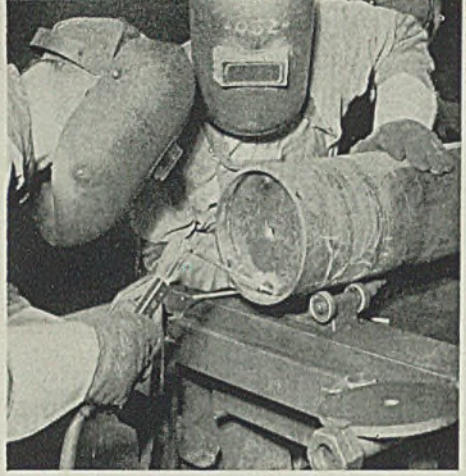

One-piece propeller blades are made from steel tubing. Page 93

STEEL

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APRIL 19, 1943

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NEWS

FEATURES

TECHNICAL

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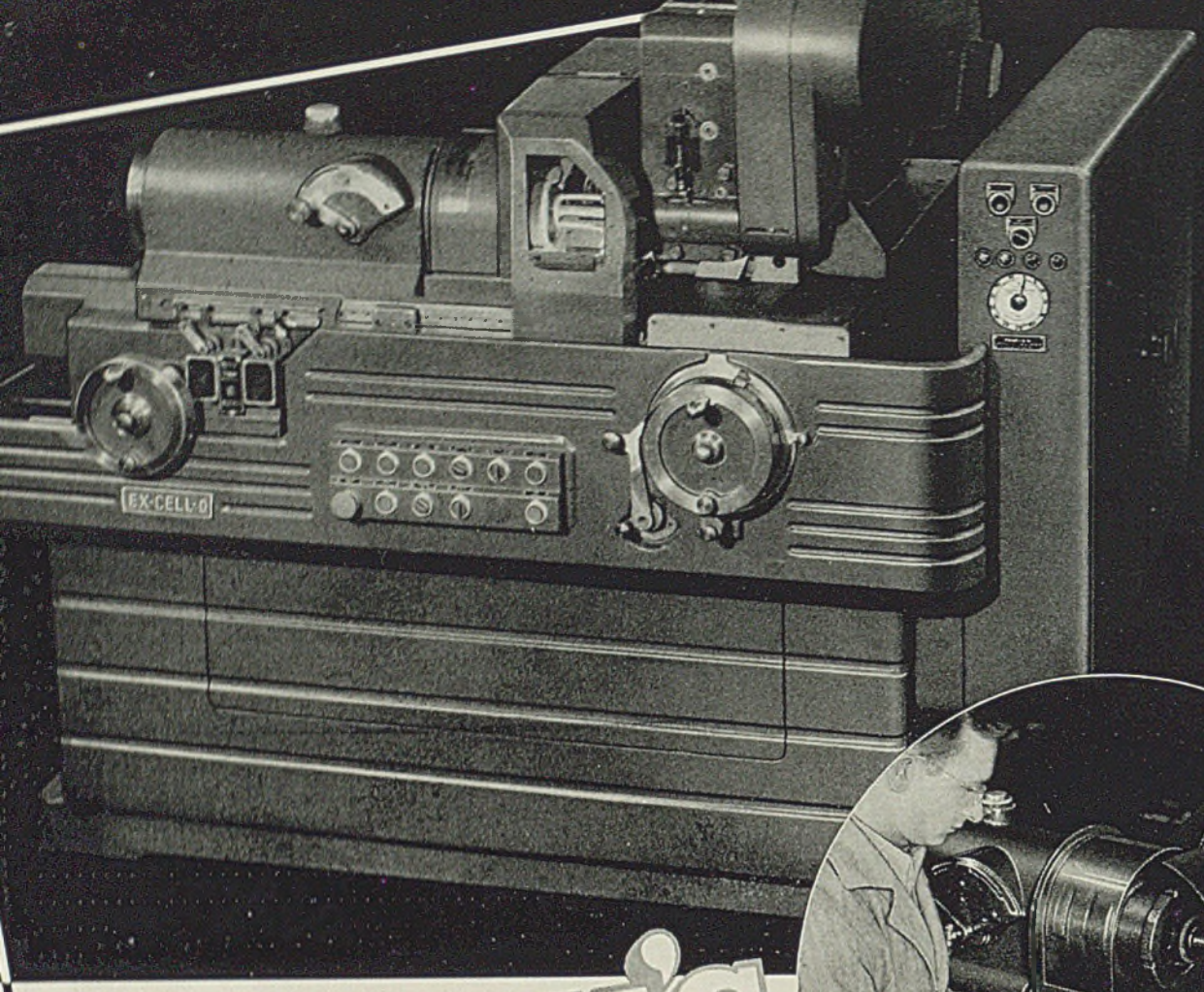
MARKETS



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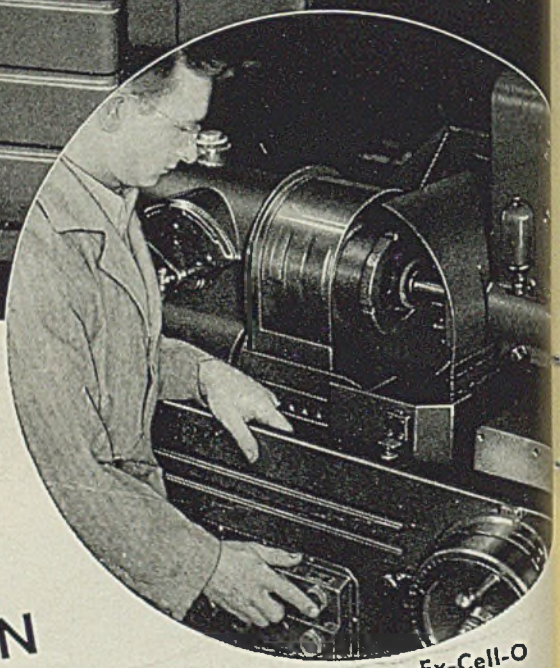

TODAY'S PRODUCTION CALLS FOR EX-CELL-O PRECISION

Ex-Cell-O's wide experience in designing and building precision machine tools makes Ex-Cell-O engineers exceptionally familiar with production requirements in today's emergency. Take, for instance, precision thread grinding, almost indispensable in the aircraft and other war industries where hardened threaded parts must be finished to the highest degree of accuracy. Ex-Cell-O engineers have designed nine standard thread grinders—automatics, universals, plain production machines. This variety in style and the flexibility in use of these Ex-Cell-O machines enable a manufacturer to select a standard machine that will meet specifically his exact thread grinding requirements today and provide him with equipment that can be readily and profitably adapted to production of civilian needs tomorrow. Because of their soundness in design, their thoroughness in construction, their simplicity and efficiency of operation, and their modern styling, Ex-Cell-O standard thread grinders are proving the first choice of America's war production industries

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PRECISION

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STEEL
April 19, 1943

INVEST IN FREEDOM: First order of business for every stay-at-home American through the remainder of April is the Second War Loan Drive. The goal is $13,000,000,000. On the basis of a population of 130,000,000, this means that individuals, corporations and other investors must raise the equivalent of $100 for every man, woman and child in the country.

Unprecedented as this goal and as inept as has been our government's wartime fiscal policy, this Second War Loan Drive can and will succeed. It is an issue in which everybody can afford to waive the impulse of class prerogative and to unite in common cause against the enemy.

How much more than the $100 per capita can each of us invest—individually and corporate-wise—to make up for those who through adversity or other limitations cannot now purchase their mathematical shares of the bonds?

° ° °

WARTIME CINDERELLA: For more than two decades shipbuilding has ranked far down the list of principal consumers of finished steel. Year after year ships have taken one per cent or less of the nation's output of steel. In 1940 they accounted for 2 per cent of the mills' production. In 1941 they took 4.4 per cent — the highest proportion recorded since the World War I period.

However, since Pearl Harbor the demand for naval and cargo vessels has leaped to fantastic figures. As a result, shipbuilding in 1942 became the No. 1 consumer of steel (p. 57), eclipsing the automotive industry, railroads, building construction and jobber classifications which in past years have held the lead in steel consumption.

The Cinderella role of shipbuilding is revealed in the annual analysis of steel distribution compiled by the American Iron and Steel Institute. A study of the institute's figures for the past three years and of STEEL's compilations dating from 1939 back to 1922 shows that this is the first time since the analyses were instituted that shipbuilding has held the No. 1 position. The construction industry ranked second and warehouses third.

In 1941, warehouses were in first place, construction second and automotive third. Throughout the years for which statistics are available, the automotive industry has held the lead position more frequently than any other consuming classification.

Looking back over distribution figures for two decades, one is impressed by the fact that depression and war have wrought more drastic changes in steel consumption than any other factors. Depression brought containers into a favorable light as a stable consumer of steel. War, in a more positive way, enhances the position of ships.

° ° °

GOAL LINE STAND: Those whose business it is to dramatize national happenings have tagged the President's appeal to check inflation with the slogan "Hold the Line." This is appropriate, because on numerous occasions the Chief Executive has indicated that he revels in his make-believe role of quarterback.

But the simile has its embarrassing aspects. Mr. Roosevelt now is calling for firm resistance against mounting prices and wages after he had encouraged favored groups to get all they could while the getting was good. Had there been more firmness at several opportune times during the past year, the present critical situation would not have developed.

Now the Presidential quarterback is forced to call for a stand under the shadow of the goal posts. In this, he is not living up to the traditions of the really smart quarterbacks who exhort their teams to play a strong defensive game in midfield. They try to avoid the ordeal of holding the line on "fourth down, goal to go."

° ° °

POOLED "KNOW HOW": Air superiority now is being demonstrated by the United Nations on many fronts. This reflects great credit upon the young airmen of the allied countries. It also speaks volumes for the smooth-running production in British and American plants.

