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# STEEL

ESTABLISHED 1882

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March 2, 1942

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**PRODUCTION • PROCESSING • DISTRIBUTION • USE**



**T**HIS man may be wearing a badge that reads "visitor", but you can bank on the fact that he's here on a more important mission than just visiting. The chances are he's answering a specific request from the Chief Engineer, or some other key man in plant operations, to come in and solve a problem.

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# HIGHLIGHTING

## THIS ISSUE OF

# STEEL

HEADED for an early showdown is the current battle for the closed shop and increased basic wages (p. 30). Despite Pearl Harbor and the appeal of the President on Feb. 23, war production continues to be hampered by work stoppages. The War Labor Board has indicated that "an authoritative national policy" on the union shop issue might soon be forthcoming. Although the broad policy does not yet stand revealed, a straw that may show which way the wind is blowing is the Board's refusal last week of a closed shop and a \$1 a day wage increase at the Douglas Smelter Division of Phelps Dodge Corp. Manufacturers hold that greater production usually is obtained from open rather than closed shops.

A new process is available (p. 38) for reclaiming tin as well as steel scrap from used tin cans. . . . STEEL lists many examples of manufacturers who have converted their plants from peacetime products to implements of war or parts of such implements (p. 33); the purpose is to suggest to other manufacturers how they too can convert to war production, in order both to assist in the war effort and to keep their men and facilities employed. . . . Machine tool output (p. 40) now is well above the billion dollar level. . . . Wood will be used in place of steel (p. 55) in some new freight cars. . . . Sacred cows must be sacrificed at Washington, declares E. L. Shaner, STEEL's editor-in-chief, if the war effort is to be speeded.

Priorities have been tightened on petroleum pipe, also it now is simpler for the petroleum industry to obtain repair parts (p. 42); chlorinated rubber stocks have been frozen; unused track-laying tractor sales are prohibited; unfilled February truck quotas will carry into March. . . . Aluminum capacity (p. 43) will be further expanded. . . . Simplification of pipe fittings has been ordered; February quotas for laundry equipment have been extended. . . . Possession

### **Steel Being Converted**

### **Expanding Aluminum**

of explosives now is under license (p. 45); the tin and terne plate order has been revised; container industry is under survey; flashlight prices are under a ceiling. . . . Congress approves construction of a new lock at the Soo (p. 54). . . . Plate scarcity may hold down construction of railroad equipment (p. 40); automobile builders can ship inventory steel only under high preference ratings; heating equipment luxury items are out for the duration. . . . Canada (p. 60) will impose heavy penalties on priorities violators. . . . Fuse-hole plugs are produced on a 125-mile assembly line in Michigan.

Professor Macconochie tells how Buick forges crankshafts (p. 66) by a greatly simplified procedure. . . . Herbert Chase gives data (p. 72)

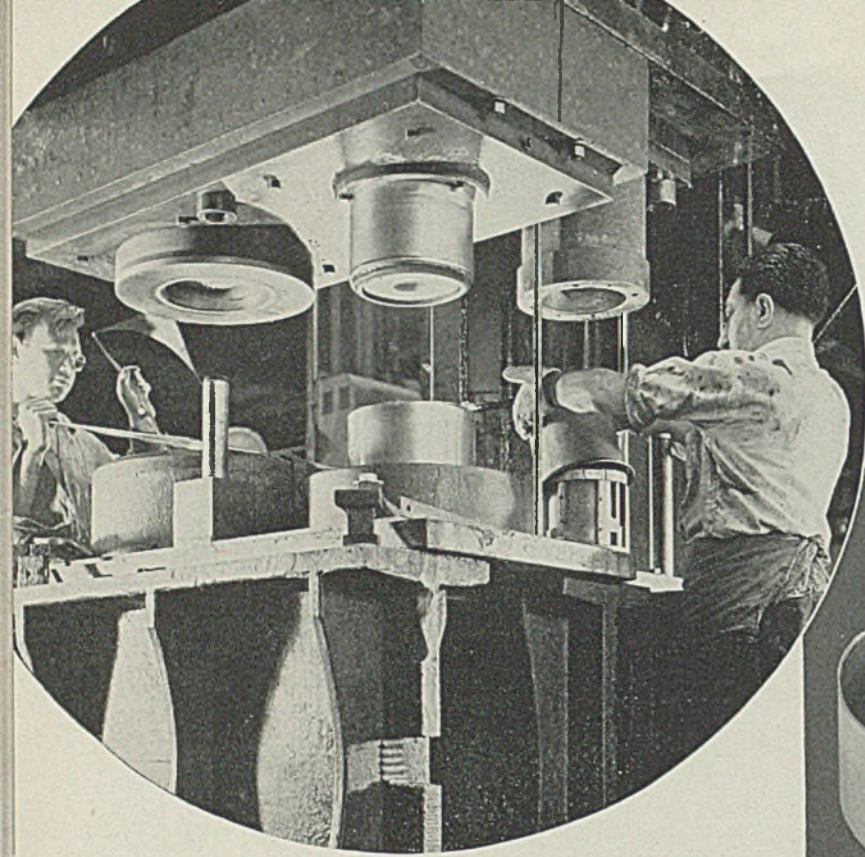
### **Simplified Forging Setup**

on flexible heat-treating equipment employed to produce desired physicals in cold-headed products. . . . Substantial economies are obtained by cleaning raw coal used in making by-product metallurgical coke, according to John Griffen who describes (p. 80) the methods employed. . . . Recovering the maximum percentage from aluminum scrap is particularly important at this time; means for increasing recovery are detailed (p. 85). . . . The use of silver in industrial applications (p. 86) expands greatly to include much ordnance work.

Many novel ideas to cut blanking and piercing costs, increase production and flexibility of dies are detailed by Jacob R. Joachimi in a discussion (p. 64) of shortcuts developed at Bell Aircraft Corp.

### **Novel Low-Cost Blanking Dies**

. . . Modern high-speed fabricating methods (p. 77) are employed by a west coast shipyard to turn out ships at a rate of one a week, an important part of our emergency ship program. . . . Paste soldering (p. 82) facilitates many joining operations. . . . Efficient handling methods (p. 88) enable self-contained induction heating units to be constructed at rate of one 5500-part assembly every 12 hours, according to A. J. Byerly. . . . Salt bath furnaces are improved (p. 98).

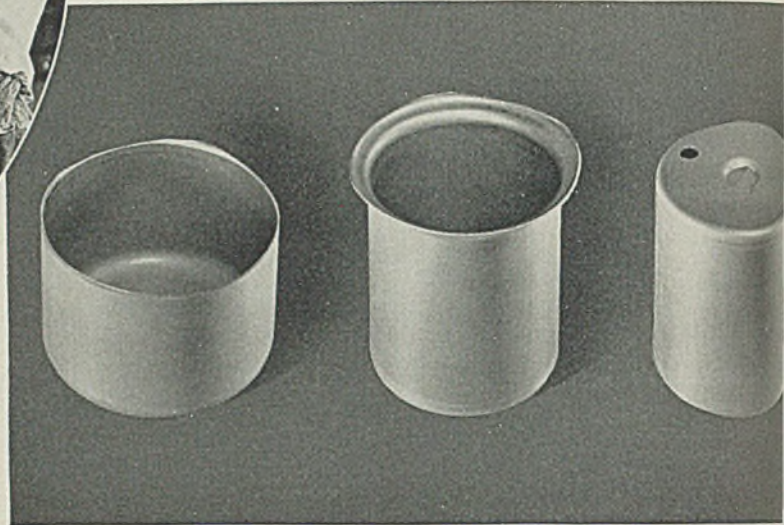


Three dies mounted in this press blank, draw, emboss punch and trim 8 1/8" x 8" cylinders.

The first die blanks and draws 6" to 10" dia.

The second die draws to finished size, 8 1/8" by 8".

The third die embosses, punches and trims, finishing the cylinder.



## 8" Cylinder Formed and Finished at Each Press Stroke

These brake booster cylinders, 8 1/8" deep by 8" in diameter, are blanked, drawn, embossed, punched and trimmed by three dies mounted in a 250-ton, double-acting press. By this ingenious production method a cylinder is finished at every stroke of the press.

Each 13-ga. Inland sheet is trimmed to correct size for two blanks. A sheet is dipped in emulsified lubricant and set to the gauges on the first die, which cuts the blank and draws to a depth of 6" on a 10" diameter. During the upstroke of the press, the part is moved to the second die, where it is drawn to finished size, 8 1/8" deep and 8" in diameter. On the next upstroke, the part is inverted and placed in the third die, where it

is embossed, punched and trimmed—completely finished and ready for shipment. This process is made continuous by feeding the press and advancing the parts at each upstroke.

Inland special drawing quality sheets have almost a perfect performance record on this difficult brake booster cylinder job, which is drawn and redrawn without score marks.

If you have a problem involving the use of steel—perhaps arising from conversion to wartime production—do not hesitate to call for an Inland Metallurgist who will be glad to work closely with you.

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**STEEL**

March 2, 1942

## HIGH PURPOSE AND THE SACRED COWS

Step by step the nation is developing a pattern for effective war effort.

Pearl Harbor shocked us into a realization of our mental and physical unpreparedness. This prompted the President to yield to public clamor for a one-man control of production. It led to the belated appointment of Donald M. Nelson.

Mr. Nelson was quick to impress the nation with the fact that ships, planes and tanks are about all that count. He has driven home the hard truth that we have left only "10 silver months" in the critical year of 1942 in which to get going on big scale war output.

But Mr. Nelson's program cannot be effective without full co-operation from every American. Work interruption, selfishness and easy living must be banned for the duration. Obviously the next step in the pattern for war was a call for unlimited support for Mr. Nelson's program.

President Roosevelt issued that call last Monday night. He proposed a war creed consisting of "three high purposes for every American":

- "1. We shall not stop work for a single day. If any dispute arises we shall keep on working while the dispute is solved by mediation, conciliation or arbitration -- until the war is won.
- "2. We shall not demand special gains or special privileges or advantages for any one group or occupation.
- "3. We shall give up conveniences and modify the routine of our lives if our country asks us to do so. We will do it cheerfully . . ."

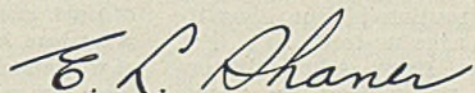
This is a stimulating creed, but it is not sufficient in itself. The words are all right. Their meaning is clear. But something is needed to endow them with rich meaning and the spirit of sincerity, high example and force.

That lack is evidence on the part of the President and his close associates that the creed of high purpose recommended for the public is meant also for the public's servants in government.

Therefore, the next logical step in the pattern of war is to abandon "business as usual" in government. This means curtailing unnecessary activities and expense in scores of overstuffed bureaus. It means "modifying the routine" of government life to increase efficiency.

Above all, it means "giving up" numerous sacred cows in Washington -- labor coddling, unnecessary social experiment, pet projects, and the like.

A drastic culling of the Presidential herd of sacred cows will give point to the creed of high purposes. It will crystallize national unity almost overnight. It is the next step.



Editor-in-Chief

# Battle for Union "Security"

## To Start with WLB Hearings on SWOC-Little-Steel Dispute

◆

**Settlement may set precedent for other cases . . . Government attitude toward union aggressiveness tightening . . . Manufacturers' group warns labor's insistence on closed shop imperils maximum production and national safety**

◆

BATTLE for the closed shop, and basic wage increases, opens this week when a panel of the War Labor Board starts hearings on the Steel Workers Organizing Committee's demands against the "Little Steel" companies.

The outcome may have a far-reaching effect on the final determination of the war. The lines have been drawn. Steel companies have stated their opposition to compulsory union membership. They are backed by manufacturers generally. They are largely supported by public opinion.

Union leaders have stated their positions. They will insist on union "security." They will insist on higher wages, despite the freezing of prices on the products of their labor in an effort to prevent inflation.

Against labor's demands, three statements of policy have been issued, tending to weaken those demands. There was the President's "Three high purposes for Americans," submitted in his address to the nation, Feb. 23. He said: "We shall not stop work for a single day . . . We shall not demand special gains or special privileges or advantages . . . we shall give up conveniences and modify the routine of our lives if our country asks us to do so . . ."

There was Price Administrator Henderson's pronouncement: "Any general increase in basic wage

rates will compound an already difficult problem."

There was the congressional proposal to suspend the 40-hour week and eliminate the necessity for pay-

ing time and a half for overtime for the duration of the war.

Meanwhile stoppages of work on vital war materials continued.

At Granite City, Ill., the Amer-



GRANITE CITY, ILL.: Members of the CIO Steel Workers Organizing Committee, at right stopped workers at employees' entrance of the American Steel Foundries plant here last week for inspection of their union cards. Because of a shortage of workers caused thereby, the plant which makes cast armor for Army tanks and Navy gun mounts suspended operations for the day. The picket line was removed after an overnight conference between Army officers and union officials. NEA photo

ican Steel Foundries plant, producing cast armor for Army tanks and gun mounts for the Navy, lost a day's production when a SWOC dues-picketing campaign forced the foundry to close.

At Pittsburgh, an illegal strike was called by a SWOC local at the Crucible Steel Co. of America's La Belle works. It was settled Friday.

At Cleveland, several days' production was lost at the Monarch Aluminum Co. through a strike called by the Mine, Mill and Smelter Workers Union which demanded to be recognized as bargaining agent. An independent union recently was certified by the National Labor Relations Board as having a majority of the plant's workers.

At Gary, Ind., dues picketing was resumed by SWOC at the Carnegie-Illinois Steel Corp. plant but did not affect plant operations.

On the West coast, many plants were closed Feb. 23 by workers who refused to heed War Production Chief Nelson's request that output of war materials be continued through Washington's birthday.

At other points stoppages occurred for miscellaneous reasons.

However, the greatest interest in the labor picture was focussed on the CIO-"Little Steel" dispute. Settlement of this controversy quite possibly will determine a precedent in close shop cases for months.

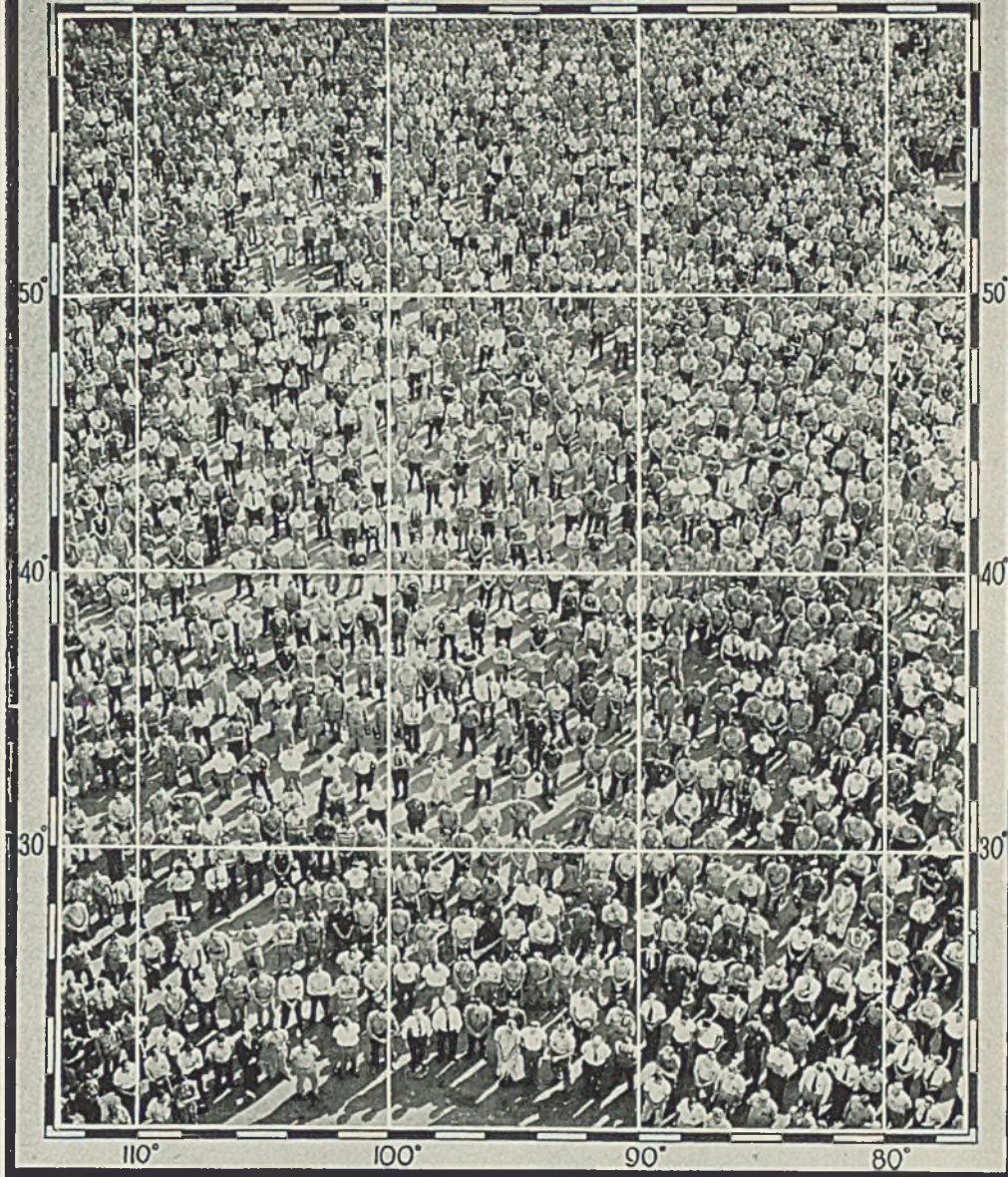
#### "Threat to National Safety"

Continued demand for union security in war industries is a definite threat to maximum production and national safety, the National Association of Manufacturers warned last week in commenting on the coming hearings.

The association emphasized that 34 of the 65 cases pending before the board Feb. 16 involved the "closed shop" or one of its variants—"union shop," "maintenance of membership," "union security" and others.

"In any event, what in the name of victory has the 'closed shop' to do with production?" the association asked. "It has nothing to do with production—but it is a way to non-production. The best assurance of maximum production for victory is an open shop where any competent patriotic citizen can work for his country regardless of whether he or she holds a union card. Common sense dictates a moratorium for the duration on this 'closed shop' issue.

"War has imposed on industry major responsibility for producing the weapons so sorely needed on fronts around the world. It is no time to erect new artificial restrictions to impede that production. Neither is it any time for manufacturers to sit supinely in their offices and see such restrictions being



THE MAP: Obedient to the President's suggestion, Mr. and Mrs. America last Monday spread before themselves maps of the world, so that they might follow with understanding his references to combat areas and "vast distances". But, as his discourse proceeded it became clear that he also was "mapping" a situation at home with elaboration on "three high purposes for every American." The "vast distances" became short steps—work and sacrifice for every one, for victory. See editorial comment, page 29

raised. Any blame for failure to produce in this crisis will be laid squarely and solely at the door of management. The public will support management in its refusal to accept restrictions from any source on war-time production.

"The managers of industry have an obligation to their country and they owe it to themselves to tell the Congress and the War Labor Board in no uncertain terms that the 'closed shop' may well throttle this country's only hope for victory—all-out production. France thought to fight two wars at once—one among themselves and one with the enemy. France fell. The closed shop can be the downfall of America!"

What will be the attitude of the War Labor Board on the closed shop issue remains a matter of con-

jecture. Last week it refused such a demand by the CIO against the Phelps Dodge Corp. at its Douglas Smelter Division at Douglas, Ariz. It also refused a \$1 a day wage increase.

The board, in a unanimous decision, indicated that "an authoritative national policy" on the union shop issue might be established in the near future.

Board's opinion held that the requests of the CIO union would disrupt prevailing contracts in Arizona as established in recent contract signed between the company and AFL unions embodying "significant improvement in work standards."

In another decision the board granted a 25-cent daily increase to employes of the St. Louis Smelting  
(Please turn to Page 136)

# Full Conversion to War Production Expected "Within Seven Months"

MASS production of the implements of war in plants formerly devoted only to making civilian goods will be reached by fall.

The automotive industry will be over the hump in seven months, according to J. S. Knowlson, director of the WPB Division of Industry Operations, which has charge of all conversion programs.

Other industries will be close behind, he added.

That there will be weeks of trouble and that there will be industrial casualties just as there will be casualties in the trenches was freely admitted. However, the program is getting well under way.

"By July 1, the flood of war materials from our plants will confound the Axis and astound even those Americans who have long known and respected the know-how of American industrial management," said William P. Witherow,

president, the National Association of Manufacturers.

"You can tell the housewives, the grocer, every kid on the streets, that they will hear sooner than they think that we have beaten the pants off the Axis." Mr. Witherow added that by Dec. 1 war output will be 75 per cent ahead of the same period last year.

WPB is finding that many companies already have conversion programs well under way—before they are approached on the matter by the war production agency. Scores of examples of this are contained in the files of WPB, and in those of private organizations.

One typical example is that of a small company which two years ago was making aluminum frying pans, egg poachers, radio dials and control devices. With the beginning of the emergency, the owners recognized the handwriting on the

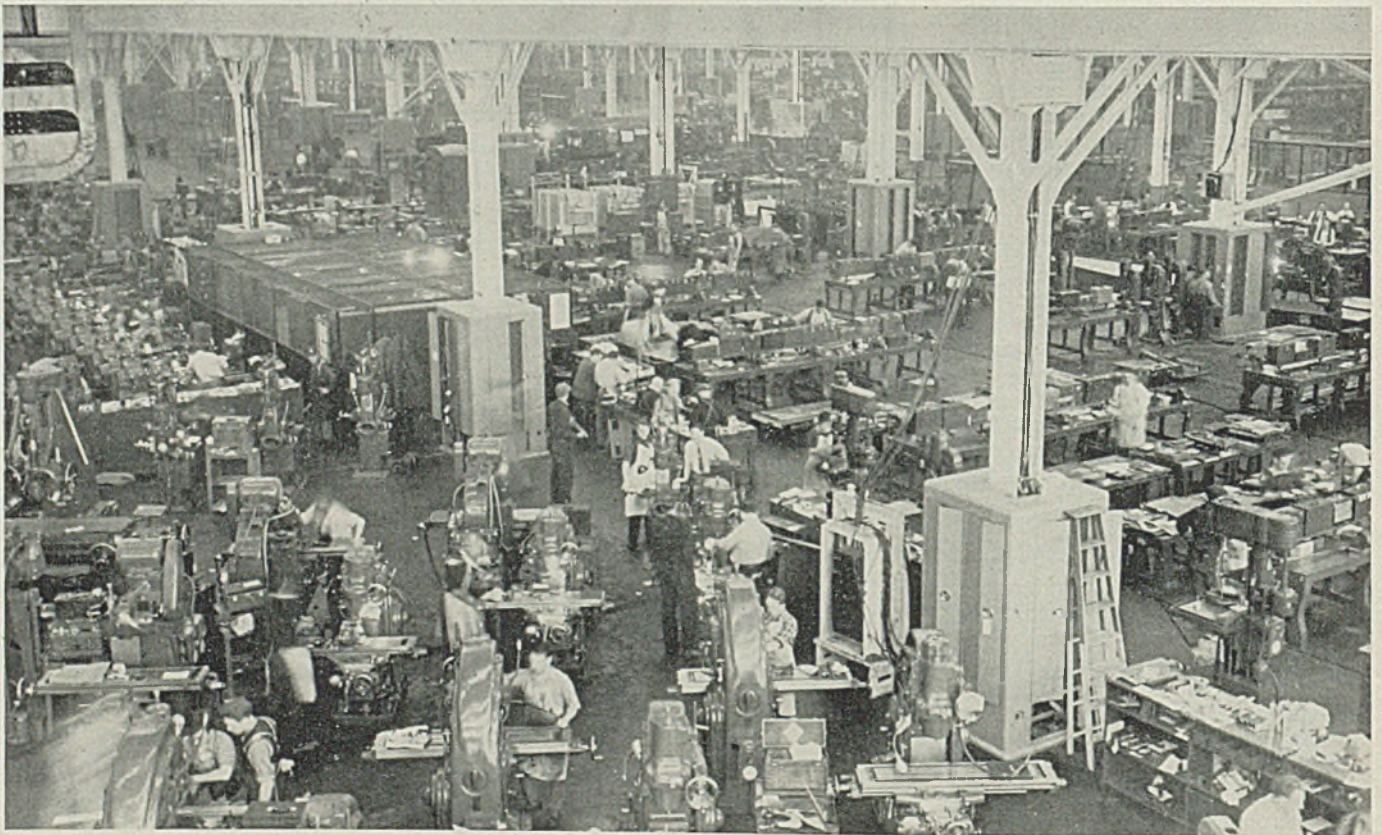
wall regarding availability of aluminum for such products. Today the company is working 100 per cent on percussion caps, struts, flap hinges and other bits and pieces for aircraft.

Other typical conversions already carried out are listed by the New England Council:

A company manufacturing cotton gin equipment developed a lathe attachment which makes possible the use of ordinary engine lathes for gun boring purposes. This concern is now boring gun tubes and making lathe attachments for other concerns.

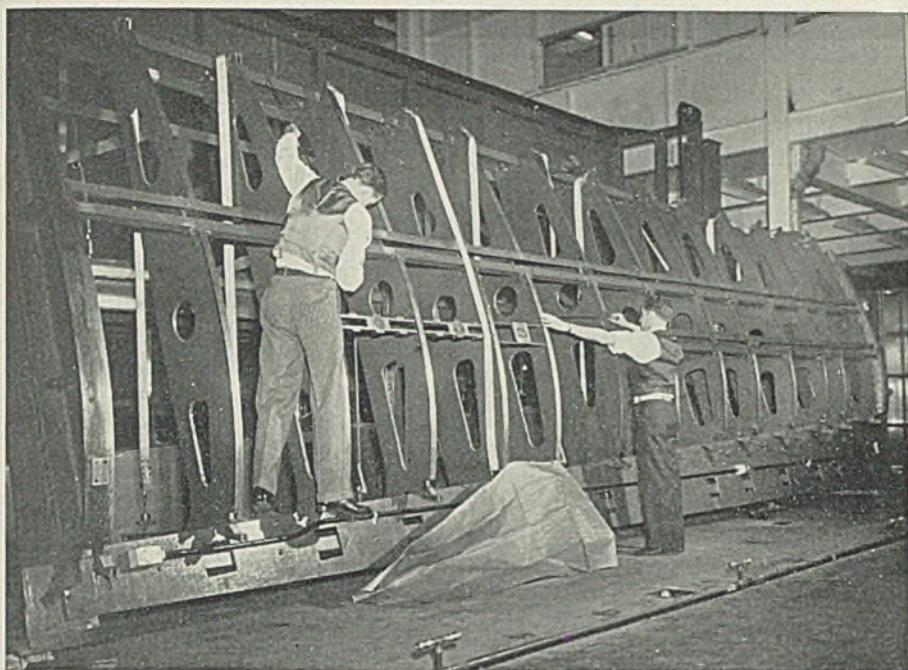
A small general machine shop developed a simple method of turning out drill bits for boring gun tubes, and is now engaged in almost full time production of these essential parts.

A shop making lawnmower equipment developed the necessary jigs



FOUR DECADES' experience in mass automobile production is reflected in the new Ford bomber plant at Willow Run, Mich., the tool and die department of which is shown above. Equipment has been installed and is in partial operation at one end of the huge factory while structural steel and masonry work proceed at the other. Soon heavy aerial battle wagons will be rolling off the long assembly line, much as automobiles once rolled off other assembly lines. Wide world photo





ENGINEERS inspect a fixture used in the construction of outer wings of a large bomber at the new Ford plant at Willow Run. Wide World photo



chinery is building special purpose lathes for the production of steel projectiles.

A concern producing shoe machinery has taken several contracts for the building of torpedo parts.

One making road building equipment has taken work in connection with the fabrication of torpedo parts.

Another engaged in the manufacture of electrical toys has converted its equipment to handle the fabrication of parachute flares.

A clock manufacturer has converted his specialized woodworking shop for the production of specially constructed boxes for the packaging of small arms.

A silver working concern has taken on work in connection with small parts of an electrical assembly considerably at variance with its regular line of work but for which the skill of its operatives is readily adaptable.

A manufacturer of metal fire doors has converted his equipment

and fixtures to handle essential machine work on a specialized piece of Navy electrical equipment. The shop is now producing these parts for the electrical manufacturer.

A small concern producing bottle capping equipment is now turning out parts essential in submarine construction on equipment previously used for bottle capping machines.

A concern manufacturing envelopes is using its maintenance shop equipment to produce special machine work in connection with a research laboratory.

A firm engaged in manufacturing men's shoes has converted part of its equipment to the manufacture of helmet linings for the Army Ordnance.

A manufacturer of women's shoes is converting part of his equipment to the fabrication of stitched duck field bags and first aid pouches for the Quartermaster Department.

A pipe organ manufacturer has taken two contracts for the production of wooden ammunition boxes.

A manufacturer of compacts and jewelry has contracted to do major work in connection with incendiary bombs, and is converting his space and equipment for handling essential production of aircraft parts.

A small plate and welding shop which specialized in boiler work has

taken a contract for fabrication of gun carriages.

A bicycle manufacturer has taken several contracts for torpedo parts.

A manufacturer of small standard valves has converted part of his equipment to the handling of fabrication of torpedo parts.

A manufacturer of paper box ma-



WITH its customary efficiency the auto industry is rapidly changing over to the production of airplanes and airplane parts. Above, workers in the Briggs Mfg. Co., which normally makes bodies for Chrysler, are turning out ducts for Flying Fortresses. The plant makes more than 70 different shapes and sizes of these parts. NEA photo

## By NOT Making Automobiles We Save

CESSATION of automobile manufacture this year will conserve enough steel and rubber to manufacture more than 200,000 medium tanks, far more than called for in the administration's two-year program, according to WPB statisticians. Vast quantities of other vitally needed *materiel* can be made from other critical materials saved. For example:

For every 24 autos we are NOT making this year we have saved steel and rubber for a single 27-ton medium tank.

For each automobile we are NOT making this year we have saved enough tin to coat 1000 cans in

which to put food for our soldiers and sailors.

For every 700 automobiles we are NOT making this year we have saved enough aluminum to make one fighter plane.

For each automobile we are NOT making this year we have saved enough nickel to make 100 pounds of nickel steel for armor plate, projectiles, and armor-piercing bullets.

For each automobile we are NOT making this year we have saved enough zinc and copper to make brass for 2400 brass cartridge cases for the .30-caliber ammunition used in our machine guns and our Garand Springfield rifles.

7,000,000 man-hours of work. This industry of 34 companies was given a large war order, three larger companies taking the prime contracts and subcontracting the parts to the other companies in the industry.

The four communities involved are: Meadville, Pa.; Newton and Kellogg, Iowa; Mansfield, O.; Eaton, Ga.

## New Ferrosilicon Plant Planned for Ohio

A plant to produce ferrosilicon costing about \$2,000,000 is planned for construction in northeastern Ohio, to be owned by Defense Plant Corp. and operated by the Vanadium Corp. of America. It will be equipped with three large phase furnaces. The work is pending until contracts are signed.

for the production of essential torpedo parts.

A company engaged in the manufacture of oil filters for automobiles is doing major work in connection with the fabrication of parts and assembly of an incendiary bomb and is now setting up to fabricate and assemble a bomb nose.

## Textile Machinery Industry Converting to War Output

Textile machinery manufacturers are engaged in the manufacture of direct war materials as well as repair parts and machinery for the production of the yarns and fabrics needed for military and essential civilian requirements, according to R. S. Dempsey, chief, WPB Textile Machinery Section.

"By the middle of 1942 the big producers will have completed their tooling-up and about 40 to 50 per cent of their capacity will be on ordnance work," Mr. Dempsey said.

"The other half of the industry's capacity will be devoted to the production of parts for maintenance and repair of existing textile machinery, and the manufacture of new equipment for mills engaged in the production of goods required to clothe the armed forces and for essential civilian clothing.

## War Contracts Awarded to "Priority-Depressed" Cities

Large awards of war contracts have made it possible for the WPB to recommend suspension of the special contract preference granted last fall to four small industrial communities and to the household washing-machine industry.

The acute "priority unemployment" which caused the board to certify these situations to the War and Navy Departments for special

treatment, including an allowance of up to 15 per cent in prices on war contracts, is being alleviated by the large orders placed under this procedure.

Labor surveys have disclosed that these unemployment situations have been improved, and that many plants otherwise unable to convert have been enabled to take part in the war production program.

Contracts let to the washing-machine industry alone will provide

Dollar value of orders taken in January by Baldwin Locomotive Co., Philadelphia, and subsidiaries, including Midvale Co., was \$32,784,835 compared with \$41,958,830 in December and \$12,721,046 in January, 1941. Consolidated sales billed in January, including Midvale Co., aggregated \$13,830,021, which included cost-plus-fixed-fee contracts, compared with \$13,212,265 in December and \$5,487,974 in January, 1941.

## Practice Bombshells Discarded for Scrap



MARCH FIELD, CALIF.: United States army air force bombardiers now dropping bombs in the southern Pacific war theater developed their skill by using these "empties" in practice at March Field (Riverside). Joining in the national drive for scrap, the salvage officer at the field has collected all the available bombs for "remelting". NEA photo

# Scrap Shortage Reduces Ford's Steel Output

DETROIT

DEPLETION of scrap reserves, dwindling of incoming shipments and lack of home scrap from normal processing operations have forced Ford Motor Co. to take off four open hearths.

Requests for allocations have been made to Washington but as yet insufficient material is being received to keep all ten of the plant's furnaces going.

Producing from 12,000 to 15,000 tons of ingots a week, purchased scrap requirements are estimated at about 750 tons a week, although additional tonnages are needed for foundry operations, including the new armor plate plant which will be in production before long.

The company is understood to have indicated 15,000 tons of scrap would take care of its requirements for a 30-day period.

Meanwhile Great Lakes Steel Corp. is continuing with 15 of 16 open hearths in service, one being down for rebuilding. A freak ice jam in the Detroit river interfered with operations briefly the other day by depressing the water level below intake pipes. Dynamiting of the jam remedied the stoppage which had never been experienced before in operations of the plant here.

The state of Michigan is being scoured for scrap iron and steel, particular emphasis being placed on auto graveyards. Results are encouraging, though estimates vary widely as to the tonnage of material in these yards. Two earlier surveys checked closely—around 33,000 tons—but another analysis purported to show a monthly turnover of 29,000 tons in auto graveyards, so the first mentioned figure is held by some to be far too low.

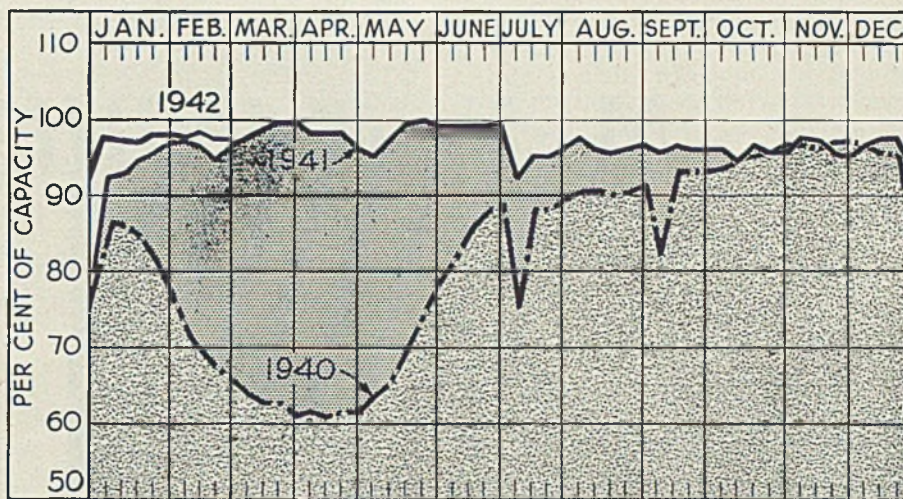
## Scrap Campaign Organized For Middle Western States

CHICAGO

Fourteen middle western states have been brought actively into an extensive campaign to increase the flow of scrap metals from industrial to consuming mills, it has been announced by Chicago officials of the WPB. Headquarters have been opened in the Civic Opera building here.

D. W. Gee, regional manager, and Eugene DuPont III, assistant regional manager, independent sal-

(Please turn to Page 117)



## PRODUCTION . . . . . Steady

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week remained steady at 96 per cent of capacity. Three districts increased, six declined and three were unchanged. A year ago the rate was 96% per cent; two years ago it was 65½ per cent, computed on the basis of capacity as of those dates.

**Chicago**—Declined 2 points to 102 per cent, every producer but one curtailing slightly for furnace repair or lack of scrap.

**Cleveland**—Removal of an open hearth by one interest and slight interruption by another caused the rate to drop 5 points to 89 per cent.

**Cincinnati**—Lost 2 points to 86 per cent in spite of effort by one interest to increase output in anticipation of a brief shutdown next month for repairs.

**Birmingham, Ala.**—Unchanged at 95 per cent, with 23 open hearths active.

**Buffalo**—Several changes in active units, necessitated by repairs, left the operating rate at 79½ per cent, which has prevailed since the second week in January.

**Central eastern seaboard**—Sufficient scrap is being received to hold production unchanged at 90 per cent.

**Pittsburgh**—Gained ½-point to 95½ per cent.

**Wheeling**—Receded 1½ points to 86½ per cent.

**St. Louis**—Heavier supply of scrap brought an increase of 16 points to 88½ per cent.

**Detroit**—Ford Motor Co., lacking scrap, took off four open hearths, cutting the district rate 8 points to 84 per cent.

**New England**—Repair necessity caused a drop of 5 points to 95 per cent, with rebound this week expected.

**Youngstown, O.**—Advanced 4 points to 91 per cent, with 71 open hearths and three bessemer in production. The same rate is scheduled for this week. Republic Steel Corp. was unable to resume work at Warren, O., on account of lack of scrap.

## District Steel Rates

Percentage of Ingot Capacity Engaged  
In Leading Districts

	Week ended Feb. 28	Change	1941	1940
Pittsburgh . . . .	95.5	+ 0.5	96	63
Chicago . . . . .	102	- 2	99	59
Eastern Pa. . . .	90	None	95	65
Youngstown . . .	91	+ 4	97	40
Wheeling . . . . .	86.5	- 1.5	88	94
Cleveland . . . .	89	- 5	91.5	71
Buffalo . . . . .	79.5	None	90.5	58
Birmingham . . .	95	None	100	90
New England . . .	95	- 5	92	56
Cincinnati . . . .	86	- 2	97.5	57
St. Louis . . . . .	88.5	+16	93	63.5
Detroit . . . . .	84	- 8	92	94
Average . . . . .	96	None	*96.5	*65.5

\*Computed on steelmaking capacity as of those dates.

## Machine Tool Shipments At Record in January

Machine tool shipments in January were valued at \$85,200,000, compared with \$85,100,000 in December, according to estimate of the National Machine Tool Builders' Association, Cleveland. This establishes a new record for any month in the history of the industry. Production in January, 1941, was estimated at \$50,700,000.

Malleable iron castings production in 1941 was 843,038 net tons, compared with 565,923 tons in 1940.

# MEN of INDUSTRY

**EDWIN H. BROWN** has been elected a vice president, Allis-Chalmers Mfg. Co., Milwaukee, in charge of engineering and development. Mr. Brown formerly was manager and chief engineer of the engine and condenser department for seven years. He joined the company in 1906, following graduation from the University of Nebraska, and served in various capacities until he became head of the engine and condenser section in 1935.



Edwin H. Brown

**Bennett S. Chapple Jr.** has been appointed assistant to vice president, in charge of emergency defense co-ordination, Carnegie-Illinois Steel Corp., Pittsburgh. Mr. Chapple formerly was in charge of sales promotion activities.

**Barnard S. Meade**, the past five years field representative for the Vise Division of Charles Parker Co., Meriden, Conn., has joined American Swiss File & Tool Co., Elizabeth, N. J., as sales representative.

**E. W. Allardt**, chief engineer, Yoder Co., Cleveland, more than 20 years, has resigned to become executive engineer, Babcock & Wilcox Co., Beaver Falls, Pa.



E. W. Allardt

**Noble B. Clark**, manager of subcontracting, Warner & Swasey Co., Cleveland, has been made assistant sales manager. Associated with the company eight years, Mr. Clark was foreign sales representa-

tive in London before outbreak of the war. **Frank J. Pelich**, district manager at Milwaukee, has been transferred to Cleveland as manager of subcontracting, to succeed Mr. Clark. **George L. Kluter**, assistant to vice president, has been promoted to works manager.

**Russell Creighton**, formerly in charge of production engineering, Bell Aircraft Corp., Buffalo, has been named a special assistant to **Lester L. Benson**, works manager. **Joseph B. Bauer** succeeds Mr. Creighton in charge of production engineering, while **Harry W. Ashburn**, previously in charge of tool design, has been named chief planning engineer, and **Harold L.**

**Smeltzer**, formerly in the tool design section, succeeds Mr. Ashburn. **Mayo E. Roe** will continue as assistant of production engineering.

**William C. Boulcott** has been appointed acting manager of the Buffalo plant of Ford Motor Co., succeeding **Alan B. Pease**, resigned. Mr. Boulcott formerly was assistant manager.

**L. W. Oswald** has been appointed manager, bar and semifinished materials bureau, Carnegie-Illinois Steel Corp., Pittsburgh. Mr. Oswald, formerly contact representative in the same bureau, succeeds **H. A. Moorhead**, promoted to metallurgical engineer, succeeding **F. T. Bumbaugh**.

**James A. Davidson**, Bay City, Mich., has been elected president and a director of the Tomlinson Fleet, Great Lakes steamships. He succeeds the late **George A. Tomlinson**. **Capt. Warren C. Jones**, a vice president and director, has become vice president and general manager, while **A. J. Risatti**, heretofore secretary of several units, has been elected treasurer of all.

**Ernest R. Breech**, chairman of the board of North American Aviation Inc., Inglewood, Calif., and vice president of General Motors Corp., Detroit, has resigned these positions to become president, Bendix Aviation Corp., probably retaining his



Joseph B. Bauer



Russell Creighton

headquarters in Detroit. **Vincent Bendix**, hitherto president of the latter company, is now chairman of the board. Bendix has plants and subsidiaries in North Hollywood, Calif.; South Bend, Ind., and Baltimore. **D. O. Thomas** and **E. R. Palmer**, long associated with various GM plants, for some time have been officials of Bendix Products at South Bend.

**Alfred Marchev** has resigned as chief engineer, works manager and a director, Signode Steel Strapping Co., Chicago, to become assistant to the president, Republic Aviation Corp., Farmingdale, N. Y.

**J. D. Wood** has resigned as president, Roller-Smith Co., Bethlehem, Pa., to devote his entire time to his duties as chief engineer. **Reg Halladay**, a director of Roller-Smith since 1939, has been elected to the presidency. **F. A. Judson**, who joined the company in September, 1941, as general manager, has been elected treasurer.

**Albert Beutler**, secretary, Belden Mfg. Co., Chicago, was presented with an honorary certificate at the midwinter meeting recently of the National Electrical Manufacturers' Association, in recognition of his 50 years in the electrical industry.

**George M. Wallner**, Upper Michigan industrial engineer, has been appointed manager of the Iron Mountain, Mich., branch office of the War Production Board's contract distribution branch, succeeding **George A. Dimmer**, production engineer from the Detroit contract distribution staff, who served as acting manager pending the permanent appointment. The past four years Mr. Wallner served the city of Iron Mountain as city manager, city engineer and superintendent of water works. Prior to that he was for ten years on the Ford Motor Co. staff at Iron Mountain as construction and design en-



Alfred Marchev

gineer and as superintendent of Ford's Pequaming plant.

**A. J. Fisher** has been named director of the aircraft section, Fisher Body Division of General Motors Corp., in an extensive reorganization of the division to facilitate direction of war goods production. Defense products sections have been created within the company, each solely responsible for specific types of work.

**Del S. Harder**, general factory manager of Fisher Body fabricating plants, has been appointed director of the tank section, with **G. H. Kublin** as chief engineer.

**G. S. Cashdollar**, manager of a stamping division, has been selected director of one artillery carriage section, with **F. B. Harrington** assistant and **Bert Cotter** chief engineer. This section will produce mobile anti-aircraft gun carriages of a new type.

**E. R. Leeder**, formerly resident manager of the Fisher Pontiac plant, has been named director of a second artillery carriage section, with **H. D. Burnside** as assistant and **Albert Haber** as chief engineer.

**J. J. Wallbillich**, assistant general factory manager of fabricating plants, will be director of ordnance specialties and machines section,

which will handle naval ordnance work, including gun breech housings, and also will build a large number of vertical boring mills needed in tank production. In addition this section will take on an augmented program of engine parts production for the Navy.

**Ternstedt Mfg. Division**, with plants in Detroit and Trenton, N. J., will produce cutting tools for use on a wide variety of armament production. **J. E. Jackson** is general manager.

**E. F. Fisher**, general manager of the body division and vice president of General Motors, will supervise work of all the new sections, assisted by **T. P. Archer**.

**Victor C. Cole**, formerly sales manager, Addressograph Division, Addressograph - Multigraph Corp., Cleveland, has been made general sales manager for the company. **Edwin H. Denny** succeeds Mr. Cole as sales manager, Addressograph Division, while **Harry L. Metz** has been made manager, Addressograph and Multigraph methods department.

**M. E. Carlisle**, associated with Pittsburgh Plate Glass Co., Pittsburgh, 13 years, serving as an engineer in the glass and paint divisions and recently as assistant purchasing agent, has been appointed general purchasing agent. He succeeds **J. A. Bechtel**, who is retiring after 50 years of service with the company, but will remain during 1942 in an advisory capacity.

**Homer M. Hoffman** has been named purchasing agent, glass division, and **E. J. Peters**, purchasing agent, paint, division.

**Palmer E. Hanson**, foundry manager, Mack Mfg. Co., New Brunswick, N. J., has been appointed sales manager, Milwaukee Foundry Equipment Co., Milwaukee.



A. J. Fisher



Del S. Harder



G. S. Cashdollar



E. R. Leeder



J. E. Jackson



J. J. Wallbillich

# Largest Ore Carrier Launched at Ecorse, Mich.; Four Others To Follow

FIRST Great Lakes ore carrier to be launched since 1938 slid down the ways at the River Rouge yards of the Great Lakes Engineering Works, Ecorse, Mich., Feb. 28. It was the LEON FRASER, one of five being constructed for Pittsburgh Steamship Co., United States Steel Corp. subsidiary. The vessel is the largest freighter ever built on the Great Lakes.

With a total length of 639 feet, a breadth of 67 feet and a depth of 35 feet, the ship will be capable of hauling 18,600 long tons of ore per trip at 24-foot draft. One trip's cargo of ore would be sufficient to produce enough steel for the construction of eight destroyers, if the material were used for that purpose.

The LEON FRASER and the four identical sister ships, all of which are expected to be in service some time during the 1942 season, will be an important addition to the United States war effort. They will increase the number of steamers under Pittsburgh Steamship's operation to 73.

Two of the remaining four vessels also are being built at Great Lakes Engineering Works and the other two are under construction at the American Shipbuilding Co.'s yards at Lorain, O.

The vessel was sponsored by Mrs.

Leon Fraser, wife of the president of the First National Bank of New York. Mr. Fraser is a member of the board of directors and a member of the finance committee of U. S. Steel.

The other four vessels will be named for high officials of the corporation and its subsidiaries: Irving S. Olds, chairman of the corporation; B. F. Fairless, president of the corporation; Enders M. Voorhees, chairman of the corporation's finance committee; and A. H. Ferbert, president of Pittsburgh Steamship Co.

## Outline Tin Recovery From Used Containers

NEW YORK

A process for recovering tin and steel from used tin cans, requiring no preparation of the cans on the part of users of canned commodities, may now be applied to large scale production, according to Walton S. Smith, vice president, Metal & Thermit Corp., which has been operating a test plant in San Francisco for five years.

"The pilot plant is a complete unit with a capacity of over 6000 tons. From its operations, suitable methods have been worked out for recovery of about 24 pounds of tin

oxide and almost a ton of scrap per ton of discarded cans. The tin oxide is readily smelted to a grade equivalent to straits tin," Mr. Smith stated.

Rough estimates indicated about 2,500,000 tons of tin cans are discarded annually in this country and that about 1,000,000 tons of these could be economically collected and detinned, yielding about 11,000 tons of tin and 900,000 tons of scrap steel.

Detinning of clippings obtained from can companies and other sources has been a well established industry for more than 30 years, but detinning of used cans has been regarded as impractical in peace times.

Collection, preparation and transportation of cans constitute principal problems.

Where cans are collected for detinning they would have to be kept separate from other refuse. It would also be advisable to shred cans at collection centers so as to reduce bulk for shipment. Location of plants of about 50,000 to 80,000 tons capacity near large centers of population appears most practical solution to transportation problem.

Announced plans to reduce by about 40 per cent the amount of tin going into containers would eventually reduce amount of tin recovered, but not for a year or two. In any event black sheet steel, which may be substituted for tin plate in many of its present uses, could be reclaimed.

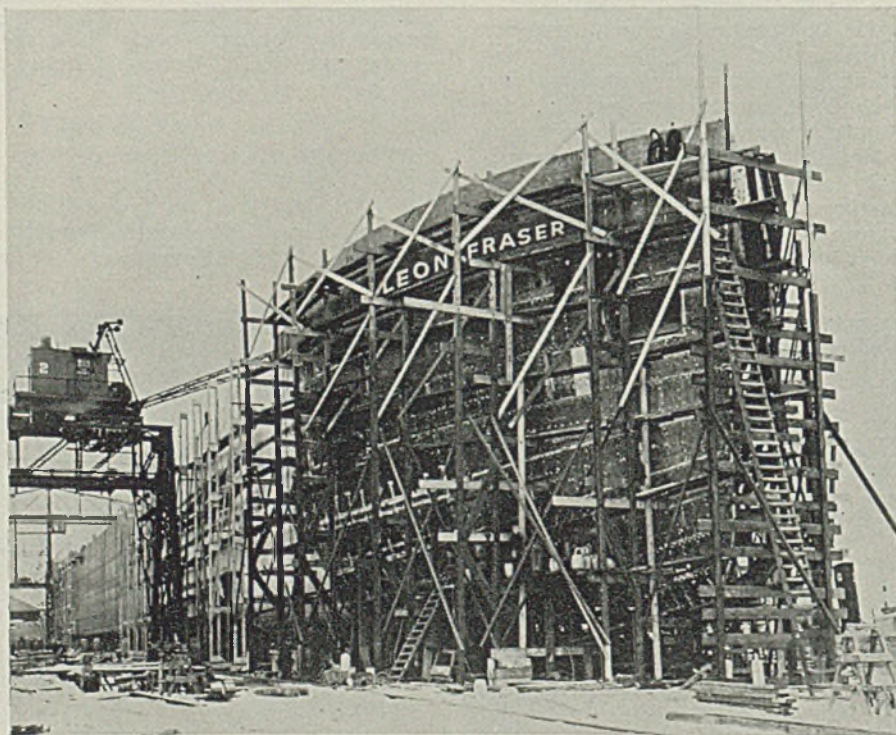
## New Jersey Ore Tunnels Prepared for Raid Shelters

MOUNT HOPE, N. J.

Two unused 1000-foot tunnels, cut into solid rock to haul out iron ore from a vein in northern New Jersey, are being prepared for air raid shelters. The Rockaway Township Defense Council has erected locked barricades, and has barred sightseers at the entrance, as a precautionary measure. It is estimated more than 5000 persons could be housed.

The ore tunnels here and at Hibernia have not been used since the iron industry thrived in this area 25 years ago. The mines were among the first operated in this section. It is said that cannon was carried through the tunnels during the Revolutionary War. They will be opened only in case of emergency.

Factory sales of mechanical stokers in December totaled 8592 units, compared with 10,877 in November, and 6582 in December, 1940, according to the Bureau of the Census. Total for 1941 was 192,447, compared with 152,825 in 1940 and 104,289 in 1939.



THE LEON FRASER, Pittsburgh Steamship Co.'s newest and largest ore freighter, standing on the ways at the River Rouge yards shortly before it was launched

## REVISIONS AND ADDITIONS TO

# PRIORITIES—ALLOCATIONS PRICES

as published in Section Two of STEEL of Feb. 23, 1942

### "M" ORDERS

**M-9-a** (Interpretation): Copper, effective Feb. 19, 1942. Specifies that order applies to brass and copper warehouses only as defined by the order and that deliveries of completed copper products designed for the ultimate consumer are not included in prohibitions of the order.

**M-21-f**: Shot and Bullet Core Steel, effective Feb. 17, 1942. Applies to steel for 20, 37, 40, 57 and 75 mm. and 3-inch armor piercing and semi-armor piercing shot, and .30 and .50 caliber bullet cores. Starting March 1 all deliveries must be made on allocation order. Producers report weekly to WPB and Army and Navy Munitions Board on PD-307. Purchasers report monthly on PD-308.

**M-46** (Amendment): Chlorinated Rubber, effective Feb. 23, 1942. Restricts use of following: As paint for interior use in industrial plants where resistance to chemical corrosion is necessary; as paint in arsenals and for painting ship bottoms and other submarine uses; for flame-proofing military fabrics; for tracer bullets; for adhering rubber articles to metal; for electrical insulation. Stocks on hand for all other uses must be reported to Chemicals Branch, WPB, and held for later disposition.

**M-61**: Madagascar Flake Graphite, effective Feb. 17, 1942. Limits use to manufacture of crucibles, subject to authorization by Director of Industry Operations. Producers request authorization monthly on PD-303A and PD-303B. Buyers seeking any article containing this material apply on PD-1A.

**M-81** (Suspension): Tin Plate, Terne Plate, effective Feb. 20, 1942. Suspends until April 30 portion of order to permit sale of certain special product and non-essential cans which had been completely assembled on or before Feb. 11, 1942. Permits assembly and delivery of cans, all the component parts of which were cut or lithographed by Feb. 11.

**M-84**: Agave Fiber, effective Feb. 20, 1942. Curtails processing for twine and yarn and restricts purchases and sales Agave wrapping and binder twine.

**M-92**: SXP Cotton Seed, effective Feb. 20, 1942. Prohibits crushing of seed suitable for planting.

### "P" ORDERS

**P-98** (Amendment): Petroleum Industry Materials, effective Feb. 20, 1942. Makes it unnecessary to obtain countersignature of OPC representative when using ratings of A-8 or lower to obtain supplies with value of less than \$500. Permission to use A-2 or

\*These orders inadvertently were omitted from the guide to "Priorities, Allocations, Prices" which was published as Section Two of STEEL of Feb. 23.

OPC in Washington, unless material is for research or laboratory purposes.

**P-108**: Fire Protective Equipment, effective Feb. 26, 1942. Assigns A-7 rating to deliveries of steel pipe, cast iron pipe and fittings for use in making such equipment.

**P-109**: Aircraft Products, effective Feb. 20, 1942, replacing P-3, P-4, P-9-a-b-c-d-e-f-g, P-13, P-15, P-52. Assigns A-1-a rating to material entering into production of direct military aircraft products. Rating may be applied only if material not otherwise obtainable and only if material either is physically incorporated into the aircraft products or is necessary for production of aircraft products. Order covers aircraft, engines and propellers, delivery schedules of which have been approved by the joint Aircraft Committee, components and spare parts.

### "L" ORDERS

**L-1-a** (Modification): Motor Trucks, effective Feb. 21, 1942. Permits manufacturers of medium and heavy trucks who do not complete production of February quotas by March 1 to carry over unused portion into March. March quotas previously established expected to be cancelled.

**L-5-c**: Domestic Mechanical Refrigerators, effective Feb. 23, 1942. Prohibits production after April 30, 1942. Production between Feb. 14 and April 30 limited to three times maximum quota originally permitted during either January or February by Order L-5-a. Ratio of deluxe models to all other models produced must be no higher than during Aug. 1, 1941 to Jan. 31, 1942.

**L-6-b**: Domestic Laundry Equipment. Maximum production quotas for March 1 to 15, 1942 set as follows: Class A manufacturers, 3900 units or 30% of factory sales in year ended June 30, 1941; Class B manufacturers, 1875 units or 32½% of factory sales in base period; Class C manufacturers, 570 units or 37½% of base period sales; Class D manufacturers, 47½% of base period sales.

**L-39**: Fire Protective Equipment, effective Feb. 24, 1942. Includes fire extinguishers, sprinkler systems, fire hydrants and fittings, hose racks and dryers, lightning rods. Specifies products for which strategic materials may be used. Assembly of parts already fabricated Feb. 24 is permitted to fill defense orders with A-2 or higher rating. Limits quarterly production of foam and anti-freeze extinguishers to quarterly average for year ended Nov. 30, 1941, except to fill government or lend-lease orders.

**L-42** (Addition): Plumbing and Heating Simplification, effective March 1, 1942. Schedule II establishes sizes and standards for gray cast iron, malleable iron and brass and bronze pipe fittings which may be produced or sold. Does not apply to finished fittings

on hand March 1, 1942.

**L-48**: Light Aircraft, effective Feb. 17, 1942. Covers new planes built after Sept. 30, 1941, flown less than 100 hours and using engines of less than 500 horsepower. Sales, other than to government agencies and Allied nations, prohibited, unless approved by Director of Industry Operations. Prohibits start of manufacture of light planes, if ribs are aluminum and airframe contains more than 18% aluminum, or if ribs are other material and airframe has more than 12% aluminum. After Sept. 1, 1942, manufacture limited to planes with airframe content of 12% aluminum, regardless of rib material.

**L-53**: Track-laying Tractors, effective Feb. 19, 1942. Includes auxiliary equipment such as bulldozers, power control units, winches, etc. Prohibits producers and distributors from selling new tractors or equipment except against orders received prior to Feb. 19 and carrying rating higher than A-2.

**L-55**: Shotguns, effective Feb. 23, 1942. Prohibits delivery of 12-gauge guns except to agencies and officers of federal, state and local governments and governments of lend-lease countries. Limits shotgun production in other than 12-gauge size to one-half average 1940 rate. Prohibits use of machinery suitable for making 12-gauge guns in turning out shotguns of other sizes.

### MISCELLANEOUS ORDERS

**Priorities Regulation No. 3** (Amendment), effective Feb. 25, 1942. Changes date on which use of Forms PD-1A and PD-3A, instead of PD-1, PD-3, PD-4 and PD-5, becomes mandatory from March 2 to March 15. Selective Service System included among agencies permitted to issue PD-3A. After March 15, preference ratings assigned previously on PD-3, PD-4 and PD-5 certificates must be extended in conformity with provisions applicable to PD-3A. Recipient of order with AA rating may extend it only as A-1-a if able to fill order from his own inventory.

**Priorities Regulation No. 7**, effective Feb. 17, 1942. Permits use of facsimile signature when assignment or extension of preference ratings requires endorsement on purchase orders.

### PRICE SCHEDULES

**No. 14**: Raw Silk and Silk Waste, revoked Feb. 19, 1942.

**No. 20** (Amendment): Copper and Copper Alloy Scrap, effective Feb. 27, 1942. Permits deliveries until March 15, 1942 of brass scrap at contract prices under written contracts entered into prior to Feb. 6, 1942. Certified copies of all contracts to be carried out between Feb. 27 and March 15 at above ceiling prices must be filed with OPA before Feb. 27.

# Windows of WASHINGTON

Plate supply studied at capital conference . . . Automotive industry restricted in sales of excess steel inventories . . . Manufacturers' group names war production steering committee . . . Steel producers granted priority rating to obtain office supplies . . . Chlorinated rubber stocks to be requisitioned. Use limited . . . WPB halts machinery auction . . . War Authorizations total \$145,000,000,000



By L. M. LAMM

Washington Editor, STEEL

## WASHINGTON

OFFICIALS charged with breaking the bottleneck in steel plates that is said to be delaying ship and railroad equipment construction, conferred with the War Production Board last week.

With them were Maritime Commission Chairman Emory S. Land, co-ordinator of merchant shipping. The Maritime Commission with its emergency ship construction program is the biggest single consumer of steel plates, and this agency has been charged by board officials with refusing to co-operate by re-designing its specifications so that a larger part of its supplies could be rolled on the converted wide-strip mills.

One steel company official said he believes there is no longer any doubt that there will be sufficient plate to meet the Navy and Maritime Commission goals, but that the program for building new railroad equipment may have to be curtailed.

## Automotive Industry Limited in Sales of Excess Steel Stocks

Automobile and automobile body manufacturers have been advised by the director of industry operations not to make shipments from their steel stocks except on orders bearing high preference ratings.

Alloy steel remaining in inventories of the automobile companies as a result of the cessation of automobile production may be sold only on orders bearing a preference rating of A-1-k or higher. All other steel and steel products may be sold only on orders with a rating of A-3 or higher.

Shipments may be made on orders bearing the required ratings without special authorization from the WPB, but a duplicate copy of each order or letter signed by the customer and certifying material and quantity ordered and preference rat-

ing applicable must be forwarded to the Distressed Stock Unit, Iron and Steel Branch, War Production Board, Washington.

## Manufacturers' Association Names War Output Committee

National Association of Manufacturers last week announced a 20-member steering committee to direct its war effort. Chairman is Malcolm Muir, publisher of *Newsweek*.

Members: R. J. Wysor, president, Republic Steel Corp.; George S. Case, chairman, Lamson & Sessions Co.; Cornelius F. Kelley, chairman, Anaconda Copper Mining Co.; Donald Douglas, president, Douglas Aircraft Co.; J. Howard Pew, president Sun Oil Co.; J. L. Vollyer, president, B. F. Goodrich Co.; Harvey Firestone Jr., president,

Firestone Tire & Rubber Co.

Harold Boeschstein, president, Okens-Corning Fibre Glass Co., E. D. Bransome, president, Canadian Corp. of America, R. H. Dunham, chairman, Hercules Powder Co., J. D. Francis, president, Island Creek Coal Co., R. E. Gillmor, president, Sperry Gyroscope Co., John Holmes, president, Swift & Co., N. W. Pickering, president, Farrell, Birmingham Co., W. S. S. Rodgers, president, Texas Co., A. G. Spiegelhalter, president, Pusey & Jones Co., Wilfred Sykes, president, Inland Steel Co., Stuart W. Cramer Jr., president, Cramerton Mills, and Hopewell L. Rogers, chairman, Belden Mfg. Co.

## Iron, Steel Producers Given Rating for Office Supplies

Producers of iron and steel products have been granted an A-10 rating to obtain office supplies and similar material under an amendment to preference Rating Order P-68. Heretofore the order was applicable only for material for actual use in iron and steel production.

## Fancy Heating Equipment Devices To Disappear

Fancy radiators, concealed piping, and other heating equipment luxuries will probably disappear from trade channels for the duration of the war, it was indicated by the WPB Plumbing and Heating Branch.

At a meeting called by the Branch to discuss simplification of vapor and vacuum specialties, manufacturers agreed to simplify the number of sizes of radiator valves, trap bodies, and other items in order to save productive capacity and critical materials.

The simplification program will

## Form PD-1-A Available

Form PD-1-A which is to be used under Priorities Regulation Number 3 has been released.

Copies of this form may be obtained from local WPB offices or from STEEL, Readers Service, at the following prices:

- 5 sets and under, 20c each.
- 6 to 15 sets, 15c each.
- 16 to 25 sets, 10c each.
- 25 sets, \$2.
- 50 sets, \$4.
- 100 sets, \$6.
- 200 sets, \$9.

This form is available for immediate shipment from STEEL, Readers Service Department, Penton Building, Cleveland.

If your order originates in Ohio, please include 3 per cent additional to cover sales tax.



# Now PRODUCTION Doubled-Trebled

**N**EVER before in the history of this great country of ours has the demand on industry been so great. It is production—faster, faster, faster! And faster production means systematic production. All work must move along easily, quickly, and efficiently.

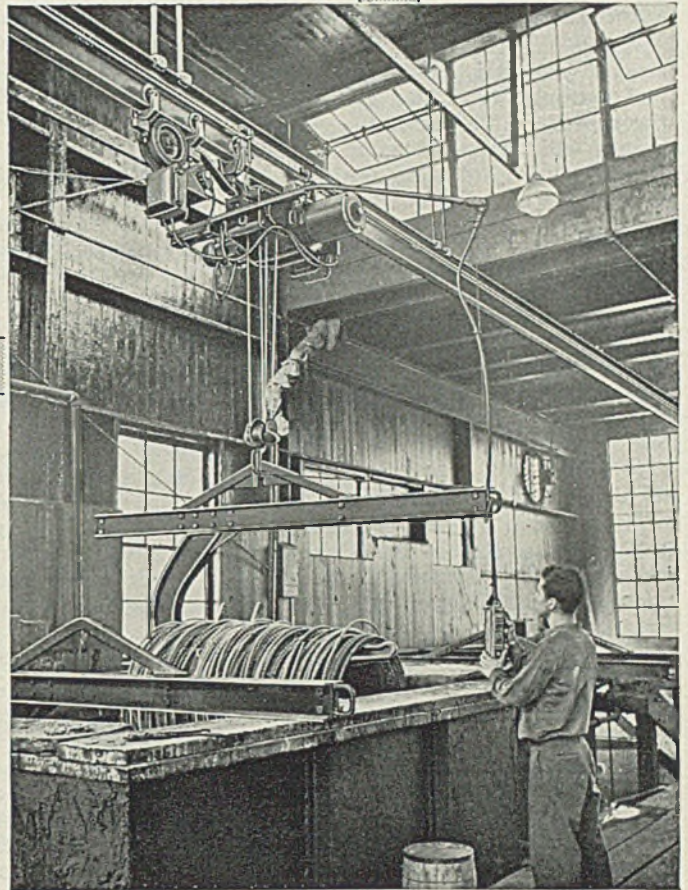
American MonoRail Equipment increases and helps speed up production. It also reduces handling costs. It relieves men from lifting and carrying, and enables them to give full time to production. American MonoRail Equipment keeps materials and products on scheduled routes without congestion, delay, and damage in transit.

Standard parts are assembled into complete systems to meet the special requirements of the particular job. Supplied for manual, electric, or automatic operation. No job too small, none too large. No interruption to your production during installation. Let an American MonoRail Engineer show you how to "open the production throttle" in your plant.

## THE AMERICAN MONORAIL CO.

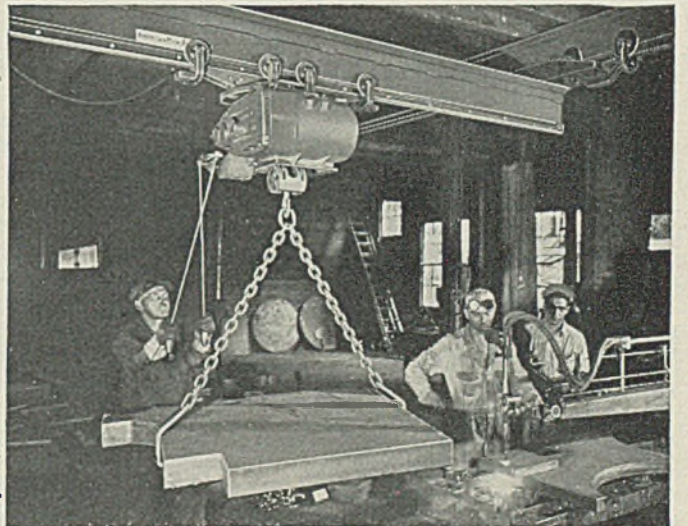
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CLEVELAND, OHIO



Finger tip operation of power driven carrier speeds up pickling process.

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probably include the use of cast iron in a number of parts which formerly consumed brass, and elimination of several connecting pieces which allowed for concealed radiation.

Army and Navy purchasing agents will soon specify the simplified equipment, it was indicated at the meeting. Terms of the requirements will be issued as a separate schedule to Limitation Order L-42.

### **Authorized War Expenditures Aggregate \$145,400,000,000**

Authorized expenditures for war, including foreign orders, from the beginning of the defense effort through Feb. 15, plus net funds requested for war purposes now before Congress, total an estimated \$145,400,000,000, according to the WPB Division of Statistics.

This amount includes \$104,698,000,000 made available by Congress, Reconstruction Finance Corp. commitments of \$5,130,000,000, foreign orders in the United States of \$4,066,000,000, and pending legislation before Congress of an estimated net \$31,500,000,000.

### **A-9 Ratings Required for Petroleum Pipe Shipments**

Steel producers supplying the petroleum industry have been ordered by the director of industry operations not to ship oil country casing, tubing, or drill pipe on or after March 14, or to ship line pipe on or after March 7 except on orders bearing a preference rating of A-9 or higher.

Warehouses which purchase this type of goods are entitled to use a preference rating of A-9 under Supplementary Order M-21-b, and oil companies may use an A-8 rating under Preference Rating Order P-98. The purpose of the order is to prevent shipments of steel for use in the petroleum industry on unrated orders, and thus to make sure that the limitations applying to the industry are observed, including limitations on inventories.

### **Simplify Procedure Under Petroleum Repair Parts**

Operators of petroleum enterprises are relieved of the necessity of obtaining a countersignature from field representatives of the Office of Petroleum Co-ordinator when using preference rating of A-8 or lower to obtain repair, maintenance and operating supplies with a value of less than \$500 by Amendment No. 1 to Preference Rating Order P-98.

The countersignature of a field official must still be obtained when the preference ratings assigned by

P-98 are used on any order amounting to more than \$500, or on any order for material to be used for new facilities.

Specific permission to use any rating of A-2 or higher must be obtained from the OPC in Washington unless the material is to be used for research or laboratory purposes.

Preference Rating Order P-98 assigns priority ratings from A-1-a to A-10 for deliveries of materials to be used for specified purposes in the production, refining, transportation and marketing of petroleum and petroleum products. As the order was originally issued, these ratings could be used only upon telegraphic authorization from Washington, or when orders were countersigned by field officials of the OPC. Today's amendment will permit the use of the lower ratings without countersignature on orders for maintenance, repair and operating supplies when the amount involved is less than \$500.

### **Machinery Auction Halted by WPB To Prevent Tool Dispersal**

To prevent the dispersal of valuable machinery adapted to war production uses, WPB issued an order stopping the scheduled sale at auction of the machinery, tools and equipment situated at the plant formerly owned by the Foos Gas Engine Co., Springfield, O.

Purpose of the order is to permit investigation of the plant and its facilities, to determine whether they can be used intact, and in their present location, for war production. If this is not feasible, the WPB will allocate the machinery and equipment to those engaged on war orders, who are most urgently in need of it.

The Foos Gas Engine plant had been in operation until just recently, when a death in the Foos family left it without management, and is in good operating condition. Its equipment consists of boring mills, grinders, milling machines, lathes, planers, diesel engines, cranes and hoists and other tools and machinery, all of which are vitally needed for war production. The plant comprises several buildings with a floor space of approximately 175,000 feet.

### **Chlorinated Rubber Stocks Frozen; To Be Requisitioned**

All stocks of chlorinated rubber in the United States, except those going into specified uses, have been ordered frozen preparatory to requisitioning by WPB for diversion into war production.

An amendment to General Preference Order M-46 provides that chlo-

minated rubber may be used only for these purposes:

As a paint for interior use in industrial plants where resistance to chemical corrosion is necessary; as a paint in arsenals, and for painting ship bottoms and other submarine uses.

For flame-proofing military fabrics, including tents.

For tracer bullets.

For adhering rubber articles to metal.

For electrical insulation.

Stocks on hand for all other uses, effective today must be reported at once to the Chemicals Branch, War Production Board, and held for later disposition.

### **Unused Track-Laying Tractor Sales Prohibited**

WPB has prohibited sale or delivery of unused track-laying tractors and certain auxiliary equipment in the possession of manufacturers, distributors and dealers.

Equipment covered by the order includes bulldozers, angledozers, power control units and winches to be mounted on unused track-laying tractors. An exception was made in the case of persons whose orders have been assigned a preference rating higher than A-2.

The order was made, to insure meeting the military and essential demands for track-laying tractors and equipment to be mounted on them. The constantly increasing requirements for this type of equipment by the armed forces and lend-lease alone indicate a demand that possibly will exceed the 1942 productive capacity of the industries.

### **Unfilled February Truck Quotas Carried Into March**

Truck manufacturers who do not complete production of their February quotas of medium and heavy trucks by March 1 will be allowed to carry over the unused portion of the quota into March. The manufacturers were warned, however, that March quotas will probably be canceled.

Manufacturers have been notified by WPB of this modification of Supplementary General Limitation Order L-1-a. The action has been taken because the civilian production schedules of several truck manufacturers have been upset during the current month by military orders.

Enough tires for the trucks produced under the February quotas have already been provided, but lack of rubber and other critical materials will probably necessitate cancellation of the March quotas. The original order establishing March quotas did not provide for tires.

# Aluminum Capacity To Be Expanded To 2,580,000,000 Pounds Annually

◆

*Dollar cost of new facilities secondary to time  
and quantity element under new WPB pro-  
duction policy . . . Magnesium output also to  
be vastly increased*

◆

## WASHINGTON

EXPANSION of aluminum capacity to provide an output of 2,580,000,000 pounds by 1943, and of magnesium capacity for total production of 725,000,000 pounds annually, was announced last week by W. L. Batt, chief, WPB Materials Division. Most contracts already have been let and equipment lined up.

Program will assure aluminum for administration's aircraft production program of 60,000 planes this year, and 125,000 next, Mr. Batt said, but does not constitute flat guarantee in all respects because of possible unforeseen secondary difficulties.

Total aluminum production will comprise United States output of 2,100,000,000 pounds to which Canadian production already has been lined up to bring total to more than 2,500,000,000 pounds. United States aluminum production was 615,000,000 pounds in 1941. Present estimates indicate 1942 production in excess of 1,000,000,000 pounds.

Aluminum Co. of America will handle bulk of aluminum ingot production; Reynolds Metals Co. also was assigned a major portion. Fabrication will be handled by various fabricators. In addition to primary aluminum, Mr. Batt stated 400,000,000 pounds scrap aluminum will be made available.

Mr. Batt disclosed a new production policy will govern the construction of new facilities.

Dollar cost of the additional facilities is to be a secondary consideration and primary thought is to be quantity of additional critical materials to result from new facilities and question of time that will be required.

Mr. Batt emphasized the aluminum expansion is "not just a paper program." Extra output, however, will not release any for house-

hold use. Present plan restricts expected quantity to aircraft and possibly other military uses.

As a sidelight on vastness of the plans, Mr. Batt said 225 cranes will be needed for additional aluminum plants.

There has been very little interruption in present war program due to lack of aluminum, Mr. Batt claimed.

Of magnesium, he stated that facilities for 54,000,000 pounds have been completed and substantial progress made on the remainder of the program. Of the 400,000,000-pound program now under construction, 352,000,000 will use the electrolytic process.

Contracts have been let by Defense Plant Corp. with six American companies for construction of new plants, including Union Carbide & Carbon Corp., American Metal Co., National Lead Co., Ford Motor Co., Permanente Metals Corp., New England Lime Co.

## WPB Acts To Recover Idle Aluminum Stocks

In the first series of nationwide roundups, WPB has moved to acquire possession of all idle aluminum inventories in the hands of fabricators.

Letters were addressed to more than 500 manufacturing users of aluminum by J. S. Knowlson, director of industry operations, requesting them to sell to the government their excess stocks. It is estimated that about 20,000,000 pounds of aluminum will be recovered from these sources for use in essential military production.

Mr. Knowlson appealed to all holders of aluminum not to wait for the government to seek them

out, but immediately and voluntarily to make their excess inventories available for war use. He urged them to report at once to the Inventory and Requisitioning Branch of the WPB any inventories which they would be willing to sell to meet the critical shortage.

Where it can be used in present form, the aluminum obtained by the program inaugurated today will be shipped immediately to plants engaged in producing implements of war. However, it is anticipated that a high percentage of the material will have to be remelted before it can be used again. Despite this fact, the government is offering to those companies being requested to sell their excess inventories prices which take into consideration the existing form of the material, as well as the form in which it will be used.

Federated Metals Division, American Smelting & Refining Co. has been designated the agent of the Metals Reserve Co. and will handle the transactions involved. In succeeding salvage programs, involving a wide range of commodities, other existing business organizations may be used.

The plan will result in a sharing by the government and industry of the expense involved in converting processed aluminum into metal which can be used in the production of implements of war.

The government's salvage prices run from current market quotations for ingot and scrap, including castings and forgings, to 50 cents a pound for finished items valued at 99 cents a pound, or more, on Oct. 1, 1941, with the greatest loss to both parties occurring in the higher brackets, and the least in the lowest.

In case of refusal to accept vol-

untarily the established prices the WPB probably will have to requisition the material leaving the question of compensation to be determined later.

### Pipe Fittings Simplification To Release Strategic Metals

Simplification of pipe fittings has been ordered by the WPB in Schedule II to Limitation Order L-42 covering plumbing and heating equipment. Schedule I, issued Feb. 11, required simplification of iron, brass, and bronze valves.

The pipe fittings schedule, in its entirety, has already been issued as a simplified practice recommendation by the Bureau of Standards under No. R185-42. Reduction under this program of the number of fittings in current use from more than 8500 to less than 3000 will satisfy 92 to 94 per cent of all demand, according to the Plumbing and Heating Branch of the WPB.

After March 1, gray cast iron, malleable iron, or brass, or bronze pipe fittings not conforming to the established schedule may not be produced, except with the express permission of the Director of Industry Operations.

Provision is made, however, for the delivery of any pipe fittings held in finished form by a producer on March 1, or those which had been processed in such a manner that their manufacture in conformity with the schedule would be impractical.

WPB officials said that use of the simplified pipe fittings schedule would release substantial amounts of critical materials which would otherwise be tied up in slow-moving stocks. The schedule eliminates more than 3600, or 73 per cent, of the cast iron fittings formerly produced; over 1100, or about 50 per cent, of the malleable iron fittings; and 784, or about 60 per cent, of the brass or bronze fittings.

In addition to releasing urgently required materials, adoption of the schedule will eliminate a great number of interruptions in production necessary to manufacture small quantities of items for which demand is limited.

A general industry conference preceded the adoption of Schedule II. The limitation order permits appeal by any manufacturer who is seriously affected by the requirements.

### Extend February Quotas for Laundry Equipment Manufacture

WPB last week issued an order, L-6-b, extending to March 15 the February quotas for the manufacture of domestic laundry equipment.

February quotas range from 60 to 95 per cent of the average monthly sales for the 12 months ended

June 30, 1941, depending on the size of the plant. Under the extensions, the same rate of production is permitted for the first half of March, the number being half that of the February quotas because it covers only half of March.

### Metals Price Clinic To Be Held in Los Angeles

Los Angeles has been selected as the site for the third of a series of nonferrous scrap metal price clinics, to be held Friday, March 6, at 2 p. m., in the Assembly Hall of the Embassy Auditorium, 847 South Grand avenue.

Purpose of the meeting is to explain the six price schedules covering nonferrous scrap metals, including aluminum, copper, brass mill, lead, zinc and nickel. Previous clinics were held in Chicago on Dec. 17 and in New York on Jan. 29.

Speakers at the Los Angeles clinic will include George R. Taylor, associate price executive of the OPA Copper and Brass Section; Fred Wolf, OPA Legal Division counsel on nonferrous metals, and Philip H. Coombs, assistant to D. H. Wallace, who is assistant director of the OPA's Price Division in charge of

metals. There will be an open period for discussion from the floor of questions raised by the trade.

### Henderson Asks Data on "Special Purpose" Automobiles

Automobile dealers and manufacturers have been asked by Price Administrator Leon Henderson to furnish his office with information regarding any passenger cars in the "stockpile" designed and equipped for special purposes which might make them of little value for military or ordinary civilian use.

It is known that a number of these "special jobs" such as vehicles for police and fire departments, funeral cars and automobiles made to permit their operation by those with physical disabilities, were caught by the government's order requiring all passenger cars assembled on and after Jan. 16 to be reserved as a stockpile for rationing in 1943 and thereafter.

Due to disbursement restrictions on public budgets in some cases, and to the length of time required for special building in others, a number of such cars were not scheduled for delivery in time to be completed prior to the freezing order.

## Planning Board To Advise WPB Chief



IDEAS for the War Production Board will be the duty of this three-member WPB Planning Board appointed recently by War Production Chief Donald M. Nelson. (See STEEL, Feb. 23, p. 29.) Left to right: Thomas C. Blaisdell, assistant director of the National Resources Planning Board; Fred Searles, consultant on ordnance, United States Army; Robert R. Nathan, assistant director of the WPB Progress Reports. NEA photo

# 4000 Ask Priority Aid Under Production Requirements Plan

WASHINGTON

IN THE two months since the Production Requirements Plan went into effect, more than half again as many applications have been received as during seven and one-half months under the Defense Supplies Rating Plan, which was replaced by PRP on Jan. 1.

The greater flexibility of the PRP has attracted over 4000 applicants, and more than 2500 companies and divisions of companies are now actually operating under the plan.

The PRP is becoming increasingly useful as the number of companies handling war or essential civilian orders bearing preference ratings grows. Under PRP such firms may avoid the necessity of applying for or extending a large number of separate preference ratings by making a single application for priority assistance covering their materials requirements for a calendar quarter. On the basis of information supplied on Form PD-25-a, they are given a rating or ratings to assist them in obtaining the kinds and quantities of materials and supplies needed for three months operations in war and essential civilian output.

Usefulness of the plan is indicated by the fact that one of the largest corporations in the United States has submitted applications under PRP covering 88 of its divisions and plants which have combined annual sales of \$846,800,000. On the other hand, about 20 per cent of the applications received under PRP have been from companies with an annual volume of business amounting to less than \$100,000. For their benefit, a simpler form of application known as the Modified Production Requirements Plan was announced on Jan. 27.

PRP makes it possible for the WPB to give consideration in granting priority assistance to the complete pattern of operations of a company or a plant, instead of treating every priority application on a piecemeal basis. At the same time, the information furnished by applicants on Form PD-25-a is of great value to the WPB as an indication of the general materials requirements and production facilities of American manufacturers.

## License Required for Possession of Explosives

Beginning March 2, all persons or corporations wishing to manufacture, distribute, store, use or possess non-military explosives or their

ingredients must have a license issued by the Explosives Control Division of the Bureau of Mines through authorized agents.

After March 1, all general emergency licenses now in effect will expire and new permits must be obtained.

The strict control over the use and manufacture of non-military explosives is intended specifically to prevent sabotage—to guard against the possibility of explosives and their ingredients getting into the hands of persons hostile or disloyal to the United States.

## Portions of Tin, Terne Plate Order Are Suspended

WPB has suspended certain portions of General Preference Order M-81 on tin plate and terne plate to permit the sale of certain special product and nonessential cans which had been completely assembled on or before Feb. 11, the date of issuance of the order.

In a telegraphic order to can manufacturers the board suspended until April 30 the restrictions imposed by Section C(4) of the M-81 regulations, insofar as they pertain to can material and sizes of special product cans and nonessential cans, for the following purposes only:

1. To permit sale and delivery of tin plate or terne plate cans which were completely manufactured before Feb. 11.
2. To permit the assembly, sale, and delivery of cans, all the component parts of which were cut or lithographed by Feb. 11.
3. To permit canners to buy cans which may be delivered pursuant to the above regulations.

These exceptions do not apply to beer, motor oil, or coffee cans, or to cans for packing products which are processed or sterilized by heating within a sealed can.

## Department of Commerce to Survey Container Industry

At the request of the WPB the Department of Commerce has undertaken a comprehensive survey of container manufacture and use, according to a joint announcement by the department and the board.

Survey is designed to provide a complete picture of the situation for the information and guidance of the WPB, other interested government agencies, the container industries and the public.

It will cover metal, glass, plastic

and paper containers, closures, shipping cartons, wooden barrels, steel drums, wooden boxes, collapsible tubes and other containers in common use.

Inquiries will be sent to some 3000 container manufacturers in order to obtain necessary information on packaging uses, raw materials, productive capacity and other important factors, as well as on products for which different types of containers are used and other pertinent facts.

Information obtained in the survey will be used as the basis for deciding container policies. At the present time data concerning the use of various types of containers is far from complete. This makes it difficult to determine the most efficient use of the materials that are available and to ease the problems arising from restrictive orders, such as the recent tin can order of the WPB, which has caused considerable disturbances in the industries concerned.

## Henderson Asks Flashlight Prices Be Maintained

Request not to raise prices above the levels of Feb. 1 and to cancel any increases made since that date is contained in letters sent out today by Price Administrator Henderson to all manufacturers of dry batteries, flashlights, and bulbs.

Characterizing flashlights and dry batteries as "items of essential civilian defense equipment", Mr. Henderson said, "it is of great importance that prices of these articles remain stable." The administrator made it clear that his request applied not only to net prices charged by manufacturers to distributors and dealers, but to suggested retail list prices as well.

## Fox Succeeds Jurey on WPB Iron and Steel Branch

Melvin J. Fox has been appointed to succeed George E. Jurey as assistant to W. A. Hauck of the plant expansion unit, WPB Iron and Steel Branch. Mr. Fox formerly was with the steel unit of WPB Statistics Division. Mr. Jurey was associated with Jones & Laughlin Steel Corp. before joining the defense agency.

J. M. Tucker has been appointed head priority specialist for the industry branches under the Division of Industry Operations. Mr. Tucker, who continues to serve on the staff of Chief Technical Consultant Samuel S. Stratton, had previously been appointed priorities specialist on farm equipment in the OPM Division of Priorities.

Before joining the war agency, Mr. Tucker was vice president and general sales manager, Oliver Farm Equipment Co., Chicago.

# FINANCIAL

## Company's Taxes Increase from \$286,000 to \$4,569,000

### MILWAUKEE

Net profit for the Harnischfeger Corp., for 1941 was reported last week as \$1,094,000 after all charges, including a special reserve of \$500,000 for inventory fluctuations and extraordinary depreciation on equipment due to continuous operation. Profit in 1940 was \$561,111.

Tax payments meanwhile rose from \$286,000 in 1940 to \$4,569,000 in 1941. Taxes were equal to 76 cents for every dollar of payroll, and \$16.02 for each share of common stock.

"It is unquestionably necessary to levy and collect substantial taxes to support the enormous cost of our war efforts," Walter Harnischfeger, president, said. "We have no complaint or criticism of high taxes for that purpose. Nevertheless, the very necessity for immense war expenditures suggests a corresponding necessity for reduction or postponement of all possible nondefense expenditures, and the elimination of as much waste as possible in the war program.

"It is hoped that such a program of caution is undertaken before higher and higher taxes undermine the vitality of our system of private enterprise."

## Youngstown Sheet & Tube Nets \$9.13 a Common Share

Youngstown Sheet & Tube Co. reports 1941 net profit of \$16,124,401, equal to \$9.13 a common share. In preceding year the company earned \$10,815,468, or \$5.96 on common. Provision for federal taxes amounted to \$21,500,000.

## M. A. Hanna Co. Reports 1941 Earnings \$4,093,717

M. A. Hanna Co., Cleveland, had net profit of \$4,093,717 in 1941, equal to \$3.39 a common share. Company paid dividends of \$1.50 on common shares and \$5 on preferred, leaving a balance of \$1,959,039 which was added to surplus to help finance necessary expansions.

## Colorado Fuel & Iron Corp. Earns \$806,450 in Quarter

Fourth quarter net of Colorado Fuel & Iron Corp. totaled \$806,450, after \$785,500 provision for federal income and excess profits taxes, equal to \$1.43 a share on capital stock. This compares with profit of \$320,064, or 57 cents a share, in like 1940 period.

For the six months ended Dec. 31

last net income amounted to \$1,485,614, equal to \$2.63 a share, against profit of \$158,362, or 28 cents a share, in same period of 1940.

## Granite City Steel Co. Reports \$479,247 Profit

Granite City Steel Co., Granite City, Ill., reports net earnings for 1941 were \$479,247, equal to \$1.25 a share. In 1940, net profit was \$315,259, or 82 cents a share.

## Woodward Iron Co. Reports Net of \$1,013,662 for 1941

Woodward Iron Co., Woodward, Ala., in 1941 earned \$1,013,662, after all charges, including taxes, equivalent to \$3.01 a share on common stock. This compares with \$1,425,214, or \$4.27 a common share, in 1940.

Net sales in 1941 totaled \$11,310,871, compared with \$10,499,821 in 1940. Provision for taxes was \$1,947,739, including settlement of income taxes claims for prior years totaling \$109,078. In 1940, provision was \$1,008,287.

## International Tool Sales Increase 125.6 Per Cent

International Machine Tool Corp., New York, reports net sales for 12 months, 1941, at \$11,414,416, compared with \$5,059,952 in 1940, an increase of 125.6 per cent. Net profits for November and December, 1941, first two months of its fiscal year, were \$215,561, equal to 63 cents per share, after allowing federal income and excess profits tax reserves of \$515,516.

Dollar value of machine tools shipped in December was \$1,373,192, compared with \$455,871 in December, 1940, and was the largest in the company's history. They went to builders of ships, airplanes, tanks and guns.

## Net Sales \$136,652,016; Net Income \$7,469,684

Net sales of Continental Can Co. Inc., New York, for 1941 were \$136,652,016, largest in the company's history and \$35,612,543 greater than in 1940. Net income after all charges was \$7,469,684, equivalent to \$2.62 per common share. Earnings in 1940 amounted to \$8,953,632, or \$2.82 a common share. The reduction in earnings was due to higher costs for labor, material and taxes, the latter alone amounting to \$6,917,760.

## Railway Income Gains; Taxes Touch New High

Class I railroads in the United States in 1941 had an estimated net income, after interest and rentals,

of \$500,545,671, compared with \$191,050,215 in 1940, according to reports to the Association of American Railroads. Net operating income, before interest and rentals, in 1941, was \$999,502,930, a return of 3.79 per cent on property investment, compared with \$682,543,218, or 2.61 per cent, in 1940.

Taxes paid in 1941 by class I railroads were the greatest for any year on record, totaling \$396,623,016. For December taxes were \$33,606,345, an increase of \$6,797,495 over December, 1940.

# EXPANSIONS

## Navy To Spend \$15,600,000 at Fairbanks, Morse Plant

Fairbanks, Morse & Co. has been notified the Navy will spend \$15,600,000 for buildings and equipment that will make it possible for company's Beloit, Wis., works in the next 18 months to multiply by six its present output of diesel engines and auxiliary equipment.

The \$15,600,000 allocation reported includes the original amount of approximately \$6,000,000 announced several months ago.

It is expected that the number of employes now on the payroll of the Beloit plant will be increased by half when this new program of expansion is complete.

## Company's Production Capacity 4000 Per Cent of 1929 Output

When its present expansion program is completed, Detroit Tap & Tool Co., Detroit, will have thread gage production capacity in excess of the nation's entire normal peacetime consumption, according to S. B. Hellstrom, general manager.

In the last few years company's production capacity for all products, special and standard ground taps and thread gages, thread milling cutters, thread hobs, has been raised to around 4000% of 1929 output.

