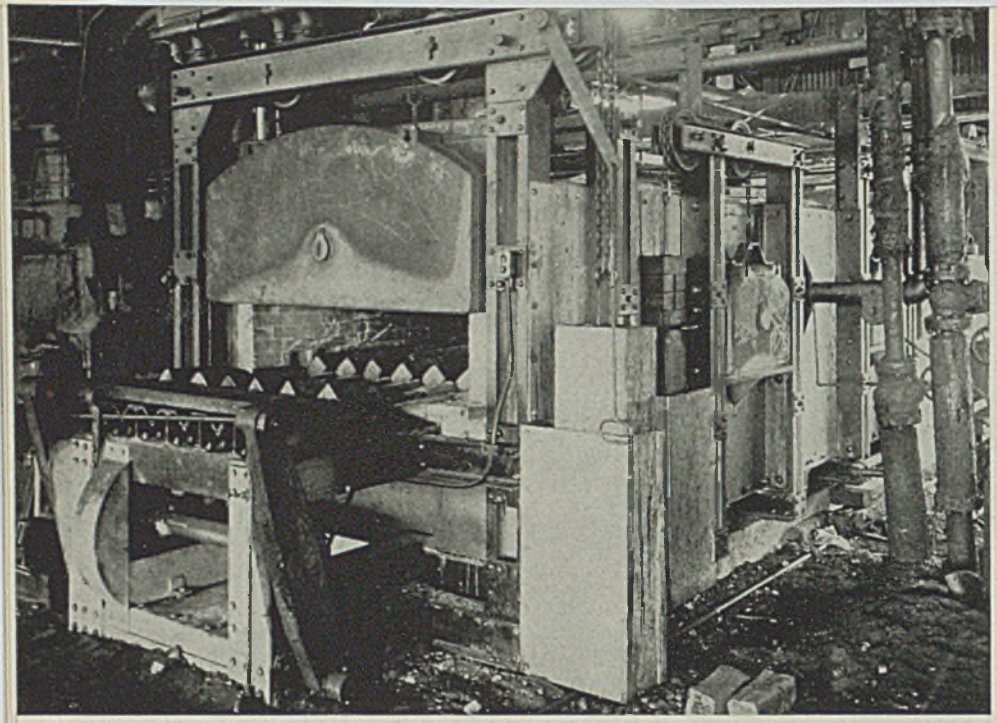

Fig. 4—This is a pusher-type billet heating furnace for forging work. The pusher arm can be seen here ready to push a group of billets into the furnace, at which operation the billets already there will be pushed along one billet length, causing the farthest set of billets to drop out of the furnace at the discharge end. This is a fuel fired furnace built by the Electric Furnace Co., Salem, O.

brought most completely into play.

For instance, if our problem should happen to be the heating of a shell billet, best results would be secured, from the standpoint of heat if it were stood on end in full "view" of the heated walls of the furnace and if the gases were circulated about it as vigorously as possible. On the other hand, if the furnace hearth were loaded in such fashion as to shield any considerable portion of the charge from the radiant heat of the refractor lining and hearth, and if also the circulation were poor, the time required would increase very considerably.

Mechanism of Scale Formation: The evils that follow in the train of prolonged heating are scaling and decarburization. When iron is exposed to a moist atmosphere at normal temperatures, the surface metal combined with oxygen and water to form the familiar compounds known as iron rust. These compounds are but the hydrated sesquioxide or peroxide of iron containing varying quantities of combined water as represented by the chemical formula $Fe_2O_3.xH_2O$. This tendency of iron to combine with oxygen increases rather than diminishes as the temperature rises, but the characteristics of the "scale" which forms change and so also do the sources of the oxygen.

Thus, at temperatures in the neighborhood of 1500 to 1650 degrees Fahr., the action becomes very rapid indeed as compared with the slow rusting at atmospheric temperatures, and a skin whose composition is represented by the formula Fe_3O_4 or $FeO.Fe_2O_3$ forms upon the surface of the steel, the source of the oxygen being the free oxygen of the furnace atmosphere and water vapor. With increase in the temperature toward forging heat, or let us say above 1850 degrees Fahr., another and less common oxide of iron, FeO, makes its appearance, the source in this case being the carbon dioxide generated in the combustion of the fuel.

Long-continued exposure to high temperatures in the ordinary atmosphere of the forge or annealing furnace will thus produce a heavy scale. Accompanying this action is a certain tendency toward removal of the carbon from the outer layers of the steel—a process especially noticeable with high-carbon steels. Hence our aim should be to impart heat to the steel as fast as it will take it without injury and to remove the part from the furnace as soon as heating through at the desired temperature has been accomplished.

Control: It is rather evident from the foregoing that accurate control of both the time of exposure to the heat and also of the temperature of the furnace (or perhaps also the several heating zones of the furnace) is essential to uniformity of result. Indeed, if the trend of forge furnace design be considered it may be observed that wherever the opportunity presented by mass production of heating a succession of similar parts renders the application of these principles practical, time and furnace temperature are commonly maintained within rather close limits. For example, as far as the time factor is concerned, its control has given rise to a distinct class of furnace of the continuous (and we might include the rotary hearth) type, as opposed to the batch or box furnace in which the time of exposure is under the direct control of the operator.

Temperature control is commonly secured by some form of thermocouple, a combination of platinum and platinum-rhodium being found most satisfactory for the comparatively high temperatures of the forge. An important precaution, the necessity for which will be apparent on slight consideration, is the placing of the couple as near to the charge in the furnace as possible so that it may be exposed to conditions approximately those of the steel itself. Standard practice calls for protection from the direct action of the flame and suggests an extension of the couple into the furnace to a distance of some four to eight inches. Couples of this type must be protected by an impervious tube, carborundum being satisfactory for the purpose. Were the rare metals of the thermocouple not protected in this way, the tendency of platinum to absorb gases would cause it to become brittle under some operating conditions.

All types of thermocouples should be checked from time to time with the aid of an optical pyrometer, but it is not nowadays considered good practice to rely on the occasional determination of furnace temperature by this means since the mischief may have been done before the remedy can be applied. Occasionally the arrangements employed to control furnace temperature are designed to produce variation according to a predetermined cycle.

The actual mechanism by which thermocouples in general exert their influence upon fuel, or in the case of electric furnaces the electric power supply, includes a depressor-bar millivoltmeter whose pointer makes contact in a relay which in its turn activates a motor or solenoid governing the air and fuel valves; or in the case of an electric furnace, throws resistors into or out of the circuit. In one form of temperature regulator, air is used as the motive power, thus avoiding the use of a solenoid. The chief objection to the more general use of automatic temperature control resides in extent of the supervision and maintenance required by most types. Ruggedness and reliability are highly essential characteristics to avoid trouble.

The fuels commonly used in the forge are oil, gas and more rarely butane. These may be used individually or as in the newer type of gas-oil burner, in association. The problem of designing a satisfactory burner for oil differs in some respects from that which confronts

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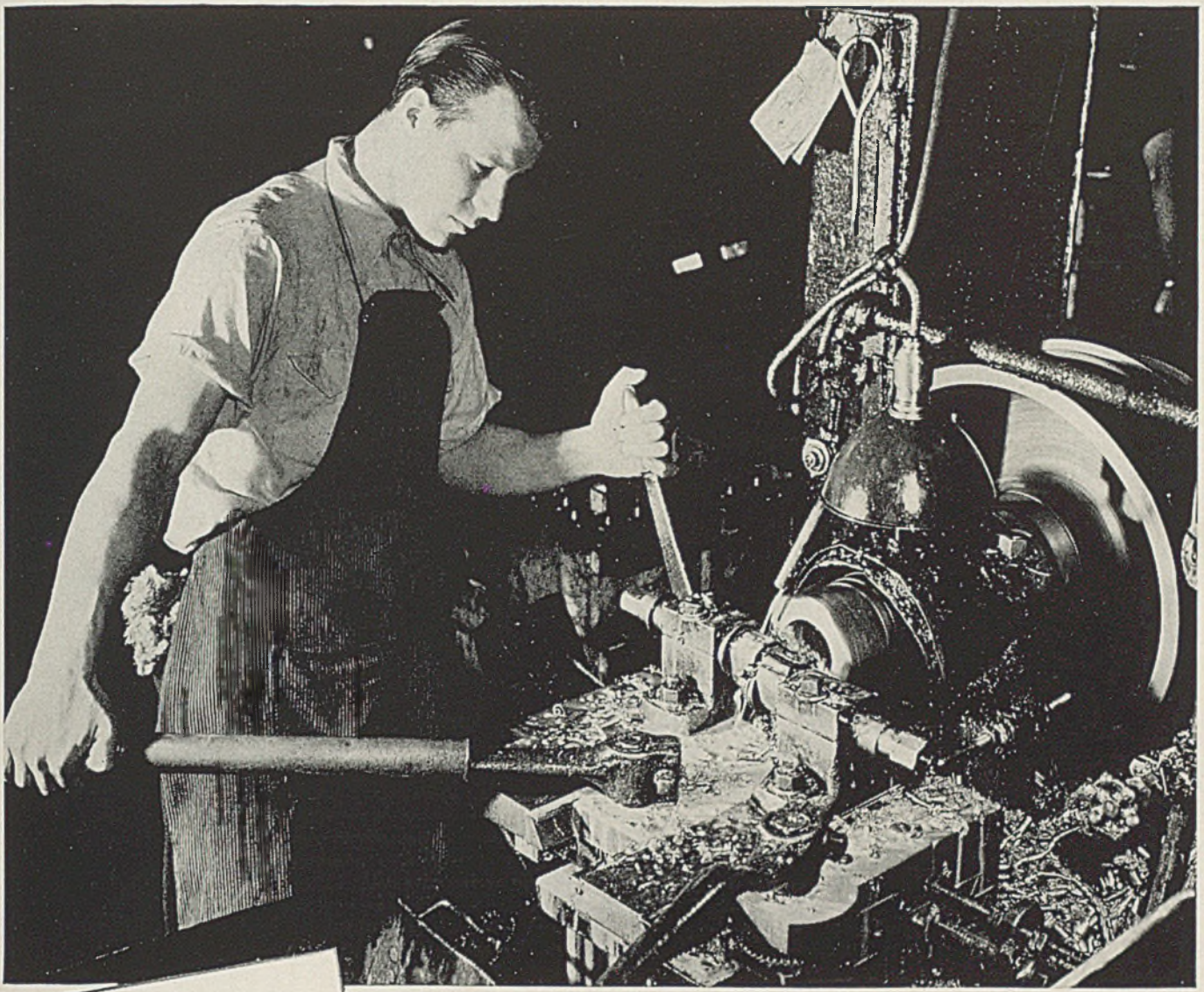


The smooth bearing-surface being put on R B & W nuts is always at right angles to the thread. Nuts semi-finished on a threaded arbor always seat at right angles . . . eliminating all possibility of complicated combined tension and bending stresses. This, together with counterboring of the lead end, means that your assembly man is assured of quicker starting and perfect bearing with R B & W nuts.

Smoother faces give rock swallowers good appetites

DOWN IN THE BOWELS OF THE EARTH are machines that eat rock.

Their jaws grind on the earth's density . . . then spew up the raw stuffs that make guns and razor blades and power.

To help keep these bucking broncos of the mines from shaking themselves to pieces . . . their makers, in large numbers — like the makers of farm equipment, tanks, bridges and battleships — write R B & W's "Empire Brand" on orders for bolts and nuts.

In three great R B & W plants, bolt shanks are "swaged" and toughened . . . threads are cold-formed, maintaining the continuity of the toughened grain, giving cleaner, stronger threads . . . nuts are punched and re-punched at right angles to the grain, eliminating the possibility of splitting . . . are burnished for appearance and to resist wrench abuse . . . are tapped with frequently-changed taps to give *you* quicker assembly, more holding power.

Russell, Burdsall & Ward Bolt and Nut Company, established 1845. Factories at Port Chester, N. Y., Rock Falls, Ill., Coraopolis, Pa.; sales offices at Philadelphia, Chicago, Detroit, Chattanooga, Los Angeles, Portland, Seattle.

RB&W **RUSSELL, BURDSALL & WARD**

Making strong the things that make America strong

BOLTS EMPIRE NUTS-RIVETS

AND ALLIED FASTENING PRODUCTS...SINCE 1845

To Train Operators
BETTER and FASTER

General Electric

PRESENTS

The INSIDE of ARC WELDING

A New Training Film in Full Color and Sound

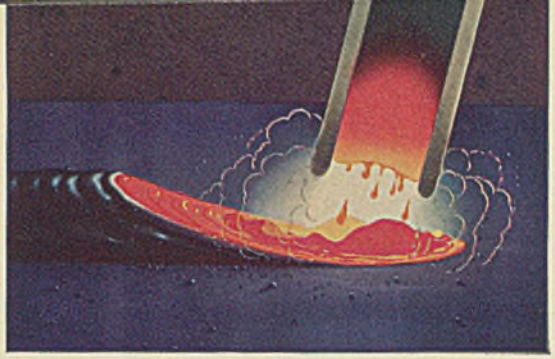
IN 6 PARTS

Each part 10 minutes and complete in itself
16 mm size

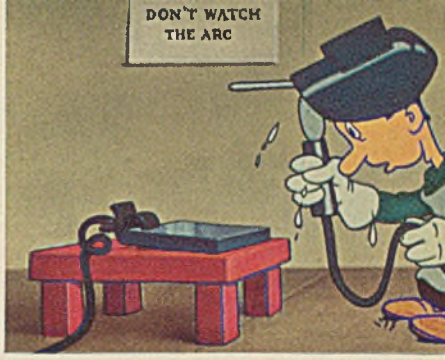
1 Fundamentals
2 Flat position
3 Horizontal position
4 Flat and Horizontal with A-C
5 Vertical position
6 Overhead position

HERE for the first time the basic principles of arc-welding technique are photographed in full color. These films show what actually happens in the arc and molten pool. Their unique, animated graphs simplify and speed training. They provide many of the advantages of individual instruction, even when used with very large classes.

The arc and molten pool are shown in detail—made possible by a new technique developed by Raphael G. Wolff Studios of Hollywood. You see why electrode travel-speed and position are so important.

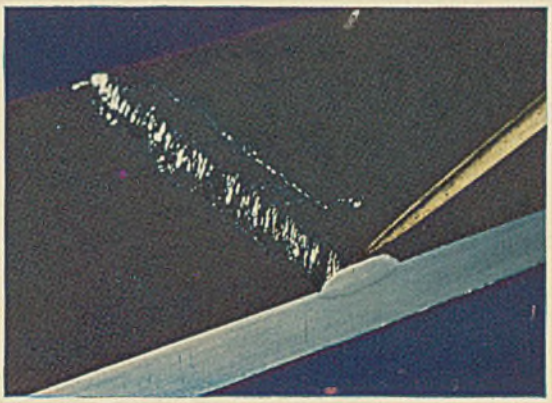


Animated cross sections show how the covering protects the arc and how the metal is melted off the electrode, mixed with the base metal, and deposited with a protective slag covering on the resultant weld.



Joe MaGee portrays, in animated cartoon portions, the groundless fears of the beginner at striking the arc, lending a humorous and effective bit of understanding and interpretation.

Experienced operators demonstrate the basic principles of shielded-arc welding. The use of movies makes it possible for all students in a large class to see these demonstrations close-up.



Quality welds, as well as poor ones, are illustrated by cross sections. The good and bad points of typical welds are shown by full-color shots, and their causes are fully explained.

All welding positions are thoroughly covered in these films. The use of a-c welding is explained in a simple, concise manner that will prove profitable to hundreds of shops looking for high-speed, high-quality production.

YOU CAN BUY these films at cost or—

YOU CAN BORROW prints for single showings. Just see your G-E arc-welding distributor or write Joe MaGee at nearest address listed:

Address: Joe MaGee, General Electric Co.,

187 Spring St., N.W., Atlanta, Ga.
140 Federal St., Boston, Mass.
840 So. Canal St., Chicago, Ill.
570 Lexington Ave., New York City
4966 Woodland Ave., Cleveland, Ohio
1901 N. Lamar St., Dallas, Texas
650 Seventeenth St., Denver, Colo.
212 N. Vignes St., Los Angeles, Calif.
1405 Locust St., Philadelphia, Pa.
920 S.W. Sixth Ave., Portland, Ore.
200 S. Main St., Salt Lake City, Utah
1 River Road, Schenectady, N. Y.

General Electric and its employees are proud of the Navy award of Excellence made to its Erie Works for the manufacture of naval ordnance.

MAIL THIS COUPON NOW

Joe MaGee, General Electric Co.,

_____ (Nearest Address)

☐ Please reserve Film No. _____ for our use on date listed below. (Film No. 1 now available; the others will be released about June 20.)

1st choice _____ (date) 2nd choice _____ (date) 3rd choice _____ (date)

☐ Send me more details on these films and how I can obtain copies for my permanent use.

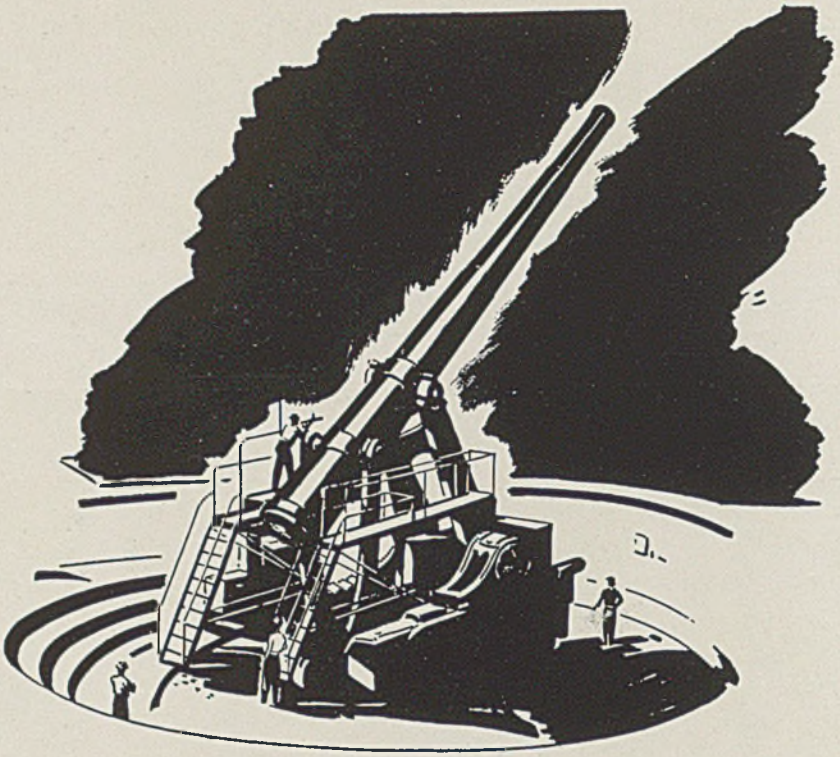
Organization .....

Your name .....

Street address ..... State .....

City .....

GENERAL ELECTRIC



Our Sights are trained on Victory

● Van Dorn had the jump in getting the range of full war output. Since 1939, our production sights have been raised higher and higher. For months now, our great fabricating plant has been one of the strongholds of production for Victory.

Every Van Dorn production worker, every production machine, every hour of production time has been drafted into the production of tons of armor plate to keep our airmen flying and fighting, to keep our gun crews in action on land and sea.

Armed with 64 years of metal fabricating experience—an intimate knowledge of new, war-born metals—an army of highly trained specialists in welding, heat treating and machining—and line after line of the most modern metal working equipment, Van Dorn is all for settling an old score against world aggressors.

But, we *can* do one thing more. Our capable staff of 45 engineers and designers can help you win the battle for sales after Peace—by assisting you on product development work now. This Van Dorn service is yours without cost or obligation. Get the details. Write, wire or phone for one of our engineers to call. Do it now.

THE VAN DORN IRON WORKS COMPANY

2685 EAST 79th STREET • CLEVELAND, OHIO

DESIGNERS AND BUILDERS OF PRISON EQUIPMENT SINCE 1878

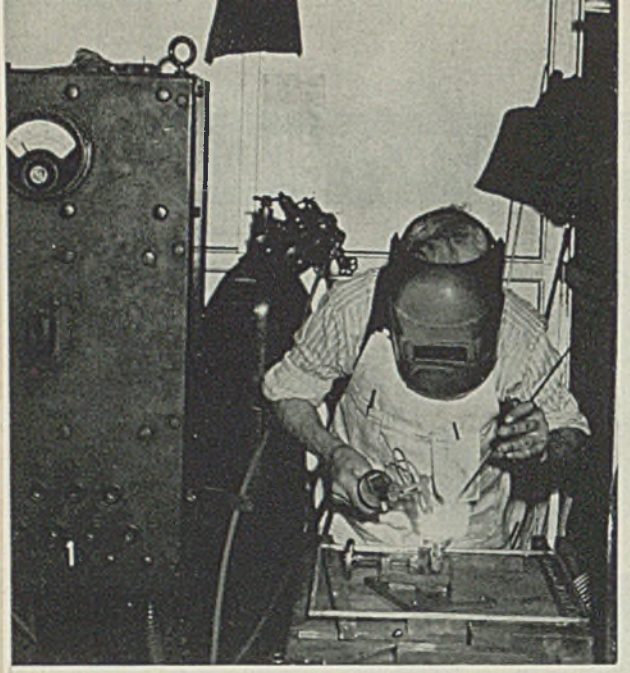


Fig. 1—Setup for arc welding tool and die parts by the manual atomic hydrogen method at plant of Underwood Elliott Fisher Co., Bridgeport, Conn.

Manual

ATOMIC HYDROGEN WELDING

Of Tool Steels

. . . . makes savings that pay for equipment the first month of use with subsequent savings at rate of $6000 or more yearly

By C. H. SPEAKMAN
Tool Room Foreman
Underwood Elliott Fisher Co.
Bridgeport, Conn.

A GREAT many engineering changes and repair jobs were made on our punches and dies, jigs and cutting tools a few years ago. Previous to this, when a punch and die had to be changed, it often was discarded and a new tool made. It was felt that if welding equipment that would weld all types of tool steels satisfactorily could be obtained, it would be possible to save a lot of time and money. After much experimenting and testing, a General Electric atomic hydrogen arc welder was selected to handle this work.

It is almost unbelievable that during the first month the savings more than paid for this welding equipment. In fact, savings continued to be made at a rate of $6000 a year or more. The job on which most of this original saving was made was the changing of about 20 punches and dies. If the old method had been used, all the punches would have been discarded. By using the welder it was possible to build up tool steel on the punches so they could be refitted and rehardened for the new work. This was done in 1936 and the dies are still in use today doing good work. Not one of these tools has had to be repaired or rebuilt on account of the welding.

At first it did not look as if it would be possible to keep this welding equipment busy all the time, but now so much use has been found for it that an operator is kept busy full time. Jobs on which it is employed include welding of high-speed steel end mills broken off at the shank, using ⅛-inch diameter straight carbon drill rod as welding rod, with 20 to 30 amperes welding current, 3 to 4-pound hydrogen pressure. Quite a number of these end mills have been salvaged in this manner, and they do not have to be rehardened.

Broken 18-4-1 high speed broaches for broaching holes as small as ⅞-inch square in steel have been welded satisfactorily without the necessity of rehardening. Welding rod used was ⅛-inch diameter straight carbon drill rod, with about 15 amperes welding current and a 3 to 4-pound pressure of hydrogen gas.

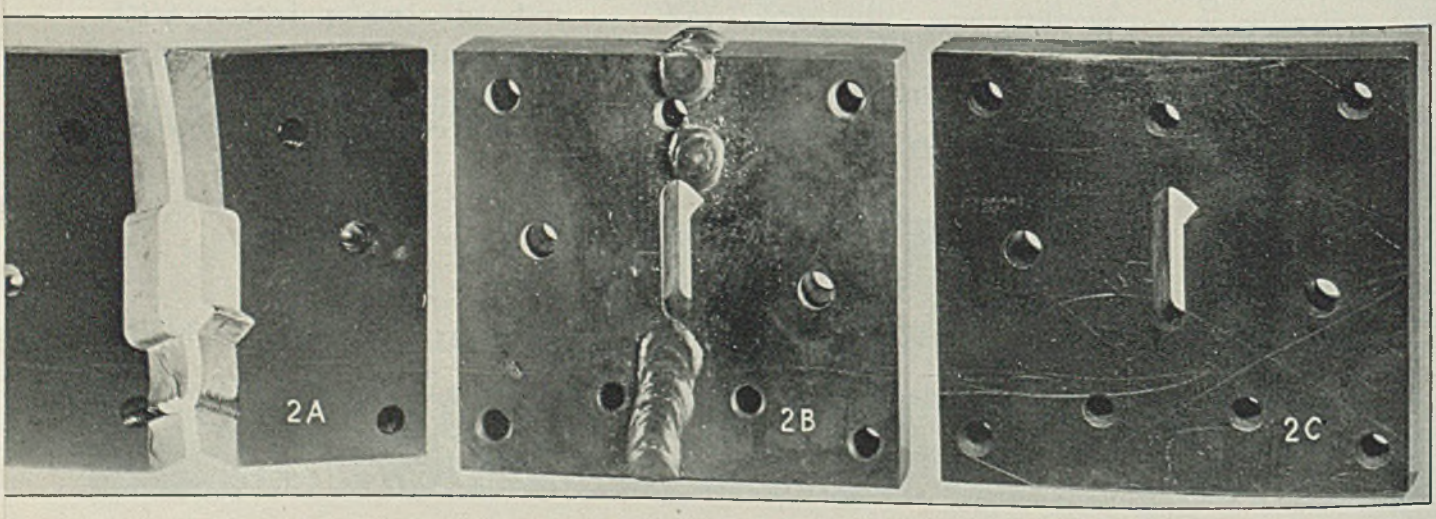
Broken feed fingers for the automatic screw machines are welded in a similar manner and are as good as new. Maxel No. 3½ steel was employed as welding rod. It contains 0.50 per cent carbon; low chromium and low molybdenum.

A large spring collet for making 75-millimeter cartridge cases was also welded when one jaw of this chuck was broken off. This was a rush job for another company. As there were no more chucks available, the jaw was welded back on the chuck. The job was completed and the chuck was ready to be put back into operation in less than an

Fig. 2A—Broken die for air-hardening tool steel, original cost—$50

Fig. 2B—Same die repaired by atomic hydrogen arc welding process

Fig. 2C—Same die completely reconditioned after welding. Total cost of repair was $10, producing a saving of $40 over cost of new die



ZINC IN WAR

PROTECTING THE MERCHANT MARINE

The United States must not only out-produce our enemies, we must see to it that this matériel reaches the far flung fighting fronts. To this end America has dedicated itself to the most gigantic ship building program in all history—and these vessels must be made as efficient as humanly possible for the courageous men who sail them.

Zinc plays an important role in protecting metal surfaces, and thus protecting men at sea. Working metal parts on ships can easily be fouled by rust. To insure efficient operation when emergencies demand quick action, such important parts as life-boat davits, shown above, are sprayed with protective zinc coatings. The corrosion-inhibiting properties of galvanized (zinc coated) iron or steel are well known —and sprayed zinc dust provides this same measure of protection for metal surfaces which do not lend themselves to galvanizing.

The photographs in the background of this advertisement show: (1)—left to right—Cast iron sheaves for life-boat davits before finishing, after grit blasting and after spraying. (2) Stacks of completely finished sheaves. (3) Grit blasting the sheaves and (4) Spraying them with zinc dust using a special gun.

Other important uses for sprayed zinc include marine floats, airplane pontoons and canal gates. The needs of the Navy and Merchant Marine for sprayed zinc coatings are just additional reasons why civilian users of zinc may not be able to obtain all of the metal or pigment they would like to use.

THE NEW JERSEY ZINC COMPANY

MANUFACTURERS OF THE FAMOUS HORSE HEAD ZINC PRODUCTS

1 METAL SPRAYING
2 GALVANIZING
3 NICKEL SILVER
4 HULL PLATES
5 RUBBER
6 PAINT
7 BRASS
8 CERAMICS
9 DIE CASTING
10 PHARMACEUTICALS

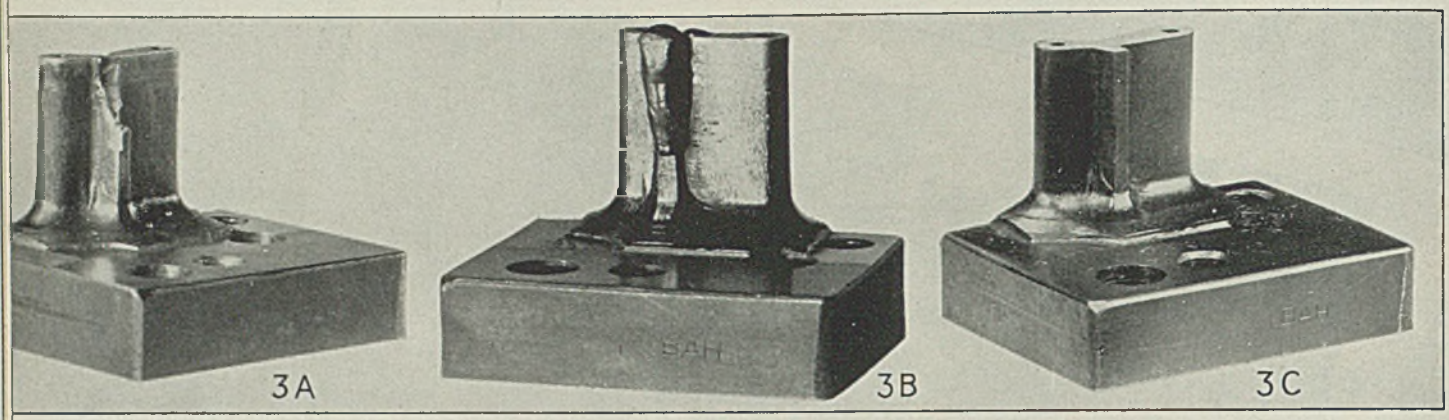


Fig. 3A—Broken punch of air-hardening tool steel. Original cost was $20

Fig. 3B—Same punch repaired by atomic hydrogen arc welding process

Fig. 3C—Punch completely reconditioned after welding. Total cost of repair was $5. Saving amounted to $15 on this job

hour. Maxel No. 3½ steel was also used as welding rod here. This chuck not only ran true but was running and doing satisfactory work a year later.

Tool steel blanking dies that have been broken have been welded. The welded part holds its edge just as well as the remainder of the die.

Quite frequently circular form tools of 18-4-1 high-speed steel for the automatic screw machines will break in two. These are welded back together using 5/32-inch diameter straight carbon drill rod as a welding rod, welding current of 20 to 40 amperes, 3 to 4 pounds hydrogen pressure. After welding, the bump or excess material around the weld is ground off on a surface grinder; without rehardening, these tools produce parts as before with just as many pieces between grinds.

An accurate account was kept of the time and money saved for the first six months this atomic hydrogen arc welder was used. The saving was so high that it was hard to believe. It is the greatest money-saving piece of equipment we have in our tool room, and it is our belief that if more companies throughout the country knew the value of such a welder they could greatly expedite the manufacture and repair of tools.

Fig. 1 shows the setup employed for arc welding these tools and dies by the manual atomic hydrogen method. Fig. 2A shows a broken die made from air-hardening tool steel used to stamp out parts from SAE 1095 steel in the form of 0.125 x 1-inch strip. The cost of this die originally was approximately $50. But the repair cost was only $10 for the welding and reconditioning. This represents a clear saving of $40. Fig. 2B shows the die as welded, while Fig. 2C shows the die completely reconditioned.

Fig. 3A shows a broken punch of air-hardening tool steel. It is employed to produce parts from 0.095 x 1⅜-inch hard cold-rolled steel strip. Original cost of this punch was approximately $20. It was welded as shown in Fig. 3B and reconditioned for further use at a total cost of $5, with a saving of $15.

A broken die made of oil-hardening steel, analyzing 0.90 per cent carbon, 1.60 manganese, 0.25 vanadium, was also repaired using 5/32-

(*Please turn to Page* 125)

New Lacquer Additive Is Rust Inhibiting

A corrosion-inhibiting additive for clear lacquers, nitrocellulose solutions, and alcoholic shellacs which eliminates the need for shipping these materials in tin-lined drums is reported by Merrimac division of Monsanto Chemical Co., Everett, Mass.

The additive, a solution of an organo-phosphorus compound known as D.P. solution, is said to give effective protection against corrosion of iron or steel under conditions met in the handling of lacquer shipments. Its action is ascribed to the fact that it reacts with iron to form an insoluble film. Of but microscopic thickness, this film is sufficient to afford protection to the surface and in case of breaks it is self-mending by virtue of the manner in which it is formed.

In addition to inhibiting corrosion, the solution has demonstrated interesting properties as a flocculating agent for maintaining good suspensions of the flatting agent in flat lacquers. The solution, however, is not recommended for pigmented lacquers inasmuch as pigments absorb it from solution and render it ineffective. Neither is it recommended for use in paints or synthetics which dry by oxidation as it will precipitate the driers.

New Lacquers Solve Conversion Problems

Watson-Standard Co., Pittsburgh, announces a series of new lacquers especially adapted to the conversion from tin or terne plate to black plate. These, developed over a period of several months, are said to have unusual properties of adhesion to the black plate and prevent underfilm corrosion.

One of the outstanding features of the lacquers is they can be made in metallic colors. The new series also includes lacquers developed to withstand processing for home canning.

Adds Mineral Spirits to Graphite Dispersions

Dispersions of "dag" colloidal graphite in volatile mineral spirits have been added to standard dispersions offered by Acheson Colloids Corp., Port Huron, Mich. Outstanding characteristic of the newly standardized dispersion is its unusual flexibility.