Indicative of the great progress made in organizing for effective production in the aircraft industry is the story of the hollow steel propeller blade. Each blade is made from an 8-foot length of 9-inch diameter chromium-nickel-molybdenum steel tubing. After a series of most interesting operations (p. 92)—

(OVER)

including honing, grinding, swaging, welding, heat treating, flattening, shearing, straightening, x-raying, hand-filing and machining—the tubing becomes a finished blade weighing less than 100 pounds.

No one who is familiar with the problems of production under the high-pressure conditions of war can fail to appreciate the significance of this achievement in propeller manufacture. It means that the expert skills in many highly specialized lines of metalworking have been harnessed to a specific undertaking and that all are pulling their shares of the load.

The war effort needs more of this kind of engineering and operating teamwork. As if in answer to this need, eastern and western aircraft manufacturers met recently in Hollywood, Calif. (p. 78) to join forces in speeding the interchange of ideas which will further improve aircraft output. They created the National Aircraft War Production Council to promote this program.

Obviously this is another important step in the pooling-of-resources technique which manufacturers in various lines of war work have been employing so effectively in the present emergency. We venture to predict that when the war is over, and when everybody can look back over industry's war production record, American manufacturers themselves will be the first to realize that one of the smartest things they did was to encourage the free interchange of "know how."

Most important of all—from the standpoint of the preservation of private enterprise after the war—will be the demonstration that American voluntary pooling of skill and experience has been far more effective than the regimentation employed by the enemy.

° ° °

FEWER AND LARGER: Early this year, somebody discovered that a small sum of money still reposed in the treasury of the long-inactive Southern Ohio Pig Iron and Coke Association. The money was given to the American Red Cross.

This commendable disposition of funds writes finis to a once colorful and useful organization. It was created in 1918 (p. 83), largely for the purpose of meeting certain challenges imposed by the emergency of World War I. The association tackled a number of important problems energetically and —imbued with the enthusiasm of its life-long president, Ralph H. Sweetser—established a notable record of tangible accomplishments.

SOPICA was born in World War I and died in World War II. Its life span of a quarter-century witnessed marked changes in the blast furnace industry. Gone are the stacks at Hematite and Middlesboro, Ky., and Bellaire, Columbus, Hanging Rock, Ironton, New Straitsville, Oak Hill, Wellston and Zanesville in southern Ohio—all of which produced iron for the first World war. The district's iron output for the present war is coming from fewer, and for the most part larger, furnaces.

° ° °

HUMAN NATURE: Many close observers of employment conditions have been predicting that sooner or later union officials who promote strikes on trivial pretexts would meet with strong opposition on the part of employes who have friends or relatives in the armed services.

There are signs that these predictions may prove to be correct. Last week a strike was called by a CIO union in an Ohio plant employing approximately 5000 men and women engaged in important war work. Picket lines were established at the gates and the usual tactics were employed to try to discourage employes from entering the plant.

Less than 350 of the 5000 responded to the strike call. The others passed through the picket lines and went to work. Some of them worked partly through the lunch period in an effort to offset the loss of production caused by those who did strike.

Newspaper reports throw light upon one of the principal reasons why the strike was a dud. A picket stopped an elderly machinist and suggested that he go back home. "Look here," shouted the old man as he removed a machinist's hammer from his coat pocket, "I have a son in North Africa. I'm going to work and I'd like to see anybody stop me."

A reporter interviewed a woman working on a punch press who had defied the picket line. "My husband is in the Pacific," she explained. "If he knew that I had stopped work unnecessarily—even for an hour—he would have a right to feel that I was not doing my share in this war."

Clearly the significant point is that in this instance the inclination of a great majority of the workers to do their bit in the war effort was stronger than their urge to heed the call of a union official. This loyalty to the war job will increase rather than diminish. Inherent honesty and integrity of human nature—when put to a real test—will prove more effective than all the power of government in curbing unjustifiable work stopages.

E. L. Shaner

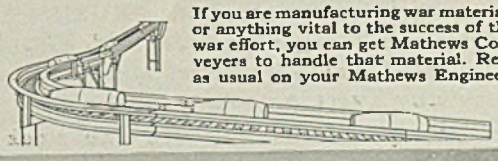
EDITOR-IN-CHIEF

TICKETED FOR *Tokio*

TOJO'S Day of Reckoning is coming and Mathews Engineers are cooperating with Plant Engineers to speed that day.

Night and day, Mathews Conveyers are moving an endless procession of armor plate, strip steel, bombs, shells, cartridge cases, and vital plane and ship parts, all material destined to make it warm in Tokio.

If your production depends on the precision movement of materials, a Mathews Conveyer System is a probable means of speeding operations all along the line. Your Mathews Engineer will gladly consult with you toward the solution of any conveying problem.



If you are manufacturing war material, or anything vital to the success of the war effort, you can get Mathews Conveyers to handle that material. Rely as usual on your Mathews Engineer.

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MATHEWS CONVEYER COMPANY ELLWOOD CITY PENNSYLVANIA

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United States Troops Advancing on Oran. Photo by U. S. Army Signal Corps.

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Certain equipment already ashore in North Africa quired important alterations to meet unusual battle nditions. The North Africa command said: "RUSH"! ne Ordnance Department said: "RUSH"! The erson customer who got the order said: "RUSH"! and fifty tons of steel were immediately forthcom- g from a nearby Ryerson stock.

Result: Delivery to the Army in one *week* of uipment which normally would have taken many eks to produce. An Army-Navy "E" Award to the manufacturer and a warm letter of thanks to Ryerson.

An unusual case? Somewhat—but typical of hundreds in which Ryerson stocks and Ryerson service have helped get war equipment started *faster*—on their way *sooner* to our fighting men.

In all probability, Ryerson Steel-Service can assist you on your rush war production contracts, if "spot" steel is required. One of the ten strategically-located Ryerson plants is nearby. Phone, wire or write; you'll receive quick personal cooperation!

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YERSON STEEL-SERVICE

Ships, No. 1 Consumer, To Take More in 1943

War program causes sharp shifts. . . Automotive industry, leader for decade, drops to ninth place. . . Construction ranks second but outlook for current year is insecure

SHIPBUILDING, which in 1942 became the No. 1 customer of the steel industry by taking a greater tonnage than the automotive industry ever used, will increase its lead substantially this year.

During the past year, at least 9,425,000 tons of steel products were fabricated into naval or merchant vessels, according to reports to the American Iron and Steel Institute from companies which produced 95 per cent of the 1942 output.

That tonnage, 16 per cent of the total produced, does not include several hundred thousand tons provided to shipyards for the construction of yards, ways and buildings.

During 1942, 8,090,800 deadweight tons of merchant shipping was built, in addition to a heavy naval program and some 800 small craft and other vessels for use by the armed services.

For 1943, the current goal for merchant shipping is 19,000,000 deadweight tons, more than double last year's record. While naval tonnage figures are not available, a similar increase in this category appears probable.

If these goals are attained, shipbuilders this year will require a much larger share of steel production, possibly a third of the total. Throughout the past year, shipments to shipbuilders represented an increasingly large proportion of total shipments, and by December, at least one ton of every five was directed to yards.

Shows Spectacular Increase

How spectacular was this increase is indicated by the fact that until three years ago, the shipbuilding industry was not considered important enough to be listed individually as a steel consumer. In 1940, approximately 940,000 tons, or 2 per cent of the total, was used for vessels of all types. In 1941, the shipyards received 2,733,000 tons, or 4.4 per cent of the total.

The rapidly increasing emphasis on shipbuilding and other war production has caused sharp shifts in the type of steel products made. Last year production was largely concentrated in plates, shapes, hot-rolled carbon bars, alloy steel bars and tool steel bars.

A Liberty ship requires 3425 tons of heavy steel products—2725 tons of plates and 700 tons of shapes. Tankers and the larger C-type vessels require from 600 to 1600 tons more, depending on the type. To meet the increased demand for plates and other heavy products required the utmost in ingenuity by steelmakers primarily equipped to produce light products for consumer durable goods.

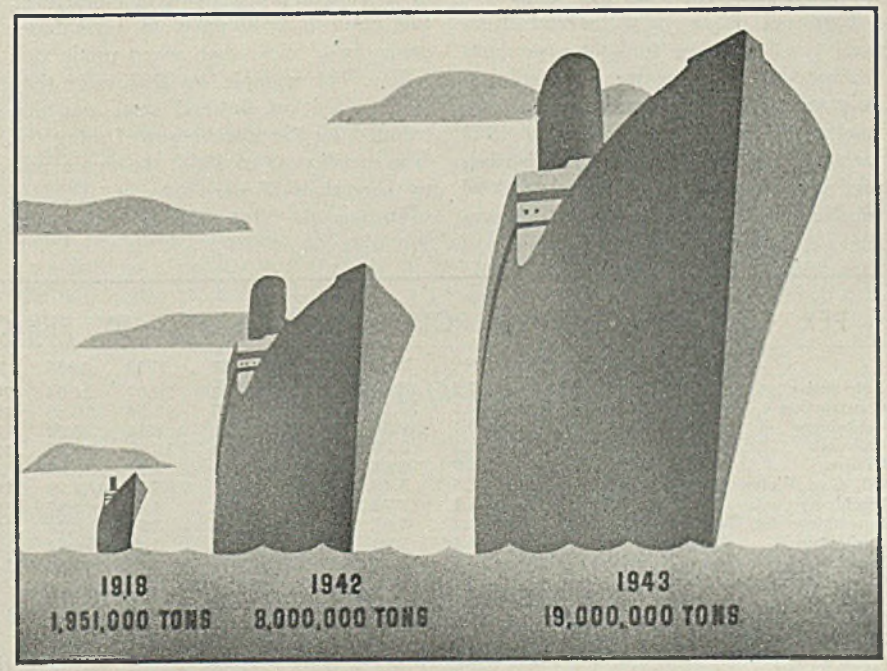
For military reasons, shipments of steel for direct military purposes in 1942 cannot be revealed separately. With exports, such shipments aggregated 14,848,000 tons last year, about 25 per cent of the total.