## Cold Limits River

## Shipments at Pittsburgh

Freezing temperatures in January reduced tonnage of freight moved by river in the Pittsburgh district. Most of the decline was in shipments from the upper rivers, mainly coal and coke. Steel showed an increase. Comparisons, in net tons:

General cargoes:	Jan., 1942	Dec., 1941
Ohio river . . . . .	1,453,400	1,710,500
Monongahela river . . . . .	2,753,100	2,991,500
Allegheny river . . . . .	176,800	244,100
Steel cargoes:		
Ohio river . . . . .	143,900	132,500
Monongahela river . . . . .	107,400	96,600

# MEETINGS

## Furnacemen, Steelmakers To Meet in Cincinnati

At the annual fellowship dinner of the National Open-Hearth and Blast-Furnace conference of the Iron and Steel division, American Institute of Mining and Metallurgical Engineers, Netherland Plaza hotel, Cincinnati, April 16-17, Charles R. Hook, president, American Rolling Mill Co., Middletown, O., will be the principal speaker.

The blast-furnace and open-hearth conferences will run simultaneously, emphasis being placed on production for national defense. Eighteen papers on ore, limestone, coke, furnace design and operation are scheduled for presentation at the blast furnace meeting. Open-hearth sessions will stress operating delays, increasing speed of furnace repairs, and reduction of ore and sinter. Two papers dealing with the use of the bessemer converter to increase production will be presented at a joint session of the Bessemer-Steel and Open-Hearth Committees, Friday morning.

Two sessions dealing with the melting and control of quality steel will be held by the acid open-hearth group.

## Convention Calendar

March 2-4—American Road Builders' Association. Defense Highway Congress

at Peabody hotel, Memphis, Tenn. Charles M. Upham, 914 National Press building, Washington, D. C., is managing director.

March 2-6—American Society for Testing Materials. Thirteenth spring meeting and 1942 ASTM committee week. Hotel Cleveland, Cleveland. C. L. Warwick, 260 S. Broad street, Philadelphia, is secretary.

March 12-13—American Gas Association. Industrial and commercial gas conference at William Penn hotel, Pittsburgh. E. D. Millener, 420 Lexington Ave., New York, is secretary.

March 12-13—Society of Automotive Engineers. National Aeronautic meeting, Hotel New Yorker, New York. John A. C. Warner, 29 W. 39th street, New York, is secretary and general manager.

March 13—National Industrial Advertisers Association, Inc. Midwest regional conference, Hotel Sherman, Chicago. M. R. Webster, 100 E. Ohio street, Chicago, is secretary.

March 23-25—American Society of Mechanical Engineers. Spring meeting. Rice hotel, Houston, Tex. C. E. Davies, 29 W. 39th street, New York, is secretary.

March 26-28—American Society of Tool Engineers. Annual meeting at Hotel Jefferson, St. Louis. Ford R. Lamb, 2567 West Grand boulevard, Detroit, is secretary.

April 14-17—Packaging Institute, Inc. Packaging Exposition and Conference, Hotel Astor, New York. H. L. Stratton, 342 Madison avenue, New York, is secretary.

April 16-17 — Open-Hearth Committee. Annual meeting, Cincinnati. L. F. Reinartz, 29 W. 39th street, New York, is chairman.

April 16-17 — Open-Hearth Committee. Twenty-fifth conference of open-hearth,

blast furnace and raw materials committees, American Institute of Mining and Metallurgical Engineers at Hotel Netherland Plaza, Cincinnati. F. T. Sisco, 29 W. 39th street, New York, is secretary.

April 20-24—American Chemical Society. Annual meeting, Memphis, Tenn. Dr. C. L. Parsons, 728 Mills building, Washington, is secretary.

April 20-24—American Foundrymen's Association. Foundry and Allied Industrial Show, Cleveland Auditorium and Exhibition Hall, Cleveland. R. E. Kennedy, 222 Adams street, Chicago, is secretary.

April 23-25—Concrete Reinforcing Steel Institute. Eighteenth annual meeting, The Homestead, Hot Springs, Va. H. C. Delzell, 228 N. LaSalle street, Chicago, is executive secretary.

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

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

## Chicago Foundrymen Sponsor Lecture Series

Chicago chapter, American Foundrymen's Association, has inaugurated the first year's series of a four-year educational program designed to teach ambitious young men subjects prerequisite to the development of good supervisors. Apprentices, foundrymen, salesmen and others interested in broadening their knowledge of foundry problems and production of better castings also will benefit from the course.

First of ten lectures and two castings clinics comprising the first year course started Jan. 13 and will be continued weekly through April 14. Meetings are held in the auditorium of the Peoples Gas building, 122 South Michigan avenue. M. E. Johnson, Whiting Corp., Harvey, Ill., is secretary of the course.

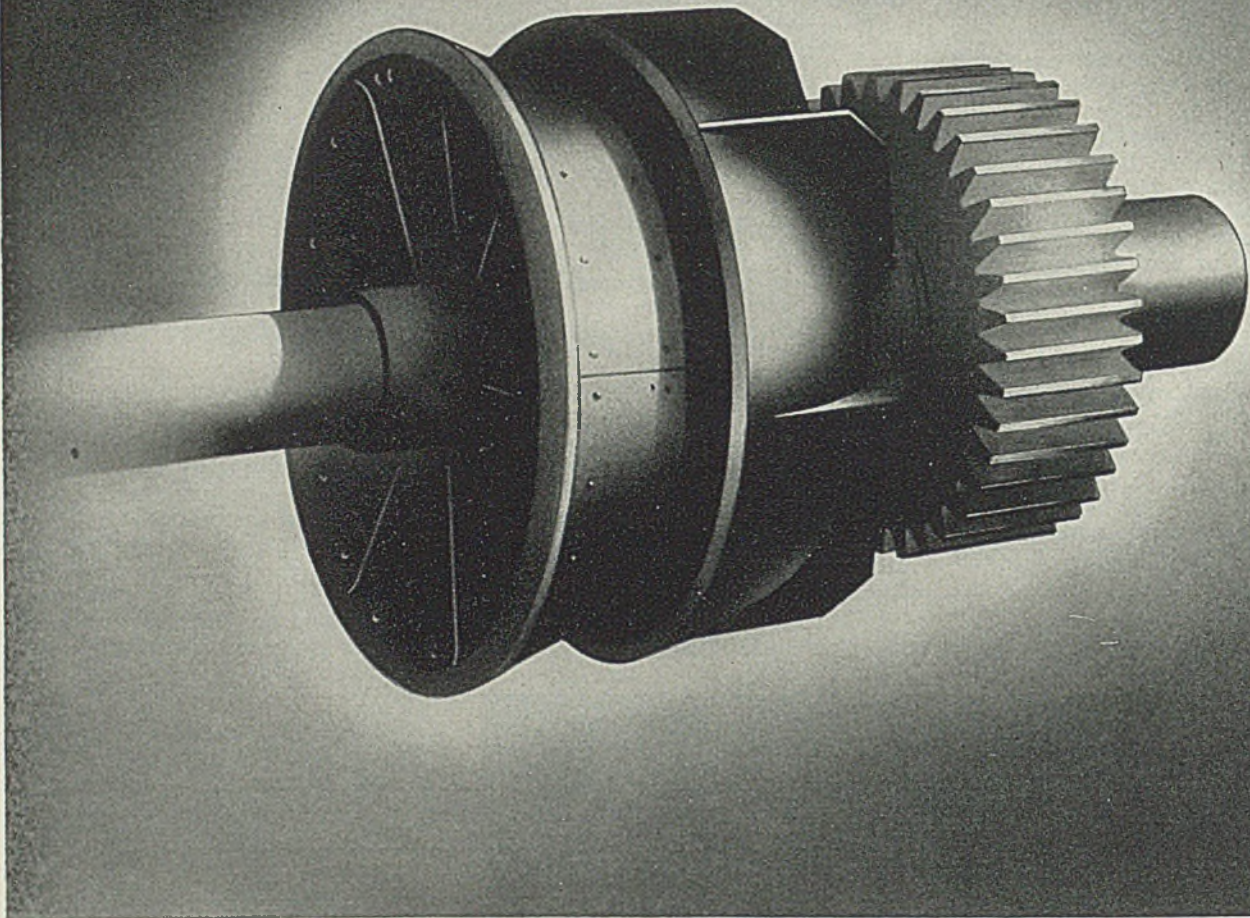
The 1942 lectures constitute essentially an introduction to the extended four-year program and will deal with castings in industry, raw materials for castings, blue print reading and elementary drawing, and patterns and pattern design.

Detroit Broach Co., Detroit, has provided funds for purchase of an ambulance for the American Red Cross. A check for \$1500 and cash contributions of \$466.40 were presented by Ture Lofberg, oldest employe in years of service, to Miss Janey Briggs, adjutant of the motor transport corps of the Detroit Red Cross. Contributions were by 125 employes and the company's executives.



LT. GEN. William Knudsen made a whirl-wind inspection of Pratt & Whitney to note first hand their progress in all-out production of machine tools, small tools and gages. President Clayton R. Burt shows him a fine precision end mill, one of many thousands being turned out

## Molybdenum Steels meet exacting service requirements without increasing costs



A considerable saving has been brought about by making the vital cone clutch in a draw works assembly of cast Manganese-Molybdenum steel.

This steel, containing 1.20%-1.50% Mn and 0.30%-0.40% Mo, develops ample strength and hardness when double normalized and tempered at 1200° F.

Without sacrifice of serviceability, costs have been reduced by adopting this steel, noted for its excellent physical property-cost ratio.

You will find the complete data on Molybdenum steels in our technical book, "Molybdenum in Steel", helpful. A copy will be sent free on request.

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

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# Mirrors of MOTORDOM

**Motor companies moving to expand working capital because of tremendous expenditures entailed by war goods production . . . Even without new cars, public keeps on spending spree . . . Await decision of labor board on double-time for Sunday work . . . Briggs will need 12,000 more to meet schedules . . . How to get a war contract . . . Neighborhood subcontracting**



By A. H. ALLEN  
Detroit Editor, STEEL

**DETROIT**  
METAMORPHOSIS of civilian goods industries into armament plants already is showing its disruptive effects on labor and materials and equipment. A new phase about which more will be heard is the effect on capital. Large sums of money are being invested in new plants, new equipment, heavy inventories of materials, training programs for employes and similar activities, much of this money being advanced from surpluses. While obviously manufacturers will be reimbursed for the war products they supply, the cash turnover in this type of production is far slower than in peacetime operations.

In the case of the automobile companies, before a new car ever left a driveaway lot, cash payment for it was in the hands of the manufacturer. Cash turnover per day was high. In war, this changes and turnover slows down to maybe once a day. Hence the inevitable demand for more working capital.

## \$100,000,000 Loan

Last week, Dow, Jones & Co. reported Chrysler Corp. to be negotiating with 175 banks for \$100,000,000 worth of credit to facilitate financing war production. Planning now is for eventual war production of two to three times the dollar volume of peacetime production in 1941, so the need for added working capital becomes obvious. Chrysler is said to have used up surplus profits for 1941 as well as \$30,000,000 from reserves to finance present war activities, and the corporation states officially: "Chrysler Corp. has currently been discussing with its banks arrangements designed to provide, in addition to advance payments on contracts with the United States government, the cash it might need to meet any emergency situation arising in connection with its commitments to the government to produce war materials, and has negotiated, it believes, a satisfactory credit arrangement for this purpose.

Similar arrangements for new

financing are expected to be forthcoming from other automotive companies. Even Ford, which has made a fetish of avoiding financing operations, may be forced to take some action because of the terrific drain on resources resulting from broad expansion of manufacturing activities to produce bombers, airplane engines, tanks, armor plate, army trucks, fire control equipment and other war items.

Commenting on demands for added capital in the motor industry, *Ward's Automotive Reports* observed recently: "The huge cash requirements of GM or Chrysler for arms output are no greater in proportion than the need for a few hundred thousand dollars which may develop for an obscure supplier. Large and small, the problem may bulk in equal dimensions and furnish a spur to borrowings which will make full use of the extended credit base which has been building for the past years."

Thus the automotive companies should have no difficulty in arranging ample loans at attractive rates. Financial houses probably welcome the prospect of large-scale loans to industry, to counterbalance the disproportionate flow of funds into government bonds.

Despite the lack of new automobiles, the country at large is undoubtedly embarked on one of the wildest spending sprees in its history. As proof, retail sales in the Detroit area for January were estimated to be 47 per cent ahead of a year ago. People everywhere are rushing to buy merchandise while it lasts and new shortages are appearing daily. At some future date the depletion of retail inventories will become accentuated to the point where the public may start to compete pricewise for what is left. However, before this critical inflationary moment arrives it is hoped that enough spending power can be si-

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phoned off into defense bonds and taxes to avert a crisis.

Astute financial services are recommending the purchase of selected common stocks "for the long pull"; in fact, despite the dark military outlook, a note of optimism pervades market circles. They feel that coming war reverses have been discounted, that yields on stocks are far more favorable than on bonds, that expanding production will sustain profits even after higher costs and taxes, and that the market is due for improvement on technical grounds, after 40 months of decline.

## Double Time for Sunday?

The War Labor Board is being pushed to final action on wage rates for swing-shift operations in motor plants. The issue—whether double-time rates shall be paid for Sunday work on a swing shift—as it applies to General Motors has been referred to the board. Last week UAW-CIO workmen in the Allison division of the Cadillac plant here adopted a resolution "accusing the corporation of attempting to provoke them into an unauthorized strike which would be damaging to the union"—a nice job of reverse English.

Substance of the dispute is this: The union claims that men should be paid double time for Sunday work, even if they work only five days out of the week and not over 40 hours in all. The corporation contends that time-and-a-half pay for anything in excess of 40 hours a week is justified, and double time for the seventh consecutive day worked in a week regardless of what day it may be. The union contract provides double time for Sunday work, but obviously on swing-shift operations where there are four shifts of men working 40 hours a week, Sundays and holidays will have to be taken in stride, just as

they are in the steel industry or any other continuously-operating industry. The union's position appears weak, but if WLB action follows its accustomed pattern, it will suggest a "compromise" by awarding double time on Sundays. If so, then the entire picture of swing-shift operations as they are now conceived by industry around here is going to need revision.

Already there are signs pointing away from swing shifts. Difficulty of obtaining suitable men for night shifts, loss of production efficiency under 'round-the-clock schedules and insufficient time for necessary maintenance and repairs are contributing reasons. There are factory managers who will insist they can get out more production on two 10-hour shifts six days a week than they can on three 8-hour shifts seven days a week, less 8 hours for maintenance. With total production the gage, it then becomes pointless to attempt full operations.

### New Plants

Electric Auto-Lite Co., Toledo, O., hitherto a large supplier of automotive electrical parts, has purchased a 160-acre tract of land for construction of a new plant embracing 600,000 square feet, to be devoted to production of aircraft parts on a large scale.

Other construction projects either proposed or under way in this area, all for war production, include ex-

tensions to the motor parts plant of Nash-Kelvinator at Lansing; a plant at Adrian for Bohn Aluminum & Brass Corp., costing \$1,415,000; an addition to the Grand Rapids stamping division of General Motors; new assembly building for Fisher Boat Works in Detroit; addition to the Continental Motors plant in Detroit.

### ABC of War Contracts

Small manufacturers who have been making their living from production of parts for the motor industries and who are now unsuccessfully looking for war contracts should heed the advice of the local branch of the WPB, which outlines essential steps:

1. Make complete survey of facilities, including business record, description of normal products, experience of managerial and supervisory personnel, previous war production experience, financial statement and names of past and present customers.

2. Take stock of labor situation, listing number of employes, skills, peak employment for one, two and three shifts, description of available labor supply and competition for it, and a brief analysis of existing and nearby wage rates.

3. Describe plant equipment, location, transportation facilities, available power and water facilities.

4. Make complete layout plans with photographs of each section of the plant, and show all tools in

position, with indication of type, make, age, size and serial number, as well as tolerances usually followed.

Armed with this extensive (and expensive) survey, the plant operator should consult the nearest contract distribution branch of the WPB, of which there are 115 throughout the country; the Army district procurement offices; the Navy Bureau of Supplies and Accounts, or local prime contractors.

If no contracts are then forthcoming, the manufacturer should realize that no formula will provide work for all manufacturers, that additional billions are now being appropriated which may eventually give him help. In any event, he should not forget that the country as a whole now is not faced with the problem of insuring the small manufacturer from being forced out of business, but rather with the more critical problem of saving the nation from ruthless enemies.

### Truck Makes Daily Circuit

An example of community cooperation on war contracts is found in western Michigan where a motor truck loaded with 20,000 small iron castings makes the rounds of different plants in three cities, covering 125 miles a day. When an automotive supply company first undertook the manufacture of a certain shell, it was discovered that the fuse hole plug, one of the small pieces, required casting, annealing, machining, cadmium plating and the addition of thread protectors before it could be assembled into the shell. The prime contractor lacked facilities for this work, so the company set out to sublet the job. A foundry was located in the same city, as well as annealing equipment. In a town 55 miles south was located a company to handle the screw machine work, and 30 miles north-east of there was found a plant to handle the cadmium plating.

So the truck route was organized, to carry loads of 20,000 pieces around the circuit. After the plating operation, a load is taken to a fourth plant 70 miles east where the thread protectors are added. Then comes a 40-mile trek back to the prime contractor's plant where the plugs are assembled into the shell. This 125-mile assembly line is believed to be the longest on record, and is silent testimony to the vital importance of the motor truck.

Isthmian Steamship Co., a subsidiary of United States Steel Corp., has moved its New York staff to new offices at 71 Broadway, headquarters of the parent corporation. Isthmian will occupy three and one-half floors.

## Arms Plant Completed in Three Months



THREE months after the first structural steel was delivered. Chrysler Corp. started operations in an annex to one of its auto factories now devoted to war production. New building is operating 24 hours a day. Above, David A. Wallace, president, Chrysler sales division, is examining a breech ring produced in the plant. The part, weighing 310 pounds in the rough, is machined down to 105 pounds. Left to right: Charles Thiede, master mechanic; A. M. Fleming, general works manager; Edward H. Priebe, works manager; Mr. Wallace; A. P. Collies, superintendent; and Harry E. Watterson, plant engineer



# M A S T E R C R A F T S M E N

The name "Chippendale" is synonymous with distinctive quality.

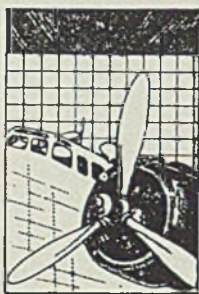
Thomas Chippendale in the early sixteenth century, while still in the ranks of apprenticeship, saw the need of originality in furniture making. Breaking away from the old school he arose to great heights of popularity and established standards and styles that are copied today.

Pace setters in modern industry are repeating the principles set forth by Chippendale and establishing new markets with restyled, attractive products.

*Thomas Chippendale*



# WING TIPS



*Navy and Marine corps to induct 30,000 pilots in one year, all to be given special "toughening" training . . . Naval aviation nearly 34 years old, but only recently has strength in planes been pushed beyond 1000 . . . Experimenting with gliders for troop transport . . . More women finding work in airplane plants, to relieve men where employment needs are critical*

IN THE naval aviation arm of our fighting services lies the hope of the first body blows against the enemy which will establish U. S. supremacy on the world battlefronts. General recognition of this fact may have come a little late, but plans have been in the making for months to concentrate the strength of the Navy in the air.

Expenditures of about 39 billions are being rushed into the contract stage for naval equipment, much of it air reinforcements. Secretary of the Navy Frank Knox recently announced a naval aviation training program under which the Navy and Marine corps expect to induct more than 2500 cadets monthly for annual total induction of 30,000 pilots. Facilities at four large universities will be leased, each to become an "Annapolis of the Air." A three-month preliminary "toughening" process has been instituted, where prospec-

tive naval airmen will learn to march 40 miles a day, will labor at ditch-digging, woodchopping and land-clearing, and will learn the finer points of boxing, jiu-jitsu and rough-and-tumble fighting.

Says Secretary Knox: "This training and the air training which follows it will make these men the best pilots in the world. They will benefit from it for the rest of their lives. They will be the leaders in postwar aviation development. They will take the air in steadily increasing numbers and will do much to win this war for the United States."

Looking back over the history of naval aviation, it is noted that the first official cognizance of this arm of the service came in September, 1908, when Orville Wright demonstrated his plane before officials at Fort Myer, Virginia. In less than two years the first plane was landed on and launched from a naval ship.

The first airplane catapult was designed at the Naval Gun Factory in Washington in 1912. When the war came in 1917, naval aviation suffered because airplane builders were forced to concentrate on Army orders, so it was decided to build a Naval Aircraft Factory in Philadelphia. The structure was completed in exactly 110 days, and by the time the armistice was signed it had delivered 185 twin-engine flying boats.

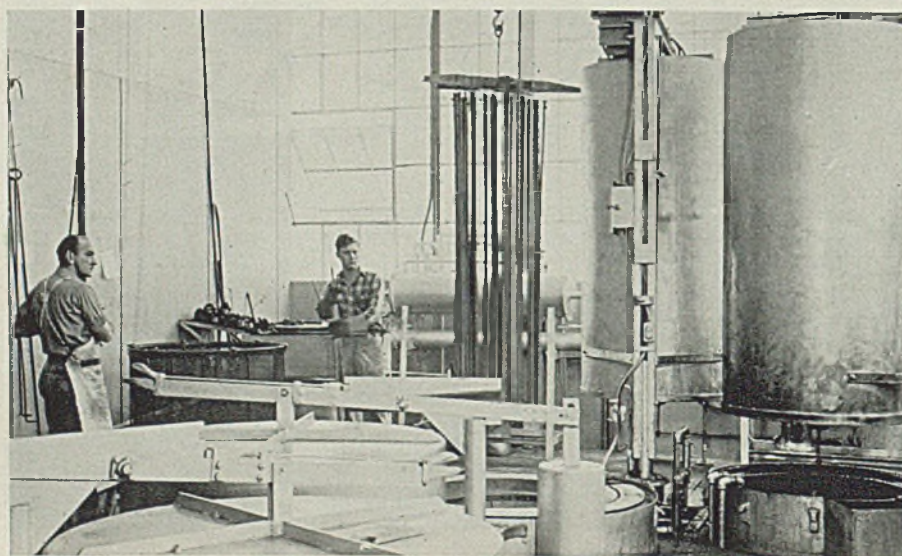
Meanwhile work was being pushed on the development and construction of new aircraft carriers and on experimentation with nonrigid airships. The collier JUPITER, first electrically driven ship in the Navy, was converted to the carrier LANGLEY and commissioned in 1922. The SARATOGA and LEXINGTON followed a few years thereafter.

In 1921, the Bureau of Aeronautics was organized and charged with the responsibility for design, building, fitting out and repair of all naval and marine corps aircraft. This was perhaps the greatest single step ever taken to stimulate naval aviation.

## Substitution of Metal

The year 1930 witnessed the passing of wood and the substitution of metal in aircraft structures. Rear Admiral A. B. Cook calls this the most striking change brought about as the result of co-ordinated development of naval aircraft, and while today aluminum alloys and stainless steel appear obvious materials for airplane construction, particularly where operations are over salt water, ten years ago the change was of revolutionary nature.

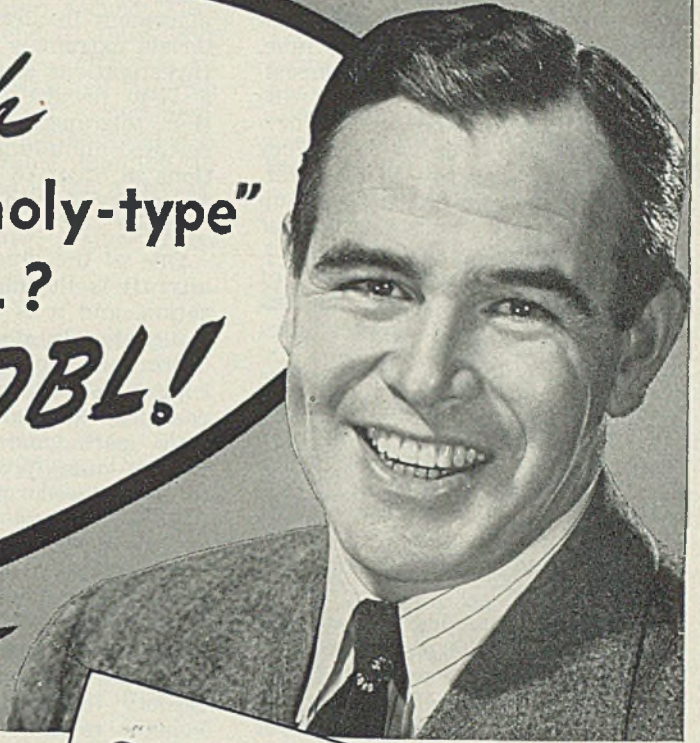
Naval aviation experienced some unfortunate blows as the result of the depression beginning in 1932, plus the tragic loss of lighter-than-air craft, but passage of the Vinson-Trammell naval bill in 1934 gave new encouragement to a force which until then was limited to a total of but 1000 planes. The bill stepped up procurement authorizations and



TO REDUCE the cooling rate on these thin-walled tubular parts as they are transferred from hardening furnace to quench tank at Menasco Mfg. Co., heated parts are drawn up inside cylindrical hoods, then moved over quench tank and the parts lowered into oil. Complete setup of two hardening furnaces, two draw furnaces, quench tank, jib hoists, transfer hoods and furnace atmosphere control equipment was built by General Electric Co. Furnaces are 30 inches inside diameter, will accommodate parts 60 inches in length

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STEEL CORPORATION

PITTSBURGH, PA.

*Tool Steel Division*



*Watervliet, N.Y.*

Allegheny Ludlum Steel Corporation T-216  
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expanded the aircraft factory to allow for the manufacture of 10 per cent of naval aircraft and engines by the government. Still, in June, 1937, naval aviation strength consisted of but 927 service planes, 195 obsolete craft on hand and 820 new ships on order. This was a far cry from the picture five years later, when procurement figures were up in the tens of thousands rather than in hundreds.

In his recent report as chief of the Navy's Bureau of Aeronautics, Rear Admiral John H. Towers notes that an investigation has been undertaken to determine designs and characteristics of gliders for naval use, with experimental models already ordered. He also calls attention to the application of plastic materials in aircraft construction, characterizing this field as "relatively unexplored in comparison with its possibilities."

Two plastic training planes have been purchased to determine the serviceability of the material in operation. But he concludes that the Bureau of Aeronautics has not yet found structural (plastic) materials which can be used under production conditions as general substitutes for the highly satisfactory high-strength aluminum alloys from which present-day aircraft are constructed.

"The unusual properties of these alloys, the facilities available, and the established procedures in the

aircraft industry for processing them in production, make their replacement in aircraft by other materials extremely hazardous. . . . Investigations are being made with a view toward widening specification tolerances for impurities in certain aluminum alloy specifications in order to permit the use of secondary aluminum wherever practicable."

One of the biggest jobs ahead in aircraft is the matter of standardization, and it is being attacked assiduously. In addition to the standardization of plane designs, it is becoming essential to work out fairly complete standardization of materials, parts and subassemblies as well if mass production goals are to be achieved. A working committee has been set up on Army-Navy aeronautical standardization and it will collaborate with other standards organizations such as the aircraft industry's national aircraft standards committee, the Society of Automotive Engineers, American Society for Testing Materials and vendors to the aircraft industry.

Projecting employment needs of the aircraft industries along the rising curve of production envisages a shortage of help which experts say can be solved only by bringing more women into plant operations. This already has been done to a limited extent. Three plants of North American Aviation—in Dallas, Tex., Inglewood, Calif., and Kansas City,

Kans., are stepping up their employment of women. Covering and sewing fabric on control surfaces, electrical subassembly work, even sheet metal and hydraulic work are being given to women operators. North American officials say that at no time will women displace men; but their employment enables the company to release men to other departments where they are more seriously needed.

The chief concern to date, a North American foreman explains, has been to keep women workers from becoming overanxious. He says, "We advise them to imagine they are in the kitchen baking a cake or washing dishes, and to take hold of their jobs in the plant in the same manner."

The problem of work dresses for women operators was solved at the Inglewood plant by decision to require women to wear uniform blue slack suits, which are inexpensive, unostentatious and solve the "hoi-siery problem."

Consolidated Aircraft also is hiring more "planeswomen". Recently a woman was given a job as operator of an electric truck to haul bomber parts between operations.

## Congress Approves New Lock at Soo

Construction of a new lock at Sault Ste. Marie, Mich., to increase by one-third the capacity of the canal connecting Lakes Superior and Michigan has been approved by Congress.

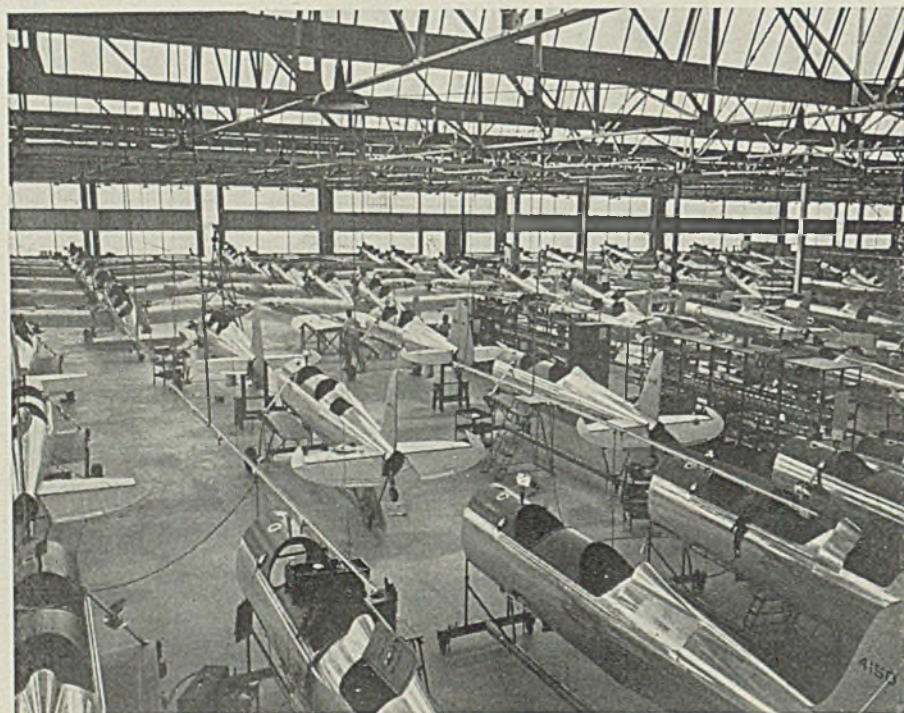
The project which first was included in the rivers and harbors bill, a "pork barrel" measure covering more than 260 projects, was transferred to a naval pay bill as a rider.

Senator Brown, Michigan, who sponsored the project's transfer, said the lock would cost \$8,000,000, and, if started soon, could be completed by the opening of 1943 navigation.

The rivers and harbors bill contains several other projects which would affect traffic through the Soo locks.

One of these is a proposal for a waterway connecting Lakes Superior and Michigan by cutting through the upper peninsula of Michigan from Au Train Lake to Little Bay de Noc. This would save considerable time in shipping from Chicago and other Lake Michigan ports and Lake Superior ports. It also would ease the burden on traffic at the Soo.

Another section of the bill proposes improvement to the St. Mary's river channel at Sault Ste. Marie to make it navigable for light draft vessels. This also would relieve pressure on the locks.



LATEST view of the production line at the Ryan Aeronautical Co., San Diego, Calif., where low-wing primary training planes are being assembled for the Army and Navy. Basic, primary and advanced types of training planes necessarily comprise a large share of total plane production because of the tremendous expansion under way in air combat forces. In 1941 the percentage was better than 50; this year it will be nearer one-third

## General Electric Gives Coffin Awards to 37

Charles A. Coffin Foundation awards have been made to 37 General Electric employes for outstanding contributions to the company's progress in 1941. Awards were for 30 accomplishments, several being made jointly to two employes. Seventeen recipients were engineers, four were workmen, six were tool designers and expert mechanics, two were administrative and clerical employes and two were construction engineers. Since the Coffin Foundation was established 19 years ago 592 employes have received awards, consisting of a certificate and cash honorarium.

Awards for 1941 were largely in technical fields, including better manufacturing processes and better engineering plans and methods. Several were for ideas which contributed directly to the company's war effort.

## Bridge Prizes Awarded

American Institute of Steel Construction has awarded prizes in its annual students' bridge design competition. All awards and honorable

mentions went to students of Iowa State College; first prize, \$200, to Everett Thorbrogger; second, \$100, to R. Kenneth Kendall; third, \$50, to Carlton Mueller. Certificate of first mention was given Gordon Johnson, certificate of second mention to Wayne A. Norman and certificates of honorable mention to Dick Utterback and Ralph A. Krass. The problem was a steel bridge to carry a highway over a river crossing.

## Manual of Reinforcing Steel Practice Revised

Concrete Reinforcing Steel Institute, Builders' building, Chicago, has issued the third edition of its "Manual of Standard Practice," which has been completely revised and made consistent with provisions of the latest American Concrete Institute building code regulations for reinforced concrete, the new reinforced concrete design handbook, and the report of the joint committee on standard specifications for concrete and reinforced concrete. The new edition also has been reviewed and approved by the engineering practice committee of the

Institute and the Portland Cement Association.

Copies will be sent to engineers and architects free of charge upon written request to Institute headquarters. All member companies and district offices will be furnished one free copy. Additional copies for distribution may be obtained at 20 cents each.

## 1,600,000 Stainless Steel Tags Ordered

New York Department of Education has placed a tentative order for 1,600,000 identification tags for school children with Addressograph Multigraph Corp. Order is contingent on obtaining a priority rating for the 14 tons of stainless steel required.

It was first intended to make the tags of monel metal, but priority rating for this could not be obtained.

If the metal can be obtained, corporation officials estimate they can produce the tags at a rate of 25,000 to 50,000 a day.

## Car Building Program Lags Behind Schedule

PITTSBURGH

Freight car construction will not reach the desired goal of 120,000 units this year unless further action to make materials available to builders and to re-establish idle shops, it is believed here.

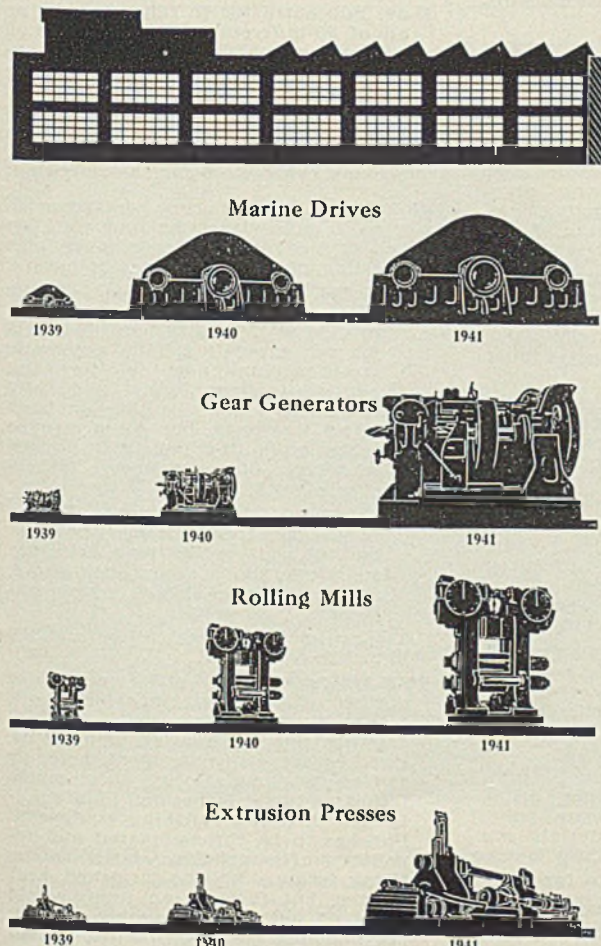
Allocation of plates will help solve the primary materials problem, but the question of supplying other materials, such as special carbuilding shapes, is difficult. Much of the structural steel tonnage being delivered now carries an A-1 rating, while railroad requirements have only an A-3 rating.

Car production in January and February was around 7500 monthly, against a production program that called for 45,000 in the first four months this year. It now appears likely six months instead of four will be needed to complete this program. On that basis total production for the year would be around 90,000 units.

## Plan Use of Wood for Steel In New Freight Car Design

New freight car designs substituting wood for metal where possible were tentatively adopted last week by the committee on car construction of the Association of American Railroads. Recommendations will be submitted to the railroads by the association and later to the War Production Board. Design will allow replacement of the wood by steel later.

## Swing To War Production Illustrated



PICTOGRAPHS are used by Farrel - Birmingham Co. Inc., Ansonia, Conn., in its annual report to employes, stockholders and customers to indicate the extent of the company's war-time production effort.

Building, above, represents company's total productive capacity; 98 per cent engaged in war production as indicated by solid section; only 2 per cent non-war as indicated by barred section. Lower pictographs show the three-year expansion in output of four lines of equipment important to war effort.

Report also contains coin diagrams showing percentage of sales dollar absorbed by taxes, replacements, wages, salaries, executive compensation and residue available for reserves and dividends

# Government Inquiries

The following prime contracts are pending, with closing dates for bids as indicated. QR refers to quantity required. Bidding forms on these items can be obtained only by wiring, mentioning schedule number, to the Procurement Branch of the service heading the list of requirements. Field offices of Contract Distribution Branch, WFB, generally have available for inspection and examination, schedules, invitations, specifications and drawings (where required) concerning these contracts.

## BUREAU OF SUPPLIES, ACCOUNTS NAVY DEPARTMENT, WASHINGTON

- 436—Railroad box cars, 40 tons capacity, standard, QR-15; railroad flat cars, 40 tons capacity, standard, QR-28. Bids Mar. 10.
- 437—Steam generating boilers, complete with auxiliaries, controls, spare parts, tools and wrenches, 2500 lbs. steam per hour capacity, QR-17, 400 lbs. per hour capacity, QR-17. Bids Mar. 5.
- 438—Flanged steel valves, misc. quantities of various types and sizes, copies of drawings and spec. required can be obtained only upon application to the Bureau of Supplies and Accounts. Bids Mar. 5.
- 371—Steel ammunition lockers, U.P. 2", QR-27,200. Revised drawings have been received and the opening date has been postponed till March 6, 1942.
- 438—Fog nozzles: national std. threads; nozzles and tubes shall be similar or equal to

- Fog Nozzle Co., Los Angeles, small quantities of numerous types and sizes. Bids Mar. 10.
- 440—Grinders, universal, tool and cutter, motor driven, QR-2. Bids Mar. 10.
- 443—Machines, milling, vertical, QR-7. Bids Mar. 12.
- 446—Steel, semi-finished, rounds, squares, flats and billets, QR-Large. Bids Mar. 10.
- 449—Lathes, turret, motor driven, QR-7. Bids Mar. 10.
- 452—Crane, Crawler type, gasoline engine driven, double drum, with 40' boom, complete with tools and accessories, QR-1. Bids Mar. 13.
- 459—Assemblies: trunnion bolt, and rear mounting post, mark I, QR-36,900. Bids Mar. 13.
- 365—Dummy charges, 8"/55 caliber, steel body with soft rubber jacket, QR-965, revised drawing has been received. Bids Mar. 13.

# Sub-Contract Opportunities

Data on subcontract work are issued by local offices of the Contract Distribution Branch, WFB. 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.

Cleveland office Division of Contract Distribution, WFB, Union Commerce building, is seeking contractor for the following:

- D-2: Forging and machining facilities wanted for completion of companion yokes for universal joints and drive shafts; 100 to 300 pieces per day, total amounts vary.
- D-3: Machining facilities to fabricate six items, consisting of bronze nuts, driving sprockets, discs, etc. Equipment indicated, Gridley automatic, Warner & Swasey No. 2A, radial drills, Potter & Johnson or equivalent; 500 of each item at 40 per day.
- D-6: Facilities to fabricate small and medium size brass and steel parts. Equipment ranging from automatics, lathes, mills, turrets; also chrome plating. Four items on display representative of 600 similar items needed.
- D-8: Subcontractor with facilities to fabricate small parts consisting of washers, lock plugs, king pins, clevis pins, etc. Material steel and bronze. Lots from 300 to 1,500.
- D-9: Manufacturer wishes to subcontract machining and heat treating of parts made of chrome moly, chrome nickel forgings, and bar stock. Equipment indicated requires heavy and medium duty, turning and boring, milling horizontal and vertical, light and medium drill press, short arm radial press, broaching, external, internal, plain and rotary type surface grinders, 2" bar boring mill. Tolerances medium and close.
- D-10: Equipment needed to rough turn, bore, and face sleeves and bushings. Require automatic screw machine 3 3/4" bar capacity. Material 3 3/4" Nitralloy, grade "G". Material furnished.
- D-11: Subcontractor to machine miscellaneous bronze bushings approximately 2" diameter, 4 1/2" long. Equipment automatic screw machines.
- D-12: Subcontractor to fabricate armatures, commutators, and armature housings, machining, wiring, and as-

sembly of armatures. Motors up to 1/2 HP.

- D-13: Facilities of hard rubber molding machines, lathes, bevel gear cutters, keyseating hard rubber parts. Also steel components in assembly required.
- D-14: Facilities to fabricate varied parts requiring automatics, milling, drilling, gear cutting, and hobbing, grinding and hardening equipment. Materials steel, bronze, cast iron, and tool steel.
- D-15: Equipment to machine complete large quantities of varied sized aero fittings. Operations requiring automatic screw machines, grinding, lapping, drilling, and anodizing. Materials, aluminum forgings, furnished.
- D-16: Equipment, to fabricate various sized bushings and bearing shells. Turret lathes, Potter & Johnsons, engine lathes, small drills, etc., is equipment indicated. Materials—forgings, tubing, and bar stock.
- D-18: Subcontractor to machine ten different items of medium size; equipment indicated 12" lathes, medium size mills, and drills. Quantities substantial.
- D-19: Subcontractor to machine various items requiring turning, small hand screw machines, heat treating equipment, cylindrical grinding, and cutter grinding, No. 2 size Universal milling machines. Delivery 500 to 1,000 per month. Material high speed steels.
- D-20: Subcontractor with equipment to fabricate a variety of small parts consisting of box hinges, nose caps, nose ends, coil springs, and stampings. Material brass and steel. Substantial quantities.
- D-23: Subcontractor with small automatic screw machines, lathes, drills, and small press to fabricate bolts, nuts, connectors, etc. Materials are brass, aluminum, and wire.
- D-24: Punch press facilities to fabricate plates and base shells. Operations indicate punch, draw, form, and cadmium plate.

D-25: Subcontractor to furnish aluminum castings, also machining facilities to mill, drill, spotface, and tap small aluminum castings. Small punch and forming presses for various size stampings of aluminum sheet.

D-27: Subcontractor to fabricate various engine parts, including large connecting rods, and smaller parts consisting of primers, pinion reduction gears, studs, etc. 13 different parts.

D-28: Equipment to machine crankshafts, worm gear and worm wheels. Material is forgings and bar stock.

D-29: Facilities to machine medium size parts made of aluminum castings and steel. Operations numerous and require a fair range of precision equipment.

D-30: Subcontractor with punch press, automatic screw machines, drill press, engine lathe, draw press and plating facilities to fabricate small parts.

D-31: Equipment necessary to machine complete nuts, bolts, small shafts, and valve seats. Automatic and hand screw machines, small mills, drills, etc. Material is steel and brass.

D-32: Subcontractor with facilities peculiar to machining and assembling electrical field communication equipment. Materials—rubber, brass, insulated wire, and aluminum.

D-33: Subcontractor to machine complete eccentric bushings, shafts, bearings. Equipment indicated automatic lathes, engine lathes, drill press, milling machines, centerless grinders, pack hardening.

D-34: Machining of gears and shafts. Equipment indicated 10" automatic chucking machine or engine lathe, 4" single spindle automatic, No. 2 Brown & Sharpe milling machine, gear shaper, internal spining, hardening furnace.

D-35: Automatic screw machines up to 2" grinding and honing capacity, including case hardening facilities to fabricate various parts. 25 items.

D-36: Subcontractor to fabricate any or all of 80 different parts consisting of springs, gunners' seats, knobs, handles, etc. Lathes, drill presses, spring winders, etc. indicated.

Chicago office, Contract Distribution Branch of WFB, 20 North Wacker Drive, is seeking contractors for the following:

19-F-A-216: Chicago prime contractor desires to subcontract machine work on two sizes of rotating bands, made from Guilding metal (copper) as follows:

- 25,000 to 30,000 per month 40 mm bands cut from tubing 1.557 I.D. by .134 wall by .618 long. This is a job for a single spindle automatic screw machine, adaptable for gang cut off tooling. Second and third operations should be done on hand screw machines, but could also be set up on multi-spindle drill presses with large diameter sleeves for accurate work.
- 25,000 to 30,000 per month 75 mm bands cut from tubing 2.940 I.D. by .103 wall by 1/2" long, with the same operations as outlined above, on large single spindle screw machines.

Tubing for both items will be supplied by prime contractor.

20-F-A-217: Chicago prime contractor desires to subcontract machine work for production of the following: 140 drawing punches for 105 mm shells. Punches are 4 1/2" outside diameter by 11" to 28" long. Heavy duty engine lathes, or turret lathes and high quality grinding and polishing equipment. Punches to be chrome plated and re-polished after grinding and polishing. Blank forgings will be furnished, heat treated, but there is an intermediate stage of heat treatment required in the finishing operation, which should



be provided for by the subcontractor.

22-F-N-217: Chicago prime contractor wishes to subcontract for production on large automatic screw machines. Work consists of 30,000 pieces (gear blanks) all in one run, made from 3 3/8" bar stock by 1/8" long. Second operation can be made on hand screw machines. This prime contractor may also sublet the gear cutting if subcontractors can be located with suitable hobbing machines. Material will be furnished by prime contractor.

Connecticut offices, Contract Distribution Branch, Production Division, WPB, (152 Temple St., New Haven; 305 Main St., Hartford; 144 Golden Hill St., Bridgeport) report the following equipment is needed for subcontract work:

Job No. 25: Automatic screw machines No. 00 to No. 1.

Job No. 26: Hand screw machines from 1/2" to 3" dia. and 24" to 30" long horizontal borer 83" high by 69" wide by 32" front-to-back; planer 83" high by 69" wide by 32" front-to-back; planer 72" wide.

Job No. 18: Cylindrical grinder.

Job No. 19: Automatic screw machines 2 1/4", 4-spindle Gridleys.

Newark, N. J., office, Contract Distribution Branch, Production Division, WPB, 20 Washington Place, reports the following subcontract opportunities:

No. 124: Prime contractor requests facilities for making drop forgings. Quantities can be divided among several small shops, if necessary. Forgings are small, running, not over 1 pound. If you can provide dies, it will simplify awarding the contracts. In this connection, if facilities are available to cut and sink dies, not necessarily in connection with forge shops, we would be glad to learn of them, for immediate use.

## Memo to Manufacturers, from a Public Relations Counselor on the Grand Jury

By ROGER WILLIAM RIIS

THESE lines are written by a man who has sat on several federal grand juries and who during the winter of 1941-42 served on one such jury for two months. Dozens of manufacturers appeared before this jury; some were excellent witnesses on their own behalf, some were equally poor witnesses on their own behalf. It was obvious in either event that the manufacturer had no clear conception

- (1) of what kind of impression he was making.
- (2) of how best to present his side of the story.

These remarks are offered in the interest of getting at full justice. Full justice does not necessarily mean building up a district attorney's batting average of convictions. In my opinion, justice in an anti-trust proceeding, at this time, is under a handicap to start with.

The first thing to remember is the nature of the federal grand jury. It is not a trial jury; it is not trying the witnesses or anyone else. It is an investigating jury, listening to evidence presented by the govern-

ment and deciding whether that evidence merits bringing an indictment. If the jury decides the evidence does warrant an indictment, it votes an indictment, and the trial follows thereafter, but not before that jury at all.

The federal grand jury is composed of 23 persons. Sixteen are a quorum. A majority rules. A minimum of 12 jurors votes an indictment. The reverse of that is that 12 jurors can also throw a case out, or refuse to indict.

These jurors are, in the Southern District of New York at least, of unusually high and solid civic character. The regular trial jury lists are picked carefully, to secure the most responsible individuals for the very limited federal grand jury lists. It follows, therefore, that a federal grand jury will contain a number of individuals of solid standing. Such a jury is not a lot of wild-eyed theorists; it is almost certain to have a majority of members who are themselves successful business men. They understand the viewpoint of the witnesses better than they do the viewpoint of the government.

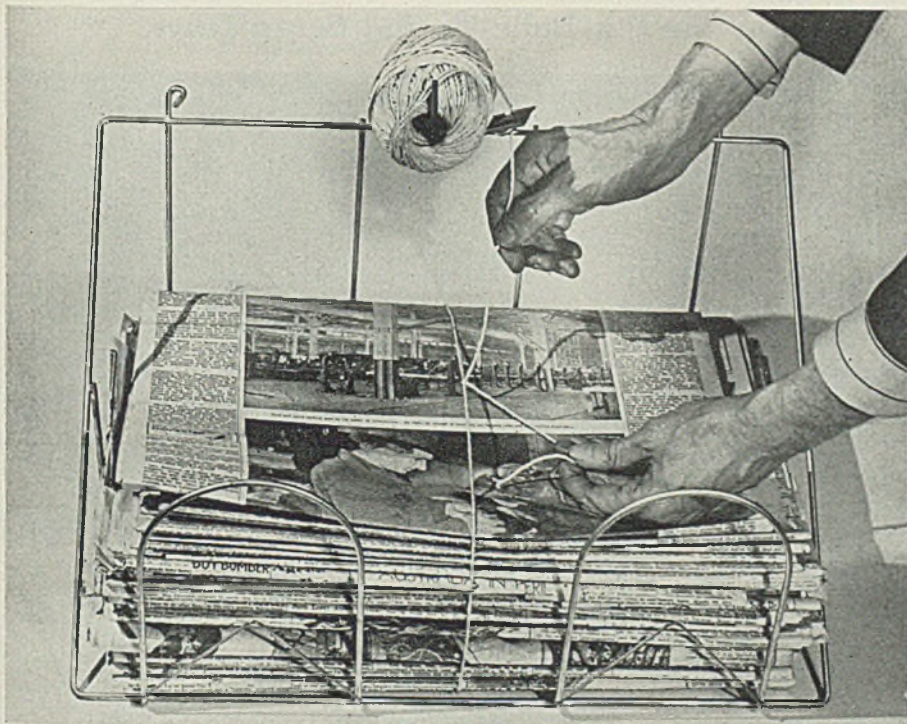
The disposition of forces in the federal grand jury room therefore favors the business man who is brought in to be cross-examined about practices in restraint of trade. Witnesses obviously do not realize this, and allow themselves to be outmaneuvered at the start, and placed at a disadvantage.

### First Impression Important

An early problem is that of waiving immunity. From the viewpoint of the jurors, it is a point in favor of the witness when he has waived his right of immunity. This is merely a matter of the impression made. Some witnesses come in, sit down, and promptly read a statement prepared for them by their lawyers. No matter who the witness is, the wording of this statement is always the same; evidently it is a standard among lawyers. It runs to the effect that the witness is here under compulsion of a subpoena and testifies unwillingly, etc. In the mind of the juror, it is pretty much a wasted statement, because it is transparently a canned statement and therefore lacks individual, warm, human appeal.

Whether or not one should waive immunity is a matter for lawyers. But lawyers cannot advise on how properly to present one's case before a grand jury, because lawyers are not allowed in the grand jury room

## Baler Helps To Save Paper



HOUSEHOLD paper baler is one of the newest gadgets to attract interest as result of the war and various salvage campaigns. The wire model above, now being shown in the Chicago Merchandise Mart, is equipped with a spool for string or cord, guarded holder for razor blade, has 25-pound capacity. NEA photo

with the witness. The witness is alone.

After long and critical observation of this point, I can say with confidence, what I personally would do were I brought before such a jury to be quizzed by an assistant district attorney about my previous business conduct. I would make some such statement as this:

"Gentlemen, I don't want to make any formal legal statement. I do, however, want to express my point of view and get the statement on record. I understand my company is being brought in here on the chance that we have, in the past, violated the Sherman Act. Frankly, I don't know whether we have or not. If we have, it was unintentional, because no company in its right mind would deliberately violate a federal statute. Not that we are so holy, but simply that it would be short-sighted and stupid policy. In any event, I am here to help this jury to the best of my ability to get at the truth.

"We are concealing nothing. We have from the beginning made all our records available to the government; we have put special file clerks on the job to accompany the government agents through our files backward and forward; and we have given the government, unhesitatingly, every document they requested. In a few instances, where we have constant use for any specific document, we have had photostatic copies made and given those to the government.

"I want to get this thing straight in your eyes. The government brings us in here, before you, and by that very act it casts a certain suspicion on us. We are already half-way accused of a crime. I want you to note the other side of that coin, too; namely, we have done everything in our power to assist the government in studying our past acts.

#### "Sauce for the Goose"

"I personally do not think we have done anything criminal. Insofar as I am aware, we have never conspired to restrict trade or stifle any competition. True, we have dominated markets in certain products, but those were products patented by the United States Patent Office. That office of the government, in issuing the patents, gave us a legal monopoly of those products.

One other point; if after hearing all the evidence, you decide to bring an indictment against us, that fact will of course be made public and we shall receive a certain amount of not too good publicity. To balance that, may I ask that if on the contrary you decide not to indict us, you will also make public announcement of that fact. What's sauce for the goose, you know. Now,

that's all; and I will try to help you as much as I can to get at the actual truth, whether that means indictment or not."

From then on, the witness should remember that the federal grand jury is sworn to get at the truth without fear or favor to anyone; that the jury is not by any means limited to listening to the government's side. This jury is the most independent body under the democratic system; it can throw out any case, take up any new case, subpoena any witnesses, etc.

#### How To Be a Good Witness

So, if the witness feels at any given point that a certain aspect of matters is not getting the correct light thrown on it, he should *NOT* simply sit there and fret internally; he should say so flatly, and explain fully whatever is in his mind. Unlike a trial, the witness here is not limited to narrow replies to questions; he is expected to contribute to the discussion and give his side. Witnesses obviously do not know this. A witness will do well to suggest the names of other witnesses who might be able to inform the jury more fully on certain aspects of a case, and to suggest further that the jury call them. Expert witnesses are a great help; assistant district attorneys are often surprisingly ignorant of business methods and language.

Many times, jurors interrupt with questions. In Sherman Act cases, these questions are likely to be

favorable to the witness. The juror is attempting to help the witness, not convict him.

The witness should not be subservient or fearful. He is a citizen before a group of fellow citizens, and he should be aware of his rights. What he says, he should have included on the stenographic record; and in the subsequent trial, if there is one, he should endeavor to have the grand jury proceedings made an open part of the trial.

He should not fence with the government attorney; he should not try to give clever answers that have a double meaning. The jury is quick to sense that, and resents it. He should of course not get angry and lose his temper. That doesn't mean, though, that a little normal indignation isn't a help.

He should avoid talking too lightly of millions of dollars. I have seen some members of a jury irritated because a witness remarked quite naturally, that he couldn't recall whether he had spent half a million or three-quarters of a million on a certain development. It sounded ritzy; also, that witness used to arrive in a chauffeur-driven Hispano-Suiza.

He should be friendly and helpful with the government attorney, who probably does not know nearly as much about the case as the witness thinks he does. For example, in the matter of setting a price on a new product; if its actual manufacturing cost today is \$50, your aver-

(Please turn to Page 116)

## Seize Pin Balls To Aid Scrap Drive



NEW YORK police are seizing pin ball machines, salvaging the metal content for war production. Above, Mayor Fiorello LaGuardia poses for a picture with Lewis J. Valentine, left, police commissioner, and Clarence Low, center, city salvage director. NEA photo

# Schwartz Proposes Reorganization And New Program for Scrap Industry

CHICAGO

A FIVE-POINT program and a plan for reorganization of the scrap iron industry were proposed by Benjamin Schwartz, former director general of the Institute and vice president of Schiavone-Bonomo Corp., Jersey City, N. J., at the annual convention of the Institute of Scrap Iron & Steel Inc., Feb. 22. Critical of "time lost and the business-as-usual attitude," Mr. Schwartz urged that the industry "organize itself on a complete emergency basis, to coordinate its efforts with the program of the OPA, the WPB, the United States Treasury Department and all other war agencies, instead of the piecemeal approach and the adoption of pious resolutions." The five points:

**Collection**—Complete integration of the industry in various salvage programs sponsored by governmental agencies.

**Compliance**—Organization of the industry along lines of self-government and self-discipline, to assist in a compliance program with various schedules and regulations affecting the industry.

**Defense Bonds**—The industry should assume a quota of defense bonds to be raised in an organized manner, to the credit of the entire industry, from scrap iron dealers and their employes.

**Civilian Defense**—There are many fields of activity in which an organized industry can enlist the talents and ability of its members in this field.

**Post-War Planning**—What will happen to the scrap industry after the war should be a matter of serious study at present.

## Basic Principles Stated

Mr. Schwartz stated that this type of program should involve certain basic principles of organization, namely:

"1. Five national commissions should be appointed to be responsible for each of the five functions mentioned in the foregoing program, with the most capable chairmen selected from the ranks of the industry.

"2. The executive staff of the industry should be increased by adding a capable attorney, and a reputable economist, who should devote his time to the preparation of the economic data to present to the OPA, as required now under the price control law, to other government agencies involving hearings and presentation of evidence, and to

assist in the post-war planning studies.

"3. The scrap iron dealers should be organized into state committees or associations, for the emergency only, so that the organization will parallel the decentralized programs emanating from Washington, which operate most often along state lines. The various activities in the war program of the industry would then be discharged through the state groups, which should result in doubling the membership of the institute, and which would function on the lines of a federation of state groups under the guidance and di-



Edwin C. Barringer

Elected president, Institute of Scrap Iron and Steel Inc., in addition to office of executive secretary, which he has held since 1938. He formerly was editor of *Daily Metal Trade* and prior to that, managing editor of *STEEL*.

rection of national headquarters and of the national commissions named above.

"4. In the selection of any advisory committees, permitted under the price control law, regional committees paralleling the Federal Reserve districts or some other adequate regional divisions, should be elected by the industry, under democratic principles, and not be hand-picked by any individuals within the industry or by any government official. Those who wish to serve should be willing to submit to an election.

"5. Such a reorganized scrap industry should then seek the co-operation of the other five branches of the waste materials industry. A waste materials conservation council should be formed to comply with the concept at Washington of one basic waste materials industry, so that all branches of the industry

may advise with each other on their common problems and projects involving national defense, without surrendering individual identities.

"6. With the membership doubled, with many capable leaders brought forward in the reorganized program through state and other committees, and with functional activities clearly outlined so that each man would have his place in an over-all, all-out war effort, the full force of the industry should then be directed to the problem of direct-dealing, which is seriously crippling the ability of the industry to serve in this emergency."

Several government officials addressed the sessions, outlining publicized efforts to increase scrap supply. Paul C. Cabot, deputy chief of the Bureau of Industrial Conservation, War Production Board, described state organizations in 35 states and the effort by the Department of Agriculture to gather scrap from farms.

Frank E. Vigor, assistant chief, Raw Materials Section, Iron and Steel Branch, WPB, presented an estimate that "despite the 60,000,000 tons of scrap consumed in 1941 the steel industry in 1942 faces a shortage of 6,500,000 tons." As to allocation of scrap, he said, there are too many sources for application of the plan being used for pig iron.

## Canadian Plan Outlined

Louis Levin, scrap supervisor for the Department of Munitions and Supply, Canada, described the system developed in that country. Maximum prices are enforced by penalties of fines and imprisonment, dealers are licensed and all material passes through the hands of dealers.

Edwin C. Barringer, who has been executive secretary, was elected president and also executive secretary. The following officers were re-elected: Vice president, Philip W. Frieder, Philip W. Frieder Co., Cleveland; secretary, George Sturm, Middletown Iron & Steel Co., Middletown, O.; and treasurer, Everett Michaels, Hyman-Michaels Co., Chicago.

Directors elected for two years are: Max Schlossberg, M. S. Kaplan Co., Chicago; Joseph E. Jacobson, Luria Bros. Inc., Pittsburgh; Herman Moskowitz, Schiavone-Bonomo Corp., Jersey City, N. J.; Darwin S. Luntz, Luntz Iron & Steel Co., Canton, O.; C. C. Cohen, I. J. Cohen Co., Kansas City, Mo.

Directors for one year are: Frank Gordon, Harcon Corp., Boston; Harry J. Kiener, Hickman, Williams & Co., St. Louis; William Wolf, Wolf Co., Hamilton, O.; Abe Cohen, Lynchburg Iron & Metal Co., Lynchburg, Va.; Harry Alvin, Grant Iron & Metal Co., Detroit.

Atlantic City will be host to the next annual convention.

# Canada Provides Heavy Penalty for Violation of U. S. Priority Rules

TORONTO, ONT.

DEPARTMENT of Munitions and Supply announced that for the purpose of preventing misuse of materials delivered to Canadian manufacturers from the United States under war preference rulings, the Wartime Industrial Control Board, has been empowered to prosecute when the terms of a United States preference rating order or certificate are contravened. Penalties

ties officer of the Department of Munitions and Supply, who must approve it before it is forwarded to Washington. Any person who makes a false statement will be subject to the penalties. If a person was accorded, before Feb. 5, a rating under one or more of the preference rating orders issued by Washington, and if he wishes to continue using the rating, he must now sign a certificate to the effect that statements made in the original application were true.

Ralph B. Bell, director-general of aircraft production in the Department of Munitions and Supply, last week stated Canadian aircraft manufacturers have now received orders for upwards of 10,000 airplanes in the country's war program, at a total cost of more than \$500,000,000. Every plant associated with Canada's aircraft industry is booked solid until Dec. 31, and some far beyond that date.

Since outbreak of war the aircraft industry has expanded from an area of 500,000 square feet of floor space and 1000 employees to one occupying 5,000,000 square feet floor space, and employing 40,000.

Two new appointments to the shipbuilding branch of the Department of Munitions and Supply are announced by C. D. Howe, minister. Russell Yuill, on loan from the

National Harbors Board, and who joined the Shipbuilding Branch in May, 1940, has been appointed director of the department. H. J. Leitch, on loan from the Algoma Steel Corp., Sault Ste. Marie, Ont., where he held the position of general sales manager, is appointed assistant to the director general of the shipbuilding branch.

Canada's exports, almost exclusively war materials and supplies, for the month of January reached the record total of \$150,520,000, a gain of 73 per cent over the \$86,921,000 reported for the same month last year. To Russia, at peace a year ago, Canada's exports in January, 1941, were so insignificant no figure was recorded, but in January this year they totaled \$2,743,000.

## Editorial on Page 29

STEEL'S editorial which has appeared in this position each week for a number of years, has been moved forward to page 29. Hereafter it will be found in its new position regularly.

*The Editors*

range up to \$5000 fine, five years' imprisonment, or both. This announcement followed the news from Washington that Canadian applicants will be given the same preference ratings as applicants in the United States.

An application for a rating under the United States preference rating order is routed through the priori-

## Rust-Inhibiting Plate Expected To Save Tin

Parker Rust-Proof Co., Detroit, has released for industrial use a new product for the replacement of tin in the treatment of steel sheets from which cans and other thin metal containers and closures are made. Already several steel companies and one manufacturer who annually produces millions of bottle caps are installing equipment necessary to use the product.

Production capacity of the equipment now on order is estimated as 10,500,000 base boxes annually. A base box is equal to 217.8 square feet of sheet. Use of the new development it is reported will release several thousand long tons of tin for more vital war production.

The product, identified under the present Parker trade-mark name of Bonderite "K," employs a new technique in application, giving high-speed production. Instead of dipping or spraying, the steel sheets pass through all operations, Bonderizing, rinsing and drying, on a series of rubber rollers with the dual capacity of conveyors and applicators. Handling is entirely automatic from feeding to packing the finished sheet.

The new Bonderite, as applied, produces a fine-grained phosphate coating, providing a rust-inhibiting steel "black plate" which, when lacquered or enameled, is successfully used in bending, drawing, crimping, lock-seaming and other forming operations, without serious loss of finish adhesion or effectiveness. With these qualities, the new Bonderizing is applicable for treatment of black plate for use in manufacturing cans, bottle caps and a wide variety of containers.

Recognition is due one of the major can companies for the inspiration which stirred the Parker research organization's interest in such a development some years ago.

## Canadian Factories Build More Depth Charges



CANADIAN war factories are speeding up production of depth charges to intensify the battle against raiding Axis submarines. Here workers force steel plates through bending rolls to form the sides of the receptacles, which are filled with high explosives. NEA photo, passed by Canadian censor

# The BUSINESS TREND



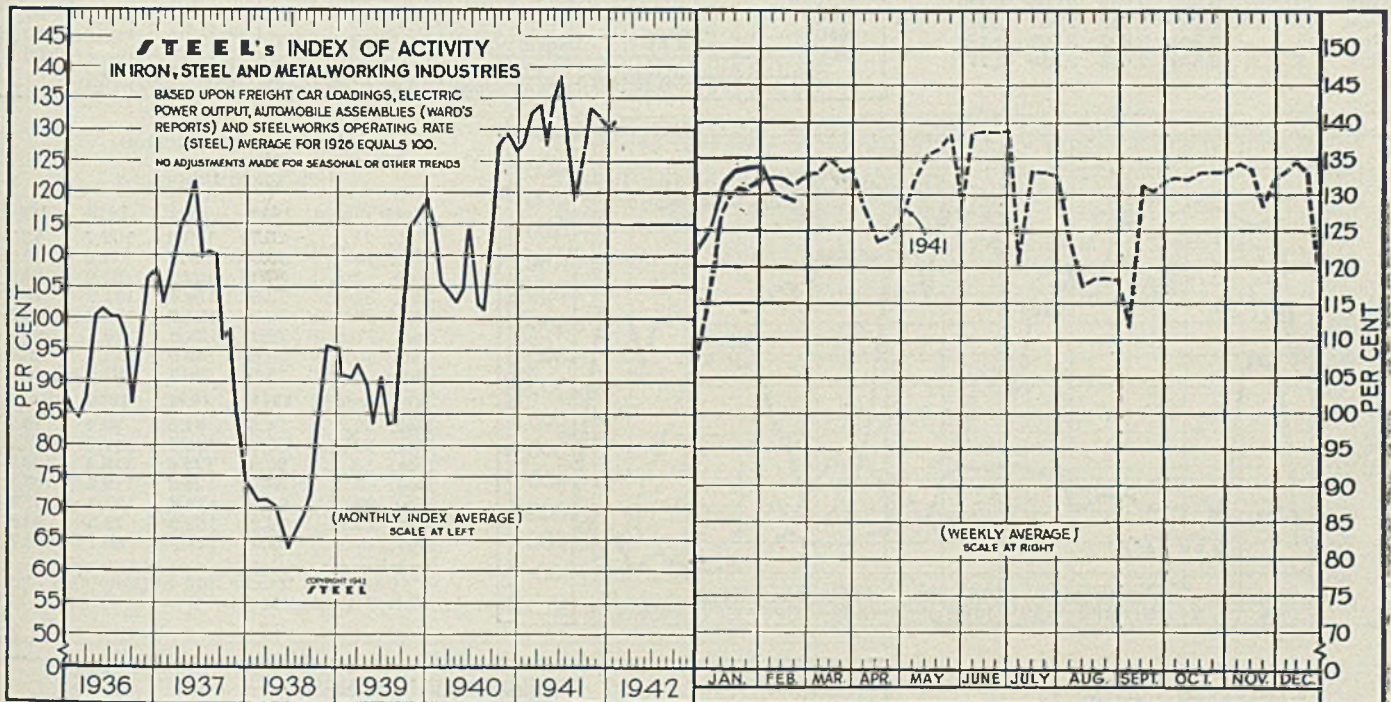
## Activity Index Slightly Lower

Industry-wide changeover to output of war materials continues to restrict the rising trend of industrial activity. Steady curtailment of civilian goods production is contrasted with accelerated gains in war industries. Shortage of skilled labor still remains a major factor retarding output in key industries, although in some sections of the country sharp increases in unemployment rolls has resulted from temporary conversion shutdowns.

STEEL'S index of activity recorded a further slight decline to 129.0 during the week ended Feb. 21. This compares with 129.8 registered in the preceding week

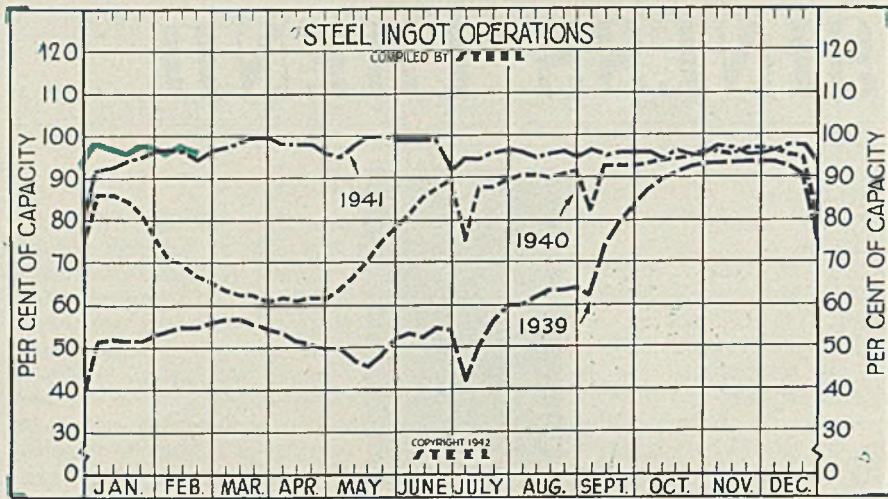
and was also below the 131.2 level recorded in the corresponding 1941 period.

The national steel rate was estimated at 96 per cent during the week ended Feb. 21; based on the new increased capacity figure of 88,566,170 net tons as of Dec. 31 last. A year ago ingot operations were at 94.5 per cent. Electric power consumption edged slightly upward during the latest period to 3,423,589,000 kilowatts, a gain of 14.7 per cent over the like week last year. Truck production in the United States and Canada and passenger car assemblies in the latter country totaled 25,645 units in week ended Feb. 21.



STEEL'S index of activity declines 0.8 points to 129.0 in the week ended Feb. 21:

Week Ended	1941	1940	Mo. Data	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931
Dec. 20	132.9	132.4	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
Dec. 27	120.5	107.5	Feb.	132.3	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5
			March	133.9	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4
			April	127.2	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0
Jan. 3	124.7	114.5	May	134.8	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6
Jan. 10	131.2	128.2	June	138.7	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1
Jan. 17	133.1	130.8	July	128.7	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3
Jan. 24	133.7	130.7	Aug.	118.1	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4
Jan. 31	133.9	132.0	Sept.	126.4	126.4	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3
Feb. 7	130.6	132.7	Oct.	133.1	133.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2
Feb. 14	129.8	132.3	Nov.	132.2	132.2	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4
Feb. 21	129.0	131.2	Dec.	130.2	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)

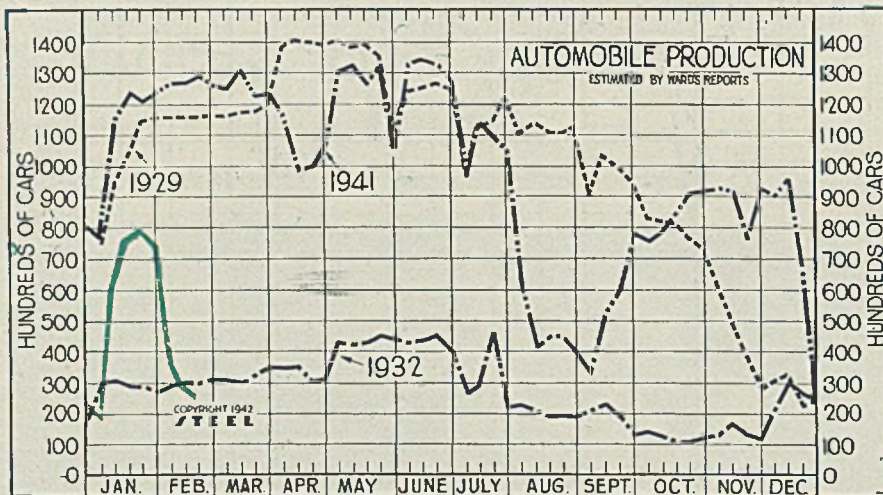
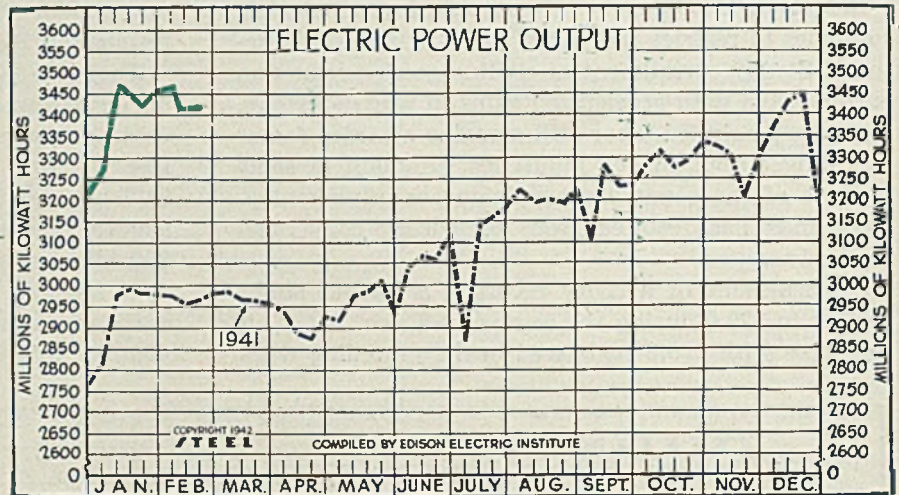
Week ended	1942	1941	1940	1939
Feb. 21.....	96.0†	94.5	67.0	55.0
Feb. 14.....	97.0	96.5	69.0	55.0
Feb. 7.....	96.0	97.0	71.0	54.0
Jan. 31.....	97.0	97.0	76.5	53.0
Jan. 24.....	97.0	95.5	81.5	51.5
Jan. 17.....	96.0	94.5	84.5	51.5
Jan. 10.....	96.5	93.0	86.0	52.0
Jan. 3.....	97.5	92.5	86.5	51.5
<b>Week ended</b>	<b>1941</b>	<b>1940</b>	<b>1939</b>	<b>1938</b>
Dec. 27.....	93.5	80.0	75.5	40.0
Dec. 20.....	97.5	95.0	90.5	52.0
Dec. 13.....	97.1	95.5	92.5	58.0
Dec. 6.....	96.5	96.5	94.0	61.0
Nov. 29.....	95.0	97.0	94.0	61.0
Nov. 22.....	95.5	97.0	93.5	62.0
Nov. 15.....	97.0	96.0	93.5	63.0

†On new capacity.

### Electric Power Output

(Million KWHR)

Week ended	1942	1941	1940	1939
Feb. 21.....	3,424	2,968	2,547	2,269
Feb. 14.....	3,422	2,959	2,565	2,297
Feb. 7.....	3,475	2,973	2,616	2,315
Jan. 31.....	2,468	2,978	2,633	2,327
Jan. 24.....	3,440	2,980	2,661	2,340
Jan. 17.....	3,450	2,996	2,674	2,342
Jan. 10.....	3,473	2,985	2,688	2,329
Jan. 3.....	3,287	2,831	2,558	2,239
<b>Week ended</b>	<b>1941</b>	<b>1940</b>	<b>1939</b>	<b>1938</b>
Dec. 27.....	3,234	2,757	2,465	2,175
Dec. 20.....	3,449	3,052	2,712	2,425
Dec. 13.....	3,431	3,004	2,674	2,390
Dec. 6.....	3,369	2,976	2,654	2,377
Nov. 29.....	3,295	2,932	2,605	2,335
Nov. 22.....	3,205	2,839	2,561	2,248
Nov. 15.....	3,304	2,890	2,587	2,325
Nov. 8.....	3,339	2,858	2,589	2,277



### Auto Production

(1000 Units)

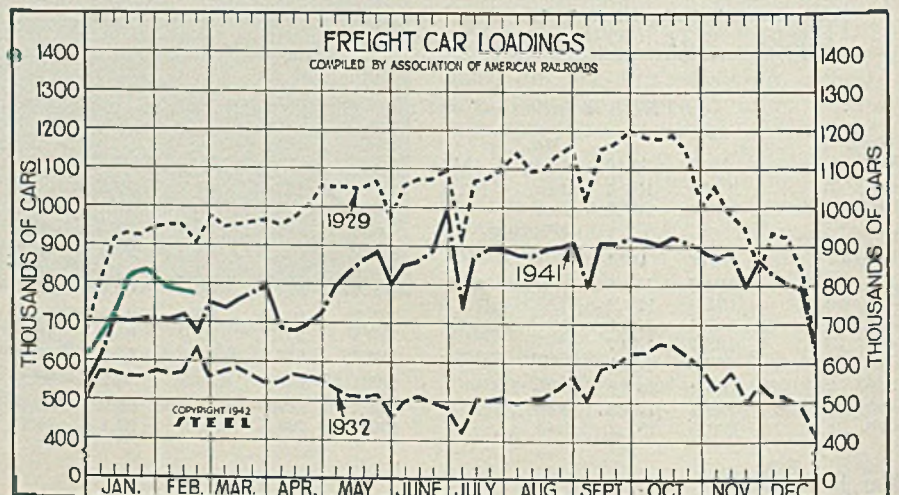
Week ended	1942	1941	1940	1939
Feb. 21....	25.7†	129.2	102.7	75.7
Feb. 14....	29.8	127.5	95.1	79.9
Feb. 7.....	37.1	127.7	96.0	84.5
Jan. 31....	73.3	124.4	101.2	79.4
Jan. 24....	79.9	121.9	106.4	89.2
Jan. 17....	75.0	124.0	108.5	90.2
Jan. 10....	59.0	115.9	111.3	86.9
Jan. 3....	18.5	76.7	87.5	76.7
<b>Week ended</b>	<b>1941</b>	<b>1940</b>	<b>1939</b>	<b>1938</b>
Dec. 27....	24.6	81.3	89.4	75.2
Dec. 20....	65.9	125.4	117.7	92.9
Dec. 13....	96.0	125.6	118.4	102.9
Dec. 6....	90.2	124.8	115.5	100.7
Nov. 29....	93.5	128.8	93.6	97.8
Nov. 22....	76.8	102.3	72.5	84.9
Nov. 15....	93.0	121.9	86.7	96.7

†Canadian trucks and automobiles and United States trucks.

### Freight Car Loadings

(1000 Cars)

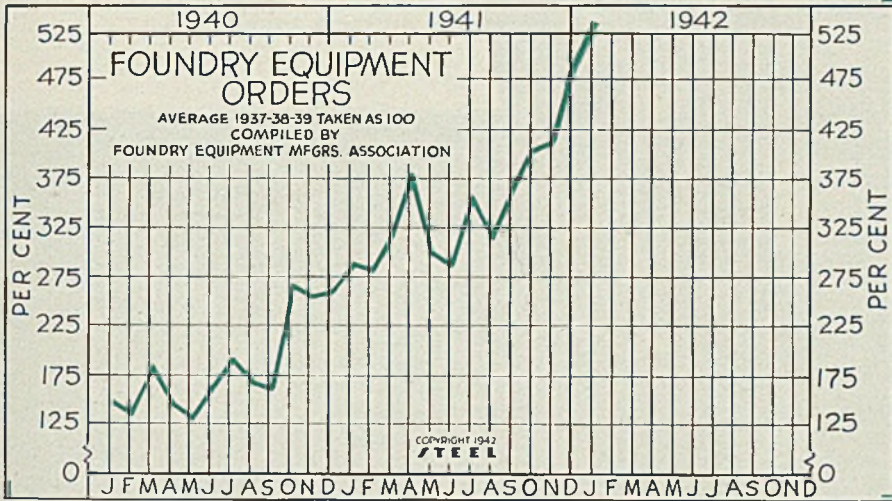
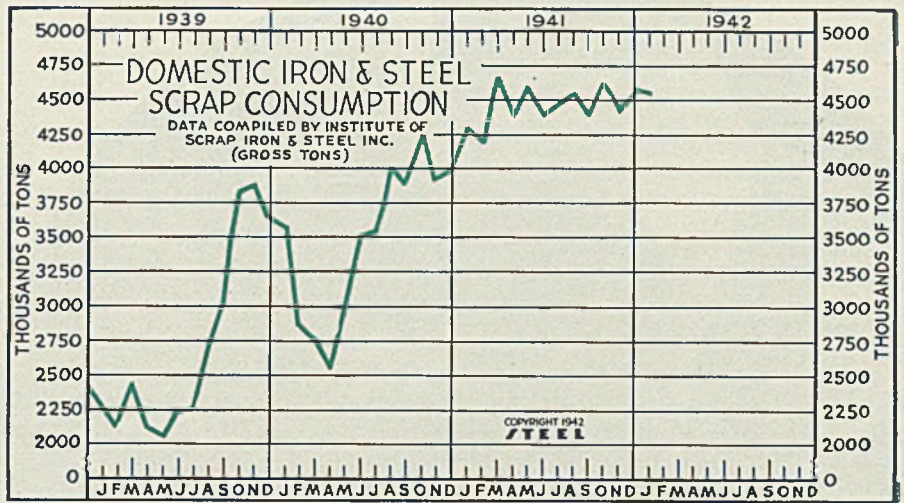
Week ended	1942	1941	1940	1939
Feb. 21.....	775	678	595	561
Feb. 14.....	783	721	608	580
Feb. 7.....	784	710	627	580
Jan. 31.....	816	714	657	577
Jan. 24.....	818	711	649	594
Jan. 17.....	811	703	646	590
Jan. 10.....	737	712	668	587
Jan. 3.....	674	614	592	531
<b>Week ended</b>	<b>1941</b>	<b>1940</b>	<b>1939</b>	<b>1938</b>
Dec. 27.....	607	545	550	500
Dec. 20.....	799	700	655	574
Dec. 13.....	807	736	681	606
Dec. 6.....	833	738	687	619
Nov. 29.....	866	729	689	649
Nov. 22.....	799	733	677	562



### Iron and Steel Scrap Consumption

(Gross Tons)

	1942	1941	1940	1939
	(000 omitted)			
Jan. ....	4,590	4,278	3,581	2,257
Feb. ....	4,172	2,812	2,124	
Mar. ....	4,662	2,728	2,419	
Apr. ....	4,406	2,548	2,114	
May ....	4,609	3,061	2,079	
June ....	4,406	3,482	2,221	
July ....	4,415	3,526	2,247	
Aug. ....	4,518	3,968	2,675	
Sept. ....	4,392	3,876	3,018	
Oct. ....	4,649	4,233	3,809	
Nov. ....	4,482	3,922	3,858	
Dec. ....	4,634	3,950	3,613	
Total ..	53,623	41,587	32,434	
Mo. Av. ..	.....	3,474	2,703	



### Foundry Equipment Orders

Monthly Average

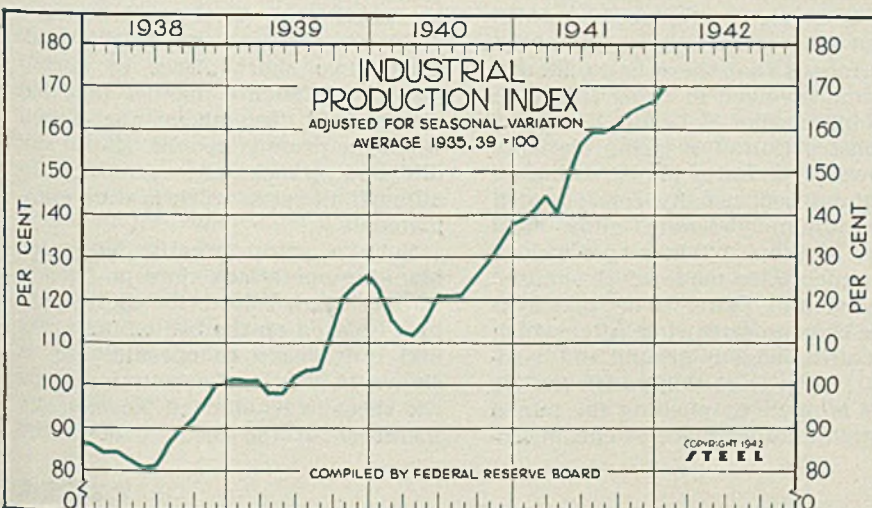
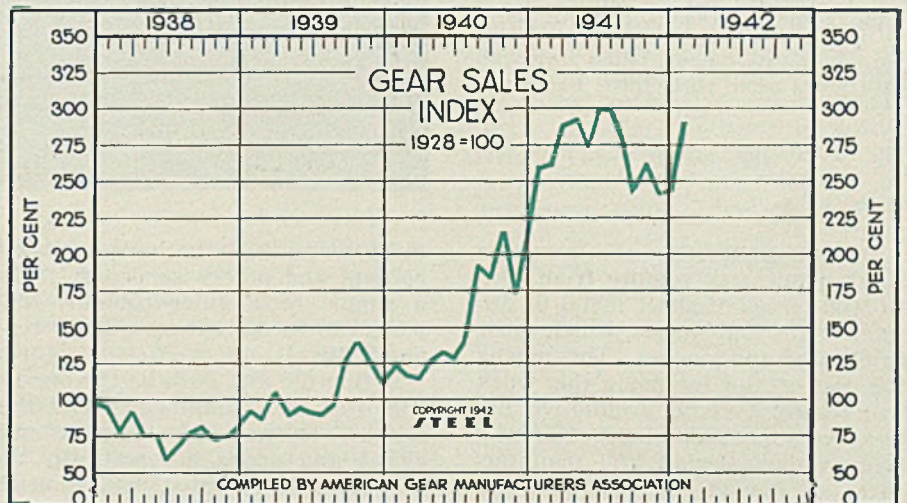
(1937-38-39 equals 100)

	1942	1941	1940
Jan. ....	532.7	285.3	149.0
Feb. ....	.....	281.1	135.7
March ..	.....	315.2	183.2
April ..	.....	377.2	145.2
May ..	.....	298.7	129.1
June ..	.....	281.1	164.9
July ..	.....	358.1	194.4
Aug. ....	.....	312.9	165.4
Sept. ....	.....	363.8	161.2
Oct. ....	.....	403.8	264.0
Nov. ....	.....	408.5	254.2
Dec. ....	.....	481.2	257.8

### Gear Sales Index

(1928 = 100)

	1942	1941	1940	1939	1938
Jan. ....	288	259	123	91.0	93.0
Feb. ....	...	262	116	86.0	77.0
Mar. ....	...	288	114	104.0	91.0
April ..	...	292	128	88.0	74.0
May ..	...	273	133	93.0	70.0
June ..	...	299	129	90.0	58.0
July ..	...	298	141	89.0	67.0
Aug. ....	...	276	191	96.0	76.5
Sept. ....	...	243	183	126.0	80.5
Oct. ....	...	261	216	141.0	72.5
Nov. ....	...	241	173	126.0	72.0
Dec. ....	...	243	208	111.0	81.0
Ave. ....	...	269.6	155.0	103.0	76.0



### Industrial Production Federal Reserve Board's Index

(1935-39 = 100)

	1942	1941	1940	1939	1938
Jan. ....	170	139	122	102	86
Feb. ....	...	141	116	101	84
March ..	...	143	112	101	84
April ..	...	140	111	97	82
May ..	...	150	115	97	80
June ..	...	157	121	102	81
July ..	...	160	121	104	86
Aug. ....	...	160	121	104	90
Oct. ....	...	163	129	121	95
Nov. ....	...	168	133	124	100
Dec. ....	...	167	138	126	101

Year Ave .... 154 122 108 88

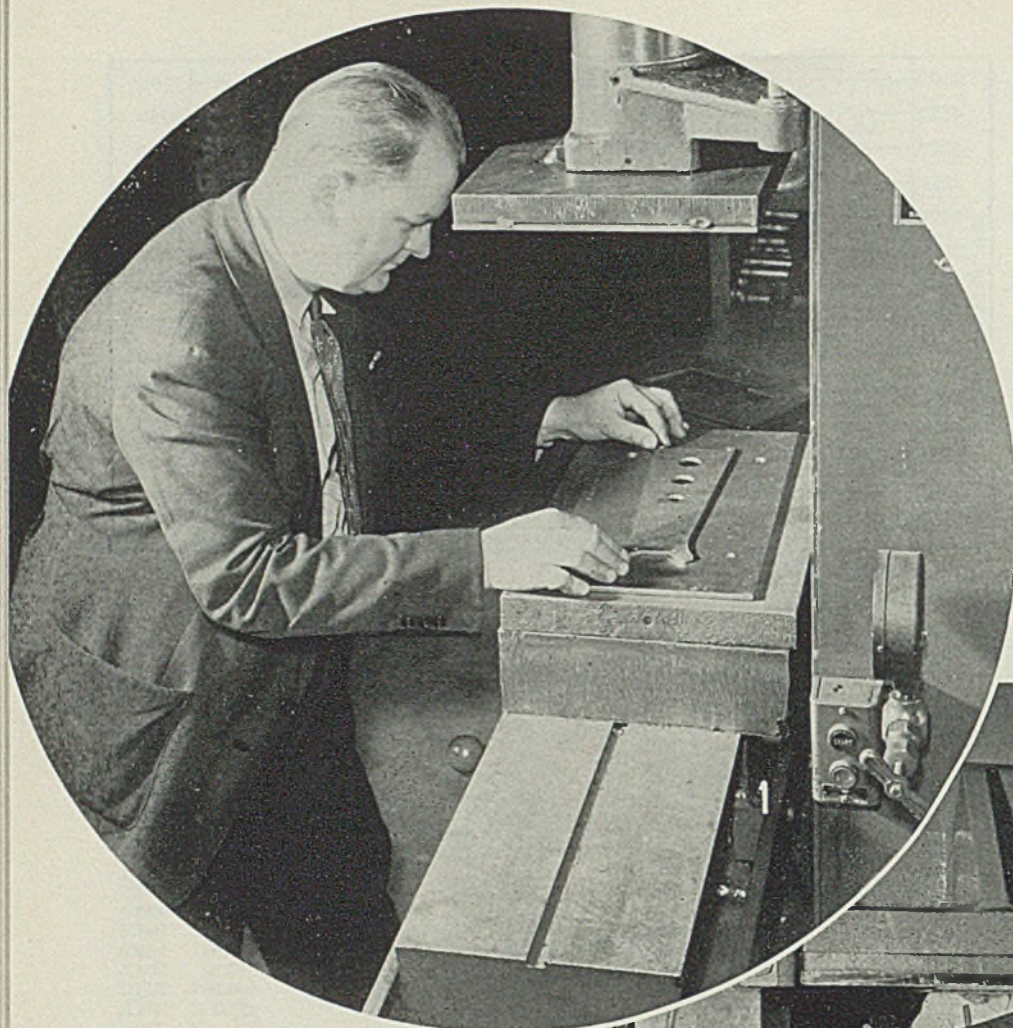


Fig. 1—An operator setting up one of the blanking dies at Bell Aircraft

Fig. 2—Waste sheet being removed from press after parts have been die-cut

Fig. 3—Hinged spring die used for blanking out small parts



# Low-Cost Blanking

By JACOB R. JOACHIMI  
Tool and Die Department  
Bell Aircraft Corp.  
Buffalo

IN PRODUCTION of aircraft, a single plane may require from 4000 to 5000 pieces of sheet metal of different sizes and shapes, which must be blanked and pierced. This means the cost of dies for doing this work may easily become prohibitive unless every possible shortcut is utilized in their design and manufacture. A few of the shortcuts employed in the tool and die shop of Bell Aircraft Corp., Buffalo, are described here.