Designated as series type 2400, the dispersions are miscible with petroleum products and are of special value for use where a dry film of graphite is desired, according to the company. Thus they are particularly suitable for lubrication of mechanisms operating at high temperatures or where permanent or semipermanent lubrication is to be provided.

The carrier features a 400-degree Fahr. endpoint. Other uses of the mineral spirits dispersion, in addition to dry-film lubrication, include lubrication of stamping dies, clutch plates and the impregnation of fabrics.

Scorching Heat or Freezing Cold... wherever goods of war must go... Protect Them with FIBREEN

Planes, tanks, guns, trucks, ammunition, food, clothing, medical supplies and vital repair parts that pour from American production lines, *may see service from the arctic circle to the equator.* They may be weeks at sea—stand long outside exposure to freezing cold, to water, to snow and ice, or steaming tropical heat, and destructive sand, dust and dirt.

But when the time comes to go into action, these materials of war must be undamaged—ready.

That's why protective packing is of such major importance now. And that's where FIBREEN is doing an outstanding job in the nation's war program. This rugged paper does its job under any temperature—is unbelievably tough, and is completely proof against moisture, wind and dirt.

It's reenforced with two crossed layers of wire-strong, closely spaced fibres, embedded with two layers of special asphalt between two layers of clean, strong kraft. FIBREEN is pliable and easy to handle—a perfect wrapping or lining material—a superior, low-cost replacement for fabrics and other materials now impossible to get.

FIBREEN is being supplied for the wartime needs of the nation. If you are making an essential war product—if unfailing protection in shipment and storage is a problem—we invite your inquiry. Write for samples. Tell us what you make and how you pack it. Our packing experts are ready to help you, without obligation.

THE SISALKRAFT CO.

Manufacturers of Sisalkraft, Fibreen, Sisal-X, Sisaltape and Copper-Armored Sisalkraft.

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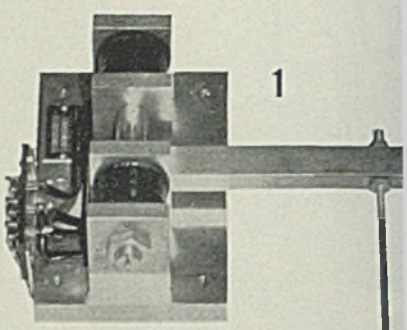
FIBREEN

EFFECTIVE *Protection* IN TRANSIT—IN STORAGE—FOR EMERGENCY USES

ELECTROMAGNETIC GAGE

Indicates Maximum Strain

Electromagnetic type of strain gage provides practical means whereby strain in a vital machine part may be measured and indicated on instrument in front of operator. Equipment can be arranged to give a signal when a predetermined value of strain is reached, or to operate control equipment which will prevent strain from exceeding predetermined value



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By M. W. HIVELY
General Engineering Laboratory
General Electric Co.,
Schenectady, N. Y.

TODAY, MACHINES are being worked to their limits to meet the production schedules set by our defense requirements. It is now more serious to have a machine out of commission than ever before. The loss in production is doubly great because a longer-than-normal idle period is probable; and men, materials, and machines that are sorely needed in building new machines must be diverted from their production to replace a broken part.

To get the maximum output from their machines without risking breakage of vital parts is a problem confronting many of our nation's production departments today. Those who are going ahead and pushing their machines to the limit need to know how much strain is encountered during an operating cycle. The answer to the question "How much?" can be obtained by a strain gage.

The electromagnetic type of strain gage is especially suited to make these strain measurements for the following reasons:

1. The power output is large enough to drive a conventional high-torque instrument without the use of an amplifier.

2. A high magnification (ratio of instrument pointer movement to strain) is easily obtained.

3. The indicating instrument can be placed within view of the operator of the machine although the point at which the strain is being measured may be out of his sight when he is in his operating position.

4. A contact-making instrument may be used to flash a light or ring a bell at a predetermined value of strain. This instrument, combined with suitable control equipment, also might be used to prevent the strain from exceeding the predetermined value.

5. Slow-changing strains can be recorded by a suitable recording instrument.

In some types of machines such as punch presses, shears, and press brakes the strain during a cycle of operation occurs for a short period of time—rising abruptly to the maximum and then falling sharply to zero. For these applications, the strain gage should indicate the maximum strain which has occurred during the cycle or past series of cycles. This can be recorded with an oscillograph even when the speed is great.

In other types of machines, such as bending machines, in which the bending takes place between rolls, the strain is brought up to the working value relatively slowly and then held at that value while the material passes between the rolls to form the material into an arc or a circle. For applications of this type, the stress at any instant can be read on on indicating instrument having a period of response of approximately one second.

Strain Indicating Equipment

An electromagnetic gage head for indicating the maximum strain during a series of operations is shown in Fig. 1, and a schematic diagram for the entire equipment is shown in Fig. 2.

At zero strain (no load on the machine) the arm *D* is so adjusted as to pull the cylindrical armature into the position which gives a zero reading of the instrument. The subsequent current readings are then a function of the maximum strain which has occurred up to that time. The past reading of maximum strain is erased by pushing the cylindrical armature up until its pin again touches the

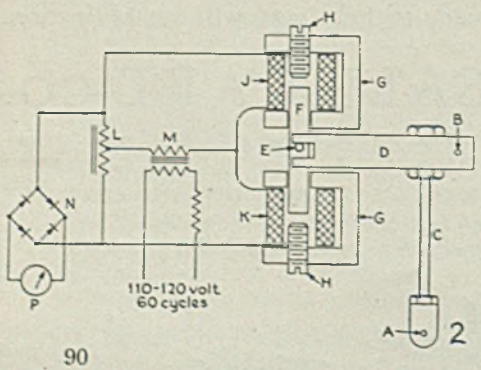
From an article in *General Electric Review*, November 1941.

Fig. 1—Gage head of the type that indicates maximum strain

Fig. 2—Schematic diagram of the electrical and mechanical elements of the maximum strain gage

Fig. 3—Calibration curve for use with instrument readings

Fig. 4—Schematic diagram of the elements of strain gage designed to give continuous indication



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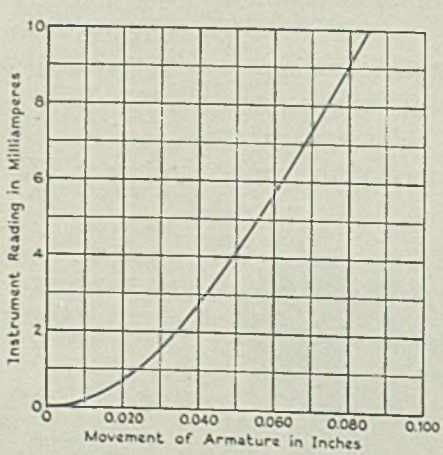

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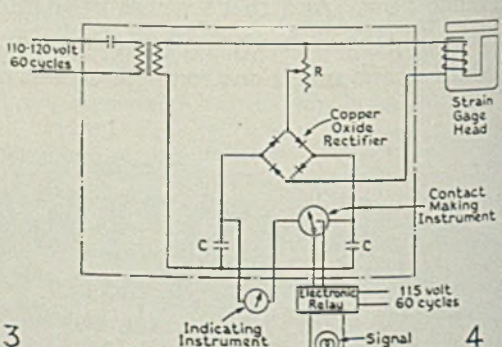
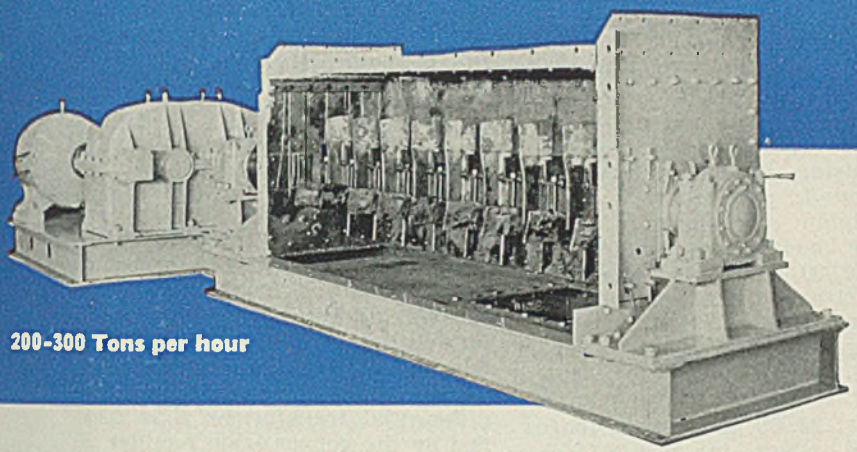


4

76 Bailey

PUG MILLS

RUGGEDLY CONSTRUCTED FOR SEVERE SERVICE



200-300 Tons per hour

Mixing Iron Ore Concentrates—Sinter and Flue Dust

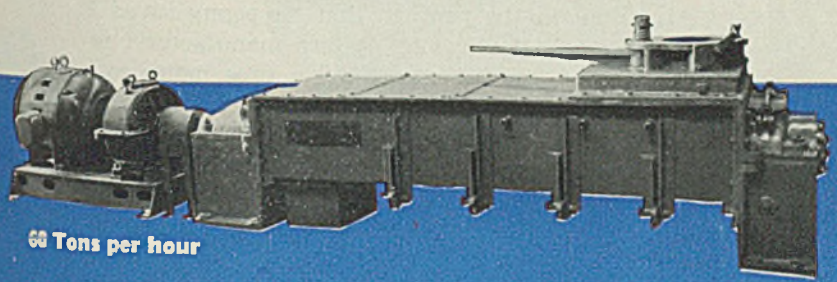
BAILEY SINTERING PLANT PUG MILL

Bailey Sintering Plant Pug Mills mix the required material rapidly at low cost with a pronounced minimum of delay and maintenance. Abrasion-resistant steel or cast manganese steel paddles assure thorough pugging and longest service. Special knock-down construction permits quick, easy access for repair.

have Proved—

- √ ECONOMICAL IN OPERATION
- √ EFFICIENT IN MIXING ACTION
- √ EASY TO CLEAN-OUT
- √ EXTRA SERVICEABLE

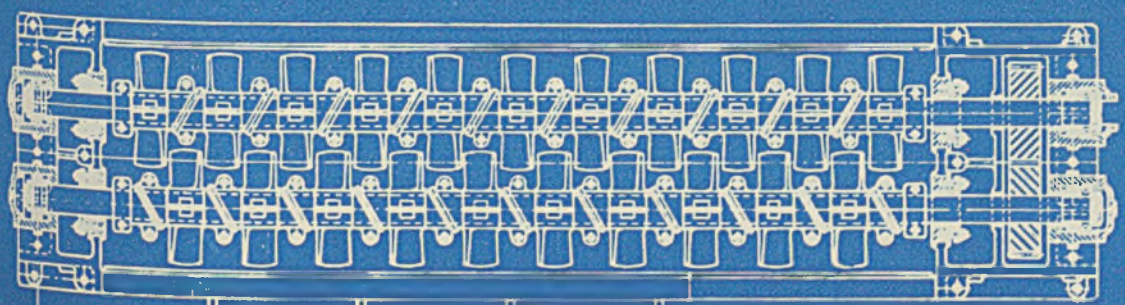
BAILEY BLAST FURNACE DUST CATCHER PUG MILL



60 Tons per hour

Thorough mixing action features the double shaft construction of the Bailey Dust Catcher Pug Mill . . . two-piece, cast manganese steel paddles give extra long service, replace easily . . . a full length drop-bottom facilitates hopper clean-outs. Dust-tight reduction gears and drive motor, improved dust inlet valve and heavy-duty construction meet every requirement of Blast Furnace men . . . assure satisfaction and economy.

WILLIAM M. BAILEY COMPANY *Engineers* **PITTSBURGH, PENNSYLVANIA**



Bailey Double Paddle-Shaft showing arrangement of split paddles

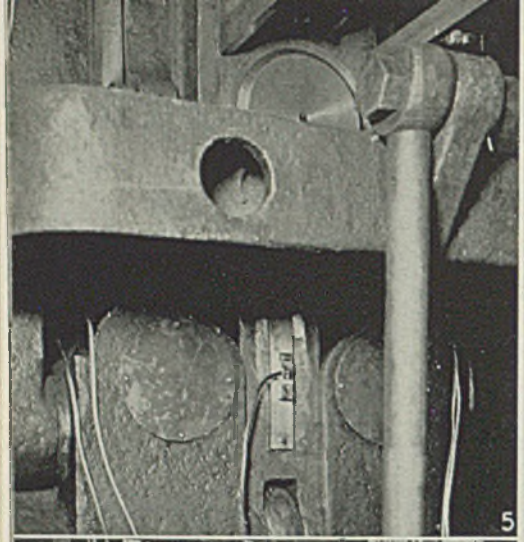


Fig. 5—Gage head mounted on a pull-down yoke of a bending machine

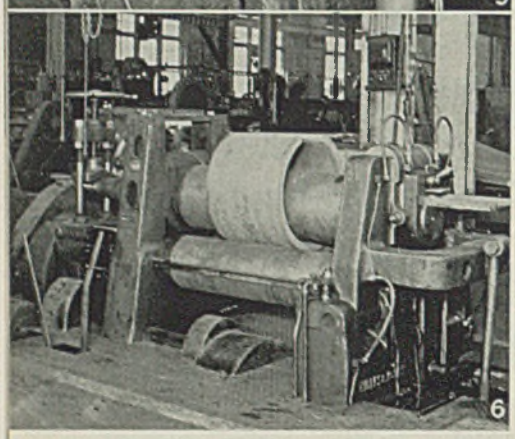


Fig. 6—Bending machine equipped with strain gage equipment

arm at the zero-strain position.

The instrument reading is also proportioned to the output voltage of transformer *M*. To minimize the change in output current, resulting from a change in line voltage, this transformer is of the voltage-regulating type. The transformer and its series resistance give a secondary voltage which has a smaller percentage voltage variation than the variation which occurs in the line voltage. Transformers of this type are sometimes called constant-voltage transformers, since the secondary voltage tends to remain constant.

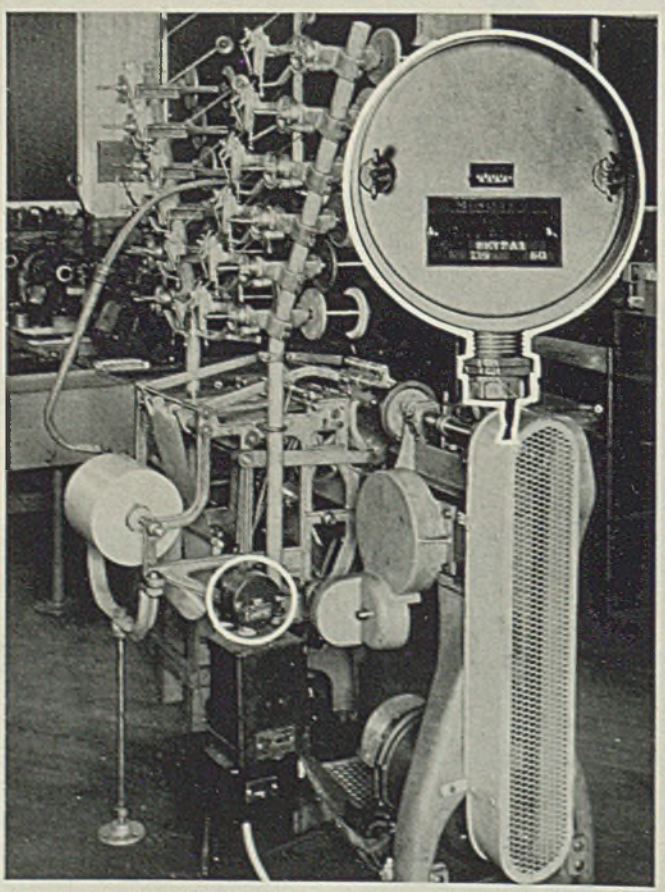
The gage head is bolted to the machine part in which the strain is to be measured. Assume that the part in question is a steel machine housing in which a stress of 20,000 pounds per square inch is the maximum safe working stress. Since the modulus of elasticity of steel is 30,000,000 pounds per square inch the strain at 20,000 pounds per square inch will be 0.00067-inch per inch of gage length. With a gage length of 20 inches(*A* to *B* in Fig. 2) and a lever-arm ratio of 5 to 1, a stress of 20,000 pounds per square inch will result in a 0.067-inch movement of the gage armature. Fig. 3 shows that this movement will give an instrument reading of 6.8 milliamperes. However, instead of the instrument scale being marked in milliamperes it may be marked to read the strain in inches per inch of gage length or to read the stress in pounds per square inch. The instrument might also be marked to read the per cent of rated load. Thus, in the foregoing example with 6.8 milliamperes flowing through the instrument, the reading would be "100 per cent rated load."

As point *A* moves farther from point *B*, rod *C* pulls down on lever arm *D* which, through contact with pin *E*, moves the cylindrical armature *F* down. When the strain is decreased and point *A* moves back toward point *B*, arm *D* moves up. However, the slot in arm *D* is wider than the diameter of pin *E* and armature *F* is held at the lowest point of its travel by a friction sleeve. If a larger strain occurs on subsequent cycles, the armature takes a new low position corresponding to this strain.

The armature *F*, yokes *G*, and cores *H* are made of magnetic materials. The coils *J* and *K* (surrounding parts *F* and *H*) along with the differential transformer *L* form an alternating-current bridge circuit which derives its power from transformer *M*. The voltage across the differential transformer *L* is rectified by the copper-oxide rectifier *N*. The rectified voltage then is used to drive a direct-current instrument *P*.

If coils *J* and *K* and their associated magnetic circuits are identical, a position of the armature *F* can be found at which the voltage across

(*Please turn to Page* 125)



Time Meter Saves $3900

According to the proverb that "a penny saved is a penny earned," a leading eastern manufacturer recently earned $3900 by applying a time meter to a purchasing problem. When faced with the necessity of purchasing four new winding machines in order to increase production, this company installed a General Electric time meter on the machine then in operation, in order to determine actual operating and shutdown time.

The time meter revealed that the machine actually ran only 13 per cent of the working day, and that 87 per cent of each working day was being used in setting up the machine. As a result, only one new winding machine was bought instead of four, and additional setup equipment was purchased to keep these two winding machines in operation 100 per cent of the time. In this way, $3900 in first cost was saved, and the new work was started much sooner than expected.

This example illustrates the importance of knowing actual work time of high-production equipment if it is to be utilized to maximum efficiency.

McKee is an important factor in the

Battle of Steel

SOMEWHERE in the broad Pacific a steel "battlewagon" hurls tons of steel shells from steel guns at a steel-clad enemy.

The history of that broadside began long before Pearl Harbor.

Since 1906, Arthur G. McKee & Company have been building iron and steel plants. During the past five years the McKee organization has designed and built new facilities for the production of vast quantities of steel for battleships, guns, tanks and shells.

Today, McKee continues to provide ever increasing means for victory in the "battle of steel."

Arthur G. McKee & Company

★ *Engineers and Contractors* ★

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COMMERCE BUILDING
HOUSTON, TEXAS

IT'S TIME TO TIGHTEN OUR BELTS ANOTHER NOTCH

Since the end of World War I, thousands of tons of nickel, chromium and other alloying elements have been employed to improve the qualities of steel. With ample supplies of these materials available, little thought was given to conservation. We wanted performance results—we got them.

But today, the picture has changed. We're in another war—a mechanized war—that demands the finest steels ever produced. Nickel, chromium and other substances have become critical alloying elements—because they're needed for *Production for Victory* —and because there just isn't enough immediately available to go 'round.

It's time to start pulling in our belts!

ALLOY and CARBON STEELS • STAINLESS STEEL • PLATES • TIN PLATE • NUTS • BOLTS • RIVETS • NAILS • PIG IRON
BARS and SHAPES • STRIP • SHEETS • PIPE and TUBING • FARM FENCE • WIRE • FABRICATED STEEL PRODUCTS

From the time when we began building for defense—now for victory—Republic has urged its customers to conserve critical alloys, and to cooperate with Governmental requests and restrictions designed for the protection of all.

To aid directly in conservation, Republic has continued its relentless research—its experimenting with new analyses which would save critical alloys, yet provide the qualities needed in steel today.

In most cases, it has been proved that critical elements alloyed in reduced quantities with steel would provide desired qualities when chemistries are properly balanced.

At the same time, Republic has warned customers of probable shortages, and has recommended *changes that eventually must be made.* Assistance has been given in the redesign of sections in preparation for keeping production moving with steels of lower alloy content — without sacrifice of needed qualities in the finished product. Suggestions have been offered on machining, forging and heat treating practices where changes were indicated.

America's greatest danger today is lost time in production. Never before in our history has time been so important. One airplane, gun or ship today may be worth a dozen tomorrow.

Republic is fully aware that its job today and tomorrow is to produce the best steel possible—with the materials available—for each specific need—and, to the utmost of its facilities, in the quantities required.

But Republic feels that this is only part of its duty. Hence, Republic's eagerness to be of greatest assistance to its customers—to help in the selection, application and fabrication of available steels to reach our mutual objective—*More Production for Victory.*

REPUBLIC STEEL CORPORATION

Alloy Steel Division Sales Offices: Massillon, Ohio • General Offices: Cleveland, Ohio

Berger Manufacturing Division • Culvert Division • Niles Steel Products Division
Steel and Tubes Division • Union Drawn Steel Division • Truscon Steel Company

Simple Method of Making IDENTIFICATION BADGES

ALL MANUFACTURERS executing government war-time contracts are required to provide fingerprints and photographic badges of identification for all employes.

Thus far, in view of this government order, various procedures have been adopted to obtain these necessary pictures. In most cases they have been made by someone especially set up to do the job. In others, employes were required to furnish their own. Generally, however, these methods have been found to be either quite expensive or unsatisfactory from the point of uniformity.

Through the ingenuity of its plant manager, Edward L. Biersmith, Columbian Steel Tank Co. of Kansas City, Mo., recently devised a simple homemade affair with which these essential photographs were taken in a professional-like manner at a "fraction of the cost" involved in either of the methods mentioned above—less than 7 cents for each photo.

Consisting essentially of an ordinary Brownie reflex camera and two R-22 photo-flood lamps with necessary appurtenances, the equipment set up in Columbian's plant costs less than $30, not including the materials used for making the prints themselves. It is arranged so when not in use the equipment is enclosed in a cabinet mounted on the wall. The accompanying illustration shows the cabinet, which is part of the setup, in open position, the front hinged portion down, with framing device and identification numbers in place and flood lamps arranged to provide proper lighting.

Taking into account the time required for reloading the camera every twelve pictures, the company was able to "snap" an average of 60 to 75 photographs per hour with the equipment. Employes were photographed by departments for 30 minutes each day, immediately after working hours or change of shifts—no objections being encountered from union workers.

In operation, an adjustable stool permits centering each employe in the viewing frame shown in the illustration, regardless of torso length. When a photograph is made the employe's chest is against the edge of the platform. Identification numbers are removable and changed quickly and easily.

Cabinet of the Columbian Steel setup, which may be fabricated of steel, plywood or similar material, measures 36 inches high, 24 inches wide and 14 inches deep. Its hinged portion is 4 inches deep. The platform on the inside extends from the hinged edge forward 13½ inches. The bracket supporting the camera on the platform measures 4 x 4 x 10 inches. As indicated by the illustration, the base tapers to the top. Holes for horizontal adjustment are on 2½-inch centers and a centered vertical slot in the bracket permits vertical adjustment.

A mounting clip is provided with slots for each of the three points at which the camera is anchored to the clip. It is firmly attached to the mounting bracket by a stud bolt from the mounting clip which fits in the vertical slot of mounting bracket. A wing nut governs the vertical adjustment of the camera.

In mounting the camera, it is fixed in an upside down position with the position of the lens determined by the base (top in inverted position). Being inverted, it is not necessary to close the catch-on loading mechanism of the camera. The removable rod viewing frame which is mounted in slots at the front edge of the platform is 23 inches wide by 17¼ inches high with a 1½-inch offset at the slotted mounting.

Fundamental idea of the whole setup is to arrange for the subject to be at least 28 inches from the camera lens, and to provide adjustments for moving the camera either forward or backward not more than 1 inch for each adjustment.

Since the Brownie reflex camera used by the company had an F-11 lens, it was necessary to use Super XX film. This resulted in a perfectly exposed negative with the exposure set on "instantaneous." After prints are made a mask is used for the negative to provide 2½-inch prints. Note the examples shown.

Approximate cost of materials utilized is shown in Table I.

Table I

Cost of Equipment, Materials

Camera	$6.35
2 Photo-flood lamps	1.60
2 Stands (if purchased)	14.00
Die cutter	7.00
Film	.32
Each print	.04

Cost of wall cabinet not included. Columbian did not need stands. Approximate cost of each photo was less than 7 cents.

Great Lakes Red Book For 1942 Is Issued

Great Lakes Red Book; paper, 170 pages, 3 x 4¾ inches, published by Penton Publishing Co., Cleveland, for $1 in United States and Canada.

With Great Lakes shipping beginning, many changes of major importance are noted in the 1942 edition.

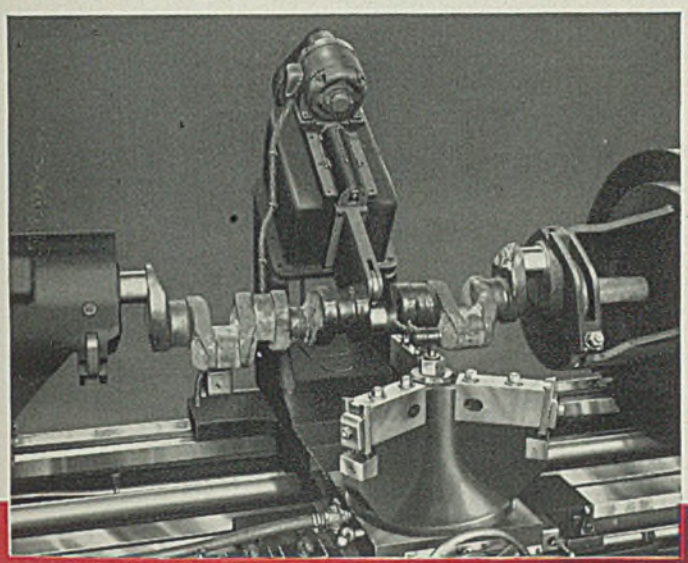
In addition to the names of more than 1500 vessels registered on the Great Lakes, both American and Canadian, with the names of owners, operators, captains and engineers, the volume contains a complete directory of shipbuilding yards in the Great Lakes area with executive personnel and other pertinent information. An alphabetical list of all ships, an index of the capacity of ore carriers and a complete port directory are also included.

WICKES UNIVERSAL CRANKSHAFT LATHES

SPEED PRODUCTION OF GAS, DIESEL, AIRPLANE CRANKS

PURPOSE Wickes Universal Crankshaft Lathes are designed for machining main line bearings and crankpins on all sizes and types of crankshafts such as gas engine, automobile, tractor, airplane and Diesel crankshafts. They turn all crankpins and intermediate main bearings, or all main bearings, on a single machine.

HYDRAULIC FEEDS Wickes Crankshaft Lathes are equipped with independent hydraulic feeds to both the carriage and cross slide, which feeds are controlled by drum switches on the front of the carriage. The feeds to carriage consist of Rapid Traverse, Coarse Feed, Intermediate Feed and Fine Feed both right and left. The cross slide is provided with these same feeds in, and rapid return out.



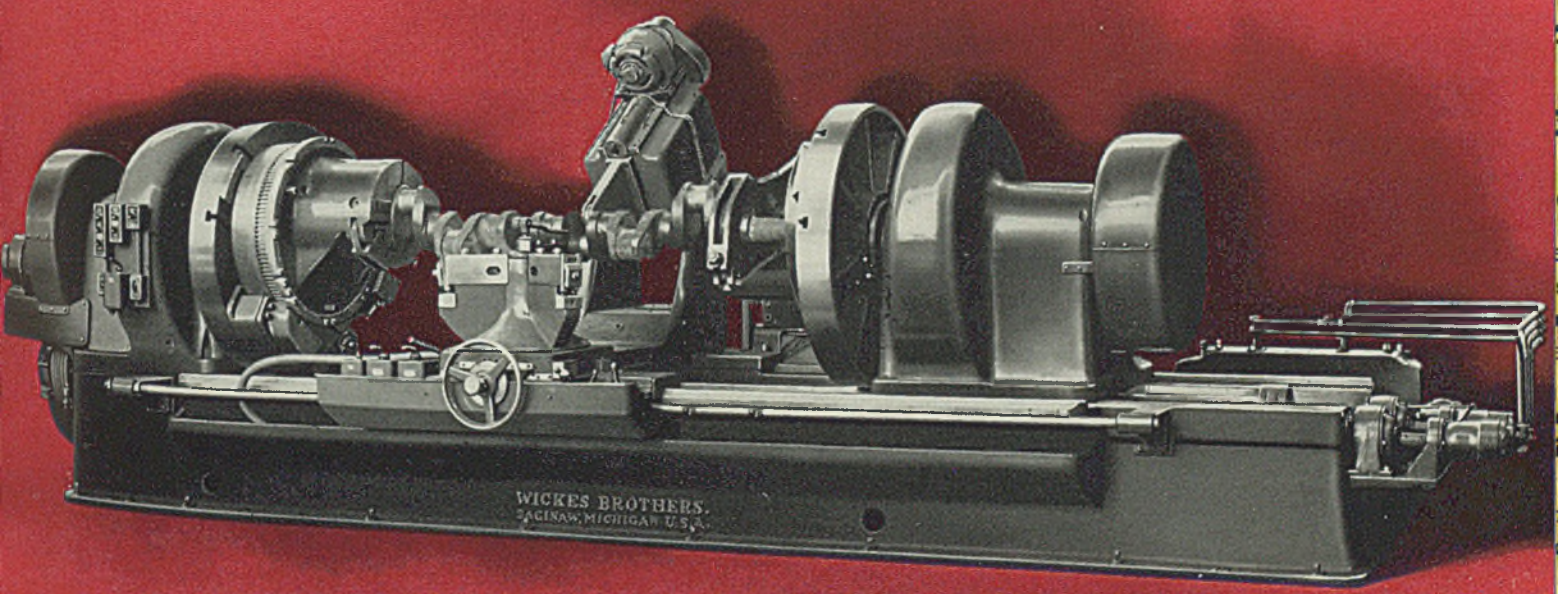
CAPACITIES Wickes Crankshaft Lathes are built in four sizes, 36", 48", 60" and 72". The UH-4 (36") machine is suitable for machining crankshafts having main line bearings and crankpins up to approximately 4" or 4½" in diameter and with strokes up to 7½".

The UH-8 (48") machine is suitable for machining crankshafts having main journals and crankpins up to 6" in diameter and with strokes up to 10".

The UH-60 (60") machine is designed for machining cranks having main bearings and crankpins up to approximately 10" in diameter and with strokes to 14".

All sizes are built with either double end drive or single end drive. The double end drive models machine the intermediate main line bearings and crankpins. The single end drive models machine the main line bearings and the two ends of the crank.

To get into real high-speed production on your crankshafts, it will pay you to operate one of these Wickes Lathes designed expressly for the job. Write today for illustrated Bulletin U-801.



A Wickes Model UH-8 (48") Universal Crankshaft Lathe, double end drive type. Inset (above) shows back roller rest in position for supporting a long crankshaft while machining intermediate crankpin.

WICKES LATHES

CUT COSTS · SPEED PRODUCTION

WICKES BROTHERS · SAGINAW, MICHIGAN · EST. 1854

Crankshaft Turning Equipment · Double End Boring Lathes · Heavy Duty Engine Lathes · Special Production Lathes · Blue Print Machines

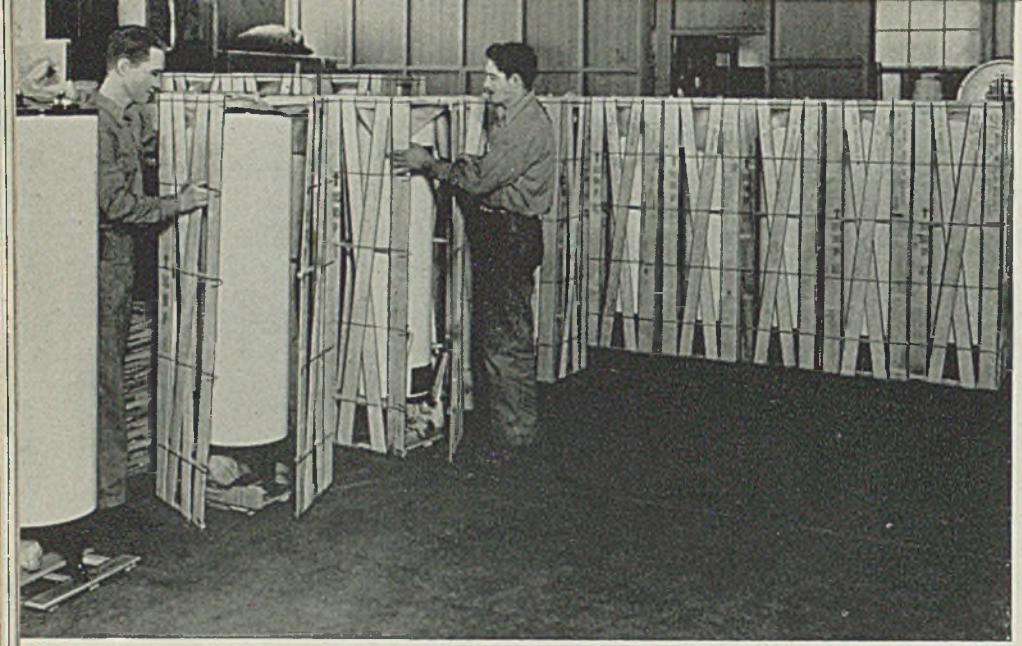


Fig. 1—Damage to the highly finished surfaces of his products was a serious problem for this manufacturer of water heaters until he began to employ this special wire-reinforced wrap-around container

ENGINEERED CONTAINERS

. . . . designed and constructed of wood, one of the few non-scarce materials, these units solve many materials handling and shipping problems

By GEORGE T. WALNE
General Box Co.
Chicago

WIDELY recognized today is the importance of the engineered container in the solving of materials handling and shipping problems. Containers scientifically designed to meet specific requirements are conserving man-hours, breaking shipping room bottlenecks, reducing shipping charges, eliminating loss and damage claims, saving space and often showing a reduction in cost over the older container designs. Because wood is one of the few materials still available in ample quantities, containers made largely of wood are expected to assume a still more important position in the handling of parts in process as well as shipping completed subassemblies and final assemblies.