Sharpest decline in steel shipments was to the automotive industry, to which has been added the aircraft industry for the past three years. Leader through practically all of the 1930s, the motor industry, including aircraft, last year received only 3.5 per cent of total steel shipments, 2,122,000 tons. Automobile production last year was largely limited to trucks essential to the war effort, and a similar condition will prevail through this year.

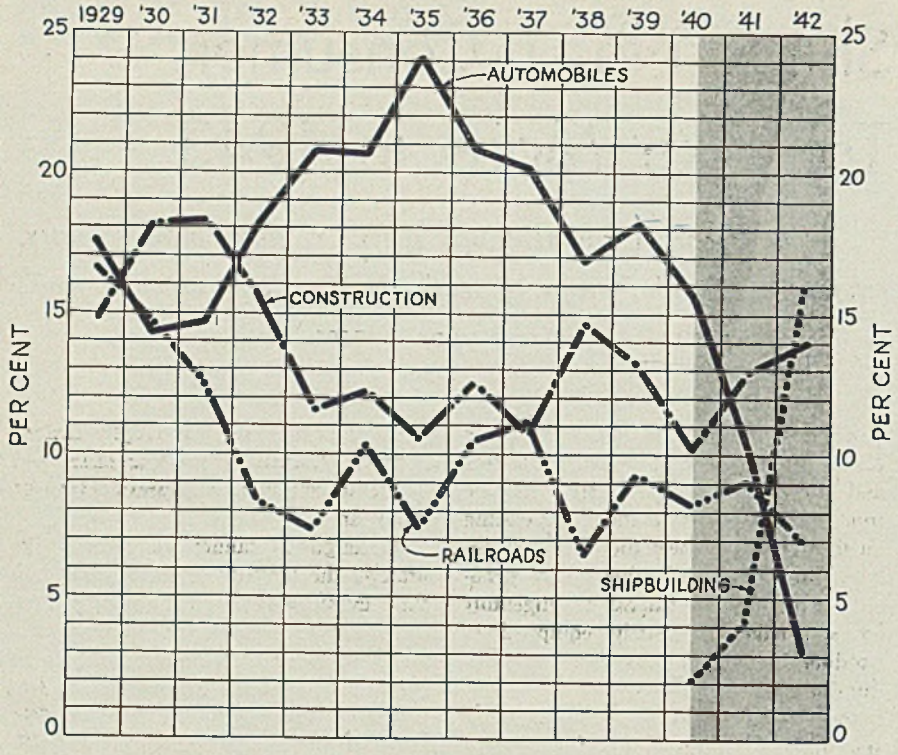
Although it cannot be shown separately, the tonnage of steel shipped to the aircraft industry was roughly three times the 1941 tonnage. In 1943, the tonnage marked for aircraft will, in all probability, continue this increase as emphasis is directed to the heavier type of planes and as new bomber plants reach capacity operations.

Ranking second to shipbuilding among individual steel-consuming industries in 1942 was the construction industry which received a total of 8,656,000 tons, 14 per cent of the total.

Both in tonnage and percentage of the total, the construction industry stood slightly higher in 1942 than in the year before. Trend at the end of the year was downward, however, reflecting the approaching completion of a large part



Infant prodigy among steel consuming groups is the shipbuilding industry, which until three years ago was not even listed separately. With 19,000,000 deadweight tons of merchant vessels alone scheduled to be built this year, ship construction may command one-third of steel output



Sharp shifts among major steel using industries is illustrated above. Automotive industry took a nose dive as nonessential vehicle production stopped. Shipbuilding shows an even more spectacular rise

of the program of new war plant construction.

Steel warehouses dropped from first to third place as an outlet for finished steel in 1942. Ten per cent of the total was distributed through warehouses last year, as compared to 14.7 per cent in 1941. On a tonnage basis, the decrease was substantially less, about 25 per cent.

Emphasis on heavy plates and structurals in preference to lighter products accounted in large measure for the lower volume handled by warehouses. Also, steel shipments to warehouses in 1942 were limited to quotas based on distributors' first quarter, 1941, shipments. Steel production has been increased substantially since then. Furthermore, warehouses received less than 75 per cent of their quotas from the mills last year. A survey covering 95 per cent of the warehouse industry shows the percentage of quotas received by quarters as follows: First, 75 per cent; second, 68; third, 68; fourth, 88.

When steel production is at a high level, the percentage shipped to warehouses generally is lower than when production is low. For example, in 1932, more than 16 per cent of finished steel was distributed by the warehouses. During the "recession" year of 1938, the figure rose to more than 17 per cent.

During the first quarter this year, warehouses were permitted to receive shipments in excess of quotas to make up for shortages in 1942, with the result that inventories now are estimated to be one-third larger than six months ago.

Outlook of the warehouses for 1943 is distinctly more favorable and distributors expect to move up to No. 2 position this year. Under the Controlled Materials Plan, mill receipts will be based upon inventories, and warehouses should receive a greater tonnage.

Fourth largest consumer in 1942 were the railroads which in normal years generally rank higher. A total of 4,318,000 tons of steel was shipped to the carriers last year, 7 per cent of all production. In 1926, railroads took 19.9 per cent of all steel produced, and in 1929, 16.7 per cent.

Railroads Consume Large Amount

In 1941, railroads consumed 3,533,836 tons and car and locomotive builders and parts manufacturers took 2,146,935 tons, a total of 5,680,801 tons. In 1940, the total was 3,777,377 tons, of which the railroads took 2,575,181 tons, the remainder going to equipment builders.

Car orders placed in 1942 totaled 26,028 units, compared with 121,499 in 1941; 66,889 in 1940 and 57,775 in 1939. War Production Board froze car orders early in the year and later allocated 20,000 units for production during first half, a portion of which will not be delivered until after mid-year. The railroads had asked for 80,000 cars to meet requirements this year and intimations have been given that perhaps 44,000 may be released for last half production.

Volume of freight traffic handled in 1942 reached a new high level. Number of cars loaded was 2 per cent greater than in 1941, heavier loading resulted in an increase of 25 per cent in freight transported. Average haul also was greater. Taking all these factors into consideration the railroads performed 36 per cent

PER CENT OF FINISHED ROLLED STEEL TAKEN BY PRINCIPAL CONSUMING GROUPS

	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Automotive	†3.5	†10.2	†15.8	18.10	16.88	20.04	20.87	24.04	20.87	20.95	18.15	14.78	14.10	17.57
Construction	14.0	13.0	10.8	13.13	14.77	10.75	12.50	10.68	12.24	11.61	15.77	18.35	18.21	14.89
Containers	6.0	7.2	6.5	9.38	9.92	8.71	8.44	9.30	8.68	12.25	10.79	7.90	5.77	4.67
Railroads	7.1	9.1	8.2	9.29	6.51	11.16	10.52	7.27	12.37	7.29	8.30	12.55	14.97	16.70
Exports	....	....	17.7	6.53	7.52	6.74	3.79	3.85	5.29	3.61	3.31	4.10	4.34	4.83
Oil, Gas, Water, Utilities	2.1	3.2	2.5	5.48	5.52	°5.84	°5.33	°4.29	°4.97	°4.88	°5.50	°9.75	°9.48	°9.01
Machinery	4.0	4.6	4.1	3.79	3.55	4.88	4.96	4.37	3.65	3.63	3.39	3.37	3.80	3.81
Furnishings for Buildings	....	....	....	3.61	3.52	3.29	3.90	4.24	3.77	3.70	3.64	2.90	3.11	2.56
Agriculture	.9	1.8	2.0	1.90	2.22	3.66	3.57	4.74	2.42	3.01	2.76	3.56	4.51	5.27
Warehouses	10.0	14.7	14.6	15.64	17.13	13.28	14.13	14.43	14.02	14.91	16.12	12.68	12.21	11.05
Pressing, Forming, Stamping	4.4	10.1	4.7	....	....	....	....	....	....	....	....	....	....	....
Converting, Processing	7.0	7.7	6.4	....	....	....	....	....	....	....	....	....	....	....
Shipbuilding	16.0	4.4	2.0	....	....	....	....	....	....	....	....	....	....	....
All Others	25.0	14.0	4.7	13.15	12.46	11.65	11.99	12.79	11.72	14.16	12.27	10.06	9.50	9.64
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

†Includes aircraft. °Includes "oil, gas, water" only; figure for "utilities" is included in "All other." Compilation of figures on steel distribution, originated by STEEL in 1922, was taken over by the American Iron and Steel Institute in 1940. Some changes in classification have been made since and figures for 1939 and previous years are not strictly comparable with those for 1940 and succeeding years.

more service than in the preceding year.

These results were attained with less equipment than in a decade or more. At the end of 1941 Class I railroads had 41,759 locomotives in service, compared with 57,571 in 1929 and 53,316 in 1932. These roads had in service 1,703,304 freight cars at the end of 1942, compared with 2,277,505 in 1929 and 2,144,730 in 1932.

Enlarged allocation of steel to the carriers in 1943 is deemed essential to continuance of good service. If this is not done, restrictions must be placed on traffic in favor of war purposes, the Interstate Commerce Commission concludes, an opinion shared by the Association of American Railroads, as voiced by M. J. Gormley, executive assistant. The latter adduces the fact that while railroads are handling 85 per cent of the increased traffic carried by all transportation facilities they are doing it with approximately 500,000 fewer freight cars and about 22,000 fewer locomotives than in 1918 and only a few more freight cars and actually fewer locomotives than they had at the outbreak of the war in 1939.

Container manufacturers, chiefly those making "tin" cans received 3,666,000 tons of steel last year, or 6 per cent of the total. In 1941, container manufacturers received 7 per cent of the output.

Manufacturers of machinery and tools received 2,539,000 tons last year, 4 per cent of the total.

Tonnage going to other principal industrial classification in 1942 was: Steel converting and processing industries, 4,293,000 tons, or 7 per cent; pressing, forming and stamping, 2,717,000 tons, 4.4 per cent; oil, gas and mining, 1,325,000 tons, 2.1 per cent; agricultural industry, including implement and equipment manufacturers, 570,000 tons, 0.9 per cent.