Possibly the lowest cost die setup is the self-contained spring die and punch shown in Fig. 4. The making of these dies is quite a simple and inexpensive proposition. In most instances it will pay to make such a die when 30 or more identical pieces are required as seldom is more than a few hours' time required to make a complete die and punch setup such as that shown. Wherever it is necessary to trim more than three sides of a piece in a shear, it is usually cheaper to make a die set for that part. Since

most aircraft parts have rounded corners and otherwise depart from a simple rectangular contour, few parts can be cut out on a shear economically.

Spring die sets such as the one in Fig. 4 are self-contained in that the die rests on the bed of the press and closes and opens automatically as the press is operated. As it need not be fastened to the press bed, it may be shifted or replaced by a different die setup almost instantly. This means that there is no die setup time involved in using this type of blanking die.

Construction of a spring die is as follows: The lower plate, resting on the press bed, usually consists of a chromium-molybdenum alloy steel plate. On top of this is spot welded the punch, also made of chromium-molybdenum plate. The punch is made by contour sawing, after which the cutting edge is ground and hardened. Then from this punch the die itself is made by pushing the punch through another piece of chromium-

molybdenum steel (which has been soft annealed). A hydraulic press using rubber pad is employed to stretch the blank over the cutting edges of the punch, thereby shearing it to the outline desired.

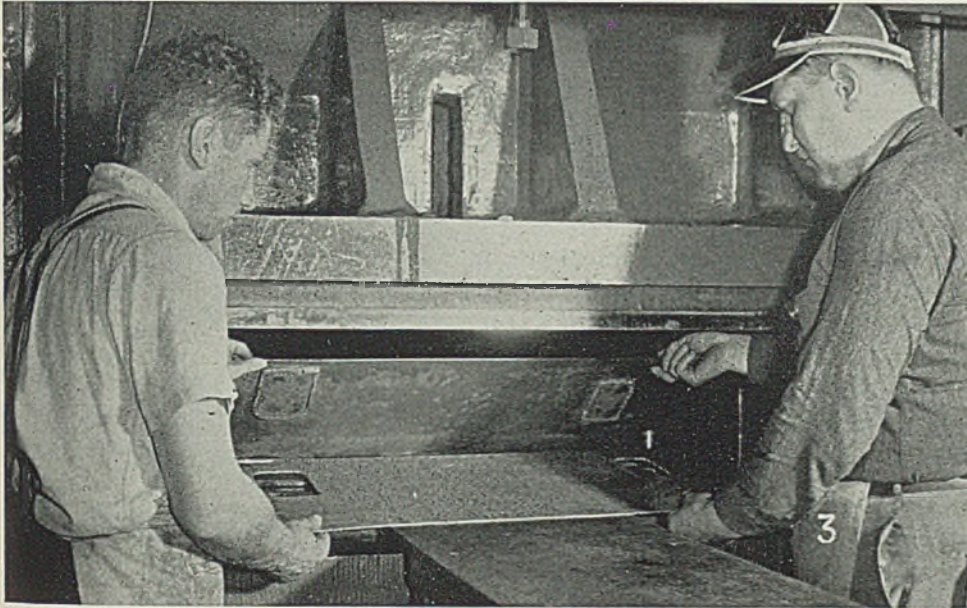
Or it is possible to saw out the opening of die first and make the punch from this. In either instance a 15-degree bevel is made on the cutting edge as the outline or contour is sawed out. The punch is spot welded to the base and the die welded to two short pieces of spring material in such a manner that the die is held free above the punch when the press is opened. Since the die and punch are permanently aligned, all setup work is thus eliminated.

Such a setup greatly facilitates blanking operations since no die setup work is involved, the die merely being placed on the bed of the press and it is ready to operate. As is shown in Fig. 4, the operator feeds the sheet to be blanked between the members of the die. A table the



# and Piercing Dies

... employ many novel ideas to increase production, cut blanking and piercing costs to the minimum in aircraft work where many different shapes must be produced from sheet metal



same height as the press bed facilitates sliding the sheets into the die. The blanked-out piece is easily pushed through the die by the operator as the press opens after each stroke, thus making removal of the blanked piece easy.

**Stripping:** To afford a positive means of opening the die at completion of each stroke, a rubber pad or strip is fastened to the bottom plate all around the cutting edge of the punch. As the pressure is removed from the die by the upward motion of the press ram, the compressed rubber pushes the top member of the die upward, freeing the die sections. In a similar manner, rubber strips are used to strip the work on the hinge dies which will be described below.

Such a self-contained spring die is easily capable of blanking out 50,000 pieces of 0.064-gage ST Dural in the fully hardened condition. Typical of the pieces handled is a rectangular door 4 x 8 inches. At the same time, such dies are capable of

cutting up to  $\frac{3}{8}$ -inch chromium-molybdenum sheet material in the annealed condition.

**Hinge Dies:** For larger and more complicated work, the spring die is made as a hinge die. About the only difference between the two types is the fact that the punch and die members are hinged along one edge instead of being welded to springs to provide the vertical movement desired. The hinge, of course, keeps the two members of the die set perfectly aligned. Fig. 3 shows a typical hinge die. It will be noticed that rubber is used around the edges of the punches here also to strip the work. Hinge dies are used in sizes up to 96 inches long. Quite a number are 76 inches long. Holes as small as  $\frac{3}{8}$ -inch in diameter are blanked out satisfactorily.

Frequently the part blanked out is to be offset a small amount near the center or along diagonals to strengthen and stiffen the piece. Quite often it is possible to make offsetting dies similar to those for

blanking. A typical part that is offset is a  $\frac{1}{4}$ -inch gasket holder, a comparatively small circular piece. These are blanked and formed from 0.040-gage SO Dural, 4000 pieces being a usual shop order.

These die sets utilize a system of pins in the die bed so any die can be set up in any press in about a minute's time. This standardization of die mounts eliminates the need for a diesetter's services as any of the press operators can set up any die set. This means no production time is lost in starting the work, and maximum production is obtainable from the presses.

Not the least of the economies made possible by these sheet dies is the small storage space required for them. In a rack only 20 feet long, 8 feet high and 5 feet wide, more than 3500 die sets are stored, and the rack is by no means full. Thus a relatively small number of these racks can make an extremely large number of die sets available for instant use.

Five 70-ton eccentric or crank-type presses made by Niagara Machine & Tool Works, Buffalo, handle a large share of the blanking operations in this department. Average production rate is some 1000 pieces per hour per press. This rather high overall output is due in no small part to the elimination of die setup time.

The ability of the sheet dies described to handle production runs has been well established as such a die will usually blank some 50,000 pieces of full-hard Dural in gages up to 0.064-inch without excessive wear. The same type of die has been used even to blank out wrenches from  $\frac{3}{16}$ -inch molybdenum alloy steel.

**Piercing:** Practically every piece that is blanked must be pierced for rivet holes, either for mounting brackets or assembly to other plates. As many as 96 holes are pierced at one stroke with a simplified type of piercing die set. The upper member of this die set carrying the punches is faced with rubber which acts as a stripper. To cut cost, many of these dies employ punches made from drill rod of the exact size desired. The end of the drill rod to be mounted in the die plate is first squeezed in a vise to flatten it slightly, and then it is driven through a tight fitting hole in the base plate, the flattened portion securely locking the punch in place. Minimum diameter of such punches is 0.098-inch, and as many as 96 holes of this diameter are punched in a single piece of work. Such a die, as well as the spring blanking die sets, complete and ready to use may cost as little as

(Please turn to Page 68)

THE ACCOMPANYING illustrations were taken for STEEL, by the Buick Motor Division of General Motors Sales Corp., Flint, Mich., to show forging practice employed in making modern automotive-type crankshafts. It will be noted that the sequence of operations is such as to take full advantage of the original grain flow in the rolled bar to the end that the final grain flow closely follows the contour of the crankshaft in the completed forging. This helps avoid end grain, especially important in fillets where fractures have a tendency to start.

Also it will be noted that the forging of this complicated and highly stressed shape is greatly facilitated by forging all cranks in the same plane and then subsequently twisting the sections to rotate the cranks into their respective positions around the main axis of the shaft. This avoids the extremely difficult task of forging the cranks in their final position, shown in Figs. 8 and 9. Not only is this procedure much easier as far as designing the dies and manipulating the work during forging but the twisting action also is said to strengthen the shaft further due to the additional hot work given the metal at those points.

# Forging

## BUICK CRANKSHAFTS

*... is greatly simplified by making all cranks in one plane and then twisting the piece to rotate the cranks to their respective positions*

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

*(Section IV in a Series on Forgings, Forging Practice and Forging Equipment)*

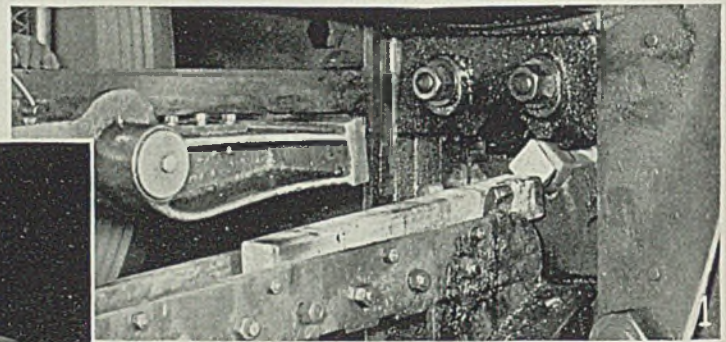
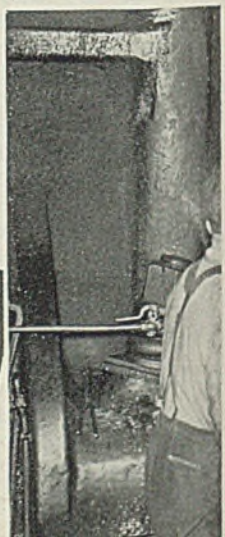
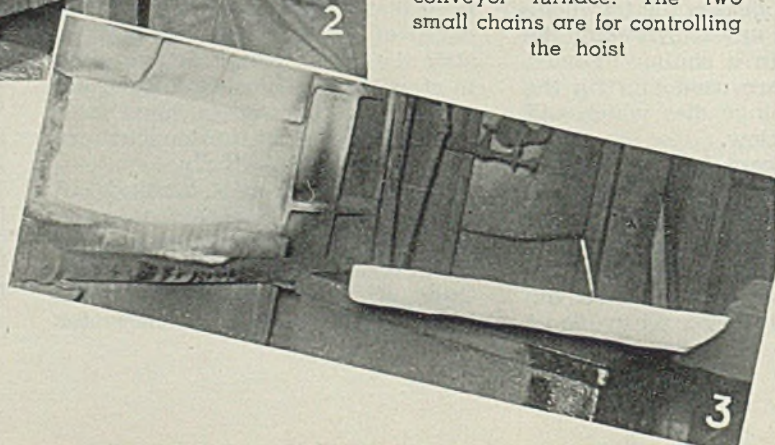


Fig. 1—First step is to cut pieces 38 inches long from round-cornered bar stock which is 4 inches square in section and 190 inches long as it comes to the shear. Huge machine shown here exerts a pressure of 1,120,000 pounds in cutting the bar. Narrow roller conveyor takes sheared lengths away. Bars are pushed against heavy stop seen just above conveyor, this being set to the length desired

Fig. 2—Some stock is die-rolled at the mill. This preliminary forming is done at the same time the final rolling takes place in the mill, is sometimes called a preforming operation. Rolls of mill pass can be formed to produce a wide variety of shapes in the bar. Note special C-hook with handle for loading the heavy bars upon the pusher-type conveyor furnace. The two small chains are for controlling the hoist



Fig. 3—Heating furnace holds approximately 100 pieces, heating being a continuous operation due to frequent pushes made by the loading mechanism, Fig. 2. Here a billet, heated to 2350 degrees Fahr. is being discharged from the furnace. Stock is SAE 1045 steel containing 0.43 to 0.50 per cent carbon, 0.60 to 0.90 per cent manganese



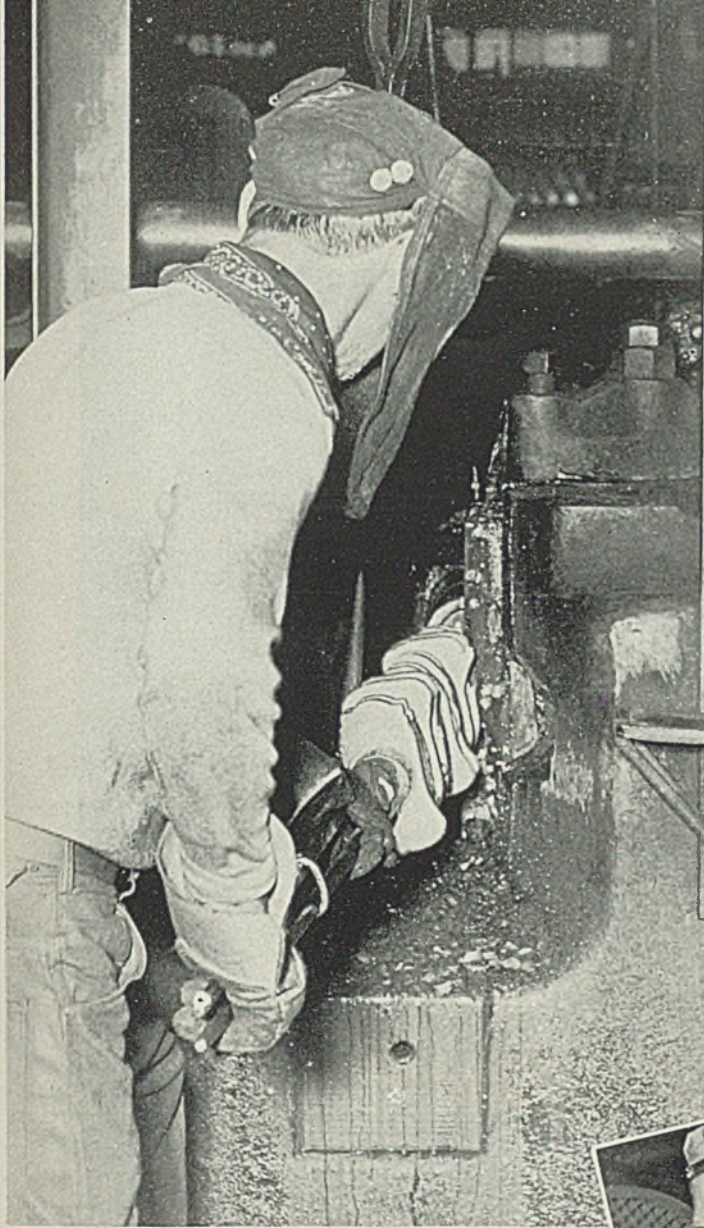


Fig. 4—Huge steam hammer exerts a pressure of 320,000 pounds per square inch. In the first of two operations on Buick crankshafts, it is used to form cheeks in one section of the dies; then in the finish impression die section, the shape is further developed. Operator at right employs air gun to keep dies clean by blowing out dirt and scale. Center man manipulates stock under the hammer. Workman at right operates the hammer controls. Portion of high-powered blower can be seen at lower left. It helps dissipate heat from work by blasting cooler air into the working zone.



Fig. 6—Now the forging has been swung into place under the die of the trimming press which will trim off the flash. A certain amount of flash must necessarily be formed in the forging operation in order to create sufficient pressure in the dies to force the metal to flow into and fill completely all cavities of the dies. In this view the already partly cooled balancers are noticeable by their darker color

Fig. 7—The heavy flange on the flywheel end of the crankshaft is now formed in this upsetter. Dies close to clamp the work tightly from the sides while a heavy pressure is exerted on the end of the piece to produce the upsetting desired. Upset flange is clearly discernible at the extreme right end of the piece in Fig. 8. Placing of work in the upsetter is facilitated by a C-hook hung from an overhead cable to carry the weight of the forging

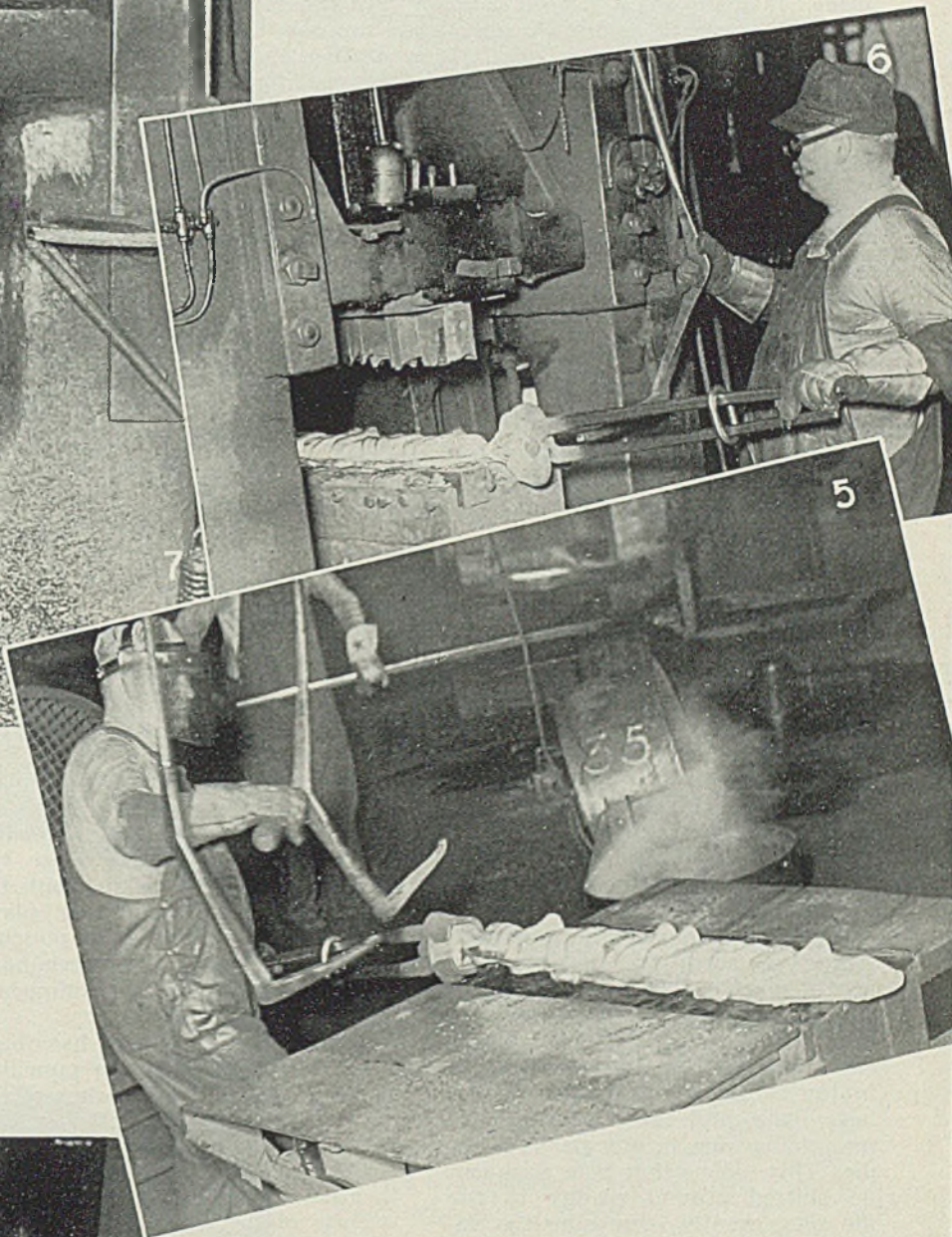


Fig. 5—Here the balancer weights forged on the crankshaft are being cooled by immersing just their tips as shown. Note that main body of forging is not immersed here since it is desired to keep its temperature up to permit trimming the flash while hot. Operator cools first one set of balancers, removes work from tank to adjoining bench, turns it over and places it back in the quench to cool other side. He is shown about to engage a C-hook (suspended from an overhead cable) into his tongs, which will then make it easy to swing the work over to the next operation—trimming

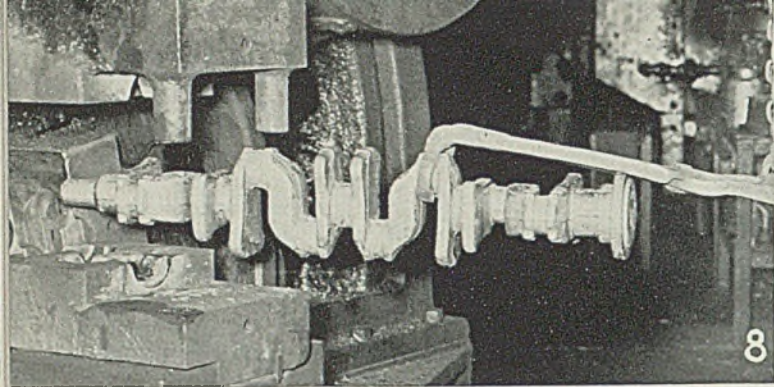


Fig. 8—Crankshaft is forged with all throws in the same plane. Then forging is clamped between these two sets of dies and twisted 90 degrees between throws two and three, thus placing cranks one and two in position. Then forging is again inserted in machine and twisted between throws seven and eight. This places throws one and two, seven and eight in a plane at right angles to throws three, four, five and six. One of the three main bearings is located at each end, the third in the center of the piece. Twisting greatly simplifies the forging problem since it permits all throws to be forged in one plane. Compare this with the exceptionally complicated forging dies and procedure that would be necessary were the crankshaft forged with all cranks or throws in final position

Fig. 9—Load of finish forged crankshafts on way to machining department. Note the heavy flanges that are upset on the right-hand ends here. Forgings are moved about on heavy steel pallets by means of power lift trucks traveling over concrete roadways that connect the various buildings and departments



## Blanking Dies

(Continued from Page 65)

\$2.

The die (lower member of the die set) is made using the hardened punches of the upper set. Holes so formed are enlarged by drilling to get the desired clearance. Then cutting edges of die are hardened locally as will be described.

Most punches, however, are not made from drill rod but are made from bar stock on an automatic screw machine to the form of a standardized design. The stock or base of all of these punches is the same diameter so they all will fit in the same mounting hole in the base plate, and thus any punch is interchangeable in any part of any die. This means that hole sizes can be shifted around readily in the die sets, greatly increasing the varieties of work that can be handled.

Standardized punches differ only in the diameter of the tip, which of course is made to the size hole which is to be punched. The base of the punch extends through the mounting plate a small amount and is attached to the mounting plate by tack welding around the base on the back side. Standardized punches are removed by cutting loose the tack welds and knocking out the punch from the mounting plate. This interchangeability of punches allows hole sizes to be interchanged at will on the work to accommodate design changes easily.

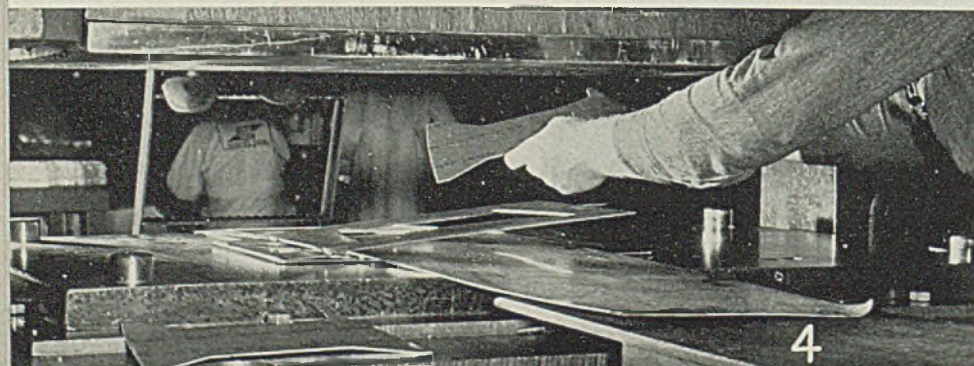
Another trick which has been found a valuable help in punching is to set the pins or punches so the

punched out pieces stay in the sheet as it is removed from the dies, thus eliminating the necessity of removing each piece of punched out material individually. By hitting the sheet against the table after it is removed from the dies, all of the pieces are knocked out of the blank simultaneously. This little kink is credited with saving much time in punching operations.

**Heat-Treating Shortcuts:** Of course all cutting edges of dies and punches must be hardened effectively to withstand deformation of the blanking and piercing operations, and also to withstand the wear encountered in high production runs. The interchangeable standardized punches are hardened before mounting into the die sets, but many of the other cutting edges are treated by local flame hardening. A special torch setup is employed to carburize and flame harden the cutting edges.

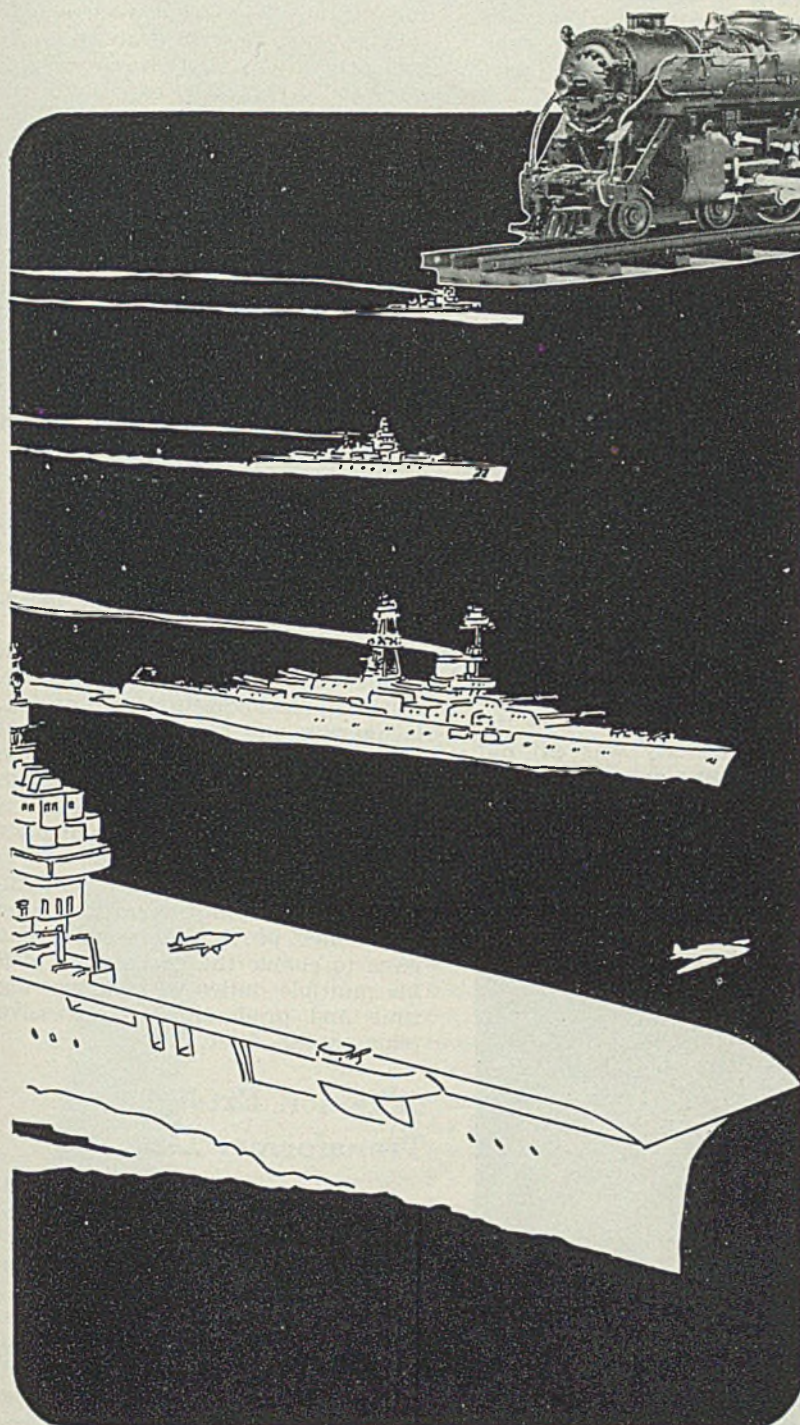
It consists of two tips mounted on a holder and burning acetylene only. The two tips are held at an angle so they straddle the edge to be hardened. Alongside and just a short distance from these two tips is a water jet nozzle. In operation, the cutting edge of the die is heated, carburized and hardened in one quick operation. Of course the technique of doing this is something

Fig. 4—Self-contained spring die is one of most economical designs for both sections of this die are permanently aligned. Die is set up for operation merely by laying on press bed



# Model trains changed into Naval instruments

*...through cooperation between Lionel and Revere*



It's hard to say who gets the more enjoyment out of Lionel electric trains and accessories . . . a boy or his father. But it is certain that both are experts in appraising the accuracy and *realness* of scale models. So the Lionel Corporation has had long experience in precision manufacturing for this ultra-critical market. And that proved the best of preparation when Lionel got into the production of Naval instruments in addition to model trains.

But any departure as great as this is sure to create problems. Not only did new equipment have to be selected, but the brass to be used was of a different analysis requiring entirely new methods.

Here is where a Revere Technical Advisor was able to perform an essential service. Revere's exceptional knowledge of brass, of fabricating processes and methods, aided Lionel greatly in setting up all the new operations and fitting them smoothly into volume production.

In this way Lionel has quickly taken an important place in America's war effort . . . and Revere once again has been able to contribute both the metals and the specialized knowledge of copper alloys which have sped so many such projects forward to success. Through the Revere Technical Advisory staff this same service is available to you. Why not get in touch with Revere now?

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which must be mastered first before satisfactory results can be obtained. The edge must be retained at heat long enough to absorb some of the carbon from the flame, which means that the torch must be moved along the edge slowly.

However, this method of localized hardening of the cutting edges is extremely simple and economical, being largely responsible for the low cost of many of the dies produced here.

That a good hard cutting edge is produced is evident from the fact that the punches of blanking dies are easily pushed through chromium-molybdenum sheets to form the female portion of the die, once the cutting edges of the punch are hardened by this method.

This localized hardening in combination with localized annealing also makes it possible to change the blanking and piercing die sets to accommodate design changes without the necessity for making an entirely new die or holding up use of the die for a long sequence of heat treating and remaking operations.

**Localized Flame Annealing:** Suppose, for example, a certain part is redesigned to require a larger or smaller cutout section. This often is the case with structural members of aircraft as the design changes may involve larger or smaller openings. To make a larger cutout, a piece exactly the size of the additional stock to be removed is sawed out and then spot welded alongside

the other portion of the punch in the die, and the cutting edges hardened. The opening in the lower or female section of the die must be enlarged to match the punch. But since this is hardened steel it must first be annealed by localized flame annealing. In spot annealing, it is most important that the operator does not heat the metal to be annealed above the critical range as the surrounding cold metal will extract heat so rapidly as to have the same effect as a quench, so the part ends up harder than before.

Ordinarily between 1200 and 1325 degrees Fahr., just below the critical, is the best heating range. The oxyacetylene torch should be adjusted by adding oxygen so there is a sharp blue-colored cone at the tip. This enables the operator to see the temper color of the work. With the sharp end of the cone approximately  $\frac{1}{4}$ -inch from the work, a deep blue ring will appear on the work after about 3 to 8 seconds' heating. When annealing along a line, the torch must be moved over the surface at a constant speed so the ring of blue on the work precedes the cone by approximately  $\frac{1}{2}$  to  $\frac{3}{4}$ -inch, depending upon tip size used.

Once the lower die section is annealed, the corrected punch may be used with a rubber pad to push out the excess metal.

Similarly, when it is desired to correct a die set so a portion of the sheet which formerly was cut out now is left continuous, it is a relatively simple matter to remove that

portion of the punching element from the die set and to fill in the die by welding the punch back into that section of the die. All of the above references refer to dies and die sets made from plate approximately  $\frac{1}{8}$ -inch thick, although some die sets may use a slightly heavier material in the backing-up or mounting plate.

It was not so long ago that tool and die operators said such shortcuts as those described above were not practicable and would never work out. However, experience at Bell Aircraft shows that a die designer with ingenuity and knowledge of his materials can do wonders in getting costs down and increasing production by such unconventional operations as those detailed.

## Egg Timer Solves Finishing Problem

An ordinary 3-minute egg timer of the hour-glass style employed by Oliver Iron & Steel Corp., Pittsburgh, in conjunction with a repetitive finishing process on small bolts was responsible recently for considerably increased production and the establishment of a fair wage incentive.

The process—a multiple-operation bolt-lacquering job involving loading, washing, rinsing, centrifugal drying, lacquering and centrifugal removal of excess lacquer—presented the problem of timing the complete cycle of operations to establish a wage incentive in the company's screw machine department.

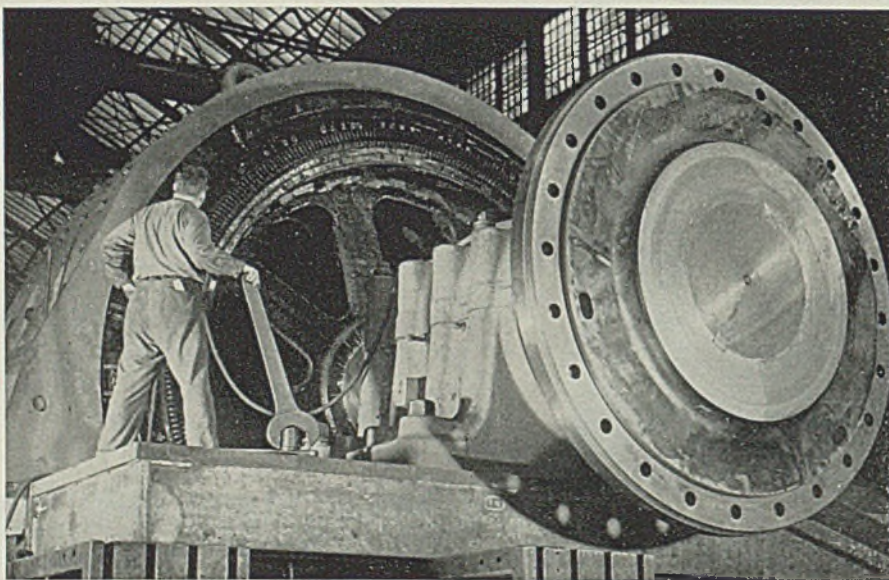
Besides scheduling the centrifugal lacquer-drying operations, the egg timer provides a visible time gage to enable the operator to plan his multiple duties without wasting time and production by excessive trips to the drier.

## Jefferson Extends Transformer Line

The indoor air-cooled power circuit transformer line of Jefferson Electric Co., Bellwood, Ill., has been extended to include transformers in capacities of 25 to 150 kilovolt-amperes according to a recent company announcement. These are designed to provide 115 volts for operation of lighting circuits, individual lighting for machine tools, welding machines and other production units.

Besides making unnecessary the installation of a low-voltage system, use of these transformers is said to effect savings of copper, conduit, installation time and power costs. Units are self-contained, equipped with roomy wiring compartments for primary and secondary connections.

## Giant Power Units for Giant Task



VIEW ABOVE shows one of two Westinghouse 5000-horsepower direct-current motors installed recently in the 55-acre plant of Aluminum Co. of America. Installed as part of a \$200,000,000 war expansion program, each drives a 96-inch reversing hot mill that rolls aluminum ingots into slabs. Each of the 480,000-pound units is driven by a 4000-kilowatt generator set powered by a 6500-horsepower synchronous driving motor

# ARE YOUR SHEAVES

**HARD ENOUGH...**

**OR...**

**LARGE ENOUGH?**

FOR long rope life make certain your sheaves are of hard, wear-resisting metal. Soft sheaves wear rapidly. Once worn (and often corrugated) they both pinch the rope and develop a filing action. *Never put a new rope on a worn, scored or corrugated sheave.* Select the proper sheave material, depending on the rope pressures encountered. Any American Cable engineer will gladly give you the benefit of his long experience.

And sheave diameters are very important too.

*If the sheave is too small, the sharp bend imposed upon the rope induces high bending fatigue and early rope destruction.* To appreciate the importance of using correct diameters note that a 1" rope of 6 x 7 construction requires a 42" sheave while a 1" rope of 6 x 41 construction requires but an 18" sheave.

For average operations here is a table setting forth the proper minimum sheave diameters for ropes of varying constructions:

for 6 x 7 Construction . . . . .	42 times diameter of rope
for 6 x 19 Seale Construction . . . . .	34 times diameter of rope
for 6 x 16 Filler Wire Construction . . . . .	30 times diameter of rope
for Flattened Strand (Type B & G) . . . . .	30 times diameter of rope
for 8 x 19 Seale Construction . . . . .	26 times diameter of rope
for 6 x 19 Filler Wire . . . . .	26 times diameter of rope
for 6 x 22 Filler Wire . . . . .	23 times diameter of rope
for 8 x 19 Warrington . . . . .	21 times diameter of rope
for 8 x 19 Filler Wire . . . . .	21 times diameter of rope
for 6 x 37 Seale . . . . .	18 times diameter of rope
for 6 x 41 . . . . .	18 times diameter of rope

Paying attention to your sheaves pays dividends in longer rope wear, less trouble and steadier production. Specifying **TRU-LAY PREFORMED** pays dividends in the same way. Consult your nearest American Cable wire rope engineer. All American Cable ropes made of Improved Plow Steel are identified by the Emerald Strand.

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

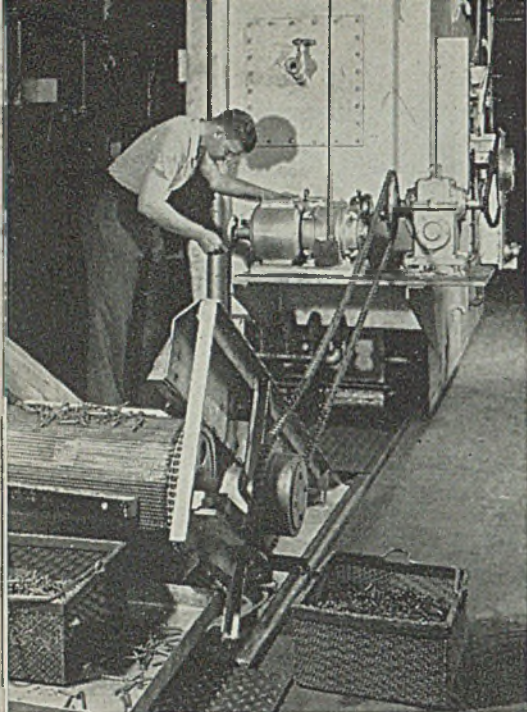


Fig. 1—Newest type of controlled-atmosphere continuous-conveyor type furnace for heat treating aircraft bolts and screws. Furnace discharges continuously into quench and separate conveyor removes parts from quench automatically

**BOLTS AND** screws of practically all types are today being produced by cold heading, almost to the exclusion of other methods where quantities required are sufficient to warrant an investment in heading dies. In addition, a great variety of other items are produced by cold heading. Even the exacting specifications for aircraft bolts and screws are now being met by cold-headed products.

Many cold-headed items do not require a heat treatment since strength, toughness and hardness may be adequate. But all aircraft bolts and screws as well as those for highly stressed automotive applications and other classes of work are passed through a carefully designed and controlled heat-treating cycle.

Well over 50 per cent of the cold-headed products made by the Lamson & Sessions Co. are heat treated. These are primarily bolts and screws, but many other cold-headed products are also treated. The proportion of nuts heat treated is smaller, though still a large volume.

Most customers specify not only the analysis of the steel used but

## Heat Treating

# COLD-HEADED PRODUCTS

... involves use of flexible heat-treating equipment, conveyors and other aids for handling large volumes of small parts

By HERBERT CHASE

also the physical properties required. Lots handled through the heat-treating department are often very large but, as much of the work is for special orders on which specifications vary widely, it is necessary to have a flexible setup capable of meeting the full range of requirements.

Of course, heat-treating cycles vary widely with type of work, but typical hardening and drawing cycles are given in Table I which also lists the physical properties that are produced for these different types of material.

Some idea as to the extent and character of the heat-treating equipment employed here can be had from the accompanying illustrations. The heat-treating department occupies a large room on the top floor of the plant and is equipped with roller conveyors, overhead trolley cranes with floor controls and electric hoists for lifting the steel containers in which the work is handled in batches. Some belt-type conveyor furnaces are included. Partly because of the diversity of parts handled, about half of the equipment is of the batch type.

Along one side of the room there is a battery of hardening furnaces, each having its own quench tank and its own conveyor. Most of the remainder of the department is given over to drawing and low-temperature-annealing equipment, all of the furnaces there being of the batch type with recirculating atmospheres. The quenching units serving these furnaces are entirely separate, one oil quenching unit and

one water quenching type serving all the drawing furnaces.

Most of the hardening furnaces are of the rotary retort type arranged for firing with natural gas and for maintaining controlled atmospheres. In some, provision is made to use an atmosphere of natural gas for carburizing to build up surface hardness. In others, the atmosphere is partly burned natural gas, high in carbon monoxide and low in carbon dioxide. In this type, no scale is formed and the product issues relatively bright. There are also electric furnaces in which the work is advanced by an alloy steel mesh belt upon which work is charged continuously and is discharged in the same manner. In these furnaces, the temperature is increased gradually through three stages or firing zones and finally is discharged into the quenching tank. These units employ an atmosphere of partly combusted natural gas.

### Treatment Varies

The type of heat treatment varies to meet customer requirements, but controls are arranged to produce uniform results.

Quenching tanks are especially designed for rapid agitation of the quench and to cool it by water circulation. The batch-type furnaces are never dumped rapidly into the quench tanks, but a hand rake is used to discharge the contents slowly.

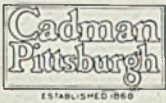
All of the parts fall through the quenching medium upon a moving wire belt conveyor which carries the parts through the tank and also helps to distribute the heat, ultimately discharging the parts, when cooled, into containers for transfer to the drawing furnaces. Much of the work, particularly the smaller sizes and diameters, is quenched in oil. Quenching of large parts may be done in water.

In the continuous electric hardening furnaces, the temperature in each of the three heating zones is subject to automatic pyrometer control. It is also possible to control the speed of the conveyor belt to ac-

TABLE I—Typical Heat Treating Cycles and Physical Properties Produced

Type of Product	Typical Alloy Steel Bolt	Typical Aircraft Bolt	Typical Automotive Bolt
Size of bolt, in.	$\frac{3}{8} \times 2\frac{1}{2}$	$\frac{3}{8} \times 1\frac{1}{2}$	$\frac{3}{8} \times 1\frac{3}{8}$
SAE steel No.	2335	2330	1035
Length of heat treatment, min.	30 at temp.	30 at temp.	30 at temp.
Temp. at quenching, degrees Fahr.	1550	1500	1580
Type of quench	oil	oil	oil
Temp. of draw, degrees Fahr.	1100	1000	1120
Length of draw, min.	60 at temp.	60 at temp.	60 at temp.
Physical Properties After Heat Treatment			
Tensile strength p.s.i.	120,300	126,600	109,600
Yield strength, p.s.i.	104,000	110,400	93,400
% Elongation in 2 in.	28	19	22
% Reduction of area	63	63	60





## A.W. CADMAN MANUFACTURING COMPANY

MASTER MAKERS OF FINE BEARING METALS

2816 SMALLMAN STREET

PITTSBURGH, PA.

A pertinent question to all users of tin base babbitt metal.

### WHAT CAN I DO TO HELP WIN THE WAR?

This is the top question in the mind of every American. It is the only real factor affecting decisions in industry today, and it is the only object of industrial production. Therefore, every step taken by industry must be taken only if it can answer this question - Will it help us win the war?

The A. W. Cadman Manufacturing Company has made such a decision. For more than eighty years we have been producing fine bearing metals - literally to keep the wheels of industry moving - and we intend to keep on this course to our full abilities.

Unfortunately, however, this easy course is not sufficient, with the fall of Singapore and the threat to the Netherlands Dutch East Indies, from whence approximately 80% of the world's tin production has originated, it is quite inevitable that our country will suffer an extreme shortage of tin and our precious supplies must be conserved. It is, therefore, the plain duty of every producer of babbitt metal and other consumers of tin to minimize the use of tin in his product, excepting only where substitution of other materials is impracticable.

To this end, therefore, the A. W. Cadman Manufacturing Company pledges its all out effort in curtailing the use of high tin base babbitt metal - and to encourage as a substitute the use of its lead base babbitt metal BEARITE, (containing less than 1-1/2% of tin) a bearing metal developed for high speed or low, heavy duty or light, which during twenty years has proven, in the majority of bearing applications having rotary motion, to have strength, toughness, hardness and resistance to wear comparable with, and in some cases superior to, those properties found in high tin base babbitt metal of the genuine type.

Cadman Acorn Brand Babbitt Metal with its tin base, its unique ductility and extreme resilience is essential only in bearing applications subjected to excessive pound and/or vibration, or both, such as slides, wrist pins, crank pins, connecting rods and in some cases main bearings on prime movers; thin linings sweated to the supporting shell, thin linings in rolling mill pinion stands and in some difficult crusher applications.

Acorn Babbitt, therefore, will be sold or offered for sale only where investigation proves its properties to be necessary, and the substitution of BEARITE will be encouraged wherever it will be practical and will give comparable service.

We know that by helping us to save tin YOU WILL HELP TO WIN THE WAR!

A. W. CADMAN MANUFACTURING COMPANY

*A. W. Cadman*

President

AMC:D



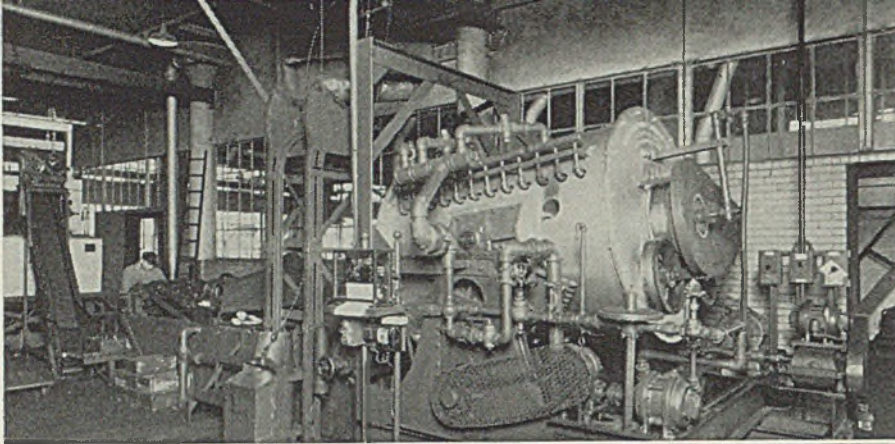


Fig. 2. (Top)—Large rotary-retort furnace. It is tipped for loading, flexible supply connections being used to permit this motion. Note overhead hoist which pulls container up vertical guides to load furnace. Unit discharges into quench from which other conveyors, left, handle work to processing



Fig. 3. (Center)—Circular drawing furnace and conveyors. Physical testing laboratory is on mezzanine, at upper center

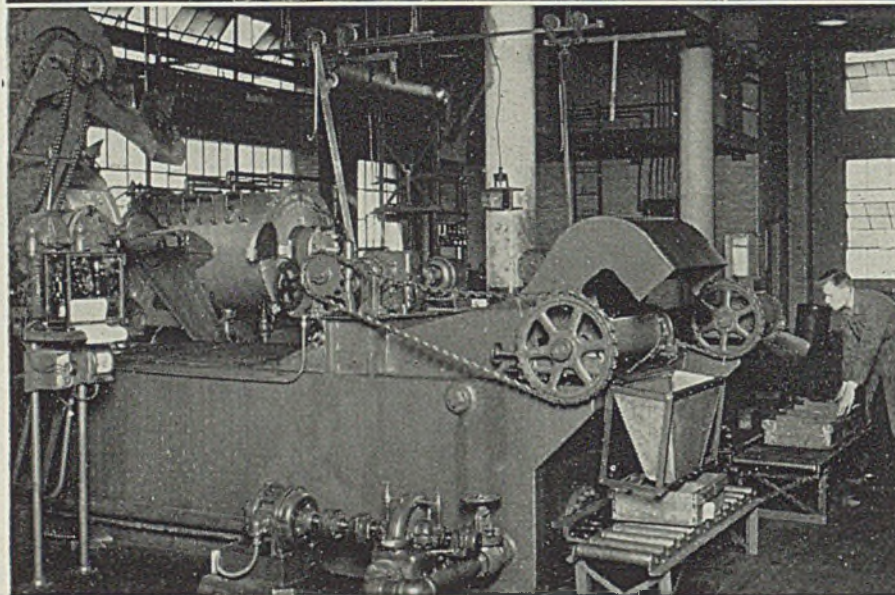


Fig. 4. (Bottom)—Pair of smaller rotary-retort units with their quench tanks and drying conveyors. Portion of loading conveyor chute can be seen at extreme upper left

commodate parts of different size. The rate of quenching, in pounds per hour, naturally varies with the size and weight of pieces being handled, but quenching rates up to 800 pounds per hour are feasible in the equipment provided.

Two general types of drawing furnaces are used and their capacities range from 400 to 700 pounds per batch. Electric drawing furnaces have a fan at the bottom which continuously recirculates the atmosphere, passing it over the heating coils and around through the work so the work is heated uniformly though not itself in motion. The

other type of furnace is gas fired and has a blower near the top to keep the combustion products circulating through the charge.

In both types, once the charge is brought up to temperature, heat added is only that needed to make up for slow radiation through the insulated walls of the furnace and, in the case of the gas-fired units, the heat carried off in the exhaust. Equipment includes automatic thermostatic control to hold the temperature constant once it is up to the level specified.

Upon completion of heat treatment, the charge, still in its con-

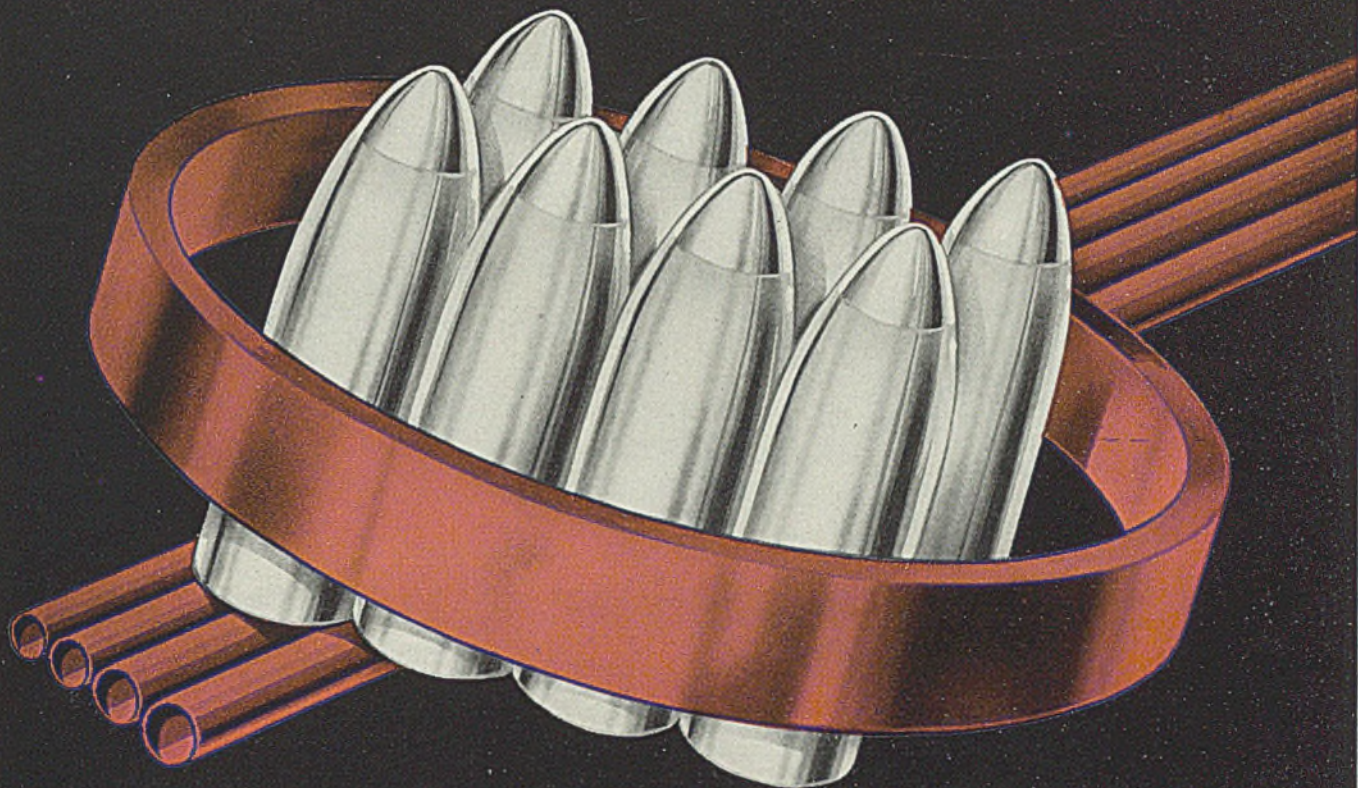
tainer is transferred by the overhead monorail crane to the oil or water quenching unit and the furnace receives a new batch. Containers are lowered slowly into the quench tanks. After quenching, parts to be plated or otherwise finished before shipment are sent to the finishing department. Those to be shipped without a finish are dried, oiled and transferred to a gravity conveyor which carries them to the inspection and shipping departments.

Although many alloy steels are being cold headed for aircraft and other special applications involving high stresses, the shortage of certain alloying elements, such as nickel, tends to necessitate more and more reliance upon carbon steels. There is, for example, a considerable shift from SAE 3135 steel (containing 1 to 1.5 per cent nickel and 0.45 to 0.75 per cent chromium) to a straight SAE 1035 carbon steel. The latter is well adapted to cold heading and, with proper heat treatment, gives about 150,000 pounds per square inch ultimate tensile strength. In sizes up to ½-inch diameter, such steel can be hardened to 285 to 321 brinell, thus meeting the requirements for which the more expensive alloy steel has been commonly used before.

Many other alloy steels can be cold headed. By selecting the right steel in the light of the present alloy situation, it is often possible to avoid using critical or strategic alloying elements yet still secure the properties needed for particular set of service conditions. For this reason, it is well to consult with experienced producers of cold-headed products who have good heat-treating facilities before issuing or insisting upon specifications as to the alloy used to obtain a given result.

Modern methods of producing steel, including careful control of analysis and of grain size, and the ability of fabricators to do a proper job of heat treatment, make it possible to secure in regular production today qualities which only the laboratory could be sure of realizing in years past.

# HOW WIDE AND THICK SHOULD A SHELL BAND BE?



Sufficiently thick to fill the groove, to take the rifling, and to withstand the stresses at the moment of greatest angular acceleration.

The width depends upon the velocity, and is usually  $1/3$  caliber in high-velocity guns. Narrow bands give less dispersion, but a minimum width is necessary to impart required rotational velocity and prevent undue erosion by escaping hot gases.

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of pure copper or gilding metal have all the qualities you can expect for this important task. They are made true to your specifications. Our electrolytic copper refinery and our own fabricating mill are located within the same plant.

LEWIN  MATHES

LEWIN-MATHES COMPANY • EAST ST. LOUIS, ILLINOIS

*then I said to myself—*



## It's development—or envelopment

*I thought this field trip was to preview tomorrow's world of welding—but look what's happening today.*

**ALTER EGO:** It may be tomorrow to you but I'm afraid it's yesterday to these people. Here they've completely shield-arc welded a building in the shop—toted it to location on a shield-arc welded truck-trailer—dropped it to the foundation with a shield-arc welded tractor crane.

*And here I am worrying about whether it's time for us to consider arc welding for some of our simpler designs.*

**ALTER EGO:** Well, this company started with welding. Found it worked, developed a stride. Now they're leaders in their field—largely

because they use welded construction 100%.

*And, as they say, "The result is a lighter, stronger product—be it machine, building, ship or what have you—a design that can be more easily and quickly changed for improvements." No wonder they've kept their products away from any enveloping movement. Their flanks won't be blitzed in the Battle for Business a few years hence. So much for them—but how about us—how can we get similar results for our products?*

**ALTER EGO:** Wouldn't it be well for us to ask The Lincoln Electric Company, Cleveland, Ohio, for their Machine Design Studies to get practical pointers on change-over to welding?

ALTER EGO: Literally, "one's other self"—the still, small voice that questions, inspires and corrects our conscious action.

## a ship a week

By HENRY W. YOUNG

ANY PROJECT that employs 1400 welders and 300 to 400 operators of cutting torches is of considerable interest even today when sensitiveness to the spectacular has become more or less dulled. One project where the application of cutting and welding has assumed such proportions is found at the shipyard of the Oregon Shipbuilding Corp., Portland, Oreg. Through the courtesy of the United States Maritime Commission and officials of the company, it has been possible to go over this project and make some observations.

Here the hull of a 10,500-ton deadweight ship comes into being from steel plates and shapes in just about seven days. These ships are the "Liberty Ships" of the emergency ship program. Over 300 are under construction in various parts of the country, and the United States Maritime Commission has authorization from Congress to build more. When the President gave the order last January to get under way, all existing United States shipyards were filled to capacity and it was found that seven new yards capable of building ocean-going cargo vessels would be necessary. This yard is one of the seven.

There are eleven ways here, each with one ship under construction at all times. The ships are of standard design, each of 6,800 gross tonnage, 14,100 tons total displacement, 457-foot length at water line and 57-foot beam. Hulls are of all-steel construction and welded throughout with the exception that the shells are riveted to the frames.

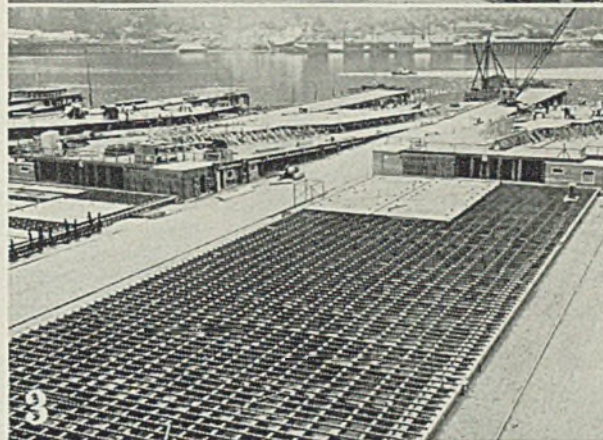
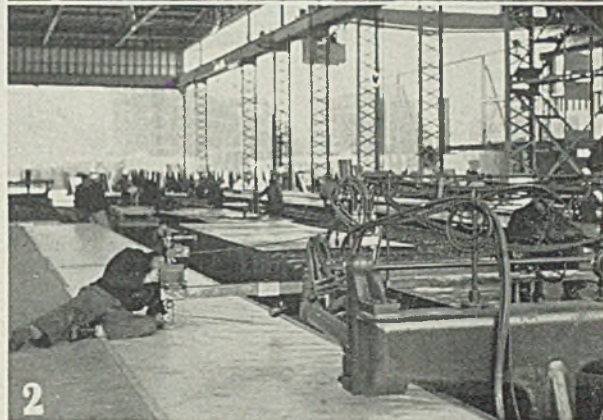
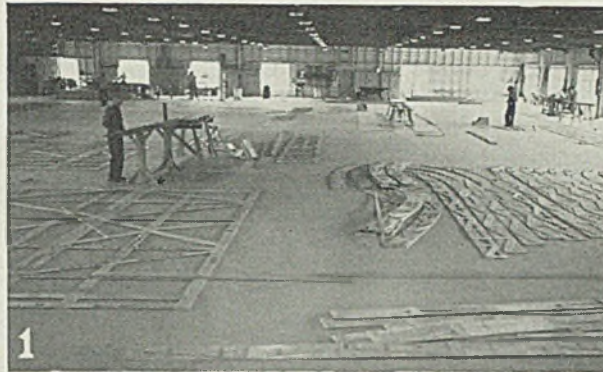


Fig. 1—Mold Loft. On this floor, smooth as a blackboard, every shape is laid out in pencil to full scale and the templets made to these enlarged drawings

Fig. 2—Big Airco Travograph cuts shapes four at a time in stock up to 1½-inches thick at the rate of 24 inches per minute per torch

Fig. 3—At the forward end of each ship way is the assembly platform where shapes are laid out and welded together, then to be taken by crane to their place on the hull

The general plan of the yard was approved Jan. 2, 1941, and construction of the ways started Feb. 4. Within a period of 297 days, this yard progressed from the stage of a mere plan to the point where it was closely approaching its weekly launching objective. The first ship, the STAR OF OREGON, was launched Sept. 27, the MERIWETHER LEWIS on Oct.

19 and the WILLIAM CLARK on Oct. 26. With 9500 men then employed, and a probable peak of 11,000 to 12,000, it was expected that this weekly launching would be kept up.

The principal units in the shipyard are the mold loft, plate shop, machine shop, pipe shop, warehouses and stores, and the ways on which the ships are built. Each of the 11 ship ways is served by a 50-ton gantry crane, with several more of these cranes for the plate shop and basin. It is in the mold loft that the mechanical procedure of building a ship begins. This is a single large room without supporting pillars and practically as long as the ship itself. See Fig. 1. It has a floor as smooth as a blackboard. Working from the blueprints of the job, every piece is laid out or developed in pencil on this floor to full size. Then wooden templets are made to fit these full-size drawings.

In the plate shop, the plate, of various thicknesses, is cut by an oxyacetylene flame exactly as marked from the templets. See Fig. 2. Here the heavy angles for the frame also are heated and bent on a table to fit the templets. Certain plates are also bent in large rolls to form the curved elements in the hull surface.

From the plate shop, the accurately cut shapes are transported to the assembly platform, Fig. 3, which forms a forward extension of each way. On these platforms various smaller pieces are fitted edge to edge and welded to form larger sections, which are then picked up by the crane and swung into position

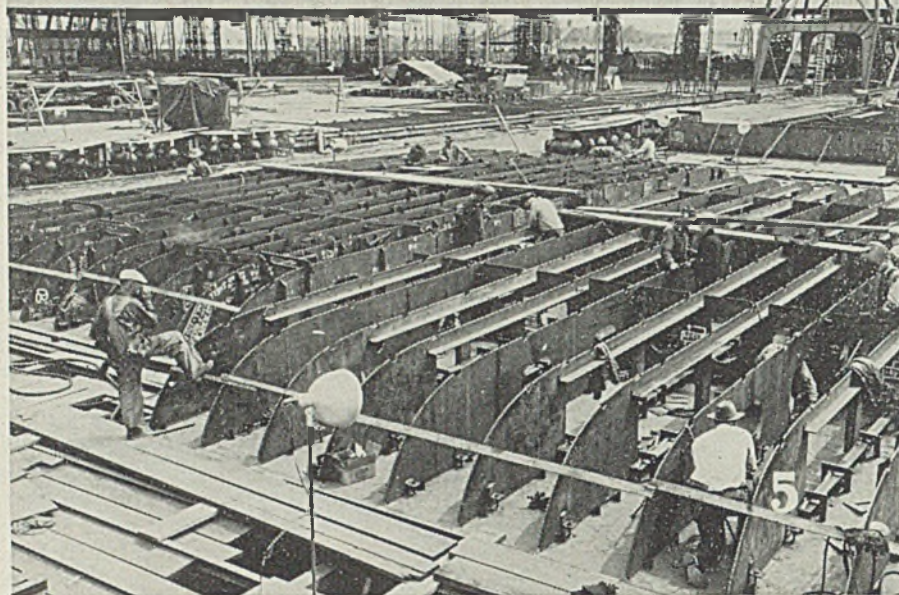
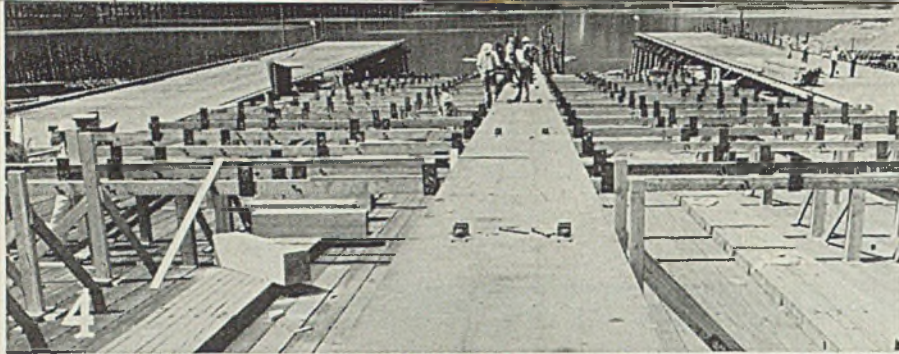


Fig. 4—Welding a keel plate. Keel is not what it used to be since now it is a series of flat plates. It will have vertical members welded to it, forming the background of the ship

Fig. 5—Inner bottom assembly (bottom side up) on the assembly platform. When its sides and top are covered, this forms the true keel, with the keel plate Fig. 4

on the hull where the seams are welded, eventually forming one continuous shell from stem to stern.

The keel comes first. But in a modern ocean-going cargo vessel, it is not a single piece of metal because it consists of a series of oblong plates placed on the blocks end to end and welded as shown in Fig. 4. These keel plates are quite flat for about 60 per cent of the length of the ship and then bend up toward the fore and aft ends of the vessel, to take the stem bar and stern frame respectively.

Lifted by gantry crane one by one, the keel plates are lowered into position each in its proper place by sequence of numbers. They are all then centered on the blocks, making sure that the keel is straight. As soon as they are laid and leveled, welding begins. Next, the bottom plates are welded to the keel, followed by the inner bottom assembly, which has previously been put together on the assembly platform as shown in Fig. 5.

The bottom assembly with the flat keel plate forms the backbone of the ship. The transverse steel bulkheads then are added as shown in Fig. 6. Joined to the double bottom and transverse bulkheads, and

riveted to the frame, the shell of the hull next rises. To fasten this shell to the framework, some 30,000 rivets are required per ship. All seams, horizontal and vertical, are welded. The bottom seams are welded with automatic welders operated by remote control. They have

a capacity for making about 17 inches of weld per minute and are of the Unionmelt type. In this welding work, the edges of the plates are brought together and tacked to a tolerance of 1/16-inch.

Superintendent of all the welders and burners on this job is L. T. Blackford, known in this country and other parts of the world as "Blackie". He got much of his welding training with Todd-California and Moore Drydocks. It was he who superintended the welding of the pipe line, now of so much international importance, between Mosul and Tripoli, for the Anglo-Iranian Oil Co.

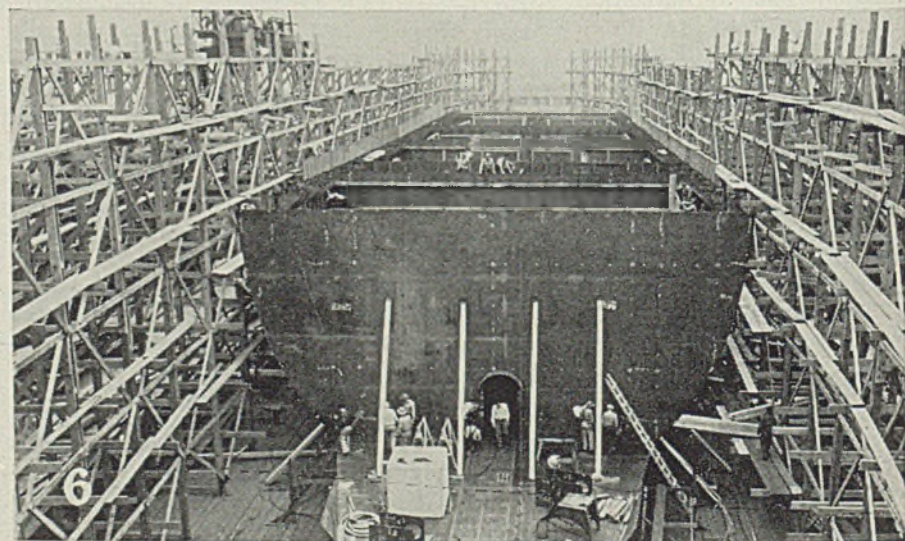
"This job requires more strict supervision than any other I was ever on. This goes even for the job in Persia, excuse me, Iran, where there were three angles to the work—first learn the language, next teach the welders, and then do the job.

"We've got all that here, with the exception that we all talk the same language, or close to it. But we have to train practically every welder. There is no such thing now as picking up 1400 welders or any fraction of that number. We get men from the vocational trade schools and right now are taking the entire 'output' of Benson Polytechnic here in Portland, one of the leading defense training schools in the country.

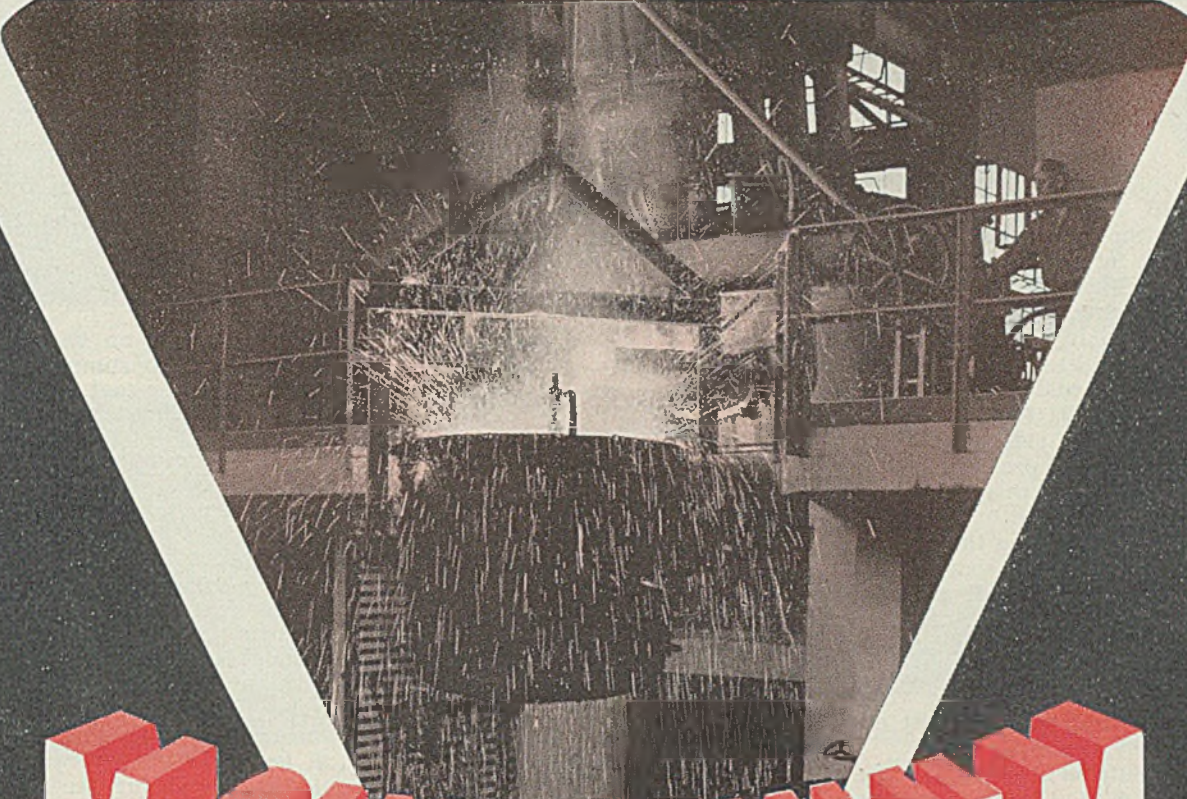
"When we get the boys from the schools, they know some of the theory of welding practice and are just about able to hold an arc and do simple tacking. We take them at this stage and give them a three to five weeks' course of training, average time required to get them into production work. During this time they are under the supervision of my foremen and top welders.

*(Please turn to Page 102)*

Fig. 6—With keel completed, transverse steel bulkheads are added, sides and top finishing off the ship



# LATROBE



## MOLYBDENUM HIGH SPEED STEELS

DOUBLE-SIX  
TATMO  
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# CLEANING COKING COALS

By JOHN GRIFFEN  
McNally-Pittsburgh Mfg. Co.  
Pittsburgh

DURING THE past 10 years the growth in the mechanical cleaning of coal used for the manufacture of coke in the Pittsburgh district has been steady and today nearly one-third of the coking coal is cleaned. Starting from less than 3,000,000 tons of cleaned coal in 1931 it had risen to over 10,000,000 in 1940. Yearly tonnages of cleaned coal and the proportion it represents of the total coal coked in this district is shown in Fig. 2.

In 1932 and 1938, when the production of coke decreased sharply, the proportion of cleaned coal used for the manufacture of coke increased sharply. This indicates that the users of cleaned coal found it economical and continued its use while the loss in tonnage was almost entirely born by raw coal.

In the Pittsburgh district, the great bulk of the coking coal is mined from the Pittsburgh and Thick Freeport seams. Both can be materially benefited by cleaning. These benefits in coke plant and blast furnace practices are three-fold due to reduced ash and sulphur content and improved physical properties of the coke arising from the removal of impurities. Fig. 1 shows the experience of one furnace plant with coke made from raw coal and from cleaned coal from the same mines which had been partially and more completely cleaned. This graph shows that poor physical qualities of coke are directly due to refuse content.

The magnitude of the overall savings in pig iron costs which are possible in the Pittsburgh district are shown by the experience of one company cleaning Pittsburgh seam coal which has been considered in its raw state of the highest quality produced in Pittsburgh area. The refuse content in the raw coal amounted to only 3 per cent, yet cleaning showed the following advantages at the coke plant:

1. Increased yields of metallurgical coke and by-products.
2. A 10 to 15 per cent improvement in the physical and chemical qualities of the metallurgical coke

Paper presented at the joint meeting of the Eastern States and Chicago District Blast Furnace and Coke Oven Association, University Club, Cleveland, Oct. 24.

Substantial economies are obtained both at the coke works and blast furnaces by treating raw coal used in the manufacture of by-product metallurgical coke. Uniformity in the coking qualities affords smooth blast furnace operation

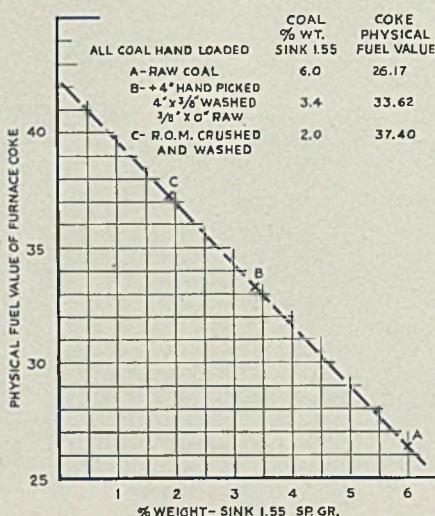
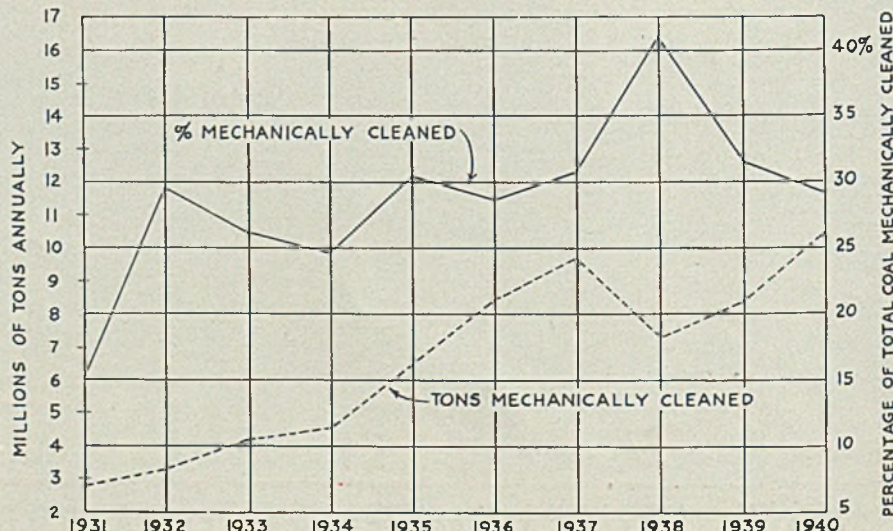


Fig. 1—Relation between physical fuel value of coke and refuse in Pittsburgh seam coking coal

and a 20 per cent reduction in the hydrogen sulphide in the gas.

In the five blast furnace plants this better coke made from cleaned coal has produced the following

Fig. 2—Preparation of coal charged to by-product coke ovens located in Pennsylvania, Ohio and West Virginia. (United States Bureau of Mines)



benefits, based on various tests:

1. Coke consumption reduced from 5 to 8 per cent.
2. Flux reduced from 5 to 10 per cent.
3. Slag volume reduced from 7 to 12 per cent.
4. Production of iron increased from 5 to 8 per cent with a lower sulphur content.
5. A substantial reduction in power for blowing the furnaces.

These benefits, after paying all costs of cleaning the coal, show savings in cost of iron of 25 to 30 cents per ton, sufficient to return the coal cleaning plant investment in less than three years. Further, the increased furnace capacity resulting from coal cleaning was obtained at two-thirds the investment cost required for a like capacity in new blast furnaces.

These substantial economies were obtained when cleaning some of the best raw coking coals in the Pittsburgh district. With inferior coals the benefits are even greater.

Along the Lakes, because of the higher freight costs on coking coals, the savings per ton of pig iron due to coal cleaning are materially higher than in the Pittsburgh district.

Mechanical loading in the coal



# FOR ALL PACKED TOWER PROCESSES

... SUCH AS DEHYDRATION  
OF AIR AND THE RECOVERY  
OF HYDROGEN SULPHIDE

Use  
**NATIONAL**  
TRADE-MARK  
*Carbon Raschig  
Rings*

## ADVANTAGES OF RASCHIG RINGS

- 1 Large surface exposure per unit of volume gives high reaction efficiency.
- 2 Large free cross section minimizes internal friction and gas velocity.
- 3 Large free volume allows time for complete absorption.

## FURTHER ADVANTAGES OF CARBON RASCHIG RINGS

- 1 High resistance to the destructive action of corrosive materials, such as sulphides and hot alkaline solutions, assures long life.
- 2 High resistance to thermal shock reduces spalling and breakage.
- 3 Low weight per unit volume reduces cost of tower construction.

PLAIN CARBON RASCHIG RINGS ARE MADE

IN 8 SIZES:

$\frac{1}{4}$ ",  $\frac{1}{2}$ ",  $\frac{3}{4}$ ", 1"  
 $1\frac{1}{4}$ ",  $1\frac{1}{2}$ ", 2", 3"

1-inch Splined Rings and 1-inch Lessing Rings are also available. These provide about 25 per cent more absorption surface than 1-inch plain rings.

## OTHER CARBON, GRAPHITE AND "KARBATE" PRODUCTS USED IN THE IRON AND STEEL INDUSTRY

★ Mold plugs, cores, inserts, small molds and crucibles.

★ Brick and slabs for lining troughs and acid processing equipment.

★ Rolls and bearings for continuous strip pickling tanks.

★ Pipe, valves and fittings for heating pickling solutions and for other uses in contact with corrosive materials.

"Karbate" products are carbon or graphite materials made impervious to seepage of liquids or gases under pressure.

"NATIONAL" CARBON, GRAPHITE  
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EFFECTING SUBSTANTIAL  
ECONOMIES IN STEEL PLANT  
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LET US SHOW YOU HOW THEY CAN SAVE MONEY FOR YOU

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Carbon Sales Division, Cleveland, Ohio

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Branch Sales Offices: NEW YORK - PITTSBURGH - CHICAGO - ST. LOUIS - SAN FRANCISCO

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mines of Pittsburgh district is showing substantial reductions in mining costs but invariably results in a large increase in the refuse content of the run-of-mine coal so that mechanical cleaning is essential for the production of satisfactory furnace coke. Mechanical loading reduces mining costs about 20 per cent while mechanical cleaning adds about 10 per cent to costs, so that the overall saving in costs is about 10 per cent and the resultant product is of better quality than raw run-of-mine coal from hand loading and produces further substantial savings in the cost of pig iron.

Undoubtedly the greatest advantage of cleaned coal for metallurgical coke is its greater uniformity in qualities which are directly reflected in greater uniformity in the

physical and chemical qualities of the coke. A number of carefully made statistical studies on this point have shown that the cleaning of coking coals has reduced the variability of the coal as to ash, sulphur, phosphorus and refuse content to from one-half to as much as one-sixth that of the raw coal. Blast furnace men are generally agreed that uniformity in coke qualities is essential for efficient, smooth furnace performance.

Rheolaveur coal cleaning plants are producing about one-half of all the mechanically cleaned coal charged to by-products ovens in the United States; in the Pennsylvania, Ohio, and West Virginia district the proportion is much higher.

The reduction in ash and sulphur analyses of Pittsburgh seam run-of-

mine coal resulting from cleaning in Rheolaveur plants varies with the ash and sulphur content of the raw coal and with the district in which it is mined. In the districts where the coal is of metallurgical quality, the reduction in ash and sulphur analyses resulting from cleaning is proportionally greater as these constituents increase in the raw coal. The reductions in analyses when cleaning hand-loaded coal are of the following order:

Material	Per cent
Ash .....	15 to 30
Sulphur .....	10 to 20
Phosphorus .....	15 to 25
Refuse .....	85 to 90

With mechanically loaded coal even greater reductions in ash content are usually obtainable.

NO PRECLEANING or fluxing is necessary in soldering and tinning on steel, copper, brass, tin, zinc, lead, and other common metals when using the Meltomatic method of soldering, according to Wayne Chemical Products Co., 9502 Cope-land street, Detroit. A paste solder is used consisting of fine granules of ordinary solder, acidic zinc chloride flux and cleaning materials wetted to form a paste. This flux readily cleans oily, dirty or rusty metal.

This standard paste is not recommended for use on cast iron, aluminum, stainless steel or for work on

and thus to prevent later corrosion or staining.

In tinning, a thin coat of paste is brushed on the surface to be tinned; a torch, flame or other source of heat is applied to bring the solder to its melting point, about 450 degrees Fahr.; and the surface is then wiped to spread tin and remove flux. This solder spreads out to form a thin layer rather than building up into a thick layer. To fill dents or low spots, firms making automobile and truck bodies, metal burial caskets and other large sheet metal assemblies use the paste as a base coating and apply melted bar solder

and ½-inch inside diameter. The pipes are preheated to 500 degrees Fahr. and then are passed over onto a fixture having a rotating metal brush which goes down through the pipe into a vessel of "C" grade paste. As the brush rises again covered with paste, it rotates so the inside surface of the pipe is coated with an even, fine, smooth coat of tin.

The insides and bottoms of fire extinguishers are tinned by applying a thin coating of past to the copper pieces which are then sent through a furnace to melt the solder. As the pieces come out, they are wiped with a cloth, leaving a bright tin finish.

Repairing of submarines in United States Navy yards is being speeded by use of this paste solder which eliminates the necessity for many tools and materials.

A manufacturer of galvanized containers including drums, gasoline cans, pails and tubs use the paste for soldering and tinning over welded seams. If any of the galvanizing has been knocked or burnt off in processing, a layer of tin is easily applied. This saves regalanizing. Leaks around bungs or other openings also are readily sealed.

In a large motor car plant where much tubing is bent, trouble was encountered with fine cracks occurring at the bends, necessitating considerable repair work or a high percentage of rejects. A little paste is now brushed over the bad spots and heated, and rejects and repair time have been cut down appreciably.

In another case where tubes are soldered into headers, it was found that the headers often were warped due to heat of soldering. Use of the paste solder method has solved the problem because heat is applied in comparatively small quantities.

A cable manufacturer, required to tin the ends of cables to hold all  
(Please turn to Page 111)

# PASTE SOLDERING

**... Facilitates many joining operations by simplifying the work, reducing amount of materials required, eliminating separate cleaning and fluxing operations. Method can be adapted to semiproduction jobs by use of simple mechanical application devices and controlled heat application**

radios, electrical communication systems, or places where there must be no corrosion of the metal. For such applications, however, two special grades of Meltomatic paste, designated "SS" and "C", are used, the former with stainless steel and the latter cast iron.

However, in some plants using the standard grade paste, parts are washed in slightly alkaline soap-suds after soldering or tinning, which tends to neutralize the acid

over it to the required depth.

Before applying grade "C" Meltomatic to cast iron parts, the work is preheated as often such parts are large and may require considerable heat to bring them up to soldering temperature. If the heat were applied to the solder paste directly, the cleaning and fluxing agents would be burned out. Grade C is being used by one company to tin the inside of valve stem guides—small cast iron pieces of pipe about 4 inches long

# Hold Everything!



WITH THE WASHER THAT HAS THE EDGE

**Everlock**  
COUNTERSUNK  
80 DEGREE TYPE



**Everlock**  
INTERNAL-EXTERNAL  
COMBINATION TYPE



**Everlock**  
INTERNAL TYPE  
LOCK WASHERS



**Everlock**  
EXTERNAL TYPE  
LOCK WASHERS



Nominal Size	Part Number	Inside Diameter	Outside Diameter	Thickness	Code
No. 2	210	.089-.093	.190-.200	.010	Balm
No. 3	312	.102-.106	.220-.232	.012	Beet
No. 4	418	.115-.119	.255-.270	.018	Ball
No. 5	518	.130-.138	.268-.280	.018	Bowl
No. 6	618	.141-.146	.280-.295	.018	Boat
No. 8	820	.168-.174	.325-.340	.020	Bond
No. 10	1022	.195-.201	.365-.380	.022	Bark
No. 12	1125	.221-.229	.395-.410	.025	Bass
1/4"	1225	.256-.265	.460-.475	.025	Boy
5/16"	1330	.320-.331	.595-.610	.030	Beard
3/8"	1435	.384-.397	.670-.690	.035	Beak
7/16"	1540	.448-.464	.740-.760	.039	Beak
1/2"	1640	.512-.530	.880-.900	.040	Bird
9/16"	1740	.576-.596	.965-.985	.040	Bite
5/8"	1832	.640-.660	1.045-1.070	.045	Fair
5/8"	1845	.640-.660	1.045-1.070	.045	Blot
11/16"	1116	.704-.728	1.130-1.155	.045	Bee
3/4"	1932	.768-.795	1.220-1.245	.050	Bull
3/4"	1950	.768-.795	1.220-1.245	.050	Bull
13/16"	1316	.832-.860	1.290-1.315	.050	Bull
7/8"	2032	.897-.927	1.380-1.410	.050	Bull
7/8"	2055	.897-.927	1.380-1.410	.050	Fan
1"	2160	1.025-1.060	1.590-1.620	.060	Bone
1-1/8"	2260	1.153-1.192	1.800-1.830	.060	Bone
1-1/4"	2365	1.281-1.325	1.935-1.975	.065	Bull

6

Nominal Size	Part Number	Inside Diameter	Outside Diameter	Thickness	Code
No. 4	2-418	.115-.119	.275-.290	.018	Cage
No. 6	2-618	.141-.146	.320-.330	.018	Camp
No. 8	2-820	.168-.174	.365-.380	.018	Card
No. 10	2-1022	.195-.201	.395-.410	.021	Cater
No. 12	2-1225	.221-.229	.460-.475	.025	Cater
1/4"	2-1225	.256-.265	.460-.475	.025	Cater
5/16"	2-1330	.320-.331	.495-.510	.025	Chalk
3/8"	2-1435	.384-.397	.595-.610	.030	Chess
7/16"	2-1540	.448-.464	.670-.690	.035	Chess
1/2"	2-1640	.512-.530	.740-.760	.039	Chief
9/16"	2-1740	.576-.596	.880-.900	.040	Chime
5/8"	2-1845	.640-.660	.965-.985	.040	Clay
5/8"	2-1845	.640-.660	.965-.985	.040	Clay
3/4"	2-1932	.768-.795	1.045-1.070	.045	Cloud
3/4"	2-1950	.768-.795	1.045-1.070	.045	Cloud
7/8"	2-2032	.897-.927	1.220-1.245	.050	Coin
7/8"	2-2055	.897-.927	1.380-1.410	.050	Fish
1"	2-2160	1.025-1.060	1.590-1.620	.055	Cowl
1-1/8"	2-2240	1.153-1.192	1.800-1.830	.060	Craft
1-1/8"	2-2260	1.153-1.192	1.800-1.830	.060	Flora
					Carat

7

**STANDARD TYPES**  
All Being Shipped Promptly  
Not for Defense Products

LISTED ON GOVERNMENT ORDNANCE STANDARDS

PRINTS BEAX 1-2-3-4

Shown on AN936 (Army-Navy Aeronautical Standard)

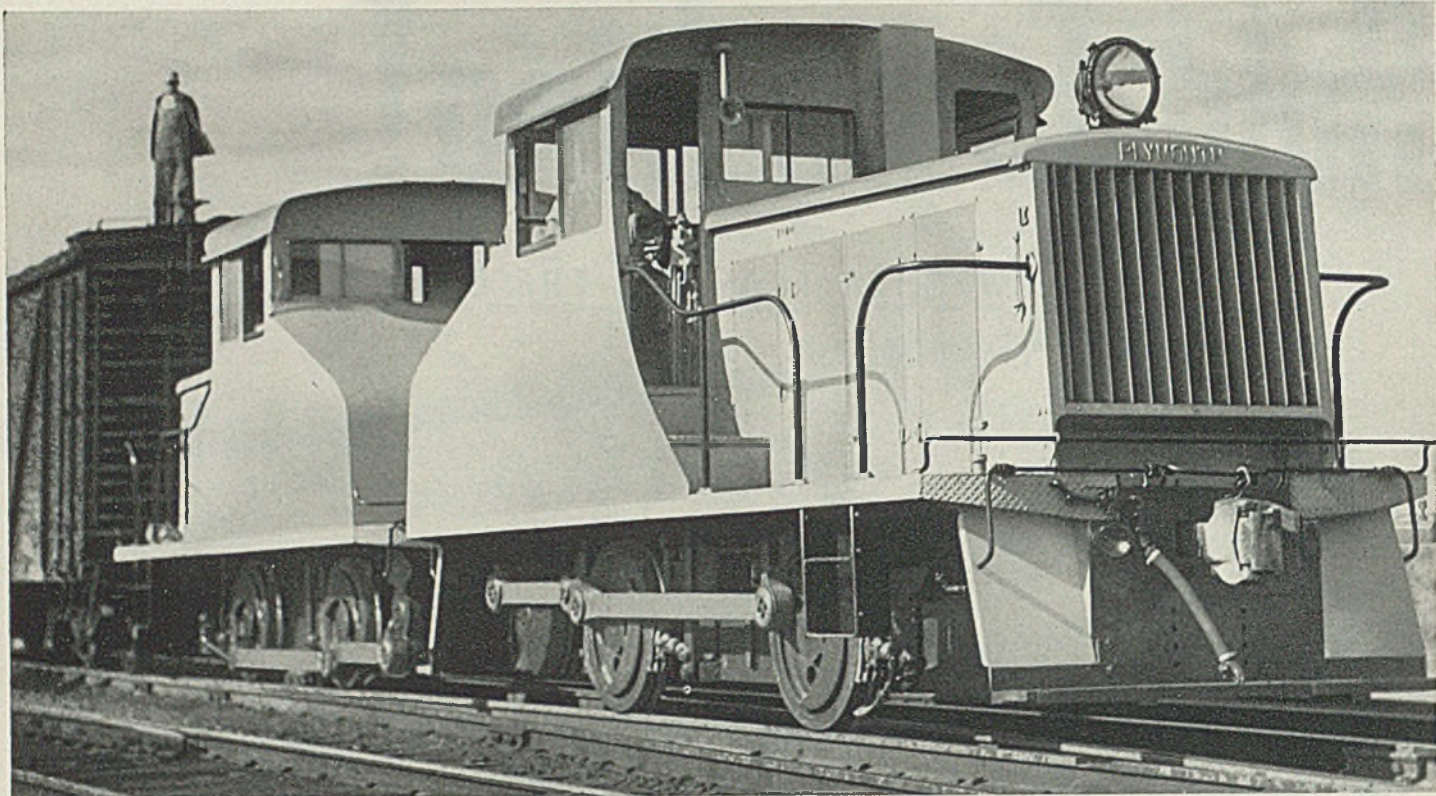
A majority of lockwasher applications are covered by these four "Everlock" types on which we are trying to maintain stock for same-day shipment . . . order now!