In many branches of the metal-working industry, engineered containers are being utilized to prevent damage to highly finished surfaces which often incur serious damage when packed by customary methods.

Take the case of a prominent electric water heater manufacturer. Improper packing, shipping and unpacking raised havoc with the highly finished surfaces of his product. By introducing a specially designed wirebound crate, shown in Fig. 1, he was able to reduce damage to a bare minimum.

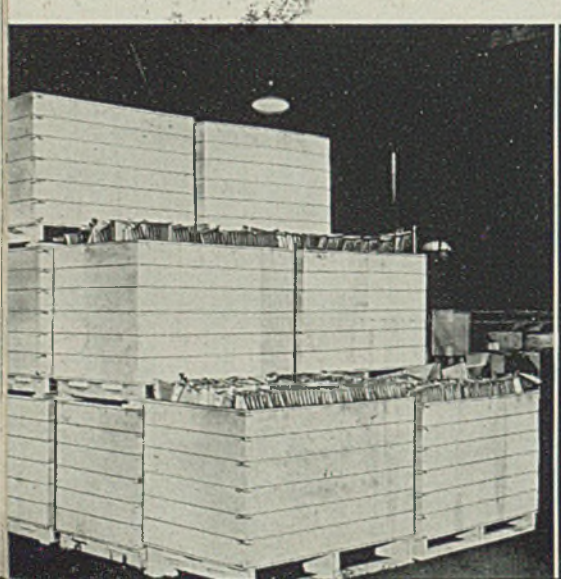
In this new packing method, the water heater is placed on the base of the crate, the top put in position and the wirebound crate mat wrapped around it. Unpacking is accomplished easily without danger of damage. There are no nails to pull out. The wire loops are simply unfastened and the crate removed from around the water heater.

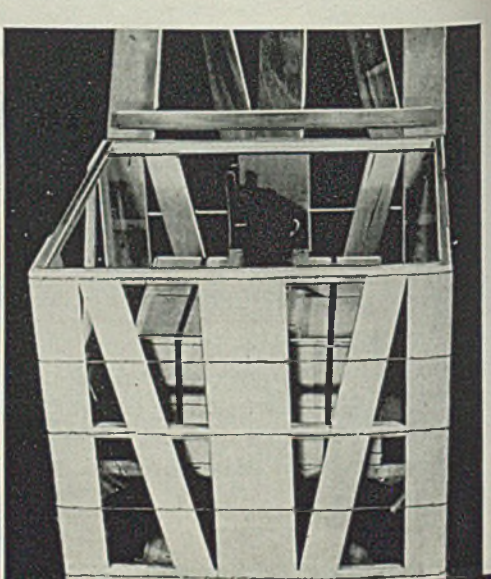
Packing in bulk, too, can be done easier and better with specially designed containers. Such products as nails, nuts, bolts, washers and the like can be transferred from department to department and shipped easily when packed in modern containers. Contrast conventional clumsy-to-handle and hard-to-open kegs with the engineered container

Fig. 2. (Left)—This special container combines a box and a double-faced pallet to produce a container that is exceptionally effective in handling and storing large volumes of sheet metal parts between processing operations. A power-driven industrial fork truck moves them about easily and tiers them as high as room space will permit to fully utilize all storage areas

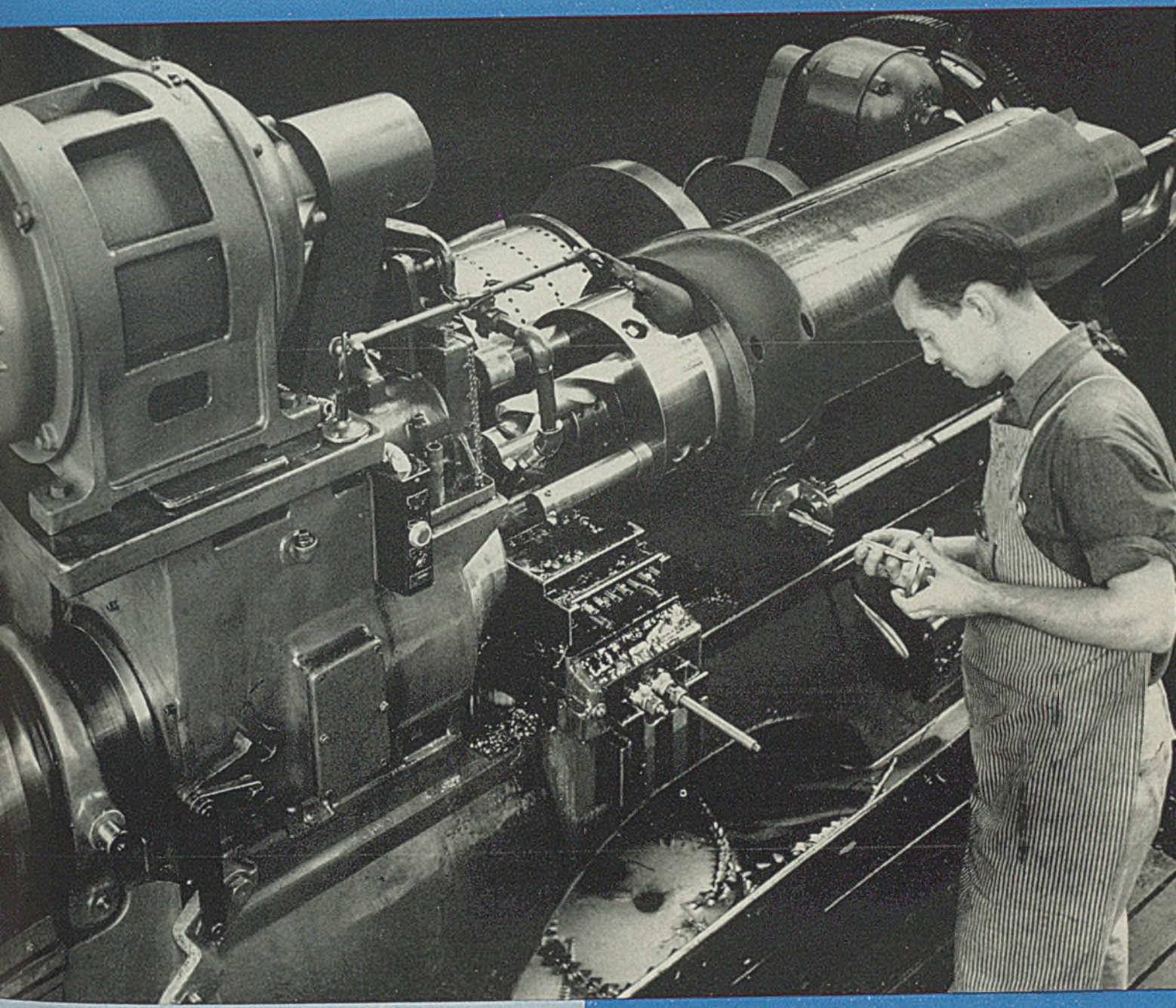
Fig. 3. (Center)—One of the newer types of containers, this unit is lightweight, yet strong, dustproof and has plenty of space to carry an advertising message. Made of wood and corrugated fiber board, it is finding favor with many shippers as it combines the advantages of both types of construction quite effectively

Fig. 4. (Right)—This container-within-a-container is an effective method of reducing losses from shipments of a large odd-shaped product. At the same time it enabled this manufacturer of woodworking machinery to put his shipping department on a basis where it could keep up with plant production, solving what had been a serious bottleneck





PRATT & WHITNEY ENGINES COME OFF THE LINE FASTER WITH HELP OF *Model "A"*



● Here is one of the newest Cleveland *Single Spindle* Automatics, a 5¾-inch capacity Model A recently installed in a P & W plant in production on *small lots and short runs* of vital engine parts, made most economically on this type of machine tool. In the 3¾-inch size up to 8-inch capacity, Model A has a four-speed motor drive, universal camming and variable tool feed. In 1 1/16-inch to 2½-inch sizes constant speed drive is standard equipment, but two-speed drive is optional at slight additional cost. Ask for information on the size that might break a "bottleneck" for you.

THE CLEVELAND AUTOMATIC MACHINE COMPANY
2269 ASHLAND ROAD, CLEVELAND, OHIO

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Chicago, 565 W. Washington St. • *Cincinnati*, 507 American Bldg.

CLEVELAND *Single Spindle* AUTOMATICS

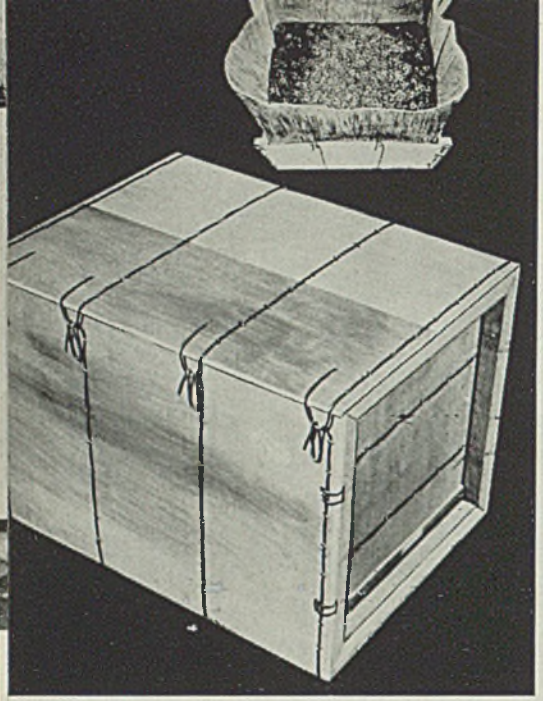


Fig. 5—The engineered container shown here produces important savings for a manufacturer of spring and lock washers. The weight of his package was reduced substantially by changing from kegs to the unit shown

shown in Fig. 5. It was designed to handle lock washers. Not only did this package reduce substantially the tare weight of his shipment, but as a result it made possible important savings in freight costs.

Heavy, cumbersome articles can be handled quite easily in a container designed specifically for the purpose. One of the largest automotive parts manufacturers found the specially designed container shown in Fig. 2 to be valuable in shipping various parts by freight to principal assembly points. Constructed of wood, this new shipping pack has replaced steel containers and substantially reduced the initial cost. Two containers can be placed side by side in the width of a standard railroad freight car.

Other important advantages are provided—in addition to its moderate cost. Note the bottom of the pack is in the form of a pallet, which permits handling and tiering the containers with an industrial power truck with lifting forks which can be inserted between the vertical pieces forming the pallet feet. This facilitates packing at the end of the line, speeds loading into cars, as well as unloading them at their final destination.

The receiver, too, benefits by simplified handling. The load is kept in the box, moved to the proper point on the assembly line and the parts then removed directly from the box as wanted. This modern shipping container also eliminates many of the customary handling and storing operations with their respective costs.

Such a container can be made in an extremely wide range of sizes and in any number of styles. Boxes have been constructed large enough to contain a load of about 2300 pounds with a capacity of 25 cubic feet.

Machinery builders often run into serious headaches in connection with the shipment of their products. A specially designed container often is the remedy. For instance, an Eastern wood-working machinery plant found its shipping department falling more and more behind the production schedule. This presented a serious problem—until laboratory-designed crates were used. Previously this company made its own containers. However, as production continued to increase, shipments began to slip behind orders.

Breaks Shipping Bottleneck

The picture completely changed, however, with the introduction of the new type crate shown in Fig. 4. Note a container-within-a-container is used. As a result, the concern was able to save more than enough packing and shipping time to break the shipping room "bottleneck". In addition, the wood-working machinery now travels safer and at less cost. Not only is the first cost of the container lower, but the reduction in tare weight makes possible important savings in freight charges.

Many manufacturers are now using a new type of engineered crate, manufactured from a combination of wood and corrugated fiber boards like that shown in Fig. 3. The exceptionally light weight of this crate makes it a popular favorite with many shippers, yet it provides adequate protection to its contents. With vertical cleats for greater column strength—plus the lateral strength of the corrugated board—this modern package resists weaving, is rigid, stacks well and has an exceptional carrying strength per pound of box.

This type of container can be made virtually dustproof to assure a clean product at arrival. Too, more space for an advertising message is provided, as this is a "cover-all" crate. When the printing is done attractively in two colors on the corrugated board, such a crate acts as a traveling billboard. Thousands of these boxes have been used successfully for the shipment of articles weighing up to 800 pounds.

Proposes Revision of Practice on Files, Rasps

Revision of the simplified practice recommendation R6-40, "Files and Rasps", to include important data on dimensions, cuts, tolerances is proposed by the standing committee of the files and rasps industry, according to the Division of Simplified Practice, National Bureau of Standards, Washington. Its inclusion, it is believed, will enhance greatly the efficacy of the simplification program.

Heretofore the recommendation listed only the standard lengths of each type of file and rasp. The proposed change supplements this with detailed dimensional standards covering width, thickness, range of file teeth per inch, the number of rasp-teeth per row and rows per inch and tolerances.

The current revision lists 374 items, of which 50 are straight and curved-tooth milled files, a new class not heretofore covered by the recommendation. It omits 55 items which the Office of Production Management requested be discontinued for the duration of the war. Mimeographed copies of this revision are available from the Division of Simplified Practice.

New Way of Making Cap Screws Saves Metal

Introduction of induction heating in the fabrication of cap screws, it is reported, is enabling the Allen Mfg. Co., Hartford, Conn., to utilize bar stock ½-inch smaller in diameter than previously used and to cut the entire screwmaking operation from 90 to 21 seconds.

Instrumental for these savings is Ohio Crankshaft's Tocco process of induction heating, changing the whole operation from one of machining to quick forging.

The old method of producing the cap screws was by machining bar stock 4⅜ inches long by 1½ inches in diameter and turning it down to 1 inch, leaving the full diameter for the head. This work consumed 1½ minutes and wasted much metal.

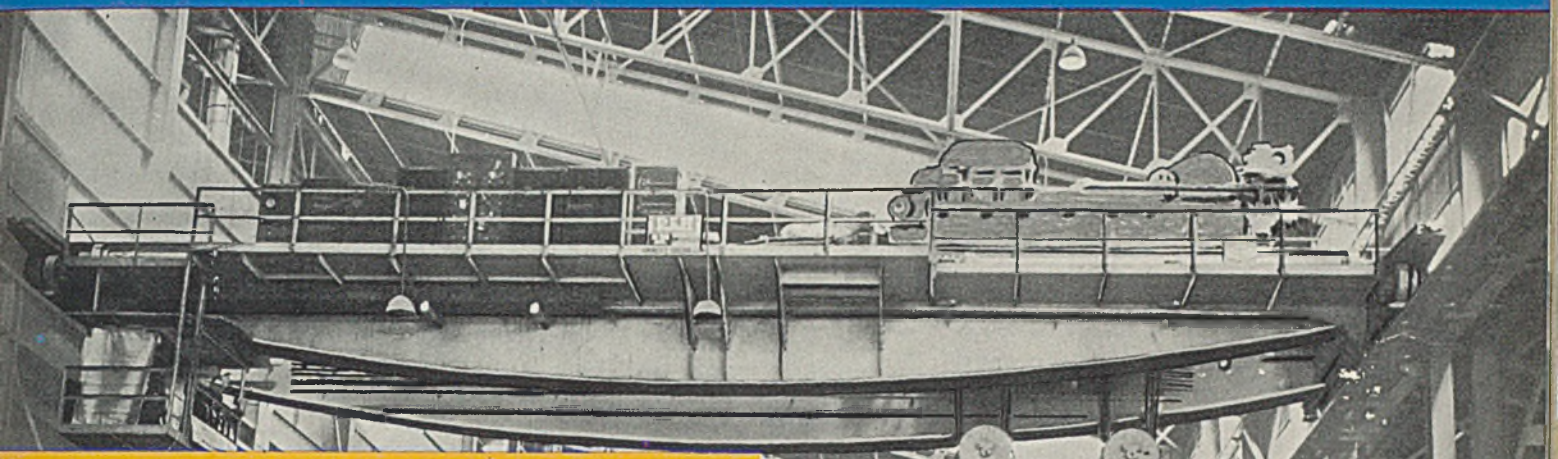
Not only is the new method four times faster, but the bar stock used measures 4⅜ inches long by only 1 inch. Placed in a water-cooled induction coil, the piece is heated for forging in 13 seconds. It is quickly transferred to a nearby heavy-duty forger for upsetting the head.

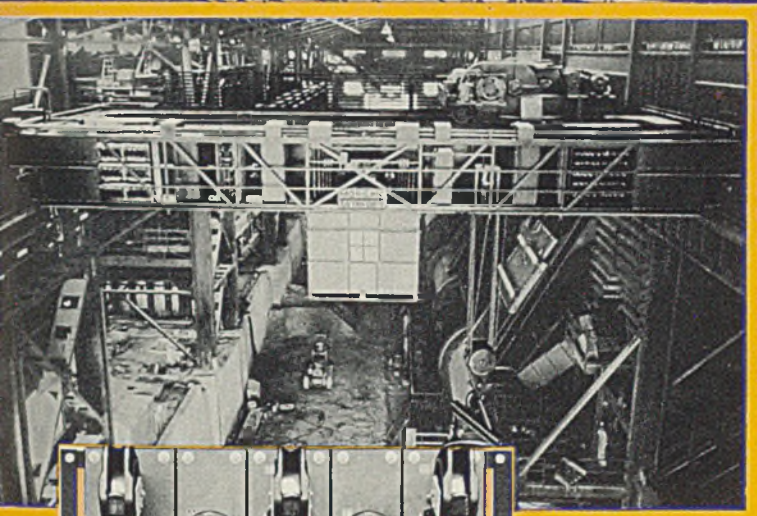
Three blows, taking about 8 seconds, are all that is necessary to complete the screw.

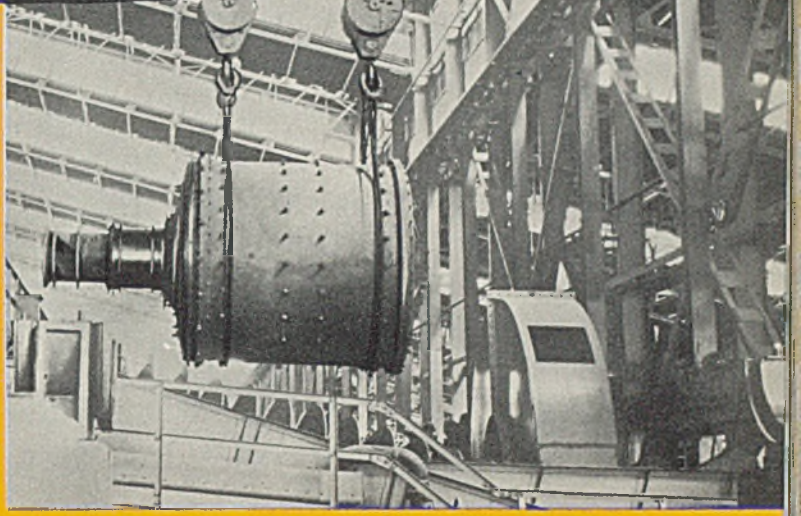
Control of induction heat to the specified area enables operator of the machine to handle the piece free of gloves or awkward tongs. The induction unit, having two stations, is powered by a 9600-cycle motor generator set of 60-kilowatt output capacity. It operates on a 440-volt hookup. The heating cycle is governed automatically, and operations are push-button controlled.

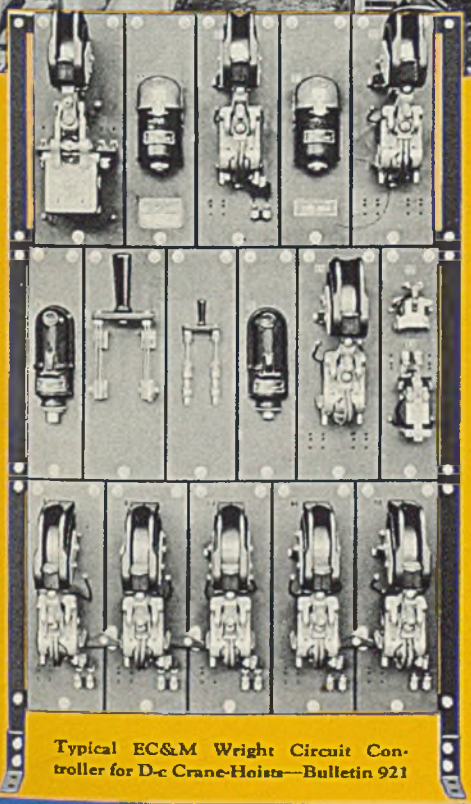
EC&M Crane Control

At Morenci Works of Phelps Dodge Corp.









Typical EC&M Wright Circuit Controller for D-c Crane-Hoists—Bulletin 921

Assures Safe · Accurate Handli

of BALL MILLS—LADLES, etc

Protects against damage when removing "Skulls" t

Wherever heavy equipment is to be spotted—hot metal to be handle EC&M Crane Control is "first choice" of plant operating men, becau The EC&M Hoist Controller, of patented Wright Circuit design *unequalled* in its ability to permit *short, accurate, inching moveme* It is SAFE—*the motor can not overspeed.* The operator always has load under absolute control when lowering capacity loads with the troller either in the full "on" position or on any intermediate poi Equally important on these cranes is the use of a "torque-limiting" r in the hoist direction to prevent damage to crane or converter, du removal of "skulls." For efficient control matched to the task—and n for low up-keep, too—specify EC&M Crane Control.

Type WB Brakes for D-c operation Bulletin 1004-C.

Youngstown Safety Limit Stops, A-c & D-c Bulletin1035-C

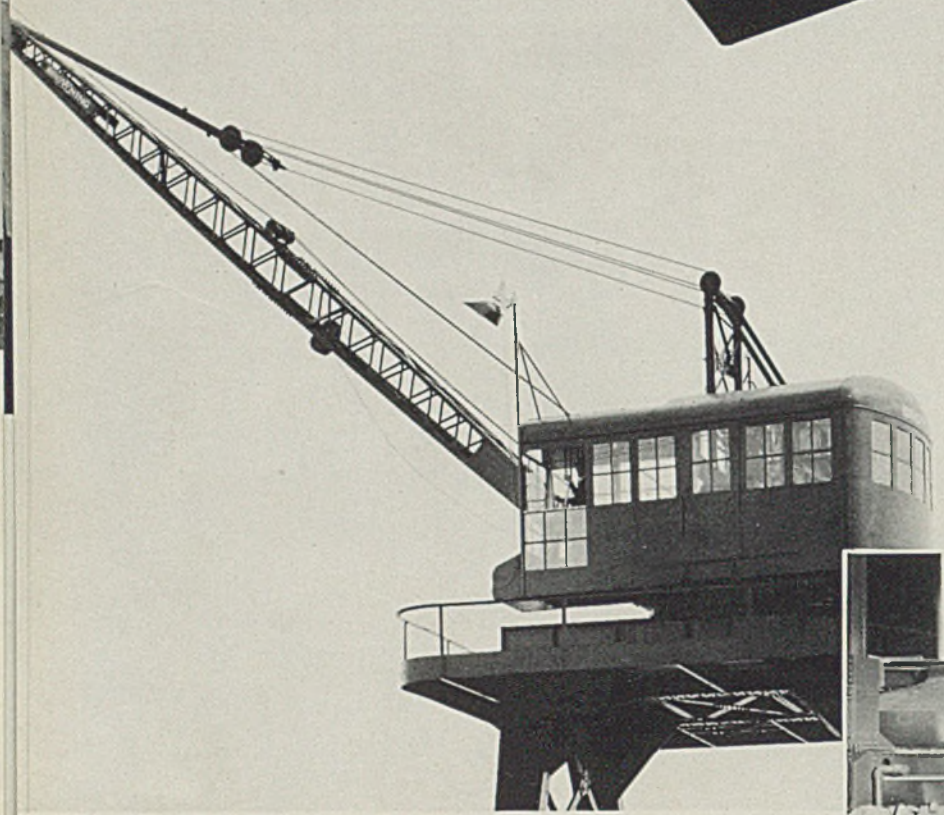
Manual Controllers Bu. 960, 980, 970.

Crane Protective Panels Bu. 1021, 1022.

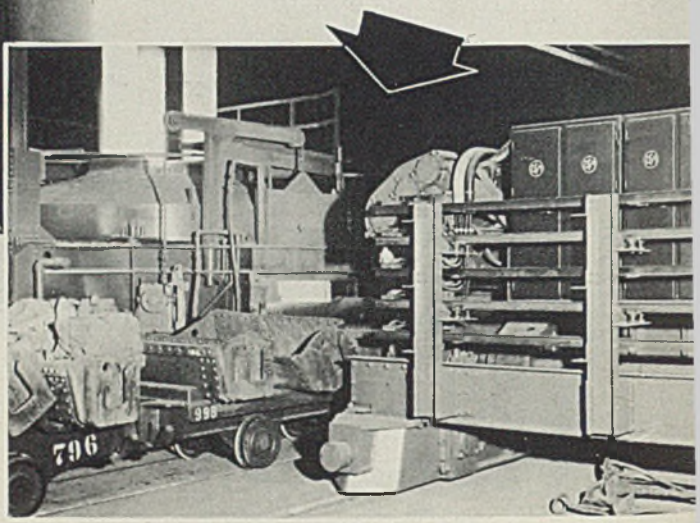
THE ELECTRIC CONTROLLER E&M CLEVELAND, OHIO

WHEN BUYING CRANES, Specify EC&M CONTROL

Complete Control for EVERY TYP AND MAKE OF CRAN

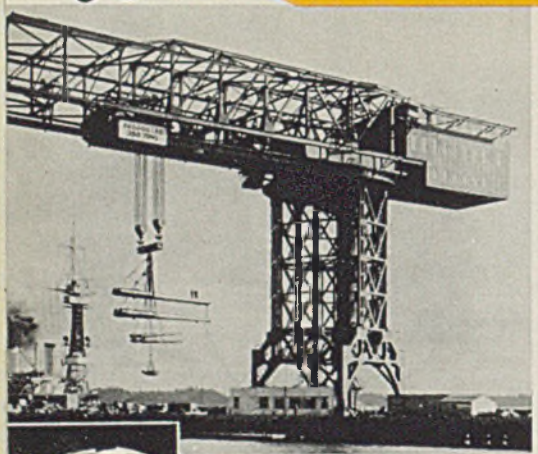


25-Ton Portal Cranes completely equipped with EC&M LINE-ARC Contactor, Time-Current Control and Type WB Brakes.



Floor-type Charging Machine with EC&M Enclosed Magnetic Control ser recently installed electric furnaces.

You Can Set a Gun or Crack a Walnut—



The above statement expresses the fine degree of accuracy you have in an EC&M Magnetic Controller for hoist motions of cranes. Under any load condition, this controller is unequalled in its ability to permit short, accurate, inching movements.

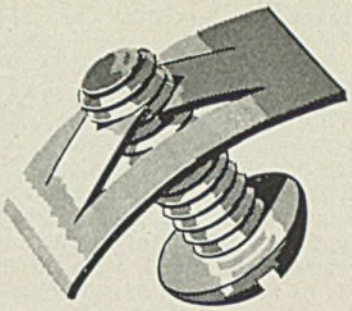
"WITH EC&M CONTROL" is practically a by-word with crane-specification-writers. They do this with complete confidence for they know that these 3 simple words mean the best procurable equipment for the *vital* part of the crane.

At EC&M, there are no pre-set standards for Crane Control. Instead, Brakes, Limit Stops, Protective Panels and Controllers are designed and built for the task at hand. This insures that the crane starts up for the first time without delay and that smooth, low-cost operation is maintained throughout the life of the crane.

For a carefully engineered job, built with efficiently operating products such as—The Wright Circuit—LINE-ARC Contactors—Time-Current Acceleration—Type WB Brakes—A-c Dynamic Hoist-Control—A-c Frequency Relay Acceleration—Youngstown Safety Limit Stops, etc., we suggest you specify "With EC&M CONTROL" when buying new cranes or revamping old ones, either A-c or D-c operated.

THE ELECTRIC CONTROLLER & MFG. CO.

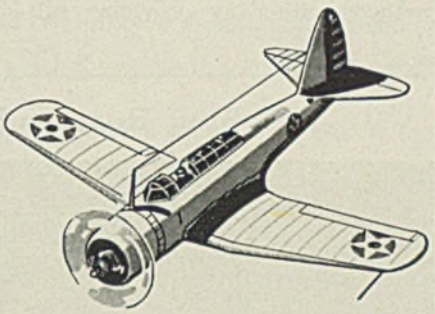
698 E. 79TH STREET CLEVELAND, OHIO



A Case in Point

One plant going great guns on war equipment orders is Tinnerman Products, Incorporated, of Cleveland, which makes those new "speed nuts" used in assembling airplanes, trucks, automobiles, countless other items.

The "speed nuts" are made of tough spring steel, provide double-locking spring tension to absorb stress and strain caused by contraction or expansion and to eliminate loosening from vibration.



Naturally, these new products—which also go into many civilian products such as ranges, refrigerators and radios—require heat treating.

Says the Company:

"We use Gas in all of our furnaces and equipment for heat treating. Our hardening furnaces, draw furnaces and shaker furnaces are all Gas-fired, and we also use Gas furnaces for hardening our tool steel."

That's the type of experience you run into with Gas-fired equipment constantly during these days of extra-pressure production.

Bullard Co.'s Reclamation Operations Recover Large Amounts of Metal

RECLAMATION operations by which 15,000,000 pounds of iron and steel briquettes are produced annually, 25,000 gallons of lubricating and cutting oil saved, with 75,000 pounds of nickel and 35,000 pounds of chromium salvaged and segregated, were described by Robinson Bullard, The Bullard Co., Bridgeport, Conn., at a group meeting in New York of co-operating engineering societies discussing the engineering aspects of the national industrial scrap program.

The Bullard Co. operates a salvage department which inspects and catalogues cutting tools when worn to a certain point or broken; if possible these tools are reconditioned for further use in other departments of the plant, but often when this is not possible, other manufacturing firms requiring less precision tooling may get many production hours from them.

In reclamation of cutting oils, machining operations normally remove about 30 per cent of the oil on the turnings. This is reclaimed by two methods, either by providing self-draining chip storage bins or by mechanical extraction. Mr. Bullard indicated mechanical extraction offers the most efficient means of reclamation.

The Bullard plant is operating 24 hours per day and lubricating oil in all machines must be changed frequently, meaning large accumulations of used oil. This oil is not lost, however, for by cleaning and blending with a heavier oil, the lubricant can be used in hand oiling applications.

The Bullard Co. operates a complete system for converting cast iron borings and steel turnings into a material suitable for remelting. A flow program was first developed in planning the system, material being segregated at the production machines by providing properly marked oil-tight boxes which are further identified by being painted different colors. The colors indicate what type of material they contain, cast iron borings, carbon steel turnings or alloy steel turnings.

Cast iron borings are briquetted without preliminary treatment other than screening to remove refuse. Steel turnings prior to briquetting are crushed, and, if machined with mineral cutting oil, this is extracted. After briquetting, the various types are conveyed to separate storage hoppers accessible to the cupola charging crane.

The steel turnings are piled on a deck and fed manually into the crusher. Those machined with mineral cutting oil are conveyed pneumatically from the crusher to a storage hopper. The oil is removed by a centrifugal extractor and the clean turnings are dumped into the intake hopper connected with another pneumatic conveyor which carries them to a compartment in the main storage hopper.

Steel turnings not machined with mineral cutting oil are carried directly to the compartment in the main storage hopper.

Briquettes are being disposed of in two ways, alloy briquettes being returned to suppliers of alloy steels and the remainder make up 35-40 per cent of the Bullard foundry needs. In most heats as high as 50 per cent briquettes are used in the charge with highly satisfactory results.