Shipments of 60,440,000 net tons of finished products were shown in reports to the American Iron and Steel Institute.

Steel Furnaces Worked 99.7 Per Cent of Time in 1942

More hours in the day or weeks in the year would have been necessary in 1942 for the steel industry to have produced much in excess of the 86,000,000 tons of steel made that year, the American Iron and Steel Institute reports.

More than 1200 steel furnaces contributed to this total and were either in production or undergoing routine maintenance work 99.7 per cent of the year, a new high rate by a wide margin. Normally a steel furnace is out of actual production 10 per cent of the time for relining and small repairs, allowance being made for this in rating capacity.

During only 0.3 per cent of the year were furnaces shut down for abnormal or emergency reasons, including scrap shortage, extraordinary repairs, labor disputes, absenteeism and floods.

Although furnaces were in operation 99.7 per cent of the time, tonnage represented only 96.8 per cent of rated capacity, mainly because wartime emergency conditions have increased average time to make a heat of steel. Light scrap of poorer quality increased charging time and oxidation losses. Increased proportion of alloy steel, which has reached one in every six tons, has tended to decrease output. In making alloy steel in the open hearth only three heats are produced in the time formerly yielding four heats of plain carbon steel.

Allocations for Tin Plate May Be Increased for Second Quarter

REPORTS were current last week that WPB would find it necessary to increase allocations of steel for tin plate for second quarter by about 90,000 tons because the Department of Agriculture underestimated total requirements for the entire year by 300,000 tons.

If the increase is approved it means 765,000 tons of steel will be available for plate in the current quarter in place of the 675,000 tons originally planned. Quota for first quarter was 620,000 tons.

While no precise figures are available on total anticipated requirements for 1943, it is felt that the tonnage will be slightly in excess of the estimated 3,300,000 tons produced in 1942. Crop acreage will be up about 30 per cent this year as compared with 1942 but not much increase is seen in the food pack.

Packs of the three most popular vegetables, peas, corn and tomatoes, reached the unprecedented total of 104,464,611 cases in 1942 and this is regarded as about the ceiling for 1943. In 1941, the combined pack was 96,591,826 cases and the average for 1937-1941 70,850,658.

Under amended Conservation Order M-81, WPB is forcing canmakers to use as much electrolytic tin plate and bonderized black plate as possible. While only a few steel companies are shipping the substitute plate, it will find ready application under WPB regulations.

For instance, electrolytic plate bearing 0.50 pound of tin per base box must be used when available for can ends in packing asparagus, beets, carrots, pumpkin, soups, spinach, tomato juice and tomato paste. For corn and peas, electrolytic plate must be used for can bodies and bonderized plate for ends. Similar specifications are set up for fish and meat.

In the meantime, canmakers find the substitute plate available from relatively few producers. In fact, the industry has not decided upon a uniform practice in producing electrolytic plate. Some are using alkaline and others acid electrolytes in applying the tin which subsequently must be "flow-brightened" to obtain a closely adherent, bright finish.

One company is usifig an oil bath-rolling process for the flow-brightening process, another oil-fired radiant tubes and others are working with resistance and induction methods.

A large can company reported to its source of supply last week that electrolytic plate actually soldered better than hot-dip.

Tin plate producers now are not permitted to make hot-dip plate bearing more than 1.25 lbs. of tin per base box except for a few corrosive packs.

Electrolytic plate is being sold at $4.50 per base box or 50 cents under the price for hot-dip plate, the 50 cents merely representing the cost of a pound of tin.

CLASS 1 RAILROADS' PURCHASES

STEEL purchases by Class I railroads for 1942 were reported officially last week, and with 1941 comparisons are as follows:

	1942	1941
Steel rail	$55,647,000	$52,234,000
Wheels, axles, tires	41,501,000	36,913,000
Frogs, switchings, crossings, parts	16,978,000	16,034,000
Track fastenings, bolts, spikes, etc.	53,349,000	15,740,000
Iron bridges, turntables, structural steel	3,183,000	3,638,000
Bar iron and steel, spring steel, tool steel, unfabricated rolled shapes, wire netting and chain, except light coil boiler, firebox, tank and sheet iron and steel	27,120,000	49,491,000
Forgings and pressed steel parts for locomotives	4,514,000	4,077,000
Car forgings, iron and steel, and fabricated or shaped steel for cars	16,963,000	17,001,000
Bolts, nuts, washers, rivets, lag screws, pins, studs	13,452,000	16,312,000
Pipe, iron, steel fittings	7,642,000	9,722,000

Synthetic Plants To Require 150,000 Tons Steel, Copper, Brass

CONSTRUCTION requirements for metals to create capacity for producing 800,000 tons of synthetic rubber annually, as anticipated, total about 141,000 tons of carbon steel, 4300 tons of alloy steel, 1500 tons of steel castings, and 2500 tons of copper and brass, according to the Rubber Administration, Washington.

The copper and brass includes 2,650,000 pounds of wire mill products and 2,350,000 pounds of low-alloy sheet and plate.

The carbon steel represents 23,000 tons of bars, 26,000 plates, 62,000 of pipe and tubular goods, 2800 sheets and strip, 21,000 structural shapes, 6500 wire and wire rod. Much of the bar tonnage goes into forgings.

The alloy steel is divided as follows: 130 tons of bars, 2300 pipe and tubing, 400 sheet, strip and plate, 1250 wire and rod and 225 alloy steel castings. A considerable tonnage of 18-8 stainless steel is being placed in heat exchangers in the form of cold-drawn seamless tubing. Stainless steel also is used in fans and blowers and in some of the valves. High-chromium steel, Type 347 or 302, is used in considerable pipe and equipment. Standard SAE 4100, which has the NE designation 8744, is used in stud bolts for heat exchangers on account of its high tensile strength at high temperatures.

Principal equipment and supplies used in carrying out the program include boilers, construction machinery, compressors, vacuum and other pumps, conveying equipment, filters, instruments, motors and generators, motor controllers, pumps, transformers, valves, bearings, turbines.

A small amount of copper-base alloy tubing is used in making heat exchangers used in a plant that is to produce butyl rubber. By far the great portion of the synthetic program will be production of the Buna S type.

Norepol Production In Commercial Stage

Accompanying photographs illustrate some uses of metals in equipment to produce a new type of synthetic rubber from oil obtained by polymerizing oil from soybeans, corn and other grains. Developed at the Northern Regional Research Laboratory of the Department of Commerce at Peoria, Ill., process is in commercial operation and it is expected 12,000 tons will be produced in 1943.

Known as Norepol—name obtained by combining abbreviations of NOrthern, REgional, POLymer—the new product has 200 per cent stretch and 500 pounds per square inch tensile strength; this compares with 600 per cent stretch and 3000 pounds or more tensile strength for natural rubber. Norepol gives satisfactory results when formed into molded and extruded articles such as rubber heels, fruit jar rings, sheets for gaskets and so on. The new material has excellent resistance to oxidation.

About 75 pounds of the synthetic rubber are obtained from 100 pounds of soybean oil. What is left can be utilized in making products formerly derived from the whole oil—for example, glycerol which is used in making explosives and antifreeze solutions, also fatty acids which are used in making lubricating greases, and soaps.

Corn, soybeans or any other grains or vegetables containing linoleic acid first are crushed in a mill. Pulp then is fed into a press where, under high pressure, the oil is pressed out. The oil is fed into a storage tank and from there into a reaction kettle, shown at left, where it is put through a series of chemical reactions. The resulting rubber substitute then is passed through a mill, shown at right, which works and mixes the material to the proper consistency and converts it into sheets of desired thickness.

Photos are from Department of Agriculture.

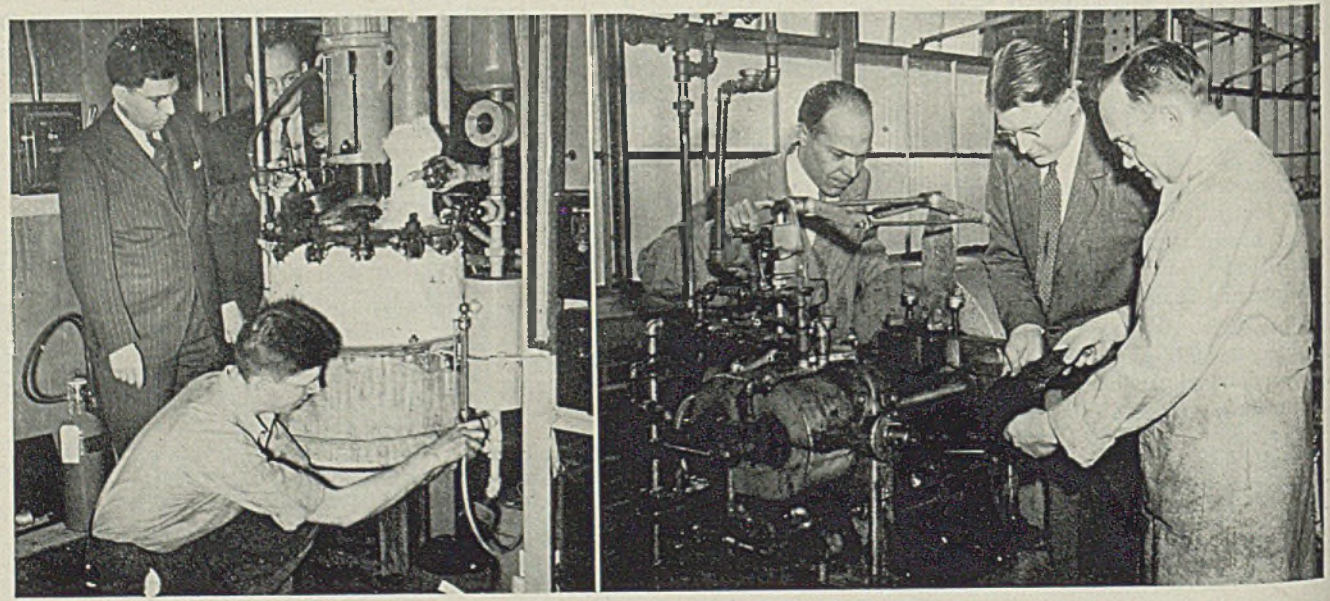
Two Synthetic Rubber Plants Start Operations