**YOU NEED THIS BOOK**  
Write for the complete Everlock Catalog (pages shown above) as a quick reference.



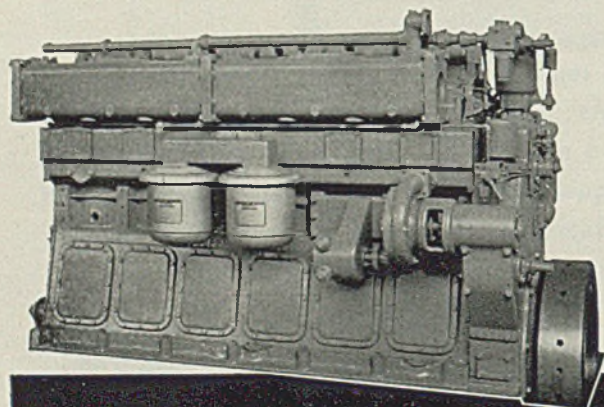
# Everlock LOCK WASHERS

**THOMPSON-BREMER & CO., 1644 W. HUBBARD ST., CHICAGO, ILL.**



# FLEXIBILITY and GUTS!

Type EN Locomotive Diesel Engine. One of these 340-hp units, with single-lever-control and patented fuel system, powers each of the Plymouth Locomotive Works switchers shown above.



The very name "Flexomotive" indicates the unusual flexibility of these heavy-duty, diesel-engined switching locomotives. Here, two of them are handling a heavy train. Both of those locomotives are being controlled by one operator in the forward cab! . . . Demonstrating the simplicity of control, ease of operation, and smooth performance of their Cooper-Bessemer Diesel Engines.

The C-B Diesels which power these huskies have time and again proven their ability in constant, 24-hour steel-mill switching. There is no tougher service. Direct-driving the wheels, these engines *must* be rugged . . . their diesel economy would be worthless without dependable strength.

Whatever the application . . . locomotive, stationary, or marine . . . the qualities demonstrated here are features every power user wants . . . and gets, with Cooper-Bessemer Diesels!

THE COOPER-BESSEMER CORPORATION  
MOUNT VERNON, OHIO



# Cooper - Bessemer

Engine Builders since 1833

WITH THE large tonnage of aluminum and aluminum alloy sheet and castings now being used in aircraft construction, a correspondingly large amount of scrap is being produced in the form of sheet clippings, punchings and turnings. Recovering a large percentage of aluminum from this material is a problem, for even the most experienced refiners find it extremely difficult to get more than 75 per cent recovery from ordinary dirt-laden scrap. On the other hand, scrap kept perfectly clean and properly melted will produce as high as 95 per cent recovery—recovering an additional 20 per cent, which is extremely important with the present great need for aluminum.

It is evident that much valuable metal can be lost through low recovery in melting down aluminum scrap. The difficulties in melting down aluminum scrap are that the material oxidizes readily and the oxide, being of practically the same specific gravity as the aluminum itself, does not float to the top of the metal readily but intermingles with the metal and even remains in it when poured.

Recovering aluminum scrap in a molten electrolytic bath is not practicable if the material is corroded or painted as the extraneous material quickly fouls the expensive electrolyte.

Briquetting the material prior to melting down tends to decrease melting loss, melting time and fuel cost and increase the ease of handling. Therefore briquetting should be used wherever possible. However, it requires expensive machinery and is only profitable where extremely large volumes of scrap are to be handled. No doubt many large aircraft plants are or could use briquetting machines to advantage.

As suggested by A. J. T. Eyles in *Sheet Metal Industries* recently, low recoveries in the melting down of aluminum are mainly due to the difficulty in getting the tiny globules of molten metal resulting from fusion of the fine clippings and chips to coalesce when covered with a skin of oxide or dirt. To promote coalescence, the scrap can be held just above the fusion point and the globules coalesced by hand puddling, which breaks through the oxide skins and makes the globules unite.

Or a flux can be employed which dissolves or melts the skin of oxide to produce clean globules which can unite. The advantage of using flux is that it does not require constant stirring and hence reduces labor cost. In the electrolytic production

of aluminum, the electrolyte commonly consists of molten cryolite holding in solution about 5 per cent of aluminum at the lowest melting point of 915 degrees Cent. To be useful in scrap melting operations, a flux must melt considerably below this point as this temperature is far too high for use in the melting operations connected with scrap aluminum. A mixture obtained by the addition of chlorides or fluorides

## Increasing Recovery from ALUMINUM SCRAP

to the cryolite mixture or by mixtures of chlorides and fluorides alone can be used.

Volatile fluxes such as zinc chloride and sal ammoniac are helpful when used at the end of the puddling process. But melting aluminum scrap, sheet punchings, etc., with these fluxes without constant stirring gives low recoveries.

A flux containing 85 per cent common salt and 15 per cent fluorspar has been found most useful when used in large proportions (20 to 25 per cent of the weight of sheet cuttings or punchings) and when mixed with the scrap before charging and subsequently heating in crucibles until the flux is fairly fluid. The melting is best done in plumbago crucibles or in a reverberatory furnace.

If cuttings are melted in pit fires, the flux method is best. Iron pot furnaces may be employed, the puddling process usually being most suitable. The iron pots must be kept well coated with a thin clay wash or graphite mixture (1 part by volume of graphite in 2 parts of water).

Since obviously the presence of dirt, oxide, oil and moisture in the scrap causes low recoveries, great care should be taken in the collection and storage of aluminum scrap to keep it clean and free from contaminating materials. The scrap should be kept free from brass, zinc, shop sweepings or other foreign metal, and wet scrap should be dried carefully as soon as possible to avoid oxidation or corrosion.

Recoveries on scrap aluminum castings vary from 80 to as high as 95 per cent, depending upon the amount of grease, dirt and other foreign matter present. Yields in remelting painted aluminum sheet may vary from 80 to 87 per cent. Recovery of discarded or used sheet may vary from 83 to 95 per cent. Recoveries when remelting old sheet and cuttings in the loose condition will average about 3 per cent less

than when the material is baled. Great care must be taken in melting down aluminum scrap to avoid overheating since low recovery will result.

At Wright Aeronautical Corp., Division of Curtiss-Wright Corp., special facilities have been developed for recovering and utilizing all scrap possible, including magnesium and ferrous scrap as well as aluminum. This plant produces the famed line of Wright aircraft engines. All foundry scrap is remelted and fluxed in special remelt furnaces in its own aluminum and magnesium foundries and is then poured into ingots. Each heat of metal is stored in a

separate pile and is sampled by the metallurgical laboratory. If it is found to be within the specifications, it is released for melting for production purposes, together with new metal in proportions determined by the laboratory. If, however, the remelt is found to be deficient in certain elements, written instructions are prepared telling exactly how much new and remelt metal and how much of each particular added element is to be used for each melt when remelt ingots from a particular batch are being used.

No difficulty is experienced in the segregation of machine shop scrap since, generally speaking, the different metals are machined in separate plant areas, and production lines are so arranged that one machine handles only one particular part. In the few cases where two or more different metals must be machined on the same equipment, care is taken that the machine is thoroughly cleaned before starting the new material, and clearly marked scrap bins are placed adjacent to the machine.

Solid aluminum and magnesium machine shop scrap is placed in marked containers and returned to the foundries for remelt, where it is treated in the same way as foundry scrap. Chips are placed in marked containers and at the present time are sold to scrap dealers. Solid ferrous scrap and ferrous chips are similarly segregated in marked containers.

### Reaffirms Practice on Horizontal Boilers

Simplified practice recommendation R157-37, "Steel Horizontal Fire-box Heating Boilers", was recently reaffirmed without change by the standing committee of the industry according to the division of simplified practice, National Bureau of Standards, United States Department of Commerce, Washington.

# Silver

... expands industrial applications to include much ordnance work

By HERBERT CHASE

MANY manufacturing problems due to scarcity of certain metals are being solved satisfactorily through the use of silver, especially in the form of silver alloys for brazing and soldering. Where a few thousand ounces of such alloys filled industrial requirements a decade ago, consumption in the past year rose to several million ounces.

Fortunately, silver is available in quantities sufficient to meet all industrial requirements.

Due to the present emergency, many manufacturers have come to understand that silver alloys, containing anywhere from 2½ to 80 per cent silver, permit brazed joints of equal or greater strength than that of the base metal. This is due to the properties of the alloys formed during the brazing operation. It also is a characteristic of the silver alloys that they penetrate into narrow openings, joints about 0.002-inch thick affording great strength and low costs. Silver alloys for brazing and soldering melt at 1175 to 1300 degrees Fahr., permitting joints to be made at temperatures sufficiently low to minimize grain growth and distortion of the materials joined.

**Brazing, Soldering:** Practically

all nonferrous metals as well as steel and iron can be brazed or soldered satisfactorily with silver alloys of varying analyses. Joints will withstand severe shock and vibration.

Important recent applications of silver brazing include joints in:—Brass ignition-wire shields for aircraft engines, preventing radio interference—Pipes and tubes in ship-building work in ferrous and non-ferrous lines for liquids, gases and gunfire control systems—Aircraft engine radiators, oil coolers, fuel and control lines—Ferrous and non-ferrous piping for refrigeration and air-conditioning systems — **ORDNANCE APPLICATIONS** such as in aerial bombs, gun recoil cylinders, machine-gun water jackets, chemical shell, torpedo pressure lines and discharge tubes, field kitchen stoves and the like.

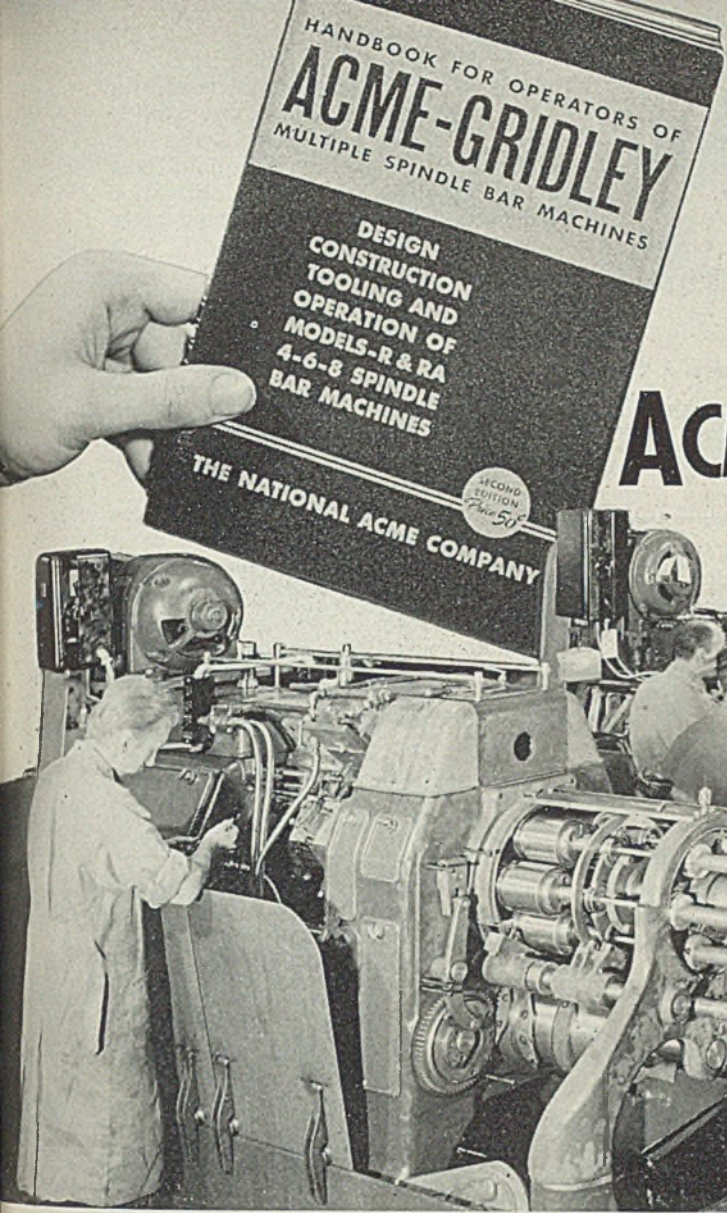
**Electrical Contacts and Brushes:** High electrical conductivity and resistance to corrosion make silver and its alloys important materials for electrical contacts. Alloys and sintered mixtures of silver and such elements as nickel, copper, cadmium, molybdenum, tungsten, palladium, carbon produce a product particularly resistant to wear, arcing, sticking, or corrosion, assuring good electrical contact under almost any set of adverse conditions. Clad or inlaid silver on copper is also used. When not subjected to wear, contact surfaces may be silver plated to keep down corrosion and maintain low contact resistance. Coil silver containing 10 per cent cop-

(Please turn to Page 112)

Top of page, all joints in this oil distributor for an anti-aircraft gun are made with a silver brazing alloy

Left, center, above, exploder for a demolition bomb employs a mild steel section brazed to the threaded fitting with a low-temperature silver alloy

Lower left, above, silver contacts are brazed to copper parts of this circuit breaker with a silver alloy, which also is used to solidify ends of the copper connecting braid and to braze terminals upon it



# HERE'S *Help* FOR THE NEW ARMY OF ACME-GRIDLEY OPERATORS

***This Book will be mailed free only  
under the following conditions:***

Every month greater numbers of Model RA Acme-Gridleys are rushed to plants where hundreds of new operators are being trained for the faster and better production of parts for shells, guns, tanks and planes.

To this army of Acme-Gridley operators behind the fighting lines this valuable Operators Hand Book is free. Its 124 pages with over 100 illustrations were prepared by our own operators — men who know Acme-Gridley from A to Z.

- 1 It covers only Models R and RA Acme-Gridley Bar Automatics — is not useful for earlier models (A, C, F, G, H machines) for which no books are left.
- 2 Give Company name, model and size of machine on which you are actually working, such as R1-1/4", RA1-5/8".
- 3 If our records show that you have already received a copy, another will not be sent.
- 4 If you are not a foreman, operator or assistant, but merely interested in this book, send 50c (a fraction of its cost) with your letter. Such orders are not encouraged.
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# NATIONAL ACME

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ACME-GRIDLEY 4-6 AND 8 SPINDLE BAR AND CHUCKING AUTOMATICS • SINGLE SPINDLE AUTOMATICS • AUTOMATIC THREADING DIES AND TAPS • SCREW MACHINE PRODUCTS • THE CHRONOLOG • LIMIT SWITCHES • POSITIVE CENTRIFUGE • CONTRACT MANUFACTURING

# 5500 PARTS

## Present Special Handling Task

*... in assembly of self-contained induction heating units. Work involves 100 subassemblies, 2000 feet of electric wire and 705 electrical connections*

ASSEMBLY of induction-hardening and heat-treating equipment designed for small and medium sized pieces of work does not lend itself easily to high-speed assembly methods. It is a specialized operation involving more than 5500 parts including 100 subassemblies, 2000 feet of wire and 705 distinct electrical connections.

This mass of material and detailed work results in a sizable materials handling operation which has been speeded up by the simple expedient of adding trained manpower and the perfecting of a system of parts distribution that keeps the stock bins filled with a supply for two weeks' output of machines. A new 9600-cycle Tocco Junior induction unit, tested and ready to go, now leaves the assembly line in plant No. 2 of the Ohio Crankshaft Co.

---

By A. J. BYERLY  
Manufacturing Manager  
Tocco Division  
Ohio Crankshaft Co.  
Cleveland

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every 12 hours because of these and similar efficiencies.

Production schedules call for so many machines per week. Every effort has been made to develop direct lines of material flow to facilitate these operations. Finished

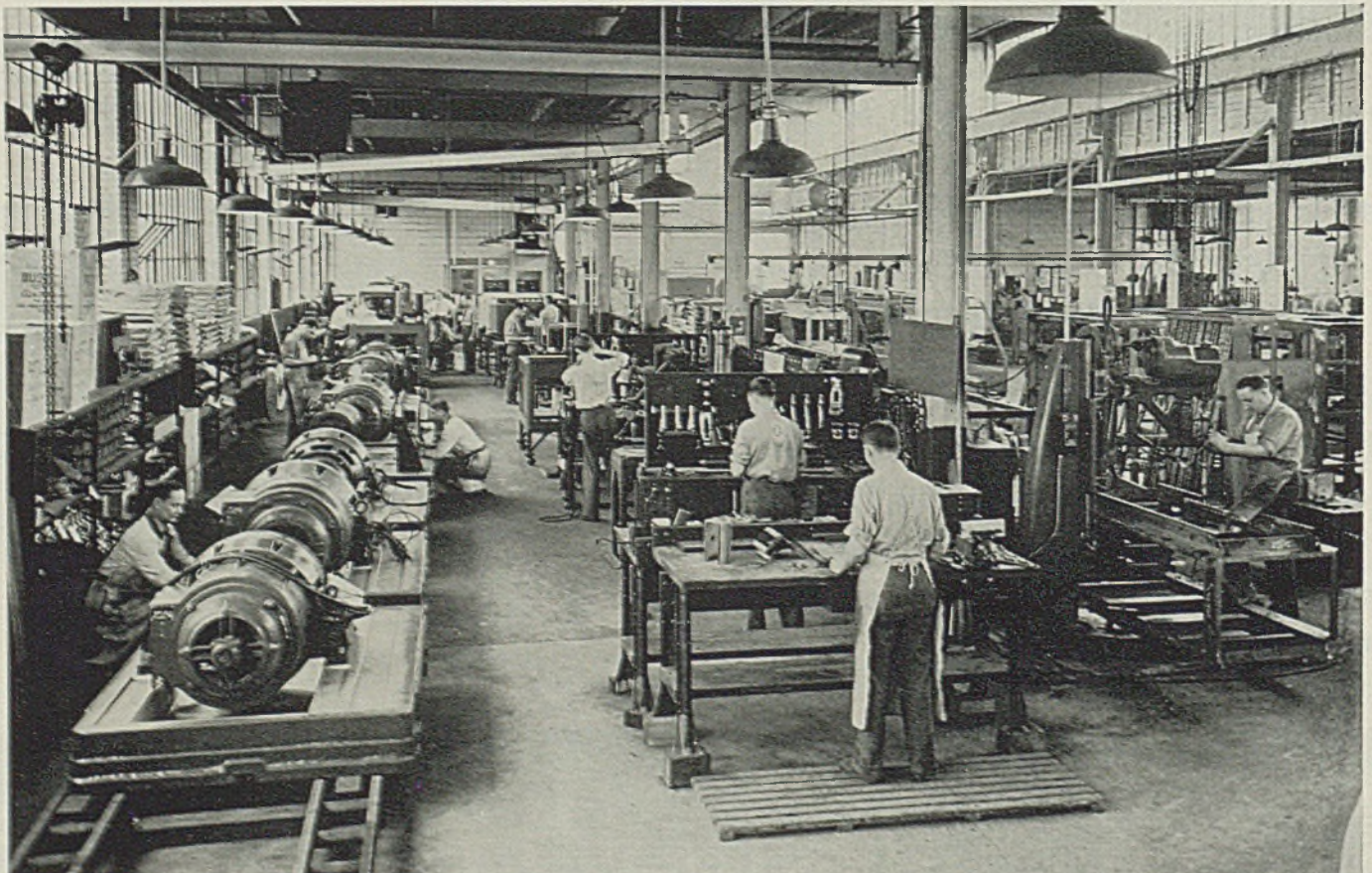
stores of bases, motor-generator sets, frames and skirts are handily located at the lower end of the line. Parts made within the plant flow in related steps from fabrication department to their appointed place along the assembly line.

For example, from the sheet metal department wherein frames for penthouses and skirts are cut, parts move to the welding section where they are joined, thence on to drilling section, and finally on to any other machine operations necessary to complete fabrication. Following comes painting; after which they wait their turn on the final assembly line.

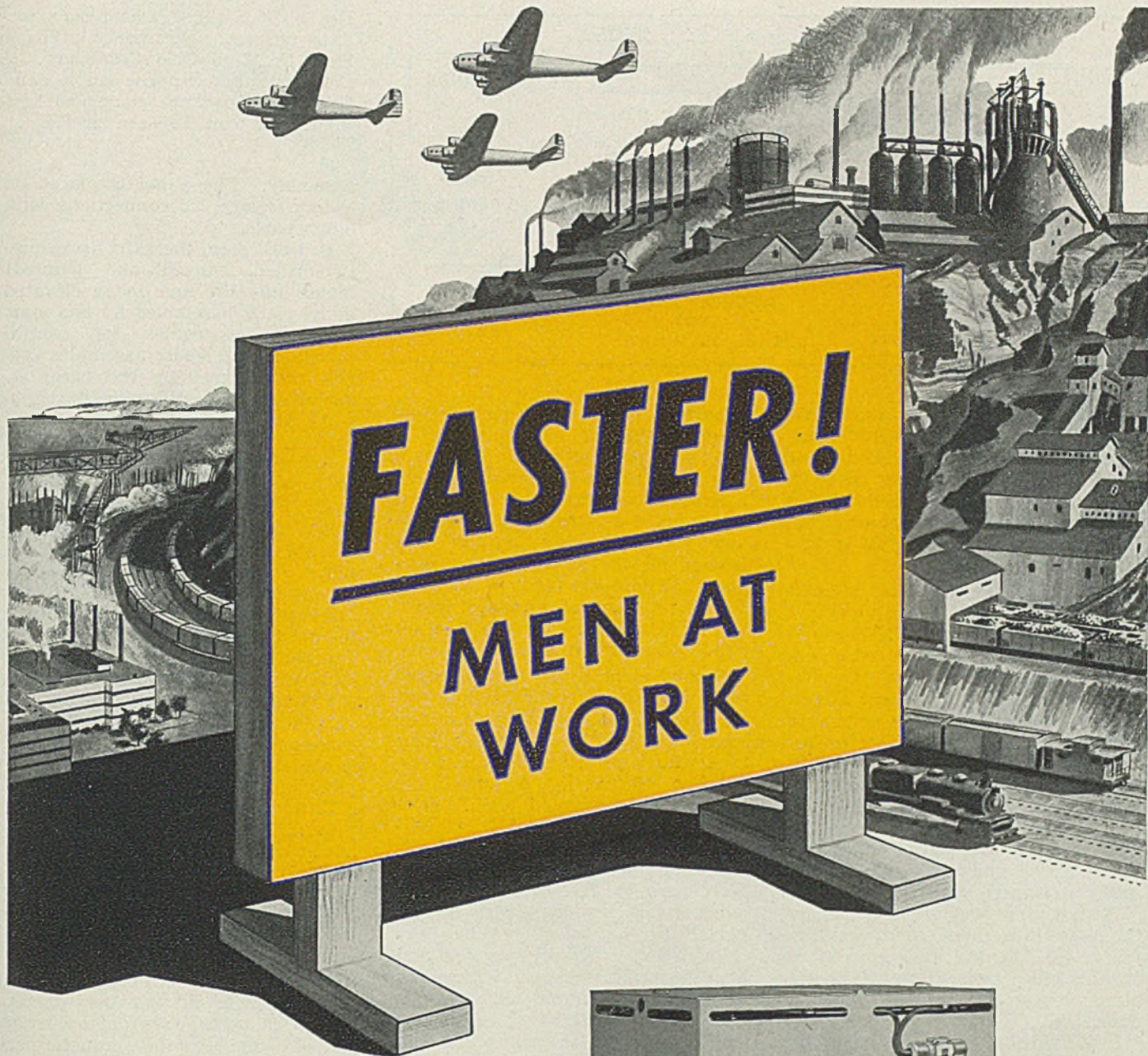
From the stockroom with its myriads of nuts, bolts, wires, insulators, fuses, tubing and the like, stockboys fill requisitions that are made for a 2-week supply, thus keeping stock bins amply supplied. Under this system delays cannot occur on the final assembly line because of a lack of parts. A production clerk, following a standard pattern of operations, fills out requisitions. This method has helped considerably to boost production.

Large parts such as the bases,

Fig. 1—Main assembly line. In immediate center foreground is layout man. To right is drilling department with penthouse frame being drilled. Note other frames in adjoining rack. Contactor panels are being assembled and checked on second bench in center. Stock bins are behind these panels. Open shelves at left contain ventilator filters, cables and other parts. Bases with motor-generator sets are shown going down main conveyor line at left. At extreme rear, right, is machine shop; welding, painting and sheet metal departments







## ... and Exide steps up the pace

No *safe* degree of speed can be too great when an entire nation arms for total war. Every factory, mill, mine, and plant must push its production at maximum pace.

Exide-Ironclad Batteries... with their surging power delivered at high voltage for good speeds... help increase production in thousands of defense operations. Exide Batteries motivate tough little electric industrial trucks to move materials from place to place. Exide's dependability, economy, and relative freedom from breakdown, help prevent costly delays... and help to *Keep America Rolling*.

THE ELECTRIC STORAGE BATTERY CO., Philadelphia  
*The World's Largest Manufacturers of Storage Batteries for Every Purpose*  
 Exide Batteries of Canada, Limited, Toronto



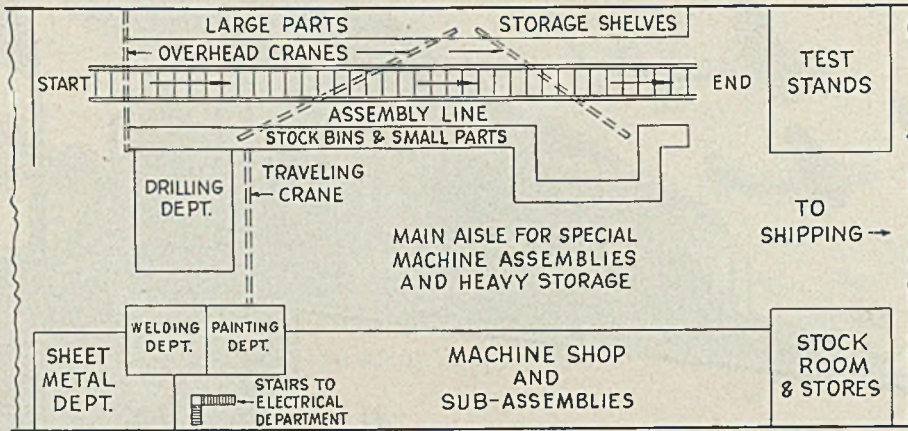


Fig. 2—Floor plan showing main sections of Tocco Junior assembly line in Plant No. 2 of Ohio Crankshaft Co., Cleveland. Not complete nor to scale. Overhead handling equipment diagrammed can be seen in Fig. 1

motor-generator sets, frames and the like have definite storage sections on the floor. A reserve of generators, each covered with a white tarpaulin and resembling a passive herd of silent sheep, contains units ranging from 20 to 125-kilowatt output.

**Assembly Stages:** First step in the unit assembly is the universal drilling with a jig of the 2000-pound cast iron base. Jig is placed at entrance to line along path of material flow. Universal drilling allows the mounting of any size generator on any base. This facilitates assembly, for a 20-kilowatt generator will fit a base as readily as an 80-kilowatt unit. Further, it makes it possible for a customer to have the generator set and power output of his machine changed without getting an entirely new unit.

With the generator in place on the base, it is then sent to preliminary test. During a 3-hour run, it is checked for bearing vibration, temperatures and general performance.

If satisfactory, both the base and

generator are moved to the next position on the final assembly line.

As the base goes upon the main line (two roller tracks over which assemblies advance), there is moved up from the sheet metal department and welding section the frames for the skirt and the penthouse. These are ready in advance for installation of electrical parts and are brought into the line on hand dollies when needed.

**Second step** is the control panel assembly, the nerve center of the machine. This work is done in the assembly line by electric wiring men who work on special portable benches electrically equipped for testing the completed panel board which contains heavy-duty contactors, relays, fuses and automatic relays to guard against overloads. More than 500 feet of oil, heat and age-resisting insulated wire is connected to the board. Wires are color-coated to signify purpose and help in circuit checking. It requires 20 hours to equip and fully test the boards. In all, there are some 103 various parts which go into this sub-

assembly. The panel is placed on a base ready for connections with other parts.

**In third step,** the skirt (previously drilled, tapped and painted) moves into the line on an elevated dolly. It is assembled by one man. He attaches cables for control panels, motor leads; assembles control transformer on the base; assembles field rectifier in skirt; installs water pen and alarm bell. The skirt is then ready to be placed on a finished base assembly by means of an overhead crane. This occurs midway in the line. The skirt itself is the lower housing which covers the motor-generator set. It employs a sturdy, welded steel beam construction.

**Fourth** assembly operation places the skirt on the base with its motor-generator and control transformers. A finish-wireman connects generator to control panel on either a 220 or 440-volt hook-up as specified by customer. The control transformer is also hooked to the panel to complete this stage.

**Fifth step** in a 6-stage assembly procedure is to build up the penthouse subassembly. All operating controls and meters are located within it. The penthouse is made to fit on the skirt accurately. It is a precision job because the heating or surface hardening inductors and fixtures are located on the penthouse. Power circuits are brought out to inductor coils or to blocks that fasten to the transformer panels.

Assembly men attach timers, field controls for each heating station, pressure gages, stop and start buttons, power signals, condenser assembly, transformers and water manifold. Time required for this work is 48 hours. Subsequently all electrical connections between the parts are made. Assembled penthouses are then placed on elevated wheel dollies for easier handling.

**Final step** is the placing of the penthouse on the skirt or base. Another electrician connects all circuits, controls and meters which he tests as he proceeds. The completed unit is now ready for final test with the exact part to be hardened by the customer.

A series of final checks are made

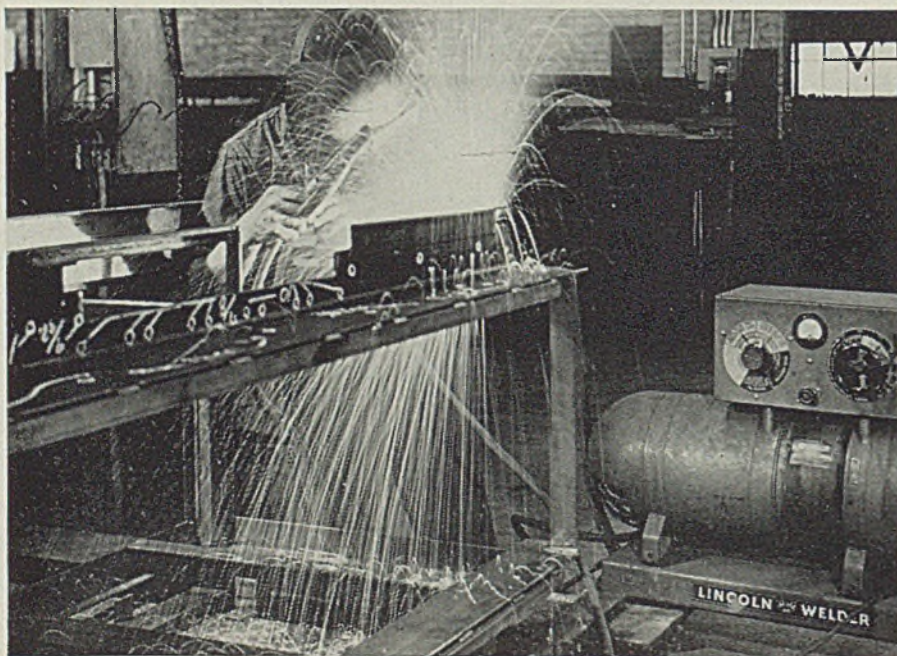
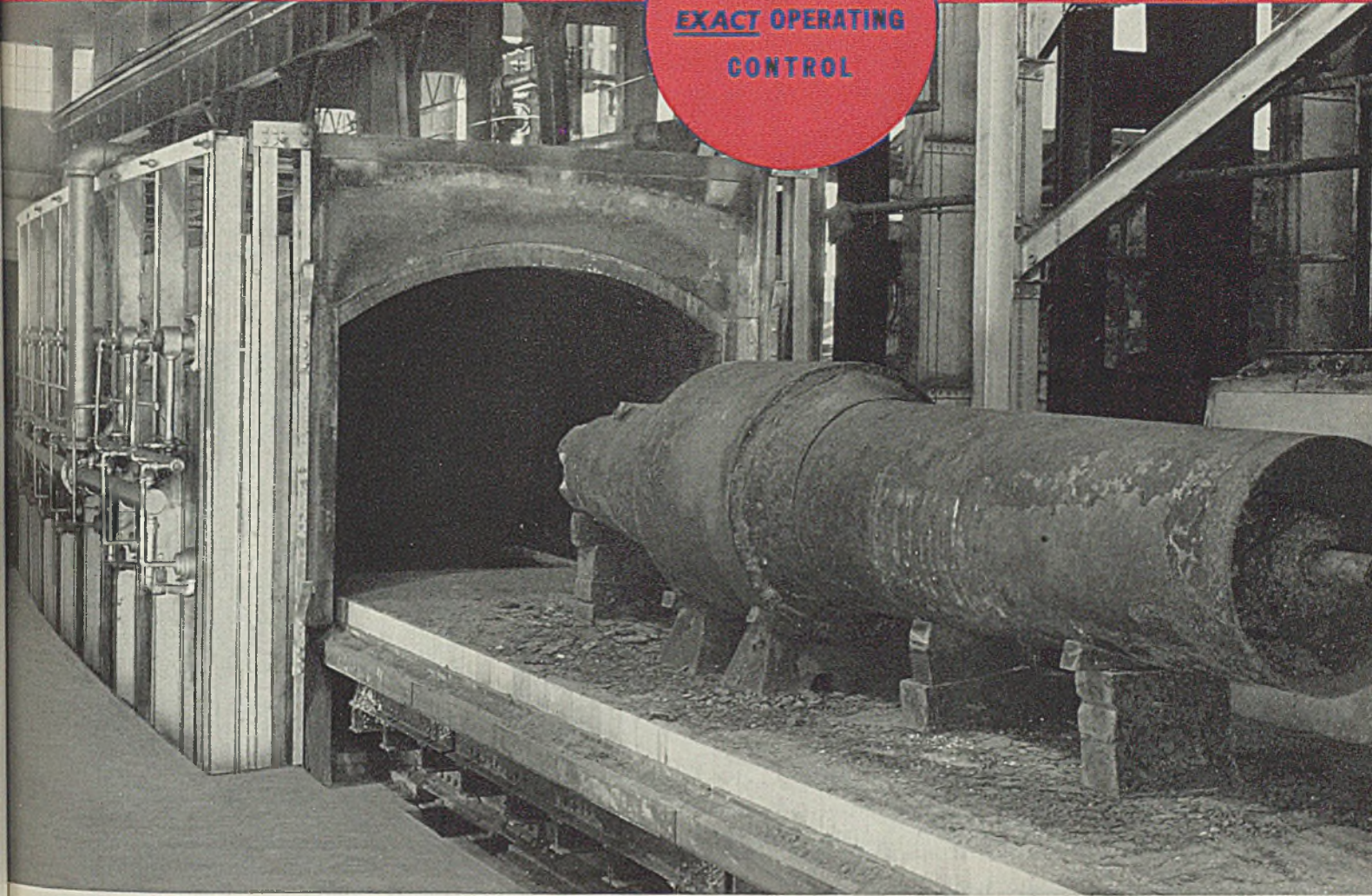


Fig. 3—Operator welding up a frame for a skirt. Pieces are held in fixture to insure accuracy. Sheet metal department is nearby

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CAR-TYPE FURNACES

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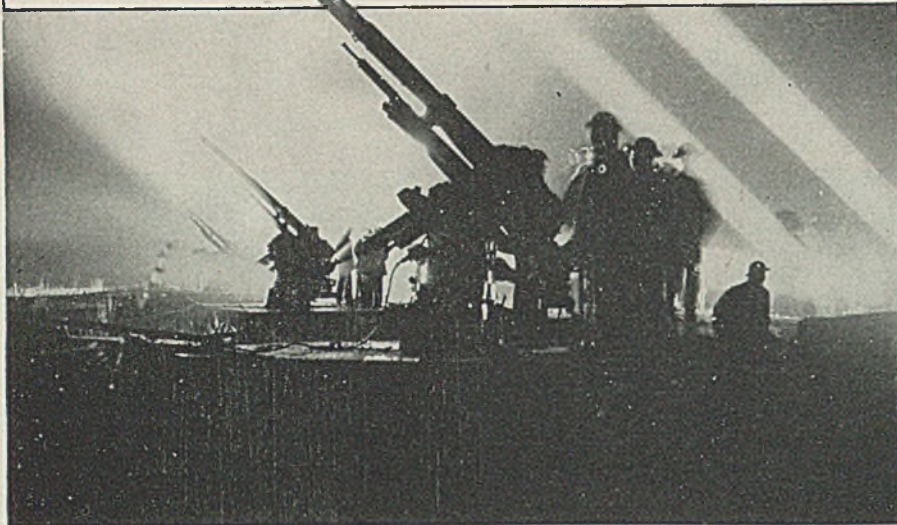
**SWINDELL-DRESSLER Corporation**

DESIGNERS AND BUILDERS OF MODERN INDUSTRIAL FURNACES SINCE 1914

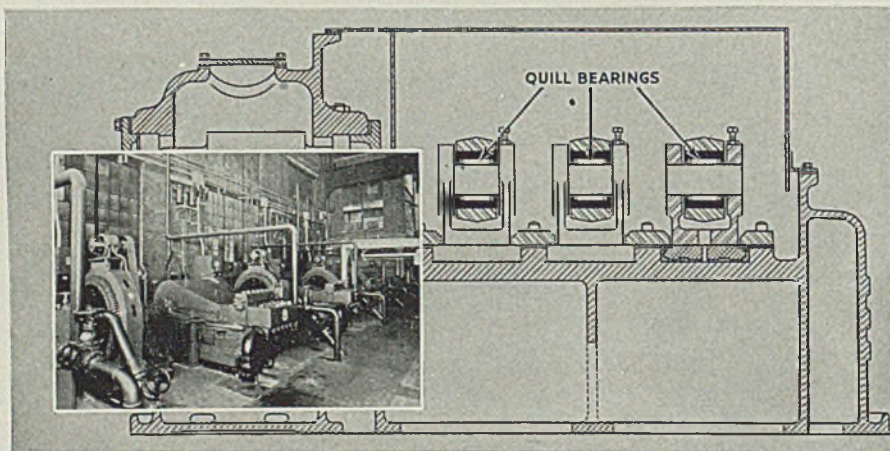
PITTSBURGH, PA.

# IN THE NEWS

## WITH BANTAM BEARINGS

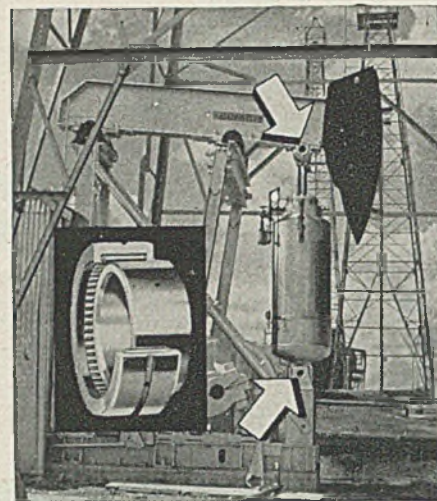


**3-INCH ANTI-AIRCRAFT GUNS** are true precision machines that must operate with extreme accuracy and complete dependability. In the design and construction of many of America's new weapons, the skill and experience of Bantam engineers are playing an important part. Bantam's broad background in the design and application of every major type of anti-friction bearing aids in the solution of new and unusual bearing problems.

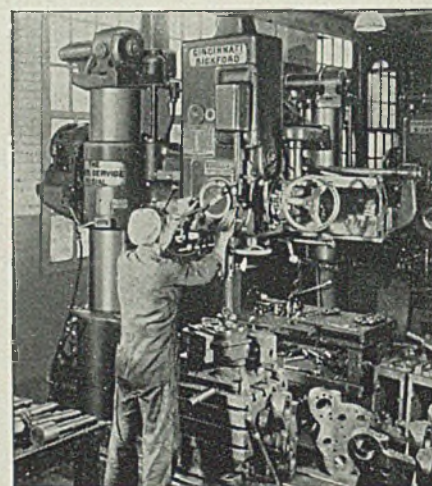


**LONG, DEPENDABLE LIFE** is essential in this application of Bantam Quill Bearings on the wrists of Baldwin Southwark Triplex Pumps. The pumps, shown in inset, are used to furnish high-pressure water for a large shell-forging plant, and deliver 450 gallons per minute at a working pressure of 1,500 pounds per square inch. Load application ranges from zero to maximum 95 times a minute. The Quill Bearings help keep maintenance costs down in this exacting service. For further information on this compact, high-capacity bearing, write for Bulletin H-104.

**BANTAM'S ENGINEERING COOPERATION** is especially valuable in meeting new and unusual requirements. Bantam makes every major type of anti-friction bearing—straight roller, tapered roller, needle, and ball. Bantam engineers aid in the selection of the type that best suits your application—or design special bearings in sizes and types that meet out-of-the-ordinary service requirements. If you have a difficult bearing problem, **TURN TO BANTAM.**



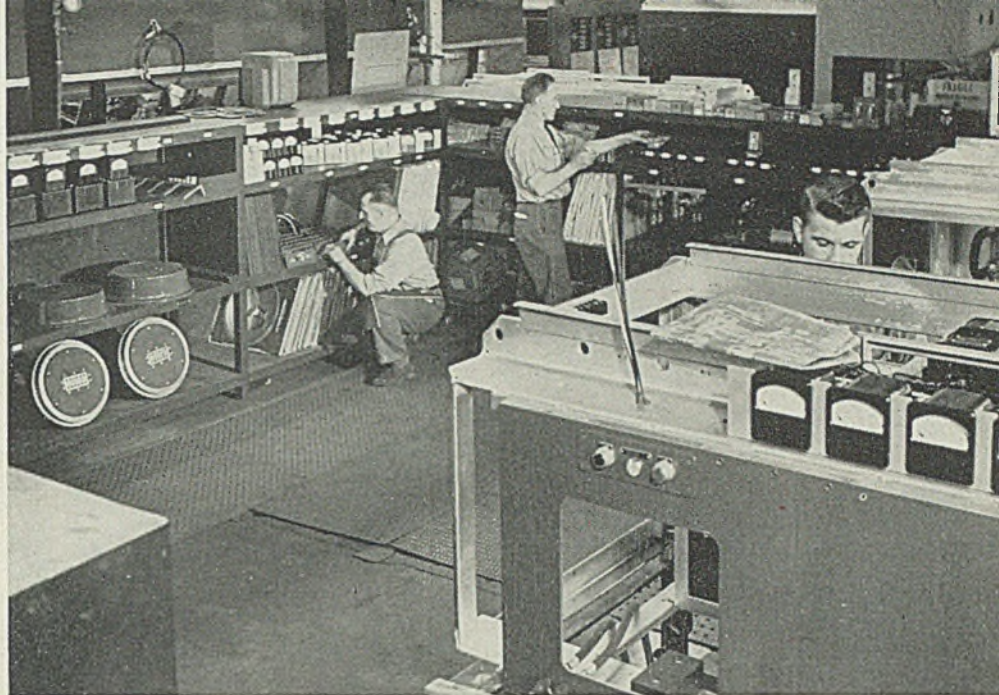
**IN THE NATION'S OIL FIELDS**, pumping units are working 'round the clock to meet wartime needs for this vital fluid. Leading manufacturers of pumpers have found that Bantam Quill Bearings contribute to efficient operation, reduce need for maintenance attention. Arrows on photograph show location of Quill Bearings on The Parkersburg Rig & Reel Company's 66-HK pumping unit—an application typical of the many oil field uses for the Quill Bearing.



**MACHINE TOOLS THAT MAKE MACHINE TOOLS** take on new importance in speeding the nation's wartime production. These Super Service Radials built by The Cincinnati Bickford Tool Co. are working 24 hours a day, 7 days a week, helping to turn out turret lathes. Bantam Quill Bearings in these machines facilitate travel of the head along the arm—another instance of the adaptability of these compact bearings.

  
**BANTAM BEARINGS**  
 STRAIGHT ROLLER · TAPERED ROLLER · NEEDLE · BALL  
 BANTAM BEARINGS CORPORATION · SOUTH BEND · INDIANA

Fig. 4—These stock bins serve the penthouse assembly station. Two partly completed penthouses are at right. Backing up to bins at left can be seen three large induction-heating units which are assembled in a stationary position in main aisle devoted to special equipment. See Fig. 2



to measure the electrical characteristics of the machine against original specifications; the heating cycle is determined; and an actual piece of work hardened and examined by company metallurgists to be sure performance of the unit is exactly correct. During this period, water circuits have been tested under a pressure of 125 pounds—more than would ever be experienced in actual operation. Just before the machine is shipped, a final check is made by a chief inspector and the entire unit is shipped intact and ready to function as a complete self-contained machine upon arrival at the destination.

**Small Assembly Department:** With the exception of the base, part of the skirt, the motor-generator set, certain electrical equipment, and such staples as bolts, insulators, and the like, some 150 parts and subassemblies are made in the Tocco plant.

The small assembly department builds up condensers and equipment for timing electrical circuits into completed subassemblies. Condensers are water tested under pressure for they are water cooled in operation. Copper bus bars are used for connections on certain electric circuits as a safety factor. Push-button control panels, water gage panels, control switches and water manifolds are some of the other subassemblies made in this department.

Points that are used to locate the penthouse on the base are accurately machined so location of fixtures and inductors will conform exactly to specifications. Transformers are also fabricated by this division. The laminated steel cores are built up from silicon steel sheets, 12 x 14 inches x 0.007-inch thick. Laminations are first blanked out and then insulated with varnish in a flash painting and baking machine designed by Ohio Crankshaft men. The sheets are placed on an endless track which carries them through a varnish spray and then through a flame which hardens the varnish by removing the volatile substances mixed with it. Some 1150 laminations or individual sheet steel sections are used in a transformer assembly. Finished transformers are placed in stores and moved to the proper assembly line stock bin as they are requisitioned.

**Handling Equipment:** A crane

system having one crane extending overhead at right angles above the beginning of the assembly line and two cranes set diagonally across to serve the line from the middle on to the end facilitates moving of heavy parts into positions. The lifts are hand powered, chain-pull. Swinging across the jig department from the welding and painting division to the entrance of the assembly line is another hand-powered crane for lifting generator sets and bases. Parts can thus be conveyed to and down the line with ease. See Fig. 2 for sketch of floor plan and handling services.

Bases after generator testing are hauled from the test point to the line on a special hydraulic 5-ton capacity dolly. As a 100-kilowatt generator and base weighs approximately 8000 pounds, an exceptionally strong yet agile dolly is required. It is propelled by hand. The base is slid off upon the roller track of the conveyor line and moved manually to the various assembly stations. Bases in position on the conveyor line are shown in Fig. 1.

**Parts Distribution:** As has been indicated, stock boys keep stock bins filled with a supply of parts sufficient for two weeks' production. The parts bins flank either side of the assembly line, Fig. 1, with those on the right containing electrical equipment, fixtures, nuts, bolts, wire, cables and similar pieces. Toward the far end, the bins take a bulge to form a spacious 3-sided alcove with sufficient space to contain the larger parts going into the penthouse subassembly.

On the left of the line, Fig. 1, open shelves contain such comparatively bulky items as ventilating filters, rectifiers and coils of cable some of which are as large as 500,000 circular miles in cross section

for the heavier currents required for certain heating jobs. These are checked according to schedule and the reserve bank is never allowed to fall below the two weeks' supply.

A sizable stockroom is presided over by a production stock clerk who makes out requisitions. He is the key man responsible for keeping the bins filled.

**Painting Streamlined:** The painting of Tocco units has been definitely "streamlined": Formerly, each machine was painted with transformer panels in place, stop and go buttons mounted, and bright work attached. This necessitated cutting friskets and masking paper for protection. It was a tedious and time-consuming operation.

Today, all sheet metal parts go through five cleaning and painting operations to prevent corrosive action and are then given their *finish painting before assembly*. The men have been trained to handle these pieces with care. Pre-painting is working out successfully, resulting in a time saving per machine of 15 hours.

## Science of Welding

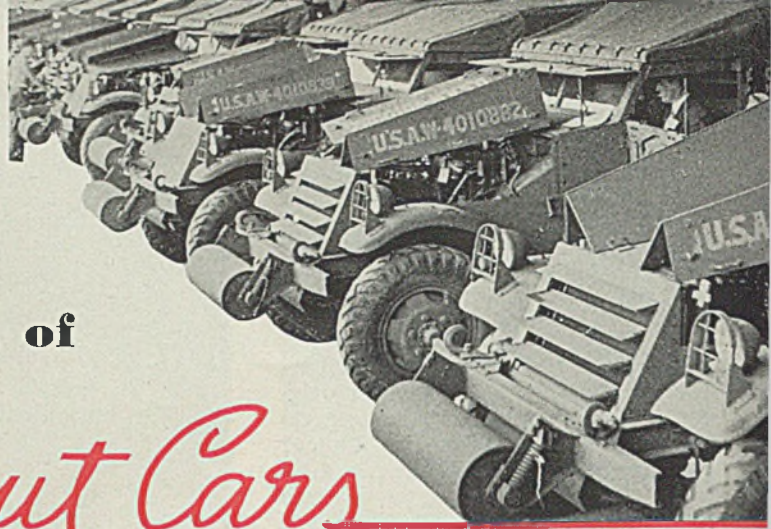
*Science and Practice of Welding*, by A. C. Davies; cloth, 436 pages, 5¼ x 7½ inches; published by the Macmillan Co., New York, and the University Press, Cambridge, for \$2.25.

An English publication by a British author, this book aims to give the basic theoretical principles underlying the various processes of welding and the practical methods of applying them. It is intended for the practical welder requiring the correct technique and the student welder requiring an understanding of the principles of physics, metallurgy, chemistry and electricity as applied to welding.

## Mechanized Assembly

### Speeds Production of

# Half Trac Scout Cars



Production record of scout car manufacture at Cleveland has set records with contracts being completed months ahead of schedule. Here the purpose and construction of the modern Half-Trac scout car as made for the United States Army is described as well as details of modern production techniques and materials handling systems utilized to build these units at high speed

WORK BY a Cleveland Co.'s engineers in ordnance production actually goes back some 8 years to when they collaborated with the United States Ordnance Department in developing scout cars. As a result, a scout car design was first deter-

mined in 1934. After a period of production development, some 300 such units were turned out in 1939.

This was followed by an order for conventional four-wheeled scout cars scheduled for completion in September, 1941. Instead it was finished early in May—almost five months ahead of schedule.

The most recent order is for more than half of a total order of Half-Trac scouting units and personnel carriers ordered from three manufacturers in accordance with the War Department policy of developing a number of sources of supply to meet any eventuality. The other two makers are located in

Chicago, and Ardmore, Pa. Of that total, Cleveland's order of Half-Tracs is on its way to completion.

Close collaboration and co-operation among these three firms in engineering and building these units absolutely identical in every particular represents an outstanding accomplishment, for not only was it necessary for the engineering departments to work hand in hand, but purchasing departments had to collaborate to get needed supplies at the right time from identical sources without conflict. This standardization allows all Half-Tracs to be serviced from the same set of

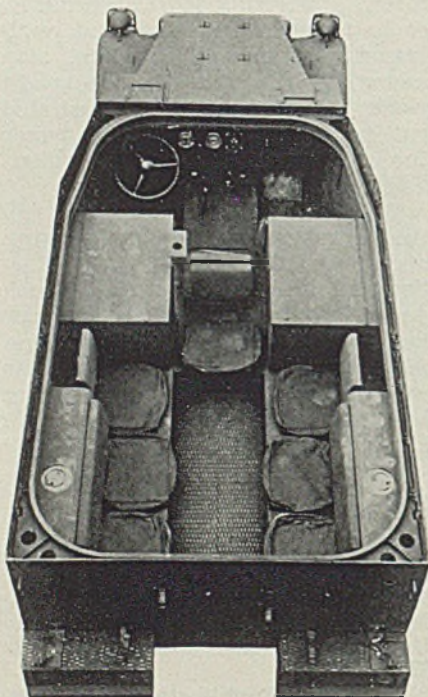


Fig. 1. (Right, above)—Line-up of partial lot of completed Half-Tracs, ready for delivery to United States Army

Fig. 2. (Immediate left)—Overhead view of Half-Trac with cover removed. Two .30-caliber and one .50-caliber machine guns operate on gun track that encircles top rim of vehicle

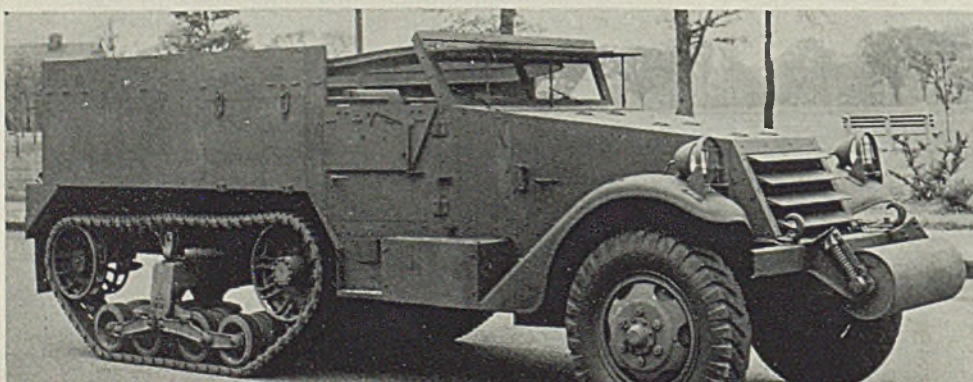
Fig. 3. (Left, below)—Oblique side view of Half-Trac scout car with cover removed and shields in open position. In combat, upper sections of doors are raised, windshield plate lowered, radiator louvre plates lowered

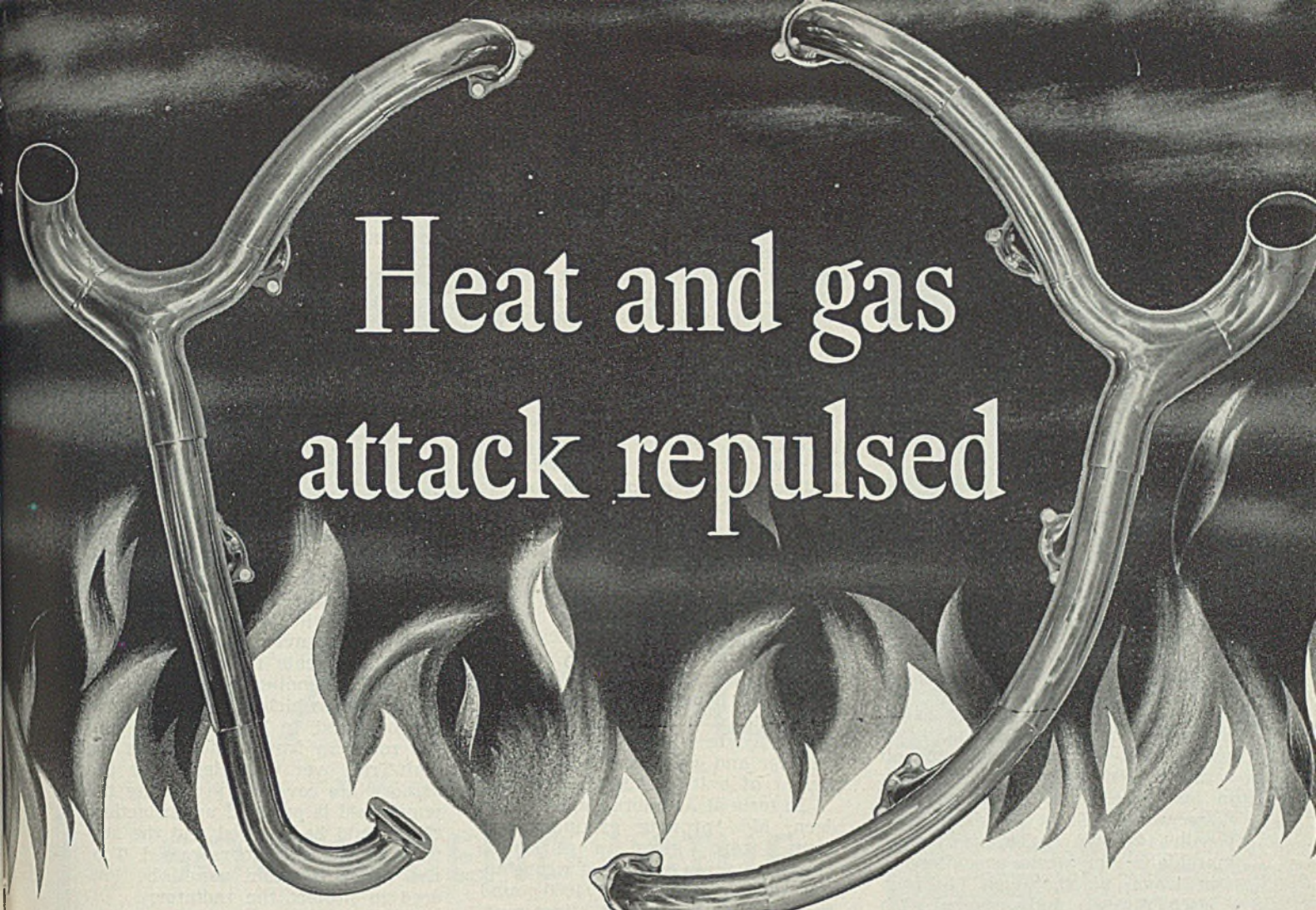
Much definite information about quantities, dimensions, fabricating procedure and identity of the manufacturer has been deleted from the accompanying article by the Office of Censorship of the War Department.

—The Editors

spare parts—of vital importance for efficiency and economy in the field.

The new Half-Tracs are a far cry from anything used in 1914-18. They not only attain a speed of 50 miles an hour or more over smooth ground or highways, but they are specifically designed to operate efficiently over soft and broken terrain as well. Such an elastic range of operation makes the Half-Tracs a valuable development of the conventional scout car. In chassis and body structure, the Half-Trac is much similar to the conventional scout car, but instead of having rear wheels it is supported by an endless belt track driven by the forward sprocket of the track suspension system. At the same time, power is supplied to the front wheels, so driving force is attained at both front and rear. This gives enormous traction power on broken





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Into action go our American army tanks. We're proud of these modern machines of warfare. For they're built to withstand enemy attack—and the attack on parts which comes with severe, gruelling service.

A good example why our tanks are better is this exhaust collector ring for radial type tank motors. Day after day it will resist the attack of flaming, corrosive gases—conditions which would quickly ruin ordinary steel—because it is made of ELECTRUNITE Electric Resistance Welded Stainless Steel Tubing (Republic's famous Enduro\* Type 347).

This is but one of the many applications of

ELECTRUNITE Stainless Steel Tubing which are contributing to *Production for Victory*. It may be the very thing you need, too. For it provides all of Enduro's resistance to rust and corrosion, to scaling and oxidation, *PLUS* the uniformity consistently obtainable only in electric resistance welded tubing. It is uniform in diameter, concentricity, wall thickness, scale-free surface, ductility and strength.

Tell us your application, size, gauge and analysis. We'll give you detailed information—promptly.

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or soft ground, which thus permits the unit to travel over practically any type of terrain.

It can climb in and out of shell holes and trenches. It will go through mud and ford shallow streams.

The large roller at the front end helps them to climb out of holes or ditches and to push down small trees and underbrush. They are built high off the ground to ride over rough ground and clear water, yet a low overall target height is maintained. Horsepower-to-weight ratio is extremely high, resulting in fast acceleration and great maneuverability. Eight speeds make it possible to pull out of wet soggy marshland; yet attain exceptionally fast travel on the open highway.

Half-Tracs are fully covered with armor plate. When subjected to fire, a series of armor-plate shutters closes down over the radiator and an armor-plate shield with two portholes covers the windshield. The canvas top is removed in action.

Although not intended for combat purposes, the Half-Tracs are well armed, carrying two .30-caliber and one .50-caliber machine guns mounted on a special gun track which encircles the top rim of the vehicle to permit full 360 degrees of action. This is shown in Fig. 2. Guns are swivelled so they can be turned up



Fig. 4—Half-Tracs easily travel over rough terrain, descend banks as shown

or down, making them also effective as anti-aircraft weapons. Additional automatic small arms are carried in the vehicle.

Large gasoline tanks are placed behind the armor plate. A sponge rubber material makes them self-sealing against bullets. Gasoline capacity of 60 gallons gives the Half-Tracs a cruising range even on rough terrain of over 300 miles.

With driving power applied at both front and rear, units have an exceptional reserve pulling power with which to draw other vehicles and so are well adapted for towing artillery. Each Half-Trac has the army-type pintle on the rear for quick attachment to any vehicle to be towed. The 6-cylinder gas engine is rated 147 brake horsepower. Double transmission has eight speeds forward, two in reverse.

A two-way radio outfit enables officer and crew to keep in touch with field headquarters. Low folding seats with wells for the feet accommodate a crew of eight plus a driver and car commander. Gross weight of unit is 17,500 pounds.

In tests at Ardmore Dept.'s Aberdeen, Md., proving ground, these units were given a 4000-mile run in three weeks of continuous driving trailing a 4600-pound howitzer at top speed. Test models thus in three weeks were given the equivalent of three years of actual service. And the Aberdeen proving ground has everything from the deepest shell holes and trenches to smooth highways, with every type of obstacle in between. The units built in Cleveland are each given an individual road test as they are driven down to Canton, O., where the armor plate is put on. Test drivers drive the same vehicle back from Canton to Cleveland after the armor has been mounted on it, thus having an excellent opportunity to detect the need for any adjustments, which subsequently are made during the tests and final inspections at Cleveland.

A new building was recently added for the sole purpose of testing and conducting final inspections of Half-Trac scout cars. Part of it is shown in Fig. 1. Approximately 60 per cent of all the company's business is now military. Present production of Half-Tracs is well over 500 per month.

Material used in the Half-Tracs is obtained from 186 primary suppliers, in turn served by some 6000 subcontractors in 26 states, so the work is spread over a wide area.

**Manufacturing Procedure:** The

first of the Half-Trac units were assembled on the heavy-duty and special-equipment assembly line—a regular factory production line on which large buses and special trucks have been assembled.

This is the same line which will be described and which is shown in the accompanying illustrations. In addition, a second line recently has been put in production which operates at still greater speed, more than doubling the output of Half-Tracs.

Fig. 1 shows Half-Tracs in the new test and final inspection building at Cleveland.

The chassis of these units have first been built in Cleveland, driven to Canton where the armor plate has been attached, and driven back to Cleveland for final inspection and test.

Figs. 2 and 3 show top and side views respectively of the completed Half-Tracs with armor attached but with top canvas stowed. Fig. 2 shows the seats for the crew, and the rail extending entirely around the body on which the machine guns are mounted. In Fig. 3 can be seen the roller in front which helps the Half-Trac over obstacles. Here the armor-plate covering protecting the windshield is propped up. In action, this would be lowered and the sections of the side doors raised. Too, the vanes in front would be lowered to protect the radiator.

Fig. 4 shows a Half-Trac coming down a steep ravine and crossing a small stream during a demonstration. In Fig. 5 the unit is progressing rapidly down the stream, shooting spray to practically hide the unit. In actual field operation, drivers are instructed to hold the speed down to prevent spray.

## Proposes Revision To Save Much Metal

Approval of a proposed revision of simplified practice recommendation R-97-30,—"Bell-Bottom Screw Jacks"—recently submitted to the industry would result in a considerable saving in metal according to the National Bureau of Standards, United States Department of Commerce, Washington. The revision was worked out by the standing committee of the industry in cooperation with the division of simplified practice.

Original recommendation, promulgated in 1930, reduced the number of stock sizes from 78 to 38, or approximately 50 per cent. The proposed revision would make a further cut in number of sizes from 38 to 27, or about 29 per cent, giving an overall reduction of 79 per cent in number of 4-way head type screw jacks.

Mimeographed copies of the proposed revision may be obtained on request from Washington.

Fig. 5—Water is no obstacle as witnesses learned in watching this test





# NAVY "E"

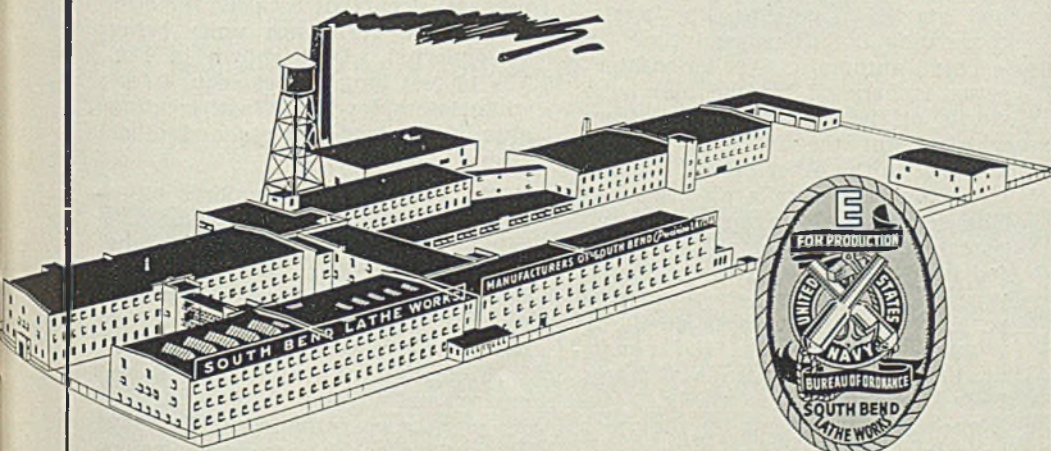
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## SOUTH BEND LATHE

The Navy Ordnance Flag and "E" Pennant have been awarded to the South Bend Lathe Works for outstanding performance in the production of ordnance matériel for the United States Navy.

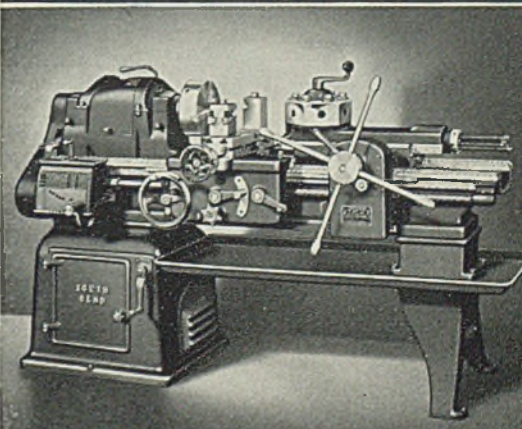
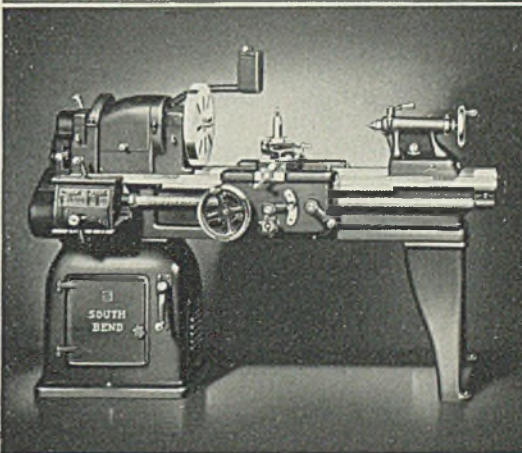
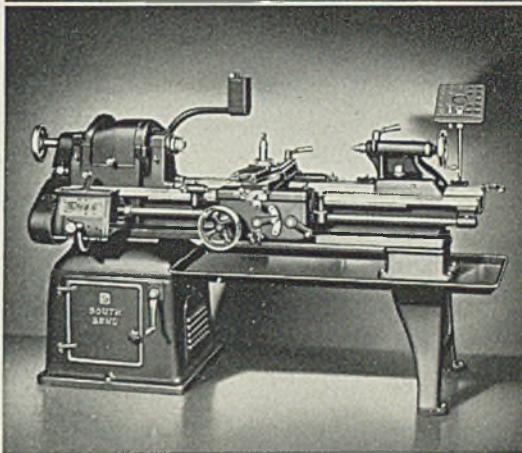
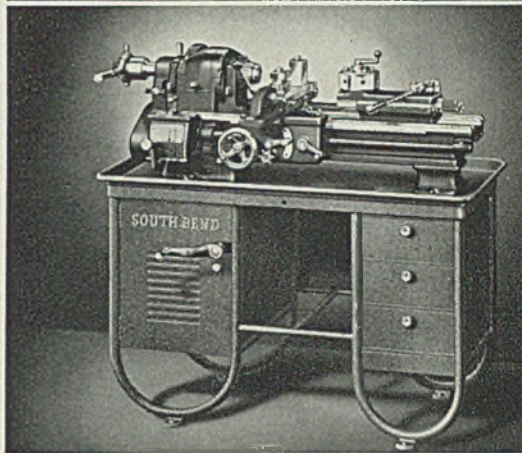
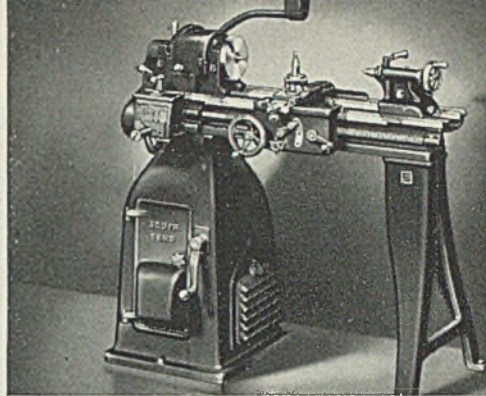
For years South Bend Lathes have served our Navy. More recently—since Defense demands have called for vastly increased machine tool production—South Bend has been "ahead of schedule" in the production of lathes.

Permission to fly the Navy "E" from our flagstaff and to wear the "E" on our lapels, is an honor. While these emblems serve as recognition for work well done—they also serve as a reminder of the tremendous job that lies ahead. We will do our part to help finish it.



### SOUTH BEND LATHE WORKS

857 E. Madison St., South Bend, Ind. Lathe Builders for 35 Years



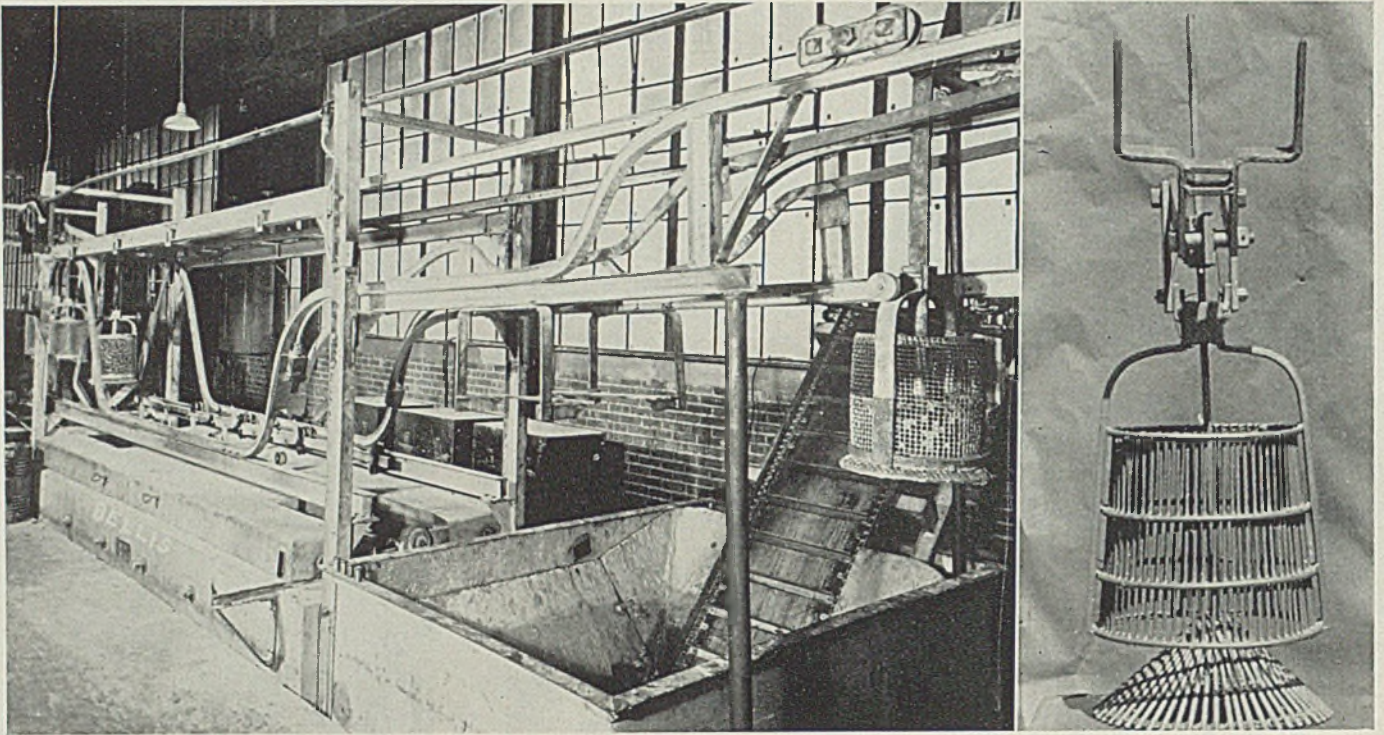


Fig. 1—Left, "roller-coaster" setup for high-production heat treating of small parts.

Fig. 2—Right, cone-shaped drop bottom spreads outwork as it is discharged into quench and eliminates need for cooling basket

## Obtains Improved Performance with SALT BATH FURNACES

A MEANS of improving performance of salt bath furnaces is to provide for continuous movement of the work through the bath and thereby prevent the salt from congealing around the work, according to the Bellis Heat Treating Co., Branford, Conn., which employs this principle to use heat most effectively and to obtain increased output from the equipment.

Fig. 1, for instance, shows a typical setup of equipment employing a salt bath furnace 10 feet long and 2 feet wide as the main unit. This is a continuous production unit, the work being carried in baskets which travel suspended from the overhead double-track shown. At the entrance end, the track dips sharply, lowering the work into the bath. Pushers then engage the carrier to move it through the bath at a constant rate. As the basket reaches the end of the salt bath, it engages a lift which automatically raises it up over the quench tank seen at the right foreground in Fig. 1.

At this point, an innovation in

basket construction helps the quenching. Basket bottom is cone-shaped, as shown in Fig. 2. As the basket strikes a trip, the bottom is lowered, allowing the work to spread out as it drops into the quench tank below. This also eliminates the need for cooling the basket as it is immediately reloaded and started down the line again, conserving both heat and time.

This automatic "roller-coaster" setup is handled by one man who works at the quenching end, from which point the reloaded baskets are sent to the other end of the line by a top set of rails also seen in Fig. 1. Some 75 pounds of small parts are loaded into a basket and fed into the salt bath every 2 minutes. Since four baskets are always passing through the bath on the 8-minute working cycle, the hourly production is 2200 pounds of work. Note the slat conveyor, Fig. 1 extreme right, which carries the parts up out of the quench.

That long salt bath furnace, rated 250 kilowatts, would ordinarily have

an excessive amount of heat loss from the open top but this loss is held to an extremely low value by means of the cover which entirely encloses the top of the bath except for a small opening at each end for ingress and egress from the bath. A narrow slot permits passage of the carrier support between these two openings.

Fig. 3 shows another unusual salt bath furnace. The pot is of welded steel boiler plate construction, no nickel or chromium alloys being needed because the salt bath is heated internally. In starting up the bath, the salt is fused by means of electric heating units embedded in the water-cooled electrodes. After the bath becomes liquefied and a conductor of electricity, it is heated by passage of current between the electrodes, the resistance units being disconnected. Unit shown in Fig. 3 is 16 feet long, 5 feet deep, 4 feet wide; is employed for heat treating aluminum sheets, rivets and other aircraft parts.

Fig. 4 is a view of another setup that is novel because not only is a salt bath used for the brazing work but because a 3-station lift is employed for moving the work fixtures from loading-unloading station at operator's immediate left, to salt bath heating unit just beyond operator, and to quench bath at left. As soon as operator has loaded one of the fixtures, he operates the valve controlling the application of air to the cylinder which supports all three



# ALL OUT PRODUCTION WITH AND BY THE USERS AND MAKERS OF STERLING WHEELS

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One operation which is being speeded up tremendously occurs in the billet grinding section. Here, the demands for speed are being matched by our fast production and delivery of Sterling Billet Grinding Wheels.

These "wheels of industry" are built to remove quickly the defects from the particular steel you are making. Especially important is the fact that Sterling Billet

Grinding Wheels permit a minimum removal of steel . . . thus saving time, material, and money!

Nearly every type of modern steel--stainless or heat resisting, for example--must be absolutely free from billet defects before being rolled. To find the Sterling Wheel for your job is the simple matter of calling in a Sterling Engineer. This is a service gladly provided at no cost or obligation . . . feel free to ask for it.



May we send our book, "The Art and Science of Grinding"? Write today on your letter-head . . . it's free!

Decide today to take advantage of higher production rate and better grade of finish by securing a Sterling specification for your particular job. Write or wire . . . we will gladly cooperate.

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THE WHEELS OF INDUSTRY



# ATKINS

## *Curled-Chip Teeth*

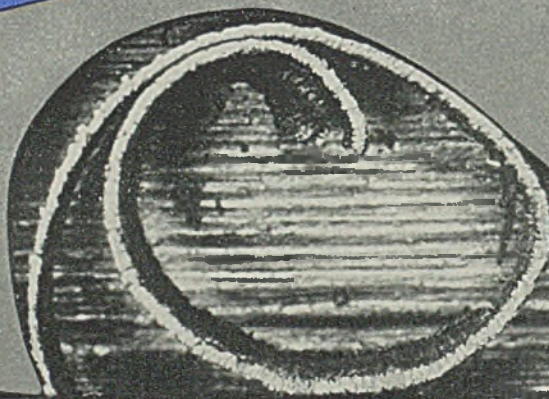
WITH LATHE TOOL CUTTING QUALITIES

### SHOCK TROOPS In the Battle for Production

● Thrown into battle on the important metal cutting sector of the industrial battle front, Atkins Curled-Chip Saws go through metal faster, stay in the fight longer with less frequent relief than others heretofore available. All this results primarily from their new tooth design—one that adapts the scientific cutting principle of lathe cutting tools to metal saws—one that removes metal in continuous chips jumping clear like lively clocksprings.

To help industry achieve and maintain peak efficiency on metal cutting work, Atkins offers the experience of over 8 decades of saw engineering to users of metal cutting saws. Call on our engineering department for close co-operation in getting the right saw on every job.

11-TIME ENLARGEMENT of Atkins Curled-Chip Powersaw Blade in action. Note how tooth removes material in a "curled-chip." Curled-Chip Teeth are available on Powersaw Blades, Circular Metal Milling Saws, Segmental Cold Saws, and Metal Cutting Bands.



E. C. ATKINS AND COMPANY • 427 S. Illinois St., Indianapolis, Ind.

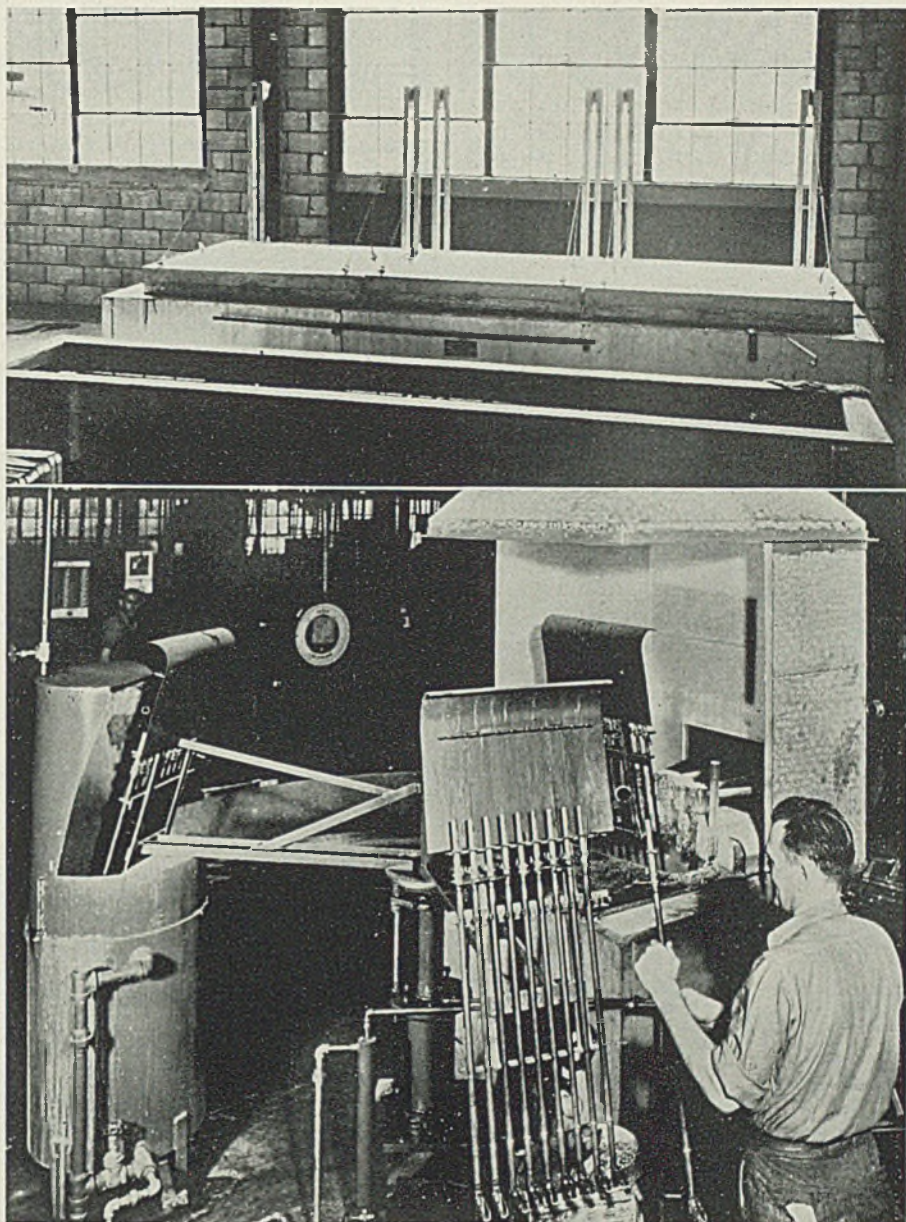
Fig. 3—Upper, unusual salt bath furnace employs resistor elements to start up bath, but utilizes bath resistance to maintain temperature by passing current directly through bath. Fig. 4—Special fixture on "merry-go-round" lift handles brazing operation with great speed in combination with salt bath for quickly bringing work up to brazing temperature

fixtures, raising all three units from their respective positions. Merry-go-round unit is then swung to bring new work above salt bath, brazed work over quench, and cooled work to unloading station. Now cylinder is lowered to allow fixtures to drop work to respective stations.

It is easy to see how this setup, Fig. 4, speeds the brazing operation. The salt bath is maintained at 1650 degrees Fahr. to quickly melt the brass brazing alloy around the steel gearshift lever, the brazing alloy being placed in the correct position at the loading station before work enters the bath.

Other developments in connection with salt bath furnaces are improving the physical properties obtained in the wire industry where large units are employed to heat coils instead of strands. Here, too, the principle of moving the work through the bath is utilized to improve the heating operation. The quench bath is connected to a heat exchanger in such a manner that heat is recovered and used for pre-heating, thus greatly increasing the thermal efficiency of the setup. These neutral salt baths are used in batteries of three.

Similar units also serve as fluxing baths for galvanizing and tinning as well as other dip operations. And this same principle of moving the work to be heated through the salt bath has also been applied to advantage to strand tinning; annealing



for necking and tapering of brass cartridge cases; the brazing of radi-

tor parts; heating of projectiles for forging, and so on.

## Text on Indexing for Workers and Schools

*Milling Machine Indexing*, by C. W. Felker and H. W. Paine; cloth, 88 pages, 5 1/4 x 8 3/4 inches; published by Bruce Publishing Co., Milwaukee, for \$1.75.

Previous treatment of the subject of indexing being of a fragmentary nature the authors in this volume have attempted to give it more thorough treatment than hitherto attempted. Five accepted types are presented, direct, simple, differential, block and compound, with explanations and sample problems showing best fields of application. In addition to the mathematical procedure involved sufficient trade in-

formation has been supplied concerning indexing attachments in common use so that operation and construction of various available types may be understood.

Instruction materials are arranged so that the book may be used as a machinist's reference book or as a classroom text for upper grades of vocational or technical high schools, apprentice or employe training classes or college engineering machine shop classes.

Versatility has been obtained by presenting first necessary trade information concerning indexing attachments and the setup being studied, in each unit. This is followed by explanations and sample problems on various applications.

## Standard on Passing Lamps Accepted

"Electric Supplementary Driving and Passing Lamps for Vehicles (after Market)," commercial standard CS97-42, was recently accepted by the trade as its standard of practice for new production beginning Jan. 8, 1942, as announced last December, according to the National Bureau of Standards, United States Department of Commerce, Washington. This is the same standard that was circulated last October to consumer and distributor organizations, testing laboratories and manufacturers for the purpose of obtaining written approval.

## A Ship a Week

(Concluded from Page 78)

They are started out at tacking and are carried along with personal instruction until they are able to do any of the work required on the ship or in the plate shop, which is practically all butt welding on mild steel with general purpose rod.

"After this training and before they can be put on production work, they must pass the standard test. If they can't pass it, they are given more instruction and then try again. Eventually we make a welder and a good one out of practically every one of them, for the schools have already sifted out most of the impossible material and what we work on is the 'concentrates', so to speak."

In addition to those employed in other parts of the plant, 60 welders are at work each day on each of the 11 hulls, 20 per ship for each of three 8-hour shifts. There is one man to each 350-ampere portable welding machine, while others work

from multiple operator machines. Equipment includes 55 General Electric welding machines, 350-ampere units; 380 Lincoln welding machines; 350-ampere units; 20 Wilson Hornets, 350-ampere units; 18 General Electric constant-potential sets, each rated 1900 amperes.

The constant-potential machines (1900 amperes each) serve the assembly platforms, usually 15 welders being supplied from each machine. The work there does not demand the portability of equipment as is the case on the hull where work is done at widely separated points in the course of construction. Also, the new operator finds it easier to work from the constant potential machines. There is less magnetic disturbance and it is easier for him to hold an arc until he becomes thoroughly versed in the technique of doing so with any class of equipment under any conditions.

Welding a ship is exacting work. It is not just a matter of welding one isolated plate to another. To get the hundreds of pieces together

in sequence and hold them so the completed hull will be perfect in form and each foot of weld perfect makes it necessary to contemplate the job as a whole, rather than as thousands of small, individual welding jobs. Contraction and expansion during progress of the work must be watched every moment for they play an unusually important part in getting such large areas of surface lined up perfectly.

Furthermore, any minor mistakes and inaccuracies from the mold loft on must eventually be absorbed by the welders unless they are so glaring that an altogether new piece must be cut. Small inaccuracies in cutting can creep in, especially since it is to be remembered that is done by relatively new operators who must be trained in the same way that the welders are trained.

### Bury No "Dead Men"

After the piece goes to its final destination, it is to the credit of all concerned to say that the welder, given a leeway of 0 to 1/2-inch, can take care of almost every piece. There is seldom a reject. But in no case, if the discrepancy is greater than that, is there ever an attempt made to cut a small piece out on the spot to fill in some gap. Such a thing would be considered next to criminal. No "dead men" are buried on this job.

After the welder has received his training and passed the test, it has been found on this job that the average capacity per man per hour is 40 feet of weld.

One thing that gave trouble at first was the welding of the stem and stern frames, work which involves welding light plate against a heavy casting. No one knew how to do it except "Blackie" himself who had to put on the goggles and get the work started so that others could carry on. It is necessary in such work to peen each bead just the right amount so as not to harden the weld as a whole. It is in work of this nature that the real "art" of welding comes in, a sort of instinct that tells the operator when the peening has reached exactly the right stage.

The Oregon Shipbuilding Corp. consists of a western group headed by Henry J. Kaiser of Oakland, Calif., who said at the Oct. 26 launching, "The Maritime Commission wants and expects this yard and other yards to deliver two ships a day—730 ships a year, a world's record. We can do it if they can furnish us the steel and other materials."

Today, this shipyard is on a production schedule of a ship a week and what is more, this schedule is being met.

## He Paints with Gold



LIKE the man who lights cigarettes with \$100 bills, the worker above paints with two of the world's most precious metals—gold and platinum. The paint, specially prepared for use on insulators at the Westinghouse porcelain plant at Derry, Pa., forms a metallic base for solder which otherwise would not adhere to the slick surface of the porcelain. Applied to insulators and baked at 1300 degrees Fahr., the gold-platinum mixture forms a metal "coat" that becomes part of the porcelain. Solder readily adheres to this metal "wrapping", forming an air-tight connection. The company finds that this gold-platinum preparation provides an effective method of preparing porcelain for soldering

## Defense Projects Use Much Cotton Insulation

Reynolds Metal Co. Inc., Richmond, Va., reports that the cotton insulation it introduced to the market last year under the name Reyn-O-Cell is proving to be an important building material in the war program. Ninety per cent of the output of this insulation now goes into defense housing projects according to C. D. Kuck, vice president in charge of the Building Products Division.