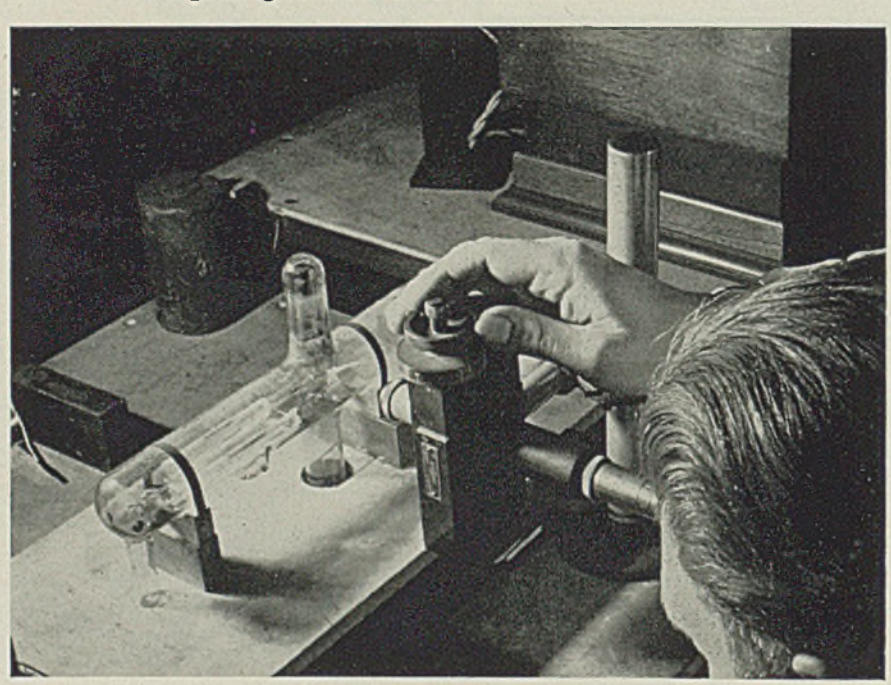
Severe strain on alloying elements has resulted from the tremendous use of alloy steel in the war effort; this has been the outstanding development in the iron and steel industry in the opinion of Dr. Charles Herty, Bethlehem Steel Co., reviewing the importance of alloy scrap segregation. Many of these alloys, including manganese, chromium, vanadium and tungsten, have been largely imported, and, while we are striving to build up domestic production, Dr. Herty stressed the need of making every effort to reclaim alloys in iron and steel resulting from various manufacturing operations. Recovery of this scrap amounts to a source of strategic alloys.

Illustrating the importance of scrap recovery in the case of 3.5 per cent nickel steel by comparing net tons of ingots produced per 1000 pounds of new nickel, Dr. Herty points out a complete job of recovery for an average product means the tons of nickel-bearing ingots has been doubled over that which would have been produced if all new nickel had been employed. Relatively the same tonnage of ingots holds for alloy steels containing molybdenum, tungsten and cobalt, because these elements are not oxidized in the steelmaking process to a large extent and are almost 100 per cent recoverable. Chromium and vanadium are oxidized in steelmaking to a large extent and their recoveries are low compared with the others.

Unless certain special practices

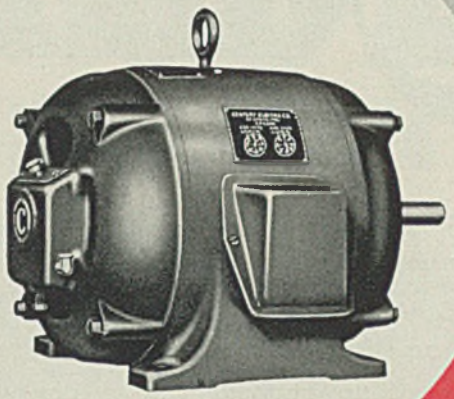
(*Please turn to Page* 132)

Weighing Rust and Tarnish on Metals

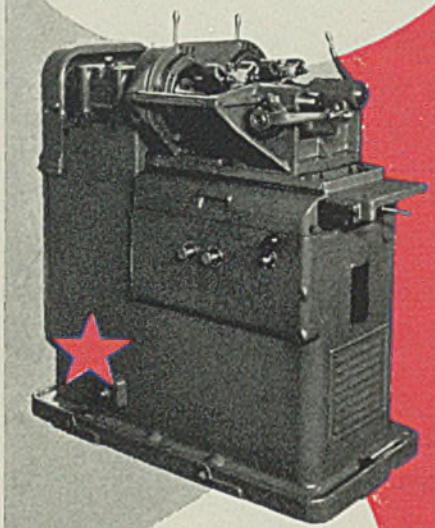


THIS TINY WEIGHING machine, so sensitive it measures its loads in weight units of ten billionths of an ounce, is being used by Dr. Earl A. Gulbransen at the Westinghouse Research Laboratories, East Pittsburgh, Pa., to weigh oxide films, or rust, to determine how, and how fast oxygen combines with metals. The white glass weighing instrument sealed in the tube measures pieces of metals half the size of a razor blade. Movements of the balance's pointer, so minute they can be observed only through a microscope reveal the weight added to the tiny steel sample

Quietly and Unseen – Thousands of CENTURY MOTORS



are playing their part by producing smooth power for the precision production of war needs

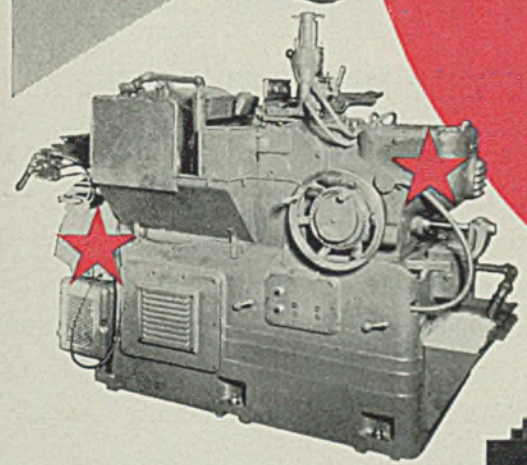


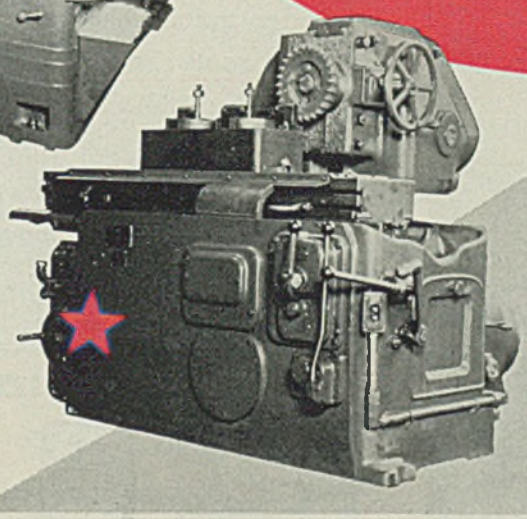
Hidden from view in the streamlined bases of thousands of the most modern machine tools, Century Motors—through their unusual freedom from vibration — are quietly contributing to more efficient production by making possible closer tolerances and consequently fewer rejects.

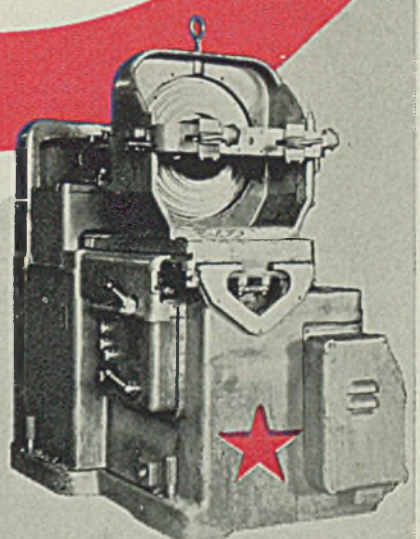
Built to stand the gaff of continuous, 3-shift, high speed production, Century Motors ask for no vacations or rest periods.

For a quick solution of any motor problem — get in touch with the nearest Century Motor Specialist. His wide experience in specialized motor application plus the wide range of Century sizes and types may save you time and trouble.

CENTURY ELECTRIC CO.
1806 Pine Street, St. Louis, Missouri
Offices and Stock Points in Principal Cities



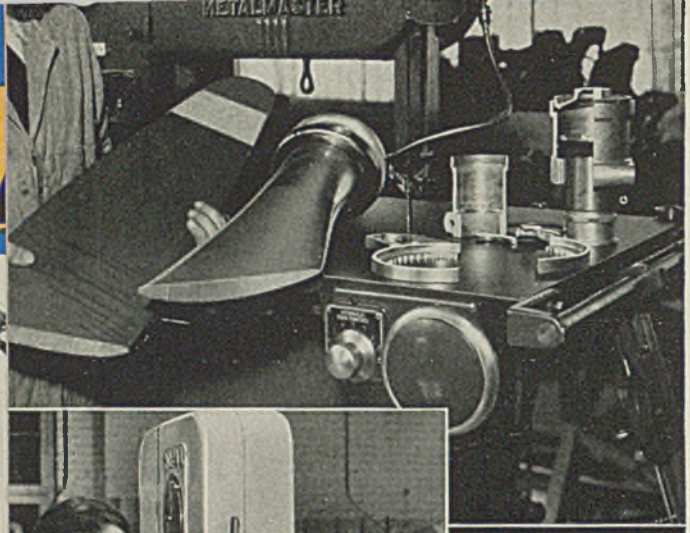




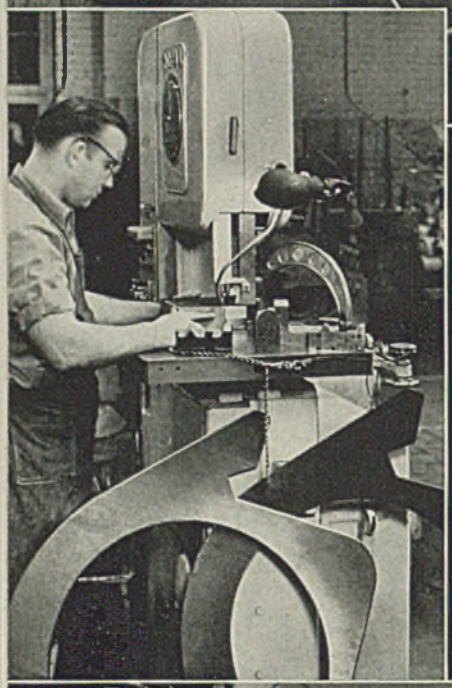
Century MOTORS

One of the Largest Exclusive Motor and Generator Manufacturers in the World.

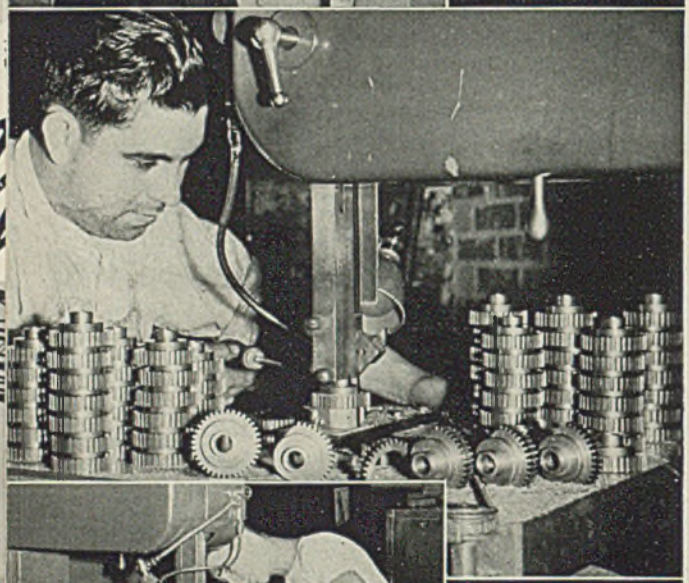
273

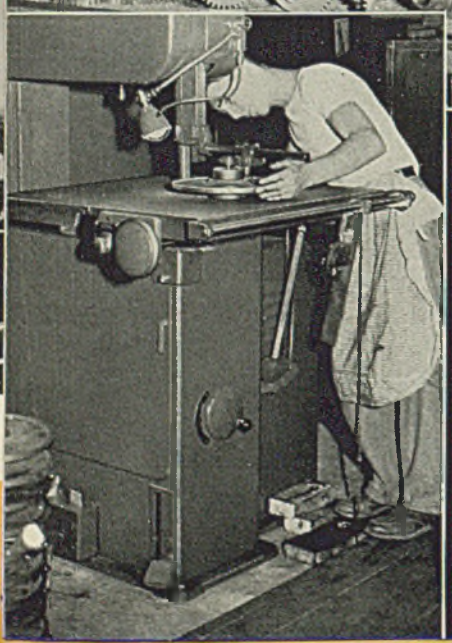


Variable pitch Propeller Blades made on the DoAll with great savings of time.



Special Parts made on the DoAll in a fraction of former time.





Sector Gears cut in 5 minutes each. Formerly took 30 minutes each on a miller.

Disc Rims polished on the DoAll in 2 minutes each. Formerly took 1 hour each by hand.

DoAll

No, we don't need any more time. We have as much time as our enemies, but we do need *more production per hour,* and that's where the DoAll Contour Machine is doing such a magnificent job—knocking former shape cutting records into a cocked hat!

ON THE JOB 24 HOURS A DAY

In every modern plant from coast to coast, wherever war orders are going through on direct or sub contract, you'll find the DoAll doing all kinds of special production cutting, relieving $5,000 to $50,000 machine tools for other work.

★ ★ ★

Don't care what the metal or alloy is—there's a DoAll band to do the job not only quicker, but smoother and better.

FASTEST PRECISION METHOD TO REMOVE METAL

For external and internal sawing of all metals and alloys (flats, blocks, bars, sheets or tubing)—for making special tools and parts without dies—for regular production work—investigate the DoAll, wonder machine of our day. There are 5 models with throat capacities ranging from 16" to 60", priced from $1000 to $5000, including motors.

Ask to have a factory-trained man call and show you how much time and energy a DoAll can save in your plant.

THE EXACT SIZE FOR YOUR JOB

Under $5000 | Under $2500 | Under $2000 | Under $1500 | Under $1000

All Models with Motors

PRODUCTION
TURNS MAN HOURS INTO MINUTES

Armor Plate 1/2" thick cut on the DoAll. Fomer method was torch and grinding off flash.

CONTINENTAL MACHINES, INC.

1324 S. Washington Ave., Minneapolis, Minn.

Associated with the DoAll Company, DesPlaines, Ill.

Manufacturers of Band Saws and Band Files for DoAll Contour Machines

NEW—Send for help book "DoAll on Prod tion" for a bird's-eye vi of real accomplishme

How To Operate a PORCELAIN ENAMEL PLANT At Peak Production

TO ELIMINATE duplication of services and to achieve the most with the least, it has been suggested that production quotas be prepared for each industry and certain plants the sum of whose maximum production equals that quota be run full blast 24 hours a day to produce it. The remaining plants of the industry would then be converted to war production work. In view of this situation, one of the meetings at the Sixth Annual Forum of the Porcelain Enamel Institute held in Columbus, O., was devoted to operation of porcelain enamel plants at peak production under war-time conditions.

Of course the possibility of substitute materials or elimination of porcelain from products has been discussed, but it does not appear likely that there will be much substitution on heating appliances for some time. Substitute materials for these applications do not yet seem to give satisfactory consumer service.

Every enamel shop, large or small, must be managed according to certain basic fundamentals in order to be successful. Most plants recognize these fundamentals, apply them as much as possible during normal periods. However, the real test comes during rush and seasonal peaks, when frequently the urge to meet production overcomes common sense principles. Peak production serves as a measure of ability in that it exaggerates bad conditions of normal times. These often pyramid to such a degree as to cause confusion. To find the direct answer as to what should be done, it will be necessary to divide the factors concerned into parts and analyze each one carefully. For the purpose of discussion we will divide them into these classes: Planning, materials, processing and control, personnel.

Principles of operating a porcelain enamel plant at peak production do not necessarily mean that costs must rise and efficiency decrease as is explained here. At the same time many items contributing to raising production also are applicable to other metal finishing processes and plants

Planning: Since planning covers all the parts in any plant, it may be considered the outstanding factor in maintaining equilibrium. Without it economical operation is practically impossible.

To operate an enameling plant at peak production is to operate it at the capacity of its furnaces. But before any attempt is made to run the plant, the entire operation should have a definite plan. Thorough analysis should be made as to just how many and what parts are to be run. The sequence of operations, equipment used and times of operations should be carefully planned. Not only should labor be calculated from a measured time basis, but figured to realize the advantage of better balanced manpower at higher schedules. It is also wise to re-examine parts to see if any are suitable for one-cover-coat application. Generally speaking, large rigid parts offer the most promising results.

Capacity box-furnace production is to maintain the maximum number of fork loads with every fork loaded with the greatest number of parts possible. Likewise, capacity continuous-furnace production is to maintain a completely loaded furnace chain traveling at its maximum speed with each tool loaded with the greatest number of parts possible. In both cases reoperations should be at a minimum.

Close contact with the designing department is essential so parts will be designed to eliminate intricate brushing and proper radii will be maintained to avoid undue strain on the metal. Design of burning tools, width and height of burning chambers, location of hang-up holes, if hooks are used, all have a definite bearing on maximum loading. On box furnaces greater footage per load can usually be obtained by hanging the ware instead of firing it on flat or pin bars. Furnace baskets for continuous furnaces should be centered as close together as possible on the chain to get the most production per foot of chain.

This material was originally presented as a symposium at the Sixth Annual Forum of the Porcelain Enamel Institute, Columbus, O., October, 1941, in papers by Clifford Andrews, McCray Refrigerator Co.; Allen E. Apple, Sunbeam Electric Co.; Paul Gerdes, A. J. Lindeman & Hoverson Co.; L. E. Nordholt, Tennessee Enamel Mfg. Co.; F. W. Rozene, American Stove Co.; L. K. Sosey, Seeger Refrigerator Co.

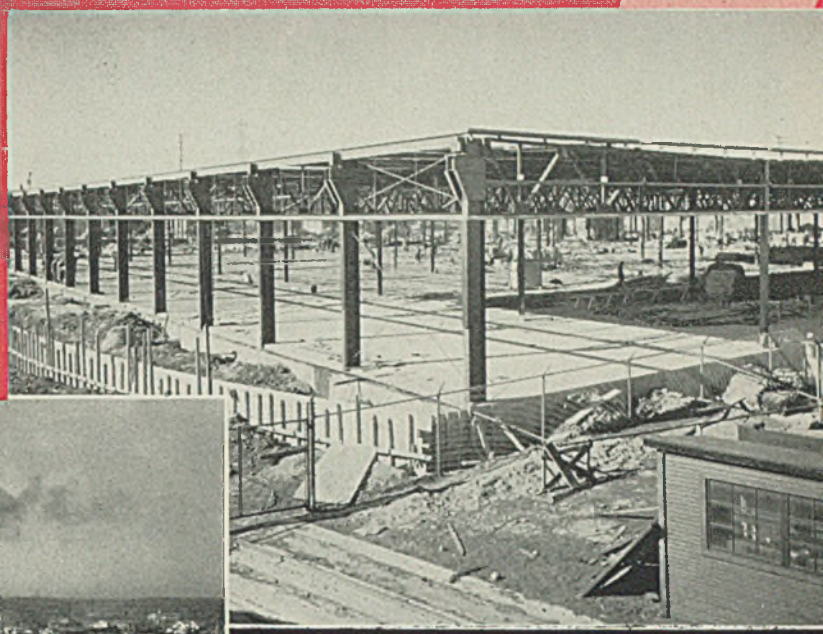
Weight and design of baskets and tools should be considered in increasing firing speed. As lightweight furnace tools as are possible for the load should be used. New lighter weight continuous furnace baskets at one plant allowed an increase of 10 per cent in chain speed over the former set. Pickle baskets should also be loaded efficiently.

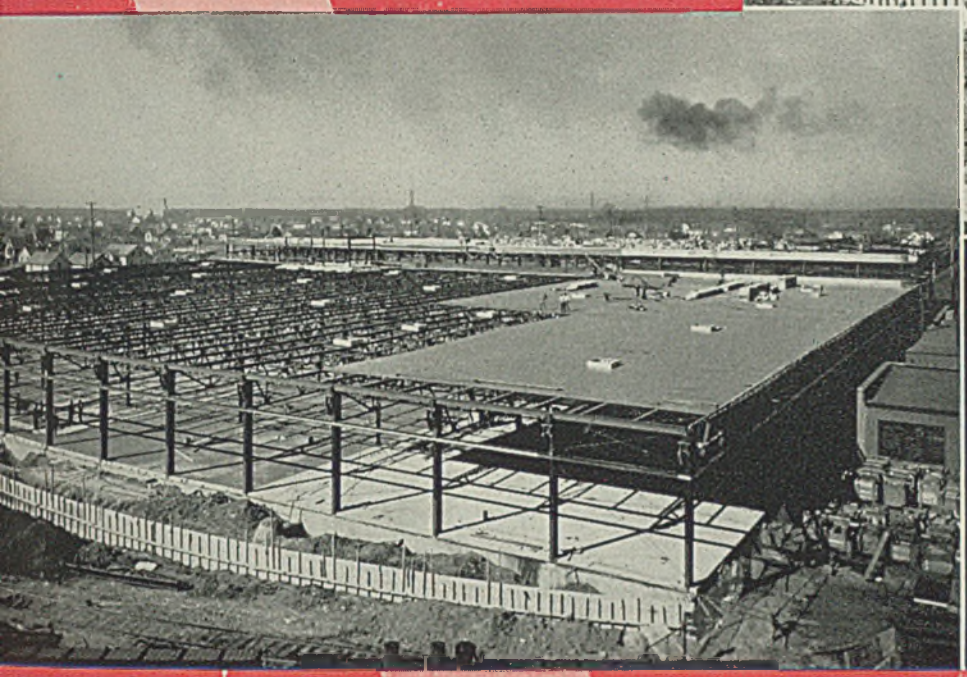
Production of one furnace was increased between 25 and 30 per cent by balancing all its cover coat enamels to burn at about the same time and temperature and utilizing new methods of hanging the work on the chain so as to take advantage of the variety of parts to leave no waste on the chain.

Soft ground coats allow much closer spacing of ware during the ground coat firing. In the firing of the white coat, too close a spacing of the ware may result in tearing, hairlining or warping of the ware. However, there is no reason that the crowded spacing cannot be used in the ground coat firing to gain the added protection. For example, one plant uses entirely different furnace tools and spacing of ware for the ground coat firing than for the white firing. In ground coat a large basket is used, hanging on 6-foot centers and carrying two liners and two interior door pans, thus giving one liner and door pan per 3 feet of furnace chain. However, with the hairpin type electric furnace such a spacing cannot be used for white firing so the liners are hung on smaller baskets on 3-foot centers on the chain. The maximum loading of furnace tools may also be accomplished by double decking,

(*Please turn to Page* 126)

Another Four V JOB





Completed ahead of Time!

THIS is an example of efficiency and coordination that achieves results. The structural steel in the above job was fabricated and erected within 9 weeks after the contract was received:

Here's the record:

Contract received	Feb. 13
Design drawings received	Feb. 16
Shop detail drawings completed for approval	Feb. 28
Began shipping	Mar. 18
Completed shipping	Mar. 27
Started erection	Mar. 23
Completed erection	Apr. 17

9 WEEKS FROM START TO FINISH

Contract called for erection to start April 1, and finish by April 25.

Four V Structural Steel Companies offer a source for the fabrication of mass tonnage under the supervision of a single engineering and production staff, and with responsibility centered in one management to secure top efficiency.

• • •

If you have a problem of structural steel fabrication, The Four V organization is ready to help you solve it . . . quickly and efficiently. Wire, write or phone Harrison 8813 today.

Four V STRUCTURAL 4 STEEL COMPANIES

37 W. Van Buren Street — CHICAGO, ILLINOIS

Clinton Bridge Works — Clinton, Iowa

Duffin Iron Company — Chicago, Illinois

Gage Structural Steel Co. — Chicago, Illinois

Midland Structural Steel Co. — Cicero, Illinois

OVER 5000 POUNDS OF ...IN ONE PLANT WITH

ZINC A WEEK SAVED...

PENNSALT CLEANER

EVERY POUND of essential metal saved is a blow against the enemy. Pennsalt Cleaners are doing forthright service in many industries, helping to conserve vital time and materials by faster, better metal cleaning—at lower cost.

Saving zinc by the proper removal of oil, grease and other soils from structural steel before galvanizing is an example. In one large fabricating plant rejects after galvanizing ran 20 to 25 per cent before Pennsalt Cleaners were introduced.

Now for the Pennsalt method:—Crates of steel parts are lowered by crane into a tank containing a steam-heated solution of Pennsalt Cleaner. After ten minutes they are taken to a rinse tank, then as they are removed they are water-sprayed. Pickling, rinsing, fluxing and coating operations proceed as before.

Result? Virtually *no* rejects! Average daily production up 20 per cent! And the zinc formerly lost due to stripping rejects now is *saved at the rate of over 5000 pounds per 80 hour week!* Over 260,000 extra pounds a year to help win this war. And this saving was made by only *one* manufacturer!

Many leading plants in every field of metal manufacture are saving needed materials and speeding cleaning operations with Pennsalt Cleaners. They are often able to dispense with hand labor and precleaning . . . and so cut cleaning costs.

In a wide range of duties, Pennsalt Cleaners are removing and preventing the redepositing of dirt—grease, oil, emery dust, rouge, carbon smut, grit. The metals and alloys they clean include carbon and alloy steels, stainless steel, copper, aluminum, zinc, nickel, nickel silver, Britannia metal, brass and bronze.

Whether the part is rolled, forged, stamped, drawn or cast . . . Pennsalt Cleaners are producing a remarkably clean, smooth surface that leads to a better job of Bonderizing, Parkerizing, enameling, painting, galvanizing or plating.

In the complete series of Pennsalt Cleaners, there is one which will meet the specific metal cleaning problem in *your* plant. All Pennsalt Cleaners have exceptional dissolving and emulsifying action, extraordinary lasting power and highly efficient cleansing qualities.

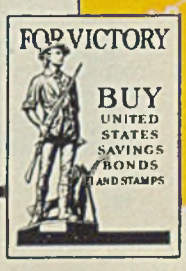
Let one of our experienced technical staff help you choose the Pennsalt Cleaner that will do most to save time, materials and money in your particular metal cleaning operations. Or write fully to our Pennsalt Cleaner Division, Dept. S.

PENNSYLVANIA SALT MANUFACTURING COMPANY

Chemicals

1000 WIDENER BUILDING • PHILADELPHIA, PA.

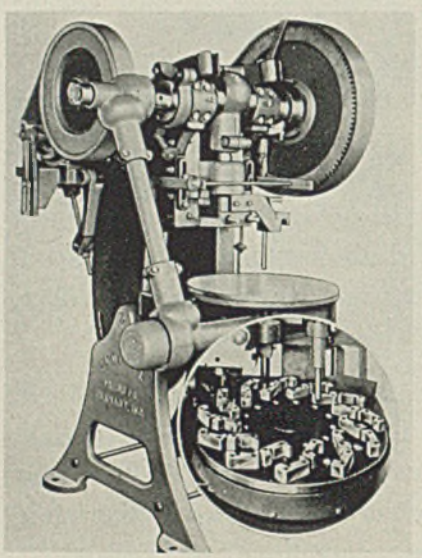
NEW YORK • CHICAGO • ST. LOUIS • PITTSBURGH • WYANDOTTE • TACOMA



Industrial Equipment

Dial Feed Press

Federal Press Co., Elkhart, Ind., has introduced a new dial feed press, feed of which features a positive indexing and locking mechanism that permits the machine to perform with high speed and accuracy. The press, with this type feed, can be



adapted to handle a variety of secondary operations, permitting a wide range of tooling. In the dial feed, all moving parts are enclosed, except the dial plate itself. Indexing is obtained by a cam and gear arrangement in connection with the crankshaft. The cam allows the dial to be indexed in any part of the revolution of the crankshaft from 90 to 180 degrees. Automatic loading and ejector mechanisms may be attached for greater speed. Dial feeds are available on eight sizes of presses, from 6 to 80-ton capacities. Features of the open-back, inclinable press itself include a new safety lock which makes it possible to set or adjust dies while the flywheel is in operation. Adjustment of the press incline is made from the front.

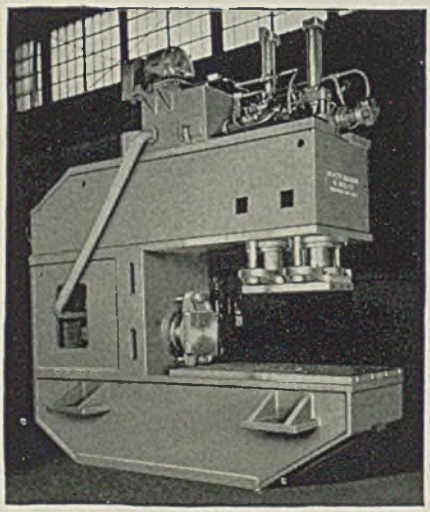
Enclosed Switchgear

General Electric Co., Schenectady, N. Y., announces that its 250-volt direct current air circuit breaker switchgear equipment for heavy duty in steel mills, shipyards and other industrial applications are now being offered in metal-enclosed cases, eliminating possibility of inadvertent contact with live parts. Individual

air circuit breakers, of this MC-5 unit are enclosed in separate steel compartments, as are the control devices of the contactor. Control switches and instruments are mounted semiflush on the steel panels of the doors. Arc chutes designed to direct gases resulting from circuit interruption lead out from the top of the structure and away from the operating area. Panels of the new equipment can be locked.

Hydraulic Forming And Flanging Press

Beatty Machine & Mfg. Co., Hammond, Ind., announces a new hydraulic press for forming and flanging operations. Offered in capacities up to 400 tons, it features a new self-cooling hydraulic oil system eliminating the need for cooling coils. The hydraulic oil circuit is arranged so that the two vertical cylinders, each having a 200-ton capacity, can be tied together and op-



erated as a single 400-ton press with operation by a lever control.

When used for flanging, the front cylinder advances to the work on the down-stroke at the rate of 290 inches per minute and holds the work under pressure while the horizontal ram advances at the same rate. Under a full load this ram presses at the rate of 21 inches per minute. All cylinders are controlled by manual valve lever. Further specifications for the 400-ton model shown in the illustration, are as follows: Maximum daylight of press 45 inches, stroke of cylinders 24 inches, depth of throat 66 inches from center of vertical cylinders to housing. The lower platen measures 48 inches right to left and 88 inches front to back.

Respiratory Protector

American Optical Co., Southbridge, Mass., announces a new American R9100-T respirator for protection against toxic dusts. It weighs 1½ ounces and gives full vision, while the entire face piece is a filter in itself and compresses

maximum protection area into minimum space. The closely-felted filter has been approved by the Bureau of Mines for protection against the inhalation of toxic or poisonous dusts such as lead, cadmium, arsenic, chromium, manganese, selenium, vanadium and their compounds. The face piece is adjusted easily and gives a comfortable fit.

Lighting Unit

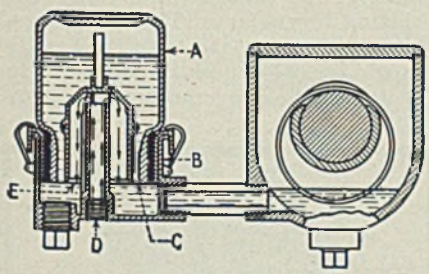
Curtis Lighting Inc., 6135 West Sixty-fifth street, Chicago, announces a new plastic lighting unit with a steel top plate and plastic diffuser primarily for use in offices. Known as PlastiLux, it is designed for installation in continuous lines or as individual units to be mounted either directly to the ceiling or suspended with hangers. Knockouts provided in the top plate aid installation. Continuous units are completely wired and include 110-120 volt high power factor ballast. The outer surface of the top steel

plate acts as the reflecting surface. The plastic shield or diffuser is removed by applying slight pressure along the sides. Starters are lo-

cated at the sides of the reflector. The reflector forms the cover of the wireway and conceals the lamps. It is removed by releasing two wing nuts.

Lubricator

Oil Rite Corp., 3466 South Thirteenth street, Milwaukee, announces a new constant level lubricator which holds a visible reserve supply of oil releasing automatically just as much as is needed to maintain a constant predetermined level of lubricant. Its use is said to insure adequate lubrication at all times and to prevent oil waste. This lubricator is used on electric motors, pillow blocks, textile and papermaking machinery, pumps, air conditioning equipment, ventilating fans, gear boxes, etc. It consists of three parts. The base is cast of Zamak metal with an integral open air vent which extends part way up into the oil reservoir. Over this vent is fitted loosely an inverted bucket or bell. The reservoir proper is a glass dome, sealed to a metal collar by plastic porcelain cement which is impervious to acids, oils, water and heat. Two spring clips lock the oil

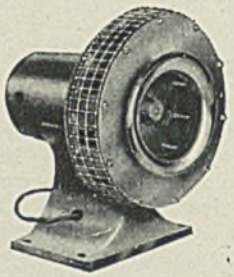


reservoir in position. A felt gasket around the outside of the bell seats against the narrower neck of the glass dome when the reservoir is removed. When the reservoir A is filled and inverted into position on the base B, the lower edge E of the inverted bucket or bell determines the oil level which the lubricator will maintain. When the level falls below this point, air from the vent, D escapes under the side of the bell —as at C—up to the top of the lubricator, permitting oil to flow down until the level to be maintained again seals across the base of the bell. Lubricators are offered in four standard sizes with capacities of 2, 4, 8 and 16 ounces. Outlet tappings

are provided at both side and bottom of base, and oil level to be maintained is clearly indicated. Air vent can be provided with filter or can be installed with breather tube connecting to bearing.

Air Raid Siren

Breuer Electric Mfg. Co., 5109 Ravenswood avenue, Chicago, announces a new Tornado type of air raid siren especially designed for industrial use. Two models are being offered, one for small departments such as offices, laboratories,



stockrooms, etc., and a larger model for manufacturing areas which can be heard above the noise of the machinery. The sirens have motors operating from either alternating or direct current. They can be mounted either vertically or horizontally.