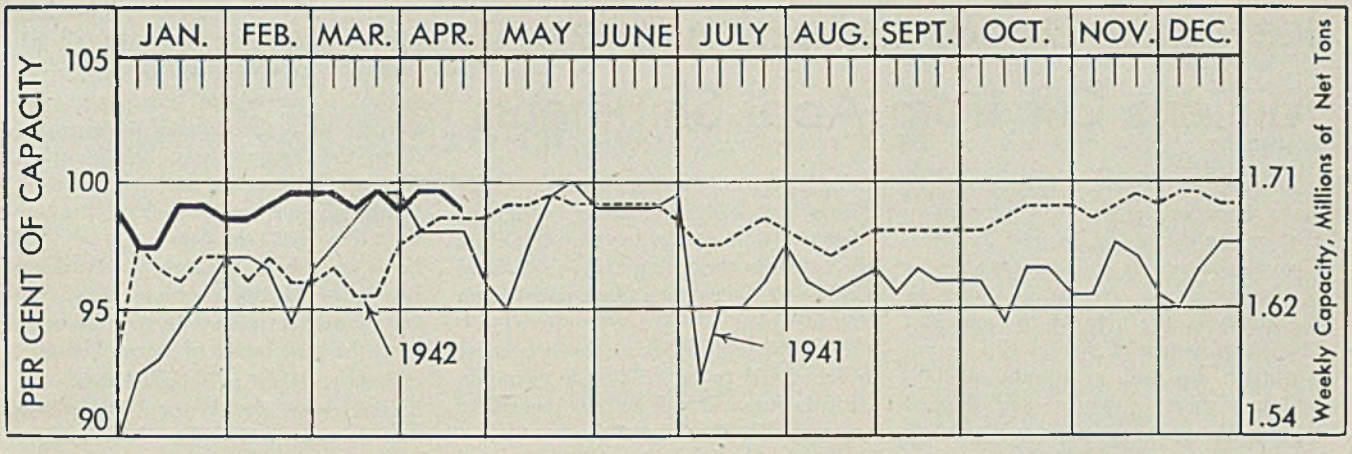
Two synthetic rubber plants built by Blaw Knox Co. at Baton Rouge, La., and Institute, W. Va., for Firestone Tire & Rubber Co. and U. S. Rubber Co., respectively, started operations recently. Plants will have capacities of 30,000 and 90,000 tons annually.

February Machine Tool Shipments Slightly Lower

Value of 25,500 new machine tools shipped in February was $114,372,000, according to WPB's Tool Division. This is a reduction of 2.6 per cent from the January figure of $117,384,000.

Backlog of orders shows a 7.9 per cent drop in value from January. Average time required to complete unfilled orders was 6.5 months at the end of February, against 6.8 months Jan. 31.





STEEL INGOT PRODUCTION BY MONTHS

Net Tons, 000 omitted

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1943	7,408	6,811	7,670									
1942	7,124	6,521	7,392	7,122	7,386	7,022	7,148	7,233	7,067	7,584	7,184	7,303
1941	6,922	6,230	7,124	6,754	7,044	6,792	6,812	6,997	6,811	7,236	6,960	7,150

PIG IRON PRODUCTION

1943	5,194	4,766										
1942	4,983	4,500	5,055	4,896	5,073	4,935	5,051	5,009	4,937	5,236	5,083	5,201
1941	4,666	4,206	4,702	4,340	4,596	4,551	4,766	4,784	4,721	4,860	4,707	5,014

Ingot Rate 99 Per Cent, Down ½-Point

Production of open-hearth, bessemer and electric furnace ingots last week declined ½-point to 99 per cent. Four districts advanced, four declined and four were unchanged. A year ago the rate was 98½ per cent; two years ago it was 98 per cent, both based on capacity as of those dates.

Carnegie-Illinois Steel Corp. blew out its No. 8 stack at South Chicago April 7 for relining.

Donner-Hanna Builds More Coke Ovens at Buffalo

Donner-Hanna Coke Corp., Buffalo, has started construction of additional coke ovens at cost of about $350,000. The ovens are scheduled to be completed by Nov. 1 and will aid in relieving gas shortage next winter. The new installation will increase coke output about nine per cent and gas volume about 12 per cent, in addition to its by-products.

Steel Corp.'s First Quarter Shipments Best in History

Although March shipments of finished steel by United States Steel Corp. were slightly smaller than in the corresponding month in 1942 the total for first quarter was the largest for that period in the history of the corporation; 5,149,982 tons, against 5,136,418 tons in first three months of last year.

(Inter-company shipments not included)

Net Tons

	1943	1942	1941	1940
Jan.	1,685,992	1,738,893	1,682,454	1,145,592
Feb.	1,691,592	1,616,587	1,548,451	1,009,256
Mar.	1,772,397	1,780,938	1,720,366	931,905
Apr.	.....	1,758,894	1,687,674	907,904
May	.....	1,834,127	1,745,295	1,084,057
June	.....	1,774,068	1,668,637	1,209,684
July	.....	1,765,749	1,666,667	1,296,887
Aug.	.....	1,788,650	1,753,665	1,455,604
Sept.	.....	1,703,570	1,664,227	1,392,838
Oct.	.....	1,787,501	1,851,279	1,572,408
Nov.	.....	1,665,545	1,624,186	1,425,352
Dec.	.....	1,849,635	1,846,036	1,544,623
Total	.....	21,064,157	20,458,937	14,976,110
Adjustment	.....	.....	*42,333	†37,639
Total	.....	.....	20,416,604	15,013,749

†Increase. *Decrease.

Colonial blast furnace at Riddlesburg, Pa., operated since 1941 by Riddlesburg Coal & Iron Co., subsidiary of United States Pipe & Foundry Co. and scheduled to shut down indefinitely April 15, will continue at WPB's request.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended Apr. 17	Change	Same week 1942	1941
Pittsburgh	98.5	—1.5	95.5	100
Chicago	100.5	None	105	102
Eastern Pa.	94	—1	94	96
Youngstown	97	—1	92	97
Wheeling	93	+4	82.5	84
Cleveland	92	—4	89.5	96.5
Buffalo	90.5	None	90.5	90.5
Birmingham	100	None	95	90
New England	100	+5	100	92
Cincinnati	93	+8	91.5	91.5
St. Louis	93	None	90.5	98
Detroit	96	+2	90	70
Average	99	—0.5	*98.5	*98

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

Republic Pours Electric Steel at New Chicago Plant

Republic Steel Corp. has placed in operation two of the nine electric furnaces at the new plant it is building at South Chicago, Ill., for the Defense Plant Corp. First heat was tapped from furnace No. 3 on April 3 and from No. 2 on April 13.

The project, one of the largest electric furnace steel units in the United States, is only approximately half finished, the two furnaces being the only equipment ready for operation. War need made it desirable to start operations before normal equipment had been installed and the building completed.

The new plant, near Republic's already extensive facilities on the Calumet river, will include a complete steel plant, from ore docks to finishing facilities. Now under construction are ore docks with unloaders and bridges; a 1275-ton blast furnace with capacity of 450,000 tons per year; 75 coke ovens; a sintering plant; by-product plant; four 250-ton tilting open hearths for duplexing steel; nine 70-ton electric furnaces; a 44-inch blooming mill; 32 and 36-inch bar mills; complete finishing and heat-treating facilities for electric furnace steel.

With completion of this plant, Republic Steel Corp., already largest electric furnace steel producer in the United States, will have capacity for approximately 1,700,000 tons annually of the country's total of about 6,000,000 tons.

M. E. Goetz, district manager in Chicago, will be in charge of operations.

Ice Jams Upper Lake Passages; Millions Cut from April Shipments

DELAY in opening navigation in the Lake Superior region, and probability that only eight of the 16 new Maritime Commission vessels will be available for service by July 1, are casting doubt on the ability of the industry to move 95,000,000 gross tons of iron ore this season. To attain this goal an average of 400,000 tons must be loaded and shipped daily from upper lake ports in about 240 days. Last year 8,600,000 tons was shipped by May 1. It is estimated less than 1,000,000 tons will be loaded by May 1 this year.

Despite efforts to clear the way to the head of the lakes, ice apparently will retard the opening until the latter part of this month. This would be the latest since 1928, when navigation at the Soo canal was not opened until May 3. In only two other years, 1904 and 1923, did navigation to the upper lake ports start at a later date than now anticipated this season. In these three years the ice was left to break up normally, for there was no need to carry record tonnages.

Escanaba was the only ore-loading port open to navigation at the close of last week. About 12 vessels had been loaded at that port, representing a total of nearly 140,000 gross tons.

With ice conditions almost as bad as when ice breaking started two weeks ago, the coast guard may charter a second carferry of the SAINTE MARIE type to break through to upper lake ports.

Consumption of iron ore attained a new all-time monthly record during March, reaching an estimated total of 7,900,000 gross tons. On this basis stocks were slightly under 25,000,000 tons April 1.

Revised schedules call for six Maritime Commission vessels to be placed in service by June 1, two more by July 1 and the remainder by Sept. 1. These vessels are smaller and slower than those built last year for the Pittsburgh Steamship Co. Carrying capacity at 23-foot draft is estimated at 14,000 gross tons each. They will have a 595-foot keel, 60-foot beam and speed of 11 knots.

American Shipbuilding Co. is building six of the Maritime Commission vessels and Great Lakes Engineering Works ten.

They will be sold to shipping interests on a trade-in basis. Companies will trade in their older vessels for the new ones, paying the difference in established values between the vessels to the commission. The ore shipping interests will continue to operate the old vessels for the duration, after which they will be turned over to the commission. Companies reported negotiating with the Maritime Commission for the vessels are the Interlake Steamship Co., Inland Steel Co., Great Lakes Steel Corp. and Wilson Transit Co.