Made of water-repellent cotton fibers, treated so as to be flame-proof and fire-resistant, the insulation is made from surplus cotton in accordance with specifications developed by the Department of Agriculture. It is said to have a high insulating value and can be installed without any expensive tools and with very little waste.

## Presents Treatise on Carbon-Steel Wire

Section 16 of the Steel Products Manual covering carbon-steel wire is now available at headquarters of the American Iron and Steel Institute, 350 Fifth Avenue, New York for 25 cents.

General definitions and manufacturing practices discussed in Part I provides considerable detail concerning the classes and finishes of coarse round wire and tabulates the gage numbers with their decimal equivalents and their decimal ranges. Seven pages are devoted to tables on gage numbers, diameter, sectional area and weight and length of wire.

Part II covers limits and ranges for standard and nonstandard steels. Ranges and limits for chemical composition for open-hearth and bessemer carbon steels are listed and standard methods for sampling and for check analysis of rolled and forged steel products are discussed. A short glossary of terms used in the wire industry comprises Part III.

## Circulates Standard on Enamelled Utensils

Recommended commercial standard for multiple-coated porcelain-enamelled steel utensils TS-3200 is now being circulated to producers, distributors and users of enamelled utensils for written acceptance as a basis for publication according to the National Bureau of Standards, United States Department of Commerce, Washington. This is the same standard that was adopted at the general conference held in Chicago Jan. 29 of this year.

# ROEBLING *Wires*

ROUND • FLAT • SHAPED



ROUND HIGH AND LOW  
CARBON COMMON  
AND SPECIALTY WIRES

Hard Drawn, Soft Annealed or Tempered,  
in all Finishes—Bright, Liquor Finish, Cop-  
pered, Tinned, Galvanized.



FLAT HIGH AND LOW  
CARBON AND  
SPECIALTY WIRES

Hard Rolled, Annealed, Scaleless Tem-  
pered; Tempered and Polished, Tempered,  
Polished and Colored; Various Finishes—  
Bright, Tinned, Coppered, Hot or Electro  
Galvanized.

### SHAPED WIRES

Various High or Low Carbon Shaped Wires  
such as: Shaft Casing Wires, I Beam Sec-  
tions, Space Block Wires, Square, Key-  
stone, Oval, Half Oval, Half Round, etc.

Snap rings for the base of textile bob-  
bins must fit snugly around the grooves  
as well as hold a uniform tension. That  
calls for exacting specifications in the  
Roebling high carbon steel wire from  
which they are made.

Dimensional accuracy and quality must  
be held within very close limits...since  
the wire must respond *uniformly* to  
heat treatment after forming. Only in  
that way can high speed production be  
maintained, rejects cut to a minimum.

Making high quality steel wire within  
close limits is a specialty with Roeb-  
ling. We have the kind of steel-making  
facilities and the highly-trained organi-  
zation that has provided  
the answer to hundreds of  
such difficult problems.



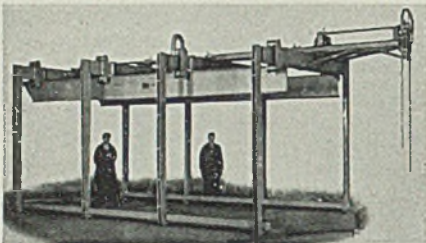
**JOHN A. ROEBLING'S SONS COMPANY**

TRENTON, NEW JERSEY • Branches and Warehouses in Principal Cities

# Industrial Equipment

## Grab for Heavy Loads

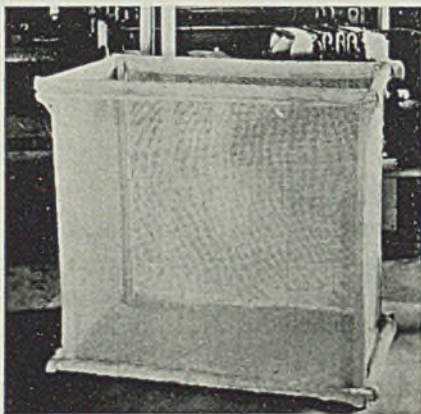
J. B. Engineering Sales Co., New Haven, Conn., has developed a Mansaver grab which is capable of lifting 100,000 pounds at one time. It picks the load up by means of pans and can be adjusted to grab



pans of varying widths. The equipment also can carry loads 20 feet long, 7 feet high and varying in width from 100 to 110 inches. It is operated by one man from the floor by means of a chainwheel. It is offered also with a motor drive where frequent operation is desired.

## Plating Tank Nets

Hanson-Van Winkle-Munning Co., Matawan, N. J., has introduced a new tank net for trapping or recovering work dropped in plating tanks. It consists of ½-inch stretched mesh, hung square, 6-thread medium twine, made to dimensions as specified. Tape is sewn in form of loops

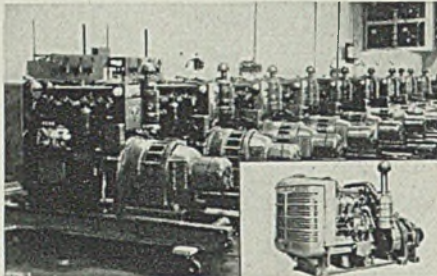


along top and bottom of both ends and sides large enough to accommodate a rod up to 1½-inch in diameter. The net can be used in nickel, cyanide copper, Mazic zinc, acid zinc and cadmium solution to

advantage. It is not suitable for alkaline cleaners or sodium stannate tin solutions.

## Power Plants

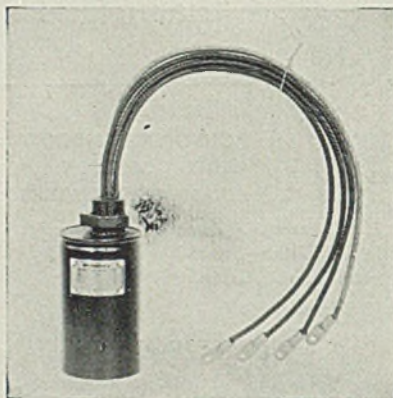
Ready-Power Co., 3818 Grand River avenue, Detroit, announces a complete line of diesel electric plants, powered by International



Harvester engines, for providing both alternating and direct current in either regular or stand-by service. Units are offered in eight plant models which cover the range between 12½ and 50 kilowatts. The engines are started and "warmed up" on gasoline at low compression. Although easy to start, they can be cranked by hand in emergencies. Engines operating at speeds from 900 to 1200 revolutions per minute are available.

## Meter Protector

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has introduced a new type A indoor watt-hour meter

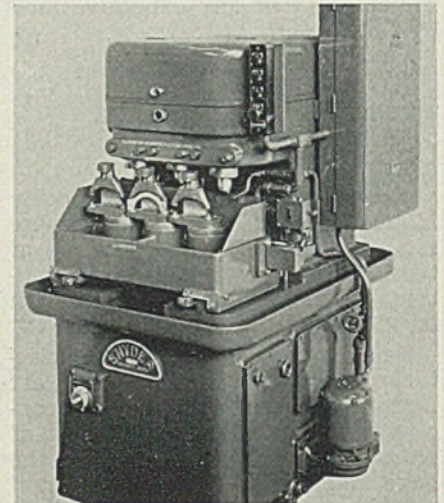


protector for preventing damage due to lightning surge voltages. It has a line to ground rating cutoff of 500 volts room mean square, a 60-cycle gap breakdown of 800 to 1200 volts root mean square, and a discharge capacity of 20,000 amperes crest. Circuit voltage range is from 110 to 575 volts on 3-phase circuits. Consisting of an assembly of porous block elements and series gaps, the protector is enclosed in a round aluminum case filled with a non-flammable compound. It can be mounted by a conduit through one of the knockouts in a connection box on which the watt-hour meters are mounted. The nipple on the protector

is 1¼ inches long and is off center to move the protector for clearance if mounted under the connection box.

## Milling Machine

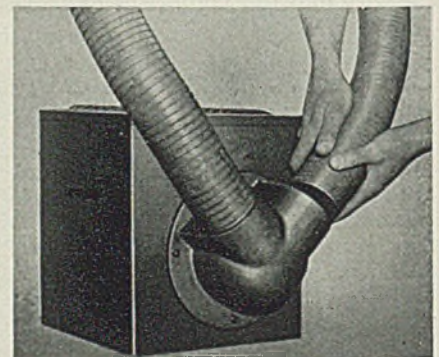
Snyder Tool & Engineering Co., 3400 East Lafayette street, Detroit, announces a new semi-automatic milling machine for radius contour milling bolt bosses on connecting rod caps. It features three spindles and three revolving fixtures for machining three parts at one time. The spindles are quill type, ball bearing mounted, and driven by V-belts through spur gears running in oil; they have quill clamps, and vertical adjustment to compensate for tool wear. Coolant is supplied by a pump from a tank in the machine base. The fixtures are mount-



ed on a main slide, and are revolved by a cross slide—both slides being hydraulically operated. The machine itself is electrically controlled by push buttons.

## Intake Flange

Aget-Detroit Mfg. Co., 959 Book building, Detroit, has placed on the market a new 2-way intake flange designed to increase efficiency and



to permit the use of 3-inch hose to allow its Dustkop dust collector to qualify under certain state codes. Intended for use with any of its

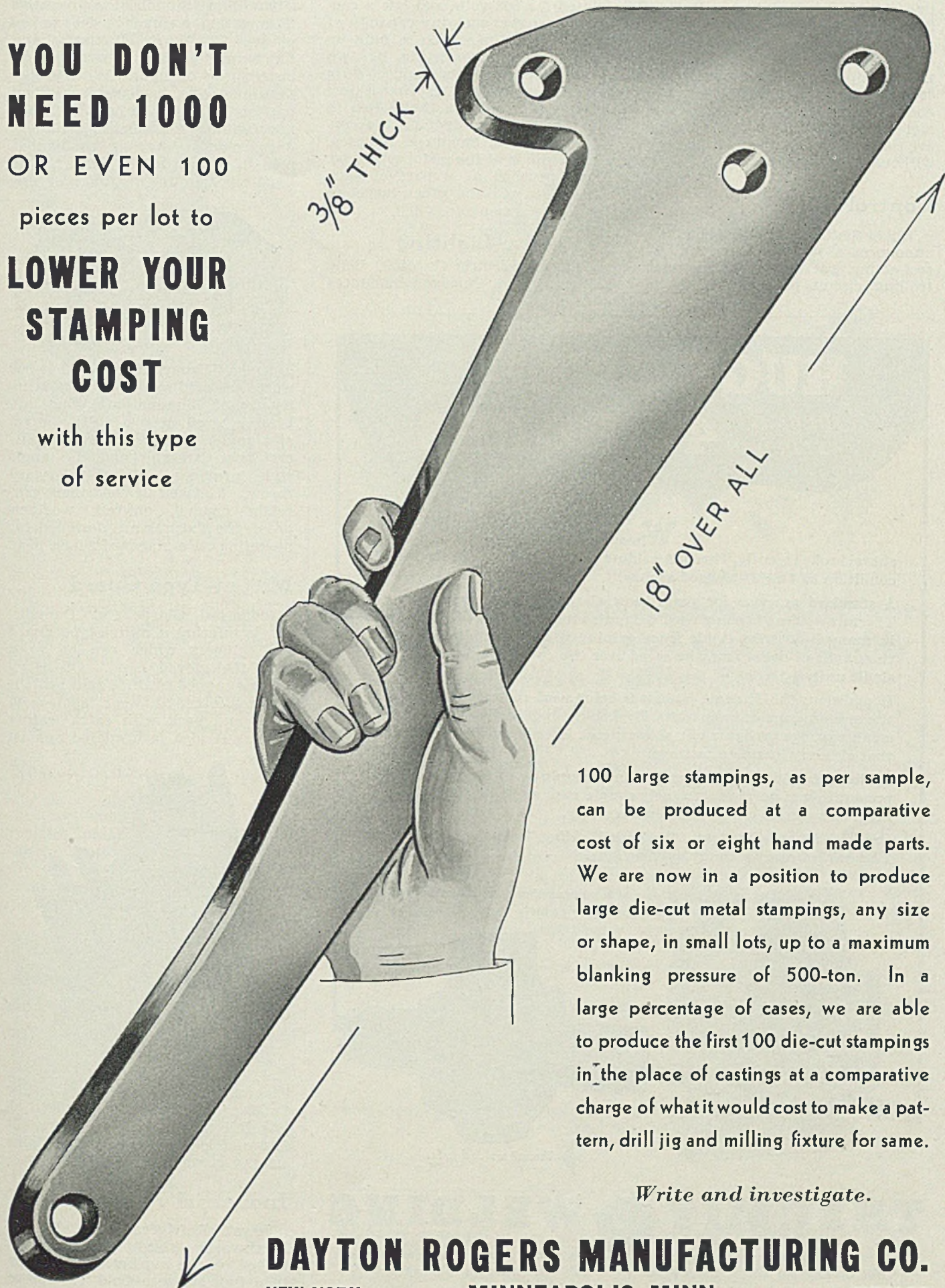


**YOU DON'T  
NEED 1000**

OR EVEN 100  
pieces per lot to

**LOWER YOUR  
STAMPING  
COST**

with this type  
of service



100 large stampings, as per sample, can be produced at a comparative cost of six or eight hand made parts. We are now in a position to produce large die-cut metal stampings, any size or shape, in small lots, up to a maximum blanking pressure of 500-ton. In a large percentage of cases, we are able to produce the first 100 die-cut stampings in the place of castings at a comparative charge of what it would cost to make a pattern, drill jig and milling fixture for same.

*Write and investigate.*

**DAYTON ROGERS MANUFACTURING CO.**

NEW YORK

MINNEAPOLIS, MINN.

CHICAGO

line of self-contained dust collectors, it is installed on the front or intake side of the unit directly over the opening in the cabinet in front of the multiple blade fan. Although compact the flange will admit the ends of two pieces of 3-inch flexible metal hose. The holes in the flange are sufficiently deep to hold the hose without other means.

### Control Switch

Roller-Smith Co., Bethlehem, Pa., announces a new double-break, direct-acting rotary switch for controlling circuit breakers. It is in-

sulated for 600 volts and has a continuous current-carrying capacity of 10 amperes. The switch is built up of units, each consisting of two single-break contacts connected in series by a jumper. A spring return arrangement returns the switch to the "off" position, opening the contacts when the handle is released. The handle is of the pistol grip type. Also furnished as a part of each switch is a red and green target to indicate position of switch.

### Protective Lighting

Goodrich Electric Co., 4600 Belle Plaine avenue, Chicago, announces

a new Elipso Standlite for protective illumination around industrial plants. Due to its elliptical shape, the fixture provides a wide lateral distribution of light. With proper fixture spacing, it creates a brilliant barrier of light around property lines without illuminating buildings and grounds, enabling the watchmen to remain in the darkness—to instantly spot the entrance of any



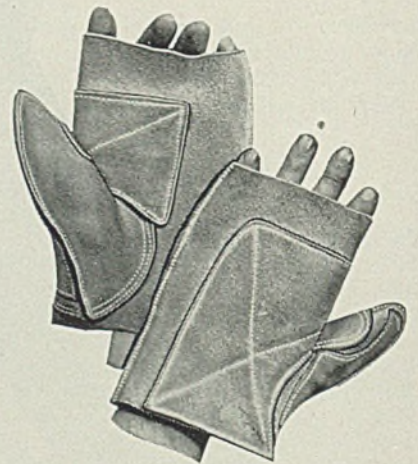
Angle Style

Direct Style

intruder. Lamps of from 300 to 500 watts are said to deliver a high intensity of illumination. They are being offered in two styles—direct and angle. The direct style delivers light laterally and the angle style provides a slight forward throw. Finished in permanent porcelain enamel, entirely weather-proof, the fixtures are designed for mounting on a standard 2-inch pipe.

### Mitten-Type Guard

Industrial Gloves Co., Danville, Ill., is offering a mitten-type guard for chippers which can be worn over the gloved hand. Of heavy chrome tanned cowhide split leather, it is reinforced at "wear" spots—on palm and back with extra leather patch. It also is insulated against



heat with a wool heat-breaker. The "mitten" is open at the end to allow full use of gloved fingers. It is available in pairs, all lefts, rights or any combination of both.

### Industrial Refrigerator

Jewett Refrigerator Co. Inc., 36 Letchworth street, Buffalo, has placed on the market a new industrial type sub-zero Cold Treater refrigerator which maintains temperatures down to -35 degrees Fahr. It

# HUGE AXLE

*THERMIT*  
**WELDED IN 48 HOURS**

**W**hen one of the huge axles of a steam shovel broke recently, Thermit welding put the axle back in serviceable condition in 2 days—as good as new.

A standard practice for years in steel mills and in marine work, Thermit welding is being used today also for the repair of heavy parts in many industries. Aside from gaining valuable production time, thousands of dollars may be saved over the cost of replacement of a single unit.

In addition, the Thermit process is being used to great advantage in the manufacture of large units. By welding together simple forgings, small castings or flame-cut shapes, cost is reduced to a fraction of that of heavy intricate castings.

A Thermit weld has the strength and soundness of forged steel. The preparation of parts is extremely simple and, as there are no locked-in stresses, stress relieving is not necessary.

*Send for 30-page booklet, "Thermit Welding," which describes the Thermit process for many applications.*



◀ Axle of huge steam shovel used for stripping coal, showing broken part cut away.



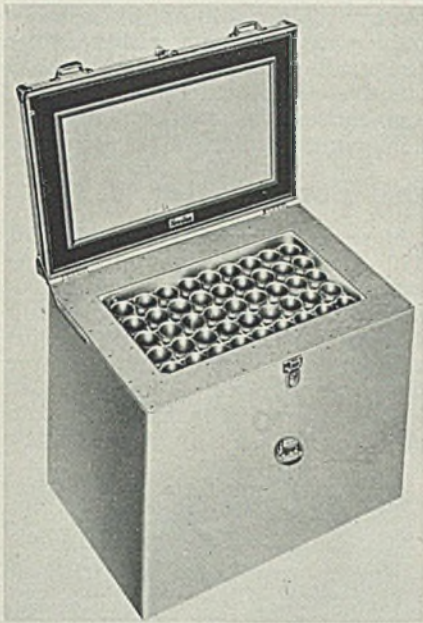
▶ Thermit welded axle.

## THERMIT WELDING

Specialists in welding for nearly 40 years. Manufacturers of Murex Electrodes for arc welding and of Thermit for repair and fabrication of heavy parts.

**METAL & THERMIT CORPORATION • 120 BROADWAY, NEW YORK, N. Y.**  
ALBANY • CHICAGO • PITTSBURGH • SO. SAN FRANCISCO • TORONTO

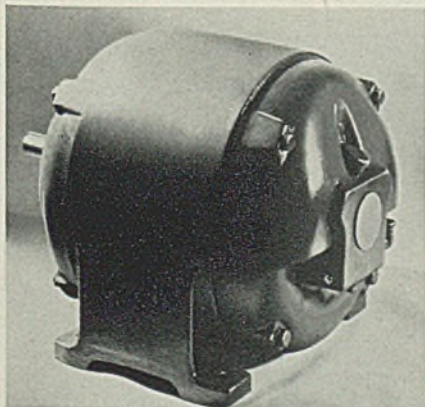
may be used for laboratory research and testing, and production processing, aging, manufacturing and assembly, having applications in the



airplane, chemical, rubber, machinery, instrument and other industries. Built in 3 and 6-cubic foot capacities, it is equipped with self-contained, trouble-free sealed condensing unit ready to plug in and use. A large single lid gives complete access to interior. Also, a standard control on the unit maintains temperatures from +5 down to -10 degrees Fahr. A special control provides temperatures from +20 to -35 degrees Fahr.

### New Motor

Allis-Chalmers Mfg. Co., Milwaukee, is offering a new Lo-Maintenance motor incorporating a new design feature, Safety Circle protection, developed to provide all around protection. This design feature consists of a wide, solid rib in-



tegrally cast as part of the frame, forming an unbroken circle of protection around the stator. Added protection is embodied by the one-piece cast frame and cast end-shields. Liberal use of electrical ma-

"GREEN AS GRASS . . .  
BUT HE DOES GOOD WORK  
WITH PHILLIPS SCREWS"



"AND DON'T FORGET!  
PHILLIPS SCREWS  
COST LESS TO USE"



## Easy Driving • Elimination of Accidents • Better Work = 50% Less Assembly Cost with Phillips Screws

Assembly jobs that demand extra patience and plenty of time when using slotted screws, can now be handled . . . in a rush . . . by green men . . . who work with Phillips Screws.

Most important — there's no danger of screwdriver slippage. The driver can't slip from the Phillips recess . . . so faster driving methods are practical. Electric and pneumatic power drivers on many jobs where their use had previously been restricted.

Operations are simplified, too.

One-hand starting and driving. Perfect control even when the operator is in an awkward position. No chance for crooked screws, split screw heads or other time wasters.

Altogether, you can depend on *twice the assembly production* with Phillips Screws! Remember *that* for today's conditions when you're interested in saving time. Remember it for tomorrow's conditions when you may be *more* interested in saving cost!

Any of the firms listed below can supply further information.



### PHILLIPS RECESSED HEAD SCREWS

GIVE YOU *2 for 1* (SPEED AT LOWER COST)

WOOD SCREWS • MACHINE SCREWS • SHEET METAL SCREWS • STOVE BOLTS • SPECIAL THREAD-CUTTING SCREWS  
• SCREWS WITH LOCK WASHERS

U. S. Patents on Product and Methods Nos. 2,046,343; 2,046,837; 2,046,839; 2,046,840; 2,082,085; 2,084,078; 2,084,079, 2,090,338. Other Domestic and Foreign Patents Allowed and Pending.

American Screw Co., Providence, R. I.  
The Bristol Co., Waterbury, Conn.  
Central Screw Co., Chicago, Ill.  
Chandler Products Corp., Cleveland, Ohio  
Continental Screw Co., New Bedford, Mass.  
The Corbin Screw Corp., New Britain, Conn.  
International Screw Co., Detroit, Mich.  
The Lamson & Sessions Co., Cleveland, Ohio  
The National Screw & Mfg. Co., Cleveland, Ohio

New England Screw Co., Keene, N.H.  
The Charles Parker Co., Meriden, Conn.  
Parker-Kalon Corp., New York, N.Y.  
Pawtucket Screw Co., Pawtucket, R.I.  
Pheoll Manufacturing Co., Chicago, Ill.  
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N.Y.  
Scovill Manufacturing Co., Waterbury, Conn.  
Shakeproof Inc., Chicago, Ill.  
The Southington Hardware Mfg. Co., Southington, Conn.  
Whitney Screw Corp., Nashua, N.H.

materials is said to make the motor internally and electrically stronger as current and magnetic densities are less extreme. Ventilation is provided by openings to the right and left of each bearing cap. Air is expelled at the bottom of the motor through openings in the housing between the mounting lugs. Other features include oil drains at bottom of bearings, removable brackets and large conduit box.

### Bus Duct

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces

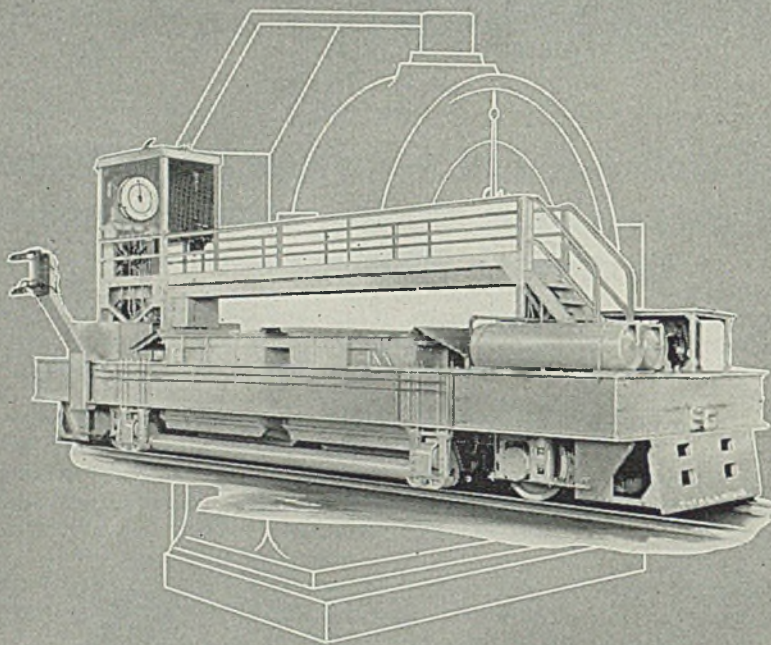
a new bus duct for industrial secondary power distribution systems. Composed of copper busses, Prestite separators and a dust-tight metal enclosure, the unit is available in ratings of 250 through 1500 amperes. At currents below 1500 amperes, long life, hot-rolled sheet steel is used; at values of 1500 amperes or above, a feeder duct of different construction, is available. Plug-in sections are supplied in 10-foot line units with outlet service staggered every 12 inches along a run. Outlet receptacle covers are not removed but simply slide along duct to expose plug-in connections. Heavy

silver plating of contact areas at bus bar joints assures good contact. Insulation of plug-in receptacles prevents flash-over in making or breaking plug-in contacts. To install, the bus duct is hung by narrow double-strap hangers either edge-wise or flatwise. Where suspension rods are used, fastening is made to any convenient overhead suspension point.

### Rail Bond Tester

Mosebach Electric & Supply Co., 1170 Arlington avenue, Pittsburgh, announces a new two-in-one instrument for testing efficiency of rail bonding in coal mine track systems. In addition to determining power losses through rail bonds, it also enables operators to ascertain voltage decrease at any point in the

# Atlas Scale Cars

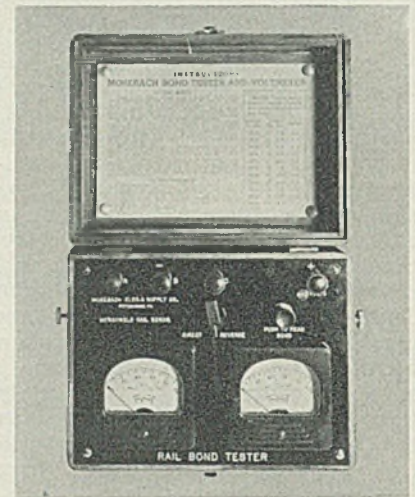


Atlas designed and Atlas built Scale Cars with the exclusive Atlas Dial Scales and Type-printing Recorders . . . effectively solve the problem of lowering material haulage costs. Specifically designed to meet the requirements of the individual plant . . . Atlas Scale Cars weigh the material, giving a printed record of each load. Shown above is an Atlas double-compartment, bottom dump scale car with Atlas underslung suspension scales, 30" diameter Indicating Scale Dial and Type-printing Recording Attachment.

*Write for more detailed information.*

## The ATLAS CAR & MFG. CO.

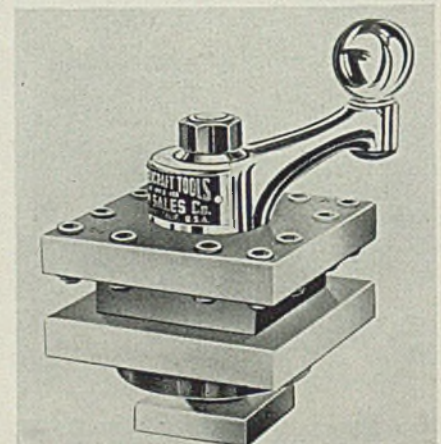
○ ○ ○ ○ CLEVELAND, OHIO • U. S. A.



line. Its operation is simple and is accomplished by one man. Size of the instrument is approximately 8 x 6 x 4½ inches. It weighs only 3½ pounds.

### Turret Tool Post

F. & M. Sales Co., Hollywood, Calif., has placed on the market an improved Mastercraft turret tool post.

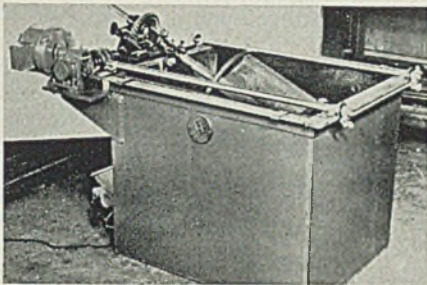


post. Completely redesigned and lightened in weight for faster action, it enables a user to set aside the tool block with all tools remain-

ing in place for future use, while another tool block is being used on the same post. It is for use on 10-inch South Bend and 9-inch workshop and similar lathes, as well as for small screw machines. Socket screws on the unit take the place of standard set screws. This 4-way indexing unit employs four steel balls in the block to insure accurate indexing. Its chromium-plated handle is provided with a swiveling ball.

### Plating Barrel

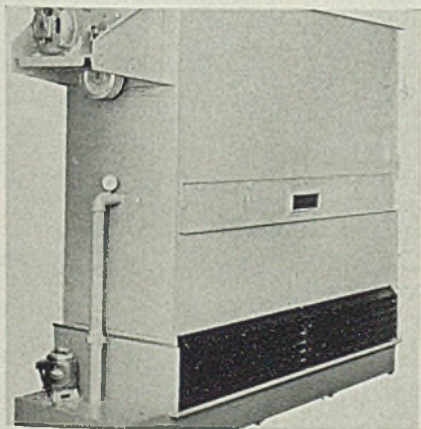
Hanson-Van Winkle-Munning Co., Matawan, N. J., announces a new type 34 motor-driven oblique plating barrel, arrangement of which permits removal of the cylinder for rinsing, loading and unloading of the work. Furnished with a wood-



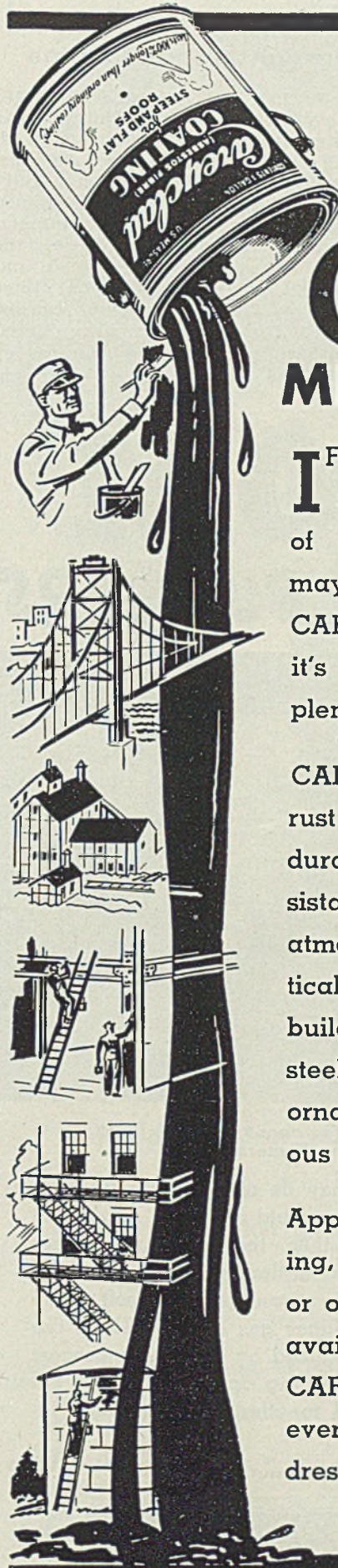
en tank, asphalt lined, or a steel tank, unlined or lined with 3/16-inch vulcanized rubber, the model is directly driven by a 1/6-horsepower motorized worm gear reducer. The cylinder is of bakelite construction with disk or button type contacts, or of hard rubber with disk type contact only. The panels in the bakelite cylinder are 1/8-inch thick—in the hard rubber cylinder, 1/4-inch thick. About 25 pounds of work per batch can be handled by the unit.

### Heat Remover

Niagara Blower Co., 673 Ontario street, Buffalo, announces a new evaporative type unit for removing



heat from certain industrial liquids, quenching baths, jacket water, oils, hydraulic fluids, oil lubricating systems, soap and other solutions, chemicals and coolants for various



## LOW-COST PROTECTION

with

# Careyclad BLACK METAL COATING

**I**F priorities or rationing have restricted your normal supply of metal coatings, CAREYCLAD may meet your requirements. CAREYCLAD does an effective job; it's economical; and the supply is plentiful.

CAREYCLAD protects metal against rust and weather — is extremely durable, abrasion resistant, and resistant to acid, alkaline and salt atmospheric conditions. It is a practical low-cost coating for metal buildings, iron sheets, structural steel, bridges, heavy machinery, ornamental iron work, and numerous sheet metal products.

Applied by spray painting, brushing, or dipping, at everyday indoor or outdoor temperatures. Promptly available in quantity through CAREY Branches and Distributors everywhere. Write for details, address Dept. 71.

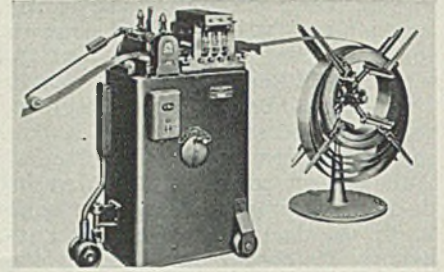
THE PHILIP CAREY MANUFACTURING COMPANY • Lockland, Cincinnati, Ohio

IN CANADA: THE PHILIP CAREY COMPANY, LTD. Office and Factory: LENNOXVILLE, P. Q.

purposes. It consists of a casing containing tubes through which the hot liquid passes. A spray system keeps tubes drenched constantly with circulated water, and air is drawn through the sprayed coils by a fan, applying the principle of evaporative cooling. In addition provision is made for by-passing the air, controlled by thermostat operated dampers, maintaining a constant liquid temperature. Provision also is made for a heating coil in the liquid tank for preheating solutions as required for controlled temperature quenching baths. This prevents freezing in winter and separation of high melting point fats.

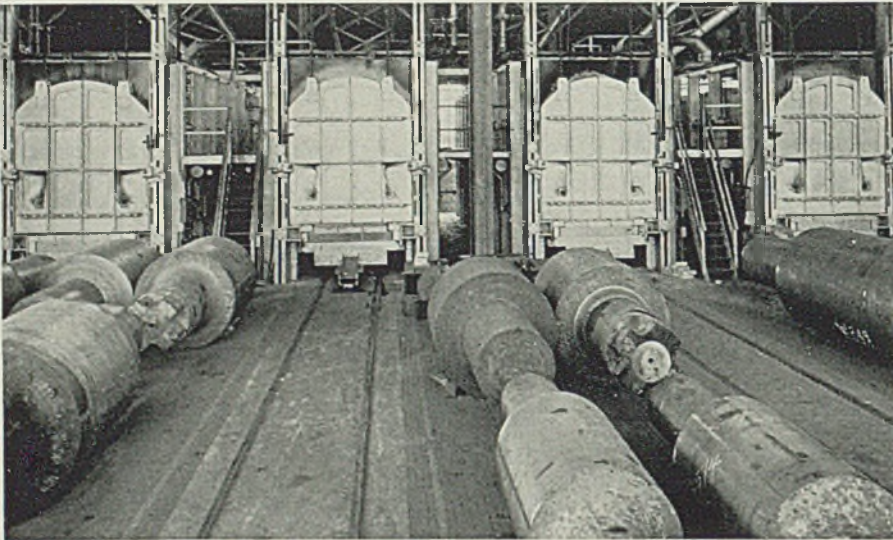
## Continuous Feeding and Straightening Machine

F. J. Littell Machine Co., 4165 Ravenswood avenue, Chicago, has introduced a new continuous feeding and straightening machine. Portable, it is mounted on a fully enclosed steel base, and is equipped with a control arm for stopping and starting the motor regulating the loop of stock between feed and press. Unit is arranged so that either a 5 or 7-roll straightener can be used. The straighteners are offered with rolls ball-bearing equipped or with the lower rolls power driven.



Unit is driven by a ¾-horsepower 3-phase 1725-revolution per minute 60-cycle 220/440-volt motor through a 6:1 variable speed transmission. Its standard speed is 10 to 60 feet per minute. Pinch rolls of the unit measure 3½ x 8½ inches for handling stock up to 8 inches wide.

# BLOOM LONG FLAME BURNERS



*Illustrated above is a furnace for annealing rolls with Bloom Long Flame Burners*

**T**O list all the advantages that may be obtained through the use of Bloom Long Flame Burners would require a catalog; in brief, the fundamental advantage is this: the long flame burner produces higher heating. The long or luminous flame burner produces, with natural gas or coke oven gas, the soft flame previously obtained only with producer gas or oil. Thus, the uniformity of flame temperature produced by the Bloom process makes it a "must" for many heat treating operations. Our engineering department will be glad to offer you additional information.

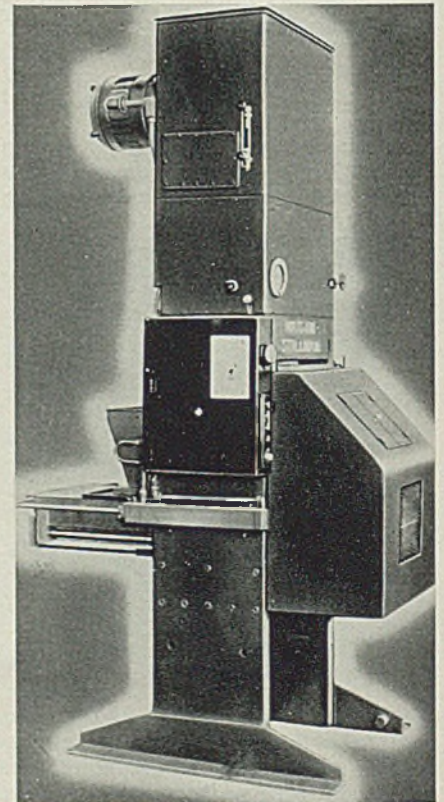
*Write for complete information.*

**BLOOM ENGINEERING CO.  
PITTSBURGH, PA.**

Chicago District: 452 Grant St., Gary, Ind. Phone: Gary 5129

## Molding Machine

Watson-Stillman Co., Roselle, N. J., has developed an improved 75-ton, fully automatic compression molding machine which features faster production. It enables all settings for time periods, materials, quantities and pressures to be made independently from a single control panel. The machine has a 10-inch stroke and an approach speed of 210 inches per minute, pressing 3.3 inches per minute. It has bottom and top ejectors, and is suitable for all materials adapted to compression molding. A hydraulically operated feeder allows predetermined amounts of material in each mold cavity. Molds are closed under low pressure, and high pressure is applied automatically at a predetermined time. Pieces are then stripped and blown down a chute to an automatic piece weighing scale.



**STEEL**

## Paste Soldering

(Concluded from Page 82)

the small wires together, formerly dipped the cable ends into flux and then into solder. Now the ends are dipped into the paste solder and heated, resulting in important economies over the previous method.

Several plants fastening bronze collars to the babbitt in bearings for large shafts brush a thin coating of solder paste between the two surfaces and bring them up to 450 degrees Fahr. to complete the union in short order. Another user fastens hollow handles of table knives to the blades by inserting the shank of the blade into the handle, applying the paste solder, holding the parts together tightly and then heating.

A Detroit firm making switchboards from copper bars has found that applying a little paste between the bars and then clamping them together with an electric low-voltage heating device saves much time over previous methods of soldering. A gas mask manufacturer uses the paste to solder the copper parts together to prevent air or gas leaks.

The method also finds use in fastening ornaments, moldings, decorative parts, novelty jewelry, badges, and similar small items. On some small items, the parts are dipped in the paste and subsequently soldered by heating with a small gas flame. The surfaces of statues, medallions and wall pieces which have become corroded or rusty are reclaimed by application of paste solder and heat.

A company shipping friction top cans of material by mail found it was necessary to have them sealed. A small amount of Meltomatic applied in three places on the cover and then heated served the purpose.

Schools teaching soldering are enthusiastic about this method as its use is easily taught, amount of materials required is reduced, and cleaning and fluxing can be omitted.

## New Molding Plastic

Bakelite Corp., unit of Union Carbide & Carbon Corp., 30 East Forty-second street, New York, announces a new impact-resistant phenolic molding plastic, designated as XM-15000 which, when molded, is said to have approximately twice the shock resistance of general-purpose phenolics.

The product is a high impact-resisting molding material that can be preformed on automatic tableting machines. Besides being water resistant to a good degree, it also may be used where molded parts are subjected to temperatures up to 300 degrees Fahr.



# "Damn the Torpedoes" — GO AHEAD!

With eloquent disregard for precedent and obstacles American industry drives irresistibly forward with raw material production records that amaze even the most optimistic. Preparedness has become the American way of life, with men, materials, money and facilities dedicated to a single purpose. Paraphrasing the words of the illustrious Farragut, industry has made its slogan, "Damn the Obstacles. Let's Go!"



DIVISIONS  
THE NEWPORT ROLLING MILL COMPANY  
THE GLOBE IRON ROOFING & CORRUGATING CO.

Basic Open-Hearth Alloy Steel Billets and Slabs

## Silver—Its Applications

(Concluded from Page 86)

per and sterling silver with 7½ per cent copper make good contacts.

Moving contacts (brushes) made of carbon (graphite) containing silver not only maintain low contact resistance but have low internal resistance as well. This is important for it means low voltage drop, hence low energy loss in the brush with corresponding low working temperature and subsequent long life.

**Bearings:** Aircraft engine bearings, both split shell and complete

rings, are capable of carrying higher specific loads when an electrolytic coating of silver is first applied.

Some complete rings for master rods of radial engines are coated both inside and out. Factors involved are higher softening temperature, corrosion resistance to lubricants, high heat conducting ability. Heavy coatings are first deposited, then machined to precision limits.

Silver is replacing aluminum as a reflective coating for "sealed beam" headlamps, applied by condensation and protected from the sulphur in

the atmosphere by a glass bulb which is evacuated.

**Chemical Processing Equipment:** Solid silver or silver clad sheet is widely used in chemical plants for its excellent resistance to corrosion in such items as evaporators, heating coils, heat exchangers, drying pans, retention vessels and similar units.

Some catalytic action may also be involved.

Conservation of critical metals is also a factor in such applications as silver brazing high-tungsten-alloy tips to cutting tools, saving tungsten since the shank can be of low-carbon steel; replacing tin in high-tin babbitt and in soft solders where 2½ to 5 per cent silver with remainder lead makes a good solder that can replace the common 50-50 lead-tin variety.

## Drinking Fountain Standard Revised

The American Standard Specifications for drinking fountains have been brought up-to-date in a recent edition approved by the American Standards Association and recommended to the organization by the American Public Health Association. The revision was prepared mostly for making certain changes in terminology in order to clarify the language.

The specifications, originally developed by the American Public Health Association and approved by the Women's Bureau of the United States Department of Labor, were recommended to the ASA for approval by its committee on industrial sanitation. The use of sanitary fountains, the committee pointed out, is one of the prerequisites for maintaining the health of industrial workers, and specifications for drinking fountains rightfully belong in the national program for industrial sanitation.

Copies of the specifications (Z42-1942) are available from the association headquarters, 29 West Thirty-ninth street, New York, at 10 cents each.

## Develops New Rust Inhibitor for Metal

A new organic rust inhibitor for black iron which is used in the same manner as oil is reported by Watson-Standard Co., Pittsburgh. Of the oxidizing type, it provides good protection against corrosion and serves as a prime coat for all types of synthetic and oleo-resinous coatings.

The coating, it is said, will withstand all usual tests and can be applied very economically at the steel mill.

*— a uniform dependable product year after year —*

**Strom Balls**

Strom Steel Balls are closely identified with the products of many of the leading domestic manufacturers of ball bearings. Uniform and dependable physical quality assures maximum resistance to fatigue . . . Inherent smoothness and sphericity, coupled with extreme precision in diameter, contribute to quiet bearing performance at all speeds . . . Remember — Ball Bearings of domestic manufacture are currently superior to anything heretofore available in this field of industry . . . Strom Balls are also produced from the following metals: Stainless Steel, Monel Metal, Brass and Bronze — Catalogue gladly furnished upon request.

**Strom Steel Ball Co.**  
1850 SO. 54TH AVE., CICERO, ILL.



# COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

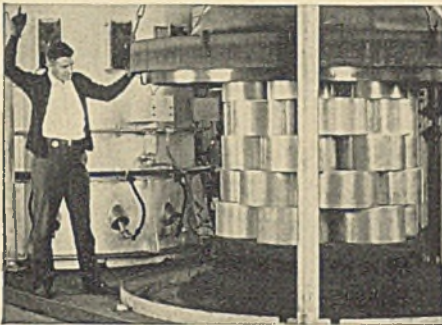
Prepared Each Month by the Bridgeport Brass Co. "Bridgeport" Headquarters for BRASS, BRONZE and COPPER

## Standards for Copper Compiled by A. S. T. M.

A booklet entitled "A. S. T. M. Standards on Copper and Copper Alloys" has been published by the American Society for Testing Materials, which covers the various specifications and tests issued by the Society on copper and copper-base products.

Sponsored by Committee B-5 on copper and copper alloys, this compilation also includes specifications developed by Committee B-1 on copper and copper alloy wires for electrical conductors, together with selected specifications prepared by Committee B-2 on non-ferrous metals.

Copies of this 350-page booklet can be obtained by writing to the A. S. T. M. at 260 South Broad Street, Philadelphia, Pa.



Hard rolled copper comes out shining from this modern precision-controlled bright annealing furnace—part of the remarkably efficient brass mill equipment with which Bridgeport takes the initiative in setting new standards of quality. This furnace eliminates the unsightly coating of oxidation left when annealing is done with ordinary equipment, and assures Bridgeport customers "made-to-order" finishes which are often required for fabricating articles of a specialized nature.

### Memos on Brass—No. 26

In these tremendously busy days when fabricators must quickly turn out many new types of work on their regular equipment, the adaptability of brass to different forming operations is especially valuable since it enables them to select the method best suited to their facilities. Brass, for example, can be subjected to severe cold working, heading, cupping, forming and spinning operations. And at the same time there is no sacrifice in quality as the composition and temper of brass can be regulated to give the best results for each process. The expert metallurgical assistance of Bridgeport's laboratory technicians is available without obligation.

## Manufacture of Shell Bands is Relatively Easy for Fabricators

**Tubing Supplied by Bridgeport Facilitates Finishing,  
Offers Simple Way of Changing Over to Defense Work**

Fabricators who are contemplating turning all or part of their production over to defense work should consider the manufacture of rotating shell bands for projectiles, as the hard drawn tubing offered by Bridgeport Brass for this purpose may be finished easily and with a minimum of equipment.

The rotating band, a cylindrical ring generally made from commercial bronze (90%

### How Bands Function

The finished rotating band is made larger in diameter than the projectile. It affords a snug seat in the gun and centers the base of projectile in the bore, thus preventing the escape of gas forward between the projectile and the bore when firing takes place. The force of the explosion causes the band to engage in the grooves of the rifled bore of the gun and causes the projectile to rotate. This contributes to more accurate firing and longer range.

The hard drawn tubing supplied by Bridgeport for the manufacture of rotating bands facilitates sawing or machining and fulfills the chemical requirements of Government Specifications. The finished bands, of course, must also meet these standards. Navy orders for rotating bands carry complete information on their prints such as dimensions and composition.

### Finishing Steps

Special machinery has been designed for cutting narrow rings off the tubing. However, automatic screw machines are used in some cases for small sizes with satisfactory results, although this equipment is not as efficient. Small establishments with low overhead who already have automatic screw machines can often compete successfully.

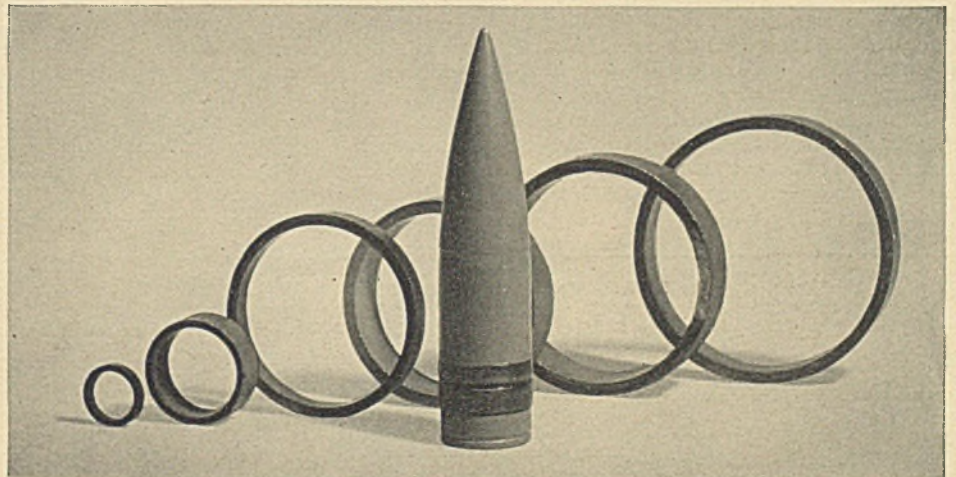
In most cases the rings or blanks are annealed in ordinary open fired muffle furnace.

(Continued on page 2, column 2)

### Other Defense Work

Fabricators desiring to change over to defense production will find further help in future "COPPER ALLOY BULLETIN" articles which will discuss the materials supplied by Bridgeport for such parts as primers, fuses, time fuses and cartridge clips, together with the equipment necessary to finish them.

copper, 10% zinc) or copper tubing, is firmly attached to the projectile and is one of its principal parts. The ring is pressed into a circular groove which is located near the base or back end of the projectile. The base of the groove is roughened so that when the rotating band is hammered or swaged on it will not slip when the projectile is fired from the gun.



Tubing for the manufacture of projectile shell bands, such as those shown above, is but one of the many mill products made by Bridgeport Brass to help speed war production.

# COPPER ALLOY BULLETIN

## How Small Fabricators Can Obtain War Work

The series of articles on the properties and uses of the copper alloys usually published here is temporarily suspended because of the importance of the following material, which was abstracted from a booklet being prepared by the Copper & Brass Research Ass'n.

The fabricator seeking a Government contract or a subcontract should call on his nearest Regional Contract Distribution Office. He should take with him one of his engineers, together with photographs of the interior of plants or shops, and pictures or descriptions of products that are being made or have been made. The fabricator should be prepared to answer detailed questions in regard to his personnel set-up, equipment, power source, shipping facilities, and customers. When necessary, skilled production men will be sent by the Office for inspection and consultation with the management.

### RFC Financing Available

The Reconstruction Finance Corporation will assist in financing fabricators handling war work through RFC loan agencies and through participation with banks. When necessary, loans will be made for plant equipment and for working capital to buy and process materials. An assignment will be taken as collateral, or part collateral, for such loans when possible.

### Pools Can Be Formed

Many small plants that are unable to qualify for a prime contract are forming pools so that collectively they can handle work they could not do individually. An interesting example is the Manufacturers Defense Association, Inc., 122 W. 42nd Street, New York, N. Y. The Association is assisting in the formation of many chapters in other cities and will gladly answer inquiries from manufacturers or Chamber of Commerce organizations without obligation. Men cannot be loaned to chapters or other pools.

Another aid to the small fabricator is the subcontracting exhibits being established in key cities for the display of currently needed equipment and parts. In these exhibits, government purchasing agencies and concerns who hold defense contracts break down this equipment into subassemblies. Information about the location of such exhibits can be secured from any Regional Contract Distribution Office.

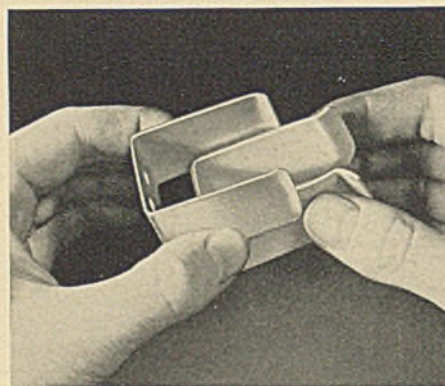
## Making Shell Bands

(Continued from page 1, column 3)

naces, then pickled, washed and dried. When bright annealing furnace equipment is used, the pickling and washing steps are eliminated. The soft or annealed blanks free from burrs are packed and shipped to the arsenal or the projectile manufacturer.

The shell band is slightly larger than the diameter of the projectile and is slipped over it. Sizes 6 inches and smaller are swedged into the projectile groove by cold hammering with special equipment. Bands larger than 6 inches are heated to redness and are forced into the groove by hot hammering or hot swedging. When cooled off, the outside surface of the blank is machined and grooved to conform to standard practice.

Manufacturers who are anxious to make rotating bands are welcome to call on Bridgeport's technical staff for any services which we can render.



Lasting resiliency, durability, high resistance to corrosion and fatigue failure—these are some of the qualities that can be obtained in copper alloys. The outer contact clip (shown above), which is used in a drop-out fuse cutout, was made from phosphor bronze because it provided the exceptional springiness needed to keep the softer inner clip in shape after being forced apart repeatedly.

## Brass Parts Used In Generator Chargers

In the wind-driven generator charging units specially designed and built for aircraft use by Champion Aviation Co., all electrical parts are made of cadmium-plated brass. Generators are equipped with voltage control and release to prevent over-charging and the propeller position can be adjusted on the four largest models to carry maximum power for all variations of cruising speed.

## NEW DEVELOPMENTS

Plating tank nets for recovering dropped work have been developed which, it is claimed, can be used in cyanide copper, nickel, Mazic zinc, acid zinc and cadmium solution. They are not suitable for alkaline cleaners or sodium stannate tin solutions. The nets are made of 1/2-inch stretched mesh, hung square, six-thread medium twine to dimensions as specified. Tape is sewn in the form of loops along the top and bottom of both ends and sides large enough to accommodate a rod up to 1 1/2 inches in diameter. (No. 300)

A blue filter glass compounded to eliminate injurious rays of light in conditions of excessive glare has been designed and is specifically recommended for aluminum and bronze welding, glass work, instrument making, and other operations where a sodium yellow glare is encountered. (No. 301)

A three-jaw universal chuck suitable for either lathe or screw machine work has been introduced. The body is semi-steel casting with jaws hardened and ground. A set of reversible jaws is also furnished. The chuck comes in four sizes—6, 7 1/2, 9 and 10 1/2 inches. A T-hand wrench is included with each chuck. (No. 302)

A tube fitting for steel, brass and copper tubing has been introduced which is available for tube sizes from 1/8 to 1 1/2 inches. Each tube is held by compression set up by a ring when a holding nut is tightened. Threading or flaring is not required. Each fitting, it is said, will take not only its rated size of tube, but also any smaller size by applications of adapters and adapter nuts. (No. 303)

A polishing lathe has been produced which is said to reduce the amount of time required for chucking and eliminate wear on the machine because work can be fed into the hand-operated collet while the machine is operating. The spindle is ball bearing mounted. The range of speeds is 1250 to 5000 r.p.m. in infinite variation. The unit is powered with either single or three-phase 1/2-horsepower motor. (No. 304)

A master gage has been put on the market which is said to position thread cutting tools at the proper angle while being ground on any type of surface grinder. It consists of a one-piece hardened steel base, milled and slotted to position, and holds thread cutting tools at the proper angles on the grinding surface for standard thread cutting operations. The tool bit is held down tightly within the slot by means of two knurled head screws. A set screw takes up any lateral motion. (No. 305)

A cleaning machine has been developed for degreasing small parts in production and for application in tool rooms, laboratories and maintenance departments. It has a working depth of 14 inches, diameter of 14 inches, and stands two feet in height. Capacity operation is to two 15-pound loads per hour. (No. 306)

This column lists items manufactured or developed by many different sources. Further information on any of them may be obtained by writing Bridgeport Brass Company, which will gladly refer readers to the manufacturer or other source.

## PRODUCTS OF THE BRIDGEPORT BRASS COMPANY

Executive Offices: BRIDGEPORT, CONN.—Branch Offices and Warehouses in Principal Cities

**SHEETS, ROLLS, STRIPS**—Brass, bronze, copper, Duronze\*, for stamping, deep drawing, forming and spinning.

**CONDENSER, HEAT EXCHANGER, SUGAR TUBES**—For steam surface condensers, heat exchangers, oil refineries, and process industries.

\*Trade-name.

**PHONO-ELECTRIC\* ALLOYS**—High-strength bronze trolley, messenger wire and cable.

**WELDING ROD**—For repairing cast iron and steel, fabricating silicon bronze tanks.

**LEDRITE\* ROD**—For making automatic screw machine products.

**COPPER WATER TUBE**—For plumbing, heating, underground piping.

**DURONZE ALLOYS**—High-strength silicon bronzes for corrosion-resistant connectors, marine hardware; hot rolled sheets for tanks, boilers, heaters, flues, ducts, flashings.



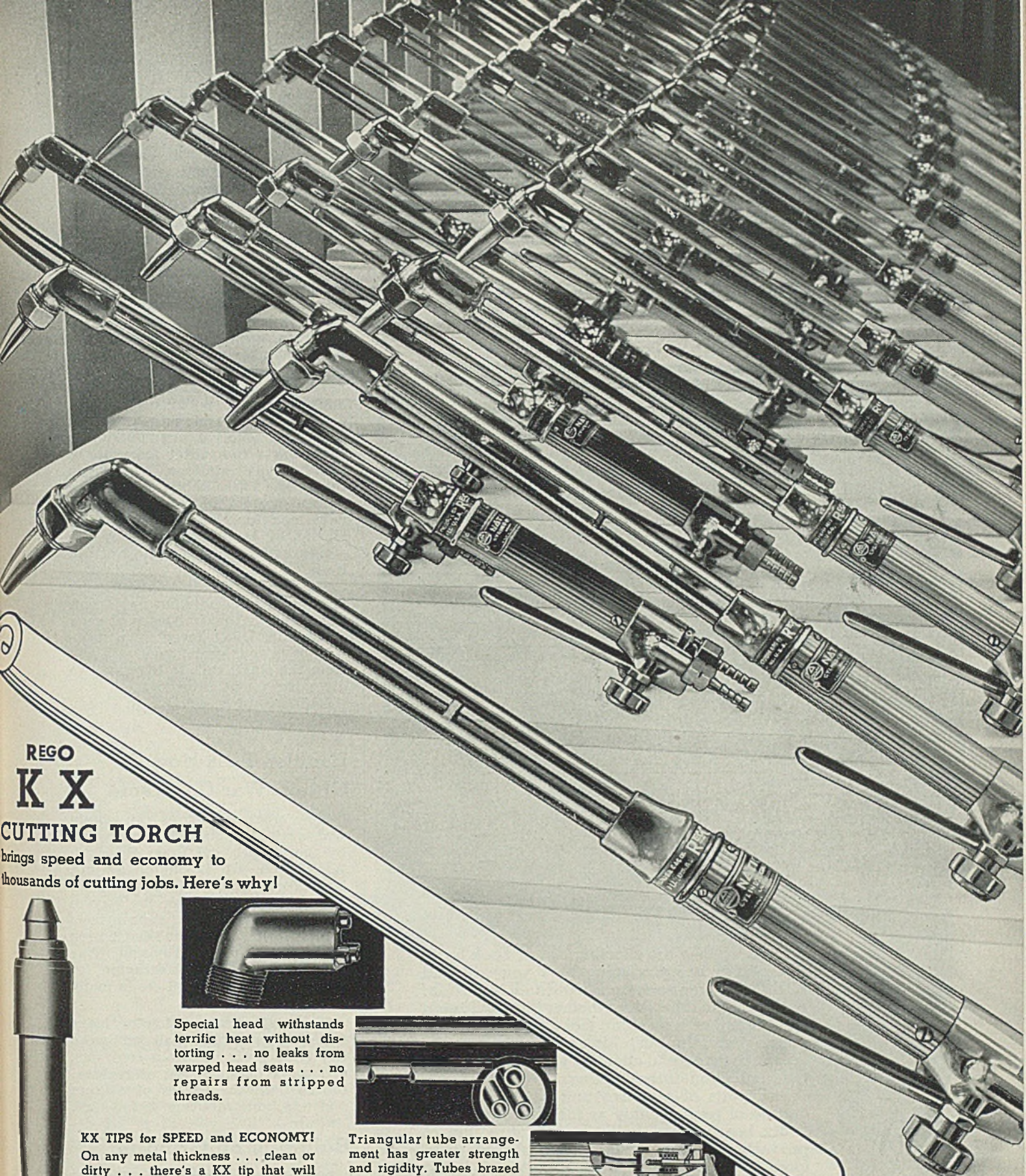
Established 1865

**BRASS, BRONZE, DURONZE WIRE**—For cap and machine screws, wood screws, rivets, bolts, nuts.

**FABRICATING SERVICE DEPT.**—Engineering staff, special equipment for making parts or complete items.

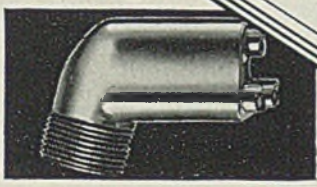
**BRASS AND COPPER PIPE**—"Plumrite"\* for plumbing, underground and industrial services.

# BRIDGEPORT BRASS

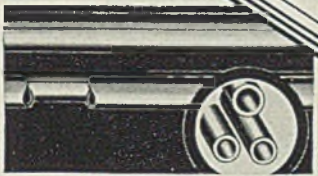


**REGO  
K X  
CUTTING TORCH**

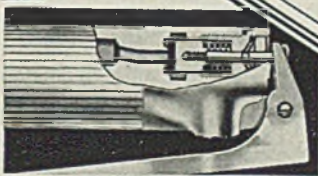
brings speed and economy to thousands of cutting jobs. Here's why!



Special head withstands terrific heat without distorting . . . no leaks from warped head seats . . . no repairs from stripped threads.



Triangular tube arrangement has greater strength and rigidity. Tubes brazed at the head and valve body assure leakproof joints.



High pressure valve assembly in the KX is leakproof . . . special diaphragm replaces packing used in ordinary construction.

Get all facts . . . send for 4-page KX folder!



REGO . . . pioneer equipment for using and controlling high pressure gases . . . distributed by  
**NATIONAL CYLINDER GAS COMPANY**

205 W. Wacker Drive

Chicago, Illinois



## Memo to Manufacturers, On Grand Jury

(Concluded from Page 58)

age government attorney thinks that the sales price should be \$55 or \$60; he has no conception of research or development costs of the past several years. But he is human and open to friendly explanation.

The witness should tell the jury about the number of inventions and products for which his company is responsible. He should portray his company as a creative force in the American scene, to balance the gov-

ernment's inclination to portray it as just another of the robber barons of industry. The jury will understand this, if the attorney does not.

He should point out to the jury how much defense work his firm is doing, if such be the case. I have seen a jury noticeably impressed by the fact that one witness remarked that his firm was engaged 99½ per cent in defense work. I could see the thought running in the jurors' minds to the effect that this was a fine time for the Department of Justice to be heckling any firm doing so much defense work. It is an apparent fact that the anti-trust

division of the Department of Justice is not in step with the departments which are constructively prosecuting the war.

A general remark on the broad strategy:

Some attempts by the government today to bring suits under the Sherman Act arise from startling new conceptions of the nature of business and the nature of government, and proceed through strange and exotic assumptions. Among these is a willingness to discard the established theory of the patent right; because that right grants a monopoly, it is to say the least not too highly respected by some of our newer thinkers in the Department of Justice. Another established business practice which is now in the doghouse is the policy of granting exclusive sales rights in a foreign country to one concern; another is excluding a competitor from use of your service stations in foreign countries. These habits, which have seemed normal and proper to business men for centuries, are today objects of attack because they are evidence of a "conspiracy to restrain trade."

The way to meet this assault is by presenting a friendly but firm front, backed up by the confidence of good citizenship. Don't forget, you probably have your grand jury with you from the start; talk to them, not to the government attorney.

And remember, *you* are an American, too.

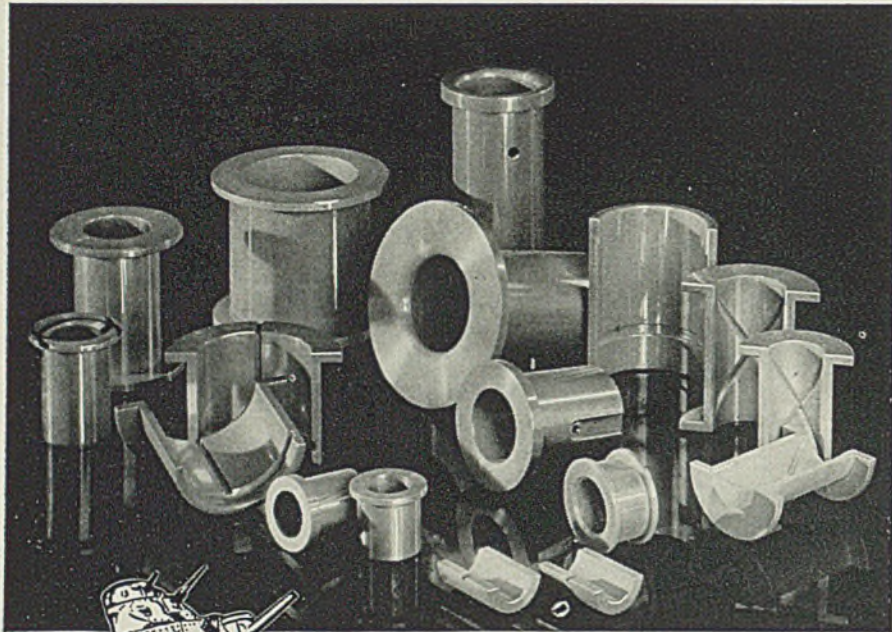
## Booklet Tells How To Obtain War Contracts

How small industries can obtain war work is explained in a booklet by the Copper and Brass Research Association, 420 Lexington avenue, New York, which is available free. The purpose is to point the way to obtain contracts or subcontracts through the Contract Distribution Branch, Production Division, War Production Board, Washington, or through its regional offices in many cities in each state.

It contains information on loans for equipment, how small companies can form pools to obtain contracts, and other data. A list of regional offices with the names of officers and telephone numbers is included.

## Bulletins on Grinding

Norton Co., Worcester, Mass. is distributing a semimonthly cartoon-type bulletin carrying hints on grinding, designed for plants employing new grinding operators. Entitled "On the Grinding Line", each carries one or two fundamental principles of grinding. They are available free to individuals or companies concerned with grinding.



## JOHNSON BRONZE Sleeve Type Bearings...

## In Action on all Fronts

Out where they are shooting . . . or back home where they are producing . . . you will find JOHNSON *sleeve type* BEARINGS *in action!* It makes little difference whether the application is in a tank or a machine tool . . . a plane or a punch press, the same high standard of quality . . . the same careful attention to detail governed the production of the bearings.

Few parts of a motive unit carry the same degree of responsibility as the bearings. One faulty bearing can hold up an entire line of production or hamper the action of our armed forces. That is why it is so important to insist on quality.

One way to be sure of quality is to specify JOHNSON BRONZE for all your *sleeve type* bearings.



## JOHNSON BRONZE Sleeve BEARING HEADQUARTERS

550 S. MILL STREET • NEW CASTLE, PA.

## Middle Western States Organized for Scrap Drive

(Concluded from Page 35)

vage section, Bureau of Industrial Conservation, WPB, are supervising the drive which has been divided into 14 districts as follows:

Wisconsin, Minnesota, South Dakota, North Dakota, under Mr. DuPont; Missouri, Kansas, Arkansas and Oklahoma, Raymond Priest, assistant to regional manager; Illinois, Iowa and Nebraska, Elmer C. Hill; and Indiana, Kentucky and Tennessee, Roland R. Andrews.

Each district chief will begin immediately to organize the executive heads of all industries in each state into either state-wide or industrial groups. The drive will concern itself with 58 materials, but principally iron and steel and nonferrous scrap.

### Cincinnati Foundrymen Seek OPA Aid To Obtain Cast Scrap

A delegation of foundrymen and scrap brokers from Cincinnati visited Washington last week to confer with Ross H. Whitman, chief of the Iron and Steel Section, Office of Price Administration.

An effort will be made to devise a plan for providing more cast scrap for the Cincinnati district, to expedite manufacture of essential machine tools. One recommendation is for price adjustment to bring in more remote scrap and allowance for processing expense where necessary.

The delegation included representatives of Cincinnati Milling Machine Co., Buckeye Foundry Co., Peerless Foundry Co., Oberhelman-Ritter Foundry Co., Stedman Foundry & Machine Co., Reliance Foundry Co., Sawbrook Steel Castings Co., Hickman, Williams & Co., David J. Joseph Co., Moskowitz Bros., Erhart Foundry & Machine Co., and E. H. Bardes Foundry Co.

### Farm Scrap Collection Plan Under Way in Pennsylvania

Collection of farm scrap in Allegheny county, Pennsylvania, which includes Pittsburgh, has been undertaken by the United States Department of Agriculture War Board. Letters have been sent to 3700 farmers, outlining procedure. The county has been divided into two zones and 19 sections and in each section dealers have been designated to handle the scrap. Prices have been established at \$14 per net ton for heavy scrap delivered at dealer's yard or \$10 at the farm. Light scrap price is \$12 per net ton delivered and \$7 on the farm. Farmers are asked to assemble the

scrap, clean it as far as possible and remove wood parts. A return post card accompanies each letter, by which the farmer can notify the dealer of the farm location, approximate quantity of scrap and other information.

### Institute Scrap Bundles Committee To Meet March 4

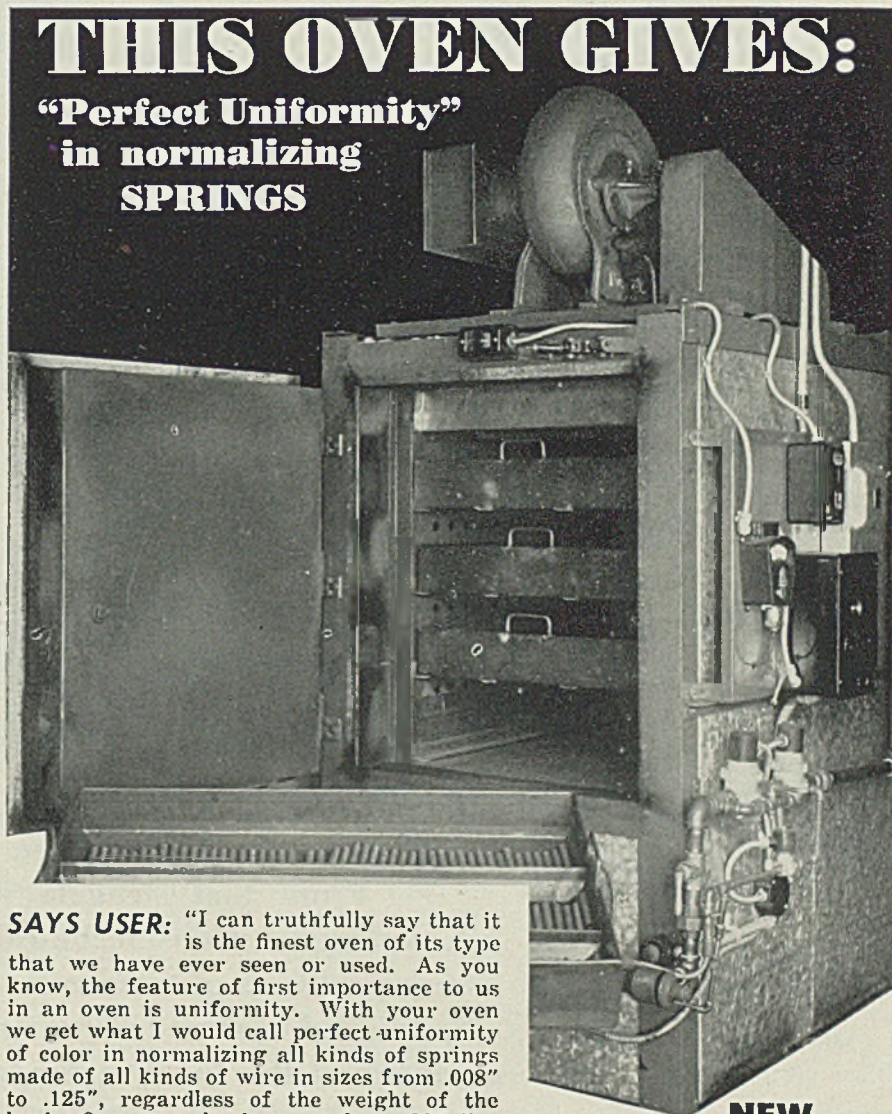
Bundles committee of the Institute of Scrap Iron and Steel Inc. will hold a special meeting at William Penn hotel, Pittsburgh, the evening of March 4, to continue discussion of various bundle matters

initiated at two meetings of the committee during the course of the recent Institute meeting at Chicago. Among the subjects will be utilization of can bundles and means for bringing in more light iron from remote territory. All operators of presses are invited whether members of the institute or not.

Orders received by General Electric Co. during 1941 reached the all-time record total of \$1,132,837,000, compared with \$354,190,000 for 1940, an increase of 73 per cent.

# THIS OVEN GIVES:

## "Perfect Uniformity" in normalizing SPRINGS



**SAYS USER:** "I can truthfully say that it is the finest oven of its type that we have ever seen or used. As you know, the feature of first importance to us in an oven is uniformity. With your oven we get what I would call perfect uniformity of color in normalizing all kinds of springs made of all kinds of wire in sizes from .008" to .125", regardless of the weight of the load. Our oven loads vary from 800 lbs. down to as little as 1 lb., the latter consisting of as many as 20,000 tiny springs."—Atlas Spring Co., Chicago

This is the kind of performance you can count on when you install Maehler Recirculating Air Heat Ovens—gas or oil fired or electrically heated—for aging, stress relieving, normalizing, tempering, bluing, annealing, etc. Write today outlining your requirements.

### NEW BULLETIN:

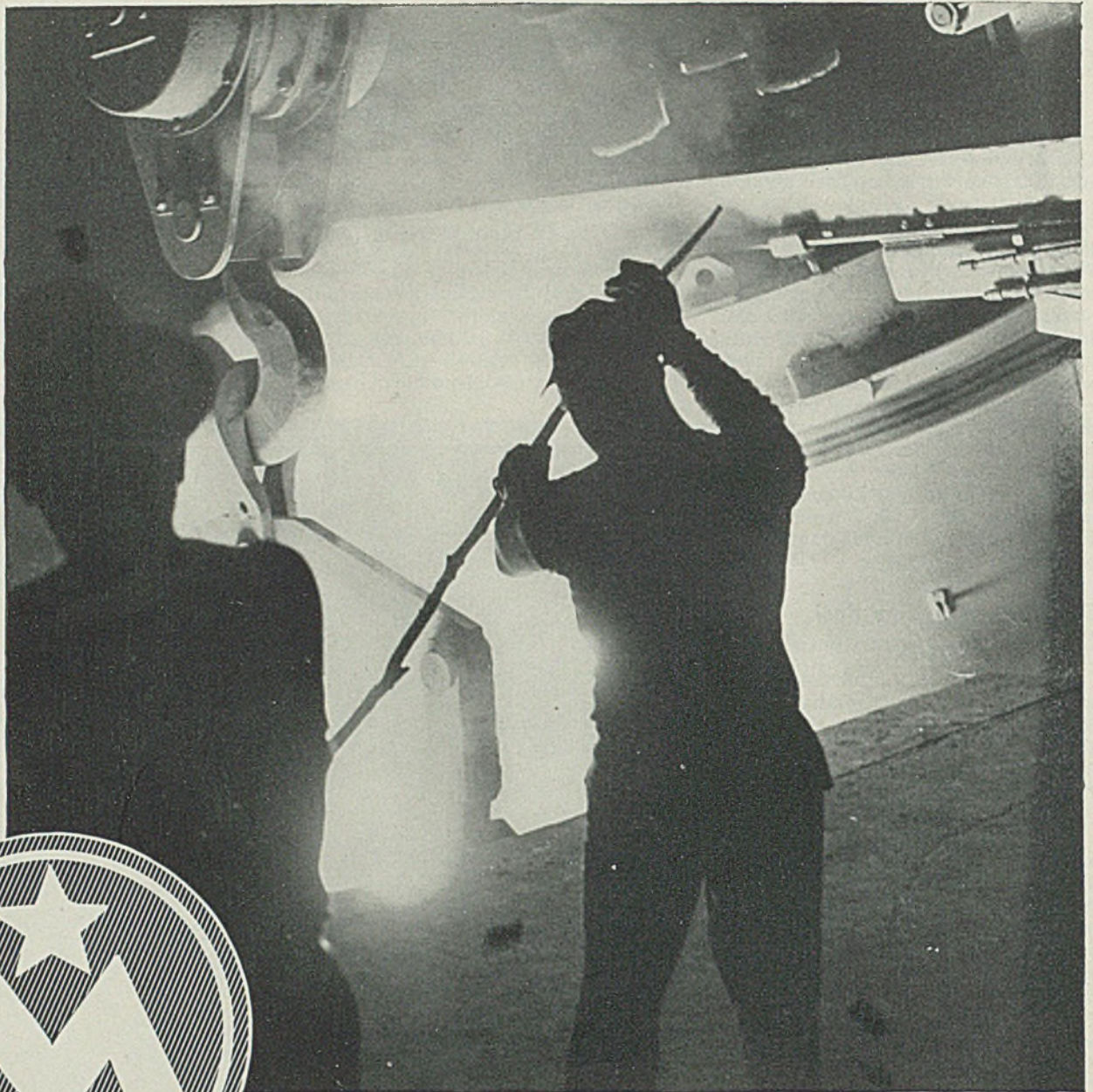
Shows typical installations of **MAEHLER HEAT TREATING OVENS**—gives users' reports. Write for your copy today. Also ask for **CORE OVEN** case studies.

**THE PAUL MAEHLER CO.**  
2208 W. Lake St., Chicago, Illinois

# MAEHLER

## INDUSTRIAL OVENS

FOR HEAT TREATING . . . CORE BAKING  
. . . JAPANING . . . ENAMELING, ETC.



**T**ODAY'S STRUGGLE is a contest of ideas, but its weapons are those of technical perfection. From that struggle will come even greater knowledge, bettered technical skill, to solve the peacetime problems of tomorrow. Every Midvale resource is strained to meet today's urgency—it will be equally eager and able to serve you tomorrow.

**THE MIDVALE COMPANY • NICETOWN • PHILADELPHIA, PA.**

**OFFICES: *New York • Chicago • Pittsburgh • Washington • Cleveland • San Francisco***

**MIDVALE**

## *Demand*

*Increasing at top ratings.*

## *Prices*

*Unchanged.*

## *Production*

*Unchanged at 96 per cent.*

# Top Priorities Prove Conversion Progress

*Mill books crowded with high ratings as more shops take war work. Pig iron demand increasing. Scrap plans bringing results*

EVIDENCE of steady progress of industrial conversion to war production is found in the increasing proportion of tonnage on mill books bearing highest rating.

As a result of accumulation of orders bearing A-1-a priority sheetmakers have little to offer under nine weeks, with lower ratings much further delayed. In structural shapes only a little better can be done. While general allocation has not been imposed on steel bars conditions indicate this may be done, as the situation is approaching that existing in plates.

A current instance of the conversion of facilities to war production is in the electrical refrigerator industry, which has been ordered to stop manufacture April 30. So much war work has been taken by these interests, including ammunition boxes and incendiary bomb cases, that their requirements for steel sheets are greater than they had been taking for their normal products. Versatility of metal-working shops converting facilities to war products is illustrated by bids from eight New England concerns on ten million projectiles requiring screw machine and lathe work. Bidders included manufacturers of metal furniture, hardware, sporting goods, locks, household appliances, automotive specialties, chain and telephone meters. Shell contracts in that area are being made with builders of cotton mill equipment.

Structural shape fabricating shops in January booked more tonnage than they shipped, after five months during which shipments were greater than new business. These interests have 704,452 net tons of work scheduled for fabrication during the next four months.

Sale of steel left over in hands of automobile manufacturers when production of cars was stopped is being regulated under rules to sell only on orders bearing high rating. Some of this already has reached hands of warehouses and given some relief.

Indications are seen of possible shortage of freight cars, especially in the East. While no effect on steelmaking has been noted from this cause some scrap shipments have been held back for lack of cars. Apprehension is felt over the situation as war production increases. Meanwhile, every assistance is being given

freight car and locomotive builders, to expedite deliveries of cars now on order. Further orders continue to be placed and backlogs are at least holding their own.

Tighter situation in pig iron seems likely over the next few months, a number of factors indicating a squeeze. Emergency requirements are increasing as more melters are converting to war work and obtain preference. At the same time those who have had large inventories and have reduced them materially are about to request tonnage. There also is the probability of considerable lost time from relining operations on stacks which have been operating at a high rate for some time. General level of pig iron priorities is rising steadily.

Steelworks operations remained steady at 96 per cent, although numerous changes were made in the various districts. Pittsburgh gained ½-point to 95½ per cent, Youngstown advanced 4 points to 91 per cent and St. Louis, on better scrap supply, added 16 points to reach 88½ per cent. Chicago lost 2 points to 102 per cent, Cleveland 5 points to 89, Cincinnati 2 points to 86, Detroit 8 points to 84, Wheeling 1½ points to 86½ and New England 5 points to 95. Birmingham was unchanged at 95 per cent, Buffalo at 79½ and Eastern Pennsylvania at 90.

Numerous county organizations are being formed under the Department of Agriculture to undertake detailed canvass of farms to obtain scrap material available there, with definite prices set for delivery to dealers and for scrap picked up at the farm by dealers. With shipments from automobile wrecking yards already started and gaining in volume the farm program will give a further uplift to supply from difficult sources. Much interest is felt in the outcome of conversion of automobile plants to war production in relation to resulting scrap. Opinion is held by some observers that the scrap produced from tanks and other armament products will be less than from automobiles.

Composite prices show no change, OPA ceilings being held steadily. Finished steel composite is \$56.73, semifinished steel \$36.00, steelmaking pig iron \$23.05 and steelmaking scrap \$19.17.

# COMPOSITE MARKET AVERAGES

	Feb. 28	Feb. 21	Feb. 14	One Month Ago Jan., 1942	Three Months Ago Nov., 1941	One Year Ago Feb., 1941	Five Years Ago Feb., 1937
Finished Steel .....	\$56.73	\$56.73	\$56.73	\$56.73	\$56.73	\$56.73	\$55.18
Semifinished Steel ...	36.00	36.00	36.00	36.00	36.00	36.00	36.20
Steelmaking Pig Iron.	23.05	23.05	23.05	23.05	23.05	22.95	19.98
Steelmaking Scrap...	19.17	19.17	19.17	19.17	19.17	20.05	19.40

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

## COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	Feb. 28, 1942	Jan. 1942	Nov. 1941	Feb. 1941	Pig Iron	Feb. 28, 1942	Jan. 1942	Nov. 1941	Feb. 1941
Steel bars, Pittsburgh.....	2.15c	2.15c	2.15c	2.15c	Bessemer, del. Pittsburgh.....	\$25.34	\$25.34	\$25.34	\$25.34
Steel bars, Chicago.....	2.15	2.15	2.15	2.15	Basic, Valley .....	23.50	23.50	23.50	23.50
Steel bars, Philadelphia.....	2.47	2.47	2.47	2.47	Basic, eastern, del. Philadelphia.	25.34	25.34	25.34	25.34
Shapes, Pittsburgh.....	2.10	2.10	2.10	2.10	No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	24.69
Shapes, Philadelphia.....	2.215	2.215	2.215	2.215	No. 2 foundry, Chicago .....	24.00	24.00	24.00	24.00
Shapes, Chicago.....	2.10	2.10	2.10	2.10	Southern No. 2, Birmingham ...	20.38	20.38	20.38	20.38
Plates, Pittsburgh.....	2.10	2.10	2.10	2.10	Southern No. 2, del. Cincinnati	24.06	24.06	24.06	24.06
Plates, Philadelphia.....	2.15	2.15	2.15	2.225	No. 2X, del. Phila. (differ. av.)..	26.215	26.215	26.215	26.215
Plates, Chicago.....	2.10	2.10	2.10	2.10	Malleable, Valley .....	24.00	24.00	24.00	24.00
Sheets, hot-rolled, Pittsburgh...	2.10	2.10	2.10	2.10	Malleable, Chicago.....	24.00	24.00	24.00	24.00
Sheets, cold-rolled, Pittsburgh...	3.05	3.05	3.05	3.05	Lake Sup., charcoal, del. Chicago	31.34	31.34	31.34	30.34
Sheets, No. 24 galv., Pittsburgh...	3.50	3.50	3.50	3.50	Gray forge, del. Pittsburgh ...	24.19	24.19	24.19	24.17
Sheets, hot-rolled, Gary.....	2.10	2.10	2.10	2.10	Ferromanganese, del. Pittsburgh.	125.33	125.33	125.33	125.33
Sheets, cold-rolled, Gary.....	3.05	3.05	3.05	3.05	<b>Scrap</b>				
Sheets, No. 24 galv. Gary.....	3.50	3.50	3.50	3.50	Heavy melting steel, Pitts.....	\$20.00	\$20.00	\$20.00	\$20.75
Bright bess., basic wire, Pitts....	2.60	2.60	2.60	2.60	Heavy melt, steel, No. 2, E. Pa. ...	18.75	18.75	17.75	18.50
Tin plate, per base box, Pitts....	\$5.00	\$5.00	\$5.00	\$5.00	Heavy melting steel, Chicago ...	18.75	18.75	18.75	19.25
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.55	Rails for rolling, Chicago .....	22.25	22.25	22.25	23.75
					No. 1 cast, Chicago .....	20.00	21.12	21.50	19.875
					<b>Coke</b>				
					Connellsville, furnace, ovens....	\$6.25	\$6.25	\$6.25	\$5.50
					Connellsville, foundry, ovens ...	7.25	7.25	7.25	6.00
					Chicago, by-product fdry., del....	12.25	12.25	12.25	11.75

### 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 2-inch, Pitts.	2.00	2.00	2.00	2.00

## STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. mill, carloads.

### Sheets, Strip

Hot-Rolled Sheets	
Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base .....	2.10c
Granite City base .....	2.20c
Detroit, del. ....	2.20c
Pacific ports .....	2.65c
Cold-Rolled Sheets	
Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, B'ham., base ..	3.05c
Granite City, base.....	3.15c
Detroit, del. ....	3.15c
Other Mich. pts., del....	2.25c
Pacific ports .....	3.70c
Galvanized Sheets, No. 24	
Pittsburgh, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base	3.50c
Granite City, base.....	3.60c
Pacific ports .....	4.05c

Enameling Sheets	
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage, base .....	2.75c
Granite City, base .....	2.85c
Pacific ports .....	3.40c
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base .....	3.35c
Granite City, base .....	3.45c
Pacific ports .....	4.00c

Electrical Sheets, No. 24	
Pittsburgh Pacific	Base Ports
Field gr. ....	3.20c
Armat. ....	3.55c
Elect. ....	4.05c
Granite City	Base
Field gr. ....	3.95c
Armat. ....	4.30c
Elect. ....	4.80c

### Stainless Steels

TYPE	Base, Cents per lb.—f.o.b.		Pittsburgh	H. R.	C. R.
	BARS	PLATES			
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
304-20% clad .....	18.00	19.00	19.00	30.00	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	48.00	48.00
316 .....	40.00	44.00	48.00	40.00	48.00
317 .....	50.00	54.00	58.00	50.00	58.00
347 .....	33.00	38.00	45.00	33.00	42.00
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
431 .....	19.00	22.00	29.00	17.50	22.50
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

\*Includes annealing and pickling.

Motor ...	4.95c	5.70c	5.05c	Detroit, del. ....	2.90c
Dynamo ..	5.65c	6.40c	5.75c	Other Mich. pts. del. ....	2.95c
Transformer		Commodity C.R. Strip			
72 .....	6.15c	6.90c		Pittsburgh, Cleveland,	
65 .....	7.15c	7.90c		Youngstown, base 3	
58 .....	7.65c	8.40c		tons and over .....	2.95c
52 .....	8.45c	9.20c		Worcester, base .....	3.35c
Hot-Rolled Strip				Detroit, del. ....	3.05c
Pittsburgh, Chicago, Gary,				Other Mich. pts. del....	3.10c
Cleveland, Birmingham,				Cold-Finished Spring Steel	
Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less .....			2.10c	Pittsburgh, Cleveland,	
Detroit, del. ....			2.20c	base; add 20 cents for	
Other Mich. pts. del. ....			2.25c	Worcester.	
Pacific ports .....			2.75c	.26-.50 Carbon .....	2.80c
				.51-.75 Carbon .....	4.30c
				.76-1.00 Carbon .....	6.15c
				Over 1.00 Carbon.....	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, Gary No. 24	
					unassorted .....	3.80c
					Pacific Ports .....	4.55c
					Special Coated Mfg. 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	25-lb. ... \$16.00
					15-lb. ... 14.00	30-lb. ... 17.25
					20-lb. ... 15.00	40-lb. ... 19.50

### Steel Plate

Pittsburgh, Chicago, Gary, Cleveland, Birmingham,



Youngstown	2.10c
Coatesville, Sparrows Point, Claymont	2.10c
Gulf ports	2.45c
Pacific Coast ports	2.65c
<b>Steel Floor Plates</b>	
Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	4.00c

<b>Structural Shapes</b>	
Pittsburgh, Bethlehem, Chicago, Buffalo, Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast ports	2.75c

<b>Bars</b>	
<b>Hot-Rolled Carbon Bars</b>	
Pittsburgh, Chicago, Gary, Cleve., Birm., base 20 tons one size	2.15c
Detroit, del.	2.25c
New York, del.	2.49c
Duluth, base	2.25c
Philadelphia, del.	2.47c
Gulf ports, dock	2.50c
All-rail, Houston from Birmingham	2.59c
Pac. ports, dock	2.80c
All-rail from Chicago	3.25c
<b>Rail Steel Bars</b>	
Pitts., Chicago, Gary, Cleveland, Birm., base 5 tons	2.15c
Detroit, del.	2.25c
New York, del.	2.49c
Philadelphia, del.	2.47c
Gulf ports, dock	2.50c
All-rail, Houston from Birmingham	2.59c
Pac. ports, dock	2.80c
All-rail from Chicago	3.25c

<b>Hot-Rolled Alloy Bars</b>	
Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size	2.70c
Detroit	2.80c
<b>Alloy</b>	
S.A.E. Diff. S.A.E. Diff.	
2000.....0.35 3100.....0.70	
2100.....0.75 3200.....1.35	
2300.....1.70 3300.....3.80	
2500.....2.55 3400.....3.20	
4100 15-25 Mo. ....0.55	
4600 0.20-0.30 Mo.; 1.50-2.00 Ni. ....1.20	
5100 80-1.10 Cr. ....0.45	
5100 Spr. flats .....0.15	
6100 Bars .....1.20	
6100 Spr. flats .....0.85	
Carb., Van. ....0.85	
9200 Spr. flats .....0.15	
9200 Spr. rounds, squares 0.40	
T 1300, Mn, mean 1.51-2.00 Do., carbon under 0.20 max. ....0.35	

<b>Cold-Finished Carbon Bars</b>	
Pitts., Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs.	2.65c
Detroit	2.70c
<b>Cold-Finished Alloy Bars</b>	
Pitts., Chicago, Gary, Cleveland, Buffalo, base	3.35c
Detroit	3.45c
Galveston, add \$0.25; Pacific Coast, \$0.50.	
<b>Turned, Ground Shafting</b>	
Pitts., Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras)	2.65c
Detroit	2.70c
<b>Reinforcing Bars (New Billet)</b>	
Pitts., Chicago, Gary, Cleveland, Birm., Sparrows Point, Buffalo, Youngstown, base	2.15c
Gulf ports, dock	2.50c
All-rail, Houston from Birmingham	2.59c
Pacific ports, dock	2.80c
Detroit, del.	2.25c
<b>Reinforcing Bars (Rail Steel)</b>	
Pitts., Chicago, Gary, Cleveland, Birm., base	2.15c
Gulf ports, dock	2.50c

All-rail, Houston from Birmingham	2.59c
Pacific ports, dock	2.80c
Detroit, del.	2.25c
<b>Iron Bars</b>	
Philadelphia, com. del.	3.06-3.50c
Pittsburgh, muck bar	5.00c
Pittsburgh, staybolt	8.00c
Terre Haute com., f.o.b. mill	2.15c

<b>Wire Products</b>	
<i>Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads</i>	
<b>Standard and cement coated wire nails</b> \$2.55 (Per Pound)	
Polished fence staples	2.55c
Annealed fence wire	3.05c
Galv. fence wire	3.40c
Woven wire fencing (base C. L. column) 67	
Single loop bale ties, (base C. L. column) 59	
Galv. barbed wire, 80-rod spools, base column	70
Twisted barbless wire, column	70
<b>To Manufacturing Trade</b>	
<i>Base, Pitts. - Cleve. - Chicago Birmingham (except spring wire at Birmingham)</i>	
Bright bess., basic wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c
Worcester, Mass., 10c higher on bright basic and spring wire.	