"Bomb Shovel"

Los Angeles Shipbuilding & Drydock Corp., Box 231, San Pedro, Calif., announces a new "bomb shovel" for fighting incendiary bombs. Invented by two of its employes, the shovel carries a load of sand in the handle to smother the blazing incendiary. The sand is automatically released from the handle as the operator uses the hollow side of the shovel to smother the blaz-

ing bomb. Then the shovel is turned over and used to scoop up the incendiary and remove it to a safe place. Made of galvanized sheet metal, the shovel weighs 19 pounds

when loaded with sand. It can be handled easily by a woman if necessary, and can be carried with ease to the roof or attic. The shovel is effective also in smothering oil or gasoline fires.

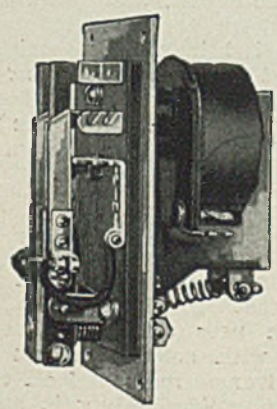
New High-Speed Steel

Jessop Steel Co., 584 Green street Washington, Pa., announces a new TCM high-speed steel which fully replaces 18-4-1 and is of particular importance in conserving strategic alloys vital to our war program. TCM is a low tungsten-molybdenum

steel heat treated in the same furnaces and at the same atmosphere as 18-4-1, requiring no change in operating equipment. This new steel has a slightly lower hardening temperature than 18-4-1.

Relay

Struthers Dunn Inc., 1335 Cherry street, Philadelphia, announces a new Dunco laminated frame relay CX3318 designed to handle circuits carrying milliamperes at microvolts in radio applications. It has sliding contacts and can be adapted for switching thermo-couple circuits. The new relay is 3¾ inches high, 2

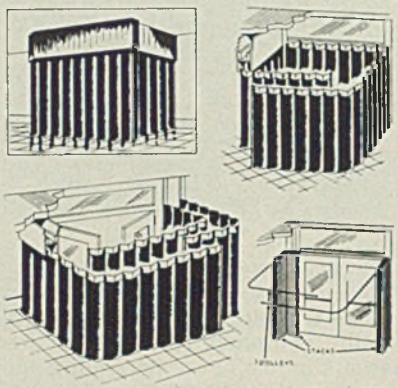


inches wide, 2¼ inches deep, weighs 9½ ounces, and is constructed to withstand extreme vibration incident to aviation service. It is tested for operation at high altitudes. Contacts are double-pole, double throw. Coils are for operation on

alternating current only and are shielded from the contacts.

Blackout Partition

New Castle Products, New Castle, Ind., has developed a new accordion-type partition to solve the lightlock and blackout entrance problem. A folding fabric partition, it conforms to blackout standards, and at the same time, permits access to and exit from lighted buildings. The partition works on an accordion-like principle having a specially-designed hinge lock self-spacing hinge plate at the top. Folding on itself, it has a roller assembly traveling easily on an overhead track. A vertical pipe connected to the lead trolley and extending to approximately 6 inches from the floor, concealed in a loose-

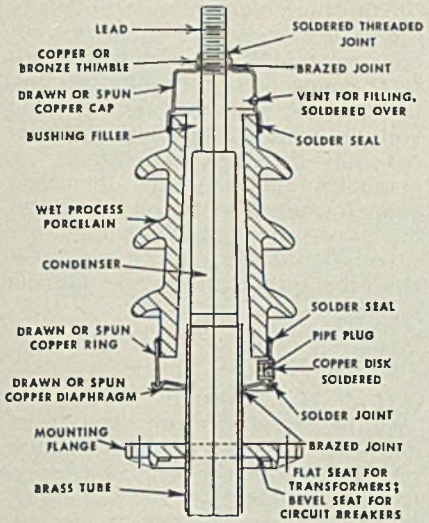


ly fitted front hem, gives rigidity to the front of the partition and serves as a standard. No handles, pulls, or assist ropes are furnished. The flameproof fabric is attached with grommets at the top and to one side of the hinged plates, hanging free. The height of the fabric is 2 inches greater than the height of the room, dragging the floor and assuring adequate coverage. Both sides of the hinge plate are covered with the same fabric, and valances are provided for each side to insure a perfect lightlock. The partition is attached to the wall with screws or nails to a covered wooden cleat extending the full length of the partition. When not in use, the partition can be folded to the wall.

Condenser Bushings

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces new condenser bushings sealed with solder for use with power transformers and oil circuit breakers. Solder-sealing is said to cut odwn maintenance costs by eliminating gaskets. To give the bushings a high safety factor and small physical dimensions, especially prepared Micarta paper is wrapped on the copper lead of the condenser, and a layer of electrolytic copper foil is wound on

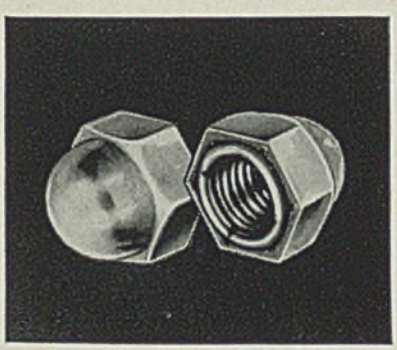
at intervals to form the condenser. Under operating conditions, the voltage gradient, radially through



the insulation; longitudinally over the surface of the condenser, is practically uniform.

Cap-Shaped Lock Nuts

An-Cor-Lox Division, Laminated Shim Co. Inc., Glenbrook, Conn., announces cap (acorn) shapes embodying the company's lock nuts. These are offered in a wide choice of materials for the nut body, also with considerable variation in the metallic composition of the locking ring insert. Standard sizes are available either with thick or thin



walls. Others can be made to the user's specifications. The locking ring in the cap nuts are integral with the nut body.

Protective Suit

Mine Safety Appliances Co., Braddock, Thomas and Meade streets, Pittsburgh, announces a new one-piece asbestos protective suit designed to provide instant and complete personal protection against flame hazards. The garment consists of an upper-and-lower durable asbestos section securely sewed together, with helmet, gloves and boots attached to completely enclose and protect the wearer. It prevents the entry of flames, insulates

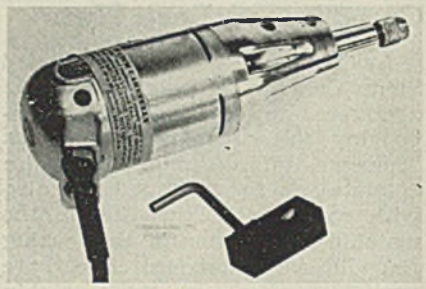
against heat, guards the head from injury by falling or flying material and enables speedy and effective work in emergency. The helmet of the suit is a laminated-bakelite type R skull-guard protective hat, asbestos-covered and with front and rear aprons to protect the head and neck. A large window of heat-resistant glass in the hood permits unobstructed vision. The suit is provided with a zipper opening extending down the front from neck to waistline. When closed, the zipper is protected by a flap held in place by two arctic buckles. Zipper fasteners at the wrist and lower sections of outside leg seams facilitate donning. Wrists, ankles, gloves and neck portion are flannel-lined. Sole and heel of boots are reinforced with asbestos brake lining material riveted in place.

Substations

Allis-Chalmers Mfg. Co., Milwaukee, announces new standardized load-center unit substations available in sizes ranging from 100 to 2000 kilovolt-amperes. These, according to the company, can be installed anywhere in industrial plants or power distribution centers. Each substation consists of a metal-enclosed incoming-line section, a throat-connected transformer and a low voltage feeder section. On the high voltage side potheads, disconnect switches, oil fuse cutouts, metal-clad switchgear or direct connection through terminal box can be supplied. On the low voltage side, stationary or drawout air breakers, electrically or manually operated, are furnished. Transformers can be oil immersed, dry type, or noninflammable Chlorextol liquid-filled. Units are available for either indoor or outdoor service.

Abrasive Pad

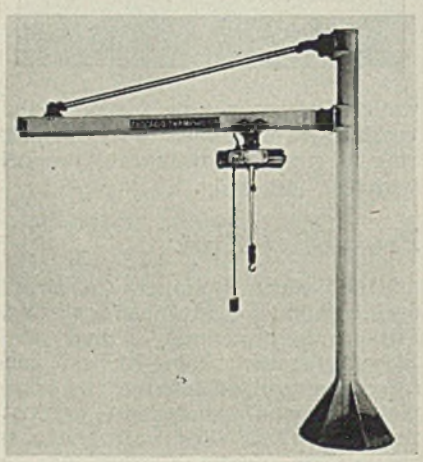
H & H Research Co., 12540 Twelfth street, Detroit, has introduced an accessory for its senior model tools—a rubber pad impregnated with abrasive for use in removing those last few thousands, and producing a mirror-like polished finish on such jobs as dies, molds, etc. The pad which measures 3 x 1 inch square, is mounted on a 2-inch



offset holder for use on the company's portable electric tools. The pad is being offered in grits ranging from 80 up to 180 and in various shapes within the above dimensions.

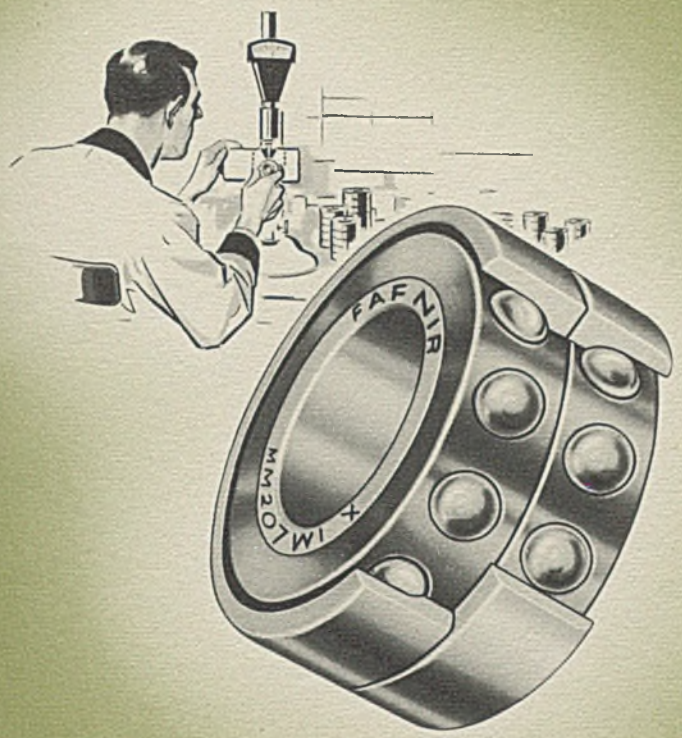
Jib Crane

Chicago Tramrail Co., 2910 West Carroll avenue, Chicago, has placed on the market a new No. 1046-A pillar type, self-supporting jib crane



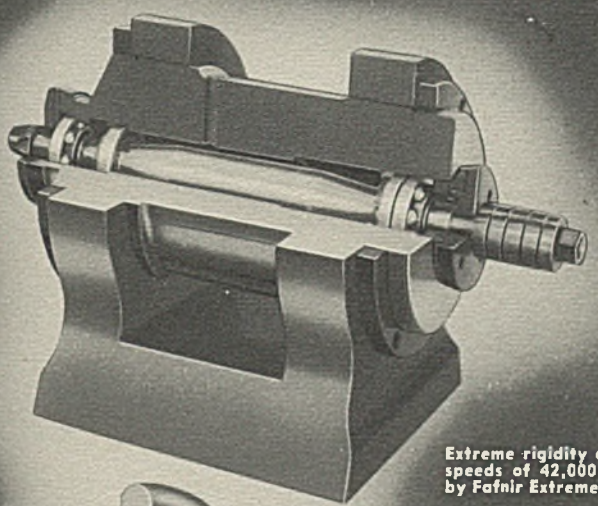
which it recently added to its line. The handling device is said to have a 220-degree swing and is being offered in capacities up to 1 ton, having a 12-foot radius.

Tolerances limited to FIVE-MILLIONTHS of an inch...

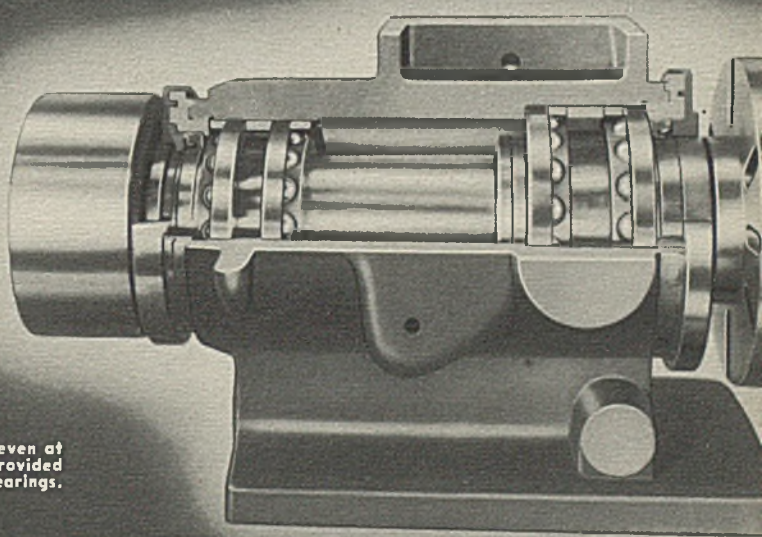


Super-Precision Bearings with balls matched to size within .000005" . . . with eccentricities of assembled bearings checked to five decimal places . . . rings so carefully heat-treated and seasoned they maintain accurate dimensions, indefinitely . . . these are several of the fine points of high precision and accuracy built into Fafnir Preloaded Pairs of X Type Extreme-Precision Ball Bearings.

But that's only part of the story. Fafnir utilizes the "eyes" and "hands" of electricity to "feel" hundred-thousandths as your fingers feel inches . . . *matching these pairs so carefully* that variations between the assembled bearings are reduced to millionths of an inch. Inbuilt preloading eliminates any need for take-up adjustment after the pairs are mounted. Your requirements may not demand such extreme precision but the skill and care which makes these bearings possible is reflected in the quality of all Fafnir Ball Bearings. The Fafnir Bearing Company, New Britain, Conn.



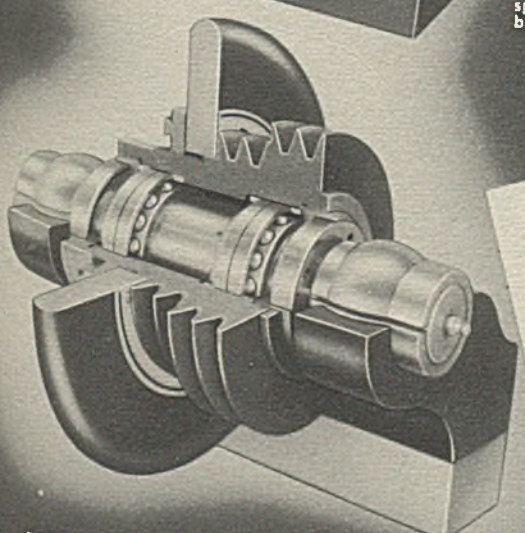
Extreme rigidity of spindle—even at speeds of 42,000 R.P.M.—provided by Fafnir Extreme-Precision Bearings.



Greater rigidity of Fafnirized spindle enabled substitution of single grinding operation for the rough and finish operations previously necessary.

EVEN 900% IS NOT ENOUGH!

In the short period of four years we have increased production over 900% to meet the unprecedented requirements of war production. Even so, the demands for ball bearings for mechanized equipment have exceeded our production. If we are not able to fill your orders as promptly as you would like, you will understand why. We're doing everything possible to supply the bearings you need.



Ball bearing spindle design has shown better than 3 to 1 life advantage over previous plain bearings.

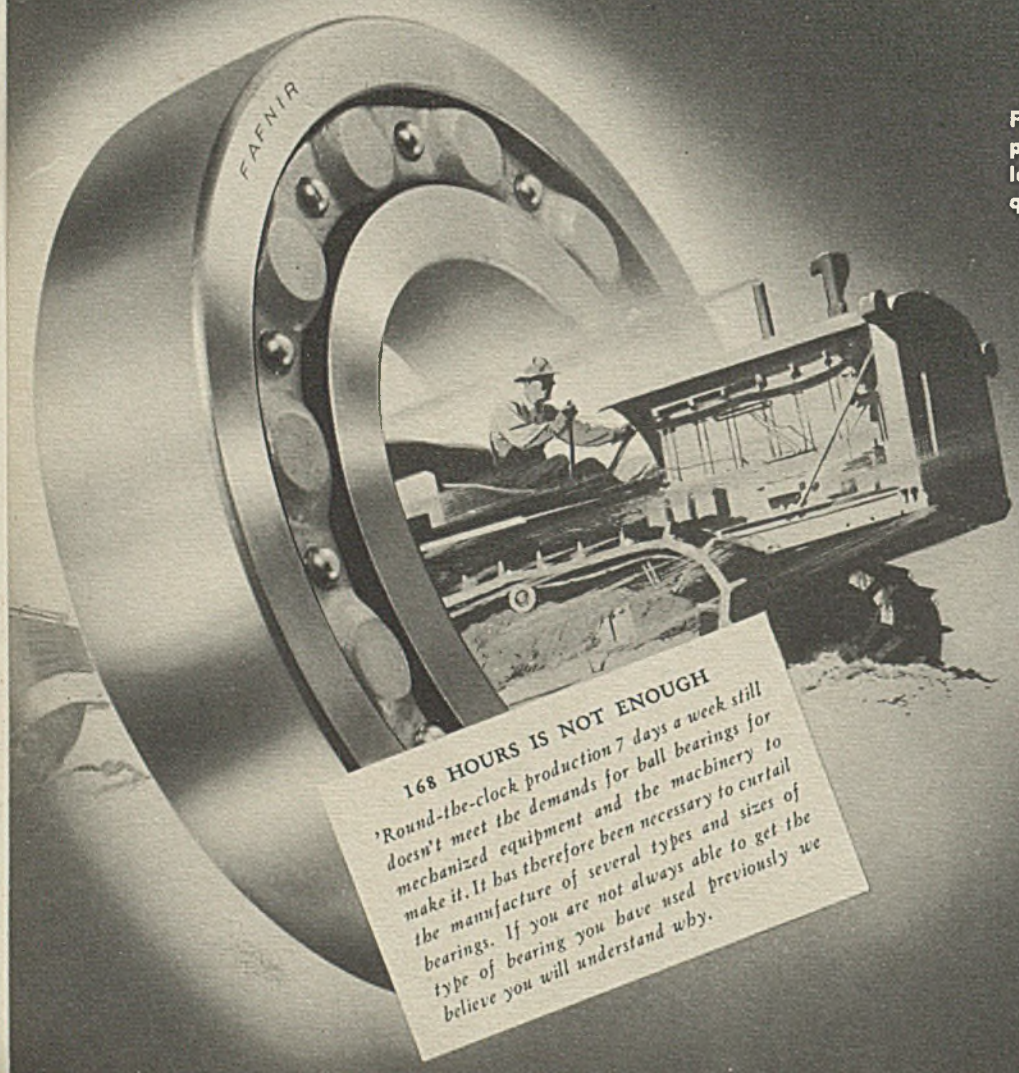
FAFNIR
Ball Bearings

THE BALANCED LINE
FOR ORDNANCE, AIRCRAFT AND
INDUSTRIAL MACHINERY

The BIG BOYS you tuck away and safely forget...

Some ball bearings are destined to live alone. Buried in an almost inaccessible gear box or housing they must perform under severest operating conditions for the life of the equipment. Their failure means a major "tearing-down" job. That's why you need a quality standard which allows the bearings to be safely tucked away and forgotten.

This quality is to be found in Fafnir Ball Bearings with their unequalled load capacity and ability to stand up under the most grueling treatment. These bearings incorporate the time-proved Fafnir Balanced Design – larger balls and deeper races for greater radial and thrust capacity. The Fafnir Bearing Company, New Britain, Conn.



Fafnir's large-ball, deep-groove design provides the user of heavy bearings with longer life, fewer breakdowns and better quality – all so vitally important today.

168 HOURS IS NOT ENOUGH

'Round-the-clock production 7 days a week still doesn't meet the demands for ball bearings for mechanized equipment and the machinery to make it. It has therefore been necessary to curtail the manufacture of several types and sizes of bearings. If you are not always able to get the type of bearing you have used previously we believe you will understand why.

FAFNIR
Ball Bearings

THE BALANCED LINE
FOR ORDNANCE, AIRCRAFT AND
INDUSTRIAL MACHINERY

The Forging Furnace

(*Concluded from Page* 80)

the power plant engineer inasmuch as radiation from the hot furnace tends to form coke at the burner tip when the oil supply is shut off. Further, the familiar type of atomizing burner employing the pressure of the oil itself, has insufficient turndown range for the forging furnace.

In burners of the high-pressure type, steam or compressed air is blown in around the tip, the amount of oil and of air being under separate control. Low-pressure burners use a displacement or turboblower delivering air at from ¾ to 5 pounds per square inch; while in fan blast burners, the air pressure ranges from 4 ounces to 1 pound. Generally speaking, the heavier and more viscous the oil, the higher the pressure of the air or steam. However, if both oil and air are sufficiently preheated, vaporization greatly assists the atomization process and low air pressure may be used.

In its simplest form, the gas burner consists of a T delivering air into which a jet of gas is blown. Control of both air and gas enables the operator to secure the proper mixture. In the widely used inspirator type, the burner functions on the bunsen principle, drawing in air in proportion to the amount of gas flowing. These inspirator type burners maintain a constant air-gas mixture over a considerable range but are liable to backfire if turned down too low. The arrangement may be modified by the use of blower instead of depending upon the suction of the gas jet. Gas has the reputation of producing a light but hard and tight scale rather difficult to remove and hard on hammer dies.

High-Lead Solders

(*Continued from Page* 75)

hydrogen, it has been found that artificial gas-air fires can be so adjusted that some of the high-lead solders will spread satisfactorily.

Controlling Spreading: In general, the higher the tin content of the solder, the better are the spreading characteristics. The entire absence of tin in the lead-silver solder thus may cause some difficulties. However, it is not always desirable to have maximum spreading, so the element of control is important in some cases. With high-lead solders, the use of hydrogen with a controlled fire makes it possible to control the amount of spreading to a considerable extent. For proper control, the burners should be equipped with valves to adjust the

flow of gas, hydrogen and air separately.

In soldering side seams of cans, it is important that the seam be wiped practically free from excess solder. If good wiping is not done, the too-thick layer may cause failure in double-seaming. To allow wiping, auxiliary gas-flames, using hydrogen-containing gas, are played on the can body just adjacent to the seam. This change in technique is necessary because the lack of a freezing range does not give time for wiping under normal cooling.

Tin Pickup: A practical question in can-making is whether the lead-silver solder bath will pick up so much tin from tinned can bodies passing through it as to become hot-short, after the fashion of the "intermediate" lead-tin-silver solders. Should this occur, the bath would have to be taken out at intervals and submitted to complete refining—possible, but expensive. The indications are, however, that the tolerance for tin will be sufficient so that the build-up of tin will not be troublesome. From this point of view, the thin electrolytic tin coatings would have an advantage over the heavy hot-dipped ones.

Experimental operation of lead-silver solder on hot-dipped plate with proper temperature control, fluxing, and auxiliary heating for wiping have progressed far enough to warrant the assumption that, once the technique is understood and the necessary equipment changes made, *no tin whatsoever* need be used in the initial solder for side seams of cans and that the rate of production need not be materially decreased. End-soldering of cans with lead-silver brings in very little difficulty.

Therefore, it appears feasible to produce soldered joints on hot-dipped tin plate without any tin in the solder.

Electrolytic Tin Plate: Little is known of the behavior of lead-silver in soldering thin electrolytic plate. However, there is no doubt that by the time electrolytic plate is available in quantity, this problem will have been solved. An electrolytic plate solderable with lead-tin should also be solderable with lead-silver.

Soldering untinned, black or "bonderized" material with lead-silver solder cannot yet be classified as commercially feasible, though there is no inherent reason why it cannot be worked out by proper attention to such features as mechanical cleaning, active fluxing, deposition on the parts to be joined of a solderable coating such as silver, etc. Active study of soldering black plate is urgently needed. Welding would give a complete answer to the problem save that welding methods are not yet developed to give the speed can-makers are accustomed to and will require extensive modifications of equipment.

Pending the solution of this problem, it will be more practical to permit use of lead-tin solder for making cans from black plate than to forbid it because the amount of tin in the lead-tin soldered seam is much less than that on the can body, even when made from very thinly coated electrolytic plate.

In side seams of food cans made of tin plate, it appears technically feasible to avoid use of solder containing *any* initially-added tin. This should be enforceable almost immediately since steady operation with 97.5 per cent lead 2.5 per cent silver in several plants is contemplated, and these operations will gladly be shown to competitors by one company at least. It should be made clear to users that such instructions are coming quickly, so that plans for adjusting soldering technique will be matured when the instructions actually issue. Solder users should be so forewarned of probable future instructions so that there will be no excuse for procrastination.

In some quarters there is a feeling that since some little tin saving has been made in hot-dipped coatings, and much more saving will

soon be made when sufficient electrolytic plate becomes available, no attention to the solder problem is needed.

Savings Imperative: The solder problem is a separate one, and users should be emphatically disabused of any idea that anything short of every attainable saving of tin in solder will be tolerated. The burden of proof is on anyone who says he cannot use tin-free side-seam solder on tin plate, for others have shown that it can be done, and any avoidable use of tin is simply stealing from the stock pile that belongs to all of us. Moreover, now that the technique has been developed, the cheaper tin-free solder would ultimately displace the more expensive tin-containing ones anyhow for side seams. It is only necessary to accelerate this shift.

Use of tin-free solder on floated-end cans for food products should await more definite findings of current toxicity studies, but meanwhile this problem should be by-passed through conversion of such cans to the "sanitary" type. As this will require changes in equipment, it will have to be forced upon the user in order to get the change operating promptly.

No present restrictions should be placed on side-seam solder for black or bonderized body stock. However, it is likely that technique will soon be developed which will permit early banning of tin there also.

Dip Soldering: Since a lion's share of the present requirements for solder is in cans, can soldering has been discussed first. Another major use is in dip soldering of radiators, oil coolers, and the like for trucks, jeeps, aircraft, etc.

These bring in questions not only of bonding and joint strength, but also of corrosion. The corrosion problems are complicated by possibilities of electrolytic attack through presence of other metals that form electrolytic couples. The corrosion problem becomes a major one when copper or brass is not available, and steel or thinly copper-coated steel must be used.

No single general cure-all is suitable for all cases where corrosion can occur; each case has to be considered in respect to its own corrosive conditions, nor can entirely sure predictions be made on the basis of tests in which the corrosive conditions are accentuated to give an "accelerated" test.

When equipment is available for so-called hydrogen-copper brazing (which includes the use of other reducing atmospheres as well as pure hydrogen, and of brass as well as copper), joining steel with copper and copper with brass by such means instead of soldering deserves careful consideration. When the temperatures necessary for such brazing methods are out of the question, but that of around 850 degrees Fahr., as used with the 95 per cent lead 5 per cent silver and 97.5 per cent lead 2.5 per cent silver solders, is applicable, the lead-silver solders, when used under a flux layer of fused anhydrous zinc chloride, give good results as dipping solders. The zinc chloride is removed by the procedure previously outlined.

If the corrosion conditions of service are such that the lead-silver solders are not sufficiently corrosion resistant, then modified compositions will be necessary. While it is almost pure speculation, in the absence of adequate corrosion tests and service experience, it is not unreasonable to expect that small tin additions of the order of less than 10 per cent to the lead-silver solders may materially improve the corrosion resistance, so a low-tin approach to the "intermediate" type of solder might have some virtue even where there is no real necessity for lowering of the melting point. (These solders may also be useful in some types of internally soldered cans for which technique of using tin-free solder is not yet fully developed.)

Wiping Solder: Conventional lead-burning technique can be applied so

that, with suitable instruction to plumbers and linesmen who join cables, sheaths, etc., entire avoidance of wiping solder could be accomplished.

So much evidence is in hand that, by suitable technique, tin-free solder can be used in place of tin-containing solder that the use of tin-free solder should promptly be made the rule rather than the exception.

The burden of proof thus lies heavily on any solder user who claims he must persist in eating into our stock pile of tin. He must show that his alleged inability to get along without tin results from real engineering requirements of his particular use of solder rather than from unwillingness to learn the suitable technique for use of tin-free solder.

National Acme Offers Acme-Gridley Handbook

National Acme Co., Coit road and 131st street, Cleveland, recently issued a revised third edition of its "Handbook for Operators of Acme-Gridley Multiple Spindle Bar Machines" which deals exclusively with design, construction, tooling and operation of models R and RA 4, 6, 8-spindle machines. It is not useful in connection with earlier A, C, F, G and H model machines—for which no more operators' manuals are available.

The new book has 128 pages, and is multiple ring bound in flexible oil resisting covers so that it lies flat when opened. It includes more than 100 illustrations—both photographs and line drawings—covering not only the basic mechanism but also numerous attachments.

An extremely important feature of this book—useful to tool engineers as well as to operating men—is the section containing cam charts, gearing diagrams and tables, and drawings and tables giving all dimensions and clearances in the "working areas"—that is around spindle noses, tool slides, etc.

National Acme announces that copies of this book will be sent free of charge to those directly concerned with tooling, setup and operation of models R and RA Acme-Gridley automatics. In making application for a free copy, applicant must give name of his company and model and size of machine with which he is working. Applicants on record as having previously been sent a copy, will not be supplied with another.

A limited number of publications are available at 50 cents per copy to those who are interested in modern automatics but who are not directly concerned with tool and operation of Acme-Gridley machines. However, this business is not sought after and in every such instance payment must accompany the order.

Strengthens Weld Seam, Eliminates Spatter

A new product, Industrial Finish Flash-Off No. 99, which is designed to eliminate weld spatter and the time cost of removing it, is reported by Acme White Lead & Color Works, Dept. FS-21, Detroit. The development also is said to provide stronger and smoother welds.

According to the company, a worker simply brushes, sprays, or wipes on the product along the edges of the metal surfaces to be joined by the weld. During the welding, metal chips bounce or fall off instead of adhering to areas adjacent to the seam. The seam is strengthened by the product as it removes impurities from the weld, and, being a conductor of electricity, helps prevent the weld arc from breaking. This, claims the company, is the feature that does much in producing a stronger seam. The development also prevents pitting on galvanized or ungalvanized metal surfaces and permits immediate application without cleaning operations other than wiping off.

Manual Welding

(*Concluded from Page* 88)

inch drill rod as the electrode material with a welding current of 40 amperes.

Speed: In this work, a perfect weld is much more important than mere time, so no attempt is made to obtain speed in welding. The operator handling this work has an unusually keen knowledge of all the factors involved and the great success obtained here is largely attributed to his technique and experience. In other words, an experienced operator can really produce excellent results in such work.

Electrodes: In preparing the electrode material, it sometimes is necessary to cut a welding rod from solid stock using a band saw since it is important that the electrode material be the same as that being welded, in most cases.

In repairing broken punches and dies of air-hardening steel with 0.95 per cent carbon, 2.04 manganese, 1.93 chromium, 1.04 molybdenum, the same steel is used for the electrode. In cutting out the electrode material, it is always extremely important to get clean metal. This usually is done by avoiding the outside of the bar, thus preventing the possibility of getting any decarburized steel into the weld.

Electromagnetic Gage

(*Continued from Page* 92)

the differential transformer is zero and, hence, the current in instrument *P* is also zero. For any other position of the armature, a voltage appears across the differential transformer and a current flows through the instrument.

The electromagnetic gage head in the foregoing description can be so modified that the cylindrical armature continuously follows the lever arm. With this modification, the equipment will indicate the strain at any instant on a machine whose load changes are slow enough to be followed by an instrument having a period of one or two seconds.

Another type of equipment for indicating the strain at any instant, for load changes that are slow, consists of an electromagnetic strain gage head, power unit, indicating instrument, and a signal or alarm system which operates when the strain reaches a predetermined value. Fig. 5 shows an electromagnetic strain gage head mounted on a pulldown yoke of a bending machine. Fig. 6 shows the bending machine and its controls. On the cross brace directly above the right-hand controller is the remainder of the strain-gage equipment. From left to right are the electronic relay, strain-gage power unit and indicating instrument.

The electromagnetic strain gage head consists of two parts, one of which holds a U-shaped core with a coil over one leg of the U and the other of which holds the armature. These parts are so arranged that the armature bridges the opened end of the U-shaped core. The position of the armature can be so adjusted that it touches the core, or it can be withdrawn to give approximately a 0.020-inch air gap between the armature and core. The strain being measured produces in this air gap a change equal to the strain per inch times the gage length, which in this case is 8 inches. The sensitivity, that is, output current versus strain, of the strain gage is greater as the gap is made smaller. Gaps of 0.001 to 0.003-inch are used in many applications of this gage head.

The power unit consists of a voltage-regulating transformer, copper-oxide rectifier, balancing rheostat, capacitors, and contact-making instrument. These are represented within the dot-dash rectangle in Fig. 4. The contact-making instrument is used to trip an electronic

relay which in turn operates a suitable signal or alarm. This electronic relay is a standard control device.

The indicating instrument, which is mounted within view of the operator of the machine, has a translucent scale behind which small dial lights may be placed to illuminate the scale for the purpose of making it easier to read if the room illumination is low.

In one application, this equipment is used to indicate the strain on the top roll of a bending machine. Although the strain under consideration is that in the top roll, the electromagnetic strain gage head was bolted on one of the pull-down yokes. Since there are two different sizes of top rolls there are two different values of rated or maximum pull-down loads recommended by the manufacturer of the bending machine. To simplify the instrument reading for the operator, the instrument scale was marked from zero to 150 per cent of rated load; and to make the instrument read correctly for the different roll sizes, the operator simply flips a toggle switch on the power unit to the size of top roll being used. A red band from 100 to 150 per cent of rated load shows the operator the danger zone.