New McArthur lock at the Soo canal is scheduled to be ready for operation early in July. It will be long enough to accommodate the largest ore vessels.

Automotive Trade Steamship Co. and the T. J. McCarthy Steamship Co. of Detroit are reconditioning the vessels INGALLS and MCCARTHY for the ore trade. Estimated capacity of these vessels is about 7000 tons each.

Inland Waterway Traffic Shows Marked Increase

Marked increase in the use of inland waterways is noted by Joseph B. Eastman, director, Office of Defense Transportation.

Increases in traffic on the Mississippi and Ohio rivers have been largely in northbound traffic and in the movement of materials requiring gondola, or open-top barges. A heavier volume of such commodities as coal and steel —particularly structural steel — combined with the withdrawal of 116 barges for petroleum carriage.

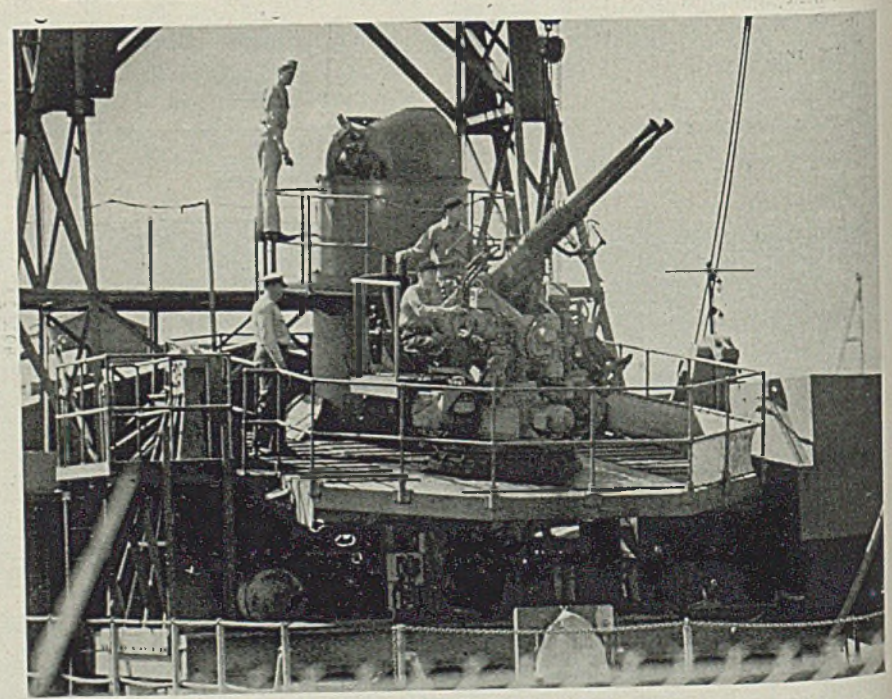
Coal is moving in great volume on virtually all the inland waterways — down the Monongahela, Allegheny and Kanawha Rivers to the steel mills at Pittsburgh; on the Ohio from Huntington, W. Va., to Cincinnati and St. Louis, and from Kentucky mines downstream to Memphis. More than 600,000 tons a year moves up the Mississippi from the coal mines of lower Illinois.

Mobile, Ala., is supplied with coal barged down the Warrior River from the Alabama fields, while New England receives a heavy volume of coal moved by waterway and ocean barges from New York and Norfolk, Va., piers.

Steel, particularly structural steel, is moving in increasing volume down the Mississippi and Ohio Rivers to shipyards on the Gulf, while sulphur is hauled from Texas and New Orleans to St. Louis, Chicago, and Pittsburgh, much of the Chicago-bound sulphur moving, during the open season, on through the Great Lakes and the New York Barge Canal to New York.

Scrap iron for the steel mills moves from Texas points, New Orleans, Memphis, and many other river ports to Chicago, Pittsburgh, and other steel centers. Fluorspar—200,000 tons of it a year—moves on the Ohio from Indiana to serve as a flux in steel production.

SIMULATES WAVES TO TEST ACK-ACK PERFORMANCE



BOFORS 40-millimeter twin antiaircraft mounted is tested for action aboard a barge which rocks to simulate the action of waves at the Navy proving ground at Dahlgren, Va. NEA photo

Steel for 150 Tanks Lost in Unauthorized Strike at Gary

CHICAGO

AN unauthorized 24-hour strike of about 300 members of the United Steelworkers of America-CIO at the Gary, Ind., works of Carnegie-Illinois Steel Corp. last week cost the production of enough steel for 150 tanks. The loss would have been even greater but for the loyalty of seven men.

It all started when three cinder snappers in No. 5 open hearth department, with eight large furnaces supplying steel to the armor plate plant, failed to report. When these men were not replaced, the other 75 men refused to work. The next turn of 75 also declined to work, and the next turn of 100 did not even show up. In sympathy, one turn in No. 1 open-hearth shop stayed out.

The seven men who stuck to their jobs on one shift in the No. 5 shop tapped the steel remaining in the furnaces, thereby saving not only the steel, but the furnaces themselves. One of these men, James Hanson from Gary, a steelworker for 15 years, did not find it necessary to explain his action—his son Clifford, 23, a lieutenant in the Army Air Corps, having enlisted a month before Pearl Harbor, was killed April 2 when his bomber-trainer crashed.

Grievances of any consequences lacking, union officials ordered the men back.

Vote on Job "Freeze"

Employer and labor organizations in the Calumet area, which is scheduled to go on a 48-hour week basis May 1, are being given an opportunity to approve or reject the job-freeze scheme planned for them by WMC. Copies of the proposed manpower control plan were mailed to 1500 companies and 400 unions last week.

The program, drafted by WMC and approved by a labor-management committee appointed by William H. Spencer, regional WMC director, would require workers to obtain written permission from employers before they could change jobs, and would channel all hiring through the United States Employment Service. Spencer describes it as a voluntary plan; labor leaders brand it as "peonage."

Enforcement of the program will be subject to approval of management and labor. They will be asked to subscribe to it, and a WMC spokesman has admitted that if a majority is adverse to it the labor-management committee probably will resign. Committee vote on the plan originally was 7 to 1. Chicago labor leaders have submitted to WMC a counter plan which would eliminate job-freeze requirements. This plan would exert public pressure of church, fraternal, labor, and business groups to achieve a stabilized labor market, reduce labor piracy, needless job turnover, and labor hoarding.

Meanwhile, steel producers in the district are making scant headway in their programs to place the compulsory 48-hour week in effect May 1. They point out that the longer work week already is established in all departments where operations are sufficient to sustain it. The rub lies in finishing departments whose schedules are restricted by government order, and in clerical capacities.

Labor-Management Committees' Accomplishments Reviewed

PHILADELPHIA

Labor-management committees now functioning in 2100 plants have expanded production, improved quality of product, cut down waste, reduced use of critical materials and aided in salvage drives, W. Ellison Chalmers, acting chief of staff, War Production Drive Headquarters, Washington, declared April 8 before a labor-management production drive conference sponsored by Middle Atlantic chapters of the National Industrial Advertisers Association.

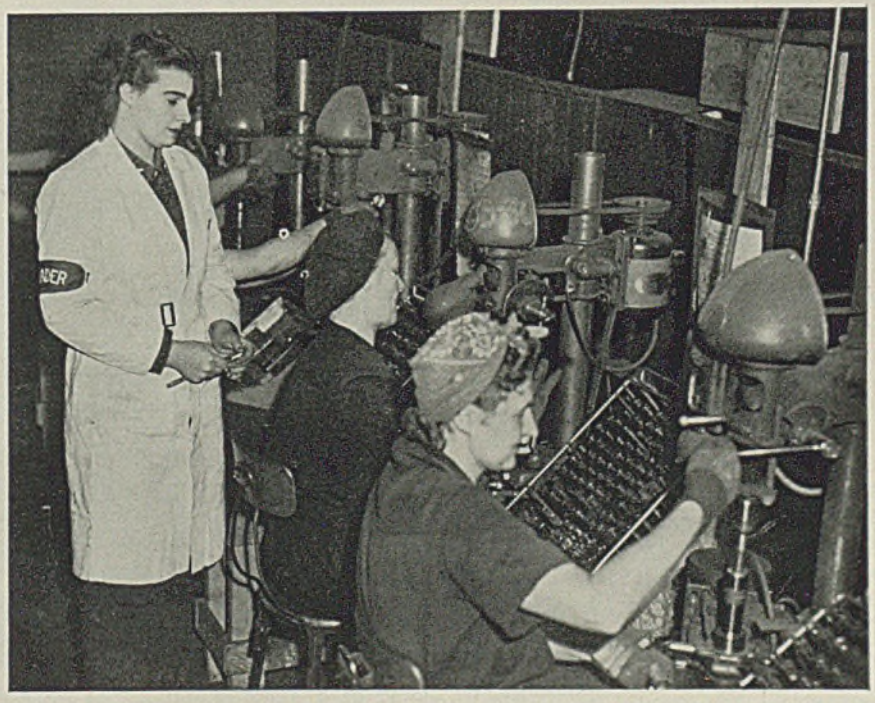
In one small steel plant in the East, every production record was broken in about a week after a labor-management committee had been set up, Michael Harris, director, United Steelworkers of America, told the conference. A 400 per cent boost in production in a plant of the Worthington Pump & Machinery Corp. was attributed in part to the efforts of a similar committee.

Where labor-management committees have not been successful, Mr. Harris said, management has not been willing to accept them.

James T. Chirurg, Boston advertising man who has just returned from a trip to England, said industrial plants generally have works committees which function in somewhat the same manner as labor-management groups here.

Appeals to patriotism through comic cartoons and the like, however, are "out." Posters are used which are truthful, specific, human and newsworthy. Often posters carry newspictures tied in with the products of a particular plant.