<b>Cut Nails</b>	
Carload, Pittsburgh, keg	\$3.85

<b>Alloy Plates (Hot)</b>	
Pitts., Chicago, Coatesville, Pa.	3.50c

<b>Rails, Fastenings</b>	
<i>(Gross Tons)</i>	
Standard rails, mill	\$40.00
Relay rails, base, 35 lbs. and over	28.00-30.00
Light rails, billet qual., Pitts., Chicago, Bham.	\$40.00
Do., rerolling quality	39.00
<i>Cents per pound</i>	
Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.75c
Do., heat treated	5.00c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c
Base, light rails 25 to 60 lbs., 20 lbs. up \$2; 16 lbs. up \$4; 12 lbs. up \$8; 8 lbs. up \$10. Base railroad spikes 200 kegs or more; base plates 20 tons.	

<b>Bolts and Nuts</b>	
<i>F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.</i>	
<b>Carriage and Machine</b>	
½ x 6 and smaller	65 ½ off
Do., ⅝ and ¾ x 6-in. and shorter	63 ½ off
Do., ¾ to 1 x 6-in. and shorter	61 off
1 ½ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
<b>Stove Bolts</b>	
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
<b>Nuts</b>	
Semifinished hex. U.S.S. S.A.E.	
½-inch and less	62 64
¾-1-inch	59 60
1 ½-1 ½-inch	57 58
1 ½ and larger	56

<b>Hexagon Cap Screws</b>	
Upset 1-in., smaller	60 off
<b>Square Head Set Screws</b>	
Upset, 1-in., smaller	68 off

Headless, ¼-in., larger	.55 off
No. 10, smaller	.60 off

<b>Piling</b>	
Pitts., Chgo., Buffalo	2.40c

<b>Rivets, Washers</b>	
<i>F.o.b. Pitts., Cleve., Chgo., Bham.</i>	
Structural	3.75c
⅝-inch and under	.65-5 off
Wrought washers, Pitts., Chl., Phila., to jobbers and large nut, bolt mfrs. l.c.l. \$3.50 off	

<b>Tool Steels</b>	
<i>Pittsburgh, Bethlehem, Syracuse, base, cents per lb.</i>	
Carb. Reg. 14.00 Oil-hard	24.00
Carb. Ext. 18.00 ening	24.00
Carb. Spec. 22.00 High	43.00

<b>High Speed Tool Steels</b>	
Tung. Chr. Van. Moly.	
18.00 4 1	67.00
18.00 4 2	77.00
18.00 4 3	87.00
1.50 4 1	8.50
5.00 4 2	8
5.50 4 1.50	4 57.50
5.50 4.50 4	4 70.00

<b>Boiler Tubes</b>	
<i>Carloads minimum wall seamless steel boiler tubes, cut-lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.</i>	
<b>Lap Welded</b>	

Charcoal Iron	
1 ½" O.D.	13 \$ 9.72
1 ¾" O.D.	13 11.06
2" O.D.	13 12.38
2 ¼" O.D.	13 13.79
2 ½" O.D.	12 15.16
2 ¾" O.D.	12 16.58
3" O.D.	12 17.54
3 ½" O.D.	11 23.15
4" O.D.	10 28.66
5" O.D.	9 44.25
6" O.D.	7 68.14

<b>Seamless</b>	
Hot Drawn	
1" O.D.	13 \$ 7.82
1 ¼" O.D.	13 9.26
1 ½" O.D.	13 10.23
1 ¾" O.D.	13 11.64
2" O.D.	13 13.04
2 ¼" O.D.	13 14.54
2 ½" O.D.	12 16.01
2 ¾" O.D.	12 17.54
3" O.D.	12 18.59
3 ½" O.D.	11 24.62
4" O.D.	10 30.54
4 ½" O.D.	10 37.35
5" O.D.	9 46.87
6" O.D.	7 71.96
<b>Cold</b>	
1" O.D.	13 \$ 9.01
1 ¼" O.D.	13 10.67
1 ½" O.D.	13 11.79
1 ¾" O.D.	13 13.42
2" O.D.	13 15.03
2 ¼" O.D.	13 16.76
2 ½" O.D.	12 18.45
2 ¾" O.D.	12 20.21
3" O.D.	12 21.42
3 ½" O.D.	11 22.48
4" O.D.	10 28.37
4 ½" O.D.	10 35.20
5" O.D.	9 43.04
6" O.D.	9 54.01
7" O.D.	8 82.93

<b>Welded Iron, Steel, Pipe</b>	
Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads, Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2 ½ and 1 ½ less, respectively. Wrought pipe, Pittsburgh base.	
<b>Butt Weld Steel</b>	

In.		Blk.	Galv.
½	63 ½	51	
¾	66 ½	55	
1-3	68 ½	57 ½	
<b>Iron</b>			
¾	30	10	
1-1 ¼	34	16	
1 ½	38	18 ½	
2	37 ½	18	

<b>Lap Weld Steel</b>	
2	61
2 ½-3	64
3 ½-6	66
7 and 8	65

<b>Iron</b>		
2	30 ½	12
2 ½-3 ½	31 ½	14 ½
4	33 ½	18
4 ½-8	32 ½	17
9-12	28 ½	12
<b>Line Pipe, Plain Ends Steel</b>		
1 to 3, butt weld	68 ½	
2, lap weld	63	
2 ½ to 3, lap weld	66	
3 ½ to 6, lap weld	65	
7 and 8, lap weld	64	
Seamless, 3 pts. lower discount.		

<b>Cast Iron Pipe</b>	
<i>Class B Pipe—Per Net Ton</i>	
6-in., & over, Birm.	\$45.00-46.00
4-in., Birmingham	48.00-49.00
4-in., Chicago	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy.	49.00
Do., 4-in.	52.00
Class A Pipe \$3 over Class B	
Std. ftgs., Birm., base	\$100.00

<b>Semifinished Steel</b>	
<b>Rerolling Billets, Slabs (Gross Tons)</b>	
Pittsburgh, Chicago, Gary, Cleve., Buffalo, Youngs., Birm., Sparrows Point	\$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

<b>Forging Quality Billets</b>	
Pitts., Chl., Gary, Cleve., Young., Buffalo, Birm.	40.00
Duluth	42.00
<b>Sheet Bars</b>	
Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

<b>Wire Rods</b>	
Pitts., Cleveland, Chicago, Birmingham No. 5 to ¾-inch incl. (per 100 lbs.)	\$2.00
Do., over ¾ to 1 ¼-in. incl.	2.15
Worcester up \$0.10, Galveston up \$0.25 and Pacific Coast up \$0.50 on water shipments.	
<b>Skelp</b>	
Pitts., Chl., Youngstown, Coatesville, Sparrows Pt.	1.90c
<b>Shell Steel</b>	
Pittsburgh, Chicago, base, 1000 tons of one size, open hearth	
3-12-inch	\$52.00
12-18-inch	54.00
18-inch and over	56.00

<b>Coke</b>	
<i>Price Per Net Ton</i>	
<b>Beehive Ovens</b>	
Connellsville, fur...	\$6.00
Connellsville, fdry.	7.00-7.50
Connell, prem. fdry.	7.25-7.60
New River fdry.	8.00-8.25
Wise county fdry.	7.50
Wise county fur.	6.50

<b>By-Product Foundry</b>	
Kearny, N. J., ovens	12.15
Chicago, outside del.	11.50
Chicago, delivered	12.25
Terre Haute, del.	12.00
Milwaukee, ovens	12.25
New England, del.	13.75
St. Louis, del.	12.25
Birmingham, ovens	8.50
Indianapolis, del.	12.00
Cincinnati, del.	11.75
Cleveland, del.	12.30
Buffalo, del.	12.50
Detroit, del.	12.25
Philadelphia, del.	12.38

<b>Coke By-Products</b>	
<i>Spot, gal., freight allowed east of Omaha</i>	
Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
<i>Per lb. f.o.b. works</i>	
Phenol (car lots, returnable drums)	12.50c
Do less than car lots	13.25c
Do tank cars	11.50c
<i>Eastern Plants, per lb.</i>	
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
<b>Bethlehem, Pa., base</b> . . . . .	\$25.00	\$24.50	\$26.00	\$25.50
Newark, N. J., del. . . . .	26.53	26.03	27.53	27.03
Brooklyn, N. Y., del. . . . .	27.50			28.00
<b>Birdsboro, Pa., del.</b> . . . .	25.00	24.50	26.00	25.50
Philadelphia, del. . . . .				
<b>Birmingham, base</b> . . . . .	20.38	19.00		
Baltimore, del. . . . .	25.61	24.73		
Boston, del. . . . .	25.12			
Chicago, del. . . . .	24.22			
Cincinnati, del. . . . .	24.06	22.60		
Cleveland, del. . . . .	24.12	23.24		
Newark, N. J., del. . . . .	26.15			
Philadelphia, del. . . . .	25.46	24.58		
St. Louis, del. . . . .	24.12	23.24		
<b>Buffalo, base</b> . . . . .	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
<b>Chicago, base</b> . . . . .	24.00	23.50	24.50	24.00
Millwaukee, del. . . . .	25.10	24.60	25.60	25.10
Muskegon, Mich., del. . . . .	27.19	26.69	27.69	27.19
<b>Cleveland, base</b> . . . . .	24.00	23.50	24.50	24.00
Akron, Canton, O., del. . . . .	25.39	24.89	25.89	25.39
<b>Detroit, base</b> . . . . .	24.00	23.50	24.50	24.00
Saginaw, Mich., del. . . . .	26.31	25.81	26.81	26.31
<b>Duluth, base</b> . . . . .	24.50	24.00	25.00	24.50
St. Paul, del. . . . .	26.63	26.13	27.13	26.63
<b>Eric, Pa., base</b> . . . . .	24.00	23.50	25.00	24.50
<b>Everett, Mass., base</b> . . . . .	25.00	24.50	26.00	25.50
Boston . . . . .	25.50	25.00	26.50	26.00
<b>Granite City, Ill., base</b> . . . . .	24.00	23.50	24.50	24.00
St. Louis, del. . . . .	24.50	24.00	25.00	24.50
<b>Hamilton, O., base</b> . . . . .	24.00	23.50	24.50	24.00
Cincinnati, del. . . . .	24.44	24.61	25.11	25.11
<b>Neville Island, Pa., base</b> . . . . .	24.00	23.50	24.50	24.00
§Pittsburgh, del. . . . .				
No. & So. sides . . . . .	24.69	24.19	25.19	24.69
<b>Provo, Utah, base</b> . . . . .	22.00			
Sharpsville, Pa., base . . . . .	24.00	23.50	24.50	24.00
<b>Sparrows Point, Md., base</b> . . . . .	25.00	24.50		
Baltimore, del. . . . .	25.99			
<b>Steelton, Pa., base</b> . . . . .		24.50		25.50
<b>Swedeland, Pa., base</b> . . . . .	25.00	24.50	26.00	25.50
Philadelphia, del. . . . .	25.84	25.34	26.34	26.34
<b>Toledo, O., base</b> . . . . .	24.00	23.50	24.50	24.00
Mansfield, O., del. . . . .	25.94	25.44	26.44	25.94
<b>Youngstown, O., base</b> . . . . .	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. . . . . 31.34

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; \$30.74, 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%.

**Celling 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 Celling Prices:** Phillipsburgh 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. E. & G. Brooke Iron Co. may charge \$1 a ton in excess of basing point prices.

**Export Prices:** In case of exports 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
Second Quality	
Pa., Ill., Ky., Md., Mo. . . . .	46.55
Georgia, Alabama . . . . .	38.00
New Jersey . . . . .	49.00

Ohio	
First quality . . . . .	43.00
Intermediate . . . . .	36.10
Second quality . . . . .	36.00

**Malleable Bung Brick**  
 All bases . . . . . \$59.85

Silica Brick	
Pennsylvania . . . . .	\$51.30
Joliet, E. Chicago . . . . .	58.90
Birmingham, Ala. . . . .	51.30

Ladle Brick	
(Pa., O., W. Va., Mo.)	
Dry press . . . . .	\$31.00
Wire cut . . . . .	29.00

Magnesite	
Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk . . . . .	22.00
net ton, bags . . . . .	26.00

Basic Brick	
Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa. . . . .	
Chrome brick . . . . .	\$54.00
Chem. bonded chrome . . . . .	54.00
Magnesite brick . . . . .	76.00
Chem. bonded magnesite . . . . .	65.00

## Fluorspar

Washed gravel, duty pd., tide, net ton . . . . .	nominal
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail . . . . .	\$25.00
Do., barge . . . . .	25.00
No. 2 lump . . . . .	25.00

## Ferroalloy Prices

<b>Ferromanganese, 78-82%</b>	Less than 200-lb. lots . . . . .	14.25c
Carlots, duty pd., seab'd . . . . .	67-72% low carbon, cts. per pound:	
Carlots, del. Pittsburgh . . . . .		
Carlots, f.o.b. So. fees . . . . .		
Add \$10 for ton, \$13.50 for less ton, \$18 for less than 200-lb. lots.		
<b>Spiegeleisen, 19-21%, gross ton, Palmerton . . . . .</b>		\$36.00
<b>Manganese Briquets, Contract carloads, bulk freight allowed, per lb. . . . .</b>		5.50c
Packed . . . . .		5.75c
Ton lots . . . . .		6.00c
Less-ton lots . . . . .		6.25c
Less 200-lb. lots . . . . .		6.50c
Spot 1/4c higher.		
<b>Manganese Electro, 99.9+%, less car lots . . . . .</b>		42.00c
<b>Chromium Metal, per lb. contained chromium</b>		
Contract . . . . .	Spot . . . . .	
98% Cr. ton lots . . . . .	80.00c	85.00c
88% Cr. ton lots . . . . .	79.00c	84.00c
<b>Ferrocolumbium, 50-60% f.o.b. Niagara Falls, per lb., contained Cr on contract . . . . .</b>		\$2.25
Less-ton lots . . . . .		2.30
(Spot 10c higher)		
<b>Chromium Briquets, per lb., freight allowed</b>		
Contract . . . . .	Spot . . . . .	
Carlots . . . . .	8.25c	8.50c
Packed . . . . .	8.50c	8.75c
Ton lots . . . . .	8.75c	9.00c
Less-ton lots . . . . .	9.00c	9.25c
Less 200 lbs. . . . .	9.25c	9.50c
<b>Ferrosilicon, 66-70%, freight allowed, 4-6% carbon, per pound contained (chrome)</b>		
Carlots . . . . .		13.00c
Ton lots . . . . .		13.75c
Less-ton lots . . . . .		14.00c

Carlots . . . . .	1.25	
20-25% C, 0.10 max., in ton lots per lb. contained . . . . .	1.35	
TI . . . . .	1.40	
Less-ton lots . . . . .	1.40	
(Spot 5c higher)		
<b>Ferro-Carbon-Titanium, 15-20% Titanium,</b>		
6-8% C 3-5% C		
Carlots, contract, f.o.b. Niagara Falls, freight allowed to destinations east of Mississippi and north of Baltimore and St. Louis . . . . .	\$142.50 \$157.50	
<b>Ferrovandium, 35-40%, contract per pound contained vanadium . . . . .</b>	\$2.70-\$2.80-\$2.90 (Spot 10c higher)	
<b>Vanadium Pentoxide, Per lb. contained, contracts . . . . .</b>	\$1.10	
Do., spot . . . . .	1.15	
<b>Zirconium Alloy, 12-15%, carloads, contract, bulk . . . . .</b>	\$102.50	
Packed . . . . .	107.50	
Ton lots . . . . .	108.00	
Less ton lots . . . . .	112.50	
Spot \$5 a ton higher		
35-40% contract, carloads, bulk or package, per lb. alloy . . . . .	14.00c	
Do., ton lots . . . . .	15.00c	
Do., less-ton lots . . . . .	16.00c	
Spot is 1/4-cent higher		
<b>Alsifer, Per lb., f.o.b. Niagara Falls.</b>		
Contract . . . . .	Spot . . . . .	
Carlots . . . . .	7.50c	8.00c
Ton lots . . . . .	8.00c	8.50c
<b>Simanal, Per lb. of alloy, contracts, freight allowed (approx. 20% Si, 20% Mn, 20% Al)</b>		
Carlots . . . . .	10.50c	
Ton Lots . . . . .	11.00c	
Less . . . . .	11.50c	

# WAREHOUSE STEEL PRICES

*Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials. As of April 16, 1941*  
*As Kansas City, Mo., Chattanooga, Tenn., Tulsa, Okla., and Portland, Oreg., were not named in the order fixing ceiling prices they have been omitted below.*

	Soft Bars	Hot-rolled Bands	Strip Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets			Cold Rolled Strip	Cold Drawn Bars		
							Hot Rolled	Cold Rolled	Galv. No. 24		Carbon	S.A.E. 2300	S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.48	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	....	4.05	....	....
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	....	....
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	4.35	4.35	....	4.35	4.35	6.10	4.35	6.35	5.60	....	5.75	....	....
Los Angeles	4.50	5.00	6.80	4.50	4.50	6.75	4.65	6.50	5.85	....	6.60	10.55	9.55
San Francisco	4.10	4.60	6.35	4.25	4.25	5.95	4.25	6.40	6.00	....	6.80	10.80	9.80

### 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; 300-4999 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, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

### S.A.E. Hot-rolled Bars (Unannealed)

	S.A.E. Hot-rolled Bars (Unannealed)				
	1035-1050 Series	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	6.25	....	8.75	9.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	9.05
San Francisco	5.60	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	
	£ s d	£ 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	5.30c	18 7 0
(a) del. Middlesbrough 5s rebate to approved customers.	....	††Rebate
15s on certain conditions.	....	....

## Ores

Lake Superior Iron Ore		South African (excluding war risk)	
Gross ton, 51½%	Lower Lake Ports	No ratio lump, 44%	Do.
Old range bessemer	\$4.75	28.00	29.00
Mesabi nonbessemer	4.45	Do., 45%	34.00
High phosphorus	4.35	Do., 48%	33.00
Mesabi bessemer	4.60	Do. concentrates, 48%	34.00
Old range nonbessemer	4.60	Do., 50%	....
Eastern Local Ore		Brazilian	
Cents. unit, del. E. Pa.	....	2.5:1 lump, 44%	31.00
Foundry and basic 56-63%, contract	12.00	2.8:1 lump, 44%	32.50
Foreign Ore		3:1 lump, 48%	41.00
Cents per unit, c.i.f. Atlantic ports	....	No ratio lump, 48%	35.00-35.50
Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.	Do. concentrate, 48%	33.00-33.50
N. African low phos.	Nom.	Philippine	
Spanish, No. African basic, 50 to 60%	Nom.	No ratio lump, 45%	32.00
Chinese wolframite, net ton, duty pd.	\$24.00	2.8:1 lump, 48%	40.00
Brazil iron ore, 68-69% ord.	7.50c	Do., concentrate, 48%	39.00
Low phos. (.02 max.) F.O.B. Rio Janeiro	8.00c	2.5:1 concentrate, 48%	36.50
Scheelite, imp.	23.50-24.00	No ratio concentrate, 48%	34.00
Chrome Ore		No ratio lump, 48%	35.00
Gross ton c.i.f. Baltimore; dry basis; subject to penalties for guarantees	....	Rhodesian	
Indian and African, 2.8:1 lump, 48%	\$29.00	nominal	
Molybdenum		Including war risk but not duty, cents per unit cargo lots	
Sulphide conc., lb. Mo. cont., mines	....	Caucasian, 50-52%	....
		S. African, 48%	65.00
		Indian, 50%	66.00
		Brazilian, 48%	65.00
		Chilean, 48%	68.00
		Cuban, 51%, duty free	81.00-83.00

# 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	Machine Shop Turnings	OPEN HEARTH GRADES*	BLAST FURNACE GRADES*	Low Phos. Grades	Heavy Structural, Plate and less	Cut Auto Scrap and less	Alloy-Free Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren, Conshohocken, Phoenixville	\$20.00	\$16.00	\$20.00	\$16.00	\$22.50	\$21.00	\$20.00	\$18.00	\$19.50	\$21.00
Beulah, Phenixville	18.75	14.75	23.75	14.75	21.25	20.75	19.75	16.75	18.25	19.75
Buffalo	19.25	15.25	24.25	15.25	21.75	20.25	19.25	16.25	17.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	15.50	24.50	15.50	22.00	21.50	20.50	17.50	19.00	20.50
Detroit	17.85	13.85	22.85	13.85	20.35	19.85	18.85	15.85	17.35	18.85
Toledo	18.75	14.75	23.75	14.75	21.25	20.75	19.75	16.75	18.25	19.75
Chicago	18.25	14.25	23.25	14.25	20.75	20.25	19.25	16.25	17.75	19.25
Kokomo	18.00	14.00	23.00	14.00	20.50	20.00	19.00	16.00	17.50	19.00
Duluth	17.50	13.50	22.50	13.50	20.00	19.50	18.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	13.00	22.00	13.00	19.50	19.00	18.00	15.00	16.50	18.00
Minneapolis, Colo.	16.50	12.50	21.50	12.50	19.00	18.50	17.50	14.50	16.00	17.50
Seattle	14.50	10.50	19.50	10.50	17.00	16.50	15.50	12.50	14.00	15.50
Portland, Ore.	.....	.....	.....	.....	15.50	15.00	14.00	11.00	12.50	14.00

## RAILROAD SCRAP

Heavy Melting Steel	Scrap Rails	Ralls for Rolling	Scrap Rails		18 in. and under
			3 ft. and under	2 ft. and under	
Pittsburgh, Wheeling, Steubenville	21.00	23.50	24.00	24.25	24.50
Sharon, Youngstown, Canton	19.75	22.25	22.75	23.00	23.25
Philadelphia, Wilmington, Sparrows Point	20.50	23.00	23.50	23.75	24.00
Cleveland, Cincinnati, Middletown	19.75	22.25	22.75	23.00	23.25
Ashland, Portsmouth	20.75	23.25	23.75	24.00	24.25
Chicago	21.25	23.75	24.25	24.50	24.75
Buffalo	19.85	22.35	22.85	23.10	23.35
Detroit	20.25	22.75	23.25	23.50	23.75
Kokomo	19.00	21.50	22.00	22.25	22.50
Duluth	18.00	20.50	21.00	21.25	21.50
Kansas City, Mo.	18.50	21.00	21.50	21.75	22.00
St. Louis	18.00	20.50	21.00	21.25	21.50
Birmingham	18.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	20.50	21.00	21.25	21.50
Seattle	15.50	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		
	150 lbs. & Under	150 lbs. & Under	150 lbs. & Under	150 lbs. & Under	150 lbs. & Under	150 lbs. & Under	150 lbs. & Under	150 lbs. & Under	150 lbs. & Under
No. 1 Cupola Cast	.....	.....	.....	.....	.....	.....	.....	.....	.....
No. 1 Machinery Cast, Drop Broken	.....	.....	.....	.....	.....	.....	.....	.....	.....
Clean Auto Cast	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stove Plate	.....	.....	.....	.....	.....	.....	.....	.....	.....
Unstripped Motor Blocks	.....	.....	.....	.....	.....	.....	.....	.....	.....
Heavy Breakable Cast	.....	.....	.....	.....	.....	.....	.....	.....	.....
Charging Box Size Cast	.....	.....	.....	.....	.....	.....	.....	.....	.....
Miscellaneous Malleable	.....	.....	.....	.....	.....	.....	.....	.....	.....

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, and No. 1 busheling and cast.  
 Blast Furnace Grades refer to mixed borings and turnings, shoveling turnings, No. 2 busheling and cast iron borings. Add \$3 for chemical borings, \$5 when chemical borings used in manufacture of explosives.  
 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. No commission is payable for preparation of scrap.  
 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, \$8.27 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 the prices listed in the table for the nearest basing point. Certain exceptions specified in OPA Price Schedule No. 4 (Amendment 11) 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.  
 Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are \$2.50 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 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.

# LOGEMANN

## Presses for Sheet Scrap

### THE NATION NEEDS YOUR SHEET SCRAP!

In mills, industrial plants and scrap yards, LOGEMANN SCRAP PRESSES are working day and night to prepare sheet scrap for the furnaces.

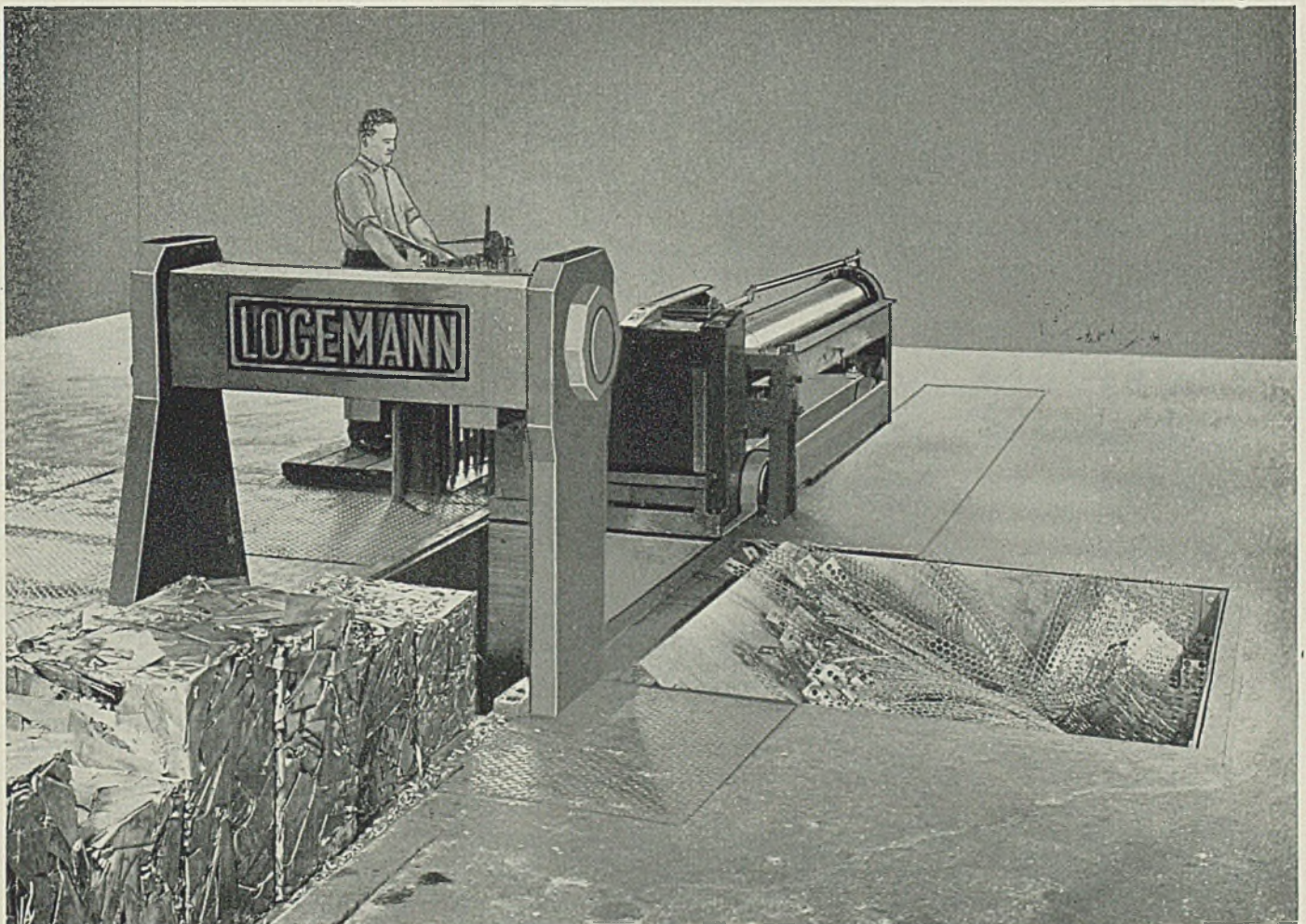
Sheet mills particularly recognize the value of the years of experience and the performance records which back up LOGEMANN designs and workmanship.

The line includes scrap presses *designed for mill service*, presses *designed for automobile plant conditions*, presses *designed for general plant applications*.

Write for details.

**LOGEMANN BROTHERS COMPANY**  
3126 W. Burleigh St., Milwaukee, Wisconsin

The scrap press illustrated operates in one of the largest industrial plants. Compresses scrap from three directions to produce high-density mill size bundles. Built in various capacities.



## Sheets, Strip

Sheet & Strip Price, Page 120

Sheet deliveries are becoming deferred, even on the highest ratings. On A-1-a priority little better than seven weeks can be done at best and many producers cannot promise anything under ten weeks. This applies both to hot and cold-rolled sheets. Occasionally a small lot can be worked into rolling schedules for delivery within a month, but this is the exception. Sheetmakers generally quote seven to eight weeks on A-1-a to A-1-c ratings and eight to nine weeks on remaining A-1 classifications.

Electric refrigerator manufacturers, ordered by WPB to suspend

production of that equipment April 10, are taking more sheets than for some time. Lacking priorities for refrigerator manufacture these consumers have not been in the market. Now, however, they are taking war work carrying high priorities and sheetmakers are called on for increasing tonnage for this outlet. Work being taken by refrigerator manufacturers includes ammunition boxes and incendiary bomb cases, the former A-1-g and the latter A-1-c. Much of this type of work fits in well for type of equipment producing refrigerators. One manufacturer in the East has taken on a line of war work quite different from his usual line.

Manufacturers of automobiles and automobile bodies have been notified by director of industry operations not to make shipments from steel stocks except on orders bearing high preference. Alloy steel remaining in inventory as a result of cessation of automobile production may be sold only on preference of A-1-k or higher and other steel and steel products only on A-3 or higher. Shipments may be made on orders bearing the required ratings but duplicate copies of each order or letter must be sent to the distressed stock unit, iron and steel branch of the War Production Board.

Andrews Steel Co. and Newport Rolling Mill Co., Newport, Ky., will interrupt production March 9 for rebuilding soaking pits and making other equipment improvements. Rolling schedules will be stopped for a week to nine days, and steelmaking for a shorter time.

In the Birmingham district diversion of ingots for use of strip mills in production of light plates is cutting into sheet production and deliveries are being delayed further and only highest priority orders can obtain promise of delivery.

With the ratio tending upward steadily, a leading producer of hot strip in New England is now engaged fully 75 per cent on high-rated volume with cold-rolled departments about 15 per cent below that rate, although the gap is narrowing. Several mills are heavily engaged on high-carbon cold strip for cartridge clips. Staple hardware lines consuming cold strip, except on priorities, are restricted, although rated volume of such business is heavy. Additional large inquiries for messware, knives, forks and spoons are out.

## Plates

Plate Prices, Page 120

Plates continue the tightest of steel products in spite of the fact that continuous sheet mills are providing substantial tonnage of light plates. Output of these mills in March is estimated at about 400,000 tons, sufficient to bring total plate output to about 850,000 tons monthly, more than 10,000,000 tons per year. Recent Washington estimates call for about 5,000,000 tons for shipbuilding, leaving 4,000,000 to 5,000,000 tons for other requirements. However, the shipbuilding program is being revised continually, spurred by numerous sinkings and necessity for movement of troops and requirements for this purpose may be increased.

Increased pressure for plates for freight car building is being felt as need for additional cars develops under war pressure. Additionally large tonnages of plates are required for military tanks and other war equipment.

Contracts are being distributed for 83 welded open and covered lighters of 250 and 500 tons capacity, on a cost plus 5 per cent basis. Bids have been made by



"Krane Kar is equally versatile for Hook or Magnet work—banding billets, bars, plate or scrap."

2½, 5, or 10 Ton Capacities

**KRANE KAR**  
SWING BOOM TRACTOR CRANE

## UNMATCHED PERFORMANCE FOR SPEED-UP

Krane Kar's performance is unmatched by any tractor crane of equal rated capacity. Indispensable for Defense Speed-up!

**Among the Users:** Bethlehem Steel, Carnegie-Illinois Steel, American Steel & Wire, Keystone Steel & Wire, Otis Elevator, Wm. Sellers & Co., General Motors, Frost Gear and Forge, etc.

Write for Bulletin No. 55, with illustrations and specifications

**SILENT HOIST WINCH & CRANE CO.**  
849 63rd ST., BROOKLYN, N.Y.

numerous shops new to shipbuilding but equipped for welding.

To obtain steel to continue operations more shops are seeking prime war orders and subcontracts. On 1575 steel cylindrical mooring buoys, taking several thousand tons of plates, a builder of asphalt plant equipment in New England and a small tank shop were among bidders.

High-rated orders for equipment supplementing the shipbuilding program are well serviced and most delay is in filling small orders to round out work already in progress.

#### PLATE CONTRACTS PLACED

175 tons, 500,000-gallon elevated water tank, Barksdale Field, La., to Pittsburgh-Des Moines Steel Co., Pittsburgh, \$43,280, pro. 105, U. S. Engineer, Vicksburg, Miss.

103 tons, marine boiler plate, navy purchasing office, New York, to Lukens Steel Co., Coatesville, Pa., 4.69c, delivered, plus \$2424.40 for gas-cutting.

100 tons, elevated steel water tank, airfield, Hattiesburg, Miss., to Chicago Bridge & Iron Co., Chicago, \$16,450.

Unstated, 1800-foot 24-inch pipe line, for Pendleton, Oreg., to Oregon Culvert & Pipe Co., Portland; city plans award of 2800 feet additional 24-inch steel water supply pipe.

#### PLATE CONTRACTS PENDING

700 tons, 30-inch, one-quarter inch plate, water line, Chicopee, Mass.; E. M. Matz, Inc., Boston, low on general contract.

650 tons, marine boiler plate, navy, east and west yards, Central Iron & Steel Co., Harrisburg, Pa., low on bulk with no bids submitted on some tonnage for Pacific coast, schedule 308, Bureau of Supplies & Accounts, Washington, bids Feb. 19.

375 tons, floor plates, navy, east and west yards, Central Iron & Steel Co., Harrisburg, Pa., low; bids Feb. 19, schedule 304, Bureau of Supplies and Accounts, Washington.

Unstated tonnage, forty-two 515-gallon fuel tanks, Civilian Aeronautics Administration, Washington, various deliveries, Kennedy Tank & Mfg. Co., Indianapolis, low, \$39.70 each, inv. 1323, bids Feb. 13.

## Bars

Bar Prices, Page 121

While the situation in steel bars is not as tight as in plates it is a close second and deliveries are increasingly difficult. To increase the difficulty large allocations of shell bars are imminent. This will also tend to limit steel rail production as rail mills are suited to roll large rounds.

Farm equipment manufacturers, large users of bars, are attempting to fill their quotas early in the year, allowing more concentration on their share of war production. Some of the new farm machinery will be needed early this season.

Producers of cold-drawn bars have been given intimations that when the allocation program on their product goes into effect April 1 their supply of hot-rolled bars may be less than at first planned. The present basis is for monthly shipments at the average of the first seven months of 1940.

War requirements for bars are expanding steadily and deliveries of hot-rolled material are difficult.

On A-1-a priority about nine weeks is a fair average. Increased priority ratings have limited present delivery promises to A-3 ratings and higher. While general allocation has not been adopted in bars numerous instances appear where producers are directed to ship to designated consumers to prevent interruption of war work.

Substantial improvement in demand for cold-rolled and alloy bars, resulting from additional contracts for armor-piercing shells and small diameter projectiles, finds some producers scheduled on top A-ratings through April, notably in cold-finished. Eight New England shops figured 150 millions of 20 and 40-millimeter projectiles requiring ex-

tensive screw machine and turning work, all but two requiring additional equipment. Estimates were received from a metal furniture shop, a hardware builder, a producer of sporting goods, including golf clubs, a lockmaker, household appliances, and a builder of automotive specialties, a chain manufacturer and a fabricator of telephone meters. Normally these fabricate limited tonnages of cold-rolled small diameter bars.

New shell contracts, taking heavier alloy bars, are being made with shops ordinarily producing cotton-mill equipment, including cotton gins. Because of the high ratio of machining equipment in the New England district, the war is having

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You can't afford loss of production caused by motors down for repairs. That means oil is "out"—because it leaks from bearings, gets on windings, and causes "burn-outs".

Such troubles disappear when you use drip-less, waste-less NON-FLUID OIL. It stays in bearings and off windings, outlasts oil, cuts lubrication cost to 1/2 or 1/3—and keeps motors in constant service.

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## MODERN STEEL MILL LUBRICANT

*Better Lubrication at Less Cost per Month*

a far-reaching effect on bar consumption, stimulating demand to a degree hardly less than plates and on a much broader scale. For files, large orders for high-carbon flats and rounds, are being placed, these being subjected to heat-treating later.

## Pipe

Pipe Prices, Page 121

Direct mill shipments of wrought iron pipe are substantial and warehouse stocks are in better balance on wrought than steel pipe, with demand good. While requirements for black pipe for construction are lower, several large housing proj-

ects take important tonnages and buying for industrial work is heavy, especially in lapweld.

Contracts are being placed for 60 miles of six and eight-inch steel pipe, a direct government purchase, for installation in New England. Quincy, Mass., has closed on 200 tons of cast iron pipe, but large orders are few. A 42-inch line for Fall River, Mass., will be reinforced concrete.

Demand for miscellaneous lots of cast pipe is active. Pipe foundries are busy, not only on pipe but also in production of miscellaneous castings for war purposes.

Restrictions have been placed on shipments of oil country casing,

tubing or drill pipe, on or after March 14 or line pipe after March 7 except on orders bearing preference rating of A-9 or higher. The purpose is to prevent shipments of steel for use in the petroleum industry on unrated orders.

### CAST PIPE PENDING

250 tons and fittings, for Port Angeles, Wash.; H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J., low \$23,316; alternates for wood.

100 tons, 6 to 12-inch and fittings; bids in to Navy, Feb. 20.

## Wire

Wire Prices, Page 121

Continued heavier bookings of war orders, notably specialties, now exceed shipments, with production schedules hampered by limited supplies of semifinished and alloys now under allocation controls, chromium especially. Current orders for specialties are about equally divided between direct purchases and contractors. To fill alloy demands the average ratings are higher and even with these most producers have difficulty in securing materials. Demand for wire screw stock, including bessemer is heavy and mounting, with screw machine capacity steadily increasing. Although heat-treating equipment is being frequently operated seven days per week, bottlenecks and unbalanced production schedules continue.

## Rails, Cars

Truck Material Prices, Page 121

Locomotive buying is heaviest in years as carriers face rising freight and passenger demands and steel supply becomes more difficult. It is understood several important roads have placed orders quietly for additional motive power. Among large fleets which have been made public are 30 for the Atchison, Topeka & Santa Fe, and 57 for the New York Central. The Santa Fe purchase will give that road thirty 5400-horsepower diesel-electric units in freight service.

Wisdom of pressing for large production of freight cars is indicated by increasing difficulty of obtaining sufficient supply to move material. Considerable concern is expressed over possibility of car shortage in the next few weeks. Some delays have been met in moving scrap because of lack of cars, but it has not been severe.

### LOCOMOTIVES PLACED

Atchison, Topeka & Santa Fe, ten 5400-horsepower diesel-electric freight locomotives, to Electro-Motive Corp., La Grange, Ill.; 20 steam locomotives, 4-8-4-type, to Baldwin Locomotive Works, Eddystone, Pa.

Lehigh Valley, ten diesel-electric switch engines, with five going to American Locomotive Co., New York, and five to the Electro Motive Corp., La Grange, Ill.

Nashville, Chattanooga & St. Louis, five 1000-horsepower diesel switchers, to American Locomotive Co., New York.

New York, New Haven & Hartford, five electric freight locomotives, to General Electric Co., Schenectady, N. Y.

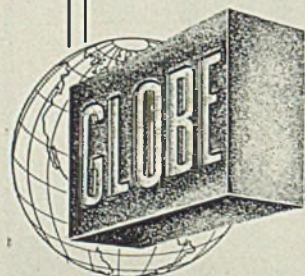
Northern Pacific, 12 Mallet locomotives

# GLOBE

## SUPERIOR LADLE BRICK

Recent additions to our plant have increased our annual capacity of "GLOBE" Superior Ladle Brick to 42,000,000 brick per year . . . to meet the demand made necessary because of years of fully satisfactory service to the steel industry.

"GLOBE" Superior Ladle Brick, either wire cut or dry pressed, will improve your metal . . . eliminate dirty steel . . . reduce lost time due to refractory replacement . . . and lower per ton brick costs.



SERVING THE STEEL INDUSTRY SINCE 1873

The **GLOBE** Brick Co.

EAST LIVERPOOL, OHIO



to American Car & Foundry Co., New York, ten 4-8-4 freight and passenger locomotives to Baldwin Locomotive Co., Philadelphia, and two 5400-horsepower diesel-electric to Electro-Motive Corp., La Grange, Ill.

St. Louis Southwestern, three 1000-horsepower diesel-electric locomotives to Baldwin Locomotive Works, Eddy-stone, Pa.

**CAR ORDERS PLACED**

Nashville, Chattanooga & St. Louis, 250 fifty-ton twin hoppers and 25 fifty-ton box cars to Pullman-Standard Car Mfg. Co., Chicago and 50 covered hoppers to American Car & Foundry Co., New York; 75 seventy-ton gondolas are still pending.

Southern Railway, 1000 gondolas to Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill.

War Department, 16 kitchen box and 16 storage box cars to St. Louis Car Co., St. Louis.

War Department, 200 box cars and 25 combination box and caboose cars, to General American Transportation Corp., Chicago.

**CAR ORDERS PENDING**

Atchison, Topeka & Santa Fe, 100 sixty-foot flat cars; bids asked.

Chicago, Indianapolis & Louisville, 200 fifty-ton box cars, 200 fifty-ton hoppers and 100 seventy-ton flat cars.

Navy, 28 forty-ton flat cars and 15 forty-ton box cars for Oakland, Calif., bids asked.

Navy, five 135-ton armored deck cars, two caboose cars and one rail motor car, for Dahlgren, Va., bids closed Feb. 27; also bids closed on that date for one combination passenger and baggage car.

Pittsburgh Railways, 100 trolley cars; bids Feb. 26.

Union Pacific, 1000 fifty-ton ballast cars, 1000 fifty-ton high-slide drop-bottom gondolas; bids asked.

**Structural Shapes**

Structural Shape Prices, Page 121

Structural fabricators, who have been working down backlogs in recent weeks, are filling up again on material for recently awarded war plants, with more projects close to bidding stage. Backlogs of steel piling are heavy, though inquiries have been lighter recently.

New business booked by the fabricating industry in January was about 12 per cent more than deliveries of completed work. New business booked in January was 37 per cent less than that booked in January, 1941, according to the American Institute of Steel Construction. Shipments in January were 4 per cent less than in the same month last year. During the last five months of 1941 the fabricating industry shipped each month more tonnage than was booked. Contracts closed in January involved

176,625 net tons, compared with 281,235 tons in January, 1941; shipments were 157,986 tons compared with 164,590 tons. Tonnage on books of fabricators for fabrication within the next four months totals 704,452 tons.

**SHAPE CONTRACTS PLACED**

3500 tons, aircraft plant, to Whitehead & Kales, New York.

3500 tons, power houses, various locations, including Texas, to Bristol Steel & Iron Works, Inc., Bristol, Va.; Stone & Webster Engineering Corp., Boston, contractor; material placed on f.o.b. works basis.

2300 tons, plant addition, General Electric Co., Pittsfield, Mass., to American Bridge Co., Pittsburgh.

2200 tons, power plant at Johnson City,

N. Y., for Atlantic Utilities Service Corp., Reading, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

2100 tons, machine tool building and miscellaneous facilities, Pratt & Whitney division, United Aircraft Corp., Hartford, Conn., to Bethlehem Steel Co., Bethlehem, Pa.

2000 tons, seven-story electric power building, Potomac Electric Power Co., Washington, to American Bridge Co., Pittsburgh, through Stone & Webster Engineering Corp., Boston; reinforcing bars to Carnegie-Illinois Steel Corp., Pittsburgh.

1600 tons, steel sheet piling, fitting out pier, navy yard, divided, Bethlehem Steel Co., Bethlehem, Pa., and Carnegie-Illinois Steel Corp., Pittsburgh; Sanders Engineering Co., Portland, Me., contractor.

1200 tons, estimated, buildings and fa-

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Strong steel for Strong castings is Strong-made from the highest quality scrap and pig iron obtainable—and it is always under the vigilant acceptance or rejection of the chemical laboratory.

Every moment of the melting is under the control of competent experts, long versed in the making of casting steel. Each heat is subjected to rigid chemical and temperature checks during the refining process and a running record is kept of the chemical and physical properties of every melt. Know the Strong way for your castings—write or wire now.

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**STRONG**



**TENSILE STRENGTH • ELONGATION**

**SHAPE AWARDS COMPARED**

	Tons
Week ended Feb 28.....	28,640
Week ended Feb. 21.....	14,661
Week ended Feb. 14.....	18,856
This week, 1941.....	34,101
Weekly average, 1942.....	23,901
Weekly average, 1941.....	27,373
Weekly average, Jan., 1942.....	21,786
Total, 1941.....	311,663
Total, 1942.....	191,205

Includes awards of 100 tons or more.

cillies for mine opening, Republic Steel Corp., Port Henry, N. Y., to Harris Structural Steel Co., New York.

960 tons, addition, airplane repair building, to Mosher Steel Co., Houston, Tex., \$94,959 f.o.b. cars, Duncan Field.

730 tons, power house, Baxter Springs, Kans., to Vierling Steel Works, Chicago.

700 tons, additional shop unit, Hyde Windlass Co., Bath, Me., to Lyons Iron Works, Inc., Manchester, N. H.

690 tons, gun roof, to Goodstein Iron & Steel Co., New York.

435 tons, buildings for Northwest Magnesite Co., Cape May, N. J., to Belmont Iron Works, Philadelphia, and Pittsburgh Bridge & Iron Works, Dochester, Pa.

375 tons, Crocker-Wheeler Electric Mfg. Co., Ampere, N. J., to J. G. Schmidt Co., Paterson, N. J.

340 tons, hangar, Republic Aviation Corp., Farmingdale, N. Y., to Jones & Laughlin Steel Service Corp., Long Island City, N. Y.; J. H. French Co., New York, contractor.

200 tons, miscellaneous defense construction, to Standard Steel Fabricating Corp., Seattle.

200 tons, building, Lombard Governor Corp., Ashland, Mass., to American Bridge Co., Pittsburgh; J. W. Bishop Co., Providence, R. I. contractor.

145 tons, slab forms, navy yard, to Phoenix Bridge Co., Phoenixville, Pa.

130 tons, repairs, bunker 6, Jersey Central P. & L. Co., Sayreville, N. J., to American Bridge Co., Pittsburgh.

130 tons, administration building and laboratory, U. S. Horticultural station, Beltsville, Md., to Bethlehem Steel Co., Bethlehem, Pa.; J. D. Hedlin Construction Co., Washington, contractor.

tion Co., Washington, contractor.

105 tons, boiler supports, Kansas City, Mo., to Kansas City Structural Steel Co., Kansas City, Mo.

100 tons, shapes and bars, control tower and boilerhouse, to Guibert Steel Co., Pittsburgh, and Dietrich Bros., Baltimore, through C. Walter Tovell Inc., Baltimore.

#### SHAPE CONTRACTS PENDING

3000 tons, building, Sperry Gyroscope Co., Lakeville, L. I., N. Y.; Stone & Webster Engineering Corp., Boston, contractor.

1600 tons, state bridge, Essex, Md.; Melwood Construction Co., New York, low on general contract.

630 tons, recreation building, Navy yard.

600 tons, pier shed, Pennsylvania railroad, Jersey City, N. J.; Allen N. Spooner & Son Inc., New York, contractor.

200 tons, pier shed, Jamaica, B.W.I.

150 tons or more, material for six roof structures, Grand Coulee power plant; Creamer & Dunlap, Tulsa, Okla., low \$15,300, to Denver.

135 tons, angles, channels, tees, navy yard, Portsmouth, N. H., schedule 6968; bids March 5.

Unstated, shed for crane runway at Coast Guard base; bids to Ketchikan, Alaska, March 3.

Unstated, steel tower Kelso-Longview loop, Fritz Ziebarth, Vancouver, Wash., low to Bonneville Power Administration, \$109,992.

Unstated, Rainier-Longview power transmission line for Bonneville Power Administration; Fritz Ziebarth, Vancouver, Wash., low at \$163,825, awarded.

Unstated, Willamette river crossing, steel tower line; C. J. Montag & Sons, Portland, low to Bonneville Power Administration, \$98,910.

Unstated, steel transmission towers, Tacoma municipal system; bids March 16.

### Reinforcing Bars

Reinforcing Bar Prices, Page 121

Shipments of reinforcing bars are practically all above A-3 rating, though some is moving at that level. Demand is steady, nothing being accepted except at high rating. Private projects are not being pushed in face of the fact deliveries cannot be obtained. Considerable new building for war purposes is coming out, for which reinforced construction is specified.

#### REINFORCING STEEL AWARDS

600 tons, lifting-out pier, navy yard, to Bancroft & Martin Rolling Mills Co., Portland, Me.; Sanders Engineering Co., Portland, contractor; Bethlehem Steel Co., Bethlehem, Pa., to roll bars.

400 tons, aluminum plant in Pacific Northwest (Tacoma) to Bethlehem Steel Co., Seattle.

400 tons, Pratt & Whitney division Unit-

#### CONCRETE BARS COMPARED

	Tons
Week ended Feb. 28.....	2,175
Week ended Feb. 21.....	3,469
Week ended Feb. 14.....	6,813
This week, 1941.....	7,274
Weekly average, 1942.....	7,441
Weekly average, 1941.....	13,309
Weekly average, Jan., 1942....	11,394
Total, 1941.....	83,561
Total, 1942.....	59,532

Includes awards of 100 tons or more.

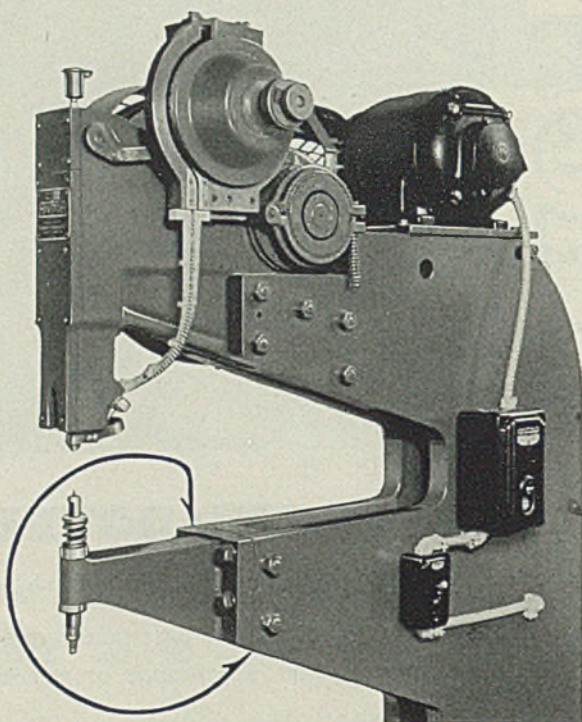
# 1" DIA. SOLID STEEL RIVETS

## 4 automatically fed and set at rates averaging 1600 per hour

Not only does this RIVITOR handle the 1/4" rivets but also (with different tooling) as efficiently handles the lighter riveting down to 1/16" diameter rivets. This greater capacity meets requirements of a greater number of jobs.

Work requiring up to 36" throat depths can be accommodated.

The detachable horn permits simple application of a variety of lower tooling designs. This machine's sturdy, rugged construction throughout provides, with minor replacements, it extended life to make full use of its versatility for riveting production now and from (practically) now on.



## "RS" RIVITOR

The average rate of 1600 rivets set per hour may be raised or in some cases lowered depending on the ease with which the work can be handled. The riveting stroke is made at the rate of 190 per minute (flywheel speed).

write for Bulletin R-4

THE TOMKINS-JOHNSON CO., 611 N. Mechanic Street, Jackson, Michigan

*this is a* **TOMKINS-JOHNSON** *product*

ed Aircraft Corp., West Hartford, Conn., to Truscon Steel Co., Youngstown, O., through James Stewart & Co., New York.

340 tons, administration building and laboratory, U. S. Horticultural station, Beltsville, Md., to Capitol Steel Co., New York; J. D. Hedin Construction Co., Washington, contractor.

300 tons, addition to St. Elizabeth's hospital, Washington, to Ceco Steel Products Corp., New York, through M. Shapiro Construction Co., New York.

135 tons, addition, airplane repair building, to Alamo Iron Works, San Antonio, Tex., \$10,567 f.o.b. cars, Duncan Field.

Unstated, additional defense projects in Pacific Northwest, to Bethlehem Steel Co., Seattle.

#### REINFORCING STEEL PENDING

1275 tons, overpass, Fourteenth street at Maine avenue, Washington; National Excavators and Structures Corp., New York, low.

600 tons, two housing projects, Jersey City, N. J.; bids March 6.

110 tons, including bar steel, Navy requirements; bids March 7 and March 9.

Unstated, cantonment projects in Pacific Northwest; bids to United States engineer, Portland, Oreg.

### Pig Iron

Pig Iron Prices, Page 122

Various factors in the pig iron market indicate approaching shortening in supply. Emergency requirements are increasing and necessity for relining of stacks within the next few weeks or months will reduce production, although the latter difficulty may be minimized by scheduling repair work to avoid too many furnaces being out at the same time. Reduction of large inventories is expected to bring into the market several large consumers who have not required allocated iron in the past. It is believed April will begin to show effects of the latter.

Major curtailment in consumer goods production is shown in pig iron requirements by their producers. General level of priorities for March shipment are higher as a larger number of melters obtain war work. The machine tool industry shows continuing demand for castings.

Shippers in the East meet some difficulty in obtaining suitable cars for pig iron shipment, though the shortage has not been sufficient to delay movement materially. All-water shipment of southern iron to the northeastern seaboard has practically ceased, though some continues to be sent by water as far as Norfolk, Va., continuing by rail. Southern shippers are understood to be absorbing the difference in freight cost.

All classes of foundries in New England, with the possible exception of those connected with the stove industry, are engaged close to capacity. Shops supplying the machine tool industry in that area have heavy backlogs and are melting at capacity on high ratings. Ratio of demand for malleable grades tends upward and there is constant minor juggling of analysis on this as well as other grades.

### Scrap

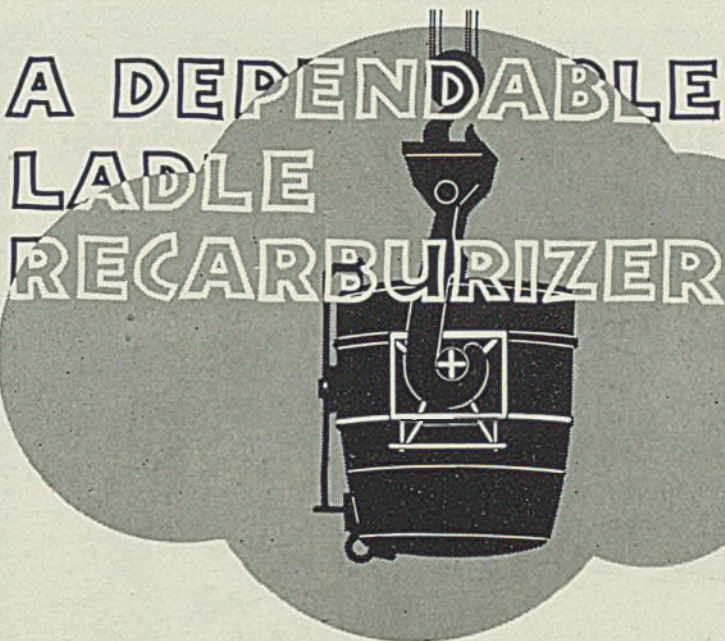
Scrap Prices, Page 124

Freight car shortage, especially in the East, is beginning to appear as a factor in movement of scrap and a growing number of instances have appeared where shipments have been delayed because cars could not be obtained promptly. This has not been sufficiently marked to affect steelmaking, as both scrap and pig iron have been moved in sufficient tonnage to maintain existing production rates. Scrap sellers claim continuation of this trend will soon make itself felt.

More intensive efforts are being put forth to dislodge scrap from

farms, the Department of Agriculture organizing campaigns in various counties to enlist the help of farmers in putting their accumulations in the hands of dealers. A representative plan includes circularizing farms, explaining the need for scrap, stating the price to be paid at the farm or delivered to dealer yards. A leading manufacturer of agricultural implements has urged its several thousand dealers to become receivers of scrap from farmers. Abandoned oil well equipment is also being sought in areas where wells have ceased to yield.

The campaign to move material from automobile wrecking yards is bringing increasing results, with



Open hearth shops called upon to work within close carbon ranges appreciate the special effectiveness and efficiency obtained when recarburizing with No. 8 Mexican Graphite.

Quiet and dependable . . . containing no sulphur or harmful impurities . . . No. 8 Mexican Graphite keeps steel hotter and reduces oxidation losses. Absolute 80% carbon recovery insures steel quality . . . quiet action insures safety against fire hazards. Conveniently packaged, clean to store and easy to use . . . write for prices and particulars.



THE UNITED STATES GRAPHITE  
SAGINAW

NO. 8  
MEXICAN  
GRAPHITE  
CO.  
MICH.

the greater part of tonnage yet to come out. Pressure is being put on dealers and wreckers to co-operate and much progress is being made. Necessity for commandeering stocks appears unlikely as a rule, most owners conforming to the plan for selling.

Associated Metals & Materials Corp., New York, made the best offer for wrecking the Atlantic avenue section, Boston Elevated railroad, \$49,100, approximately 9000 tons of heavy melting structural steel scrap and rails being included. There were 18 bidders. Cleveland Wrecking Co., Cincinnati, offered \$43,765, and the combination bid, Charles Dreifus Co. and Newton Iron & Steel Corp., Brooklyn, was third best at \$43,576.50.

## Warehouse

Warehouse Prices, Page 123

Steel sales by warehouses are shrinking and while the total for February will not show a heavy decline the loss will be noticeable in most cases and March is expected to show a further falling off. The general warehouse situation is becoming increasingly difficult, due to continued recession in deliveries from mills. Some sheets bought originally for automobile body production in the East have been resold, part going to jobbers. This practice may be interfered with by order of the director of industry operations that sales of such surplus can be made only on orders bearing high preference ratings.

Amendment No. 3 to steel warehouse price schedule No. 49 was expected to be made public over the week-end. It was to contain two changes in wording, prohibiting steel warehouses from accepting deliveries of steel in excess of their assigned quantity from any person or company. Another provision of the amendment permits warehouses to accumulate preference ratings up to 90 days in order to place an order in a minimum commercial quantity.

## Pacific Coast

Seattle—Opening of bids for heavy electric equipment for the Bonneville power system featured the week. General Electric Co. was low at \$1,900,290, for furnishing 25,000-kva. transformers for Ampere, Covington and Spokane; Allis-Chalmers Mfg. Co. is low at \$1,192,000 for ten 20,000/26,667-kva. transformers for Longview station, and Westinghouse low at \$867,100, for furnishing 12 circuit breakers for Ampere station. Awards are expected shortly.

One of the largest projects, a major cantonment in the Pacific Northwest brought a joint bid of \$27,500,000, to Col. C. R. Moore, United States engineer, Portland, Ore. The award was made at once and construction will proceed without delay. The job includes unstated tonnages of reinforcing bars and cast iron pipe and a small lot of shapes. The joint bidders include Sound Construction & Engineering Co., Seattle; Peter Kiewit & Sons, Omaha; Morrison-Knudsen Co., Boise, Idaho, and Ford Twait & Griffin Co., Los Angeles. A second major project of like nature was opened Feb. 28.

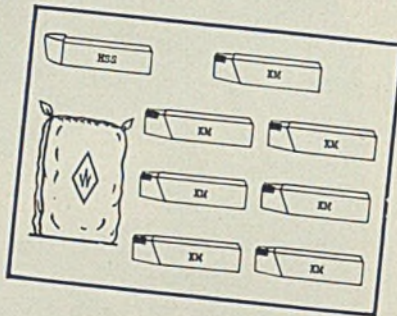
Twelve pattern works, machine shops and other metalworking plants in Seattle have pooled plant and other facilities under the corporation name of Machine & Metal Mfrs. Association. These shops have been busy only intermittently. The plan is to take subcontracts for defense work and to allocate to the best advantage so that equipment and facilities may be used to capacity. A central assembly plant will be established. Three major machine pools, formed by Oregon firms, report having contracts for \$30,000,000. Eight machine pools are reported operating in that area.

Heavy girders and beams are being salvaged from the high steel trestle at Grand Coulee dam, over which concrete was carried. In the original structure 9600 tons of shapes were used but much of this has been covered with concrete. The salvaged material is being shipped to Pacific Coast shipyards, 1000 tons already having been forwarded.

The scrap situation is not improved. Receipts of steel and cast iron are well under requirements, the latter being particularly scarce. An advance of 50 cents a ton has failed to increase receipts. Foundries are facing an acute shortage, instances being cited where plants

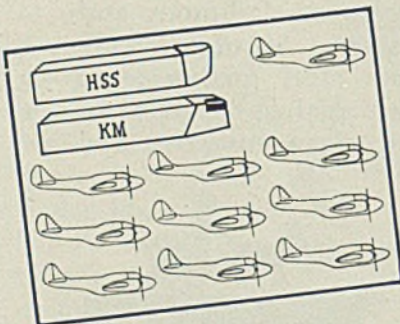
# Machine 60 times More Steel per pound of Tungsten Consumed

with **KENAMETAL** carbide-tipped tools



A 100 lb. bag of 70% wolframite will make 140 tungsten steel tools weighing 2.1 lbs. each, or 1000 KENAMETAL-tipped tools of the same size having tips weighing 22.5 grams each. Seven times more KENAMETAL tools can be made per pound of tungsten consumed, as shown at right.

Each of the above KENAMETAL tools will turn, bore, or face nine times more steel parts during its useful life as 18% tungsten steel tools (see chart below). By simple multiplication ( $7 \times 9 = 63$ ), it can be seen that KENAMETAL tools will machine more than 60 times as many steel parts per pound of tungsten consumed than will 18% high speed steel tools.



You can do your part to conserve tungsten and speed up production by specifying KENAMETAL-tipped tools on your steel turning, boring and facing jobs. Furthermore, the savings in machining time and tool costs resulting from the use of KENAMETAL will help you reduce production costs to meet post-war competition. Send for our Catalog No. 42.

KENAMETAL costs no more than other carbides. Write for Price List No. 7 containing new low prices on tools and blanks, effective Jan. 5, 1942.

SALES REPRESENTATIVES FROM COAST TO COAST



fully engaged in defense contracts have no cast scrap. Rolling mills are reducing raw material stocks but receipts continue unsatisfactory.

## Canada

**Toronto, Ont.**—One of the most important advances in steel prices in more than two years was announced by Algoma Steel Corp. Ltd., increasing price on bars, sheets, grinding balls and track materials \$5 per ton. The increase is understood to have approval of the government, but other producers have not announced similar action. While rumors have been in circulation for some time regarding higher prices for steel, nothing definite appeared until the official announcement by Algoma. Rumors also have been heard regarding higher prices for pig iron, but to date no action has been taken.

Demand for all classes of finished and semifinished steel continues heavy and mill representatives report a flood of orders, almost exclusively associated with war effort. Sales are widely diversified, and with mills operating at capacity and backlogs sufficient for months, delivery dates are uncertain and may be quoted anywhere from six weeks to four months.

It is reported that Dominion Steel & Coal Corp. Ltd., Sydney, N. S., will be ready to start its plate mill about April 1, and the first plates will be shipped to rolling stock builders to enable them to make cars available to railroads for handling war materials. Announcement also has been made that Dominion Foundries & Steel Ltd., Hamilton, Ont., is about to place contracts for further addition to its plate mill. At present practically all plates produced in Canada are going into shipbuilding and war tank construction, and supply is well below demand.

As a result of shortage of steel the city of Toronto has been forced to put off indefinitely construction of its proposed \$5,600,000 sewage disposal plant. Previously arrangements had been made with Burlington Steel Co., Hamilton, Ont., for 1950 tons of reinforcing steel, but M. A. Hoey, deputy steel controller, now states that there is little prospect that Toronto will be permitted the necessary steel during 1942.

Demand for merchant bars continues to expand and mills find more difficulty in taking care of most pressing war demands, with nothing available for nonessential activities.

Structural steel lettings are increasing steadily with some big awards pending. Awards for the past week were reported at better than 10,000 tons, although most orders held to 700 tons or less. The government has announced several large war projects recently for which heavy tonnages of steel will be required despite the fact that steps have been taken to eliminate steel wherever possible in plant construction.

Merchant pig iron demand is be-

coming more active. Melters, unable to obtain scrap, are making more pressing demands for foundry and malleable grades, which are urgently needed to maintain war production. With demand in excess of supply blast furnace operators have no opportunity to build reserves.

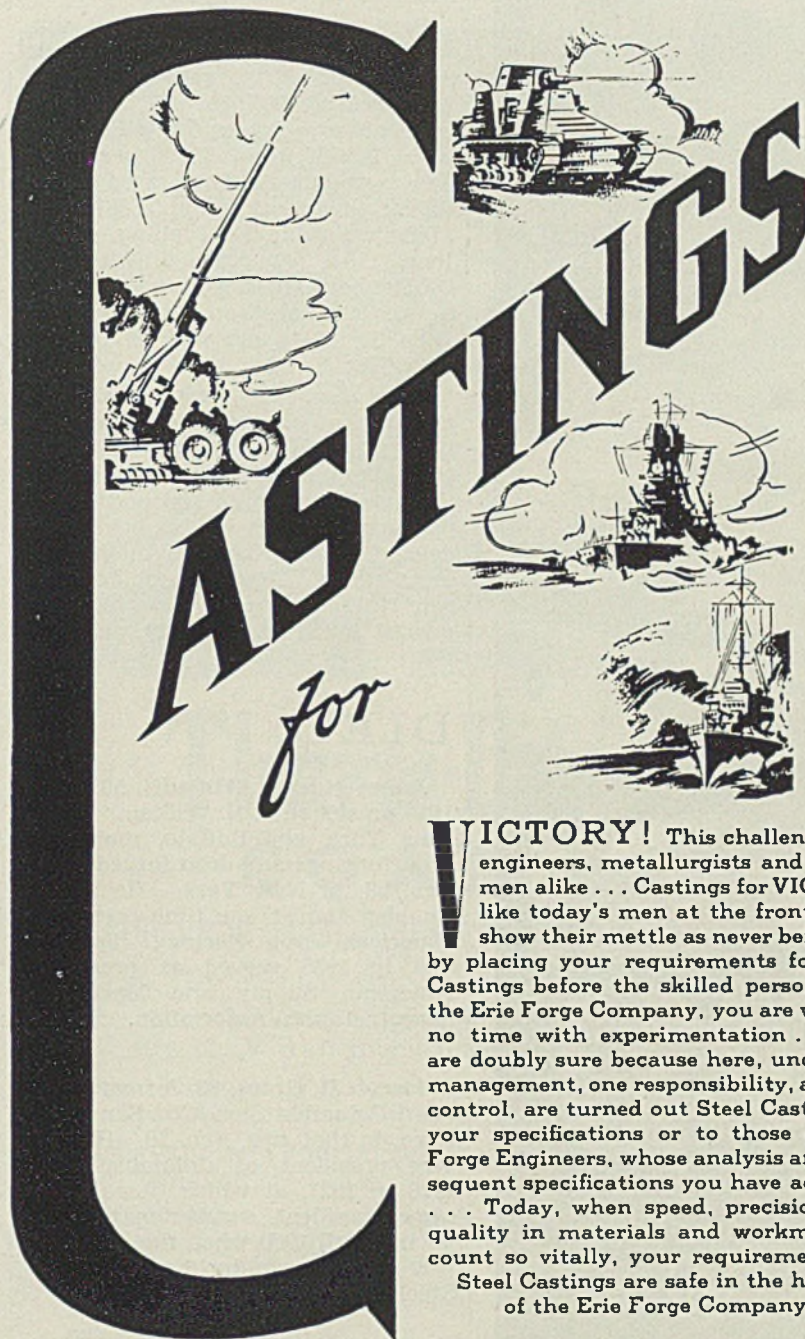
In iron and steel scrap some improvement is reported and dealers again are back to schedule on deliveries. Practically all the improvement is in steel grades, only small quantities of cast and stove plate appearing. No. 1 heavy melting steel is scarce, but larger tonnages of turnings, borings, No. 2 heavy melting and similar grades

are appearing. Foundries are pressing dealers to obtain cast scrap. Supply of iron scrap materials is shrinking rapidly and offerings are far below consumers' requirements.

## Steel in Europe

Foreign Steel Prices, Page 123

**London**—(By Cable)—Little change has taken place in the steel and iron position in Great Britain. Demand for steel plates and special alloys still is expanding. High-speed tungsten steel now is obtainable only under license. Producers of black sheets are active and remaining tin plate mills are well occupied.



**CASTINGS**  
*for*  
**VICTORY!**

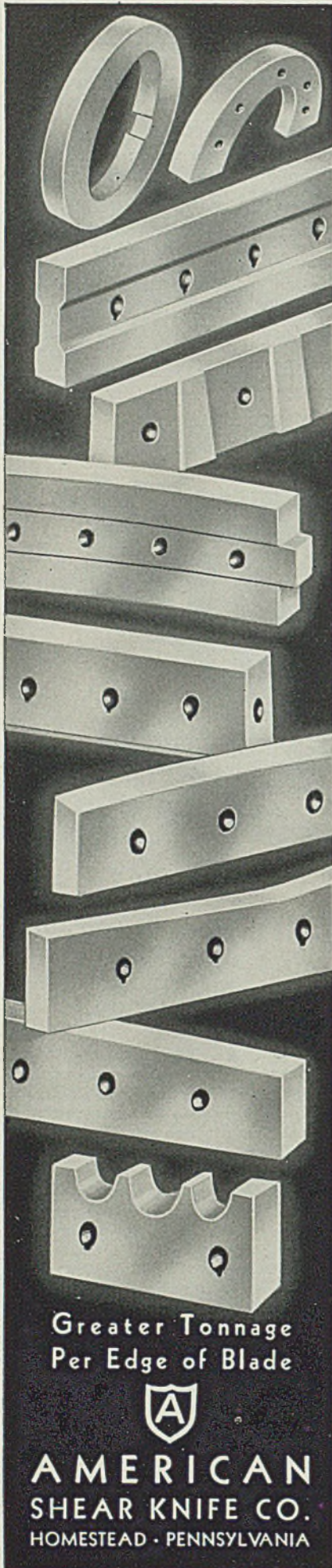
This challenge is to engineers, metallurgists and craftsmen alike . . . Castings for VICTORY like today's men at the front, must show their mettle as never before . . . by placing your requirements for Steel Castings before the skilled personnel of the Erie Forge Company, you are wasting no time with experimentation . . . you are doubly sure because here, under one management, one responsibility, and one control, are turned out Steel Castings to your specifications or to those of Erie Forge Engineers, whose analysis and subsequent specifications you have accepted . . . Today, when speed, precision, and quality in materials and workmanship count so vitally, your requirements for Steel Castings are safe in the hands of the Erie Forge Company.



**ERIE FORGE COMPANY, ERIE, PA.**



★ ★ ★ ★ ★ ★ ★ ★



## January Steel for Sale 7.82% Above Year Ago

Steel produced for sale in January totaled 5,567,539 net tons, compared with 5,557,210 tons in December and 5,163,912 tons in January, 1941, the American Iron and Steel Institute reports. This is a gain of 10,329 tons over December and 404,027 tons over a year ago, 7.82 per cent.

Shipments to other members of the industry for further conversion into finished products in January were 397,172 tons, compared with 382,814 tons in December and 300,543 tons in January, 1941.

Bars constituted the largest tonnage, 1,059,525 tons, at the rate of 91.7 per cent of bar capacity. Sheets were second, 908,579 tons, 81.7 per cent of capacity and plates third with 713,182 tons, 118.2 per cent. Other production above rated capacity included black plate, 51,887 tons, 178.5 per cent; steel piling, 38,099 tons, 119.9 per cent; drawn wire, 200,987 tons, 100.7 per cent. These figures are based on capacity as of June 30, 1941, and will be revised as of Dec. 31, 1941.

Total companies on whose reports the Institute bases its figures number 196. During 1940 these companies represented 97.9 per cent of the total output of finished rolled products. Export figures have been deleted in accordance with government policy. Exports for November, 1941, and prior months appeared in STEEL, Dec. 29, page 24.

## DIED:

**James Harvey Williams, 59**, since 1916 president, J. H. Williams & Co., New York and Buffalo, maker of drop forgings and drop forged tools, Feb. 23, in New York. He was a founder and at one time president, American Drop Forging Institute, and in 1935 served as president, American Supply and Machinery Manufacturers Association.

**Joseph D. Grant, 83**, former president, Columbia Steel Co., San Francisco, in that city, Feb. 19. He was vice president of Columbia from 1920 to 1927, at which time he became president, serving in that capacity until 1930 when the company was taken over by United States Steel Corp.

**Harry W. Griffith, 66**, secretary, Briggs Mfg. Co., Detroit, Feb. 21, in Detroit. Before going to Detroit in 1924 he was vice president and general manager, Delco-Remy Co., Anderson, Ind.



## Guard YOUR WATER SUPPLY SYSTEM

Beware of sabotage! Remember, in an emergency, your water system may save highly valuable materials, buildings and even lives.

Neglect is almost as destructive as sabotage. If your water supply system is not in tip top order, call in Layne and have necessary repairing and reconditioning done at once. Materials, except for strictly war work, may not be available later. Maintaining present equipment is real conservation.

If you require more water, arrange for additional wells and pumps without delay. Better call in a Layne engineer. He will cooperate with you in planning your additional water supply so as to use the minimum amount of materials essential to war work, yet give you an adequate, efficient and long lived installation. Layne wells and pumps are designed for your requirements regardless of size. They are noted for their high efficiency and trouble free service. They are serving all types of industries, municipalities both large and small, army and navy needs, training camps, flying fields and munitions plants.

Write, wire or telephone for further facts.

LAYNE & BOWLER, INC.  
Memphis, Tennessee

LAYNE  
PUMPS & WELL  
WATER SYSTEMS

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Layne-Arkansas Company.....	Stuttgart, Ark.
Layne-Atlantic Company.....	Norfolk, Va.
Layne-Central Co.....	Memphis, Tenn.
Layne-Northern Company.....	Mishawaka, Ind.
Layne-Louisiana Company.....	Lake Charles, La.
Layne-New York Co.....	New York City.
Layne-Northwest Company.....	Milwaukee, Wis.
Layne-Ohio Company.....	Columbus, Ohio
Layne-Texas Company.....	Houston, Texas.
Layne-Western Company.....	Kansas City, Mo.
Layne-Western Co. of Minn.....	Minneapolis, Minn.
Layne-Bowler New England Corp.....	Boston, Mass.
International Water Supply, Ltd.....	London, Ont.

WORLD'S LARGEST WATER DEVELOPERS

## Nonferrous Metal Prices

Feb.	Copper			Straits Tin, New York		Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Anti-mony Amer Spot, N.Y.	Nickel Cathodes
	Electro, del. Conn.	Lake, del. Midwest	Casting, refinery	Spot	Futures						
1-27	12.00	12.12 1/2	11.75	52.00	52.00	6.50	6.35	8.25	15.00	14.00	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
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### Wire

Yellow brass (high)	19.73
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### OLD METALS

#### Dealers' Buying Prices

#### No. 1 Composition Red Brass

New York	9.50
Cleveland	9.25-9.50
Chicago	9.50
St. Louis	9.50

#### Heavy Copper and Wire

New York, No. 1	10.00
Cleveland, No. 1	10.00
Chicago, No. 1	10.00
St. Louis	10.00

## Nonferrous Metals

**New York**—Vast expansion of the nation's aluminum and magnesium production facilities was announced last week by WPB. Aluminum facilities now in operation plus those under way and due to start production soon call for reaching a top rate of 1,450,000,000 pounds of annual capacity. This will be increased to 2,100,000,000 pounds a year compared with 1941 output of 615,000,000. Production this year is expected to exceed one billion pounds. In addition, imports of Canadian aluminum are expected to aggregate 250 million pounds this year and 400,000,000 pounds in 1943.

**Copper**—Fabricators consumed 126,000 tons of copper in January and were short 309,356 tons at the month-end.

**Lead**—Refinery output is now on an annual basis of 636,000 tons and may rise to 825,000 tons, due mainly to stimulation derived from the premium price arrangement for over-quota production.

**Zinc**—Smelter output is maintaining a rate of about 948,000 tons per year and will be stepped up to over 1,000,000 for the full year.

**Tin**—Consumption in the United States likely will be cut below 50,000 tons per year compared with 99,380 tons in 1941 and 74,050 in 1940. Use in tinplate is being cut around 40 per cent and use in other applications probably will be reduced even a greater percentage.

Lead	
New York	5.25-5.00
Cleveland	5.40-5.50
Chicago	5.25-5.60
St. Louis	5.25-5.35

### Old Zinc

New York	5.00-5.25
Cleveland	5.25-5.50
St. Louis	4.50-5.00

### Aluminum

Old castings	10.50
Segregated borings	8.50
Old sheet	10.50
Clips, pure	9.50

Composition Brass Turnings	
New York	9.25

### Light Copper

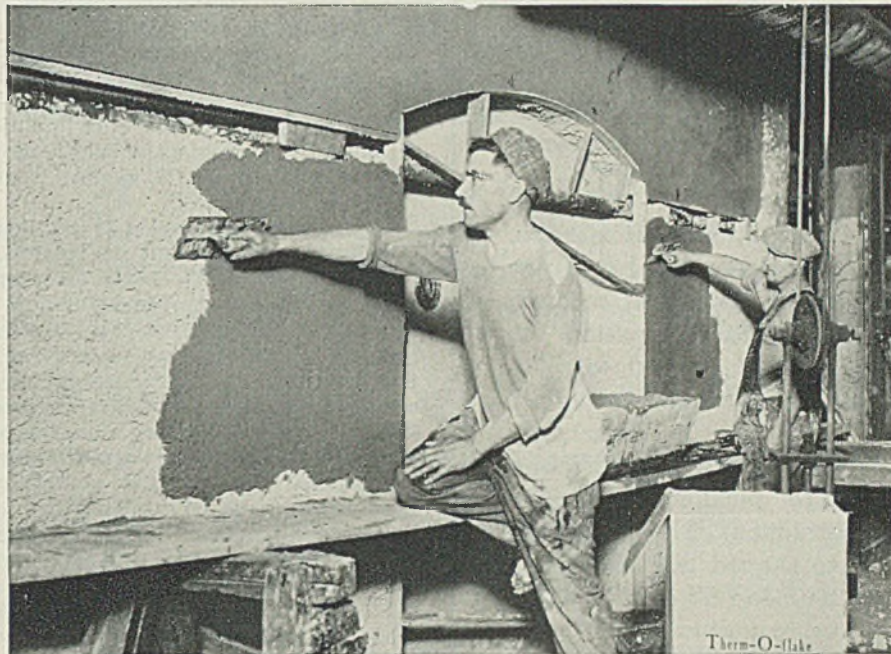
New York	8.00
Cleveland	8.00
Chicago	8.00
St. Louis	8.00

### Light Brass

Cleveland	6.25-6.50
Chicago	6.50
St. Louis	6.50

### SECONDARY METALS

Brass ingot, 85-5-5-5, l.c.l.	13.25
Standard No. 12 aluminum	14.50



# Therm-O-flake COATING

## SUPERIOR HIGH TEMPERATURE INSULATION

Keeps heat inside, with a coating of plastic insulation.

One inch thickness equivalent to about nine inches of fire brick wall in insulation value.

More economical in cost and installation, on existing furnaces, than walls of insulation brick.

Easily applied and largely reclaimable for re-use, after removal.

Most widely used material for high temperature insulation, up to 2000°F.

Write for Information and Prices

Other Therm-O-Flake Products

Made from Exfoliated Vermiculite

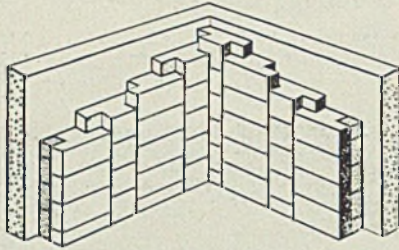
Granules, Brick, Block, Concrete



JOLIET, ILL.

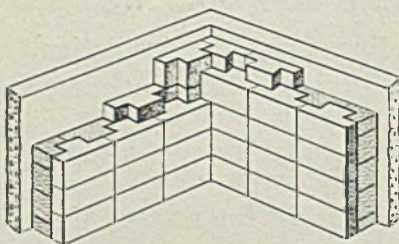
# Keagler-Nukem

## MONOLITHIC CONSTRUCTION BRICK SHAPES



SHOWING SINGLE BRICK LINING  
(PATENT APPLIED FOR)

Here is a new brick shape, manufactured of fire clay by the deairated method, and highly resistant to acid. It guarantees maximum strength of acid proof wall, and is particularly adapted for high temperature pickling tank construction. The bricks are so shaped that walls may be made 5" or 8" without using additional brick. The type shown above is especially adapted as a sheathing for steel rubber-lined tanks, concrete shell tanks, acid pits or wooden tanks. Samples and catalogs sent on request.



SHOWING DOUBLE BRICK LINING  
(PATENT APPLIED FOR)

### KEAGLER BRICK CO.



STUEBENVILLE, OHIO

## Labor

(Concluded from Page 31)

& Refining Co., St. Louis, retroactive to Nov. 4.

Louis C. Cates, Phelps Dodge president, interpreted the decision affecting his company as "determining not alone a purely local issue but establishing a basis for employer-employee relationships which can only serve to further the production efforts of the nation."

However, William H. Davis, WLB chairman, assured Philip Murray, CIO president, that he and the board had "an open mind" in the dispute of the SWOC and independent steel companies.

Mr. Murray had complained to Mr. Davis that "certain government and industry officials" had joined in a "premeditated publicity campaign" designed to prejudice the public mind and, if possible, the War Labor Board" against SWOC demands on the steel companies.

His action followed the publication by the independent steelmakers of their reaction to Davis proposal that the "Marshall Field formula" be applied to the steel case (STEEL, Feb. 23, p. 23). Mr. Davis "deplored" the procedure of the steelmakers' announcing their position before hearings opened before the board despite the fact the steelmakers' statements were called forth by Washington advices indicating he had already decided on the settlement formula—before the hearings started.

Mr. Murray's reference to government officials apparently referred to Price Administrator Henderson's statement to the WLB warning against wage increases which would increase the inflation peril.

Mr. Davis backed away from the report the board intended to offer the "Marshall Field formula" as a basis of settlement of the steel controversy, and said his open mind would be retained until he knew all the facts and heard the full discussion.

Mr. Davis incidentally announced that in the future all hearings before the full board would be open to the public.

"The practice by public bodies of holding open hearings is one of the hallmarks of democracy" Mr. Davis said in commenting on the change in procedure. "Because of the national agreement between labor and management that there shall be no strikes or lockouts for the duration of the war and that all disputes shall be settled by peaceful means, the decisions of the board have a quasi-judicial character."

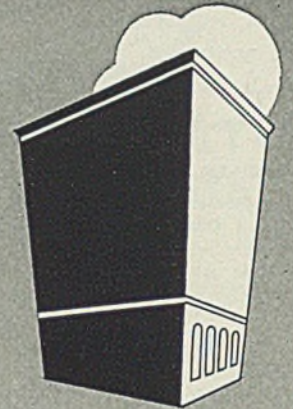
Preliminary hearing by the panel which will consider the case of the SWOC and the independent steel companies was held last Thursday

to determine procedure. No statement was available as to the procedure agreed upon.

Members of the panel are: Chairman, Arthur S. Meyer, of the New York state board of mediation; Cyrus Ching, vice president, United States Rubber Co.; and Richard T. Frankenstein, director of aircraft organization, United Automobile Workers.

## Submits Proposed Minimum For Structural Wages

Industry committee for fabricated structural steel industry, of which



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CHARLES H. LOTT  
General Manager



Robert B. Thomas is chairman, has submitted to the Public Contracts Board, Labor Department, its recommendations in connection with the determination of the prevailing minimum wages in that industry under the Walsh-Healy act.

The industry committee recommended wages all the way from 35 cents an hour to 62½ cents. The 62½-cent rate was for the Northwest and some parts of Pennsylvania, Ohio and Michigan. Parts of New York would bear a 60-cent rate, while other parts of New York would be on a 55-cent rate along with Massachusetts, Rhode Island, Connecticut, New Jersey and parts of Pennsylvania and Illinois.

A 50-cent rate was suggested by the industry committee for Wisconsin, Minnesota, Iowa, and parts of Ohio, Michigan, Illinois and Missouri, while a 45-cent rate was asked for Montana, Wyoming, North and South Dakota, Nebraska, Kansas, Oklahoma, Arkansas, Delaware, Maryland, and the District of Columbia, 40-cent rate for Maine, New Hampshire, Vermont, Kentucky, West Virginia, Virginia, Tennessee, and part of Alabama, with a 30-cent rate in North and South Carolina, Georgia, Florida, Mississippi, Louisiana, and Texas.

#### Steel Industry Operating On Four-Crew System

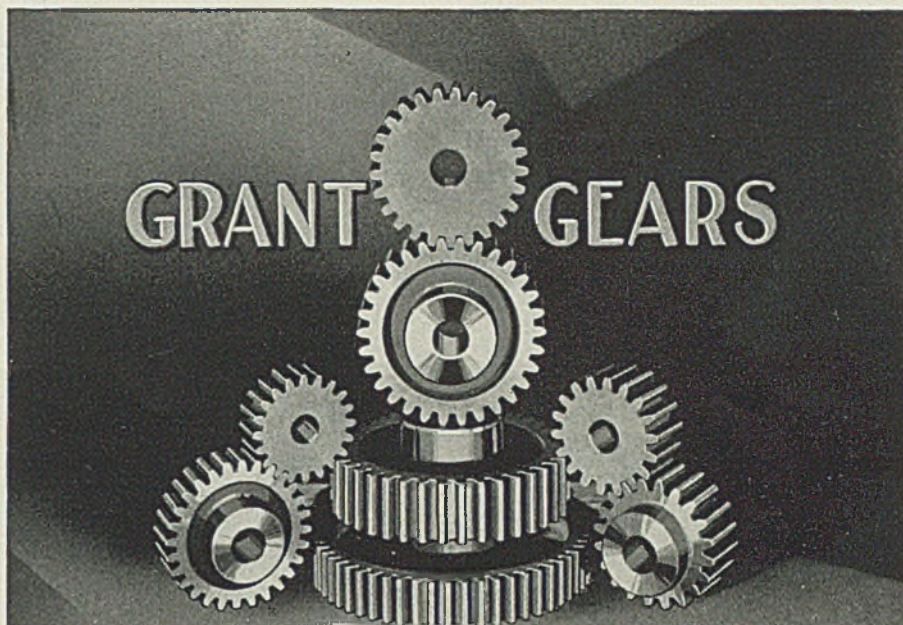
To maintain maximum production of steel needed for the war, steel mills have generally adopted the four-crew or "swing-shift" system of scheduling work, according to the American Iron and Steel Institute.

Under this system, the industry has operated 24 hours each day. It permits each worker to have 48 hours off at the end of approximately 40 hours of work, each week.

The four-crew system, adopted months ago by most steel companies, necessitated the employment of thousands of additional workers when steel operations rose to capacity at the beginning of the defense emergency. Between August, 1939, and December, 1941, employment in the steel industry rose from 458,000 to 646,000 persons, a gain of 188,000.

Under the swing-shift system, each crew of workers takes turns on the three eight-hour periods into which each day's work is divided. Only three crews are needed on any one day. The fourth crew is needed to fill in during the days off periods of the various crews.

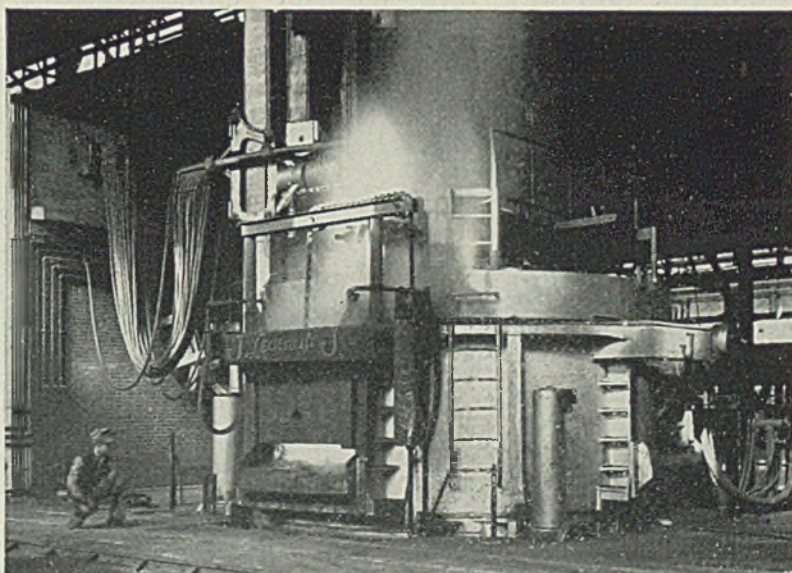
Numerous variations of the swing-shift system have been developed in the steel industry.