Porcelain Enamel Plant

(*Concluded from Page* 108)

telescoping or other special arrangements of the ware on the baskets.

The speed of the furnace chain or the number of fork loads per hour can be greatly increased in the ground coat firing by using as soft a ground coat combination as is suitable for the furnace. One company has increased its ground coat production 45 per cent over what was attained with the old type hard ground coats of five years ago. Some plants now fire ground and white coats at the same time. One shop formerly found it necessary to run out on the ground coat shift and to bunker on the floor 1400 to 1600 refrigerator liners ahead of the white shifts. Now, by running the ground and white coats through the furnace at the same time, the bunker has been eliminated, giving more floor space for operating and reducing the congestion during peak production. This has resulted in a more orderly system of production, saved the cost of bunkering, reduced ware damaged from handling, eliminated necessity of cleaning the accumulated dust off the ware before the spraying operation, and many other advantages.

Source of Lost Time

If it is necessary to set aside definite average periods for ground coating and cover coating, under no circumstances is it advisable during cover coating operation to cut in and burn half an hour or so of ground coat parts which should have been in previous ground coating period. Such a break-in when operations are closely synchronized not only causes lost chain speed but means that operators on cover coating must stand around and lose time. The production accounting should be adequate to prevent cut-ins.

Hanging of ware crosswise on the burning tool, instead of parallel, tends to serve as a baffle, thereby effecting a saving in fuel, and no doubt a better burning condition is obtained inasmuch as the flanges take the extreme heat, being adjacent to the furnace walls.

Shops using electric current as a heating medium have in the past found it cheaper to shut the current off for certain periods each day. Now it would be well to call in an engineer from the source of current supply and have him submit comparative cost figures on operating through "peak period" hours and off "peak period" hours. In some localities if the furnace capacity can be employed to advantage it is

cheaper to operate through "peak period" hours.

Power driven conveyors have proved a great asset in enameling plants having straight line production, but they are not as convenient for a mixed production. Automatic spraying pays dividends when it can be used without too great an enamel overspray so little loss of enamel results, but many parts must be hand sprayed to prevent this loss of enamel. In one plant, staggered booths placed ahead of the automatic spray enable ware to be placed closer together, one operator spraying two flanges, while the other operator sprays the remaining two, the ware then passing under the automatic guns to spray the surface. Thickness of application is checked periodically in this installation at the end of the spray dryer by a General Electric thickness gage to be sure that air and material pressures are being maintained constant. Automatic spraying on door panels here has more than paid for the original investment inasmuch as the panel matching has been reduced to practically nil, due to the evenness of application and the elimination of the human factor.

Must Keep Crews Balanced

The status and quantity of parts in production should be available at all times. With the capacity of the furnace determined, production must then be scheduled and planned through the various operations of pickling, ground coat dipping and reinforcing, and white coat spraying and brushing so a completely loaded furnace can be maintained at all times. Crews and shifts must be lined up to handle the different parts being run through the various operations at their required speeds to keep the furnace loaded. Too much cannot be said regarding the importance of correctly lining up these crews and shifts so that the required number of workers are at each of the various stages of processing at the right time to handle the different parts at their various speeds of production and to do it in an efficient manner.

Some plants are able to process parts through their shop for a specified number of units per day, having enough fabricated parts on hand to complete a certain number of units daily. But if parts are interchangeable and several different models are being enameled, scheduling complete units presents quite a problem. To accomplish a continuity of production, it becomes necessary for the planning department to maintain a perpetual inventory of all parts used on different models, then to lay out a daily production for at least one week in advance in order for the shop to meet these requirements.

Whenever possible the flow of production should be so planned that each shift has its particular part to run, or if several parts are to be run, that the same combination of parts is run day after day on the same shift. This simplifies the planning required in balancing the crews to maintain peak production. Also, shifts working on the same type of ware day after day become more efficient in their operating speed and quality of workmanship, thus enabling the supervision on the shift to devote more time to handling unforeseen problems to assure uninterrupted maximum production.

However, production planning is more complicated in plants producing a great number of different parts of various shapes and sizes differing in man-hour requirements. There production requirements vary and the same lineup of crews and shifts cannot be used from day to day. Crews and shifts have to be scheduled according to the type of ware being run. In such a case man-hour requirements may be scheduled.

Man-hours at all times should be

the controlling factor in increasing or decreasing production. Standards should be set for man-hours necessary to produce 1000 square feet of enamel, breaking this down into different operations such as pickling, dipping, spraying, etc. With such a labor distribution, production can be increased or decreased while average man-hours per 1000 square feet of enamel produced are maintained.

Graphs based on time studies can be made for the man-hour requirements of each of the various operations of pickling, dipping, spraying, brushing, burning, etc., plotting the man-hours required against the footage to be run.

Lines drawn through the vertices represent different classifications of ware. For example, in the construction of an all-porcelain display case, 20 or 30 different shaped and sized porcelain parts are used. If the time studies for a particular operation such as brushing for each of the parts are added together, it gives the man-hours required to brush a complete set of display case parts. Then dividing by the total footage of the parts gives the man-hours required for the brushing operation per square foot of ware run. This then can be plotted on the brushing operation graph and the line labeled "display case parts."

Other lines can be plotted on the graph in the same manner for other classifications of ware such as all-porcelain reach-in cabinets, exterior domestic cabinets, special coolers, etc. Particularly good results have been obtained with this method of production planning as long as the parts were processed in sets.

Another problem to be considered is the scheduling of shifts so as to operate 24 hours a day, 6 days a week. If three equal shifts are scheduled for 8 hours apiece with ½-hour off for lunch, the actual working time for each shift is 7½ hours. On a 5-day week basis, the workmen would then have 37½ hours, with only 2½ hours left for the sixth day before running into overtime. To solve this problem, three shifts can be lined up with one working 6½ hours per day and the other two 8 hours. With a ½-hour lunch period for each shift, the 24-hour day is filled. The 6½-hour shift can start at Sunday midnight, working 6 days for their 40 hours. The other two 8-hour shifts operate 5 days for their 40 hours.

To operate on a 6-day basis without overtime, the same shift schedule can be used by adding a swing shift to the two 8-hour shifts, meaning that for every five men a sixth is added as a relief man so that each man receives one day off a week, working five 8-hour shifts. A similar arrangement can be utilized for 24-hour 7-day-per-week operation.

With planning carefully considered, the next step is aggressive management. Most supervisors are prone to accept excuses for failures since they usually seem plausible. This develops into a sympathetic attitude by management, and intelligent investigation of the problem may be neglected, the excuse being accepted as unavoidable. Of course all troubles cannot be prevented, but the hard-boiled fact-finding mind can eliminate a surprising number.

To realize the full value of planning, a foreman must be well informed on all factors of the job. In addition, he must be provided with financial guides and time study rates. Without these aids, supervisors must depend on what they think best and plunge into high schedules, not knowing positively whether they are right or wrong. Costs soon may be entirely out of line, and the foreman then is helpless since production is needed at any cost.

Materials: Materials consist of everything used in the enamel shop, both productive and nonproductive.

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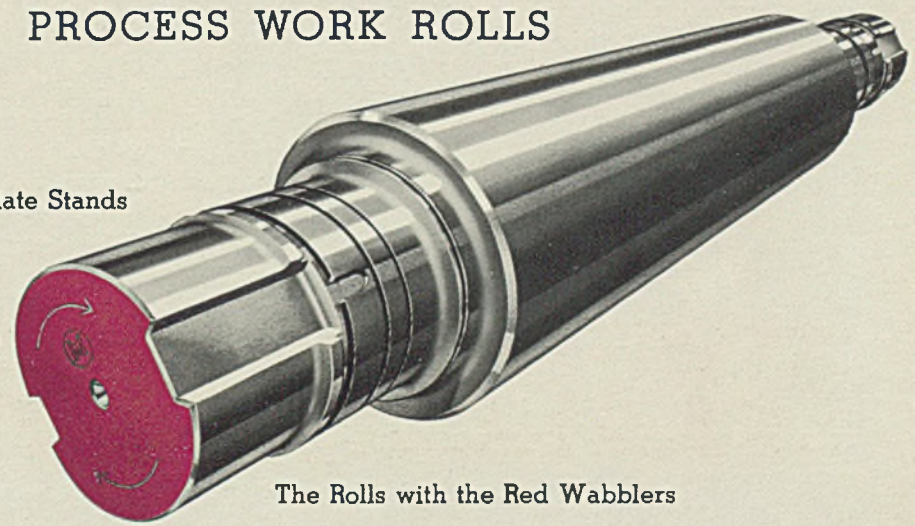

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Potentiometer Instruments

Incorrect or defective materials can become a major problem both in employe morale and high reoperation and scrap. Since productive materials directly affect both the quality and cost of the product, serious consideration should be given them. Peak production entails enough other problems, so standardization of material is necessary before this period is reached. As every enamel shop has its own peculiar conditions, it may mean considerable experimentation and checking in order to discover what produces the best possible results in each plant.

Checking Prevents Waste

Nonproductive materials represent quite an important part in the final cost.

Excessive waste during high periods may more than offset the careful savings and checks a foreman makes during normal times. It is very easy to set up check methods on items such as gloves, brushes and masks which will function properly at any time. When operators know that they are not being checked by supervision, the tendency is always to discard useful equipment before full value has been received. This checking should be a definite part of the job of a stock control or tool crib man. This releases a supervisor to the additional work necessary to maintain peak production and gives him the assurance that amount of waste will not go out of line.

Stock conditions on all standard items should be sufficient at all times to take care of interim of delivery. Normally now we will find most plants carry at least one month's supply of materials on hand at a minimum. Remelting of reclaimed enamel is another source of improving upon volume of production.

Such a practice, however, does involve additional cost of materials but on an overall cost basis it will show an equalization due to improvement of quality of ware and reduction of rework, which in turn reduces excess handling and confusion.

Since every effort is being made to utilize all available material at the present time, occasionally a manufacturer may come into possession of some sheets not previously considered suitable for enameling. Recently a commercial refrigerator manufacturer had some sheets previously used with a dulux finish. After a little experimenting, he worked out a method of utilizing them.

The cleaning time was increased by about 15 minutes over usual stock requirements to remove a mineral coating, but a minimum pickle was found to be sufficient. After careful inspection the sheets were dipped in the enamel preparatory to firing.

The biggest problem was firing. Use of burning-out points and hanging were tried. Quite a bit of buckling and warpage were encountered, but it was found that with ground coat temperature held as low as possible and reverse hanging, warpage could be kept to a minimum. Rejects were not much greater than usual on black specks and reboiling. What reboiling there was came in bunches, so it was probably due to the sheets. No fish-scaling to speak of was encountered. Since warpage was uneven and unpredictable, small pieces having heavy flanges and not requiring close tolerances were run of this material. For the six weeks during which this material was run, scrap ran only slightly higher than usual.

Another manufacturer who had some sheets not up to the usual standard found they could be successfully run for dark parts such as ground coat stipple, walnut grain and brown ground coat.

(Concluded in June 1, Issue)

Reclamation Operations

(*Continued from Page* 104)

are followed for most specific grades of electric furnace steel, with modern steelmaking methods, including rapid analysis, use of alloy scrap presents two major problems; ability to obtain scrap in proper charging form and certainty the scrap charged will contain no alloys which are not permissible in the particular heat involved or that the alloys are, at least, under the maxima specified or desired.

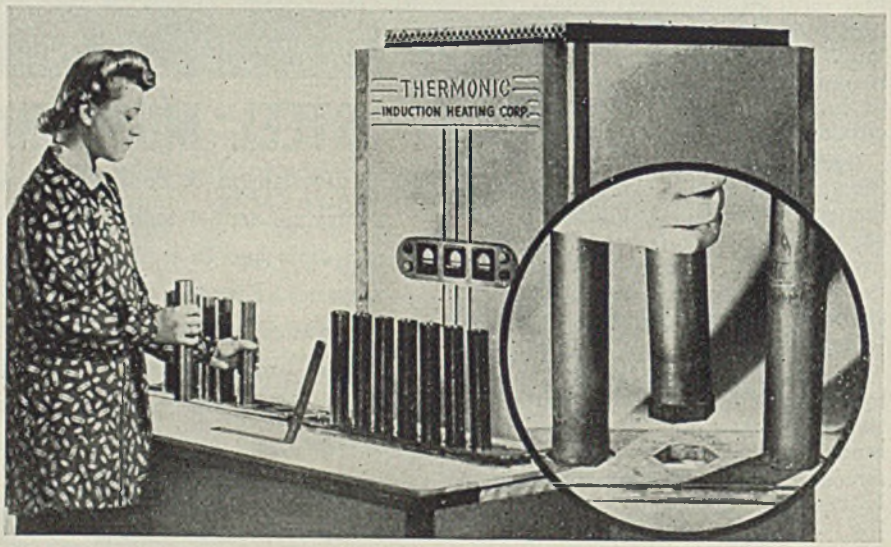
Heats are slowed and excessive losses by oxidation are encountered if the scrap consists of light, bushy turnings which have a low bulk density and which in many cases are impossible to charge into the furnace in a reasonable time. Such turnings should be prepared in any manner to increase their density, crushing, briquetting or both. Many other types, Dr. Herty said, can be charged direct or be prepared for crushing. As regards undesirable alloys, it must be realized the grades of alloy steel are many and the effect of some of the alloys is very pronounced, thus careful segregation of various grades must be practiced if maximum utilization of the scrap is to be obtained. If nickel-molybdenum scrap is charged into a straight nickel heat, the amount of nickel recovered from the scrap may be determined by the extent to which molybdenum can be allowed in the product, Dr. Herty said. The charging of such scrap is a waste of molybdenum in the case in point, although sometimes unavoidable, depending on the character of heats being made and the character of the scrap available.

The more segregation of scrap, the better opportunity there will be for this scrap finding its way into proper analysis steels where it can be utilized to the fullest extent.

In many instances, die steel, high in nickel and chromium, and cutting tools, containing large quantities of tungsten have been thrown into ordinary scrap piles. These should be relatively easy to segregate, and, if properly done, would add considerably to the supply of three alloys contained. Large quantities of alloys are being wasted because alloy scrap is mixed with carbon scrap, finding its way into carbon heats.

Cars of carbon scrap, according to Dr. Herty, have been found to contain as much as 50 per cent of 3.5 per cent nickel scrap, result of failure to segregate at the yards. Not only is this wasteful of alloys, but in many cases deleterious to the carbon heat in that the resulting physical properties make the steel unsuitable for intended use. Frequently nonferrous and ferrous scrap are found in the same car. Many elements in nonferrous scrap are distinctly injurious to steel and every effort should be made to keep nonferrous out of the ferrous scrap, both for the reason of protecting the carbon steel heat, and

Brazing 10,000 Four-Pound Units Per Day



NO SKILLED LABOR is required when using this method of brazing shown above. This Thermonic unit made by Induction Heating Corp., New York, applies heat instantly through a push-button control, brazing seven 4-pound units at once—leading to a day's end production rate of 10,000. It controls the temperature exactly to the brazed and adjoining areas, effecting no annealing beyond. After preliminary setup, its operation is automatic. Strength of braze is said to be as high as the solid parts, resulting joint being free of internal oxidation

also to meet critical shortages of most nonferrous metals for specific needs.

With a proper pricing situation on segregated scrap, Dr. Herty declared the producer of such scrap will find it profitable to do his utmost to make certain that alloy scrap finds its way into the melting furnace in which it will do the most good for the war effort.

Under normal circumstances, separation of metal grindings and the working of slag dumps is considered uneconomical, but shortages are stimulating such operations. J. W. Jarman Jr., Separations Engineering Corp., New York, said in separation of grindings, best response is attained by electrostatic methods, several plants employing this process to separate stainless steel and other types of alloy grindings from abrasives, making grindings suitable for use in the melting furnace. Grindings are the original metal plus abrasive grains and bond holding the grains to the wheel and should not be confused with turnings, borings and cuttings which are generally oil contaminated. Mr. Jarman estimated 500,000 tons of steel will be recovered this year from slag dumps either by magnetic or gravity separation processes.

Collections Should Be Refined

Better methods of collecting and segregation of nonferrous metal scrap at the point of origin were urged by James S. Earle, metallurgist, American Smelting & Refining Co., reviewing the role of nonferrous scrap in the war effort. A system of proper supervision for salvage in every plant was favored by Mr. Earle, checking the type of scrap at the machine producing each grade. Debased alloys grow from severely mixed scrap, taxing facilities of refining furnaces, control laboratories and adding cost factors.

Paul C. Cabot, deputy chief of the Bureau of Industrial Conservation, WPB, presided and outlined plans for stimulating collection and distribution of all types of scrap, saying, incidentally, nine steel furnaces were down for the lack of scrap. An added feature was the showing of the sound film, "Mines Above Ground," depicting the salvage methods of Western Electric Co. and Bell Telephone Co.

New Manual Tells How To Increase Output

Practical methods for organizing management-labor committees as a means of obtaining greater output are detailed in a manual for business executives and plant managers on "How To Boost Production Through Increased Employee Morale" recently issued by the Labor Relations Institute, 1775 Broadway, New York.

The publication also tells how to formulate and administer suggestion systems and effective grievance machinery. It includes practical pointers on how to enlist union and employe co-operation in plans for speeding production. In addition, it discusses effective uses of posters, bulletin boards, loudspeaker systems and production scoreboards. It also provides a check-list of fifteen industrial "morale killers" which retard production and lower employe morale.

Standard Covers for Bearings Developed

R-S Products Corp., 4530 Germantown avenue, Philadelphia, reports it has developed standard covers for ball and roller bearings which serve as a dust and grease-tight closure to the bearing housing.

Developed with the approval of all leading manufacturers of ball and roller bearings, the covers are being made in a complete range of types and sizes.

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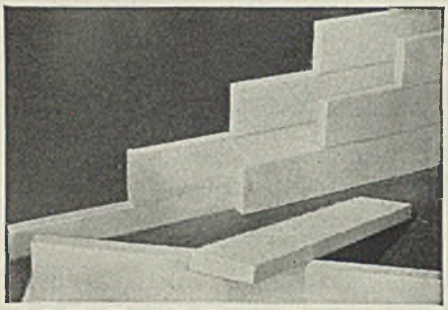
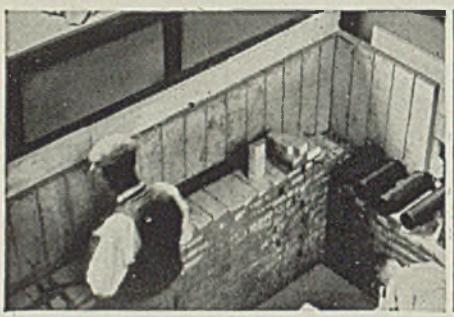
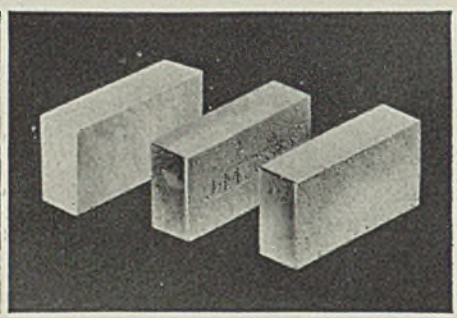
Superex Blocks—The outstanding block insulation for temperatures to 1900° F. Combines high heat resistance with low thermal conductivity. Standard sizes 3" x 18", 6" x 36" and 12" x 36"; from 1" to 4" thick.



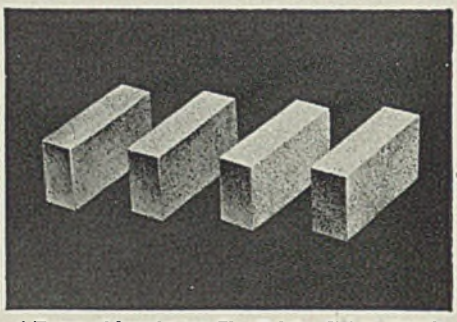
J-M 85% Magnesia Blocks—For many years the most widely used block insulation for temperatures to 600° F. Highly efficient and durable. Standard sizes 3" x 18", 6" x 36" and 12" x 36"; from 1" to 4" thick.



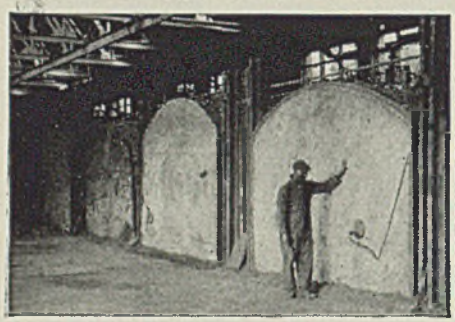
J-M Superex Combination—An inner layer of Superex and an outer layer of J-M 85% Magnesia. Combines high heat resistance and exceptional insulating efficiency. Available in both block and pipe-covering forms.



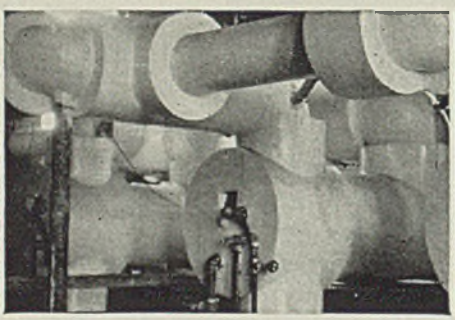
3 Types of Insulating Brick . . . Sil-O-Cel Natural Brick (1600° F.); Sil-O-Cel C-22 Brick (2000° F.); Sil-O-Cel Super Brick (2500° F.). Available in all standard 9" shapes of the 2½" and 3" series.



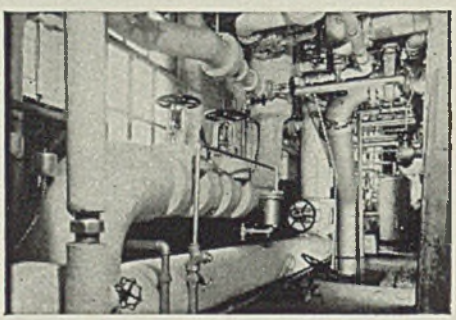
4 Types of Insulating Fire Brick—JM-16 (1600° F.); JM-20 (2000° F.); JM-23 (2300° F.); JM-26 (2600° F.). Combine light weight, low conductivity, low cost. All standard 9" shapes of the 2½" and 3" series.



Sil-O-Cel C-3 Concrete—Cast on the job from Sil-O-Cel C-3 aggregate and cement. Sets up into a durable semi-refractory insulating concrete for use up to 1800° F. 28 lbs. required per cu. ft. Shipped in 100-lb. bags.



J-M 85% Magnesia Pipe Covering—Long recognized as the standard pipe insulation for temperatures up to 600° F. Highly efficient, durable, long lasting. Furnished in 3-ft. lengths in thicknesses up to 3".



Asbesto-Sponge Felted Pipe Insulation—Especially suited to steel mill service because of its unusual durability and resistance to abuse. For temperatures to 700° F. Furnished in 3-ft. lengths in thicknesses up to 3".

For details on these materials, and on the complete J-M Insulation line, write for catalog GI-6A. Johns-Manville, 22 East 40th Street, New York, N. Y.

Johns-Manville INDUSTRIAL INSULATIONS

For every temperature . . . for every service

Mill Books Congested With Topmost Ratings

Directives needed to establish precedence. Plates bulk heaviest in demand. Scrap supply upholds steel output at record rate

MARKET IN TABLOID ★

Demand
Only war needs considered.

Prices
Some concessions by OPA.

Production
Up ½-point to 99½ per cent.

WITH a preponderance of orders on steel mill books rated at A-1-a or A-1-b and nothing being accepted below A-1-j, congestion is extreme and producers are much confused as to precedence of shipments. In numerous cases almost complete reliance is being placed on directives, which are necessary in many cases to free tonnage for immediate production.

The situation is that so much steel is needed for war purposes, all of which are of greatest importance, that the top rating has become overloaded and further action is needed to determine the most important. Steelmakers are not in a position to perform this function and the question increasingly is being put up to the War Production Board for solution.

An important midwestern mill has leveled off all its products at A-1-a and is accepting orders in the A-1 group on the basis of delivery when possible, declining all other business. A large producer reports all requests from war material manufacturers during the past week have borne A-1-a ratings. No rollings are scheduled below A-1-k and probability of delivery at that level is remote as new directives are constantly received, taking position above all ratings and pressing delivery dates back.

Most eastern sellers cannot offer reasonable assurance of delivery on anything under A-1-c, particularly in shapes and bars, and in sheets the situation is little better. A large producer of diversified lines is on a basis of A-1-b or higher on all open-hearth products. On bessemer products the situation is relatively easier and material may be obtained in limited quantities on lower ratings.

In spite of this confusion as to precedence steel mills are doing a good job of production, and distribution to most needed fabricators is being managed without severe difficulty. Close attention is being paid to inventory by WPB and no accumulation is allowed by any consumer at the expense of supply to others.

Plates constitute the most needed item, shipbuilding taking by far the largest portion. New shipyards coming into production are increasing this demand. Plate production has been pushed to successive record heights in recent months and a total of 975,000 tons has been set for May. If this is attained, plate output will represent about 17 per cent of all finished steel for the month. One producer is putting 40 per cent of his output into plates.

Steel production last week rose ½-point to 99½ per cent of capacity, the highest rate since the final week of June last year and exactly the same as the corresponding week in May, 1941. With the enlarged capacity this represents the largest tonnage ever produced in the history of the steel industry. Pittsburgh advanced ½-point to 96 per cent, New England 7 points to 100, Detroit 6 points to 96 and Cleveland 6 points to 94½ per cent. Chicago lost ½-point from its historic high, to 105 per cent, Buffalo 2½ points to 90½, Cincinnati 4½ points to 84½ and Wheeling 1 point to 81½. Rates were unchanged at Birmingham, 95; eastern Pennsylvania, 95; Youngstown, 94 and St. Louis, 93½, the previous week's rate being revised.

Pig iron for essential purposes has been enhanced by refusing all requests in the B classifications and by elimination of the large number of civilian articles no longer allowed to be manufactured. In most districts all blast furnaces are producing. Two stacks in the Pittsburgh district are out for repairs but will resume in June. The New England stack will be blown in during June after relining. A second reconditioned stack at Granite City, Ill., will be ready in August.

Scrap supply continues at the more satisfactory level of the past several weeks and all consuming districts are receiving enough for the high rate of steel production, though in most cases it is sufficient only for current needs. Efforts to accumulate reserves for winter have met little success, though slight progress has been made in some instances. Intensive drives continue under WPB auspices and additional sources are found.

Office of Price Administration has granted exceptions to price schedule No. 6 to five steelmakers on shipments to consumers outside their normal area where usual basing points imposed a hardship. In a sixth case a similar petition was refused since examination indicated the company's overall profit was ample, though on the one item for which exemption was asked the margin was small.

Composite prices of steel and steelmaking materials are steady and unchanged, finished steel at $56.73, semifinished steel at $36, steelmaking pig iron at $23.05 and steelmaking scrap at $19.17.

COMPOSITE MARKET AVERAGES

	May 16	May 9	May 2	One Month Ago Apr., 1942	Three Months Ago Feb., 1942	One Year Ago May, 1941	Five Years Ago May, 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	18.50

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, 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

	May 16, 1942	Apr. 1942	Feb. 1942	May 1941
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.49	2.47	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.22	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	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, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to $\frac{9}{32}$-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	May 16, 1942	Apr. 1942	Feb. 1942	May 1941
Bessemer, del. Pittsburgh	$25.34	$25.34	$25.34	$25.34
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.34	25.39	25.34	25.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.06	24.06	24.06	24.06
No. 2X, del. Phila. (differ. av.)	26.215	26.263	26.215	26.215
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.54	31.54	31.34	31.09
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.65	125.63	125.33	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	21.50

Coke

Connellsville, furnace, ovens	$6.25	$6.25	$6.25	$5.70
Connellsville, foundry, ovens	7.25	7.25	7.25	6.30
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 invididual 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 (bil.) $36.00.
(Wheeling Steel Corp. allocated 21,000 tons 2" square, base grade rerolling billets under lease-lend during first quarter 1942 at $37, f.o.b. Portsmouth, O.; Andrews Steel Co. may quote carbon steel slabs $41 gross ton at established basing points.)

Forging Quality Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.25; 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.)

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.	0.45
2300	1.70	6100 Bars	1.20
2500	2.55	6100 Spr. flats	0.85
3100	0.70	Carb., Van.	0.85
3200	1.35	9200 Spr. flats	0.15
3300	3.80	9200 Spr. rounds, squares	0.40
3400	3.20	T 1300, Mn. mean 1.51-2.00	0.10
4100 .15-25 Mo. 46.00 .20-.30 Mo. 1.50-2.00; Ni.	0.55 1.20	Do., carbon under 0.20 max.	0.35

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, 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: 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.
(Central Iron & Steel Co. may quote carbon steel plates at 2.35c at established basing points; Granite City Steel Co. may quote ship plates 2.25c, f.o.b. mill.)
Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; 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.)
Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

Bright basic, bessemer wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Wire Products to the Trade:

Standard and cement-coated wire nails, polished and staples, 100-lb. keg	$2.55
Annealed fence wire, 100 lb.	3.05
Galvanized fence wire, 100 lb.	3.40
Woven fence, 12½ gage and lighter, per base column	67
Do., 11 gage and heavier	70
Barbed wire, 80-rod spool, col.	70
Twisted barbless wire, col.	70
Single loop bale ties, col.	59
Fence posts, carloads, col.	69
Cut nails, Pittsburgh, carloads	$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

Steel In.	Blk.	Galv.	Iron In.	Blk.	Galv.
⅛	56	33	½	24	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

Steel In.	Blk.	Galv.	Iron In.	Blk.	Galv.
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2½"	12	16.01	18.45	15.16	....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $40.00.
Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.
*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.
Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.
High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base, per lb.
18.00	4	1	..	67.00c
18.00	4	2	1	77.00c
18.00	4	3	1	87.00c
1.5	4	1	8.5	54.00c
.....	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
311	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	....	....
*316	40.00	44.00	48.00	40.00	48.00
*317	50.00	54.00	58.00	50.00	58.00
‡321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
442	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	§§18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.
Extras mean additions or deductions from base prices in effect April 16, 1941.
Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price plus all-rail freight may be charged.
Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin of shipment.
Dislocated tonnage: Producers shipping material outside their usual marketing areas because of the war emergency may charge the basing point price nearest place of production plus actual cost of transportation to destination.
Seconds or off-grade iron or steel products cannot be sold at delivered prices exceeding those applying to material of prime quality.
Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941. Domestic or export extras may be used in case of Lease-Lend tonnage.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅝ and ⅝ x 6-in. and shorter	63½ off
Do., ¾ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	56 off
Plow bolts	65 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less	62	64
⅝-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	68 off
Headless, ¼-in., larger	55 off
No. 10, smaller	60 off

Piling

Pittsburgh, Chicago, Buffalo	2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	$6.00
Connellsville, foundry	7.00- 7.50
Connellsville prem. fdry.	7.25- 7.60
New River, foundry	8.00- 8.25
Wise county, foundry	7.50
Wise county, furnace	6.50

By-Product Foundry

Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c

Per lb. f.o.b. works

Phenol (car lots, returnable drums)	12.50c
Do. less than car lots	13.25c
Do. tank cars	11.50c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	8.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$29.00

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.62	26.12	27.62	27.12
Brooklyn, N. Y., del.	27.65	.....	.....	28.15
Birdsboro, Pa., del.	25.00	24.50	26.00	25.50
Birmingham, base	†20.38	†19.00	.....	.....
Baltimore, del.	25.67	.....	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	‡24.47	.....	.....	.....
Cincinnati, del.	24.30	22.92	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del	26.24	.....	.....	.....
Philadelphia, del.	25.51	25.01	.....	.....
St. Louis, del.	‡24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.53	26.03
Syracuse, del.	26.08	.....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.17	24.67	25.67	25.17
Muskegon, Mich., del.	27.38	.....	.....	27.38
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.47	24.97	25.97	25.47
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.45	25.95	26.95	26.45
Duluth, base	24.50	.....	25.00	24.50
St. Paul, del.	26.76	.....	27.26	26.76
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.68	24.68	.....	25.35
Neville Island, Pa., base	24.00	23.50	24.50	24.00
§Pittsburgh, del., No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	.....	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	26.05	.....	.....	.....
Steelton, Pa., base	.....	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.89	25.39	.....	26.39
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	26.06	25.56	26.56	26.06
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorous 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

High Silicon, Silvery

6.00-6.50 per cent (base)	$29.50		
6.51-7.00	$30.50	9.01- 9.50	$35.50
7.01-7.50	31.50	9.51-10.00	36.50
7.51-8.00	32.50	10.01-10.50	37.50
8.01-8.50	33.50	10.51-11.00	38.50
8.51-9.00	34.50	11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling irons, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn. $28.00
Chicago, del. 31.54

Southern

Semi-cold blast, high phos, f.o.b. furnace, Lyles, Tenn. $28.50
Semi-cold blast, low phos., f.o.b furnace, Lyles, Tenn. 33.00

Gray Forge

Neville Island, Pa. $23.50
Valley, base 23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.81, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorous Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorous content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942.

Export Prices: In case of exports only, the governing basing point nearest point of production may be used, plus differentials and export transportation charges.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky. $64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Ohio	43.00

Second Quality

Pa., Ill., Ky., Md., Mo.	46.55
Georgia, Alabama	38.00
New Jersey	49.00
Ohio	36.00

Malleable Bung Brick

All bases $59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$31.00
Wire cut	29.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, 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.

Manganese Briquets: Contract basis in carloads per pound, bulk freight allowed 5.50c; packed 5.75c; ton lots 6.00c; less-ton lots 6.25c; less 200-lb. lots 6.50c. Spot prices ¼-cent higher.