WOMEN REPLACE MEN AS "LEADERS"



MORE than 100 women have replaced men as foremen at the N. A. Woodworth Co.'s plant, Ferndale, Mich., manufacturing aircraft parts. Program was inaugurated with the training of 15 women for such occupations. It proved so successful the company plans to increase the number of "leaders"—as they are called—to 130. Only 60 per cent of applicants met requirements

DPC Authorizes War Plants, Equipment

NEW war plant facilities and equipment purchases authorized last week by Defense Plant Corp. include the following (figures are approximate):

Koppers Co., Baltimore, to provide equipment and machinery for a plant in Maryland at a cost of $450,000.

Commodity Credit Corp., Washington, to provide plant facilities in Illinois and Wisconsin at an average cost of $350,000 each.

Bendix Aviation Corp., Bendix, N. J., to provide additional facilities at a plant in New Jersey at a cost of $530,000, resulting in an overall commitment of $50,000,000.

Maryland Sanitary Mfg. Co., Baltimore, to provide additional plant facilities in Maryland costing $240,000, resulting in an overall commitment of $1,500,000.

Washington Iron Works, Seattle, Washington, to provide additional machinery and equipment for a plant in Washington at a cost of $120,000, resulting in an overall commitment of $250,000.

Pacific Intermountain Express, Salt Lake City, Utah, to provide transportation equipment to be operated in various Western states at a cost of $155,000.

Ralph C. Coxhead Corp., New York, to provide machinery and equipment for a plant in New York.

Westvaco Chlorine Products Co., New York, to provide additional plant facilities in California at a cost of $100,000, resulting in an overall commitment of $340,000.

Wenatchee Alloys Inc., Canton, O., to provide additional facilities at a plant in Washington at a cost of $200,000, resulting in an overall commitment of $1,450,000.

Grain Processing Corp., Muscatine, Iowa, to provide additional plant facilities at a plant in Iowa at a cost of $380,000, resulting in an overall commitment of $1,225,000.

Barnes-Duluth Shipbuilding Co., Duluth, Minn., to provide additional plant facilities in Minnesota at a cost of $300,000, resulting in an overall commitment of approximately $900,000.

Canton Drop Forging & Mfg. Co., Massillon, O., to provide facilities for a plant in Ohio at a cost of $4,000,000.

H. K. Porter Co. Inc., Pittsburgh, to provide additional equipment for a plant in Pennsylvania at a cost of $25,000, resulting in an overall commitment of $125,000.

General Electric Co., Schenectady, N. Y. to provide additional equipment and machinery for a plant in Massachusetts at a cost of $750,000, resulting in an overall commitment of $5,800,000.

Vermont Marble Co., Proctor, Vt., to provide additional equipment for a plant in Vermont at a cost of $20,000, resulting in an overall commitment of $170.000.

FINANCIAL

Arthur G. McKee & Co. Notes Decline in Construction

After two years of record business, Arthur G. McKee & Co., Cleveland, appears to be entering a period of reduced volume, Arthur McKee, president, states in the annual report. He says the decline apparently taking place in construction volume throughout the United States is reflected in the dollar value of new contract work for the first three months of this year, a total far below that for corresponding periods of the two previous years. Construction sales in 1942 aggregated $47,000,000.

At the end of 1942, however, McKee company still had a large backlog of uncompleted contracts on hand which, when completed, it is estimated will approximate $100,000,000 in cost.

Net profit for the year after all charges was $723,028, equal to $8.79 per share on class B stock. This compares with $718,238, or $8.73 per share, for 1941.

Reports Iron, Steel Group's Net Earnings 6.5 Per Cent

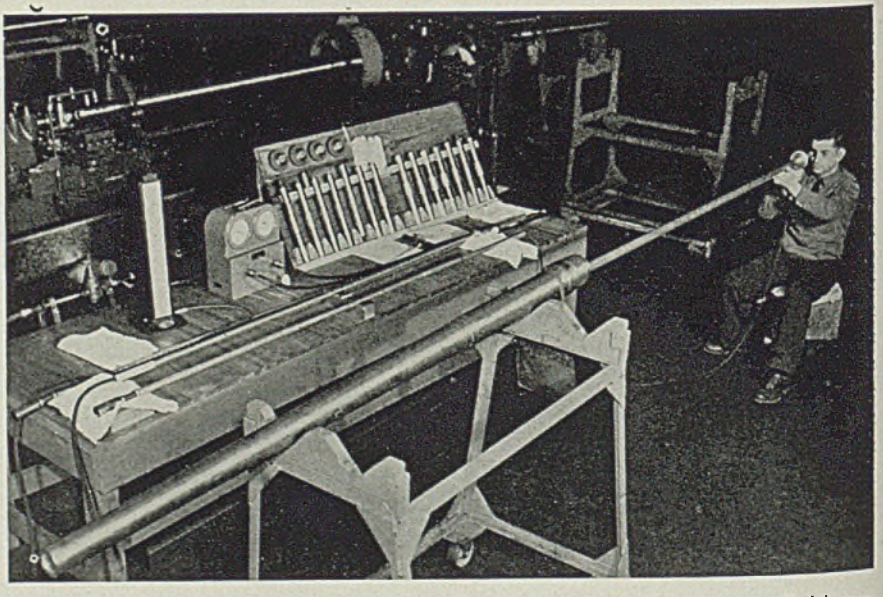
Fifty-six companies classified as "iron and steel" reported net income after taxes as $226,667,000, with 6.5 per cent return on capital, in 1942, against $322,261,000, with 9.6 per cent return, in 1941, according to National City Bank of New York.

Net profit for 1336 companies comprising "total manufacturing" in 1942 was $2,521,508,000, compared with $2,925,624,000 in 1941.

No. of Companies	Industrial Group	Per Cent Return 1941	1942
56	Iron and steel	9.6	6.5
13	Agricultural implements	10.7	9.1
41	Building equipment	10.9	9.6
39	Hardware and tools	17.3	14.5
122	Machinery	18.8	15.9
17	Nonferrous metals	11.4	10.0
60	Miscellaneous metal products	14.1	10.5
55	Auto equipment	19.6	16.7
21	Railway equipment	10.8	11.0
34	Aircraft and parts	48.8	45.0
6	Shipbuilding	28.9	26.6
1336	Total manufacturing	12.3	10.1

Except for executives and employes, only seven stockholders of Bethlehem Steel Corp. attended the corporation's annual meeting in Wilmington, Del., April 13, smallest number in more than 20 years. Robert E. McMath, vice president, who presided in the absence of President Eugene G. Grace, was unable to elicit a single question from those present and no one criticized action of officers or company policies.

GUN INSPECTION METHOD BORROWED FROM SURGERY



ONE of a hundred inspections on the barrel of the 40-millimeter field gun manufactured by Pontiac Motor Division of General Motors Corp. is that done with the "borescope." Every inch of the gun's barrel is examined for material or machining defects under a strong interior light. Such examinations once were attempted by "feeler" gages until the principal of the borescope was borrowed from surgery

A. D. Whiteside, Former Chief of Steel Branch, Heads Civilian Supply

APPOINTMENT of Arthur D. Whiteside, formerly head of the Iron and Steel Branch of the Office of Production Management, predecessor to WPB, as vice chairman of WPB in charge of a new division of Civilian Supply was announced by Chairman Donald Nelson last week. Mr. Whiteside returns to the war agency to expand a division that has been functioning under Joseph Weiner. Mr. Weiner's future status, it was indicated, will depend on whether he desires to remain at War Production Board, in which case he would be subordinate to Mr. Whiteside.

Mr. Weiner will be remembered as the author of the much discussed "bedrock economy" report of several weeks back. Chairman Nelson has been under pressure to set up a different mechanism for handling civilian requirements.

The new division, it is expected, will have the effect of easing the situation on all types of civilian supply where this is consistent with war production needs. Industry branches will continue to formulate programs, including material requirements in all fields such as metals and others, but these must now have Mr. Whiteside's approval, and he will be empowered to make revisions with civilian requirements in mind, at his discretion.

Mr. Whiteside resigned as chief of the OPM Iron and Steel Branch Dec. 1, 1941, to return to his position with Dun & Bradstreet.

New Controls Established Over Antifriction Bearings

Additional controls over scheduling the production and distribution of antifriction bearings are established by General Preference Order E-10.

Heretofore, scheduling in the bearing industry has been covered by a general scheduling order (M-293) which applies to the scheduling of bearings and other critical common components. The present order supplements M-293 by the inclusion of special features which are not covered by it.

Among the features are the following:

Commencing June 1, 1943, each producer shall schedule his production of bearings for successive 90-day periods.

Production is to be scheduled by producers so that 85 per cent of each quarter's bearings will go to fill "production orders," defined as follows:

(1) Orders for one or more antifriction bearings of one size having a total price of $500 or more.

(2) Single orders or contracts for more than 500 bearings of any one size.

The other 15 per cent of each producer's schedule is to be devoted to miscellaneous orders. A miscellaneous order is defined as any purchase order or contract for bearings other than production orders; provided, however, that no person shall subdivide his purchase orders or contracts for the purpose of coming within this definition.

Transportation Materials Order, P-142, Amended

WPB has amended Preference Rating Order P-142 to provide for a steady flow of materials entering into the operations of transportation systems during the time required for the changeover from Preference Rating Order P-88, which was superseded by P-142 on April 5.

Under P-142 as originally issued, operators would technically have been unable to extend a preference rating until they had applied for and received a serial number under the new order. Also, P-142 requires the use of Form PD-844, in place of Form PD-351, which was used under Order P-88.

Amended regulation provides that until an operator receives his serial number under the new order he may use on the certification which must accompany an order for maintenance, repair and operating supplies the CMP allotment symbol MRO-P-88 plus his serial number under P-88.

Likewise, the amendment provides that to the extent that an operator continues to receive ratings and authorizations on Form PD-351 for the second quarter of 1943, PD-351 shall be considered equivalent to PD-844.

Plan Controlled Production Of Office Equipment

A plan to put manufacture of office machinery on a scheduled basis to allow controlled production in accordance with actual needs has been submitted to the Office Machinery Industry Advisory Committee by officials of the WPB Service Equipment Division.