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# Construction and Enterprise

## Michigan

ADRIAN, MICH.—Bohn Aluminum & Brass Corp., 1400 Lafayette building, Detroit, has awarded general contract to Kreighoff Co., Detroit, for construction of plant here, estimated to cost \$1,415,000. Buckheit & Stuchell, Detroit, architects. (Noted Dec. 1).

DETROIT—O. W. Burke Co., Fisher building, Detroit, has general contract for an addition and alterations to factory building of Ex-Cell-O Corp., 1200 Oakman boulevard.

DETROIT—Fisher Boat Works Inc.,

9666 East Jefferson, has let contract to Darin & Armstrong Inc., 2041 Fenkel street, for construction of \$20,000 assembly building.

DETROIT—Contract has been awarded to Campbell Construction Co., 3255 Goldner, for a \$40,000 factory addition for Buhl Land Co., Buhl building.

DETROIT — L. B. Jameson, Hamtramck, Mich., architect, is preparing revised plans for tool shop for Falcon Tool Co., Greiner and Harburg streets. (Noted Feb. 23).

DETROIT—Continental Aviation & Engineering Corp. is having Giffels & Vallet

Inc., 1000 Marquette building, prepare sketches for an addition to its factory.

DETROIT—Enterprise Engineering & Mfg. Co. has been incorporated with \$50,000 capital to engage in general manufacturing. Correspondent: John Edgar Van Tuyl, 1206 Atkinson avenue.

DETROIT—Development Engineering Co., 2901 Chene street, has been organized to manufacture machine tools. Correspondent: W. H. Bagley Jr., 18026 Cherrylawn.

FLINT, MICH.—General contract has been awarded Thorgerson & Ericksen, Chicago, for construction of \$10,000,000 aluminum foundry here for Buick Division of General Motors Corp. Albert Kahn Associated Architects & Engineers Inc., Detroit, in charge.

GRAND RAPIDS, MICH.—Fisher Body Division of General Motors Corp., Detroit, is taking figures for an addition to its Grand Rapids Stamping Division plant.

JACKSON, MICH.—Jackson Automatic Products Corp., 202 Security building, Jackson, has been organized to manufacture screw machine products. Correspondent: Cleon D. Gauss, 336 East South street.

LANSING, MICH.—Giffels & Vallet Inc., 1000 Marquette building, Detroit, is preparing plans for extensions to the motor parts division plant of Nash-Kelvinator Corp. here.

LUDINGTON, MICH.—Dow Magnesium Corp., an affiliate of Dow Chemical Co., Midland, Mich., will soon start construction of \$20,000,000 plant here to extract chemicals from brine for manufacture of magnesium metal. Austin Co. is general contractor. The project is to be financed by Defense Plant Corp.

MUSKEGON HEIGHTS, MICH.—Morton Mfg. Co., Muskegon Heights, has let general contract to Strom & Strom, Muskegon, for an addition to its factory. Emil Zillmer, Grand Rapids, Mich., architect.

SAGINAW, MICH.—Eaton Mfg. Co., Saginaw, has awarded contract to Fred C. Trier Construction Co., 1401 Brockway street, for one-story factory, estimated to cost \$90,000. G. S. Rider, Terminal Tower, Cleveland, architect.

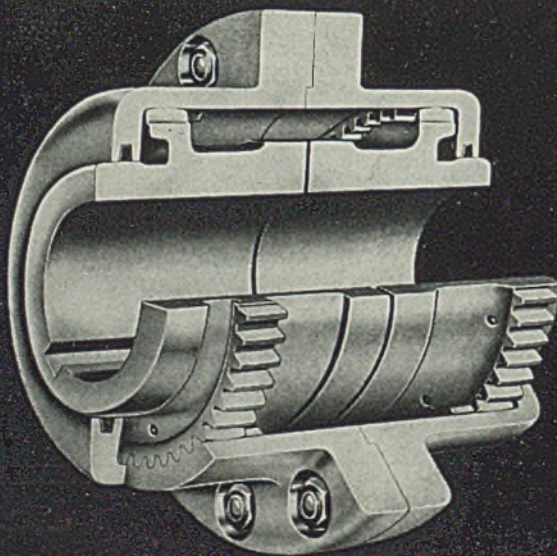
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# FLEXIBLE COUPLINGS

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## Connecticut

FAIRFIELD, CONN.—Bridgeport Molded Products Inc. will build one-story factory addition. Estimated cost \$60,000.

## Massachusetts

ATTLEBORO, MASS.—Larson Tool & Stamping Co., 1 Olive street, will build one-story 95 x 180-foot factory addition, and has let contract to Brask & Swanson & Son, 163 South Main street, Providence, R. I. Estimated cost \$75,000.

FITCHBURG, MASS.—Fitchburg Engineering Corp., 52 Oak Hill road, has let contract to J. B. Lowell Co., 173 Grove street, Worcester, Mass., for one-story 100 x 250-foot factory. (Noted Feb. 23).

WALTHAM, MASS.—Clifford Mfg. Co., 564 East First street, South Boston, has awarded contract for one-story 180 x 360-foot factory to Aberthaw Co., 80 Federal street, Boston. Estimated cost \$300,000. D. D. Eames, 739 Boylston street, Boston, engineer.

## New Jersey

NEWARK, N. J.—Bergen Machine & Tool Co. Inc. has been incorporated with 2500 shares of stock, with Harry Philpson as agent.

TRENTON, N. J.—Atlantic Alloy Steel Corp. has been incorporated with 2500

shares of capital stock. Corporation Bureau of New Jersey is agent.

TRENTON, N. J.—Thlokol Corp., maker of synthetic rubber products, has purchased a portion of the plant of Murray Rubber Co., and will use facilities for manufacture of airplane parts.

TRENTON, N. J.—Plant of L. A. Young Spring & Wire Corp. here has been sold to Defense Plant Corp. for war purposes.

#### New York

FALCONER, N. Y.—Swanson Machine Co., L. Swanson, president and manager. Jamestown, N. Y., will build one-story, 150 x 200-foot plant addition here, costing \$150,000.

#### Ohio

CANTON, O.—Hercules Motors Corp., 201 Eleventh street, is erecting \$15,000 factory building at present plant.

CINCINNATI — LeBlond Engineering Co., Harold R. LeBlond, president, plans addition to plant containing 44,000 square feet of floor space, to be used for machine tool assembly.

CLEVELAND—Davis Plywood Corp., 10800 Lorain avenue, E. F. Davis, president, has leased 5000 square feet of first floor at 10920 Madison avenue for storage purposes.

CLEVELAND—Alar Products Inc., 1032 East Sixty-second street, is being organized by E. G. Steffen, engineer, who will be president, and Charles A. Sanford, attorney, Fidelity building, who will be secretary, to engage in precision tool manufacturing.

CLEVELAND—Motch & Merryweather Machinery Co., Penton building, will house additional heat treating facilities in 4100-square foot addition to plant at 888 East Seventieth street. Albert B. Elmg is general manager.

CLEVELAND—Overly-Hautz Co., Harry W. Overly, president, is increasing production space with addition of 2800 square feet at 1966 West 115th street.

CLEVELAND—Cleveland Steel Products Co., 7306 Madison avenue, will build plant on newly acquired site at West 117th street and Carbon avenue.

COLUMBUS, O.—Banner Die Tool & Stamping Co., 1300 Holly avenue, has purchased an additional tract of land adjoining its present holdings, for future expansion.

MASSILLON, O.—Eaton Mfg. Co., 739 East 140th street, Cleveland, H. C. Stuessy, secretary, is adding to plant here.

WARREN, O.—Federal Machine & Welder Co., Charles H. Whittier, president, will build tank assembly plant here on Overland avenue. The 12,000-square foot building is expected to cost \$400,000, without machinery.

WOOSTER, O.—Gerstenslager Co., maker of truck bodies, will add \$9000 extension to present plant.

#### Pennsylvania

BRIDGEVILLE, PA.—Cyclops Division, Universal Cyclops Steel Corp., V. Grant Miller, vice president and works manager, H. G. Speasmaker, purchasing agent, has let contract for plant additions and improvements.

OAKMONT, PA.—Scaife Co., J. Verner Scaife, president, has let contract for 120 x 740-foot plant to Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh. Estimated cost \$500,000.

TITUSVILLE, PA. — Struthers-Wells-Titusville Corp. will erect one-story 81 x 500-foot heat treating and forge shop addition, costing approximately \$75,000.

Rogers Structural Steel Co., Corry, Pa., has general contract.

WILKES-BARRE, PA. — Wilkes-Barre Carriage Co. has let contract to Chatham Construction Co. for one-story 102 x 334 foot addition, costing over \$100,000.

#### Illinois

CHICAGO—Charles E. Larson & Sons Inc., 2645 North Keeler avenue, will erect a \$10,000 boiler room addition.

DECATUR, ILL.—Purchase of \$15,000 worth of machinery to equip a machine and general metal shop for Decatur high school has been approved by the school

board. William Harris is superintendent of schools.

FRANKLIN PARK, ILL.—City will spend over \$25,000 for elevated tank, water main extensions, pumping station, etc. W. L. Ashdown, Chicago Heights, Ill., engineer.

#### Indiana

ANDERSON, IND.—Philadelphia Quartz Co., 121 South Third street, Philadelphia, is rebuilding plant here at cost of \$50,000, including equipment.

COLUMBUS, IND.—Board of public works, F. C. Owens, mayor, has pre-



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liminary surveys for waterworks improvements and extensions, estimated to cost over \$300,000. Greeley & Hansen, 6 North Michigan avenue, engineers.

DECATUR, IND.—C. Brodbeck, superintendent of municipal waterworks, is considering filtration plant addition, new equipment lines, etc. Cost \$25,000.

RICHMOND, IND.—Belden Mfg. Co. is installing machinery to increase production of copper wire, cost of which is about \$200,000. Cost of addition, electrical station, new stoker and operating equipment is \$125,000.

#### Maryland

BALTIMORE—Baugh Chemical Co. has let contract to Leimbach & Williams Inc., 30 West Biddle street, for addition to building at 2400 South Clinton street. Cost \$10,000.

BALTIMORE—Leimbach & Williams

Inc., 30 West Biddle street, has contract for \$125,000 building at 3811 Dillon street for National Brewing Co. J. O. Chertkof, 207 West Franklin street, engineer.

BALTIMORE—American Can Co., 2723 Hudson street, has let contract for one-story 70 x 200-foot factory addition, to Davis Construction Co., 9 West Chase street. Estimated cost \$40,000.

CHESTERTOWN, MD.—Industrial company has awarded contracts for plant to Edward Sant, Millington, Md., and office building to H. Tucker, Chestertown.

#### Florida

JACKSONVILLE, FLA.—City commission will engage Burns & Roe Inc., 233 Broadway, New York, to make survey of municipal electric system and recommend changes and improvements.

#### West Virginia

PARKERSBURG, W. VA.—Corning Glass Works, Corning, N. Y., is having preliminary plans prepared for a manufacturing plant here. H. K. Ferguson Co., 1650 Hanna building, Cleveland, general contractor.

#### Oklahoma

LAWTON, OKLA.—City will take bids March 10 for waterworks improvements. Nofsteger & Lawrence, engineers, 2720 Northwest Twenty-sixth street, Oklahoma City, Okla.

TULSA, OKLA.—City has advance grant of \$41,000 on a \$532,000 waterworks project, and work will be started immediately on construction of a 36-inch main, coagulation basin at filtration plant and installation of new pumping facilities.

#### Wisconsin

MILWAUKEE—Interstate Drop Forge Co., 4051 North Twenty-seventh street, has asked bids for one-story 60 x 100-foot shop and office building. Estimated cost \$60,000.

MILWAUKEE—Allis-Chalmers Mfg. Co. has let contract to Meredith Bros. Inc., 121 East Washington street, Milwaukee, for one-story 26 x 100-foot foundry addition, and alterations.

MILWAUKEE—Kearney & Trecker Corp. will spend approximately \$3,000,000 for addition to plant and equipment. Defense Plant Corp. will finance.

RACINE, WIS.—Lakeside Malleable Castings Co. is rebuilding one-story 60 x 60-foot building, and has let contract to Nelson & Co., 1550 York street. E. A. Klinger, 614 Fourteenth street, architect.

#### Minnesota

MINNEAPOLIS—Dayton Rogers Mfg. Co., 2830 Thirteenth avenue, has awarded general contract to Spady & Haagen, 708 Pence building, for one-story factory. Estimated cost, including equipment, \$40,000. (Noted Nov. 24).

#### Texas

BROWNWOOD, TEX.—Brown county water improvement district No. 1 will take bids March 18 for waterworks improvements. Tamm & Fitzgerald, engineers, Harlingen, Tex.

HOUSTON, TEX.—Defense Plant Corp. has authorized Los Angeles By-Product Co. to erect \$58,000 tin can processing plant here.

HOUSTON, TEX.—Houston Lighting & Power Co. has begun construction of 35,000-kilowatt power plant. Ebasco Services Inc., 2 Rector street, New York, is supervising the work.

TEXAS CITY, TEX.—Carbide & Carbon Chemicals Corp., subsidiary of Union Carbide & Carbon Corp., 30 East Forty-second street, New York, will spend about \$6,500,000 for additional plant expansion. Ford, Bacon & Davis Inc., 39 Broadway, New York, engineer.

#### California

LOS ANGELES—Great Western Steel Co. sustained damage by fire to its plant at 1011 East Sixty-first street.

LOS ANGELES—Molybdenum Steel Co. has been incorporated with 1000 shares of no par value stock, by C. B. Gauthier, C. Earl Stoner and J. H. Blain, all of Los Angeles. The new corporation is represented by Victor F. Collins, 111 West Seventh street, Los Angeles.

SAN FRANCISCO—City plans erection



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of steam pumping plant at Lake Merced to cost over \$1,000,000.

**SAN LEANDRO, CALIF.**—Friden Calculating Machine Co. Inc., 2350 Washington street, will spend approximately \$500,000 for plant expansion.

#### Washington

**ILWACO, WASH.**—Norman A. Hower-ton, mayor, will open bids March 17 for construction and equipment of filtration plant. Plans have been prepared by Hostmark Engineering Co., Seattle.

**SEATTLE**—Glenco has been incorporated by J. Esten Bakken, Northern Life tower, for Allen B. Codling and associates, to engage in foundry and machine operations and metals manufacturing.

#### Canada

**BRANTFORD, ONT.**—Massey Harris Co. Ltd., Market street South, has let contract to A. W. Robertson Ltd., 57 Bloor street West, Toronto, for plant addition to cost \$300,000.

**GALT, ONT.**—Shurley-Dietrich-Atkins Co. Ltd., 17 Glebe street, has given general contract to G. H. Thomas & Son Ltd., 45 Dickson street, for plant addition, to cost about \$50,000.

**HAMILTON, ONT.**—Dominion Foundries & Steel Ltd., Depew street, has awarded general contract to Canadian Engineering & Contracting Co. Ltd., 25 Hughson street, for addition to continuous furnace aisle and soaking pit building, at cost of about \$65,000. Awards for machine shop and plate mill additions are still pending. Plans are by Prack & Prack, Pigott building.

**HAMILTON, ONT.**—National Steel Car Corp. Ltd., Kenilworth avenue North, has received bids through Hutton & Souter, architects, Pigott building, for shell plant building, one story, 150 x 300 feet, to cost about \$300,000, including equipment.

**KINGSTON, ONT.**—Kingston Shipbuilding Co., Ontario street, has received bids through Hutchison & Wood, architects, 204 Notre Dame street West, Montreal, Que., and will award contracts soon for one-story machine shop, 65 x 76 feet.

**LEASIDE, ONT.**—Leeds Steel Products Ltd., care of Norman K. Fredenburg, 1802 Royal Bank building, Toronto, has awarded general contract to Gatehouse Bros., 989 Bay street, Toronto, for plant here for production of tools.

**MERRITTON, ONT.**—Hayes Steel Products Ltd. has completed plans and will start work soon on two-story plant addition to cost \$80,000.

**OTTAWA, ONT.**—International Harvester Co. of Canada Ltd., Hillyard street, Hamilton, Ont., has purchased a site 230 x 500 feet on Carling avenue here for erection of plant.

**OTTAWA, ONT.**—Instruments Ltd., 240 Sparks street, has given general contract to George A. Crane & Sons, 285 Clemow street, for plant on Parkdale avenue to cost about \$100,000, including equipment.

**TORONTO, ONT.**—Singer Sewing Machine Co., 246 Richmond street West, has called bids through N. A. Armstrong, architect, 19 Melinda street, for plant addition to cost about \$40,000.

**TORONTO, ONT.**—Dominion Bridge Co. Ltd., 289 Sorauen avenue, has plans and will call bids immediately for erection of plant addition, 90 x 400 feet, to cost about \$85,000.

**TORONTO, ONT.**—Steel Co. of Canada Ltd., Hamilton, Ont., is having plans prepared for plant addition on Windermere avenue here to cost about \$100,000, with equipment.

**WINDSOR, ONT.**—Canadian Industries Ltd., 1135 Beaver Hall Hill, Montreal, Que., is having plans prepared for further addition to plant at 4016 Sandwich street here, to cost about \$100,000, including equipment.

**LA TUQUE, QUE.**—Brown Corp. Ltd. has given general contract to John F. Wickenden, Ameau building, Three Rivers, Que., for plant addition to cost \$100,000. R. A. Rankin & Co., 1420 Sherbrooke street West, Montreal, consulting engineers.

**LENNOXVILLE, QUE.**—Union Screen Plate Co. of Canada Ltd., Main street, has plans by Alphonse Belanger, 76 Marquette street, and will call bids soon for plant addition to cost about \$35,000.

**MONTREAL, QUE.**—J. & R. Weir Ltd., 53 Nazareth street, has given general contract to James Thom & Co. Ltd., 660 St. Catharine street West, for addition to machine shop and boiler plant to cost, with equipment, about \$100,000.

**ST. HYACINTHE, QUE.**—Volcano Ltd., 2020 St. Anne street, is having plans prepared for addition to machine shop and will call bids soon. Cost about \$35,000, with equipment.

**VERDUN, QUE.**—Defense Industries Ltd., 1135 Beaver Hall Hill, Montreal, has given general contract to Collet Freres, 1978 Parthenais street, and let a number of subcontracts in connection with addition to war plant here to cost about \$300,000.

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Cleveland, O.

## ANODES (All Types)

Udylite Corp., The, 1651 E. Grand  
Blvd., Detroit, Mich.

## ANODES (Nickel)

Seymour Manufacturing Co., The,  
Seymour, Conn.

## AXLES

Bethlehem Steel Co., Bethlehem, Pa.  
Carnegie-Illinois Steel Corp.,  
Pittsburgh-Chicago.  
Columbia Steel Co.,  
San Francisco, Calif.  
Republic Steel Corp.,  
Dept. ST, Cleveland, O.  
Standard Steel Works Div. of The  
Baldwin Locomotive Works,  
Philadelphia, Pa.  
Tennessee Coal, Iron & Railroad  
Co., Brown-Marx Bldg.,  
Birmingham, Ala.

## RABBIT METAL

Cadman, A. W., Mfg. Co.,  
2816 Smallman St.,  
Pittsburgh, Pa.  
National Bearing Metals Corp.,  
928 Shore Ave., Pittsburgh, Pa.  
Ryerson, Jos. T., & Son, Inc.,  
16th and Rockwell Sts.,  
Chicago, Ill.

## BALANCING MACHINES

Gisholt Machine Co., 1217 E. Wash-  
ington Ave., Madison, Wis.

## BALING PRESSES

Galland-Henning Manufacturing Co.,  
2747 So. 31st St., Milwaukee, Wis.  
Logemann Brothers Co., 3126 Bur-  
leigh St., Milwaukee, Wis.

## BALL TRANSFERS

Mathews Conveyer Co., 142 Tenth  
St., Elwood City, Pa.

## BALLS (Brass or Bronze)

SKF Industries, Inc., Front St. and  
Erie Ave., Philadelphia, Pa.  
Strom Steel Ball Co.,  
1850 S. 54th Ave., Cicero, Ill.

## BALLS (Special Alloy Metals)

SKF Industries, Inc., Front St. and  
Erie Ave., Philadelphia, Pa.

## BALLS (Steel)

\*Also Stainless  
\*Strom Steel Ball Co.,  
1850 S. 54th Ave., Cicero, Ill.

## BAND FILES (Metal)

Continental Machines, Inc.,  
1324 So. Washington Ave.,  
Minneapolis, Minn.

## BAND SAWS (Metal Cutting)

Continental Machines, Inc.,  
1324 So. Washington Ave.,  
Minneapolis, Minn.  
Disston, Henry, & Sons, Inc.,  
226 Tacony, Philadelphia, Pa.  
Walker-Turner Co., Inc.,  
5012 Berkman St.,  
Plainfield, N. J.

## BANDS—See HOOPS AND BANDS

## BANDS (Iron and Steel)

Bethlehem Steel Co.,  
Bethlehem, Pa.  
Carnegie-Illinois Steel Corp.,  
Pittsburgh-Chicago.  
Columbia Steel Co.,  
San Francisco, Calif.

Inland Steel Co.,  
38 So. Dearborn St., Chicago, Ill.  
Laclede Steel Co., Arcade Bldg.,  
St. Louis, Mo.  
Republic Steel Corp.,  
Dept. ST, Cleveland, O.  
Ryerson, Jos. T., & Son, Inc.,  
16th and Rockwell Sts.,  
Chicago, Ill.  
Stanley Works, The,  
New Britain, Conn.  
Bridgeport, Conn.  
Tennessee Coal, Iron & Railroad  
Co., Brown-Marx Bldg.,  
Birmingham, Ala.

## BAR BENDERS

Kardong Bros. Inc., 346 Buchanan  
St., Minneapolis, Minn.

## BARGE MOVERS

Silent Hoist Winch & Crane Co.,  
849 63rd St., Brooklyn, N. Y.

## BARGES (Steel)

American Bridge Co.,  
Frick Bldg., Pittsburgh, Pa.  
Bethlehem Steel Co.,  
Bethlehem, Pa.  
Dravo Corp. (Engin'g Works Div.)  
Neville Island, Pittsburgh, Pa.  
Federal Shipbuilding & Dry Dock  
Co., Kearney, N. J.  
Jones & Laughlin Steel Corp.,  
Jones & Laughlin Bldg.,  
Pittsburgh, Pa.  
Maryland Dry Dock Co.,  
Baltimore, Md.

## BARRELS (Plating)

Udylite Corp., The, 1651 E. Grand  
Blvd., Detroit, Mich.

## BARRELS (Steel)

Continental Steel Corp.,  
Kokomo, Ind.  
Pressed Steel Tank Co.,  
1461 So. 66th St.,  
Milwaukee, Wis.

## BARS (Alloy)

Ampco Metal, Inc., Dept. S-2,  
3830 W. Burnham St.,  
Milwaukee, Wis.  
Bethlehem Steel Co.,  
Bethlehem, Pa.  
Bliss & Laughlin, Inc.,  
Harvey, Ill.  
Carnegie-Illinois Steel Corp.,  
Pittsburgh-Chicago.  
Columbia Steel Co.,  
San Francisco, Calif.  
Copperweld Steel Co., Warren, O.  
Firth-Sterling Steel Co.,  
McKeesport, Pa.  
International Nickel Co. Inc., The,  
67 Wall Street, New York City.  
LaSalle Steel Co., Chicago, Ill.  
Midvale Co., The,  
Nicoletown, Philadelphia, Pa.  
Monarch Steel Co., 545 W. McCarty  
St., Indianapolis, Ind.  
Republic Steel Corp.,  
Dept. ST, Cleveland, O.  
Ryerson, Jos. T., & Son, Inc.,  
16th and Rockwell Sts.,  
Chicago, Ill.  
Tennessee Coal, Iron & Railroad  
Co., Brown-Marx Bldg.,  
Birmingham, Ala.  
Timken Roller Bearing Co., The,  
Steel & Tube Div., Canton, O.

## BARS (Brass, Bronze or Copper)

American Brass Co., The,  
Waterbury, Conn.  
Copperweld Steel Co., Warren, O.  
Johnson Bronze Co.,  
550 So. Mill St., New Castle, Pa.  
Revere Copper & Brass, Inc.,  
230 Park Ave., New York City.

## BARS (Concrete Reinforcing)

Bethlehem Steel Co.,  
Bethlehem, Pa.  
Carnegie-Illinois Steel Corp.,  
Pittsburgh-Chicago.  
Columbia Steel Co.,  
San Francisco, Calif.  
Foster, L. B., Co., Inc.,  
P. O. Box 1647, Pittsburgh, Pa.

Inland Steel Co.,  
38 So. Dearborn St., Chicago, Ill.  
Jones & Laughlin Steel Corp.,  
Jones & Laughlin Bldg.,  
Pittsburgh, Pa.  
Laclede Steel Co., Arcade Bldg.,  
St. Louis, Mo.  
Northwest Steel Rolling Mills,  
4315 Ninth Ave., Seattle, Wash.  
Republic Steel Corp.,  
Dept. ST, Cleveland, O.  
Ryerson, Jos. T., & Son, Inc.,  
16th and Rockwell Sts.,  
Chicago, Ill.  
Tennessee Coal, Iron & Railroad  
Co., Brown-Marx Bldg.,  
Birmingham, Ala.  
Youngstown Sheet & Tube Co., The,  
Youngstown, O.

## BARS (Iron)—See IRON (Bar)

## BARS (Steel)

(\*Also Stainless)  
\*Allegheny Ludlum Steel Corp.,  
Dept. T-125,  
Oliver Bldg., Pittsburgh, Pa.  
\*Bethlehem Steel Co.,  
Bethlehem, Pa.  
Carnegie-Illinois Steel Corp.,  
Pittsburgh-Chicago.  
Columbia Steel Co.,  
San Francisco, Calif.  
Continental Steel Corp.,  
Kokomo, Ind.  
\*Copperweld Steel Co., Warren, O.  
Enterprise Galvanizing Co.,  
2525 E. Cumberland St.,  
Philadelphia, Pa.  
Inland Steel Co.,  
38 So. Dearborn St., Chicago, Ill.  
Jones & Laughlin Steel Corp.,  
Jones & Laughlin Bldg.,  
Pittsburgh, Pa.  
\*Midvale Co., The,  
Nicoletown, Philadelphia, Pa.  
\*Republic Steel Corp., Dept. ST,  
Cleveland, O.  
\*Ryerson, Jos. T., & Son, Inc.,  
16th and Rockwell Sts.,  
Chicago, Ill.  
Scully Steel Products Co.,  
1316 Wabansia Ave., Chicago, Ill.  
Stanley Works, The,  
New Britain, Conn.  
Bridgeport, Conn.  
Sutton Engineering Co., Park Bldg.,  
Pittsburgh, Pa.  
Tennessee Coal, Iron & Railroad  
Co., Brown-Marx Bldg.,  
Birmingham, Ala.  
Timken Roller Bearing Co., The,  
Canton, O.  
Weirton Steel Co., Weirton, W. Va.  
Youngstown Sheet & Tube Co., The,  
Youngstown, O.

## BATHS (Heat Treating—High Speed)

A. F. Holden Co., The,  
200 Winchester Ave.,  
New Haven, Conn.

## BATTERIES (Storage)

Edison Storage Battery Div. of  
Edison, Thomas A., Inc.,  
West Orange, N. J.  
Electric Storage Battery Co., The,  
19th St. and Allegheny Ave.,  
Philadelphia, Pa.  
Graybar Electric Co.,  
420 Lexington Ave.,  
New York City.

## BATTERY CHARGING

## APPARATUS

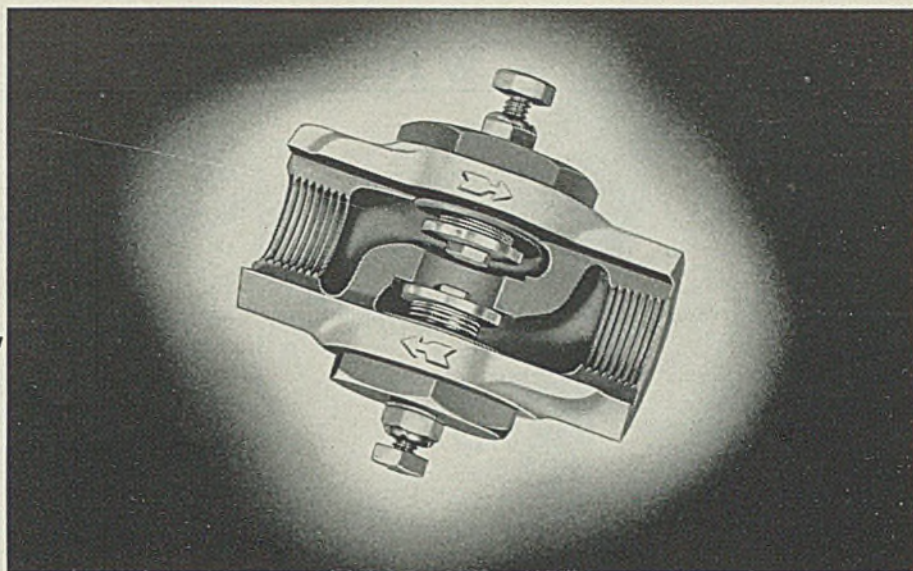
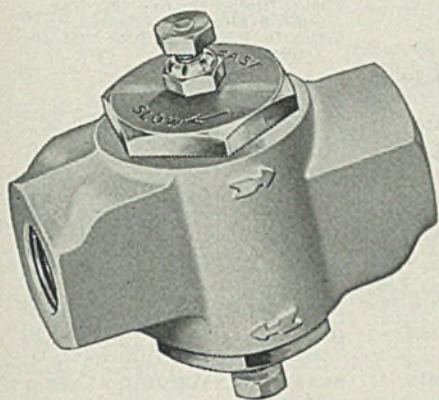
Cutler-Hammer, Inc.,  
1211 St. Paul Ave.,  
Milwaukee, Wis.  
Mallory, P. R., & Co.,  
3029 E. Washington Ave.,  
Indianapolis, Ind.

## BEAMS, CHANNELS, ANGLES,

## ETC.

(\*Also Stainless)  
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Bethlehem, Pa.  
Carnegie-Illinois Steel Corp.,  
Pittsburgh-Chicago.  
Columbia Steel Co.,  
San Francisco, Calif.

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Enterprise Galvanizing Co.,  
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Philadelphia, Pa.  
Inland Steel Co.,  
38 So. Dearborn St., Chicago, Ill.  
Jones & Laughlin Steel Corp.,  
Jones & Laughlin Bldg.,  
Pittsburgh, Pa.  
Laclede Steel Co., Arcade Bldg.,  
St. Louis, Mo.  
Levinson Steel Co.,  
33 Pride St., Pittsburgh, Pa.  
\*Ryerson, Jos. T. & Son, Inc.,  
16th and Rockwell Sts.,  
Chicago, Ill.  
Tennessee Coal, Iron & Railroad  
Co., Brown-Marx Bldg.,  
Birmingham, Ala.  
Welton Steel Co., Welton, W. Va.  
Youngstown Sheet & Tube Co., The,  
Youngstown, O.

**BEARINGS (Ball)**

Ahlberg Bearing Co.,  
3015 W. 47th St., Chicago, Ill.  
Bantam Bearings Corp.,  
South Bend, Ind.  
Fafnir Bearing Co.,  
New Britain, Conn.  
New Departure Div., General  
Motors Corp., Bristol, Conn.  
Norma-Hoffmann Bearings Corp.,  
Stamford, Conn.  
SKF Industries, Inc., Front St. and  
Erie Ave., Philadelphia, Pa.  
Torrington Co., The,  
Torrington, Conn.

**BEARINGS (Babbitt)**

Johnson Bronze Co.,  
550 So. Mill St., New Castle, Pa.  
National Bearing Metals Corp.,  
928 Shore Ave., Pittsburgh, Pa.

**BEARINGS (Brass, Bronze)**

Ampco Metal, Inc., Dept. S-2,  
3830 W. Burnham St.,  
Milwaukee, Wis.  
Cadman, A. W., Mfg. Co.,  
2816 Smallman St.,  
Pittsburgh, Pa.  
Johnson Bronze Co.,  
550 So. Mill St., New Castle, Pa.  
Lawrence Copper & Bronze,  
Bessemer Bldg., Pittsburgh, Pa.  
Moraine Products Division,  
General Motors Corporation,  
Dayton, Ohio.  
National Bearing Metals Corp.,  
928 Shore Ave., Pittsburgh, Pa.  
Shenango-Penn Mold Co., Dover, O.

**BEARINGS (Graphite)**

United States Graphite Co., The,  
Saginaw, Mich.  
Ampco Metal, Inc., Dept. S-142.

**BEARINGS (Journal)**

Ahlberg Bearing Co.,  
3015 W. 47th St., Chicago, Ill.  
Bantam Bearings Corp.,  
South Bend, Ind.  
Bower Roller Bearing Co.,  
3040 Hart St., Detroit, Mich.  
Fafnir Bearing Co.,  
New Britain, Conn.  
Hyatt Bearings Division,  
General Motors Corp.,  
Harrison, N. J.  
National Bearing Metals Corp.,  
928 Shore Ave., Pittsburgh, Pa.  
Rollway Bearing Co., Inc.,  
541 Seymour Ave., Syracuse, N. Y.  
SKF Industries, Inc., Front St. and  
Erie Ave., Philadelphia, Pa.  
Timken Roller Bearing Co., The,  
Canton, O.

**BEARINGS (Needle)**

Torrington Co., The,  
Torrington, Conn.

**BEARINGS (Non-Metallic)**

Moraine Products Division,  
General Motors Corporation,  
Dayton, Ohio.  
Ryerson, Jos. T. & Son, Inc.,  
16th & Rockwell Sts., Chicago, Ill.

**BEARINGS (Oilless)**

Moraine Products Division,  
General Motors Corporation,  
Dayton, Ohio.  
Rhoades, R. W., Metaline Co.,  
P. O. Box 1, Long Island City,  
N. Y.

**BEARINGS (Quill)**

Bantam Bearings Corp.,  
South Bend, Ind.

**BEARINGS (Radial)**

Ahlberg Bearing Co.,  
3015 W. 47th St., Chicago, Ill.  
American Roller Bearing Co.,  
416 Melwood St., Pittsburgh, Pa.  
Bantam Bearings Corp.,  
South Bend, Ind.  
Bower Roller Bearing Co.,  
3040 Hart St., Detroit, Mich.

Fafnir Bearing Co.,  
New Britain, Conn.  
Hyatt Bearings Div.,  
General Motors Corp.,  
Harrison, N. J.  
Link-Belt Co., 519 No. Holmes Ave.,  
Indianapolis, Ind.  
New Departure Div., General  
Motors Corp., Bristol, Conn.  
Rollway Bearing Co., Inc.,  
541 Seymour Ave., Syracuse, N. Y.  
SKF Industries, Inc., Front St.  
and Erie Ave., Philadelphia, Pa.  
Timken Roller Bearing Co., The,  
Canton, O.

**BEARINGS (Roll Neck)**

Bantam Bearings Corp.,  
South Bend, Ind.  
Fafnir Bearing Co.,  
New Britain, Conn.  
Harrison, N. J.  
Hyatt Bearings Div.,  
General Motors Corp.,  
Harrison, N. J.  
Morgan Construction Co.,  
Worcester, Mass.  
National Bearing Metals Corp.,  
928 Shore Ave., Pittsburgh, Pa.  
Rollway Bearing Co., Inc.,  
541 Seymour Ave., Syracuse, N. Y.  
Ryerson, Jos. T. & Son, Inc.,  
16th and Rockwell Sts.,  
Chicago, Ill.  
SKF Industries, Inc., Front St. and  
Erie Ave., Philadelphia, Pa.  
Timken Roller Bearing Co., The,  
Canton, O.

**BEARINGS (Roller)**

Ahlberg Bearing Co.,  
3015 W. 47th St., Chicago, Ill.  
American Roller Bearing Co.,  
416 Melwood St., Pittsburgh, Pa.  
Bantam Bearings Corp.,  
South Bend, Ind.  
Bower Roller Bearing Co.,  
3040 Hart St., Detroit, Mich.  
Fafnir Bearing Co.,  
New Britain, Conn.  
Hyatt Bearings Div.,  
General Motors Corp.,  
Harrison, N. J.  
Link-Belt Co., 519 No. Holmes Ave.,  
Indianapolis, Ind.  
Norma-Hoffmann Bearings Corp.,  
Stamford, Conn.  
Rollway Bearing Co., Inc.,  
541 Seymour Ave., Syracuse, N. Y.  
SKF Industries, Inc., Front St. and  
Erie Ave., Philadelphia, Pa.  
Timken Roller Bearing Co., The,  
Canton, O.

**BEARINGS (Roller Tapered)**

Ahlberg Bearing Co.,  
3015 W. 47th St., Chicago, Ill.  
Rollway Bearing Co., Inc.,  
541 Seymour Ave., Syracuse, N. Y.

**BEARINGS (Rolling Mill)**

American Roller Bearing Co.,  
416 Melwood St., Pittsburgh, Pa.  
Bantam Bearings Corp.,  
South Bend, Ind.  
Hyatt Bearings Div.,  
General Motors Corp.,  
Harrison, N. J.  
Morgan Construction Co.,  
Worcester, Mass.  
Norma-Hoffmann Bearings Corp.,  
Stamford, Conn.  
SKF Industries, Inc., Front St. and  
Erie Ave., Philadelphia, Pa.  
Timken Roller Bearing Co., The,  
Canton, O.

**BEARINGS (Shaft Hangers)**

Rollway Bearing Co., Inc.,  
541 Seymour Ave., Syracuse, N. Y.

**BEARINGS (Thrust)**

Ahlberg Bearing Co.,  
3015 W. 47th St., Chicago, Ill.  
Bantam Bearings Corp.,  
South Bend, Ind.  
Fafnir Bearing Co.,  
New Britain, Conn.  
Link-Belt Co., 519 No. Holmes  
Ave., Indianapolis, Ind.  
Norma-Hoffmann Bearings Corp.,  
Stamford, Conn.  
Rollway Bearing Co., Inc.,  
541 Seymour Ave., Syracuse, N. Y.  
SKF Industries, Inc., Front St. and  
Erie Ave., Philadelphia, Pa.  
Timken Roller Bearing Co., The,  
Canton, O.

**BELTING (Chain and Link)**

Link-Belt Co., 220 So. Belmont  
Ave., Indianapolis, Ind.

**BELTING (Metal, Conveyor, High  
and Low Temperature)**  
Cyclone Fence Co., Waukegan, Ill.

**BENCH PLATES**

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Grand Haven, Mich.

**BENCHES**

Challenge Machinery Co.,  
Grand Haven, Mich.  
Lyon Metal Products, Inc.,  
7211 Madison Ave., Aurora, Ill.

**BENDING AND STRAIGHTENING  
MACHINES**

Alliance Machine Co., The,  
Alliance, O.  
Cleveland Crane & Engineering Co.,  
Steelweld Machinery Div., The,  
1125 E. 283rd St., Wickliffe, O.  
Cleveland Punch & Shear Works  
Co., The, 3917 St. Clair Ave.,  
Cleveland, O.  
Elmes, Chas. F., Engineering  
Works, 243 N. Morgan St.,  
Chicago, Ill.  
Farquhar, A. B., Co., Ltd.,  
175 Duke St., York, Pa.  
Hannifin Mfg. Co., 621-631 So.  
Kolmar Ave., Chicago, Ill.  
Kardong Bros., Inc., 346 Buchanan  
St., Minneapolis, Minn.  
Logemann Brothers Co.,  
3126 Burleigh St., Milwaukee,  
Wis.  
Morgan Engineering Co., The,  
Alliance, O.  
Thomas Machine Mfg. Co.,  
Elma Branch P. O.,  
Pittsburgh, Pa.

**BENZOL AND TOLUOL  
RECOVERY PLANTS**

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struction Div., 300 Koppers Bldg.,  
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Koppers Co., Tar & Chemical Div.,  
901 Koppers Bldg.,  
Pittsburgh, Pa.  
Western Gas Div., Koppers Co.,  
Fort Wayne, Ind.  
Youngstown Sheet & Tube Co., The,  
Youngstown, O.

**BILLETS (Alloys and Carbon Steel)**

Alan Wood Steel Co.,  
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Andrews Steel Co., The,  
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Carnegie-Illinois Steel Corp.,  
Pittsburgh-Chicago.  
Firth-Sterling Steel Co.,  
McKeesport, Pa.  
Northwest Steel Rolling Mills,  
4315 Ninth Ave., Seattle, Wash.  
Republic Steel Corp.,  
Dept. ST, Cleveland, O.  
Roebling's, John A., Sons Co.,  
Trenton, N. J.  
Stanley Works, The,  
New Britain, Conn.  
Tennessee Coal, Iron & Railroad  
Co., Brown-Marx Bldg.,  
Birmingham, Ala.  
Timken Roller Bearing Co., The,  
Steel & Tube Div., Canton, O.  
Washburn Wire Co.,  
Phillipsdale, R. I.

**BILLETS (Forging)**

Alan Wood Steel Co.,  
Conshohocken, Pa.  
Andrews Steel Co., The,  
Newport, Ky.  
Carnegie-Illinois Steel Corp.,  
Pittsburgh-Chicago.  
Copperweld Steel Co., Warren, O.  
Hennepin Co., 47th & Hatfield  
Sts., Pittsburgh, Pa.  
Jones & Laughlin Steel Corp.,  
Jones & Laughlin Bldg.,  
Pittsburgh, Pa.  
Laclede Steel Co., Arcade Bldg.,  
St. Louis, Mo.  
Midvale Co., The,  
Nicolown, Philadelphia, Pa.  
Republic Steel Corp.,  
Dept. ST, Cleveland, O.  
Standard Steel Works Div. of The  
Baldwin Locomotive Works,  
Philadelphia, Pa.  
Stanley Works, The,  
New Britain, Conn.  
Bridgeport, Conn.  
Tennessee Coal, Iron & Railroad  
Co., Brown-Marx Bldg.,  
Birmingham, Ala.  
Timken Roller Bearing Co., The,  
Steel & Tube Div., Canton, O.

**BILLETS AND BLOOMS**

(\*Also Stainless)  
\*Alan Wood Steel Co.,  
Conshohocken, Pa.  
Andrews Steel Co., The,  
Newport, Ky.  
Bethlehem Steel Co.,  
Bethlehem, Pa.  
Carnegie-Illinois Steel Corp.,  
Pittsburgh-Chicago.  
Continental Steel Corp.,  
Kokomo, Ind.  
\*Copperweld Steel Co., Warren, O.  
\*Firth-Sterling Steel Co.,  
McKeesport, Pa.  
Inland Steel Co.,  
38 So. Dearborn St., Chicago, Ill.

Jones & Laughlin Steel Corp.,  
Jones & Laughlin Bldg.,  
Pittsburgh, Pa.  
Laclede Steel Co., Arcade Bldg.,  
St. Louis, Mo.  
\*Republic Steel Corp.,  
Dept. ST, Cleveland, O.  
Roebling's, John A., Sons Co.,  
Trenton, N. J.  
Standard Steel Works  
Div. of The Baldwin Locomotive  
Works, Philadelphia, Pa.  
Stanley Works, The,  
New Britain, Conn.  
Bridgeport, Conn.  
Tennessee Coal, Iron & Railroad  
Co., Brown-Marx Bldg.,  
Birmingham, Ala.  
Timken Roller Bearing Co., The,  
Steel & Tube Div., Canton, O.  
Youngstown Sheet & Tube Co., The,  
Youngstown, O.

**BINS (Storage)**

Lyon Metal Products, Inc.,  
7211 Madison Ave., Aurora, Ill.

**BLACKING (Graphite)**

United States Graphite Co., The,  
Saginaw, Mich.

**BLAST CLEANING EQUIPMENT  
(Sand)**

American Foundry Equipment Co.,  
The, 509 So. Byrkit St.,  
Mishawaka, Ind.  
Pangborn Corp., Hagerstown, Md.

**BLAST FURNACE CLEANING**

(\*Gas)  
McKee, Arthur G., & Co.,  
2300 Chester Ave., Cleveland, O.

**BLAST FURNACE HOT BLAST**

McKee, Arthur G., & Co.,  
2300 Chester Ave., Cleveland, O.

**BLAST FURNACE SPECIALTIES**

Bailey, Wm. M., Co.,  
702 Magee Bldg., Pittsburgh, Pa.  
Brosius, Edgar E., Co., Sharps-  
burg Branch, Pittsburgh, Pa.  
Leeds & Northrup Co., 4957 Sten-  
ton Ave., Philadelphia, Pa.  
McKee, Arthur G., & Co.,  
2300 Chester Ave., Cleveland, O.

**BLAST FURNACE STOCK**

McKee, Arthur G., & Co.,  
2300 Chester Ave., Cleveland, O.

**BLAST FURNACES—See**

**FURNACES (Blast)**  
**BLOCKS (Chain)**  
Reading Chain & Block Co.,  
Dept. D-2, Reading, Pa.  
Yaie & Towne Mfg. Co.,  
4530 Tacony St., Philadelphia, Pa.

**BLOWERS**

General Electric Co.,  
Schenectady, N. Y.  
Kirk & Blum Mfg. Co., The,  
2838 Spring Grove Ave.,  
Cincinnati, O.  
Mahr Mfg. Co.,  
Div. of Diamond Iron Works, Inc.,  
Minneapolis, Minn.  
Stewart Furnace Div., Chicago  
Flexible Shaft Co., Dept. 112,  
5600 Roosevelt Rd., Chicago, Ill.  
Sturtevant, B. F., Co.,  
Hyde Park, Boston, Mass.

**BLOWPIPES (Oxy-Acetylene)**

Linde Air Products Co., The,  
30 E. 42nd St., New York City.

**BOILER HEADS**

Bethlehem Steel Co.,  
Bethlehem, Pa.

**BOILER TUBES—See TUBES**

(Boiler)

**BOILERS**

Babcock & Wilcox Co., The,  
Refractories Div., 85 Liberty St.,  
New York City.  
Oil Well Supply Co., Dallas, Texas

**BOLT AND NUT MACHINERY**

Landis Machine Co.,  
Waynesboro, Pa.  
National Machinery Co., The,  
Tiffin, O.  
Oster Mfg. Co., The,  
2037 E. 61st St., Cleveland, O.

**BOLTS**

(\*Also Stainless)  
Bethlehem Steel Co.,  
Bethlehem, Pa.  
Carnegie-Illinois Steel Corp.,  
Pittsburgh-Chicago.  
Cleveland Cap Screw Co.,  
2930 E. 79th St., Cleveland, O.  
Columbia Steel Co.,  
San Francisco, Calif.



# WHERE-TO-BUY

**BOLTS (Also Stainless)—Con.**  
 Lamson & Sessions Co., The,  
 1971 W. 85th St., Cleveland, O.  
 Oliver Iron & Steel Corp.,  
 So. 10th & Muriel Sts.,  
 Pittsburgh, Pa.  
 \*Republic Steel Corp., Upon Nut  
 Div., Dept. ST, 1912 Scranton  
 Rd., Cleveland, O.  
 Russell, Burdsall & Ward Bolt &  
 Nut Co., Port Chester, N. Y.  
 \*Ryerson, Jos. T., & Son, Inc.,  
 16th and Rockwell Sts.,  
 Chicago, Ill.  
 Tennessee Coal, Iron & Railroad  
 Co., Brown-Marx Bldg.,  
 Birmingham, Ala.  
 Triplex Screw Co., The,  
 5317 Grant Ave., Cleveland, O.

**BOLTS (Carriage and Machine)**  
 Bethlehem Steel Co.,  
 Bethlehem, Pa.  
 Cleveland Cap Screw Co.,  
 2930 E. 79th St., Cleveland, O.  
 Lamson & Sessions Co., The,  
 1971 W. 85th St., Cleveland, O.  
 Republic Steel Corp., Upon Nut  
 Div., Dept. ST, 1912 Scranton  
 Rd., Cleveland, O.  
 Russell, Burdsall & Ward Bolt &  
 Nut Co., Port Chester, N. Y.  
 Ryerson, Jos. T., & Son, Inc.,  
 16th & Rockwell Sts.,  
 Chicago, Ill.  
 Triplex Screw Co., The,  
 5317 Grant Ave., Cleveland, O.

**BOLTS (Non-Ferrous and Stain-  
 less)**  
 Harper, H. M., Co., The,  
 2646 Fletcher St., Chicago, Ill.

**BOLTS (Special)**  
 Bethlehem Steel Co.,  
 Bethlehem, Pa.  
 Cleveland Cap Screw Co.,  
 2930 E. 79th St., Cleveland, O.  
 Lamson & Sessions Co., The,  
 1971 W. 85th St., Cleveland, O.  
 Republic Steel Corp., Upon Nut  
 Div., Dept. ST, 1912 Scranton  
 Rd., Cleveland, O.  
 Russell, Burdsall & Ward Bolt &  
 Nut Co., Port Chester, N. Y.

**BOLTS (Stove)**  
 Central Screw Co.,  
 3517 Shields Ave., Chicago, Ill.  
 Cleveland Cap Screw Co.,  
 2934 E. 79th St., Cleveland, O.  
 Lamson & Sessions Co., The,  
 1971 W. 85th St., Cleveland, O.  
 Republic Steel Corp., Upon Nut  
 Div., Dept. ST, 1912 Scranton  
 Rd., Cleveland, O.  
 Russell, Burdsall & Ward Bolt &  
 Nut Co., Port Chester, N. Y.  
 Ryerson, Jos. T., & Son, Inc.,  
 16th and Rockwell Sts.,  
 Chicago, Ill.

**BOLTS (Stove, Recessed Head)**  
 American Screw Co.,  
 Providence, R. I.  
 Bristol Co., Waterbury, Conn.  
 Chandler Products Co., Euclid, O.  
 Continental Screw Co.,  
 New Bedford, Mass.  
 Corbin Screw Corp.,  
 New Britain, Conn.  
 Lamson & Sessions Co., The,  
 1971 W. 85th St., Cleveland, O.  
 National Screw & Mfg. Co.,  
 2440 E. 75th St., Cleveland, O.  
 Pheoll Mfg. Co., 5700 Roosevelt  
 Rd., Chicago, Ill.  
 Russell, Burdsall & Ward Bolt &  
 Nut Co., Port Chester, N. Y.  
 Scovill Mfg. Co., Waterbury, Conn.

**BOLTS (Track)—See TRACK  
 BOLTS**

**BORING MACHINES (Precision)**  
 Ex-Cell-O Corp., 1228 Oakman  
 Blvd., Detroit, Mich.  
 Head Machine Co.,  
 Worcester, Mass.  
 William Sellers & Co., Inc.,  
 16th & Callowhill St.,  
 Philadelphia, Pa.

**BORING TOOLS**  
 (Carbide Tipped)  
 McKenna Metals Co.,  
 200 Lloyd Ave., Latrobe, Pa.

**BOXES (Annealing)**  
 Carnegie-Illinois Steel Corp.,  
 Pittsburgh-Chicago.  
 Continental Roll & Steel Fdry. Co.,  
 E. Chicago, Ind.  
 Morgan Engineering Co., The,  
 Alliance, O.

**BOXES (Open Hearth Charging)**  
 Carnegie-Illinois Steel Corp.,  
 Pittsburgh-Chicago.  
 Continental Roll & Steel Fdry. Co.,  
 E. Chicago, Ind.  
 Morgan Engineering Co., The,  
 Alliance, O.

**BRAKE LININGS**  
 Johns-Manville Corp., 22 E. 40th  
 St., New York City.  
 Manhattan Rubber Mfg. Co. Div.,  
 Raybestos Manhattan, Inc.,  
 Passaic, N. J.

**BRAKES (Electric)**  
 Clark Controller Co., The,  
 1146 E. 152nd St., Cleveland, O.  
 Culer-Hammer, Inc., 1211 St. Paul  
 Ave., Milwaukee, Wis.  
 Electric Controller & Mfg. Co., The,  
 2700 E. 79th St., Cleveland, O.

**BRAKES (Press)**  
 Cincinnati Shaper Co., Elam and  
 Garrard Sts., Cincinnati, O.  
 Cleveland Crane & Engineering Co.,  
 The Steelweld Machinery Div.,  
 1125 E. 283rd St., Wickliffe, O.  
 Elmes, Chas. F., Engineering  
 Works, 243 N. Morgan St.,  
 Chicago, Ill.

**BRICK (Acid Resisting)**  
 Keagler Brick Co., 1443 W. Market  
 St., Steubenville, O.  
 Nukem Products Corp.,  
 70 Niagara St., Buffalo, N. Y.

**BRICK (Chrome)**  
 Harbison-Walker Refractories Co.,  
 1800 Farmers Bank Bldg.,  
 Pittsburgh, Pa.

**BRICK—(Insulating)—See  
 INSULATING BRICK**

**BRICK (Ladle)**  
 Globe Brick Co., The,  
 East Liverpool, O.

**BRICK (Refractory)—See  
 REFRACTORIES, CEMENT,  
 ETC.**

**BRICK (Silica)**  
 Harbison-Walker Refractories Co.,  
 1800 Farmers Bank Bldg.,  
 Pittsburgh, Pa.

**BRICK (Silicon Carbide)**  
 Bay State Abrasive Products Co.,  
 Westboro, Mass.  
 Carborundum Co., The,  
 Perth Amboy, N. J.  
 Norton Co., Worcester, Mass.

**BRIDGE CRANES (Ore and Coal  
 Handling)—See CRANES (Bridge)**

**BRIDGES, BUILDINGS,  
 VIADUCTS, STACKS, ETC.**  
 American Bridge Co.,  
 Frick Bldg., Pittsburgh, Pa.  
 Babcock & Wilcox Co., The,  
 Refractories Div., 85 Liberty St.,  
 New York City.  
 Belmont Iron Works,  
 22nd St., and Washington Ave.,  
 Philadelphia, Pa.  
 Bethlehem Steel Co.,  
 Bethlehem, Pa.  
 Blaw-Knox Co., Blawnox, Pa.  
 Columbia Steel Co.,  
 San Francisco, Calif.  
 General American Transportation  
 Corp., 135 So. LaSalle St.,  
 Chicago, Ill.  
 Levinson Steel Co.,  
 33 Pride St., Pittsburgh, Pa.  
 Robertson, H. H., Co.,  
 Farmers Bank Bldg.,  
 Pittsburgh, Pa.  
 Uhl Construction Co.,  
 6001 Butler St., Pittsburgh, Pa.

**BROACHING CUTTERS**  
 Ex-Cell-O Corp., 1228 Oakman  
 Blvd., Detroit, Mich.

**BROACHING MACHINES**  
 American Broach & Machine Co.,  
 Ann Arbor, Mich.  
 Bullard Co., The, Bridgeport, Conn.  
 Cincinnati Milling Machine &  
 Cincinnati Grinders, Inc.,  
 Oakley Sta., Cincinnati, O.  
 Colonial Broach Co.,  
 147 Jos. Campau, Detroit, Mich.

**BRUSHES**  
 Fuller Brush Co., The,  
 Hartford, Conn.

**BRUSHES (Carbon)**  
 United States Graphite Co., The,  
 Saginaw, Mich.

**BRUSHES (Industrial)**  
 Fuller Brush Co., The,  
 Hartford, Conn.

**BRUSHES (Steelgrit)**  
 Fuller Brush Co., The,  
 Hartford, Conn.

**BUCKETS (Clam Shell, Dragline  
 Grab, Single Line)**  
 Atlas Car & Mfg. Co., The,  
 1100 Ivanhoe Rd., Cleveland, O.



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**SAVE!**  
**CONSERVE!**

## TOOL STEELS

BY USING

*Eureka* **TOOL STEEL  
 WELDING RODS**

We originally planned to devote this space to the praising of our products. We finally decided it would be more fair to you as a user and ourselves, as a manufacturer, to put it this way—drop us a note telling us where conservation of tool steel is needed in your plant and we will mail you complete literature that lists and explains the various types, their characteristics, proper applications and treatment. Should your answer not be found in this literature, our research force will prescribe the proper electrode and outline the best methods for its use. **THEN** after using our electrodes, **YOU** will do the praising—we won't have to.

**WELDING EQUIPMENT & SUPPLY CO.**

DETROIT, MICHIGAN

**BUCKETS** (Clam Shell, etc.)—Con. Blaw-Knox Co., Blawnox, Pa. Cullen-Friestedt Co., 1308 So. Kilbourn St., Chicago, Ill. Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis. Industrial Brownhoist Corp., Bay City, Mich. Wellman Engineering Co., The, 7016 Central Ave., Cleveland, O.

**BUCKETS (Single Hook, Automatic Dump, Automatic Single Line)** Brosius, Edgar E., Co., Sharpshurg Branch, Pittsburg, Pa. Wellman Engineering Co., The, 7016 Central Ave., Cleveland, O.

**BUILDINGS (Industrial)** Austin Co., The, 16112 Euclid Ave., Cleveland, O.

**BUILDINGS (Steel)—See BRIDGES, BUILDINGS, ETC.**

**BULLDOZERS**

Hannifin Mfg. Co., 621-631 So. Kolmar Ave., Chicago, Ill. Logemann Brothers Co., 3126 Burelgh St., Milwaukee, Wis.

**BURNERS (Acetylene)—See TORCHES AND BURNERS**

**BURNERS (Automatic)**

Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore, Md. Pennsylvania Industrial Engineers, 2413 W. Magnolia St., Pittsburgh, Pa.

Bloom Engineering Co., 916 Behan St., Pittsburg, Pa. Surface Combustion Div., 2375 Dorr St., Toledo, O.

Wean Engineering Co., Warren, O. Wilson, Lee, Engineering Co., 1368 Blount St., Cleveland, O.

**BURNERS (Fuel, Oil, Gas, Combination)**

American Gas Furnace Co., Elizabeth, N. J. Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York City.

Bloom Engineering Co., 916 Behan St., Pittsburg, Pa. Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh, Pa.

Machler, Paul, Co., The, 2208 W. Lake St., Chicago, Ill. Mahr Mfg. Co.,

Div. of Diamond Iron Works, Inc., Minneapolis, Minn. Pennsylvania Industrial Engineers, 2413 W. Magnolia St., Pittsburgh, Pa.

Stewart Furnace Div., Chicago Flexible Shaft Co., Dept. 112, 5600 Roosevelt Rd., Chicago, Ill. Surface Combustion Div.,

2375 Dorr St., Toledo, O. Wean Engineering Co., Warren, O.

Wilson, Lee, Engineering Co., 1368 Blount St., Cleveland, O.

**BUSHINGS (Bronze)**

Ameco Metal, Inc., Dept. S-2, 3830 W. Burnham St., Milwaukee, Wis.

Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburg, Pa.

Johnson Bronze Co., 550 So. Mill St., New Castle, Pa. Lawrence Copper & Bronze, Bessemer Bldg., Pittsburg, Pa.

National Bearing Metals Corp., 928 Shore Ave., Pittsburg, Pa. Shenango-Penn Mold Co., Dover, O.

**BUSHINGS (Jit)** Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit, Mich.

**BUSHINGS (Oilless)**

Rhoades, R. W., Metaline Co., P. O. Box 1, Long Island City, N. Y.

**RY-PRODUCT PLANTS**

Koppers Co., Engineering and Construction Div., 901 Koppers Bldg., Pittsburg, Pa.

**CABINETS (Steel)**

Dahlstrom Metallic Door Co., Jamestown, N. Y.

**CADMIUM**

Udylite Corp., The, 1651 E. Grand Blvd., Detroit, Mich.

**CADMIUM PLATING PROCESS**

Udylite Corp., The, 1651 E. Grand Blvd., Detroit, Mich.

**CALCIUM METAL AND ALLOYS**

Electro Metallurgical Co., 30 E. 42nd St., New York City.

**CAP SCREWS—See SCREWS (Cap, Set, Safety-Set)**

**CAISSONS (Pneumatic)**

Dravo Corp., (Contracting Div.), Neville Island, Pittsburg, Pa.

**CAR DUMPERS** Alliance Machine Co., The, Alliance, Ohio. Industrial Brownhoist Corp., Bay City, Mich.

**CAR PULLERS and SPOTTERS**

American Engineering Co., 2484 Aramingo Ave., Philadelphia, Pa.

Cullen-Friestedt Co., 1308 So. Kilbourn St., Chicago, Ill. Link-Belt Co., 2410 W. 18th St., Chicago, Ill.

Silent Hoist Winch & Crane Co., 849 63rd St., Brooklyn, N. Y.

**CARBIDE**

Linde Air Products Co., The, 30 E. 42nd St., New York City. National Carbide Corp., 60 E. 42nd St., New York City.

National Cylinder Gas Co., 205 W. Wacker Dr., Chicago, Ill.

**CARBIDE (Special Parts)**

McKenna Metals Co., 200 Lloyd Ave., Latrobe, Pa.

**CARBIDE TOOLS (Steel Cutting)**

McKenna Metals Co., 200 Lloyd Ave., Latrobe, Pa.

**CARBON SPECIALTIES**

United States Graphite Co., The, Saginaw, Mich.

**CARBURIZING COMPOUNDS**

Park Chemical Co., 8076 Military Ave., Detroit, Mich.

**CARBURIZING (Pack or Gas)**

Lakeside Steel Improvement Co., The, 5418 Lakeside Ave., Cleveland, O.

**CARS (Charging)**

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland, O. Carnegie-Illinois Steel Corp.,

Pittsburg-Chicago. Continental Roll & Steel Fdry. Co., E. Chicago, Ind.

Morgan Engineering Co., The, Alliance, O.

**CARS (Dump)**

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland, O. Differential Steel Car Co.,

Findlay, O. Easton Car & Construction Co., Easton, Pa.

**CARS (Industrial and Mining)**

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland, O. Bethlehem Steel Co.,

Bethlehem, Pa. Carnegie-Illinois Steel Corp., Pittsburg-Chicago.

Differential Steel Car Co., Findlay, O. Easton Car & Construction Co., Easton, Pa.

**CARS (Scale)** Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland, O.

**CASTING WASHER EQUIPMENT**

Pangborn Corp., Hagerstown, Md.

**CASTINGS (Acid Resisting)**

Ameco Metal, Inc., Dept. S-2, 3830 W. Burnham St., Milwaukee, Wis.

Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburg, Pa.

International Nickel Co., Inc., The, 67 Wall St., New York City.

National Alloy Steel Div. of Blaw-Knox Co., Blawnox, Pa.

National Bearing Metals Corp., 928 Shore Ave., Pittsburg, Pa. Shenango-Penn Mold Co., Dover, O.

**CASTINGS (Alloy Iron)** Erie Forge Co.,

W. 15th & Cascade Sts., Erie, Pa. National Alloy Steel Div. of Blaw-Knox Co., Blawnox, Pa.

**CASTINGS (Alloy Steel)** Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York City.

Bethlehem Steel Co., Bethlehem, Pa. Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.

**CASTINGS (Brass, Bronze, Copper, Aluminum)** Ameco Metal, Inc., Dept. S-2, 3830 W. Burnham St., Milwaukee, Wis.

Bartlett-Hayward Div., Koppers Co., Baltimore, Md.

Bethlehem Steel Co., Bethlehem, Pa. Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburg, Pa.

Homestead Valve Mfg. Co., P. O. Box 20, Coraopolis, Pa. Lawrence Copper & Bronze, Bessemer Bldg., Pittsburg, Pa.

Morgan Engineering Co., The, Alliance, O. National Bearing Metals Corp., 928 Shore Ave., Pittsburg, Pa.

Shenango-Penn Mold Co., Dover, O.

**CASTINGS (Corrosion Resisting)**

National Alloy Steel Div. of Blaw-Knox Co., Blawnox, Pa. Wall-Colmonoy Corp., 637 Buhl Bldg., Detroit, Mich.

**CASTINGS (Die)—See DIE CASTINGS**

**CASTINGS (Electric Steel)**

Carnegie-Illinois Steel Corp., Pittsburg-Chicago. Continental Roll & Steel Fdry. Co., E. Chicago, Ind.

Erie Forge Co., W. 15th & Cascade Sts., Erie, Pa. National-Erie Corp., Erie, Pa.

Reading Steel Casting Div. of American Chain & Cable Co. Inc., Reading, Pa.

West Steel Casting Co., 805 E. 70th St., Cleveland, O. Youngstown Alloy Casting Corp., 103 E. Indianola Ave., Youngstown, O.

**CASTINGS (Gray Iron, Alloy, or Semi-Steel)**

American Engineering Co., 2484 Aramingo Ave., Philadelphia, Pa.

Bartlett-Hayward Div., Koppers Co., Baltimore, Md. Bethlehem Steel Co., Bethlehem, Pa.

Brown & Brown, Inc., 456 So. Main St., Lima, O. Carnegie-Illinois Steel Corp., Pittsburg-Chicago.

Columbia Steel Co., San Francisco, Calif. Erie Foundry Co., Erie, Pa.

Etna Machine Co., The, 3400 Maplewood Ave., Toledo, O. Ferracuta Machine Co.,

Bridgeton, N. J. Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburg, Pa.

Hyde Park Foundry & Machine Co., Hyde Park, Pa.

Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill. Midvale Co., The, Nicetown, Philadelphia, Pa.

National Roll & Foundry Co., The, Avonmore, Pa. Oil Well Supply Co., Dallas, Texas.

Shenango-Penn Mold Co., Dover, O. Western Gas Div., Koppers Co., Fort Wayne, Ind.

**CASTINGS (Heat Resisting)**

Electro Alloys Co., The, Elyria, O. International Nickel Co., Inc., The, 67 Wall Street, New York City.

National Alloy Steel Div. of Blaw-Knox Co., Blawnox, Pa. Shenango-Penn Mold Co., Dover, O.

**CASTINGS (Malleable)** American Chain & Cable Co. Inc., Bridgeport, Conn.

Lake City Malleable Co., 5026 Lakeside Ave., Cleveland, O. Link-Belt Co., 220 S. Belmont Ave., Indianapolis, Ind.

**CASTINGS (Manganese Steel)** Damascus Steel Casting Co., New Brighton, Pa.

Continental Roll & Steel Fdry. Co., E. Chicago, Ind. Ferracuta Machine Co., Bridgeport, N. J.

Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburg, Pa. Mesta Machine Co., P. O. Box 1466, Pittsburg, Pa.

\*Midvale Co., The, Nicetown, Philadelphia, Pa. National-Erie Corp., Erie, Pa.

National Roll & Foundry Co., The, Avonmore, Pa. Ohio Steel Fdry. Co., Lima, O.-Springfield, O.

Oil Well Supply Co., Dallas, Texas. Pittsburgh Rolls Div. of Blaw-Knox Co., Pittsburg, Pa.

Standard Steel Works Div. of Baldwin Locomotive Works, The Paschal P. O., Philadelphia, Pa.

Steel Founders' Society of America, 920 Midland Bldg., Cleveland, O. Strong Steel Fdry. Co., Hertel & Norris Ave., Buffalo, N. Y. Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.

Union Steel Casting Div. of Blaw-Knox Co., 62nd and Butler Sts., Pittsburg, Pa.

United Engineering & Fdry. Co., First National Bank Bldg., Pittsburg, Pa.

Western Gas Div., Koppers Co., Fort Wayne, Ind.

West Steel Casting Co., 805 E. 70th St., Cleveland, O. Youngstown Alloy Casting Corp., 103 E. Indianola Ave., Youngstown, O.

**CASTINGS (Steel) (\*Also Stainless)**

\*Allegheny Ludlum Steel Corp., Dept. T-125, Oliver Bldg., Pittsburg, Pa. Bethlehem Steel Co., Bethlehem, Pa.

Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa. Carnegie-Illinois Steel Corp., Pittsburg-Chicago.

Columbia Steel Co., San Francisco, Calif. Erie Forge Co.,

W. 15th & Cascade Sts., Erie, Pa. Pittsburgh Rolls, Div. of Blaw-Knox Co., Pittsburg, Pa.

Union Steel Casting Div. of Blaw-Knox Co., 62nd and Butler Sts., Pittsburg, Pa.

United Engineering & Fdry. Co., First National Bank Bldg., Pittsburg, Pa.

Youngstown Alloy Casting Corp., 103 E. Indianola Ave., Youngstown, O.

**CASTINGS (Wear Resisting)**

Hagan, George J., Co., 2400 E. Carson St., Pittsburg, Pa. Shenango-Penn Mold Co., Dover, O. Wall-Colmonoy Corp., 637 Buhl Bldg., Detroit, Mich.

**CASTINGS (Worm and Gear Bronze)**

Ameco Metal, Inc., Dept. S-2, 3830 W. Burnham St., Milwaukee, Wis.

Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburg, Pa. National Bearing Metals Corp., 928 Shore Ave., Pittsburg, Pa.

**CEMENT (Acid Proof)** Nukem Products Corp., 706 Niagara St., Buffalo, N. Y. Pennsylvania Salt Mfg. Co., Dept. S, Pennsalt Cleaner Div., Philadelphia, Pa.

**CEMENT (High Temperature)** Bay State Abrasive Products Co., Westboro, Mass. Carborundum Co., The, Perth Amboy, N. J.

Eagle-Picher Lead Co., The, Cincinnati, O. Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburg, Pa.

Johns-Manville Corp., 22 E. 40th St., New York City. Norton Company, Worcester, Mass.

**CEMENT (High Temperature Hydraulic)** Atlas Lumnite Cement Co., Dept. S, Chrysler Bldg., New York City.

**CENTRAL STATION EQUIPMENT** Westinghouse Electric & Mfg. Co., Dept. 7-N, East Pittsburg, Pa.

**CHAIN (Conveyor and Elevator)** Link-Belt Co., 220 S. Belmont Ave., Indianapolis, Ind.

**CHAIN (Draw Bench)** Link-Belt Co., 220 S. Belmont Ave., Indianapolis, Ind.

**CHAIN (Malleable)** Lake City Malleable Co., 5026 Lakeside Ave., Cleveland, O. Link-Belt Co., 220 S. Belmont Ave., Indianapolis, Ind.

**CHAIN (Power Transmission)** Link-Belt Co., 220 S. Belmont Ave., Indianapolis, Ind.

**CHAIN (Roller)** Link-Belt Co., 220 S. Belmont Ave., Indianapolis, Ind.

**CHAIN (Sling)** American Chain & Cable Co. Inc., Bridgeport, Conn.

**CHAIN (Sprocket)** Link-Belt Co., 220 S. Belmont Ave., Indianapolis, Ind.

**CHAIN (Steel-Finished Roller)** Link-Belt Co., 220 S. Belmont Ave., Indianapolis, Ind.

## WHERE TO BUY

**CHAIN (Welded or Weldless)**  
American Chain & Cable Co. Inc.,  
Bridgeport, Conn.

**CHARGING MACHINES (Cupola)**  
Atlas Car & Mfg. Co., The,  
1100 Ivanhoe Rd., Cleveland, O.  
Morgan Engineering Co., The,  
Alliance, O.

**CHARGING MACHINES (Open  
Hearth)**  
Morgan Engineering Co., The,  
Alliance, O.  
Wellman Engineering Co., The,  
7016 Central Ave., Cleveland, O.

**CHARGING MACHINES AND  
MANIPULATORS (Autofloor  
Type)**  
Brosius, Edgar E., Co., Sharp-  
sburg Branch, Pittsburgh, Pa.

**CHECKER BRICK**  
Loftus Engineering Corp.,  
747 Oliver Bldg., Pittsburgh, Pa.

**CHECKS (Metal)**  
Cunningham, M. E., Co.,  
172 E. Carson St., Pittsburgh, Pa.

**CHEMICALS (Industrial)**  
American Solder & Flux Co.,  
2153 E. Norris St.,  
Philadelphia, Pa.  
Metal & Thermit Corp.,  
120 Broadway, New York City.  
Park Chemical Co.,  
8076 Military Ave., Detroit, Mich.  
Titanium Alloy Mfg. Co., The,  
Niagara Falls, N. Y.

**CHROME ORE**  
Samuel, Frank & Co., Inc.,  
Harrison Bldg., Philadelphia, Pa.

**CHROMIUM METAL AND  
ALLOYS**  
Electro Metallurgical Co.,  
30 E. 42nd St., New York City.  
Metal & Thermit Corp.,  
120 Broadway, New York City.  
Vanadium Corp. of America,  
420 Lexington Ave.,  
New York City.

**CHROMIUM PLATING PROCESS**  
United Chromium, Inc.,  
51 E. 42nd St., New York City.

**CHUCKING MACHINES (Multiple  
Spindles)**  
National Acme Co., The, 170 E.  
131st St., Cleveland, O.  
Oster Mfg. Co., The,  
2057 E. 61st St., Cleveland, O.

**CHUCKS (Automatic Closing)**  
Tomkins-Johnson Co., The,  
Dept. S, 611 N. Mechanic St.,  
Jackson, Mich.

**CLAMPS (Drop Forged)**  
Williams, J. H., & Co.,  
400 Vulcan St., Buffalo, N. Y.

**CLEANERS (Steam)**  
Homestead Valve Mfg. Co.,  
P. O. Box 20, Coraopolis, Pa.

**CLEANING SPECIALTIES**  
American Chemical Paint Co.,  
Dept. 310, Ambler, Pa.  
MacDermid, Inc., Waterbury, Conn.  
Pennsylvania Salt Mfg. Co.,  
Dept. S, Pennsalt Cleaner Div.,  
Philadelphia, Pa.

**CLUTCHES (Friction)**  
Jones, W. A. Fdry. & Mach. Co.,  
4437 Roosevelt Rd., Chicago, Ill.

**CLUTCHES (Magnetic)**  
Cutter-Hammer, Inc., 1211 St. Paul  
Ave., Milwaukee, Wis.

**COAL OR COKE**  
Alan Wood Steel Co.,  
Conshohocken, Pa.  
Carnegie-Illinois Steel Corp.,  
Pittsburgh-Chicago.  
Cleveland-Cliffs Iron Co., Union  
Commerce Bldg., Cleveland, O.  
Columbia Steel Co.,  
San Francisco, Calif.

Hanna Furnace Corp., The,  
Ecorse, Detroit, Mich.  
Koppers Co., Gas & Coke Div.,  
300 Koppers Bldg.,  
Pittsburgh, Pa.  
Koppers Coal Co., 300 Koppers  
Bldg., Pittsburgh, Pa.  
New England Coal & Coke Co.,  
Boston, Mass.  
Pickands Mather & Co.,  
Union Commerce Bldg.,  
Cleveland, O.

Shenango Furnace Co.,  
Oliver Bldg., Pittsburgh, Pa.  
Snyder, W. P. & Co.,  
Oliver Bldg., Pittsburgh, Pa.  
Tennessee Coal, Iron & Railroad  
Co., Brown-Marx Bldg.,  
Birmingham, Ala.  
Youngstown Sheet & Tube Co., The,  
Youngstown, O.

**COAL, COKE, ORE AND ASH  
HANDLING MACHINERY**  
Atlas Car & Mfg. Co., The,  
1100 Ivanhoe Rd., Cleveland, O.  
Easton Car & Construction Co.,  
Easton, Pa.

Hagan, Geo. J., Co., 2400 E.  
Carson St., Pittsburgh, Pa.  
Industrial Brownhoist Corp.,  
Bay City, Mich.  
Koppers Co., Engineering & Con-  
struction Div., 901 Koppers  
Bldg., Pittsburgh, Pa.  
Koppers-Rheolaveur Co., 300 Kop-  
pers Bldg., Pittsburgh, Pa.  
Link-Belt Co., 300 W. Pershing Rd.,  
Chicago, Ill.

**COKE—See COAL OR COKE**  
**COKE OVEN MACHINERY**  
Alliance Machine Co., The,  
Alliance, Ohio.  
Atlas Car & Mfg. Co., The,  
1100 Ivanhoe Rd., Cleveland, O.  
Morgan Engineering Co., The,  
Alliance, O.

**COKE OVENS (By-Product)**  
Koppers Co., Engineering and Con-  
struction Div., 100 Koppers Bldg.,  
Pittsburgh, Pa.

**COLUMBIUM**  
Electro Metallurgical Co.,  
30 E. 42nd St., New York City.

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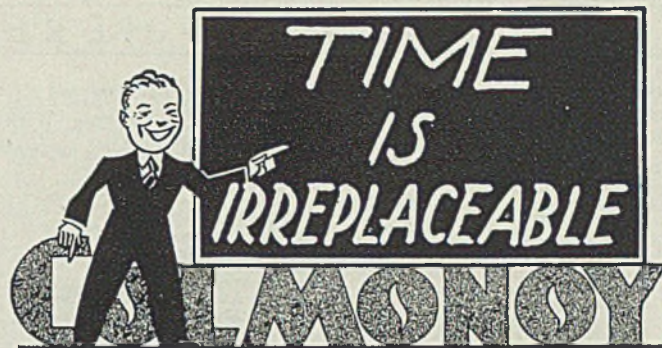
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Link-Belt Co., 300 W. Pershing Road, Chicago, Ill. Reading Chain & Block Corp., Dept. D-2, Reading, Pa.

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**OUTTING OILS—See OILS (Cutting)**

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Bethlehem Steel Co.,  
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Jones & Laughlin Steel Corp.,  
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Pittsburgh-Chicago.

Electro Metallurgical Co.,  
30 E. 42nd St., New York City.  
Jones & Laughlin Steel Corp.,  
Jones & Laughlin Bldg.,  
Pittsburgh, Pa.

Samuel, Frank & Co., Inc.,  
Harrison Bldg., Philadelphia, Pa.

**FERROPHOSPHORUS**  
Samuel, Frank & Co., Inc.,  
Harrison Bldg., Philadelphia, Pa.

**FERROSILICON**  
Electro Metallurgical Co.,  
30 E. 42nd St., New York City.

Samuel, Frank & Co., Inc.,  
Harrison Bldg., Philadelphia, Pa.  
Southern Ferro Alloys Co.,  
2108 Chestnut St., Chattanooga,  
Tenn.

Vanadium Corp. of America,  
420 Lexington Ave.,  
New York City.

**FERROSILICON ALUMINUM**  
Vanadium Corp. of America,  
**FERROTITANIUM**  
Metal & Thermit Corp.,  
120 Broadway, New York City.

Titanium Alloy Mfg. Co., The,  
Niagara Falls, N. Y.  
Vanadium Corp. of America,  
420 Lexington Ave.,  
New York City.

**FERROVANADIUM**  
Electro Metallurgical Sales Corp.,  
30 E. 42nd St., New York City.

Vanadium Corp. of America,  
420 Lexington Ave.,  
New York City.

**FILES AND RASPS**  
Atkins, E. C., & Co.,  
427 So. Illinois St.,  
Indianapolis, Ind.

Dixon, Henry, & Sons, Inc.,  
226 Tacony, Philadelphia, Pa.

**FILES AND RASPS**  
Atkins, E. C., & Co.,  
427 So. Illinois St.,  
Indianapolis, Ind.

**FILTER CLOTH (Asbestos)**  
Jones-Manville Corp.,  
22 E. 40th St., New York City.

**FIRE CLAY—See REFRACTORIES**

**FIRE DOORS & SHUTTERS—See  
DOORS & SHUTTERS**

**FIRE EXTINGUISHERS**  
C-O-Two Fire Equipment Co.,  
10 Empire St., Newark, N. J.  
Klidae, Waller, & Co., Inc.,  
232 West St., Bloomfield, N. J.

**FIRE EXTINGUISHING  
SYSTEMS**  
C-O-Two Fire Equipment Co.,  
10 Empire St., Newark, N. J.

**FIRE PROTECTION EQUIPMENT**  
C-O-Two Fire Equipment Co.,  
10 Empire St., Newark, N. J.  
Waller Klidae & Co., Inc.,  
140 Rector St., New York, N. Y.

**FITTINGS (Electric Steel)**  
Reading-Pratt & Cady Div. of  
American Chain & Cable Co.,  
Inc., Bridgeport, Conn.

**FLAME HARDENING**  
Air Reduction, 60 E. 42nd St.,  
New York City.  
Linde Air Products Co., 30 E. 42nd  
St., New York City.

National-Erie Corp., Erie, Pa.

**FLANGES (Welded Steel)**  
Kling Fifth Wheel Co., 2915 No.  
Second St., Philadelphia, Pa.

**FLOORING (Monolithic)**  
Carey, Philip, Co., The,  
Lockland, Cincinnati, O.  
Johns-Manville Corp.,  
22 E. 40th St., New York City.

**FLOORING (Steel)**  
Alan Wood Steel Co.,  
Conshohocken, Pa.  
Blaw-Knox Co., Blawnox, Pa.  
Carnegie-Illinois Steel Corp.,  
Pittsburgh-Chicago.  
Columbia Steel Co.,  
San Francisco, Calif.  
Dravo Corp. (Machinery Div.),  
300 Penn Ave., Pittsburgh, Pa.  
Inland Steel Co.,  
38 So. Dearborn St., Chicago, Ill.

Republic Steel Corp.,  
Dept. ST, Cleveland, O.  
Robertson, H. H. Co., Farmers Bank  
Bldg., Pittsburgh, Pa.  
Ryerson, Jos. T., & Son, Inc.,  
16th & Rockwell Sts., Chicago, Ill.  
Scully Steel Products Co.,  
1316 Wabansia Ave., Chicago, Ill.  
Tri-Lok Co., 5515 Butler St.,  
Pittsburgh, Pa.

**FLUE DUST CONDITIONERS**  
Brosius, Edgar E., Co., Sharpsburg,  
Branch, Pittsburgh, Pa.

**FLUE GAS ANALYZERS**  
Hays Corp., The, 960 Eighth Ave.,  
Michigan City, Ind.

**FLUORSPAR**  
Samuel, Frank & Co., Inc.,  
Harrison Bldg., Philadelphia, Pa.

**FLUXES (Soldering, Welding &  
Tinning)**  
American Chemical Paint Co.,  
Dept. 310, Ambler, Pa.  
American Solder & Flux Co.,  
2153 E. Norris St.,  
Philadelphia, Pa.

Kester Solder Co., 4222 Wright-  
wood Ave., Chicago, Ill.  
Wayne Chemical Products Co.,  
9502 Copeland St., Detroit, Mich.

**FORGING BILLETS—See BILLETS**

**FORGING MACHINERY**  
Alliance Machine Co., The,  
Alliance, Ohio.  
Erie Foundry Co., Erie, Pa.  
Industrial Brownholst Corp.,  
Bay City, Mich.  
Morgan Engineering Co., The,  
Alliance, O.

National Machinery Co., The,  
Tiffin, O.

**FORGINGS (Brass, Bronze,  
Copper)**  
American Brass Co., The,  
Waterbury, Conn.  
Ameco Metal, Inc., Dept. S-2,  
3830 W. Burnham St.,  
Milwaukee, Wis.  
Bridgeport Brass Co.,  
Bridgeport, Conn.

**FORGINGS (Drop)**  
(\*Also Stainless)  
Atlas Drop Forge Co.,  
Lansing, Mich.  
Bethlehem Steel Co.,  
Bethlehem, Pa.

Oil Well Supply Co., Dallas, Texas.  
Oliver Iron & Steel Corp.,  
So. 10th & Muriel Sts.,  
Pittsburgh, Pa.

Williams, J. H., & Co.,  
400 Vulcan St., Buffalo, N. Y.

**FORGINGS (Hollow Bored)**  
American Hollow Boring Co.,  
1054 W. 20th St., Erie, Pa.

Atlas Drop Forge Co.,  
Lansing, Mich.  
Bay City Forge Co., W. 19th and  
Cranberry Sts., Erie, Pa.  
Erie Forge Co.,  
W. 15th & Cascade Sts., Erie, Pa.

National Forge & Ordnance Co.,  
Irvine, Warren Co., Pa.

**FORGINGS (Iron and Steel)**  
(\*Also Stainless)  
Atlas Drop Forge Co.,  
Lansing, Mich.

Bay City Forge Co., W. 19th and  
Cranberry Sts., Erie, Pa.  
Bethlehem Steel Co.,  
Bethlehem, Pa.

Carnegie-Illinois Steel Corp.,  
Pittsburgh-Chicago.  
Columbia Steel Co.,  
San Francisco, Calif.

Erie Forge Co.,  
W. 15th & Cascade Sts., Erie, Pa.  
Heppenstall Co.,  
47th & Haifield Sts.,  
Pittsburgh, Pa.

Mesta Machine Co.,  
P. O. Box 1466, Pittsburgh, Pa.

\*Middvale Co., The,  
Niagara Falls, Philadelphia, Pa.  
National Forge & Ordnance Co.,  
Irvine, Warren Co., Pa.

Oil Well Supply Co., Dallas, Texas.  
Standard Steel Works Div. of The  
Baldwin Locomotive Works,  
Paschall P. O., Philadelphia, Pa.  
Tennessee Coal, Iron & Railroad  
Co., Brown-Marx Bldg., Birming-  
ham, Ala.

Williams, J. H., & Co.,  
400 Vulcan St., Buffalo, N. Y.

**FORGINGS (Small)**  
Oliver Iron & Steel Corp.,  
So. 10th & Muriel Sts.,  
Pittsburgh, Pa.

**FORGINGS (Sheet)**  
Atlas Drop Forge Co.,  
Lansing, Mich.  
Bethlehem Steel Co.,  
Bethlehem, Pa.

Oliver Iron & Steel Corp.,  
So. 10th & Muriel Sts.,  
Pittsburgh, Pa.

**FOUNDRY EQUIPMENT**

American Foundry Equipment Co.,  
The, Mishawaka, Ind.

**FROGS AND SWITCHES**

Atlas Car & Mfg. Co., The,  
1100 Ivanhoe Rd., Cleveland, O.  
Bethlehem Steel Co.,  
Bethlehem, Pa.  
Carnegie-Illinois Steel Corp.,  
Pittsburgh-Chicago.

**FURNACE INSULATION—See  
INSULATION**

**FURNACES (Blast)**

McKee, Arthur G., & Co.,  
2300 Chester Ave., Cleveland, O.

**FURNACES (Brazing)**

Bellis Heat Treating Co.,  
Branford, Conn.  
Hevl Duty Electric Co., 4100 W.  
Highland Blvd., Milwaukee, Wis.  
Upton Electric Salt Bath Furnace  
Div., Commerce Pattern Fdry. &  
Mach. Co., 7452 Melville Ave., at  
Green, Detroit, Mich.

**FURNACES (Electric Heating)**

Ajax Electrothermic Corp.,  
Ajax Park, Trenton, N. J.  
Bellis Heat Treating Co.,  
Branford, Conn.  
Electric Furnace Co., The,  
Salem, O.  
General Electric Co.,  
Schenectady, N. Y.  
Hagan, Geo. J., Co., 2400 E.  
Carson St., Pittsburgh, Pa.  
Hevl Duty Electric Co., 4100 W.  
Highland Blvd., Milwaukee, Wis.  
Mahr Mfg. Co.,  
Div. of Diamond Iron Works, Inc.,  
Minneapolis, Minn.  
Pittsburgh Lectromelt Furnace  
Corp., P. O. Box 1257,  
Pittsburgh, Pa.  
Salem Engineering Co.,  
714 So. Broadway, Salem, O.  
Swindell-Dressler Corp.,  
P. O. Box 1888, Pittsburgh, Pa.  
Westinghouse Electric & Mfg. Co.,  
Dept. 7-N, East Pittsburgh, Pa.

**FURNACES (Electric Melting)**

Ajax Electrothermic Corp.,  
Ajax Park, Trenton, N. J.  
American Bridge Co.,  
Frick Bldg., Pittsburgh, Pa.  
Detroit Electric Furnace Div.,  
Kuhlman Electric Co.,  
Bay City, Mich.  
General Electric Co.,  
Schenectady, N. Y.  
Pittsburgh Lectromelt Furnace  
Corp., P. O. Box 1257,  
Pittsburgh, Pa.

**FURNACES (Enamelling)**

Hagan, George J., Co.,  
2400 E. Carson St., Pittsburgh, Pa.

**FURNACES (Forging)**

Ajax Electrothermic Corp.,  
Ajax Park, Trenton, N. J.  
Amsler-Morton Co., The,  
Fulton Bldg., Pittsburgh, Pa.  
Bellis Heat Treating Co.,  
Branford, Conn.  
Electric Furnace Co., The,  
Salem, O.  
Hagan, Geo. J., Co.,  
2400 E. Carson St.,  
Pittsburgh, Pa.  
Pennsylvania Industrial Engineers,  
2413 W. Magnolia St.,  
Pittsburgh, Pa.  
Salem Engineering Co.,  
714 So. Broadway, Salem, O.  
Stewart Furnace Div., Chicago  
Flexible Shaft Co., Dept. 112,  
5600 Roosevelt Rd., Chicago, Ill.  
Surface Combustion Div.,  
2375 Dorr St., Toledo, O.  
Swindell-Dressler Corp.,  
P. O. Box 1888, Pittsburgh, Pa.

**FURNACES (Galvanizing)**

Salem Engineering Co.,  
714 So. Broadway, Salem, O.  
Stewart Furnace Div., Chicago  
Flexible Shaft Co., Dept. 112,  
5600 Roosevelt Rd., Chicago, Ill.

**FURNACES (Gas or Oil)**

Electric Furnace Co., The,  
Salem, O.  
Hagan, Geo. J., Co., 2400 E. Car-  
son St., Pittsburgh, Pa.  
Pennsylvania Industrial Engineers,  
2413 W. Magnolia St.,  
Pittsburgh, Pa.  
Salem Engineering Co.,  
714 So. Broadway, Salem, O.  
Stewart Furnace Div.,  
Flexible Shaft Co., Dept. 112,  
5600 Roosevelt Rd., Chicago, Ill.  
Surface Combustion Div.,  
2375 Dorr St., Toledo, O.  
Swindell-Dressler Corp.,  
P. O. Box 1888, Pittsburgh, Pa.

**FURNACES (Heat Treating,  
Annealing, Carburizing, Harden-  
ing, Tempering)**

Ajax Electrothermic Corp.,  
Ajax Park, Trenton, N. J.  
American Gas Furnace Co.,  
Elizabeth, N. J.  
Amsler-Morton Co., The,  
Fulton Bldg., Pittsburgh, Pa.  
Bellis Heat Treating Co.,  
Branford, Conn.  
Carborundum Co., The,  
Perth Amboy, N. J.  
Electric Furnace Co., The,  
Salem, O.  
General Electric Co.,  
Schenectady, N. Y.  
Hagan, Geo. J., Co., 2400 E. Car-  
son St., Pittsburgh, Pa.  
Hevl Duty Electric Co., 4100 W.  
Highland Blvd., Milwaukee, Wis.  
A. F. Holden Co., The,  
200 Winchester Ave.,  
New Haven, Conn.  
Kemp, C. M., Mfg. Co., 405 E.  
Oliver St., Baltimore, Md.  
Leeds & Northrup Co., 4957 Stenton  
Ave., Philadelphia, Pa.  
Mahr Mfg. Co.,  
Div. of Diamond Iron Works, Inc.,  
Minneapolis, Minn.  
Ohio Crankshaft Co., The,  
6600 Clement Ave., Cleveland, O.  
Pennsylvania Industrial Engineers,  
2413 W. Magnolia St.,  
Pittsburgh, Pa.  
Salem Engineering Co.,  
714 So. Broadway, Salem, O.  
Stewart Furnace Div., Chicago  
Flexible Shaft Co., Dept. 112,  
5600 Roosevelt Rd., Chicago, Ill.  
Surface Combustion Div.,  
2375 Dorr St., Toledo, O.  
Swindell-Dressler Corp.,  
P. O. Box 1888, Pittsburgh, Pa.  
Upton Electric Salt Bath Furnace  
Div., Commerce Pattern Fdry. &  
Mach. Co., 7452 Melville Ave., at  
Green, Detroit, Mich.  
Wean Engineering Co., Warren, O.  
Westinghouse Electric & Mfg. Co.,  
Dept. 7-N, East Pittsburgh, Pa.