Electrolytic manganese: 99.9% plus, less carlots, per lb. 42.00c.

Chromium Metal: Per lb. contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: 66-70%, per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

	Car loads	Ton lots	Less ton	Less 200 lbs.
2% C.	19.50c	20.25c	20.75c	21.00c
1% C.	20.50c	21.25c	21.75c	22.00c
0.20% C.	21.50c	22.25c	22.75c	23.00c
0.10% C.	22.50c	23.25c	23.75c	24.00c

Spot is ¼c higher.

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybdic Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrophosphorus: 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

Ferrosilicon: Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

	Carloads	Ton lots
50%	$ 74.50	$ 87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

Spot prices ¼-cent higher.

Silicon Metal: Contract basis per lb., f.o.b. producers' plants, freight allowed; 1% iron; carlots 14.50c, ton lots 15.00c, less-ton lots 15.25c, less 200 lbs. 15.50c.

Silicon Metal: Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

Silicon Briquets: Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

Silicomanganese: Contract basis freight allowed, 1½% carbon; in carloads per gross ton $128; ton lots $140.50. Spot $5 per ton higher.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot 5 cents per lb. higher.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%, Contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producer's plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Vanadium Pentoxide: 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

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials. As of April 16, 1941

	Soft Bars	Hot-rolled Strip Bands	Hot-rolled Strip Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled	Sheets Cold Rolled	Sheets Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars Carbon	Cold Drawn Bars S.A.E. 2300	Cold Drawn Bars S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.68	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	4.65	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.04	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.52	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	5.50	....	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.37	4.92	3.45	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.50	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.35	5.00	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.38	4.23	4.98	3.54	3.88	8.38	6.98
St. Louis	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.24	4.99	3.61	4.02	8.77	7.12
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Chattanooga*	3.80	4.00	4.00	3.85	3.85	5.80	3.75	....	4.50	....	4.39	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.93	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	5.25	5.00	4.60	....	....
Houston, Tex.	3.75	4.30	4.30	4.05	4.05	5.50	4.00	....	5.25	....	6.90	....	....
Seattle	4.20	4.25	5.45	4.75	4.45	6.50	4.65	7.60	5.70	....	5.75	....	....
Los Angeles	4.50	4.95	6.80	4.50	4.50	6.75	4.65	6.50	5.85	....	6.10	10.55	9.55
San Francisco	3.95	4.50	6.25	4.65	4.35	6.35	4.55	6.40	6.10	....	6.80	10.80	9.80

*Not named in OPA price order.

	S.A.E. Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	6.25	....	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	8.80
San Francisco	5.45	9.80	8.80	8.65	9.05

EUROPEAN IRON, STEEL PRICES

Dollars at $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH Gross Tons f.o.b. U.K. Ports	£	s	d
Merchant bars, 3-inch and over	$66.50	16	10	0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20	0	0
Structural shapes	2.95c	15	10	0
Ship plates	2.90c	16	2	6
Boiler plates	3.17c	17	12	6
Sheets, black, 24 gage	4.00c	22	5	0
Sheets, galvanized, corrugated, 24 gage	4.61c	25	12	6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.20	1	10	9

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

		£	s	d
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$25.79	6	8	0(a)
Basic pig iron	24.28	6	0	6(a)
Furnace coke, f.o.t. ovens	7.56	1	17	6
Billets, basic soft, 100-ton lots and over	49.37	12	5	0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14	10	6
Merchant bars, rounds and squares, under 3-inch	3.17c	17	12	0††
Shapes	2.77c	15	8	0††
Ship plates	2.91c	16	3	0††
Boiler plates	3.06c	17	0	6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22	15	0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26	2	6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	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.

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.

Ores

Lake Superior Iron Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents. unit, del. E. Pa.

Foundry and basic 56-63%, contract	12.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

Gross ton c.i.f. Baltimore; dry basis; subject to penalties for guarantees

Indian and African, 2.8:1 lump, 48%	$39.00
South African (excluding war risk)	
No ratio lump, 44%	28.00
Do. 45%	29.00
Do. 48%	34.00
Do. concentrates, 48%	33.00
Do. 50%	34.00
Brazilian (nominal)	
2.5:1 lump, 44%	31.00
2.8:1 lump, 44%	32.50
3:1 lump, 48%	41.00
No ratio lump, 48%	35.00-35.50
Do. concentrate, 48%	33.00-33.50

Manganese Ore

Including war risk but not duty, cents per unit cargo lots

Caucasian, 50-52%	
S. African, 48%	65.00
Indian, 50%	68.00-70.00
Brazilian, 48%	....
Chilean, 48%	68.00-69.00
Cuban, 51%, duty free	83.00-85.00

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

				ELECTRIC FURNACE AND FOUNDRY GRADES										
				Low Phos. Grades										
	OPEN HEARTH GRADES*	Machine Shop Turnings	BLAST FURNACE GRADES*	Billet, Bloom Forge Crops	Bar Crops and smaller; Punchings, Plate	Heavy Structural, Plate 3 ft. and less	Heavy Structural, Plate 2 ft. and less	Heavy Structural, Plate 1 ft. and less	Cut Auto Scrap 3 ft. and less	Cut Auto Scrap 2 ft. and less	Cut Auto Scrap 1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$16.00	$16.00	$25.00	$22.50	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Bethlehem	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Buffalo	19.25	15.25	15.25	24.25	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	15.50	15.50	24.50	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Detroit	17.85	13.85	13.85	22.85	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo	.....	13.85	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Kokomo	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth	18.00	14.00	14.00	23.00	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
St. Louis	17.50	13.50	13.50	22.50	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	13.00	13.00	22.00	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle	14.50	10.50	10.50	19.50	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50
Portland, Oreg	.....	.....	.....	.....	15.50	14.00	14.50	15.00	13.00	13.50	14.00	11.00	12.50	14.00

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails 3 ft. and under	Scrap Rails 2 ft. and under	Scrap Rails 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	21.00	22.00	23.50	24.00	24.25	24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	17.50	18.50	19.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

*Open Hearth Grades refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. Blast Furnace Grades refer to mixed borings and turnings, shoveling turnings, No. 2 busheling and cast iron borings. Add $5 per ton for chemical borings containing not over 0.5 per cent oil content.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, provided most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $2.50 less (railroad grades $3.50 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Graveyard autos not considered unprepared scrap.

Remote Scrap: Consists of all grades, except railroad scrap, located in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington and Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

Exceptions to Steel Price Order Granted to Five Companies by OPA

ORDERS permitting several steel companies to pass on to some customers certain heavier freight costs stemming from war business have been issued by OPA under Revised Price Schedule No. 6, governing sales of iron and steel products.

Companies granted the exceptions are: South Chester Tube Co., Chester, Pa.; Sheffield Steel Corp., Kansas City, Mo.; Colorado Fuel & Iron Corp., Denver; Seneca Wire & Mfg. Co., Fostoria, O.; and Follansbee Steel Corp., Pittsburgh.

"In general," OPA said in granting the exceptions, "revised price schedule No. 6 allows a producer of steel who must ship out of its usual market area, or by other than usual means of transportation, because of the war program, to use the basing point closest to the mill rather than the normal governing basing point. However, though this provision affords ample relief in the great majority of cases, it does not completely alleviate the situation of those mills not located at basing points and which are compelled to ship toward their emergency basing point because of an allocated or high-rated order. In certain cases on which orders are now being issued by the price administrator, freight absorptions of this unusual type were involved."

South Chester Tube Co. has, in certain instances, been required to ship to Pacific or Gulf points by rail, entailing unusual freight absorption against the Pittsburgh basing point. Sheffield Steel Corp. and Colorado Fuel & Iron Corp. have been granted relief on lend-lease shipments otherwise priced on the Chicago basing point. Seneca Wire & Mfg. Co. is granted permission to pass on certain charges arising chiefly in connection with lend-lease wire shipments. Follansbee Steel Corp. is allowed to increase price of forging quality steel billets to cover cost of manufacture of a superior quality product.

OPA Denies Pollak Steel Request To Raise Prices

Request by Pollak Steel Co., Cincinnati, for permission to raise prices on merchant bars has been denied by the OPA.

On March 13 the company filed an amended request for an exception from the terms of Revised Price Schedule No. 6 on iron and steel products.

The company operates a rerolling mill at Marion, O., using rerolling rails as its chief material. The mill's principal products are carbon steel and reinforcing bars.

In the request, just denied by OPA, the company withdrew application for permission to increase maximum prices applicable to reinforcing bars, and also withdrew application for permission to be allowed to price merchant bars f.o.b., Cleveland, rather than at established basing points.

The company did, however, ask permission to charge a base price of $2.40 per 100 pounds on merchant bars.

In denying the company's request on prices of merchant bars, the OPA said, after an examination of Pollak Steel's profits and production costs:

"An exception will not be granted merely to make a particular item more profitable when over-all profits are good. In the present case, the petitioning company makes a slight profit on sales of merchant bars at ceiling prices. The 1941 overall profit figures are good. Adjustment of February figures to allow for sales at established maximum prices, and for a decline in warehouse revenues which is far from certain, leaves the petitioner with a profit margin of 7.74 per cent of net worth."

Sheets, Strip

Sheet & Strip Prices, Page 136

Extension of the list of goods on which production has been banned by WPB has caused demand to fall off but effect on sheet and strip shipments will be small as supply for many of these consumers had been curtailed for some time. Increasing needs for war purposes more than make up for slackening in this respect. Mill backlogs are expanding and practically all new orders entered are at top priority. Rolling schedules are being drawn up for limited periods as allocations are being received constantly, disrupting plans. Tonnage on books is rated as low as A-1-k but little possibility exists of deliveries in the lower brackets.

Rolling of plates on continuous sheet and strip mills requires such heavy supplies of semifinished steel that shortage of sheet bars is becoming evident. The chief problem results from the fact that other products absorb steel to an extent that sheet mills are crammed. In addition to this, sheet mills have insufficient tonnage rated above A-1-k to command steel supply and as a result there is some idleness. Probably the greatest effect of the order by WPB cutting off production of numerous products will be felt in production of sheet siding and roofing for war plants, which is to be replaced by wood.

Sheet mill operators do not expect much change in demand from tin mills as electrolytic and bonderizing lines probably will take up the slack and about the usual tonnage of sheet mill output will go into fabrication of cans.

Heavy bookings of narrow cold strip, high carbon ratio leading, are rated A-1-a, few lower. Rerolling operations are closely geared to hot strip deliveries, little tonnage being available below A-1-a and some cold strip units are engaged at capacity with others less active. Pressure for deliveries on some items is stronger from fabricators now swinging into war production after tooling and converting for heavy consumption of strip.

Alloys are rarely available under four months, producers estimating requirements for melting schedules nearly three months ahead. Large forward orders for alloys extend through the remainder of the year and beyond with some mills.

Plates

Plate Prices, Page 137

If plate mills succeed in making 975,000 tons of steel plates in May, as planned, plate production will represent approximately 17 per cent of all finished steel for the month. One maker estimates that its plate output in May will be 40 per cent of its total.

With critical ratings on plates at A-1-a and A-1-b some mills are forced to tighten on acceptance of orders. In some cases directed tonnage and allocations are making deliveries on even A-1-a a matter of difficulty.

Shipbuilding requirements lead and by far the largest portion is being delivered to shipyards on all three coasts, where construction is assuming large proportions as new yards come into production. Considerable plate tonnage is required also for ship fittings and boilers.

In the southern area practically all plates are going into ships and some plates are being shipped from other producing points to support freight car construction.

The shipbuilding situation has eased as to plate supply, heavy deliveries against allocations having rounded out inventories to a comfortable extent and some plate consumers in other lines believe shipyard inventory is too large at a time they are unable to obtain delivery. Large elevated tank work has halted and some tanks are being made of wood, on steel towers, even for airfields and army depots.

Bars

Bar Prices, Page 136

Carbon bar deliveries are tightening further, averaging 10 to 13 weeks on A-1-a ratings. Some larger sizes of rounds cannot be had as early as that and some rod sizes, such as 3/16 to 3/8-inch are almost as difficult to obtain. Shipments are relatively easy on sizes from ⅝ to 1¼ inches, one mill being able to do nine weeks.

So much tonnage is being pushed into the higher brackets that either complete allocation or a new series based on AA, seems necessary. There is a constantly growing number of new consumers, at least new to many sellers. One cold-drawn bar seller says that over recent weeks he has had inquiries from at least 50 consumers from whom he never had requests before. This may be due to greater efforts to obtain material and probably also to some degree to con-

version to war work by numerous concerns not formerly needing this material.

Forgers, faced by demand sufficient to keep their equipment busy at capacity, are apprehensive of ability to handle all the business now being booked, all of which carries top rating.

Mills are receiving increasing tonnage of the new national emergency specifications in alloy bars and this volume is expected to grow. All alloy orders are heavy and are coming from a larger number of sources.

Pipe

Pipe Prices, Page 137

Some pipe mills unable to promise anything definite on deliveries of open-hearth steel lap-weld merchant pipe are able to give fairly prompt delivery on butt-weld pipe made of bessemer steel.

Output of cast iron pipe is tapering as restrictions limit priorities outside direct war needs for cantonments and manufacturing plants. Numerous cast pipe foundries have converted to various lines of war production, replacing pipe output by heavy castings for armament and other purposes.

Wire

Wire Prices, Page 137

Wire orders are larger individually, but fewer; heavy bookings for high-rated defense requirements are accompanied by cancellations from consumers affected by limitation regulations and others confronted with a ban on use of wire in their products. Aggregate tonnage being booked is up to shipments.

Estimates indicate fully 20 per cent of normal wire consuming trade not already converted will be forced to take on war contracts or retire for the duration. Meanwhile many specialties entering numerous consumer goods are going through a transition period, inquiries declining from many normal directions, although total volume so affected is more than offset by heavier high-priority orders.

Rods are scarce and tight, some alloys notably so; straight carbon steel is being substituted in some operations for chromium-vanadium. Lend-lease orders continue to cut into supplies of semifinished for domestic requirements, curtailing among other products the production of fencing below A-1-k. Strand for rope mills is also tighter.

Rails, Cars

Track Material Prices, Page 137

Placing of 800 ninety-ton hoppers by Bessemer & Lake Erie with Pullman-Standard Car Mfg. Co. is the first important award apparently given official approval by Washington since regulations affecting railroad equipment were applied early in April.

Producers of track accessories, on which ratings are relatively low, can offer little hope of delivery in open-hearth steel, except under special directive, but can promise fairly good delivery where bessemer steel is used.

Domestic freight car awards in April totaled 2125 units, though the official status of this business is not clarified. 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
4 mos.	22,183	43,386	6,688	6,157
May	.....	18,630	2,010	2,051
June	.....	32,749	7,475	1,324
July	.....	6,459	5,846	110
Aug.	.....	2,668	7,525	2,814
Sept.	.....	4,470	9,735	23,000
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

Structural Shapes

Structural Shape Prices, Page 137

Elimination of steel wherever possible in building construction by government agencies, substituting reinforced concrete and wood, leads to hope for improvement in supply of wide flanged beams and other structural shapes. Only a small need for steel for straps and bolts is met in wood construction. WPB has banned use of steel for building spans of 60 feet or less, wood to be substituted.

Some fabricators report plans are being changed on projects against which they had placed orders for shapes and in some cases deliveries had been made. They are seeking high-rated assembly jobs to insure continued operation.

Reinforcing Bars

Reinforcing Bar Prices, Page 137

Most suppliers of concrete reinforcing bars are hard pressed to meet deliveries on old contracts, which in most instances are heavy. Output is limited by volume of steel available for this purpose. Demand is increased by design of more war plants for reinforced concrete to conserve structural steel. A number of housing projects have been stopped because priorities are too low and efforts to obtain higher rating have failed.

Highway work is taking practically nothing but airfield landing mats are requiring large tonnages in all sections of the country.

Pig Iron

Pig Iron Prices, Page 138

Gray iron foundries find general conservation order M-126 will affect their ability to obtain work and some important units are understood to have decided their only course is to close down. In some communities foundrymen are discussing possibility of pooling such war orders as they have, to give economical operation of one or two plants instead of part time in all.

Steel foundries are overflowing with work and most malleable plants are in good position. Some gray iron foundries have canceled the remainder of their pig iron allocations for May, having enough iron to last over the period allowed in winding up business taking less than A-10 priority.

Mystic furnace at Everett, Mass., down for relining, will resume early in June, which will relieve the situation in New England. Meanwhile basic iron for that district will be supplied from outside sources. Foundry consumers there are generally down to 30 to 40-day inventory, larger reserve stocks being well liquidated. Pinch in June allocations will result from depletion of reserves at Everett and to meet higher ratings more foundry iron probably will be allocated from Buffalo furnaces. Considerable juggling of analysis specifications is being done to fill the gap, with malleable melt affected in some instances.

Repairs on the second stack of the Granite City Pig Iron Co., Granite City, Ill., are nearing completion and it will be put in blast in August. Output of the two stacks will be about 1200 tons per day. Most of the present production is going to Granite City Steel Co. as hot metal. The remainder is going into general distribution, as will iron from the second stack.

Two stacks in the Pittsburgh district are down for relining or repairs, which will reduce output for the next few weeks. At present scrap supply is sufficient to make up the loss in iron for open-hearth use and steelmaking may not be affected. In several districts all blast furnaces are active and stacks undergoing relining are being pushed to completion as early as possible.

As a result of recent orders cutting off production of various lines of consumer goods a number of former users who have not obtained war work are not being allocated any tonnage. Nothing is being provided for B ratings in current distribution. This results in an easier situation for melters producing war work and supply for these purposes is more nearly equal to requirements. At the same time a larger number apply for tonnage as conversion becomes more widespread.

Scrap

Scrap Prices, Page 140

Increased scrap supply is being maintained and is holding steel production at the high level prevailing for several weeks. Flow from remote sources is surprisingly good and collection campaigns are yielding excellent returns, with prospects of increased tonnage in the immediate future. Some scrap continues to come from the upper lakes region.

Increased supply of scrap rails, due to reclaiming of abandoned street railway tracks under WPB orders, is relieving the shortage of foundry scrap and receipts of motor blocks from wrecked autos is adding to cast scrap receipts. Larger foundries are in better position than for some time, though some smaller melters meet difficulty in obtaining sufficient ton-

nage under shipping regulations.

With the industrial salvage campaign well under way in the Buffalo district 2200 tons of scrap metal has been collected. As a result of the increased movement at least one consumer there has made some progress in accumulating a reserve for winter.

Dealers in the St. Louis district have bought and scrapped more than 6000 wrecked autos during the past month, while the government drive has been under way.

Office of Price Administration has amended its policy as to mixed shipments, requiring a maximum price on the carload to be the ceiling price on the lowest-priced grade. This replaces a requirement that the maximum price be $2.50 below that of the lowest grade, rating as unprepared scrap. The change is made to remove the threat to prompt delivery by small dealers who may not accumulate full carloads of a grade within a reasonable period.

Automobile wreckers in Iowa, southern Wisconsin and northern Illinois dismantled 3440 cars during the week of May 2, producing 4769 tons of scrap.

Warehouse

Warehouse Prices, Page 139

Ability of mills to ship steel is being narrowed to A-1-a ratings so rapidly that the new A-1-k priority given to warehouses recently already has little effect. Elevation of distributors' rating from A-9 gives a better standing but falls short of improving their position. Secondary warehouses find their position increasingly difficult as production of seconds is below normal and it is expected WPB soon will direct their disposition.

Revised warehouse quotas and heavier production of wire nails and other products will allow jobbers larger replacements. On the other hand, galvanized sheet quotas are reduced, extension of orders under A rating at A-1-k governing replacements.

Some warehousemen believe inventories will be released by consumers whose normal output has been stopped by WPB orders, thus furnishing some material to fill pressing requirements which jobbers cannot meet from their depleted stocks.

Ferroalloys

Ferroalloy Prices, Page 138

While the recent increase in the seaboard prices of ferromanganese combined with unchanged prices on spiegeleisen has caused some speculation as to whether there has been a certain shift in demand to the latter product, spiegeleisen sellers assert they have not noticed any such trend. They say there has been some improvement in demand from iron foundries, due to increasing difficulty in getting manganese briquets, but that otherwise the situation is much the same, and that so far there has been no difficulty in meeting consumer requirements.

Sellers of ferromanganese assert, by way of general confirmation, that if there has been any shift in demand it is too small for them to notice. In fact, pressure for ferromanganese appears to them as great as ever. They claim they are meeting all requirements, but

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

have so scheduled their operations to just about meet them. There has been little variance in shipments for a number of weeks past.

Metallurgical Coke

Coke Prices, Page 137

While New England by-product sellers have applied to OPA for the privilege of quoting higher prices retroactive as of May 6 and are inserting a clause in their billings covering such a possible contingency, no such action has been taken by other sellers. New England producers base their requests for higher prices largely on increased cost of bringing in coal, far more rail transportation, and correspondingly less water movement, which is cheaper.

Pacific Coast

Seattle — Spokane county, Washington, has signed an agreement with federal agencies for use of a county-owned site of 330 acres near Hillyard, later to be condemned, on which the proposed $20,000,000 magnesium plant is to be erected. Construction is expected to proceed immediately.

Idaho is urging construction of a magnesium plant in the southeastern section where dolomite in large quantities is said to have been discovered. A survey is said to indicate sufficient quantities of essential minerals in Bannock and Butte counties and sufficient power is said to be available.

United States engineers in both the Seattle and Portland areas are awarding large contracts for defense projects. The latter office has placed awards for unstated amounts with Hoard & Stuart, Lord & Loyrea and Parker & Schram, Portland, and Axman & Miller, Burbank, Calif., for various projects involving cantonments, airports, etc., in the Oregon area and on May 11 opened bids for a coast base engineering shop.

Paul J. Raver, of Bonneville Power Administration, reports that 1000 tons of copper and 2500 tons of steel are being used in construction of the Coulee-Spokane transmission line, total strategic metals in this project being 5000 tons. American Bridge Co. with a $750,000 contract for steel towers has delivered 17½ per cent, 67 per cent being rolled. Future improvements may specify wooden poles, to conserve steel.

Cast iron pipe inquiries are confined mainly to housing projects which rate high priority, several large tonnages pending. Some material is being sold out of stock but inventories are small and badly broken. King county district No. 49 is considering bids for 16,250 feet of 3 to 6-inch pipe, hydrants and valves, which is likely to go transite.

Jobbers are entirely out of some items, plates, sheets, cold-finished and alloys being particularly hard to get. Local mills are crowded with defense orders. Some urgent items are being supplied under allocation, sheets and plates in particular. Nails are extremely scarce, contractors with priorities buying in carlots from mills through local jobbers.

The scrap market is materially improved. One inland town of 100 population forwarded seven cars to a local mill. Meanwhile mills have ample receipts and in spite of record consumption the intake is so heavy that inventories are increasing. Washington Toll Bridge Authority has decided to sell 7660 tons of steel and cables salvaged from the Narrows bridge, the towers to be dismantled in an effort to contribute to the scrap supply.

Oregon Shipbuilding Corp. has been awarded 42 additional cargo vessels of Liberty type, by the Maritime Commission, three for 1942 delivery and the remainder in 1943. This brings total awards to this builder to 173. Of 131 vessels already under contract 31 had been launched and 23 delivered for service before May 1.

Steel in Europe

Foreign Steel Prices, Page 139

London—(*By Cable*)—Satisfactory supplies of steel and iron are being maintained in Great Britain. Expanding demand is being met for special alloys for armament and aircraft production. Requirements for heavy plates are steady but demand for structural steel is quiet-

Nonferrous Metal Prices

May	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
1-15	12.00	12.12½	11.75	52.00	52.00	6.50	6.35	8.25	15.00	14.50	35.00

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.75
Zinc, 100 lb. base	13.15

Tubes

High yellow brass	22.23
Seamless copper	21.37

Rods

High yellow brass	15.01
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.73

OLD METALS

Dealers' Buying Prices

(In cents per pound, carlots)

Copper

No. 1 heavy	9.50-10.00
Light	7.50- 8.00

Brass

No. 1 composition	9.00- 9.50
Light	6.00- 6.50
Heavy yellow	6.50- 7.00
Auto radiators	7.25- 7.75
Composition turnings	7.75- 8.25

Zinc

Old	5.25- 5.75
New clippings	6.75- 7.25

Aluminum

Clippings	10.50-11.00
Cast	10.00-10.50
Pistons	10.00-10.50
Sheet	10.00-10.50

Lead

Heavy	5.12½-5.62½
Mixed babbitt	6.00- 7.00
Electrotype shells	5.00- 5.75
Stereotype, Linotype	6.50- 7.50

Tin and Alloys

Block tin pipe	45.00-47.00
No. 1 pewter	37.00-39.00
Solder joints	9.50-10.00

SECONDARY METALS

Brass ingot, 85-5-5-5, l.c.l.	13.25
Standard No. 12 aluminum	14.50

er. Stocks of semifinished steel now are adequate. Tin plate business is confined to a limited scale.

Nonferrous Metals

New York—All foundries must secure immediately permission from the Copper Branch, WPB, to melt any ingot brass or bronze now on hand, regardless of the preference rating by which the metal was secured. Authorization must also be obtained by foundries in order to comply with order M-9-b as amended May 9. This was emphasized at a meeting here Thursday of ingot makers, foundries and officials of WPB.

Copper—Deliveries eased to 106,701 tons in April from 111,062 in March, while refined output rose to 90,672 tons from 89,552. Refined stocks rose 4252 tons to 83,789 tons, while blister stocks rose 3642. Demand for copper is at the rate of three to four million tons per year, while the supply is about two million, indicating that further reductions in less essential uses must be made.

Lead—Supplies of lead are ample for all essential needs with MRC allocations only about one-half of its imports. The balance is being stockpiled.

Zinc—Consumers who have not obtained form PD-94a should do so immediately and should file their requests for June shipment of metal. After June 1 producers no longer will be able to ship zinc without specific authorization.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 137

The British Purchasing Commission is said to be planning to place orders in the United States for 12,000 tons of bolts, nuts and rivets.

Canada

Toronto, Ont.—With the war industry of Canada now nearing peak production and many new plants with new lines of production introduced since the first of the year and several more slated to go into operation immediately, iron and steel makers are being called upon to maintain a flow of raw materials well beyond any previous rate. While steel production in Canada is reported at 96 per cent of capacity, this rate is the maximum that may be expected under existing supply sources of raw materials. While some departments are operating 25 to 50 per cent above their rated capacity, production in other departments is held down through lack of steel. For further increase in steel production additional blast furnace capacity is necessary and this will not be available until near the end of the year. In an effort to make larger quantities of steel available for war industry, new regulations have been announced which wipe out almost every line of nonessential manufacture involving use of any metals, other than gold and silver.

Demand for merchant pig iron is steady, about 8000 tons weekly. Improvement in scrap supply has relieved some pressure on blast furnaces that have been supplying needs of electric furnaces.

To Set Trucking Charge For Nonferrous Scrap

Representatives of OPA met between 50 and 60 nonferrous scrap metal dealers and consumers in Chicago, May 11, to consider proposed amendments to various price schedules. Proposals applying to copper, copper alloy, brass mill, aluminum, lead, zinc, nickel and nickel alloy scrap, related to control of transportation charges when shipment is made in vehicles belonging to the seller.

OPA representatives proposed a tentative trucking schedule starting at $1.10 per ton for distances up to 20 miles, with 20 cents additional for each ten miles further, up to 70 miles, and 15 cents additional for each ten miles additional, up to 100 miles. Objection was made to the $1.10 charge up to 20 miles, as it would apply to a block or a mile as well as to 20 miles.

A similar meeting was held in New York, May 13, and these will be followed by conferences in Washington where criticism and comment will be reviewed and a schedule adopted.

Ceiling Prices Established for Nonferrous Foundry Products

Maximum prices for nonferrous foundry products based on levels prevailing between Oct. 1 and 15, were announced last week by OPA.

Foundries accounting for more than 70 per cent of the nation's output, in compliance with a request of the OPA last January, already had said they would maintain prices based on those of the first half of

last October. While there has been no indication that the remaining 30 per cent of the foundry industry has not been complying with the OPA request, maximum prices have been formally established "to insure that the whole industry complies."

The new price measure, Maximum Price Regulation No. 125, became effective May 11.

War-Time Trends Topic At Warehouse Convention

(*Concluded from Page* 64)

warehousemen would concede this procedure is thoroughly sound from the standpoint of public interest and frequently advantageous to the industry.

He raised the question of whether it will not be necessary to harmonize warehouse quotas more closely with actual war demands, since the period on which quotas are based was a time when the civilian market was rampant.

In closing, he expressed appreciation for the work of the Iron and Steel Section of WPB, which, he said, keenly realized that "for every ton of steel required for the production of munitions, approximately one ton of Schedule A products must flow through steel warehouses."

Another speaker on the opening day's program was Whiting Williams, industrial relations consultant, who presented a human relations philosophy picture which he said he had sensed from his direct contacts with labor as a workman in the shops and factories throughout the country for many years.

Mr. Doxsey was re-elected president of the association. Two new vice presidents were named; E. L. Parker of Edgar T. Ward's Sons Co., Pittsburgh; and Richmond Lewis, Charles C. Lewis Co., Springfield, Mass. Lester Brion, Peter A. Frasse & Co., New York, was elected treasurer.

E. C. Ducommun, Ducommun Metals & Supply Co., Los Angeles; Everett D. Graff, Joseph T. Ryerson & Son, Chicago, and E. L. Parker, retiring directors at large, were re-elected.

Mirrors of Motordom

(*Concluded from Page* 56)

Brown, president of Briggs Mfg. Co., said his company now has 15 major war contracts. On May 1, one of the wing assembly projects was 39 per cent ahead of schedule, another wing section job was 38 per cent ahead, a third complete wing contract was 13 per cent to the good, and an undisclosed "complicated mechanism" was 20 per cent ahead of schedule. Perhaps explaining why 80 per cent of the hundreds of presses in the Briggs plants are either in use on war work or have been designated for new jobs, Mr. Brown noted his engineers had expanded the technique and use of dies in forming aluminum alloy stampings, and have undertaken extensive development work in the forming of aluminum alloy extrusions by means of bending rolls.

Under terms of the most recent limitation order, manufacturers of replacement automotive parts may fabricate in the second and third quarters of this year—at a rate not exceeding 70 per cent of dollar volume of parts sold in corresponding periods of 1941—the following parts: Engines, clutches, transmissions, propeller shafts, universal joints, axles, brakes, wheels, hubs, drums, starting apparatus, spring suspensions, shock absorbers, exhaust systems, cooling systems, fuel systems, lubricating systems, electrical systems, gages, speedometers, mirrors, windshield wipers, control mechanisms and steering apparatus.

First group of soldier-students will enroll this week in a new training school launched by Buick at Flint, Mich., to supply mechanics skilled in teardown, rebuilding and trouble shooting operations on the radial aircraft engine the company now is building. Training groups will comprise several hundred at a time and will be billeted at Flint under command of air force officers.

C. S. Stutz, former traffic manager of Chevrolet Gear & Axle here, has been named head of a new local office of the War Department's chief of transportation, aimed to co-ordinate and expedite the flow of lend-lease and other military supplies, equipment and material in this area. Only a cursory inspection of the area is required to convince anyone that Mr. Stutz will have his hands full.

NEW BUSINESS

Plant Expansion, Construction and Enterprise, Government Inquiries, Sub-Contract Opportunities, Contracts Placed and Pending

SUB-CONTRACT OPPORTUNITIES . . .

Data on subcontract work are issued by local offices of the Contract Distribution Branch, WPB. Contact either the office issuing the data or your nearest district office. Data on prime contracts also are issued by Contract Distribution offices, which usually have drawings and specifications, but bids should be submitted directly to contracting officers as indicated.

New York office, Contract Distribution Branch of WPB, 122 East Forty-Second street, New York, reports the following subcontract opportunities:

S-122: A New Jersey firm is seeking subcontractors who can produce 10 steel castings for a power shovel car body, approximate weight 6000 pounds each. A steel foundry is required. No machining is necessary. Patterns will be furnished by prime contractor.

S-123: A New York City concern needs subcontractors who can produce bodies for 37-mm shells and fuzes. Body for 37-mm shell is to be made of steel, S.A.E. 3135 or 3425, cold drawn, heat treated. Length is 3¾ and diameter 1½ inches. Tolerance, minus .005. 600,000 bodies are required at rate of 100,000 per month. Machines needed, four, six or eight-spindle automatic screw machines, 1½-inch capacity. Heat treating equipment optional. Body for 37-mm fuzes is to be made of steel, S.A.E. X1335, cadmium plated. Length is 2¼ and diameter 1⅜-inch. Tolerance, minus .005. Quantity, 600,000 at rate of 100,000 per month. Machines needed, four, six or eight-spindle automatic screw machines, 1½-inch capacity, turret lathe, 1½-inch capacity, cadmium plating equipment.

S-124: A New Jersey manufacturer seeks a subcontractor who can furnish planing work on cast iron columns, 51-inch bottom, 30-inch top, one inch wide by 9½ inches high. Set of five columns to be machined, as follows: First operation, machine bottom, top and side; second operation, reverse column, machine other side; third operation, vertical setting to machine bearing support. Tolerance, plus or minus .001. Machine needed, 10-foot planer with 10-foot clearance under crossarm.

D-20: A New York City watch manufacturer making clocks for airplanes seeks automatic screw machine facilities for manufacture of 20,000 to 30,000 small clock gears. Material high carbon steel, oil hardened.