**FURNACES (Laboratory)**

Ajax Electrothermic Corp.,  
Ajax Park, Trenton, N. J.  
Dieterl, Harry W., Co.,  
9330J Roselawn Ave.,  
Detroit, Mich.  
Hevl Duty Electric Co., 4100 W.  
Highland Blvd., Milwaukee, Wis.

**FURNACES (Non-Ferrous Melting)**

Ajax Electrothermic Corp.,  
Ajax Park, Trenton, N. J.  
Detroit Electric Furnace Div.,  
Kuhlman Electric Co.,  
Bay City, Mich.

**FURNACES (Open Hearth)**

Amsler-Morton Co., The,  
Fulton Bldg., Pittsburgh, Pa.  
McKee, Arthur G., & Co.,  
2300 Chester Ave., Cleveland, O.  
Swindell-Dressler Corp.,  
P. O. Box 1888, Pittsburgh, Pa.

**FURNACES (Portable)**

Hagan, George J., Co.,  
2400 E. Carson St., Pittsburgh, Pa.

**FURNACES (Recuperative)**

Electric Furnace Co., The,  
Salem, O.  
Hagan, Geo. J., Co., 2400 E. Car-  
son St., Pittsburgh, Pa.  
Salem Engineering Co.,  
714 So. Broadway, Salem, O.  
Surface Combustion Div.,  
2375 Dorr St., Toledo, O.  
Swindell-Dressler Corp.,  
P. O. Box 1888, Pittsburgh, Pa.

**FURNACES (Rivet Heating)**

Ajax Electrothermic Corp.,  
Ajax Park, Trenton, N. J.  
Salem Engineering Co., 714 So.  
Broadway, Salem, O.  
Surface Combustion Div.,  
2375 Dorr St., Toledo, O.

**FURNACES (Sheet and Tin Mill)**

Electric Furnace Co., The,  
Salem, O.  
Hagan, Geo. J., Co., 2400 E. Car-  
son St., Pittsburgh, Pa.  
Kemp, C. M., Mfg. Co., 405 E.  
Oliver St., Baltimore, Md.  
Pennsylvania Industrial Engineers,  
2413 W. Magnolia St.,  
Pittsburgh, Pa.  
Salem Engineering Co.,  
714 So. Broadway, Salem, O.  
Surface Combustion Div.,  
2375 Dorr St., Toledo, O.  
Swindell-Dressler Corp.,  
P. O. Box 1888, Pittsburgh, Pa.  
Wean Engineering Co., Warren, O.  
Wilson, Lee, Engineering Co.,  
1368 Blount St., Cleveland, O.

**FURNACES (Steel Mill)**

Ajax Electrothermic Corp.,  
Ajax Park, Trenton, N. J.  
Electric Furnace Co., The,  
Salem, O.  
(General Electric Co.,  
Schenectady, N. Y.)  
Hagan, Geo. J., Co., 2400 E. Car-  
son St., Pittsburgh, Pa.  
Kemp, C. M., Mfg. Co., 405 E.  
Oliver St., Baltimore, Md.  
Pennsylvania Industrial Engineers,  
2413 W. Magnolia St.,  
Pittsburgh, Pa.  
Salem Engineering Co.,  
714 So. Broadway, Salem, O.  
Surface Combustion Div.,  
2375 Dorr St., Toledo, O.  
Swindell-Dressler Corp.,  
P. O. Box 1888, Pittsburgh, Pa.  
Wellman Engineering Co., The,  
7016 Central Ave., Cleveland, O.  
Wilson, Lee, Engineering Co.,  
1368 Blount St., Cleveland, O.  
**FURNACES (Welding)**  
Hagan, George J., Co.,  
2400 E. Carson St.,  
Pittsburgh, Pa.

**GAGE BLOCKS**

Dearborn Gage Co.,  
22036 Beech St., Dearborn, Mich.

**GAGES**

Brown & Sharpe Mfg. Co.,  
Providence, R. I.  
Federal Products Corp.,  
1144 Eddy St., Providence, R. I.  
Greenfield Tap & Die Corp.,  
Greenfield, Mass.  
McKenna Metals Co.,  
200 Lloyd Ave., Latrobe, Pa.  
Sheffield Corp., The,  
Gage Div., Dayton, O.

**GAGES (Automatic Control & Re-  
cording)**

Bristol Co., The, 112 Bristol Rd.,  
Waterbury, Conn.

**GAGES (Indicating and  
Recording)**

Bristol Co., The, 112 Bristol Rd.,  
Waterbury, Conn.

**GAGES (Pressure & Vacuum Re-  
cording)**

Bristol Co., The,  
112 Bristol Rd., Waterbury, Conn.

**GALVANIZING (Hot Dip)**

Acme Galvanizing, Inc.,  
Milwaukee, Wis.  
Acme Steel & Malleable Iron  
Works, Buffalo, N. Y.  
American Hot Dip Galvanizers  
Assoc., Inc., 903 American Bank  
Bldg., Pittsburgh, Pa.  
American Tinning & Galvanizing  
Co., Erie, Pa.  
Atlantic Steel Co., Atlanta, Ga.  
Buffalo Galvanizing & Tinning  
Works, Inc., Buffalo, N. Y.  
Cattle, Jos. P., & Bros., Gaul and  
Liberty Sts., Philadelphia, Pa.  
Diamond Expansion Bolt Co., Inc.,  
Garwood, N. J.  
Enterprise Galvanizing Co.,  
2525 E. Cumberland St.,  
Equipment Steel Products Div., of  
Union Asbestos & Rubber Co.,  
Blue Island, Ill.

**Galvanizers Incorporated,**

Portland, Ore.  
Fanner Mfg. Co., The,  
Cleveland, O.  
Finn, John, Metal Works,  
San Francisco, Calif.  
Gregory, Thomas, Galvanizing  
Works, Maspeth, N. Y.  
Hanlon-Gregory Galvanizing Co.,  
5515 Butler St., Pittsburgh, Pa.  
Hill, James, Mfg. Co., Providence,  
R. I.  
Hubbard & Co., Oakland, Calif.  
Independent Galvanizing Co.,  
Newark, N. J.  
International-Stacey Corp.,  
Columbus, O.  
Isaacson Iron Works, Seattle, Wash.  
Joslyn Co. of California,  
Los Angeles, Calif.  
Joslyn Mfg. & Supply Co.,  
Chicago, Ill.  
Koven, L. O., & Bro., Inc.,  
Jersey City, N. J.  
Lehigh Structural Steel Co.,  
Allentown, Pa.  
Lewis Bolt & Nut Co.,  
Minneapolis, Minn.  
Missouri Rolling Mill Corp.,  
St. Louis, Mo.  
National Telephone Supply Co.,  
The, Cleveland, O.  
Penn Galvanizing Co.,  
Philadelphia, Pa.

**Riverside Foundry & Galvanizing**

Co., Kalamazoo, Mich.  
San Francisco Galvanizing Works,  
San Francisco, Calif.  
Sanitary Tinning Co., The,  
Cleveland, O.

Scaife Co.,  
Ames St., Oakmont, Pa.  
Standard Galvanizing Co.,  
Chicago, Ill.  
Wilcox, Crittenden & Co., Inc.,  
Middletown, Conn.  
Witt Cornice Co., The,  
Cincinnati, O.

**GALVANIZING COMPOUNDS**

American Solder & Flux Co.,  
2153 E. Norris St.,  
Philadelphia, Pa.

**GALVANIZING PLANTS FOR  
SHEETS**

Erie Foundry Co., Erie, Pa.  
Wean Engineering Co., Warren, O.

**GALVANIZING PRODUCTS**

Enterprise Galvanizing Co., 2525  
E. Cumberland St., Philadelphia,  
Pa.

**GAS HOLDERS**

Bartlett-Hayward Div., Koppers  
Co., Baltimore, Md.  
Bethlehem Steel Co.,  
Bethlehem, Pa.  
Western Gas Div., Koppers Co.,  
Fort Wayne, Ind.

**GAS PRODUCER PLANTS**

Koppers Co., Engineering and Con-  
struction Div., 901 Koppers  
Bldg., Pittsburgh, Pa.  
Morgan Construction Co.,  
Worcester, Mass.  
Wood, R. D., Co., 400 Chestnut  
St., Philadelphia, Pa.

**GAS RECOVERY COKE OVEN  
AND GAS PLANTS**

Bartlett-Hayward Div., Koppers  
Co., Baltimore, Md.  
Koppers Co., Engineering and Con-  
struction Div., 901 Koppers  
Bldg., Pittsburgh, Pa.

**GAS SCRUBBERS**

Bartlett-Hayward Div., Koppers  
Co., Baltimore, Md.  
Western Gas Div., Koppers Co.,  
Fort Wayne, Ind.

**GASKETS (Asbestos, Metal or  
Rubber)**

Johns-Manville Corp.,  
22 E. 40th St., New York City.

**GEAR BLANKS**

Ampco Metal, Inc., Dept. S-2,  
3830 W. Burnham St.,  
Milwaukee, Wis.  
Bay City Forge Co., W. 19th and  
Cranberry Sts., Erie, Pa.  
Bethlehem Steel Co.,  
Bethlehem, Pa.  
King Fifth Wheel Co., 2915 No.  
Second St., Philadelphia, Pa.  
National-Erie Corp., Erie, Pa.  
Philadelphia Gear Works,  
Erie Ave. & G St.,  
Philadelphia, Pa.  
Standard Steel Works Div. of The  
Baldwin Locomotive Works,  
Philadelphia, Pa.  
Waldron, John, Corp.,  
New Brunswick, N. J.

**GEAR MACHINERY (Generating)**

National Broach & Machine Co.,  
5600 St. Jean, Detroit, Mich.

**GEAR MACHINERY (Lapping, Fin-  
ishing, Checking)**

Michigan Tool Co., 7171 E.  
McNichols Rd., Detroit, Mich.

**GEARS (Non-Metallic)**

Chicago Rawhide Mfg. Co.,  
1308 Elston Ave., Chicago, Ill.  
Pittsburgh Gear & Machine Co.,  
2680-2700 Smallman St.,  
Pittsburgh, Pa.  
Simonds Gear & Mfg. Co., The,  
25th St., Pittsburgh, Pa.

**GEARS (Steel Laminated)**

Simonds Gear & Mfg. Co., The,  
25th St., Pittsburgh, Pa.  
Waldron, John, Corp.,  
New Brunswick, N. J.

**GEARS (Worm)**

Cleveland Worm & Gear Co.,  
3270 E. 80th St., Cleveland, C.  
Horsburgh & Scott Co., The,  
5112 Hamilton Ave., Cleveland, O.  
Michigan Tool Co., 7171 E.  
McNichols Rd., Detroit, Mich.  
Philadelphia Gear Works,  
Erie Ave. & G St.,  
Philadelphia, Pa.  
Pittsburgh Gear & Machine Co.,  
2680-2700 Smallman St.,  
Pittsburgh, Pa.  
Simonds Gear & Mfg. Co., The,  
25th St., Pittsburgh, Pa.

**GEARS AND GEAR CUTTING**

General Electric Co.,  
Schenectady, N. Y.  
Grant Gear Works,  
2nd & B Sts., Boston, Mass.  
Horsburgh & Scott Co., The,  
5112 Hamilton Ave., Cleveland, O.  
James, D. O., Mfg. Co.,  
1120 W. Monroe St., Chicago, Ill.

## WHERE-TO-BUY

**GEARS AND GEAR CUTTING—**  
 Con.  
 Jones, W. A., Fdry. & Mach. Co.,  
 4437 Roosevelt Rd., Chicago, Ill.  
 Lewis Foundry & Machine Div. of  
 Blaw-Knox Co., Pittsburgh, Pa.  
 Mackintosh-Hemphill Co., 9th and  
 Bingham Sts., Pittsburgh, Pa.  
 Mesta Machine Co., P. O. Box 1466  
 Pittsburgh, Pa.  
 Michigan Tool Co., 7171 E.  
 McNichols Rd., Detroit, Mich.  
 National-Erie Corp., Erie, Pa.  
 Philadelphia Gear Works,  
 Erie Ave. & G St.,  
 Philadelphia, Pa.  
 Pittsburgh Gear & Machine Co.,  
 2630-2700 Smallman St.,  
 Pittsburgh, Pa.  
 Simonds Gear & Mfg. Co.,  
 25th St., Pittsburgh, Pa.  
 United Engineering & Fdry. Co.,  
 First National Bank Bldg.,  
 Pittsburgh, Pa.

**GENERATING SETS**  
 Fairbanks, Morse & Co., Dept. C75,  
 600 So. Michigan Ave.,  
 Chicago, Ill.  
 General Electric Co.,  
 Schenectady, N. Y.  
 Harnischfeger Corp., 4411 W. Na-  
 tional Ave., Milwaukee, Wis.  
 Reliance Electric & Eng. Co.,  
 1081 Ivanhoe Rd., Cleveland, O.  
 Westinghouse Electric & Mfg. Co.,  
 Dept. 7-N, East Pittsburgh, Pa.

**GENERATORS (Acetylene—  
 Portable and Stationary)**  
 Linde Air Products Co., The,  
 30 E. 42nd St., New York City.

**GENERATORS (Electric)**  
 Allis-Chalmers Mfg. Co.,  
 Milwaukee, Wis.  
 Fairbanks, Morse & Co., Dept. C75,  
 600 S. Michigan Ave.,  
 Chicago, Ill.  
 General Electric Co.,  
 Schenectady, N. Y.  
 Harnischfeger Corp., 4411 W. Na-  
 tional Ave., Milwaukee, Wis.  
 Lincoln Electric Co., The,  
 Cleveland, O.  
 Reliance Electric & Eng. Co.,  
 1081 Ivanhoe Rd., Cleveland, O.  
 Westinghouse Electric & Mfg. Co.,  
 Dept. 7-N, East Pittsburgh, Pa.

**GENERATORS (Plating)**  
 Udyllite Corp., The, 1651 E. Grand  
 Blvd., Detroit, Mich.

**GRABS—FOR SHEETS, COILS,  
 INGOTS**  
 J-E Engineering Sales Co.,  
 1743 Orange St., New Haven,  
 Conn.

**GRAPHITE**  
 United States Graphite Co., The,  
 Saginaw, Mich.

**GRATING**  
 Blaw-Knox Co., Blawnox, Pa.  
 Dravo Corp., (Machinery Div.),  
 300 Penn Ave., Pittsburgh, Pa.  
 Tri-Lok Co., 5515 Butler St.,  
 Pittsburgh, Pa.

**GREASE FITTINGS**  
 Lincoln Engineering Co.,  
 5700 Natural Bridge Ave.,  
 St. Louis, Mo.

**GREASE GUNS**  
 Lincoln Engineering Co.,  
 5700 Natural Bridge Ave.,  
 St. Louis, Mo.

**GREASE (Lubricating)—See  
 LUBRICANTS (Industrial)**

**GREASE RETAINERS AND  
 SEALS**  
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 1308 Elston Ave., Chicago, Ill.

**GRINDER CENTERS**  
 McKenna Metals Co.,  
 200 Lloyd Ave., Latrobe, Pa.

**GRINDER HEADS**  
 Fitchburg Grinding Machine Corp.,  
 Fitchburg, Mass.

**GRINDERS (Circular Saw)**  
 Motch & Merryweather Machinery  
 Co., Penton Bldg.,  
 Cleveland, O.

**GRINDERS (Foundry Core)**  
 Milwaukee Foundry Equipment Co.,  
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 Milwaukee, Wis.

**GRINDERS (Precision Thread)**  
 Ex-Cell-O Corp., 1228 Oakman  
 Blvd., Detroit, Mich.

**Jones & Lamson Machine Co.,**  
 Springfield, Vt.

**GRINDERS (Single Slide Internal)**  
 Bryant Chucking Grinder Co.,  
 Springfield, Vt.

**GRINDERS (Surface)**  
 Brown & Sharpe Mfg. Co.,  
 Providence, R. I.  
 Heald Machine Co.,  
 Worcester, Mass.  
 Norton Company, Worcester, Mass.

**GRINDING (Shear Knife)**  
 American Shear Knife Co.,  
 3rd & Ann Sts., Homestead, Pa.

**GRINDING COMPOUNDS**  
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 2733 S. Troy St., Chicago, Ill.  
 Sun Oil Co., Dept. 1, 1608 Walnut  
 St., Philadelphia, Pa.  
 Wayne Chemical Products Co.,  
 9502 Copeland St., Detroit, Mich.

**GRINDING MACHINE ATTACH-  
 MENTS**  
 Fitchburg Grinding Machine Corp.,  
 Fitchburg, Mass.

**GRINDING MACHINES  
 (Automotive Reconditioning)**  
 Heald Machine Co.,  
 Worcester, Mass.

**GRINDING MACHINES (Bench &  
 Floor Type)**  
 Walker-Turner Co., Inc.,  
 5012 Berckman St.,  
 Plainfield, N. J.

**GRINDING MACHINES (Center-  
 less, Internal and External)**  
 Cincinnati Milling Machine and  
 Cincinnati Grinders, Inc.,  
 Oakley Sta., Cincinnati, O.  
 Heald Machine Co.,  
 Worcester, Mass.

**GRINDING MACHINES  
 (Chucking)**  
 Cincinnati Milling Machine and  
 Cincinnati Grinders, Inc.,  
 Oakley Sta., Cincinnati, O.  
 Fitchburg Grinding Machine Corp.,  
 Fitchburg, Mass.  
 Heald Machine Co.,  
 Worcester, Mass.

**GRINDING MACHINES (Crank  
 Pin, Cam, Piston & Valve Face)**  
 Cincinnati Milling Machine and  
 Cincinnati Grinders, Inc.,  
 Oakley Sta., Cincinnati, O.  
 Norton Company, Worcester, Mass.

**GRINDING MACHINES (Die)**  
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 Fitchburg, Mass.

**GRINDING MACHINES (Gear)**  
 Fitchburg Grinding Machine Corp.,  
 Fitchburg, Mass.

**GRINDING MACHINES  
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 Cincinnati Milling Machine  
 and Cincinnati Grinders, Inc.,  
 Oakley Sta., Cincinnati, O.

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 (Plain and Universal)**  
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 Providence, R. I.  
 Cincinnati Milling Machine  
 and Cincinnati Grinders, Inc.,  
 Oakley Sta., Cincinnati, O.  
 Fitchburg Grinding Machine Corp.,  
 Fitchburg, Mass.  
 Norton Co., Worcester, Mass.

**GRINDING MACHINES (Roll)**  
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 and Cincinnati Grinders, Inc.,  
 Oakley Sta., Cincinnati, O.  
 Mesta Machine Co., P. O. Box 1466,  
 Pittsburgh, Pa.  
 Norton Co., Worcester, Mass.

**GRINDING MACHINES  
 (Rotary Surface)**  
 Blanchard Machine Co., The, 64  
 State St., Cambridge, Mass.  
 Heald Machine Co.,  
 Worcester, Mass.

**GRINDING MACHINES (Sec-  
 mental)**  
 Norton Company,  
 Worcester, Mass.

**GRINDING MACHINES (Spindle)**  
 Fitchburg Grinding Machine Corp.,  
 Fitchburg, Mass.

**GRINDING MACHINES  
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 Brown & Sharpe Mfg. Co.,  
 Providence, R. I.  
 Cincinnati Milling Machine  
 and Cincinnati Grinders, Inc.,  
 Oakley Sta., Cincinnati, O.  
 Ex-Cell-O Corp., 1228 Oakman  
 Blvd., Detroit, Mich.  
 Fitchburg Grinding Machine Corp.,  
 Fitchburg, Mass.  
 Kearney & Trecker Corp., 5926 Na-  
 tional Ave., Milwaukee, Wis.  
 Norton Co., Worcester, Mass.  
 Oster Mfg. Co., The,  
 2037 E. 61st St., Cleveland, O.  
 Walker-Turner Co., Inc.,  
 5012 Berckman St.,  
 Plainfield, N. J.  
 William Sellers & Co., Inc.,  
 16th & Callowhill St.,  
 Philadelphia, Pa.

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 Tacony & Fraley Sts.,  
 Philadelphia, Pa.  
 Atkins, E. C., & Co.,  
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 Blanchard Machine Co., The, 64  
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 Cleveland Quarries Co., Tiffin, O.

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 Carborundum Co., The,  
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 Norton Company, Worcester, Mass.  
 Sterling Grinding Wheel Div.,  
 Cleveland Quarries Co., Tiffin, O.

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 Youngstown Alloy Casting Corp.,  
 103 E. Indianola Ave.,  
 Youngstown, O.

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 Ampco Metal, Inc., Dept. S-2,  
 3830 W. Burnham St.,  
 Milwaukee, Wis.  
 National-Erie Corp., Erie, Pa.  
 Youngstown Alloy Casting Corp.,  
 103 E. Indianola Ave.,  
 Youngstown, O.

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 burg Branch, Pittsburgh, Pa.

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 Erie Foundry Co., Erie, Pa.  
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 Morgan Engineering Co., The,  
 Alliance, O.

**HAMMERS (Power)**  
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 Walworth Ave., Cleveland, O.

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 Alliance, Ohio.  
 Chambersburg Engineering Co.,  
 Chambersburg, Pa.  
 Erie Foundry Co., Erie, Pa.  
 Industrial Brownhoist Corp.,  
 Bay City, Mich.  
 Morgan Engineering Co., The,  
 Alliance, O.

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 Grinnell Co., Inc., Providence, R. I.  
 SKF Industries, Inc., Front St. and  
 Erie Ave., Philadelphia, Pa.

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 South Bend, Ind.  
 Fafnir Bearing Co.,  
 New Britain, Conn.  
 Hyatt Bearings Division,  
 General Motors Corp.,  
 Harrison, N. J.  
 New Departure Div., General  
 Motors Corp., Bristol, Conn.  
 SKF Industries, Inc., Front St. and  
 Erie Ave., Philadelphia, Pa.

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 National Machinery Co., Tiffin, O.

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 The, 5418 Lakeside Ave.,  
 Cleveland, O.  
 Van Dorn Iron Works,  
 2685 E. 79th St., Cleveland, O.

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 8076 Military Ave., Detroit, Mich.

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 Babcock & Wilcox Co., The,  
 Refractories Div., 85 Liberty St.,  
 New York City.

**HEATERS (Electric Space)**  
 Cutler-Hammer, Inc., 1211 St. Paul  
 Ave., Milwaukee, Wis.

**HEATERS (Unit)**  
 Dravo Corp. (Machinery Div.),  
 300 Penn Ave., Pittsburgh, Pa.  
 Grinnell Co., Inc., Providence, R. I.

**HELMETS (Blast Cleaning)**  
 Pangborn Corp., Hagerstown, Md.

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 American Chain & Cable Co., Inc.,  
 Bridgeport, Conn.

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 Providence, R. I.  
 Michlean Tool Co., 7171 E.  
 McNichols Rd., Detroit, Mich.

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 land Crane & Engineering Co.,  
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 Ford Chain Block Div. of Ameri-  
 can Chain & Cable Co., Inc., 2nd  
 & Diamond Sts., Philadelphia, Pa.  
 Reading Chain & Block Co.,  
 Dept. D-2, Reading, Pa.  
 Wright Mfg. Div. of American  
 Chain & Cable Co., Inc., York, Pa.  
 Yale & Towne Mfg. Co.,  
 4530 Tacony St., Philadelphia, Pa.

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 American Engineering Co.,  
 2484 Aramingo Ave.,  
 Philadelphia, Pa.  
 American MonoRail Co., The,  
 13102 Athens Ave., Cleveland, O.  
 Cleveland Tramrail Div. of Cleve-  
 land Crane & Engineering Co.,  
 1125 E. 283rd St., Wickliffe, O.  
 Euclid Crane & Hoist Co., The,  
 Chardon Rd., Euclid, Ohio.  
 Harnischfeger Corp., 4411 W. National  
 Ave., Milwaukee, Wis.  
 Industrial Brownhoist Corp.,  
 Bay City, Mich.

Reading Chain & Block Corp.,  
 Dept. D-2, Reading, Pa.  
 Shaw-Box Crane & Hoist Div.,  
 Manning, Maxwell & Moore, Inc.,  
 406 Broadway, Muskegon, Mich.  
 Shepard Niles Crane & Hoist Corp.,  
 358 Schuyler Ave.,  
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 Silent Hoist Winch & Crane Co.,  
 849 63rd St., Brooklyn, N. Y.  
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 Chain & Cable Co., Inc., York, Pa.  
 Yale & Towne Mfg. Co.,  
 4530 Tacony St., Philadelphia, Pa.

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 Philadelphia, Pa.

American MonoRail Co., The,  
 13102 Athens Ave., Cleveland, O.  
 Cleveland Tramrail Div. of Cleve-  
 land Crane & Engineering Co.,  
 1125 E. 283rd St., Wickliffe, O.  
 Euclid Crane & Hoist Co., The,  
 Chardon Rd., Euclid, Ohio.  
 Harnischfeger Corp., 4411 W. National  
 Ave., Milwaukee, Wis.  
 Reading Chain & Block Corp.,  
 Dept. D-2, Reading, Pa.  
 Shaw-Box Crane & Hoist Div.,  
 Manning, Maxwell & Moore, Inc.,  
 406 Broadway, Muskegon, Mich.  
 Shepard Niles Crane & Hoist Corp.,  
 358 Schuyler Ave.,  
 Montour Falls, N. Y.  
 Yale & Towne Mfg. Co.,  
 4530 Tacony St., Philadelphia, Pa.

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 Hanna Engineering Works,  
 1765 Elston Ave., Chicago, Ill.

**HONING MACHINES**  
 Micromatic Hone Corp.,  
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 Detroit, Mich.

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 American Chain & Cable Co., Inc.,  
 Bridgeport, Conn.

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 Carnegie-Illinois Steel Corp.,  
 Pittsburgh-Chicago.  
 Columbia Steel Co.,  
 San Francisco, Calif.  
 Laclede Steel Co., Arcade Bldg.,  
 St. Louis, Mo.  
 Ryerson, Jos. T. & Son, Inc.,  
 16th & Rockwell Sts., Chicago, Ill.  
 Stanley Works, The,  
 New Britain, Conn.  
 Bridgeport, Conn.  
 Tennessee Coal, Iron & Railroad  
 Co., Brown-Marx Bldg.,  
 Birmingham, Ala.  
 Youngstown Sheet & Tube Co., The,  
 Youngstown, O.

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 Fidelity Machine Co.,  
 3908-18 Frankford Ave.,  
 Philadelphia, Pa.

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 The American Brass Co.,  
 Waterbury, Conn.  
 Chicago Metal Hose Corp.,  
 1315 S. Third St., Maywood, Ill.

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 Raybestos Manhattan, Inc.,  
 Passaic, N. J.

**HUMIDIFIERS (Industrial)**  
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 Allis-Chalmers Mfg. Co.,  
 Milwaukee, Wis.  
 Baldwin Southwark Div.,  
 Baldwin Locomotive Works,  
 Philadelphia, Pa.

Bethlehem Steel Co.,  
 Bethlehem, Pa.  
 Chambersburg Engineering Co.,  
 Chambersburg, Pa.  
 Elmes, Chas. F., Engineering  
 Works, 243 N. Morgan St.,  
 Chicago, Ill.

Farquhar, A. B., Co., Ltd.,  
 175 Duke St., York, Pa.  
 Hannlin Mfg. Co., 621-631 So. Kol-  
 mar Ave., Chicago, Ill.  
 Morgan Engineering Co., The,  
 Alliance, O.  
 National-Erie Corp., Erie, Pa.  
 Schloemann Engineering Corp.,  
 Empire Bldg., Pittsburgh, Pa.  
 Weinman Pump & Supply Co., The,  
 210 Boulevard of the Allies,  
 Pittsburgh, Pa.  
 Wood, R. D., Co., 400 Chestnut St.,  
 Philadelphia, Pa.

**HYDRAULIC PRESSES—See  
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**HYDRAULIC UNITS**  
 Ex-Cell-O Corp., 1228 Oakman  
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 Racine Tool & Machine Co.,  
 Racine, Wis.  
 Weinman Pump & Supply Co., The,  
 210 Boulevard of the Allies,  
 Pittsburgh, Pa.

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 Slack Line)**  
 Brosius, Edgar E., Co., Sharp-  
 burg Branch, Pittsburgh, Pa.

**INDICATORS (Temperature)**  
 Bristol Co., The, 112 Bristol Rd.,  
 Waterbury, Conn.

Brown Instrument Div. of Min-  
 neapolis-Honeywell Regulator Co.,  
 4462 Wayne Ave.,  
 Philadelphia, Pa.  
 Foxboro Co., The, 118 Neponset  
 Ave., Foxboro, Mass.  
 Leeds & Northrup Co., 4957 Stenton  
 Ave., Philadelphia, Pa.

**INGOT MOLD WASH (Graphite)**  
 United States Graphite Co., The,  
 Saginaw, Mich.

**INGOT MOLDS**  
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 Bethlehem, Pa.  
 Shenango-Penn Mold Co.,  
 Oliver Bldg., Pittsburgh, Pa.  
 Valley Mould & Iron Corp.,  
 Hubbard, O.

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 Dept. 410, Ambler, Pa.  
 Parkin, Wm. M., Co., The,  
 1005 Highland Bldg.,  
 Pittsburgh, Pa.

**INSTRUMENTS (Electric-  
 Indicating and Recording)**  
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 Waterbury, Conn.  
 Brown Instrument Div. of Min-  
 neapolis-Honeywell Regulator  
 Co., 4462 Wayne Ave.,  
 Philadelphia, Pa.  
 Foxboro Co., The, 118 Neponset  
 Ave., Foxboro, Mass.  
 General Electric Co.,  
 Schenectady, N. Y.  
 Graybar Electric Co.,  
 420 Lexington Ave.,  
 New York City.  
 Leeds & Northrup Co., 4957 Stenton  
 Ave., Philadelphia, Pa.  
 Westinghouse Electric & Mfg. Co.,  
 Dept. 7-N, East Pittsburgh, Pa.

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 Johns-Manville Corp.,  
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 Ramtite Co., The, Div. of the S.  
 Obermayer Co., 2557 W. 18th St.,  
 Chicago, Ill.

**INSULATING BRICK**  
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 Johns-Manville Corp.,  
 22 E. 40th St., New York City.  
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 Dept. S, Chrysler Bldg.,  
 New York City.  
 Illinois Clay Products Co.,  
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 Johns-Manville Corp., 22 E. 40th  
 St., New York City.

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 Ajax Electrothermic Corp.,  
 Ajax Park, Trenton, N. J.  
 Babcock & Wilcox Co., The,  
 Refractories Div., 85 Liberty St.,  
 New York City.  
 Illinois Clay Products Co.,  
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 Johns-Manville Corp., 22 E. 40th  
 St., New York City.  
 Ramtite Co., The, Div. of the S.  
 Obermayer Co., 2557 W. 18th St.,  
 Chicago, Ill.

**INSULATION (Building)**  
 Carey, Philip, Co., The,  
 Lockland, Cincinnati, O.  
 Johns-Manville Corp., 22 E. 40th  
 St., New York City.

**INSULATION (Furnace, Boiler  
 Settings, Ovens, Steam Pipe, Etc.)**  
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 Cleveland-Cliffs Iron Co., Union  
 Commerce Bldg., Cleveland, O.  
 Hanna Furnace Corp., The,  
 Ecorse, Detroit, Mich.  
 Pickands Mather & Co.,  
 Union Commerce Bldg.,  
 Cleveland, O.  
 Shenango Furnace Co.,  
 Oliver Bldg., Pittsburgh, Pa.  
 Snyder, W. P., & Co.,  
 Oliver Bldg., Pittsburgh, Pa.  
 Youngstown Sheet & Tube Co., The,  
 Youngstown, O.

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 Chicago, Ill.  
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 Green Bay, Wis.

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 Harnischfeger Corp., 4411 W. National  
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 Atkins, E. C., & Co.,  
 427 So. Illinois St.,  
 Indianapolis, Ind.  
 Cowles Tool Co.,  
 2086 W. 110th St., Cleveland, O.  
 Disston, Henry, & Sons, Inc.,  
 226 Tacony, Philadelphia, Pa.  
 Ohio Knife Co., Duman Ave. &  
 B. & O. R.R., Cincinnati, O.

**LABORATORY EQUIPMENT**  
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 9330J Roselawn Ave.,  
 Detroit, Mich.

**LABORATORY WARE**  
 Bay State Abrasive Products Co.,  
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 Norton Company, Worcester, Mass.

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 101 Andrews Ave., Youngstown, O.

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 Cincinnati Milling Machine  
 and Cincinnati Grinders, Inc.,  
 Oakley Sta., Cincinnati, O.  
 Ex-Cell-O Corp., 1228 Oakman  
 Bld., Detroit, Mich.  
 National Branch & Machine Co.,  
 5600 St. Jean, Detroit, Mich.  
 Norton Company, Worcester, Mass.

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 Challenge Machinery Co.,  
 Grand Haven, Mich.

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 Differential Steel Car Co.,  
 Findlay, O.

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 McKenna Metals Co.,  
 200 Lloyd Ave., Latrobe, Pa.

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 400 Vulcan St., Buffalo, N. Y.

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 Jones & Lamson Machine Co.,  
 Springfield, Vt.

LeBlond, R. K., Machine Tool Co.,  
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 Monarch Machine Tool Co.,  
 Sidney, O.  
 Morey Machinery Co., Inc.,  
 410 Broome St., New York City.

South Bend Lathe Works, 857 E.  
 Madison St., South Bend, Ind.  
 Warner & Swasey Co., 5701 Car-  
 negie Ave., Cleveland, O.

**LATHES (Automatic)**  
 Brown & Sharpe Mfg. Co.,  
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 Madison, Wis.  
 Jones & Lamson Machine Co.,  
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Oster Mfg. Co., The, 2037 E. 61st St., Cleveland, O.

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South Bend Lathe Works, 857 E. Madison St., South Bend, Ind.

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Hyde Park Foundry & Machine Co., Hyde Park, Pa.

Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh, Pa.

Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh, Pa.

Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.

United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.

Warner & Swasey Co., 5701 Carnegie Ave., Cleveland, O.

**LATHES (Turret)** Brown & Sharpe Mfg. Co., Providence, R. I.

Bullard Company, The, Bridgeport, Conn.

Gisholt Machine Co., 1217 E. Washington Ave., Madison, Wis.

Jones & Lamson Machine Co., Springfield, Vt.

Oster Mfg. Co., The, 2037 E. 61st St., Cleveland, O.

Warner & Swasey Co., 5701 Carnegie Ave., Cleveland, O.

**LAYOUT SURFACE PLATES** Challenge Machinery Co., Grand Haven, Mich.

**LEAD (Tellurium)** National Lead Co., 111 Broadway, New York City.

**LENSES (Illuminated)** Pike, E. W., & Co., 492 North Ave., Elizabeth, N. J.

**LEVELING MACHINES** Erie Foundry Co., Erie, Pa.

Hyde Park Foundry & Machine Co., Hyde Park, Pa.

McKay Machine Co., Youngstown, O.

Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.

Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.

Wean Engineering Co., Warren, O.

**LIFT TRUCKS—See TRUCKS (Lift)**

**LIFTING MAGNETS—See MAGNETS (Lifting)**

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**LINERS (Pump and Cylinder)** Shenango-Penn Mold Co., Dover, O.

**LOCOMOTIVE CRANES—See CRANES (Locomotive)**

**LOCOMOTIVES (Diesel-Electric)** Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland, O.

Cooper-Bessemer Corp., The, Mt. Vernon, O.

Differential Steel Car Co., Findlay, O.

Plymouth Locomotive Works, Div., Fate-Root-Heath Co., Plymouth, O.

Porter, H. K., Co., Inc., 49th & Harrison Sts., Pittsburgh, Pa.

Whitcomb Locomotive Co., Rochelle, Ill.

**LOCOMOTIVES (Diesel Mechanical)** Plymouth Locomotive Works, Div., Fate-Root-Heath Co., Plymouth, O.

Porter, H. K., Co., Inc., 49th & Harrison Sts., Pittsburgh, Pa.

Whitcomb Locomotive Co., Rochelle, Ill.

**LOCOMOTIVES (Electric)** Porter, H. K., Co., Inc., 49th & Harrison Sts., Pittsburgh, Pa.

**LOCOMOTIVES (Electric Trolley)** Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland, O.

Differential Steel Car Co., Findlay, O.

General Electric Co., Schenectady, N. Y.

Whitcomb Locomotive Co., Rochelle, Ill.

**LOCOMOTIVES (Wireless)** Porter, H. K., Co., Inc., 49th & Harrison Sts., Pittsburgh, Pa.

**LOCOMOTIVES (Gasoline-Electric)** Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland, O.

Differential Steel Car Co., Findlay, O.

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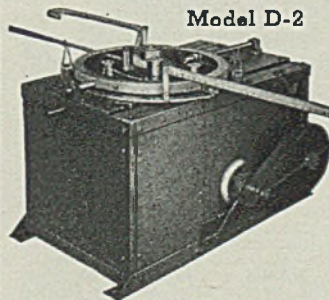
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Republic Steel Corp., Dept. ST. Cleveland, O.  
Tubular Service Corp., 120 44th St., Brooklyn, N. Y.  
Western Gas Div., Koppers Co., Fort Wayne, Ind.  
Wheeling Steel Corp., Wheeling, W. Va.  
Youngstown Sheet & Tube Co., The, Youngstown, O.

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National Forge & Ordnance Co., Irvine, Warren Co., Pa.  
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Nicetown, Philadelphia, Pa.  
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Oliver Bldg., Pittsburgh, Pa.

Firth-Sterling Steel Co.,  
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Monarch Steel Co., 545 W. McCarty  
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Rockefeller Bldg., Cleveland, O.

Bethlehem Steel Co.,  
Bethlehem, Pa.  
Carnegie-Illinois Steel Corp.,  
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Columbia Steel Co.,  
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\*Copperweld Steel Co., Warren, O.

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Jones & Laughlin Steel Corp.,  
Jones & Laughlin Bldg.,  
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**RODS (Welding)—See WELDING  
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Monessen, Pa.

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Andrews Steel Co., The,  
Newport, Ky.

Bethlehem Steel Co.,  
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Lockland, Cincinnati, O.

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Continental Steel Corp.,  
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Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.  
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**SHEETS (Perforated)**  
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**SHEETS (Phosphor Bronze)**  
 Seymour Manufacturing Co., The, Seymour, Conn.

**SHEETS (Reinforced)**  
 Erdle Perforating Co., 171 York St., Rochester, N. Y.

**SHEETS (Roofing)**—See ROOFING AND SIDING

**SHEETS (Stainless)**  
 Allegheny Ludlum Steel Corp., Dept. T-125, Oliver Bldg., Pittsburgh, Pa.  
 American Rolling Mill Co., The, 3091 Curtis St., Middletown, O.  
 Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.  
 Columbia Steel Co., San Francisco, Calif.  
 Republic Steel Corp., Massillon, O.  
 Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.

**SHEETS (Stainless Clad)**  
 Granite City Steel Co., Granite City, Ill.  
 Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago, Ill.

**SHEETS (Tin)**—See TIN PLATE  
**SHEETS (Tin Mill Black)**  
 Andrews Steel Co., The, Newport, Ky.

Bethlehem Steel Co., Bethlehem, Pa.  
 Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.  
 Columbia Steel Co., San Francisco, Calif.  
 Granite City Steel Co., Granite City, Ill.  
 Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.  
 Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.  
 Republic Steel Corp., Dept. ST, Cleveland, O.  
 Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.  
 Weirton Steel Co., Weirton, W. Va.

**SHEETS—HIGH FINISH**  
 (Automobile, Metal Furniture, Enamelling)  
 American Rolling Mill Co., The, 3091 Curtis St., Middletown, O.  
 Andrews Steel Co., The, Newport, Ky.  
 Apollo Steel Co., 2243-2244 Oliver Bldg., Pittsburgh, Pa.  
 Bethlehem Steel Co., Bethlehem, Pa.  
 Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.  
 Columbia Steel Co., San Francisco, Calif.  
 Great Lakes Steel Corp., Ecorse, Detroit, Mich.  
 Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.  
 Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.  
 Republic Steel Corp., Dept. ST, Cleveland, O.  
 Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.  
 Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.  
 Wheeling Steel Corp., Wheeling, W. Va.  
 Weirton Steel Co., Weirton, W. Va.  
 Youngstown Sheet & Tube Co., The, Youngstown, O.

**SHELL BANDS (Rotating)**  
 Lewin-Mathes Co., East St. Louis, Mo.

**SHELLS (Seamless Drawn)**  
 Crosby Co., The, 183 Pratt St., Buffalo, N. Y.

**SHOVELS (Power)**  
 Northwest Engineering Co., 23 E. Jackson Blvd., Chicago, Ill.

**SIEVES**—See SCREENS AND SIEVES  
**SIGNALING & INTER-COMMUNICATION EQUIPMENT**  
 Graybar Electric Co., 420 Lexington Ave., New York City.

**SILICO-MANGANESE**  
 Electro Metallurgical Co., 30 E. 42nd St., New York City.  
 Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia, Pa.

**SILICON METAL AND ALLOYS**  
 Electro Metallurgical Co., 30 E. 42nd St., New York City.  
 Revere Copper & Brass, Inc., 230 Park Ave., New York City.  
 Vanadium Corp. of America, 420 Lexington Ave., New York City.

**SKELP (Steel)**  
 Alan Wood Steel Co., Conshohocken, Pa.  
 Bethlehem Steel Co., Bethlehem, Pa.  
 Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.  
 Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.  
 Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.  
 Laclede Steel Co., Arcade Bldg., St. Louis, Mo.  
 Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.

**SLAG GRANULATING MACHINES (Blast Furnace and Open Hearth)**  
 Brosius, Edgar E., Co., Sharpshurg Branch, Pittsburgh, Pa.

**SLITTERS**  
 Cowles Tool Co., 2086 W. 110th St., Cleveland, O.  
 Ohio Knife Co., Dreman Ave. & B. & O. R.R., Cincinnati, O.

**SMALL TOOLS**  
 Brown & Sharpe Mfg. Co., Providence, R. I.  
 Cleveland Twist Drill Co., The, 1242 E. 49th St., Cleveland, O.

**SOAKING PITS**  
 Amsler-Morton Co., The, Fulton Bldg., Pittsburgh, Pa.  
 Salem Engineering Co., 714 S. Broadway, Salem, O.  
 Surface Combustion Div., 2375 Dorr St., Toledo, O.

**SOLDER**  
 Kester Solder Co., 4222 Wrightwood Ave., Chicago, Ill.  
 Wayne Chemical Products Co., 9502 Copeland St., Detroit, Mich.

**SOLENOIDS (Electric)**  
 Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee, Wis.

**SOLVENT (Degreasing)**  
 Pennsylvania Salt Mfg. Co., Dept. S. Pennsalt Cleaner Div., Philadelphia, Pa.

**SPACING TABLES**  
 Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh, Pa.

**SPECIAL MACHINERY**—See MACHINERY (Special)

**SPEED REDUCERS**  
 Cleveland Worm & Gear Co., 3270 E. 80th St., Cleveland, O.  
 Grant Gear Works, 2nd & B. Sts., Boston, Mass.  
 Horschburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland, O.  
 James, D. O., Mfg. Co., 1120 W. Monroe St., Chicago, Ill.  
 Jones, W. A., Fdry. & Mach. Co., 4437 Roosevelt Rd., Chicago, Ill.  
 Link-Belt Co., 2045 W. Hunting Park Ave., Philadelphia, Pa.  
 Michigan Tool Co., 7171 E. McNichols Rd., Detroit, Mich.  
 New Departure Div., General Motors Corp., Bristol, Conn.  
 Philadelphia Gear Works, Erie Ave. & G St., Philadelphia, Pa.

**SPIEGELEISEN**  
 Electro Metallurgical Co., 30 E. 42nd St., New York City.  
 New Jersey Zinc Co., 160 Front St., New York City.  
 Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia, Pa.

**SPIKES (Screw)**  
 Bethlehem Steel Co., Bethlehem, Pa.  
 Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.

Columbia Steel Co., San Francisco, Calif.  
 Republic Steel Corp., Dept. ST, Cleveland, O.  
 Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.  
 Youngstown Sheet & Tube Co., The, Youngstown, O.

**SPINDLE SHAPERS (For Non-Ferrous Metal, Plastics & Wood)**  
 Walker-Turner Co., Inc., 5012 Berekman St., Plainfield, N. J.

**SPINDLES (Grinding)**  
 Bryant Chucking Grinder Co., Springfield, Vt.  
 Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit, Mich.  
 Heald Machine Co., Worcester, Mass.

**SPINDLES (Lathe)**  
 American Hollow Boring Co., 1054 W. 20th St., Erie, Pa.

**SPLICE BARS (Rail)**  
 Bethlehem Steel Co., Bethlehem, Pa.  
 Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.  
 Columbia Steel Co., San Francisco, Calif.  
 Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.  
 Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.

**SPRINGS**  
 (\*Also Stainless)  
 \*American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.  
 \*Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.  
 Hubbard, M. D., Spring Co., 443 Central Ave., Pontiac, Mich.  
 Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.  
 \*Raymond Mfg. Co., Div. Associated Spring Corp., 280 So. Centre St., Corry, Pa.  
 Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia, Pa.  
 Washburn Wire Co., 118th St. & Harlem River, New York City.

**SPRINGS (Alloy)**  
 Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.  
 Raymond Mfg. Co., Div. Associated Spring Corp., 280 So. Centre St., Corry, Pa.

**SPRINGS (Coil & Elliptic)**  
 Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.  
 Raymond Mfg. Co., Div. Associated Spring Corp., 280 So. Centre St., Corry, Pa.

**SPRINGS (Compression)**  
 Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.  
 Raymond Mfg. Co., Div. Associated Spring Corp., 280 So. Centre St., Corry, Pa.

**SPRINGS (Oil Tempered—Flat)**  
 Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.  
 Davis Brake Beam Co., Laurel Ave. & P. R. R., Johnstown, Pa.  
 Raymond Mfg. Co., Div. Associated Spring Corp., 280 So. Centre St., Corry, Pa.

**SPRINGS (Torston)**  
 Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.  
 Raymond Mfg. Co., Div. Associated Spring Corp., 280 So. Centre St., Corry, Pa.

**SPRINGS (Valve)**  
 Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.  
 Raymond Mfg. Co., Div. Associated Spring Corp., 280 So. Centre St., Corry, Pa.

**SPRINKLERS (Automatic)**  
 Grinnell Co., Inc., Providence, R. I.

**SPRUCE CUTTERS**  
 Shuster, F. B., Co., The, New Haven, Conn.

**STACKS (Steel)**—See BRIDGES, ETC.

**STAINLESS STRIP—See BARS, SHEETS, STRIP, PLATES, ETC.**

**STAMPINGS**  
 American Tube & Stamping Plant, (Stanley Wks.), Bridgeport, Conn.

Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.  
 Crosby Co., The, 183 Pratt St., Buffalo, N. Y.  
 Dahlstrom Metallic Door Co., Jamestown, N. Y.  
 Davis Brake Beam Co., Laurel Ave. & P. R. R., Johnstown, Pa.  
 Dayton Rogers Co., Minneapolis, Minn.  
 Erdle Perforating Co., 171 York St., Rochester, N. Y.  
 Homestead Valve Mfg. Co., P. O. Box 20, Coraopolis, Pa.  
 Hubbard, M. D., Spring Co., 443 Central Ave., Pontiac, Mich.  
 Kirk & Blum Mfg. Co., The, 2838 Spring Grove Ave., Cincinnati, O.  
 Lyon Metal Products, Inc., 7203 Madison Ave., Aurora, Ill.  
 Pressed Steel Tank Co., 1461 So. 66th St., Milwaukee, Wis.  
 Raymond Mfg. Co., Div. Associated Spring Corp., 280 So. Centre St., Corry, Pa.  
 Scalfe Co., Ames St., Oakmont, Pa.  
 Stanley Works, The, Bridgeport, Conn.  
 Toledo Stamping & Mfg. Co., 90 Fearing Blvd., Toledo, O.  
 Whitehead Stamping Co., 1667 W. Lafayette Blvd., Detroit, Mich.

**STAMPS (Steel)**  
 Cunningham, M. E., Co., 172 E. Carson St., Pittsburgh, Pa.

**STAPLES (Wire)**  
 American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.  
 Columbia Steel Co., San Francisco, Calif.  
 Continental Steel Corp., Kokomo, Ind.  
 Republic Steel Corp., Dept. ST, Cleveland, O.  
 Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.  
 Wickwire Brothers, 189 Main St., Cortland, N. Y.  
 Youngstown Sheet & Tube Co., The, Youngstown, O.

**STARTERS (Electric Motor)**  
 Electric Controller & Mfg. Co., The, 2700 E. 79th St., Cleveland, O.

**STEEL (Alloy)**  
 Alan Wood Steel Co., Conshohocken, Pa.  
 American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.  
 Bethlehem Steel Co., Bethlehem, Pa.  
 Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.  
 Carpenter Steel Co., Dept. 51, Reading, Pa.  
 Columbia Steel Co., San Francisco, Calif.  
 Copperweld Steel Co., Warren, O.  
 Disston, Henry, & Sons, Inc., 226 Tacony, Philadelphia, Pa.  
 Frith-Sterling Steel Co., McKeesport, Pa.  
 Frasse, Peter A., & Co., Inc., 17 Grand St., New York City  
 Heppenstall Co., 47th & Hatfield Sts., Pittsburgh, Pa.  
 Jessop Steel Co., 584 Green St., Washington, Pa.  
 Midvale Co., The, Nicetown, Philadelphia, Pa.  
 National Forge & Ordnance Co., Irvine, Warren Co., Pa.  
 Republic Steel Corp., Dept. ST, Cleveland, O.  
 Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.

**STEEL (Alloy, Cold Finished)**  
 American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.  
 Bliss & Laughlin, Inc., Harvey, Ill.  
 Copperweld Steel Co., Warren, O.  
 Frith-Sterling Steel Co., McKeesport, Pa.  
 LaSalle Steel Co., Chicago, Ill.  
 Moltrup Steel Products Co., Beaver Falls, Pa.



## WHERE - TO - BUY

### STEEL (Alloy, Cold Finished)— Con.

Monarch Steel Co., 545 W. McCarty St., Indianapolis, Ind.  
 Union Drawn Steel Div. of Republic Steel Corp., Massillon, O.  
 Wyckoff Drawn Steel Co., First National Bank Bldg., Pittsburgh, Pa.

### STEEL (Clad—Corrosion Resisting) (\*Also Stainless)

Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.  
 Carpenter Steel Co., Dept. 51, Reading, Pa.  
 \*Copperweld Steel Co., Warren, O. Room 117—405 Lexington Ave., New York City.  
 \*Granite City Steel Co., Granite City, Ill.  
 Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago, Ill.  
 Jessop Steel Co., 584 Green St., Washington, Pa.  
 Sharon Steel Corp., Sharon, Pa.  
 Superior Steel Corp., Carnegie, Pa.

### STEEL (Cold Drawn)

American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.  
 Bliss & Laughlin, Inc., Harvey, Ill.  
 Firth-Sterling Steel Co., McKeesport, Pa.  
 Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.  
 Moltrup Steel Products Co., Beaver Falls, Pa.  
 Monarch Steel Co., 545 W. McCarty St., Indianapolis, Ind.  
 Roebing's, John A., Sons Co., Trenton, N. J.  
 Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.  
 Union Drawn Steel Div. of Republic Steel Corp., Massillon, O.  
 Wyckoff Drawn Steel Co., First National Bank Bldg., Pittsburgh, Pa.

### STEEL (Cold Finished)

American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.  
 Bethlehem Steel Co., Bethlehem, Pa.  
 Bliss & Laughlin, Inc., Harvey, Ill.  
 Firth-Sterling Steel Co., McKeesport, Pa.  
 Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.  
 LaSalle Steel Co., Chicago, Ill.  
 Moltrup Steel Products Co., Beaver Falls, Pa.  
 Monarch Steel Co., 545 W. McCarty St., Indianapolis, Ind.  
 Roebing's, John A., Sons Co., Trenton, N. J.  
 Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.  
 Scully Steel Products Co., 1316 Wabansia Ave., Chicago, Ill.  
 Union Drawn Steel Div. of Republic Steel Corp., Massillon, O.  
 Wyckoff Drawn Steel Co., First National Bank Bldg., Pittsburgh, Pa.

### STEEL (Corrosion Resisting)

Allegheny Ludlum Steel Corp., Dept. T-125, Oliver Bldg., Pittsburgh, Pa.  
 American Rolling Mill Co., The, 3091 Curtis St., Middletown, O.  
 American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.  
 Andrews Steel Co., The, Newport, Ky.  
 Bethlehem Steel Co., Bethlehem, Pa.  
 Blissett Steel Co., The, 943 E. 67th St., Cleveland, O.  
 Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.  
 Carpenter Steel Co., Dept. 51, Reading, Pa.  
 Firth-Sterling Steel Co., McKeesport, Pa.  
 Frasse, Peter A., & Co., Inc., 17 Grand St., New York City  
 Granite City Steel Co., Granite City, Ill.  
 Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago, Ill.  
 Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.  
 Jessop, Wm., & Sons, Inc., 627-629 Sixth Ave., New York City.  
 Jessop Steel Co., 584 Green St., Washington, Pa.  
 Midvale Co., The, Nicetown, Philadelphia, Pa.  
 National Forge & Ordnance Co., Irvine, Warren Co., Pa.  
 National Tube Co., Frick Bldg., Pittsburgh, Pa.  
 Republic Steel Corp., Dept. ST, Cleveland, O.

Roebing's, John A., Sons Co., Trenton, N. J.  
 Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.  
 Stanley Works, The, New Britain, Conn.  
 Bridgeport, Conn.  
 Superior Steel Corp., Carnegie, Pa.  
 Timken Roller Bearing Co., The, Steel & Tube Div., Canton, O.

### STEEL (Die)

Disston, Henry, & Sons, Inc., 226 Tacony, Philadelphia, Pa.  
 Jessop, Wm., & Sons, Inc., 627-629 Sixth Ave., New York City.  
 Jessop Steel Co., 584 Green St., Washington, Pa.  
 Vanadium-Alloys Steel Co., Latrobe, Pa.

### STEEL (Electric)

Bethlehem Steel Co., Bethlehem, Pa.  
 Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.  
 Copperweld Steel Co., Warren, O.  
 Disston, Henry, & Sons, Inc., 226 Tacony, Philadelphia, Pa.  
 Firth-Sterling Steel Co., McKeesport, Pa.  
 Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.  
 Jessop, Wm., & Sons, Inc., 627-629 Sixth Ave., New York City.  
 Jessop Steel Co., 584 Green St., Washington, Pa.  
 Latrobe Electric Steel Co., Latrobe, Pa.  
 National Forge & Ordnance Co., Irvine, Warren Co., Pa.  
 Republic Steel Corp., Dept. ST, Cleveland, O.  
 Timken Roller Bearing Co., The, Steel & Tube Div., Canton, O.

### STEEL (High Speed)

Allegheny Ludlum Steel Corp., Dept. T-125, Oliver Bldg., Pittsburgh, Pa.  
 Bethlehem Steel Co., Bethlehem, Pa.  
 Carpenter Steel Co., Dept. 51, Reading, Pa.  
 Disston, Henry, & Sons, Inc., 226 Tacony, Philadelphia, Pa.  
 Firth-Sterling Steel Co., McKeesport, Pa.  
 Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago, Ill.  
 Jessop, Wm., & Sons Co., 627-629 Sixth Ave., New York City.  
 Jessop Steel Co., 584 Green St., Washington, Pa.  
 Latrobe Electric Steel Co., Latrobe, Pa.  
 Vanadium-Alloys Steel Co., Latrobe, Pa.

### STEEL (High Tensile, Low Alloy)

Alan Wood Steel Co., Conshohocken, Pa.  
 Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.  
 Cold Metal Products Co., The, 2131 Wilson Ave., Youngstown, O.  
 Columbia Steel Co., San Francisco, Calif.  
 Great Lakes Steel Corp., Ecorse, Detroit, Mich.  
 Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.  
 Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.  
 Republic Steel Corp., Dept. ST, Cleveland, O.  
 Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.  
 Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.  
 Youngstown Sheet & Tube Co., The, Youngstown, O.

### STEEL (Nitriding)

Allegheny Ludlum Steel Corp., Dept. T-125, Oliver Bldg., Pittsburgh, Pa.  
 Firth-Sterling Steel Co., McKeesport, Pa.

### STEEL (Rustless)—See STEEL (Corrosion Resisting)

### STEEL (Screw Stock)

American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.  
 Bethlehem Steel Co., Bethlehem, Pa.  
 Bliss & Laughlin, Inc., Harvey, Ill.  
 Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.  
 Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.

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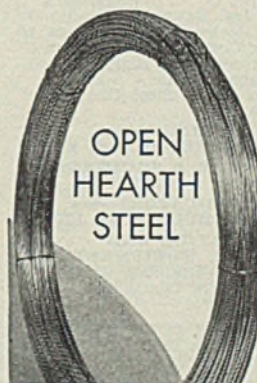
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**STEEL (Spring)**  
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O. Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn. Cold Metal Products Co., The, Wilson Ave., Youngstown, O. Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa. Roebbing's, John A., Sons Co., Trenton, N. J. Washburn Wire Co., 118th St. & Harlem River, New York City. Phillipsdale, R. I.

**STEEL (Stainless)**—See **STEEL (Corrosion Resisting)**

**STEEL (Strapping)**  
Atkins, E. C., & Co., 427 So. Illinois St., Indianapolis, Ind.

**STEEL (Strip, Copper Coated)**  
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O. Stanley Works, The, New Britain, Conn. Bridgeport, Conn. Thomas Steel Co., The, Warren, O. Rockefeller Bldg., Cleveland, O.

**STEEL (Strip, Hot and Cold Rolled)**  
(\*Also Stainless)  
Allegheny Ludlum Steel Corp., Dept. T-125, Oliver Bldg., Pittsburgh, Pa. American Rolling Mill Co., The, 3091 Curtis St., Middletown, O. American Steel & Wire Co., Rockefeller Bldg., Cleveland, O. American Tube & Stamping Plant, (Stanley Wks.), Bridgeport, Conn. Andrews Steel Co., The, Newport, Ky. Bethlehem Steel Co., Bethlehem, Pa. Carnegie-Illinois Steel Corp., Pittsburgh-Chicago. Cold Metal Products Co., The, 2131 Wilson Ave., Youngstown, O. Columbia Steel Co., San Francisco, Calif. Enterprise Galvanizing Co., 2525 E. Cumberland St., Philadelphia, Pa. Firth-Sterling Steel Co., McKeesport, Pa. Frasse, Peter A., & Co., Inc., 17 Grand St., New York City Great Lakes Steel Corp., Ecorse, Detroit, Mich. Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago, Ill. Inland Steel Co., 38 So. Dearborn St., Chicago, Ill. Jessop, Wm., & Sons, Inc., 627-629 Sixth Ave., New York City. Jessop Steel Co., 584 Green St., Washington, Pa. Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa. Republic Steel Corp., Dept. ST, Cleveland, O. Roebbing's, John A., Sons Co., Trenton, N. J. Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill. Scully Steel Products Co., 1316 Wabansia Ave., Chicago, Ill. Stanley Works, The, New Britain, Conn. Bridgeport, Conn. Superior Steel Corp., Carnegie, Pa. Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala. Thomas Steel Co., The, Warren, O. Washburn Wire Co., 118th St. & Harlem River, New York City. Phillipsdale, R. I. Weirton Steel Co., Weirton, W. Va.

**STEEL (Strip, Tin Coated)**  
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O. Roebbing's, John A., Sons Co., Trenton, N. J. Thomas Steel Co., The, Warren, O. Washburn Wire Co., 118th St. & Harlem River, New York City.

**STEEL (Strip, Zinc Coated)**  
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O. Roebbing's, John A., Sons Co., Trenton, N. J. Thomas Steel Co., The, Warren, O. Washburn Wire Co., 118th St. & Harlem River, New York City.

**STEEL (Structural)**  
(\*Also Stainless)  
American Bridge Co., Frick Bldg., Pittsburgh, Pa. Belmont Iron Works, 22nd St. and Washington Ave., Philadelphia, Pa. Bethlehem Steel Co., Bethlehem, Pa. Carnegie-Illinois Steel Corp., Pittsburgh-Chicago. Clinton Bridge Works, Clinton, Ia. Columbia Steel Co., San Francisco, Calif. Duffin Iron Co., 37 W. Van Buren St., Chicago, Ill. Enterprise Galvanizing Co., 2525 E. Cumberland St., Philadelphia, Pa. Gage Structural Steel Co., Chicago, Ill. Inland Steel Co., 38 So. Dearborn St., Chicago, Ill. Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa. Laclede Steel Co., Arcade Bldg., St. Louis, Mo. Levinson Steel Co., 33 Frick St., Pittsburgh, Pa. Midland Structural Steel Co., Cleora, Ill. Republic Steel Corp., Dept. ST, Cleveland, O. Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill. Scully Steel Products Co., 1316 Wabansia Ave., Chicago, Ill. Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala. Uhl Construction Co., 6001 Butler St., Pittsburgh, Pa. Weirton Steel Co., Weirton, W. Va. Youngstown Sheet & Tube Co., The, Youngstown, O.

**STEEL (Tool)**  
Allegheny Ludlum Steel Corp., Dept. T-125, Oliver Bldg., Pittsburgh, Pa. Bethlehem Steel Co., Bethlehem, Pa. Blissett Steel Co., The, 900 E. 67th St., Cleveland, O. Carpenter Steel Co., Dept. 51, Reading, Pa. Copperweld Steel Co., Warren, O. Darwin & Milner, Inc., 1260 W. 4th St., Cleveland, O. Dilsont, Henry, & Sons, Inc., 226 Tacony, Philadelphia, Pa. Firth-Sterling Steel Co., McKeesport, Pa. Frasse, Peter A., & Co., Inc., 17 Grand St., New York City Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago, Ill. Jessop, Wm., & Sons Co., 627-629 Sixth Ave., New York City. Jessop Steel Co., 584 Green St., Washington, Pa. Latrobe Electric Steel Co., Latrobe, Pa. Midvale Co., The, Nicetown, Philadelphia, Pa. National Broach & Mach. Co., 5600 St. Jean, Detroit, Mich. Republic Steel Corp., Dept. ST, Cleveland, O. Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill. Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala. Vanadium Alloys Steel Co., Latrobe, Pa.

**STEEL BUILDINGS**—See **BRIDGES, BUILDINGS, ETC.**

**STEEL DOORS & SHUTTERS**—See **DOORS & SHUTTERS**

**STEEL FABRICATORS**—See **BRIDGES, BUILDINGS, ETC.**

**STEEL FLOATING AND TERMINAL EQUIPMENT**  
Dravo Corp. (Engin'g Works Div.), Neville Island, Pittsburgh, Pa.

**STEEL PLATE CONSTRUCTION**  
American Bridge Co., Frick Bldg., Pittsburgh, Pa. Bartlett-Hayward Div., Koppers Co., Baltimore, Md. Belmont Iron Works, 22nd St., and Washington Ave., Philadelphia, Pa. Bethlehem Steel Co., Bethlehem, Pa.

Federal Shipbuilding & Dry Dock Co., Kearney, N. J. General American Transportation Corp., 135 So. LaSalle St., Chicago, Ill. Graver Tank & Mfg. Co., Inc., 4409-40 Tod Ave., E. Chicago, Ind. Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa. Western Gas Div., Koppers Co., Fort Wayne, Ind.

**STELLITE**  
Haynes Stellite Co., Harrison and Lindsay Sts., Kokomo, Ind.

**STOCKS**  
Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York City.

**STONES (Honing)**  
Bay State Abrasive Products Co., Westboro, Mass.

**STOPPERS (Cylinder Notch)**  
Bailey, Wm. M. Co., 702 Magee Bldg., Pittsburgh, Pa. Brosius, Edgar E., Co., Sharpshurg Branch, Pittsburgh, Pa.

**STOPPERS (Rubber)**  
Rhoades, R. W., Metalline Co., P. O. Box 1, Long Island City, N. Y.

**STORAGE EQUIPMENT**  
Graver Tank & Mfg. Co., Inc., 4409-40 Tod Ave., E. Chicago, Ind. Lyon Metal Products, Inc., 7203 Madison Ave., Aurora, Ill.

**STORAGE BATTERIES**—See **BATTERIES (Storage)**

**STRAIGHTENING MACHINERY**  
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland, O. Elmes, Chas. F., Engineering Works, 243 N. Morgan St., Chicago, Ill. Farouhar, A. B., Co., Ltd., Hydraulic Press Div., 175 Duke St., York, Pa. Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh, Pa. Lewis Machine Co., 3450 E. 76th St., Cleveland, O. Logemann Brothers Co., 3126 Burling St., Milwaukee, Wis. Shuster, F. B., Co., The, New Haven, Conn. Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.

**SULPHURIC ACID**  
Cleveland-Cliffs Iron Co., The, Union Commerce Bldg., Cleveland, O. New Jersey Zinc Co., 160 Front St., New York City. Pennsylvania Salt Mfg. Co., Dept. S. Pennsalt Cleaner Div., Philadelphia, Pa.

**SURFACE WELDING**  
Wall-Colmonoy Corp., 637 Buhl Bldg., Detroit, Mich.

**SWITCHES (Electric)**  
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee, Wis. Electric Controller & Mfg. Co., The, 2700 E. 79th St., Cleveland, O. General Electric Co., Schenectady, N. Y. Westinghouse Electric & Mfg. Co., Dept. 7-N, East Pittsburgh, Pa.

**TACHOMETERS**  
Bristol Co., The, 112 Bristol Rd., Waterbury, Conn. Brown Instrument Div. of Minneapolis-Honeywell Regulator Co., 4462 Wayne Ave., Philadelphia, Pa. Foxboro Co., The, 118 Neponset Ave., Foxboro, Mass.

**TANK LININGS**  
Celcote Co., 750 Rockefeller Bldg., Cleveland, O. Goodyear Tire & Rubber Co., 1144 E. Market St., Akron, O. National Carbon Co., W. 117th St. and Madison Ave., Cleveland, O. Nukem Products Corp., 70 Niagara St., Buffalo, N. Y.

**TANKS (Pickling)**  
Goodyear Tire & Rubber Co., 1144 E. Market St., Akron, O. Manhattan Rubber Mfg. Co. Div., Raybestos Manhattan, Inc., Passaic, N. J. National Carbon Co., W. 117th St. and Madison Ave., Cleveland, O. Nukem Products Corp., 70 Niagara St., Buffalo, N. Y.

**TANKS (Storage, Pressure, Riveted, Welded)**  
American Bridge Co., Frick Bldg., Pittsburgh, Pa. Bartlett-Hayward Div., Koppers Co., Baltimore, Md. Bethlehem Steel Co., Bethlehem, Pa. General American Transportation Corp., 135 So. LaSalle St., Chicago, Ill. Graver Tank & Mfg. Co., Inc., 4409-40 Tod Ave., E. Chicago, Ind. Kirk & Blum Mfg. Co., The, 2838 Spring Grove Ave., Cincinnati, O. Pressed Steel Tank Co., 1461 So. 66th St., Milwaukee, Wis. Scaife Co., Ames St., Oakmont, Pa. Western Gas Div., Koppers Co., Fort Wayne, Ind.

**TANKS (Wood or Steel, Rubber or Lead Lined)**  
Goodyear Tire & Rubber Co., 1144 E. Market St., Akron, O. Kirk & Blum Mfg. Co., The, 2838 Spring Grove Ave., Cincinnati, O. Manhattan Rubber Mfg. Co. Div., Raybestos Manhattan, Inc., Passaic, N. J.

**TAPS AND DIES**  
Greenfield Tap & Die Corp., Greenfield, Mass. Landis Machine Co., Waynesboro, Pa. National Acme Co., The, 170 E. 131st St., Cleveland, O. Oster Mfg. Co., The, 2037 E. 61st St., Cleveland, O.

**TERMINALS (Locking)**  
Thompson-Bremer & Co., 164 W. Hubbard St., Chicago, Ill.

**TERNE PLATE**—See **TIN PLATE**

**TESTING MACHINERY (Materials)**  
Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia, Pa. National Broach & Machine Co., 5600 St. Jean, Detroit, Mich.

**THERMOMETERS**  
Bristol Co., The, 112 Bristol Rd., Waterbury, Conn. Brown Instrument Div. of Minneapolis-Honeywell Regulator Co., 4462 Wayne Ave., Philadelphia, Pa. Foxboro Co., The, 118 Neponset Ave., Foxboro, Mass. Leeds & Northrup Co., 4957 Stanton Ave., Philadelphia, Pa.

**THREAD CUTTING TOOLS**  
Landis Machine Co., Waynesboro, Pa. Oster Mfg. Co., The, 2037 E. 61st St., Cleveland, O.

**TIE PLATES**  
Bethlehem Steel Co., Bethlehem, Pa. Carnegie-Illinois Steel Corp., Pittsburgh-Chicago. Columbia Steel Co., San Francisco, Calif. Inland Steel Co., 38 So. Dearborn St., Chicago, Ill. Republic Steel Corp., Dept. ST, Cleveland, O. Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala. Weirton Steel Co., Weirton, W. Va.

**TIN PLATE**  
Bethlehem Steel Co., Bethlehem, Pa. Carnegie-Illinois Steel Corp., Pittsburgh-Chicago. Columbia Steel Co., San Francisco, Calif. Granite City Steel Co., Granite City, Ill. Inland Steel Co., 38 So. Dearborn St., Chicago, Ill. Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa. Republic Steel Corp., Dept. ST, Cleveland, O. Weirton Steel Co., Weirton, W. Va. Wheeling Steel Corp., Wheeling, W. Va. Youngstown Sheet & Tube Co., The, Youngstown, O.

**TIN PLATE MACHINERY**  
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore, Md. Wean Engineering Co., Warren, O.

**TITANIUM**  
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y. Vanadium Corp. of America, 420 Lexington Ave., New York City.

**TONGS (Chain Pipe)**  
Williams, J. H. & Co., 400 Vulcan St., Buffalo, N. Y.

**TONGS (Rail Handling)**  
Cullen-Friedstedt Co., 1308 S. Kilbourn Ave., Chicago, Ill.

**TOOL BITS (High Speed)**  
Allegheny Ludlum Steel Corp., Dept. T-125, Oliver Bldg., Pittsburgh, Pa.  
Disston, Henry, & Sons, Inc., 226 Tacony, Philadelphia, Pa.  
Firth-Sterling Steel Co., McKeesport, Pa.  
Haynes Stellite Co., Harrison and Lindsay Sts., Kokomo, Ind.  
Jessop Steel Co., 584 Green St., Washington, Pa.  
Michigan Tool Co., 7171 E. McNichols Rd., Detroit, Mich.

**TOOL HOLDERS**  
Williams, J. H. & Co., 400 Vulcan St., Buffalo, N. Y.

**TOOLS (Pneumatic)**  
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland, O.

**TOOLS (Precision, Lathe, Metal Cutting, etc.)**  
Brown & Sharpe Mfg. Co., Providence, R. I.

Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit, Mich.  
Gisholt Machine Co., 1217 E. Washington Ave., Madison, Wis.  
McKenna Metals Co., 200 Lloyd Ave., Latrobe, Pa.

**TOOLS (Steel-Cutting)**  
McKenna Metals Co., 200 Lloyd Ave., Latrobe, Pa.

**TOOLS (Tipped, Carbide)**  
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit, Mich.  
McKenna Metals Co., 200 Lloyd Ave., Latrobe, Pa.

**TOOLS (Turning, Boring and Facing)**  
McKenna Metals Co., 200 Lloyd Ave., Latrobe, Pa.

**TORCHES & BURNERS (Acetylene, Blow, Oxy-Acetylene)**  
Air Reduction, 60 E. 42nd St., New York City.  
Linde Air Products Co., The, 30 E. 42nd St., New York City.  
National Cylinder Gas Co., 205 W. Wacker Drive, Chicago, Ill.

**TOWBOATS**  
Dravo Corp. (Engin'g Works Div.)  
Neville Island, Pittsburgh, Pa.

**TOWERS (Transmission)**  
American Bridge Co., Frick Bldg., Pittsburgh, Pa.  
Bethlehem Steel Co., Bethlehem, Pa.

**TOWERS (Tubular Hoisting)**  
Dravo Corp., (Machinery Div.), 300 Penn Ave., Pittsburgh, Pa.

**TRACK ACCESSORIES**  
Bethlehem Steel Co., Bethlehem, Pa.  
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.  
Columbia Steel Co., San Francisco, Calif.  
Foster, L. B., Co., Inc., P. O. Box 1647, Pittsburgh, Pa.  
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.  
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.  
Oliver Iron & Steel Corp., So. 10th & Muriel Sts., Pittsburgh, Pa.  
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.

**TRACK BOLTS**  
Bethlehem Steel Co., Bethlehem, Pa.  
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.  
Columbia Steel Co., San Francisco, Calif.  
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.  
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland, O.  
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland, O.  
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.  
Youngstown Sheet & Tube Co., The, Youngstown, O.

**TRAILERS**  
Mercury Manufacturing Co., 4140 S. Halsted St., Chicago, Ill.  
Ohio Galvanizing & Mfg. Co., Penn St., Niles, O.

**TRAILERS (Arch-Glider)**  
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.

**TRAMRAILS**  
American MonoRail Co., The, 13102 Athens Ave., Cleveland, O.  
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.  
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.  
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.

**TRANSMISSIONS—VARIABLE SPEED**  
Link-Belt Co., 2045 W. Hunting Park Ave., Philadelphia, Pa.

**TRAPS (Compressed Air)**  
Nicholson, W. H., & Co., 177 Oregon St., Wilkes-Barre, Pa.

**TRAPS (High Pressure Steam)**  
Nicholson, W. H., & Co., 177 Oregon St., Wilkes-Barre, Pa.

**TRAPS (Steam)**  
Nicholson, W. H., & Co., 177 Oregon St., Wilkes-Barre, Pa.

**TREADS (Safety)**  
Alan Wood Steel Co., Conshohocken, Pa.  
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.  
Dravo Corp. (Machinery Div.), 300 Penn Ave., Pittsburgh, Pa.  
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.  
Republic Steel Corp., Dept. ST, Cleveland, O.  
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.  
Tri-Lok Co., 5515 Butler St., Pittsburgh, Pa.

**TROLLEYS**  
American MonoRail Co., The, 13102 Athens Ave., Cleveland, O.  
Ford Chain Block Div., American Chain & Cable Co. Inc., 2nd & Diamond Sts., Philadelphia, Pa.  
Reading Chain & Block Co., Dept. D-2, Reading, Pa.  
Wright Mfg. Div. of American Chain & Cable Co., Inc., York, Pa.  
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.

**TRUCK CRANES**  
Northwest Engineering Co., 28 E. Jackson Blvd., Chicago, Ill.  
Silent Hoist Winch & Crane Co., 849 63rd St., Brooklyn, N. Y.

**TRUCKS AND TRACTORS (Electric Industrial)**  
Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland, O.  
Baker-Raulang Co., The, 2167 W. 25th St., Cleveland, O.  
Easton Car & Construction Co., Easton, Pa.  
Elwell-Parker Electric Co., The, 4501 St. Clair Ave., Cleveland, O.  
Mercury Manufacturing Co., 4140 S. Halsted St., Chicago, Ill.  
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.

**TRUCKS AND TRACTORS (Gasoline Diesel)**  
Silent Hoist Winch & Crane Co., 849 63rd St., Brooklyn, N. Y.

**TRUCKS AND TRACTORS (Gasoline Industrial)**  
Baker-Raulang Co., The, 2167 W. 25th St., Cleveland, O.  
Clark Tractor Div., Clark Equipment Co., Battle Creek, Mich.  
Elwell-Parker Electric Co., The, 4501 St. Clair Ave., Cleveland, O.  
Mercury Manufacturing Co., 4140 S. Halsted St., Chicago, Ill.

**TRUCKS (Dump-Industrial)**  
Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland, O.  
Easton Car & Construction Co., Easton, Pa.

**TRUCKS (Hydraulic Lift)**  
Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland, O.

**TRUCKS (Industrial)**  
Easton Car & Construction Co., Easton, Pa.  
Mercury Manufacturing Co., 4044-4140 S. Halsted St., Chicago, Ill.

Ohio Galvanizing & Mfg. Co., Penn St., Niles, O.

**TRUCKS (Lift)**  
Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland, O.  
Baker-Raulang Co., The, 2167 W. 25th St., Cleveland, O.  
Clark Tractor Div., Clark Equipment Co., Battle Creek, Mich.  
Easton Car & Construction Co., Easton, Pa.  
Elwell-Parker Electric Co., The, 4501 St. Clair Ave., Cleveland, O.  
Mercury Manufacturing Co., 4140 S. Halsted St., Chicago, Ill.  
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.

**TUBE MILL EQUIPMENT**  
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh, Pa.  
Taylor-Wilson Mfg. Co., 1200 Thomson Ave., McKees Rocks, Pa.

**TUBES (Roller)**  
Allegheny Ludlum Steel Corp., Dept. T-125, Oliver Bldg., Pittsburgh, Pa.  
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.  
Bethlehem Steel Co., Bethlehem, Pa.  
Bissett Steel Co., The, 943 E. 67th St., Cleveland, O.  
Columbia Steel Co., San Francisco, Calif.  
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.  
National Tube Co., Frick Bldg., Pittsburgh, Pa.  
Ohio Seamless Tube Co., Shelby, O.  
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.  
Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland, O.  
Timken Roller Bearing Co., The, Steel & Tube Div., Canton, O.  
Tubular Service Corp., 120 44th St., Brooklyn, N. Y.  
Youngstown Sheet & Tube Co., The, Youngstown, O.

**TUBES (Brass, Bronze, Copper, Nickel Silver)**  
American Brass Co., The, Waterbury, Conn.  
Bridgeport Brass Co., Bridgeport, Conn.  
Revere Copper & Brass, Inc., 230 Park Ave., New York City.

**TUBES (High Carbon)**  
Ohio Seamless Tube Co., Shelby, O.  
Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland, O.  
Tubular Service Corp., 120 44th St., Brooklyn, N. Y.

**TUBING (Alloy Steel) (\*Also Stainless)**  
\*Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.  
Bissett Steel Co., The, 943 E. 67th St., Cleveland, O.  
Columbia Steel Co., San Francisco, Calif.  
\*National Tube Co., Frick Bldg., Pittsburgh, Pa.  
Ohio Seamless Tube Co., Shelby, O.  
Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland, O.

Timken Roller Bearing Co., The, Steel & Tube Div., Canton, O.  
Tubular Service Corp., 120 44th St., Brooklyn, N. Y.

**TUBING (Copper, Brass, Aluminum)**  
American Brass Co., The, Waterbury, Conn.  
Lewin-Mathes Co., E. St. Louis, Ill.  
Revere Copper & Brass, Inc., 230 Park Ave., New York City.  
Shenango-Penn Mold Co., Dover, O.

**TUBING (Flexible Metal)**  
Chicago Metal Hose Corp., 1315 S. Third St., Maywood, Ill.

**TUBING (Monel)**  
Bundy Tubing Co., 10951 Hern Ave., Detroit, Mich.

**TUBING (Seamless Flexible Metal)**  
American Metal Hose Branch of The American Brass Co., Waterbury, Conn.

**TUBING (Seamless Steel)**  
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.  
Columbia Steel Co., San Francisco, Calif.  
Frasse, Peter A. & Co., Inc., 17 Grand St., New York City  
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.

National Tube Co., Frick Bldg., Pittsburgh, Pa.  
Ohio Seamless Tube Co., Shelby, O.  
Pipe & Tube Products, Inc., 445 Communipaw Ave., Jersey City, N. J.  
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.  
Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland, O.  
Timken Roller Bearing Co., The, Steel & Tube Div., Canton, O.  
Tubular Service Corp., 120 44th St., Brooklyn, N. Y.  
Youngstown Sheet & Tube Co., The, Youngstown, O.

**TUBING (Square, Rectangular)**  
Ohio Seamless Tube Co., Shelby, O.  
Steel & Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland, O.  
Tubular Service Corp., 120 44th St., Brooklyn, N. Y.

**TUBING (Welded Steel)**  
Bundy Tubing Co., 10951 Hern Ave., Detroit, Mich.  
Frasse, Peter A. & Co., Inc., 17 Grand St., New York City  
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.  
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.  
Ohio Seamless Tube Co., Shelby, O.  
Republic Steel Corp., Dept. ST, Cleveland, O.  
Revere Copper & Brass, Inc., 230 Park Ave., New York City.  
Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland, O.  
Tubular Service Corp., 120 44th St., Brooklyn, N. Y.  
Youngstown Sheet & Tube Co., The, Youngstown, O.

**TUBULAR PRODUCTS**  
Bundy Tubing Co., 10951 Hern Ave., Detroit, Mich.  
Ohio Seamless Tube Co., Shelby, O.  
Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland, O.  
Tubular Service Corp., 120 44th St., Brooklyn, N. Y.

**TUMBLING BARRELS (Coke Testing)**  
Broslus, Edgar E., Co., Sharpsburg Branch, Pittsburgh, Pa.

**TUNGSTEN CARBIDE**  
Bissett Steel Co., The, 943 E. 67th St., Cleveland, O.  
Haynes Stellite Co., Harrison and Lindsay Sts., Kokomo, Ind.  
Michigan Tool Co., 7171 E. McNichols Rd., Detroit, Mich.

**TUNGSTEN CARBIDE (Tools and Dies)**  
Firth-Sterling Steel Co., McKeesport, Pa.  
McKenna Metals Co., 200 Lloyd Ave., Latrobe, Pa.

**TUNGSTEN METAL AND ALLOYS**  
Electro Metallurgical Co., 30 E. 42nd St., New York City.

**TURBINES (Steam)**  
Allis-Chalmers Mfg. Co., Milwaukee, Wis.  
General Electric Co., Schenectady, N. Y.  
Westinghouse Electric & Mfg. Co., Dept. 7-N, East Pittsburgh, Pa.

**TURBO BLOWERS—See BLOWERS**

**TURNTABLES**  
American Bridge Co., Frick Bldg., Pittsburgh, Pa.  
Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland, O.

**TURRET LATHES—See LATHES (Turret)**

**TURRET LATHE CUTTERS (Carbide Tipped)**  
McKenna Metals Co., 200 Lloyd Ave., Latrobe, Pa.

**TWIST DRILLS**  
Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland, O.  
Greenfield Tap & Die Corp., Greenfield, Mass.

**UNIT HEATERS**  
Dravo Corp. (Machinery Div.), 300 Penn Ave., Pittsburgh, Pa.

**VACUUM CLEANERS**

Sturtevant, B. F., Co.,  
Hyde Park, Boston, Mass.

**VALVE CONTROL**

(Motor Operated Units)  
Cutler-Hammer, Inc., 1211 St. Paul  
Ave., Milwaukee, Wis.

**VALVE CONTROLS**

Philadelphia Gear Works,  
Erie Ave. & G St.,  
Philadelphia, Pa.

**VALVES (Blast Furnace)**

Bailey, Wm. M., Co.,  
702 Magee Bldg., Pittsburgh, Pa.  
Broslus, Edgar E., Co., Sharp-  
sburg Branch, Pittsburgh, Pa.

**VALVES (Blow-off)**

Homestead Valve Mfg. Co.,  
P. O. Box 20, Coraopolis, Pa.

**VALVES (Brass, Iron and Steel)**

Crane Co., 836 S. Michigan Ave.,  
Chicago, Ill.  
Galland-Henning Mfg. Co.,  
2747 So. 31st St., Milwaukee, Wis.  
Reading-Pratt & Cady Div. of Ameri-  
can Chain & Cable Co., Inc.,  
Bridgeport, Conn.

**VALVES (Check)**

Crane Co., 836 S. Michigan Ave.,  
Chicago, Ill.  
Reading-Pratt & Cady Div. of Ameri-  
can Chain & Cable Co., Inc.,  
Bridgeport, Conn.

**VALVES (Control—Air and Hydraulic)**

Bristol Co., The, 112 Bristol Rd.,  
Waterbury, Conn.  
Foxboro Co., The, 118 Neponset  
Ave., Foxboro, Mass.  
Galland-Henning Mfg. Co.,  
2747 So. 31st St., Milwaukee, Wis.  
Hanna Engineering Works,  
1765 Elston Ave., Chicago, Ill.  
Hannifin Mfg. Co., 621-631 So.  
Kolmar Ave., Chicago, Ill.  
Homestead Valve Mfg. Co.,  
P. O. Box 20, Coraopolis, Pa.  
Nicholson, W. H., & Co.,  
177 Oregon St., Wilkes-Barre, Pa.  
Racine Tool & Machine Co.,  
Racine, Wis.

**VALVES (Electrically Operated)**

Bristol Co., The, 112 Bristol Rd.,  
Waterbury, Conn.  
Foxboro Co., The, 118 Neponset  
Ave., Foxboro, Mass.  
Nicholson, W. H., & Co.,  
177 Oregon St., Wilkes-Barre, Pa.

**VALVES (Gas and Air Reversing)**

Blaw-Knox Co., Blawnox, Pa.

**VALVES (Gate)**

Bartlett-Hayward Div., Koppers  
Co., Baltimore, Md.  
Crane Co., The, 836 So. Michigan  
Ave., Chicago, Ill.  
Reading-Pratt & Cady Div. of  
American Chain & Cable Co., Inc.,  
Bridgeport, Conn.  
Western Gas Div. Koppers Co.,  
Fort Wayne, Ind.

**VALVES (Globe)**

Crane Co., 836 S. Michigan Ave.,  
Chicago, Ill.  
Reading-Pratt & Cady Div. of  
American Chain & Cable Co., Inc.,  
Bridgeport, Conn.

**VALVES (Hydraulic)**

Bayard, M. L., & Co., 20th &  
Indiana Ave., Philadelphia, Pa.  
Birdsboro Steel Fdry. & Mach. Co.,  
Birdsboro, Pa.  
Elmes, Chas. F., Engineering  
Works, 243 N. Morgan St.,  
Chicago, Ill.  
Homestead Valve Mfg. Co.,  
P. O. Box 20, Coraopolis, Pa.  
Racine Tool & Machine Co.,  
Racine, Wis.  
Wood, R. D., Co., 400 Chestnut St.,  
Philadelphia, Pa.

**VALVES (Iron & Steel)**

Galland-Henning Mfg. Co.,  
2747 So. 31st St., Milwaukee, Wis.

**VALVES (Needle)**

Crane Co., 836 S. Michigan Ave.,  
Chicago, Ill.  
Reading-Pratt & Cady Div. of  
American Chain & Cable Co., Inc.,  
Bridgeport, Conn.

**VALVES (Open Hearth Control—Oil, Tar, Steam & Air)**

Nicholson, W. H., & Co.,  
177 Oregon St., Wilkes-Barre, Pa.

**VALVES (Plug)**

Homestead Valve Mfg. Co.,  
P. O. Box 20, Coraopolis, Pa.

**VALVES (Steam and Water)**

Reading-Pratt & Cady Div. of  
American Chain & Cable Co., Inc.,  
Bridgeport, Conn.

**VALVES AND FITTINGS—See PIPE FITTINGS**

**VANADIUM**

Electro Metallurgical Co.,  
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Oliver Iron & Steel Corp.,  
So. 10th & Muriel Sts.,  
Pittsburgh, Pa.  
Thompson-Bremer & Co.,  
1644 W. Hubbard St.,  
Chicago, Ill.

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Garrett, George K., Co., 1421 Chest-  
nut St., Philadelphia, Pa.  
Thompson-Bremer & Co., 1644 W.  
Hubbard St., Chicago, Ill.

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less)**

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1421 Chestnut St.,  
Philadelphia, Pa.  
Harper, H. M., Co., The,  
2646 Fletcher St., Chicago, Ill.

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Associated Spring Corp.,  
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Garrett, Geo. K., Co.,  
1421 Chestnut St.,  
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Raymond Mfg. Co., Div. Associated  
Spring Corp., 280 So. Centre St.,  
Corry, Pa.  
Thompson-Bremer & Co., 1644 W.  
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Hobart Bros.,  
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Lincoln Electric Co., The,  
Cleveland, O.  
Progressive Welder Co., 3050  
E. Outer Drive, Detroit, Mich.  
Welding Equipment & Supply Co.,  
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Mich.

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Co., Baltimore, Md.  
Bayard, M. L., & Co., 20th &  
Indiana Ave., Philadelphia, Pa.  
Lincoln Electric Co., The,  
Cleveland, O.  
Metal & Thermit Corp.,  
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Scaife Co.,  
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Van Dorn Iron Works,  
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American Agile Corp.,  
5806 Hough Ave., Cleveland, O.  
Harnischfeger Corp., 4411 W. Na-  
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International Nickel Co. Inc., The,  
67 Wall Street, New York City.  
Lincoln Electric Co., The,  
Cleveland, O.  
Maurath, Inc., 7311 Union Ave.,  
Cleveland, O.

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Page Steel & Wire Div. of Ameri-  
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Welding Equipment & Supply Co.,  
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American Steel & Wire Co.,  
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Bridgeport Brass Co.,  
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Harnischfeger Corp., 4411 W. Na-  
tional Ave., Milwaukee, Wis.  
Hobart Bros.,  
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Lincoln Electric Co., The,  
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\*Page Steel & Wire Div. of Ameri-  
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\*Republic Steel Corp.,  
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Laclede Steel Co., Arcade Bldg.,  
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Page Steel & Wire Div. of Ameri-  
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Monessen, Pa.  
Republic Steel Corp., Dept. ST,  
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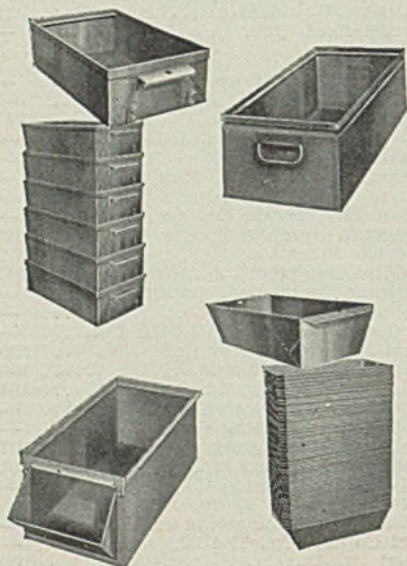


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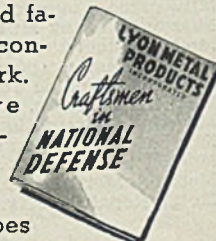
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