S-125: A Brooklyn firm holding Navy contracts seeks subcontractors who can perform certain machining operations on aluminum castings and a variety of gear blanks. Firms are wanted to mill and bore 100 aluminum castings 22 x 26 x 36-inches and holes up to 9¾ inches I.D. Tolerances .001 to .005. Machine needed, horizontal boring mill, Lucas No. 4 or 42 or equivalent. Castings will be furnished by prime contractor. Facilities also sought for gear blanks of several types, of aluminum, naval brass, steel, phosphor bronze, up to 4 inches diameter. Tolerances, .0005 to .004. Machine needed, turret lathes, up to 4½-inch chucking capacity. Quantities average 200 of each type of gear. Materials furnished by prime contractor.

Milwaukee office, Contract Distribution Branch of WPB, 161 West Wisconsin avenue, Milwaukee, Wis., is seeking contractors for the following:

WP246XOS: Ball end of nickel-molybdenum steel, about 1 inch long and ½-inch in diameter requires screw machine, centerless grinder, surface grinder, cadmium plating facilities and a polishing jack for machine work. Piece is heat treated to Rockwell C40 to C60.

WP247XOS: Nickel-molybdenum steel forging of irregular shaped valve tappet guide requires heat treatment, cadmium plating. Equipment needed, turret lathe, chucking machine, grinder and automatic miller, disc grinder and sizematic.

WP248XOS: Automatic, Blanchard surface grinder, demagnetizer, speed lathe and honing machine are needed for this piece, which is heat treated to Rockwell C63. It is a roller valve tappet approximately 1½ inches in diameter and .3-inch thick, made from 1⅝-inch bar stock, AMS 6294.

WP249XOS: Automatic, centerless grinder, sizematic, rotary surface grinder and speed lathe necessary for this piece, which is heat treated to Rockwell C35. This valve tappet roller bushing is turned from 13/16-inch bar stock AMS 4650. Completed piece is about ¾-inch diameter and ⅝-inch long.

WP250XOS: Front counterweight bushing to be ground, honed and polished. Piece of 2 inches in diameter and ½-inch thick, turned from 2 3/16-inch bar stock of chrome-nickel steel. Tolerances no more than .0005 on the O.D.

WP251XOS: Stud turned from 9/16-inch bar stock of chrome nickel steel requires two different threads at each extremity. Automatic, centerless and thread grinders, heat treatment and plating facilities are required to machine this piece.

WP252XOS: Stud turned from ⅝-inch bar stock requires automatic, centerless and thread grinders, heat treatment, plating and threader of No. 00 Brown & Sharpe automatic are facilities required.

WP254XOS: Turret lathe, centerless and surface grinders, demagnetizer and lapping machines are needed to machine this piston from chrome nickel steel forging about 1-inch diameter and 4 inches long.

Boston office, Contract Distribution Branch of WPB, 17 Court street, is seeking contractors for the following:

SC-38: Additional facilities will probably be necessary for manufacturing small brass parts in large quantities. Machines required are automatic screw machines similar in design and capacity to Brown & Sharpe No. 0 and 00. For information apply at nearest WPB office.

SC-39: Subcontractors wanted for production of small pieces from ⅝-inch round brass bar stock. Could be made on multi-spindle automatics, B & S No. 0 or equal or on hand screw machines or turret lathes. 9,000,000 are required prior to Dec. 1, 1942, and contracts will be placed in accordance with ability to deliver. Information from nearest WPB office.

SC-40: Connecticut manufacturer urgently requires services of subcontractors for processing of small parts. SAE 1050 steel will be supplied by prime contractor. Work carries A-1-a priority. First order in each case will be for 25,000 pieces and may be repeated. Job requirements: (a) surface grinders; drill presses, 1 to 6-spindle, ⅝-inch capacity; No. 12 Brown & Sharpe horizontal milling machines. (b) Surface grinders; No. 10 plane milling machines; No. 10 bench drill presses; drill presses, 5-spindle, ⅝-inch capacity. (c) Surface grinders; No. 10 and 12 plane milling machines, Pratt & Whitney No. 12 two-spindle profilers; drill presses, 3-spindle, ⅝-inch capacity; No. 6 hand milling machines. (d) Surface grinders; No. 10 and 12 plane milling machines; drill presses, 5-spindle, ⅝-inch capacity. (e) Surface grinders; No. 2 plane milling machines; drill presses, 6-spindle, ⅝-inch capacity: Pratt & Whitney No. 12B profilers; No. 12 Brown & Sharpe milling machine; No. 3 hydraulic milling machine. (f) Surface grinders; No. 2 and 12 plane milling machines; Warner & Swasey turret No. 1a; drill presses, 5-spindle, ⅝-inch capacity; No. 14 and 12 two-spindle profilers; No. 6 hand milling machine; No. 1 bench hand milling machine.

Philadelphia Office, Contract Distribution Branch, Production Division, WPB, Broad Street Station Building, reports the following subcontract opportunities:

11-15-2: An Eau Claire, Wis., manufacturer requires subcontracting facilities for body for M-48 detonating fuze. Materials are forgings or bar stock. Tolerances plus or minus .005. Quantity large. Tools required, multi-spindle screw machines 2⅝-inch capacity, finished forgings and threading facilities. Prints and specifications at Philadelphia office.

11-15-3: A Grand Rapids, Mich., firm requires subcontracting facilities on component parts for ANM101A1 bomb tail fuze, six different component parts. Quotations will be considered on any one or more. Material, stainless steel, cold-drawn steel, seamless steel tubing and steel bar stock. Tol-

erances, plus or minus .001. Quantity, 500,000 at rate of 50 to 100M per month. Tools necessary are automatic screw machines ¾ to 1¾ inch, threading operations same range. Prints and specifications at Philadelphia office.

11-17-1: An Illinois prime contractor is seeking subcontracting facilities to manufacture component parts of M-48 and M-51 fuze, particularly interested in obtaining desirable subcontractors for screw machine parts. Prime contractor will furnish materials for all brass and steel parts. Delivery approximately 70,000 per week. Blueprints for 27 different parts at Philadelphia office.

13-16-1: Government requires subcontracting facilities for complete socket wrench sets, ¼-inch square drive. Material is bar steel to develop hardness of Rockwell C-35 to C-50 after heat treating. Quantity 4900 sets. Production to start as soon as possible. Tools required are automatic lathes No. 0 and No. 1, broaching facilities, heat treating facilities and milling machines. Prints and specifications on file at the Philadelphia office.

16-16-1: A Pennsylvania concern requires several steel forgings approximately 13 feet long, 4¾ inches O.D. and 2½ to 3 inches I.D. A rush job.

Chicago office, Contract Distribution Branch of WPB, 20 North Wacker Drive, is seeking contractors for the following:

73-A-424: Contractor wanted to make adapter for bombs, from 2½-inch steel bar; quantities several hundred thousand. Machine recommended, 4-spindle 2½-inch automatic, capable of external and internal threading. Blueprints available at Chicago office.

78-AN-425: We are interested in locating subcontracting for melting, machining and other fabrication of special alloy metals. For melting it is necessary to have electric arc or induction furnace equipment, preferably the latter type, ranging in size up to at least 1000 pounds. Numerous sizes and shapes of castings, both in small and large quantities, would be required. Also interested in machine shop facilities, preferably in same plant in which melting is done, although it is not necessary. Also interested in equipment to be used for rolling ingots, weighing approximately 350 pounds, down into plate, strip, sheet and rod stock.

Detroit office, Contract Distribution Branch, Production Division, WPB, Boulevard building, is seeking contractors for the following:

Rm-15: Machining sources are required for a forged aluminum landing gear truss. Boring, milling and drilling operations are required. A horizontal boring mill, vertical and horizontal milling machines and drill presses needed. Quantities, 25 pairs in May, increasing to 90 pairs in August. Forgings and some of tools and fixtures will be furnished by prime contractor. Prints and processing sheets at Detroit exhibit.

Rm-26: Forgings and machining sources are wanted on four parts for 1000-pound S.A.P. bomb. Covered by A-1-a priority and 50,000 each is required. Delivery of 2000 pieces must start Sept. 15, with quantities increased to 10,000 by December and each succeeding month. Prints at exhibit room.

Rm-27: Quotations are wanted on two to three million brass screw machine parts. Two outside thread, 1.6-2o NS-2LH and 2.-12NS-1, and one tapped hole, 1.7-14 NS-1, should be finished, as well as an eccentric cavity. Six-spindle automatics are required.

Rm-28: Thirty screw machine parts

have been put on display, including machine, castle and cap nuts, special studs, bolts, screws, etc. Range in size from ¼ to 1½ inches in diameter and include, in additioin to steel, a few bronze and aluminum parts. Most require second operations, including threading, milling, tapping, centerless grinding and polishing. All threads are British standard. Material will be furnished by prime contractor. Requirements, 14,000 pieces each, with deliveries starting Sept. 1.

Rm-29: Source required for SAE 4615 steel blades, 1 x $\frac{5}{16}$ x $\frac{3}{32}$-inch. Parts are roughed out, normalized, carburized, ground and hard chrome plated. Quantities on three blades are 2000, 5000 and 10,000 pieces each. A rotor made of nitraloy is also required. Requires rough machining, normalizing, milling, reaming, rough grinding, nitriding and finish grinding. Quantities are 1000, 5000 and 10,000. A-1-a priority with some material furnished by prime contractor. Samples and prints on display.

STRUCTURAL SHAPES.

SHAPE CONTRACTS PLACED

8600 tons, armor plate plant, Carnegie-Illinois Steel Corp., Defense Plant Corp. financed, to American Bridge Co., Pittsburgh; March, Peterson, Walker & Snyder, Gary, Ind., contractors.

7000 tons, shop buildings, Birdsboro Foundry & Machine Co., Birdsboro, Pa., to Harris Structural Steel Co., New York, through Turner Construction Co., New York.

2800 tons, buildings, Humble Oil Co., Baytown, Tex., to Lehigh Structural Steel Co., Allentown, Pa., through E. B. Badger & Sons Co., Boston.

2500 tons, Nisqually power project, Tacoma, Wash., to unstated interest; L. E. Dixon Co., Los Angeles, contractor.

1850 tons, stripper and mold preparation buildings, Republic Steel Corp., Chicago, to Wisconsin Bridge & Iron Co., Milwaukee; James Stewart Corp., Chicago, contractor.

1600 tons, building additions, Harrisburg Steel Corp., Harrisburg, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

1500 tons, unstated defense project, to Pacific Car & Foundry Co., Seattle.

1050 tons, plant building, Standard Oil Co., Wood River, Ill., to Vincennes Steel Corp., Vincennes, Ind.

600 tons, extension to building No. 8, Aluminum Co. of America, Lafayette, Ind., to Indiana Bridge Co., Muncie, Ind.

560 tons, sheet steel piling, DB2, for Todd Seattle Drydocks expansion, Seattle, divided equally between Bethlehem Steel Co. and Columbia Steel Co.; General Construction Co., Seattle, contractor.

500 tons, buildings, Staten Island, New York, to Belmont Iron Works, Phila-

SHAPE AWARDS COMPARED

	Tons
Week ended May 16	28,560
Week ended May 9	22,801
Week ended May 2	95,840
This week, 1941	37,442
Weekly average, 1942	32,492
Weekly average, 1941	27,373
Weekly average, April, 1942	64,510
Total to date, 1941	622,599
Total to date, 1942	617,342

Includes awards of 100 tons or more.

delphia, through Skinner, Cook & Babcock Inc., New York.

SHAPE CONTRACTS PENDING

1200 tons, building, U. S. Rubber Co., Passaic, N. J., Thompson-Starrett Co., New York, contractor.

Unstated, steel structures Nisqually power project terminals; bids to Tacoma, May 18.

Unstated, steel-framed squadron hangars in Pacific Northwest; bids to United States engineer, Portland, May 14.

REINFORCING BARS . .

REINFORCING STEEL AWARDS

6000 tons, stripper and mold preparation buildings, Republic Steel Corp., Chicago, to Truscon Steel Co., Youngstown, O.; James Stewart Corp., Chicago, contractor.

2500 tons or more, Nisqually power project, Tacoma, Wash., to unstated interest; L. E. Dixon Co., Los Angeles, contractor.

1500 tons, nonferrous metal refining plant, Aluminum Co. of America, New York district, to Jos. T. Ryerson & Son Inc., through Thomas Crimmins Contracting Co., New York.

800 tons, addition to airplane engine plant, Buick Motor Division, General Motors Corp., Melrose Park, Ill., to Calumet Steel Co., Chicago; Thorgersen & Ericksen Co., Chicago, contractor.

500 tons, building, Walter Kidde Co., Belleville, N. J., to Bethlehem Steel Co., Bethlehem, Pa., through Walter Kidde Constructors Inc., New York.

500 tons, building addition, Otis Elevator Co., Harrison, N. J., to Bethlehem Steel Co., Bethlehem, Pa., through Walter Kidde Constructors Inc. New York.

235 tons, terminal facilities and appurtenant works, Maryland, to Dietrich Bros., Baltimore, through Tuller Construction Co., Red Bank, N. J.

125 tons, sewage disposal plant, Camp Custer, Battle Creek, Mich., for army, to Ceco Steel Products Corp., Chicago.

100 tons, addition, Ahlberg Bearing Co., Chicago, to Ceco Steel Products Corp., Chicago.

Unstated, Anderson Ranch dam project, Idaho, to unstated interest by Bureau of Reclamation.

REINFORCING STEEL PENDING

Unstated, 613-foot concrete bridge, Salem, Oreg.; bids in to Oregon highway commission.

Unstated, 6500-foot concrete-lined tunnel, Nisqually power project; bids to Tacoma Board of Contracts, May 18.

PIPE . . .

CAST PIPE PENDING

Unstated, 16,250 feet of 3 to 6-inch, 23 hydrants and 21 valves, King county, Washington, water district No. 49; bids May 8; alternates for transite.

CONCRETE BARS COMPARED

	Tons
Week ended May 16	12,260
Week ended May 9	4,980
Week ended May 2	48,276
This week, 1941	5,137
Weekly average, 1942	11,002
Weekly average, 1941	13,609
Weekly average, April, 1942	22,105
Total to date, 1941	225,286
Total to date, 1942	209,044

Includes awards of 100 tons or more.

RAILS, CARS . . .

CAR ORDERS PLACED

Bessemer & Lake Erie, 800 ninety-ton hoppers, to Pullman-Standard Car Mfg. Co., Chicago.

CAR ORDERS PENDING

Navy, 88 standard-gage and 36 narrow-gage box and flat cars; Warren Tank Car Co. and Gregg Corp. Ltd., low bidders.

CONSTRUCTION and ENTERPRISE

Michigan

ANN ARBOR, MICH.—Metals Recovery Co., 1354 North Main street, has been incorporated to conduct a general metals business, by Charles Baird, 530 South State street.

DETROIT—H & H Chrome Mfg. Co., 1500 West Fort street, has been incorporated with $20,000 capital to manufacture restaurant and store fixtures, by I. M. Herman, 1968 Baline avenue.

DETROIT — Fabricated Metal Products

Inc., 5235 Grand River avenue, has been incorporated with $50,000 capital to conduct a machine shop and metal manufacturing business, by J. E. Horste, trustee, Detroit.

DETROIT—Faulds Machine & Tool Co., 1761 Union Guardian building, has been incorporated with $10,000 capital to deal in tools and machinery, by Leonard Simons, Washington boulevard, Detroit.

DETROIT—Lincoln Sheet Metal Co. will erect a factory building. Bennett & Straight, Dearborn, Mich., are architects.

DETROIT—Precision Nut Co. has awarded general contract to Industrial Construction Co., Detroit, for a factory building.

DETROIT—Superior Steel Treating Co. will erect a factory building on Grinnell avenue.

KALAMAZOO, MICH.—Fuller Transmission Co., 1419 North Pitcher street, has been incorporated with $300,000 capital to manufacture automotive transmissions and parts, by Charles H. Galin, 411 East Mason street, Milwaukee.

SAGINAW, MICH.—Christman Co., Lansing, Mich., has been awarded the general contract for construction of an aluminum forge plant in Saginaw for Chevrolet division of General Motors Corp. (Noted April 27).

WEST DEARBORN, MICH. — Ekman & Sons Tool Co., 23954 Kean avenue, has been incorporated with $50,000 capital to deal in tools, gages and dies, by Claes G. Ekman, 3915 Parker avenue, West Dearborn.

Massachusetts

ATHOL, MASS.—Charles T. Main Inc., engineer, 201 Devonshire street, Boston, will soon let contract for one-story 70 x 450-foot plant here for L. S. Starrett Co., 121 Crescent street.

WORCESTER, MASS.—Worcester Wire Works, 70 James street, has let contract for one-story 80 x 202-foot factory to Fiske Carter Construction Co. Estimated cost $55,000.

Connecticut

BRISTOL, CONN.—New Departure division, General Motors Corp., 269 Main street, has let contract to George A. Fuller Co., 597 Madison avenue, New York, for factory costing $600,000. Albert Kahn Inc., 345 New Center building, Detroit, engineer.

EAST HARTFORD, CONN.—Union Drawn Steel division of Republic Steel Corp., Republic building, Cleveland, plans manufacturing unit here. Estimated cost $1,000,000.

STAMFORD, CONN.—American Cyanamid Co., 1937 West Main street, has let contract for addition to Cuzzi Bros. & Singer Inc., 10 South Second avenue, Mt. Vernon, N. Y. (Noted April 20).

Ohio

AKRON, O.—B. F. Goodrich Rubber Co., Akron, plans $17,000,000 plant in Texas for manufacture of latex.

CLEVELAND—Jack & Heintz Inc., 1767 East Twenty-seventh street, is preparing plans for erection of plant in Maple Heights.

CLEVELAND — Cleveland Co-operative Machine Co., newly organized, will engage in machine shop work. Attorney William Brower, 426 Hickox building, is handling legal details.

CLEVELAND — Eaton Mfg. Co., C. I. Ochs, president, 755 East 140th street, plans 256,000 square foot factory in Battle Creek, Mich.

CLEVELAND—Falcon Mfg. Co., newly organized, will manufacture auto and airplane parts. Charles F. Devine, president, Bowman Auto Supply, 6853 Broadway, will head the new firm.

CLEVELAND—Aluminum Smelting & Refining Co., J. J. Ripner, president, 5465 Dunham road, Maple Heights, O., has started $20,000 addition to aluminum alloy plant.

DENNISON, O.—Ohio Axle Co., newly organized, will establish axle plant here. (Noted May 4).

NAPOLEON, O.—City plans improvements to light and water plant costing $187,000. A new turbine will be installed.

YOUNGSTOWN, O.—Commercial Shearing & Stamping Co. plans $500,000 expansion program, to include plant addition and office building.

Pennsylvania

BEAVER FALLS, PA.—Union Drawn Steel division, Republic Steel Corp., Beaver Falls, has let contract to Rust Engineering Co., Clark building, Pittsburgh, for addition to plant. Estimated cost $200,000.

PHILADELPHIA—Selas Co., Erie avenue and D street, has awarded contract to Schneider Construction Co., 3451

North Park avenue, for machine shop addition costing $40,000.

SHARON, PA.—National Malleable & Steel Casting Co., W. L. Moody, general manager, 1315 Yahres street, has let contract for one-story 150 x 350-foot, 40 x 100-foot and 80 x 100-foot steel foundry additions to Paul W. Flenn, South Docket street. (Noted April 27).

Illinois

AURORA, ILL.—Independent Pneumatic Tool Co. is expanding its plant here.

CHICAGO—Construction has been started on one and two-story addition to plant of Midland Machinery Co., 515 West Thirty-fifth street.

CHICAGO—Industrial Gear Mfg. Co., 4539 West Van Buren street, is constructing addition to present facilities, necessitated by prime and sub-contracts for gears and sprockets.

CHICAGO—Sivyer Steel Casting Co., 3100 South Wood street, is expanding its plant here to facilitate manufacture of castings for the war effort.

CHICAGO—Edison General Electric Appliance Co. Inc., 5600 West Taylor avenue, is acquiring a third plant in the Chicago-Cicero area for production of heavy ordnance.

DIXON, ILL.—Illinois Northern Utilities Co. will take bids about June 20 for power plant addition costing $6,000,000. Sargent & Lundy, 140 South Dearborn street, Chicago, engineers.

JACKSONVILLE, ILL. — Approximately $200,000 will be spent by city for light and power plant addition.

McCOOK, ILL.—Electro-Motive Division, General Motors Corp., La Grange, Ill., has completed plans for plant expansion program here which calls for addition of 250,000 square feet to present buildings.

MOLINE, ILL.—Deere & Co. has awarded general contract to Axel Carlson Co., 320 Seventeenth street, for tractor works addition. Cost $40,000, with equipment.

Alabama

GORGAS, ALA.—Alabama Power Co., 600 North Eighteenth street, Birmingham, Ala., will soon let contract for steam generator plant costing $6,000,000.

MOBILE, ALA.—City will spend $2,819,800 for water and sewer systems. Converse & Co. Inc., Wilson building, engineer.

Kentucky

LOUISVILLE, KY.—Curtiss-Wright Corp., Buffalo, will erect $12,000,000 airplane assembly plant here.

Georgia

MACON, GA.—City will soon call bids for waterworks costing $260,000. Robert & Co., Bona Allen building, Atlanta, Ga., engineer.

MILLEDGEVILLE, GA.—Mion Construction Co., 377 Techwood drive Northwest, Atlanta, has contract for fuse loading plant. Philip M. Julien & Co., Washington, architect, and W. E. Dunwoody Jr., Macon, Ga., associate architect.

Florida

JACKSONVILLE, FLA.—City will soon have survey completed for municipal electric system. Burns & Roe Inc., 233 Broadway, New York, is making survey.

West Virginia

HINTON, W. VA.—United States engineer's office, Huntington, W. Va., will take bids May 28 for furnishing plant, labor and materials and performing all work for design, manufacture, delivery f.o.b. cars Hinton, and installing and testing of two 33,333-kva alternating current generators and auxiliaries for Bluestone power house.

Missouri

ST. LOUIS—J. L. Muren, 3939 Fillmore street, has contract for one-story addition to machine shop for John Ramming Machine Co., 4591 McRee street. Estimated cost $15,000.

ST. LOUIS — National Bearing Metals Corp., 4930 Manchester avenue, has awarded contract for one-story addition, 74 x 82 feet, to its plant costing $23,000.

Oklahoma

PONCA CITY, OKLA.—Continental Oil Co., acting as agent for Defense Plant Corp., will contact private firms for construction of two plants to manufacture aviation gasoline and toluene.

Wisconsin

BELOIT, WIS.—Fairbanks Morse & Co. has given contract for foundry addition and warehouse to Cunningham Bros., 359 East Grand avenue. Estimated cost $45,000. W. Fred Dolke, 189 West Madison street, Chicago, architect.

GREEN BAY, WIS.—Hudson & Sharp

Machine Co., 1207 Main street, has given contract for one-story 110 x 115-foot factory addition to J. C. Basten, 618 Roosevelt street. R. W. Surplice, 310 West Walnut street, architect.

MANITOWOC, WIS.—Eastman Mfg. Co., 1002 North Eleventh street, has plans by F. W. Raeuber, 926 South Eighth street, for one-story 40 x 120-foot addition.

Minnesota

DULUTH, MINN.—Minnesota Power & Light Co., 30 West Superior street, will spend approximately $2,700,000 for substation.

Texas

DALLAS, TEX.—National Concrete Co. of Texas, Construction building, Dallas, has contract for shredded iron manufacturing plant for Shredded Steel Co., H. H. Johnson, manager, with temporary offices in the Adolphus hotel, Dallas.

HOUSTON, TEX.—United States engineer's office will handle all contracts for building and installation of equipment for expansion program for Texas Electric Steel Casting Co., Tom Shartle, president. Cost of buildings estimated at $65,000; company will purchase machinery and equipment at cost of $600,000.

LONGVIEW, TEX.—Madaras Steel Corp. of Texas is reported to have funds available for completion and expansion of steel plant.

PORT ARTHUR, TEX.—Cities Service Oil Co. has been granted federal aid of $18,000,000 for construction of plant.

California

LOS ANGELES—H. L. H. Precision Parts Inc. has been organized with 2500 shares of no par value stock by E. W. Lartent, H. J. Hutchings and Hugh Hill, all of Los Angeles. The new corporation is represented by Earl A. Everett, Santa Monica boulevard and Western avenue, Hollywood, Calif.

SANTA MONICA, CALIF.—Douglas Aircraft Co. will erect machine shop, 220 x 260 feet here to cost $73,000.

Oregon

PORTLAND, OREG.—Commercial Iron Works has awarded $22,000 contract for office and other plant additions.

Washington

TACOMA, WASH.—General Construction Co., Seattle, has general contract to erect plant here for Air Reduction Sales Co., to produce oxygen gas.

SEATTLE—Burke Millwork Co., 3205 Fremont avenue, will erect boiler building at plant.

SEATTLE—Hydraulic Supply & Mfg. Co., 7500 Eighth avenue South, has awarded contract for plant additions and office building.

SEATTLE—Bethlehem Steel Co., 4001 Twenty-eighth avenue Southwest, has given contract for plant addition to Isaacson Iron Works, 2917 East Marginal way. Estimated cost $100,000.

Canada

SYDNEY, N. S.—Atlantic Spring & Machine Co. Ltd., King's road, is having plans prepared for four factory buildings to cost about $55,000.

BROCKVILLE, ONT.—Phillips Electrical Works Ltd., King street West, is completing arrangements and plans to start work immediately on new plant addition to cost about $25,000 with equipment.

FORT ERIE, ONT. — Fleet Aircraft of Canada Ltd., Gilmour road, has given general contract to Elmer Zimmerman, 231 High street, for plant addition to cost about $15,000.

LONDON, ONT.—Department of Munitions and Supply, Ottawa, H. H. Turnbull, secretary, is receiving bids for addition to overhaul plant, 112 x 180 feet, operated by Fleet Aircraft of Canada Ltd.

NEW TORONTO, ONT.—Wilson Motor Bodies Ltd., 48 Abell avenue, Toronto, is calling bids for plant buildings on Lake Shore road here to cost about $80,000. Lindsay A. Wardell, 59 Kendal avenue, Toronto, architect.

TORONTO, ONT. — Toronto Transportation Commission, 35 Yonge street, is considering plans for three plant buildings at its various shops here, estimated to cost about $275,000, with equipment.

TORONTO, ONT.—Moffat's Ltd., 24 Denison avenue, has given general contract to Mollenhauer Contracting Co. Ltd., 188 Perth avenue, for plant addition costing $15,000, equipment extra.

TORONTO, ONT. — Silverware Products (Canada) Ltd., 100 Monro street, is having plans prepared by B. Brown, architect, 21 Dundas square, for plant addition, to cost about $25,000, equipment extra.

TORONTO, ONT.—Atlas Engineering & Machine Co. Ltd., 14 Eastern avenue, has given general contract to Chestnut McGregor Ltd., 96 Bloor street West, for plant addition costing about $50,000, including equipment.

TORONTO, ONT.—Shaw Machine & Tool Co., 34 St. Patrick street, has begun work on machine shop, 50 x 120 feet to cost $15,000, equipment extra.

TORONTO, ONT.—DeHavilland Aircraft of Canada Ltd., Sheppard avenue West, has let contract to A. W. Robertson Ltd., 57 Bloor street West, for further addition to plant, consisting of experimental shop.

TORONTO, ONT.—National Iron Corp. Ltd., 324 Cherry street, has given general contract to Russell Construction Co. Ltd., Harbor Commission building, for two plant buildings to cost $150,000, with equipment.

TORONTO, ONT.—Canon Electric Co. Ltd., a subsidiary of Canon Electric Development Co., Los Angeles, has been incorporated to produce the company's line of cable connectors and plugs for the Canadian aircraft industry. A building at 2271 Danforth avenue has been acquired and another building, now under construction at 2273 Danforth avenue will be equipped for manufacturing purposes. Plant will be under direction of L. D. Cahoon.

TORONTO, ONT.—Research Enterprises Ltd. is erecting unit to extend its radio assembly plant, 125 x 460 feet, to cost $1,000,000, with equipment.

TORONTO, ONT.—Addressograph-Multigraph of Canada Ltd., 349 Carlaw avenue, has purchased building at 1152 Bay street and will equip it for manufacturing purposes.

TORONTO, ONT.—Canadian Aircraft Instruments & Accessories Ltd., and K.D.G. Instruments Ltd., Vanderhoof avenue, Leaside, will erect one-story addition to provide 28,000 square feet of floor space.

ST. CATHARINES, ONT. — Thompson Products Ltd., 37 Louth street East, has plans by A. E. Nicholson, architect, 46 Queen street, for plant addition to cost about $100,000.

WELLAND, ONT. — Atlas Steels Ltd., Main street East, has let general contract to Standard Steel Construction Co. Ltd., Port Robinson, Ont., for plant addition 100 x 300 feet. Pigott Construction Co. Ltd., Pigott building, Hamilton, Ont., has contract for other additions and is preparing to lay foundations for heavy equipment, including new electric furnaces.

LONGUEUIL, QUE.—Fairchild Aircraft Ltd. has given general contract to A. F. Byers Construction Co. Ltd., 1226 University avenue, Montreal, for plant addition.

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PUNCH, Multiple "E" L & A, cap. 340 tons
SHEARS, Plate 72" x 1-1/4" United, M.D.
SHEAR, Plate No. 32 Wms. & White, 100" x 1"
SHEAR, Squaring 132" x 1/4" Wheeling, M.D.
SHEARS, Squaring 54" and 48" x 3/16", M.D.

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Hydraulic Riveting Machines, 48" throat, 1½" daylight.
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To purchase equipped and going machine shop. Give list of machinery, location, annual business, debts. We will assume debts. Address Box 694, STEEL, Penton Bldg., Cleveland.

CLASSIFIED

Help Wanted

WANTED

Man with extensive steel experience, preferably in strip steel, to serve as Assistant to Manager of specialty cold rolled strip steel mill entirely engaged in war work. Technical education, successful background in steel sales, and some knowledge of operating practice desirable. Excellent opportunity for the right man. In reply, state age, draft classification, education and complete business experience. Salary open. Address Box 690, STEEL, Penton Bldg., Cleveland.

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Help Wanted

SALESMAN OR SALES ENGINEER — Manufacturer of high grade specialty steels wants man with proved sales ability to take brief training course and then do sales-service work in the industrial market. State age, education and experience. Address Box 684, STEEL, Penton Bldg., Cleveland.

WANTED—MAN WITH EXTENSIVE EXperience to serve as assistant superintendent of blast furnaces in large steel company. 35 to 45 years of age with technical training preferred. State salary expected. Address Box 637, STEEL, Penton Bldg., Cleveland.

PROCESSING ENGINEER, U. S. CITIZEN, with metallurgical training wanted for improving existing steel mill practices; development of new production methods with view of increasing production and decreasing costs. State salary desired. Address Box 701, STEEL, Penton Bldg., Cleveland, Ohio.

METALLURGICAL RESEARCH ENGIneer, U. S. Citizen, graduated in metallurgy preferably with some experience in research work alloy steels and steel specialties. State salary desired. Address Box 700, STEEL, Penton Bldg., Cleveland, Ohio.

SALESMEN EXPERIENCED IN TOOL steels, stainless steels, etc., by alloy specialty mill, Pittsburgh district. Various territories open. Give age, experience, references. Address Box 702, care STEEL, Penton Bldg., Cleveland, Ohio.

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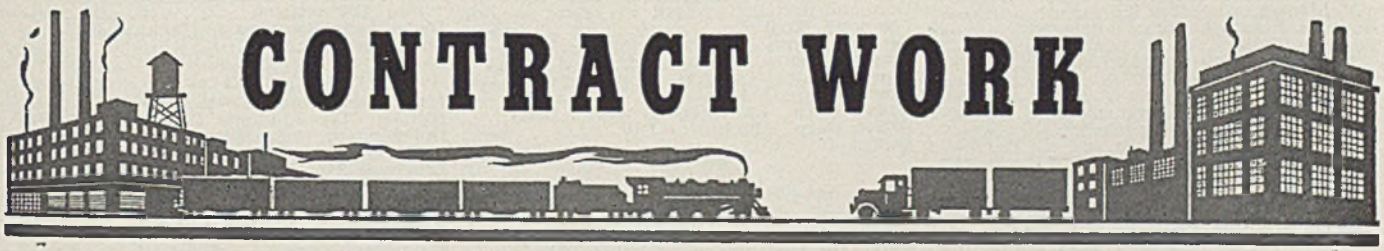

Castings

ADVERTISING INDEX

Where-to-Buy Products Index carried in first issue of month.

ADVERTISING INDEX

Where-to-Buy Products Index carried in first issue of month.

How to get maximum use from Monel

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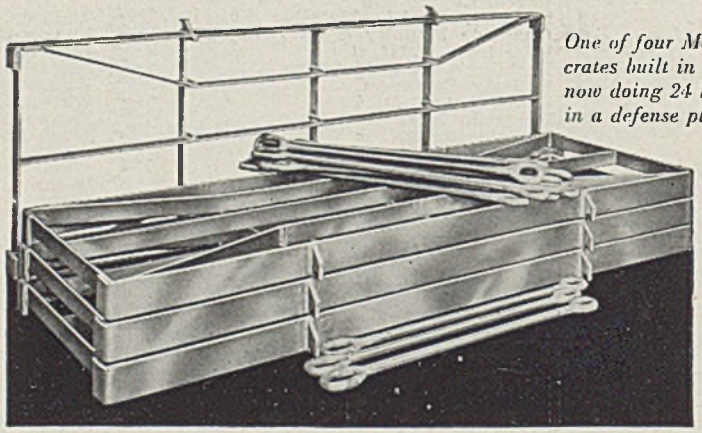

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