The plan would permit scheduled production of certain types of office machinery for the most essential needs, but would not mean unrestricted manufacture of the machinery for ordinary civilian purposes.

WPB scheduling of the output of office machinery manufacturers would be intended solely as an expedient for handling the most pressing nonmilitary requirements.

Warns Die-Casters To Adhere to Specifications

WPB Conservation Division last week warned that tentative specifications for zinc-base die-castings must be closely followed, thus advancing to full ASTM standard such specifications.

The division predicted trouble if there was any relaxation in strict adherence to the standard.

Exclusion of harmful impurities is stressed in the proposed standard. The division emphasized the danger of contamination of lead and tin as their presence makes the alloys susceptible to a type of corrosion causing serious embrittlement and dimensional change of casting.

Members of the industry now are voting on a proposal to make the tentative standard permanent, see page 72.

Warns Manufacturers To Pass On CMP Authorizations

Flow of materials to war uses is being threatened by failure of some manufacturers receiving CMP allotments to pass on authorizations in proper form to suppliers, according to WPB officials. Producers under CMP are required to authorize production schedules of suppliers and make allotments of necessary controlled materials to suppliers.

Urges Early Placement of Orders for Fine Wire

Manufacturers of resistors and fine wire, used in military radio, have been urged to place orders quickly for fine wire in a recent letter by S. K. Wolf, chief Resources Branch of the WPB Radio Division.

Mr. Wolf pointed out that while orders for many sizes of fine wire are being delayed, the wire producers are working below capacity. He stated that facilities for producing some sizes have not been completed so that complaints of slow deliveries may be justified.

War Production Board has revoked Order P-134, repair and maintenance materials for copper, zinc and alloy producers, to avoid confusion with CMP Regulation No. 5, which in effect replaces it.

And This in Wartime . . .

OBSERVERS who give their principal attention to railroads talk alarmingly about the possibility that the railroads may fall far short of their 1942 tonnage record. In the first place, equipment has been wearing out at a rate considerably under the replacements that have been authorized by the War Production Board—and the effects of wear are becoming more noticeable. Secondly, movement of trains is slowing down, not only because of wear, but because the railroads have lost many of their most efficient men and are forced to operate with men of less experience.

One authority whose opinion usually is held in high esteem predicts that a railroad "breakdown" will begin to assume important proportions within 60 days. This prediction, however, is considered rash by some observers. All authorities agree that the railroad situation is deteriorating; actual cases are cited where railroad slow-downs have reduced the freight movement as much as 50 per cent under last year.

"Holding the Line"

Capitol observers who have been watching the accelerating pace of price and wage increases feel better about the outlook. A crisis appears to have developed and been weathered. Recommital of the vetoed Bankhead bill to the Senate Committee on Agriculture, followed by President Roosevelt's executive order of April 8 which drastically curbs the power of administration agencies to grant price and wage increases, should mean that inflation from now on will be at least slowed down.

The President's executive order, plus the veto of the Bankhead bill, is welcomed in private by many individuals who have been active in pressure groups. These individuals, whether they hold political office or whether they depend for their income upon labor unions or associations of farmers, have given every proof that they were loyal to the cause of those they represent. They now have a good excuse to report back that they did all they could and that failure to get further increases in prices or wages is not their fault. The President has given them an alibi and indications are that most of them will be glad to accept it.

Conversion in Reverse

Indications are accumulating that long before the war's end we may have made substantial progress in the reconversion of industry back to peacetime civilian production. First, this being a global war, we perhaps will bring military operations to an end in some areas before we clean up in other areas. Secondly, as we ship our rapidly increasing production of military items through various lines to depots all over the world, the lines will choke and bring about stoppages or decreased production here and there.

Some observers think it likely that it will become necessary within a comparatively few months to embark on such reconversion to cure unemployment that would result here and there from stoppages at plants now producing military items. This makes it all the more necessary for plant managements to be ready with civilian production programs which can be implemented at a moment's notice.

In testifying before the Senate Banking and Currency Committee on April 6, Donald M. Nelson, chairman, War Production Board, expressed the attitude that the board should continue to have full control of civilian production. He expressed strong opposition to provisions of the Maloney bill, under which the present Office of Civilian Supply within WPB would be replaced with a new and independent agency able to have Mr. Nelson's rulings reviewed in the Office of Economic Stabilization.

Chances of enactment of Senator Maloney's bill do not appear to be especially bright. Indications are that when and as reconversion becomes necessary it will be handled by the going organization of the WPB.

Senate's Official Spanker

Manufacturers who have been on the Truman committee's witness stand should not get the idea that they are singled out for harsh treatment. The Truman committee is in the habit of lashing out at anybody and everybody whose contribution to the war production effort may be under suspicion. That is true whether the witness comes from industry or business, or whether he is with the Maritime Commission, the Army, the Navy or any other organization related to the war effort.

For example, the day after the committee gave U. S. Steel Corp. officials a rough going-over—after it had been disclosed that plate analyses had been "faked" at the Irwin Works—it took organized labor apart. AFL's William Green, CIO's Philip Murray and UMW's John L. Lewis were catechised for various union abuses and practices which the committee members believed are

Mr. Green was questioned about the AFL policy of collecting large initiation fees from workers at Camp Blanding and then replacing them with new workers who also had to pay initiation fees.

Senator Brewster, Maine, in striving to ascertain what legislation is necessary to protect the huge army of unorganized workers from discriminatory treatment in favor of organized labor, asked some searching questions. Various senators wanted to know how CIO was helping the war effort by trying to raid the Kaiser shipyard at Portland, Oreg., where AFL unions have contracts. They demanded financial statements from the unions and threatened to subpoena such statements if they were not forthcoming voluntarily.

The committee showed plainly that it was not much impressed with Mr. Lewis' statistics on the rise in the cost of living in the coal regions, and its later report proved that was the case.

It may be said in passing that labor leaders are much more skillful than the average business man in dealing with the Truman committee. They have more confidence and often "speak out loud" and pound the table.

Senator Truman, as chairman, does not permit any personalities and when instances of demagoguery occasionally begin to develop he puts a quick end to them and expunges the questions or the answers from the record.

An unbiased observer gets the impression that the Truman committee on the whole is a good committee. Some of its members have pet prejudices and formulate many questions in conformity. It is a group of individuals with an unusual level of intelligence, trying to do an honest and patriotic job of unearthing any instances of carelessness or dishonesty that interfere with the war effort.

Censorship Eases

Ordnance Department has relaxed its policy of censoring articles describing production of shells. Certain details having to do with operations involved will be deleted. From now on, however, readers of technical publications again can expect to get more information on this subject than has been the case since Pearl Harbor. In addition the ban on publicizing the "pepping up" of steel through small additions of boron has been eased.

Buy Early

Last spring the Office of Defense Transportation "suggested" that New England coal consumers purchase their supplies as early in the year as possible and thus be assured of delivery. This year, says a spokesman, they will be "told" to order early in the year "and no fooling." He says that to be sure of delivery New England consumers must get their coal shipped before Sept. 1.

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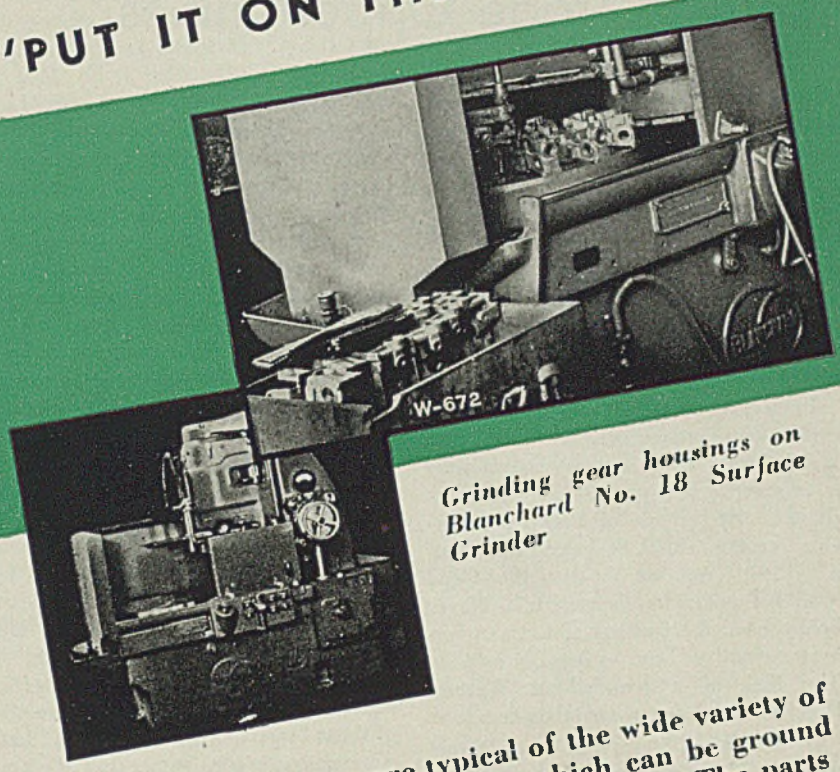

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Offers U. S. Manufacturers Postwar Trade Opportunities

NUMEROUS questions have come from manufacturers who read a discussion that appeared in STEEL of Jan. 11 and 18, 1943. They wanted to know what sorts of manufactured products will be bought by the Latin American countries after the war. In other words, they want to know the extent to which they, as individual manufacturers, can expect to do business with Latin America.

In seeking to answer these questions certain observations may be made. One is that Latin America as a whole rapidly is improving her position in dollar exchange. At the end of 1942 her favorable position stood at better than half a billion. Another is that the Good Neighbor policy has borne fruit. Never before have the feelings of Latin Americans toward us been as friendly as now. The idea of a rounded-out Western Hemisphere economy has taken firm root.

In the United States and Great Britain much has been and is being said about the peace and the postwar world. An abundant life is to be assured to all the peoples of the world. Backward countries are to be assisted in the development of their economies. Services and goods are to be supplied to needy peoples, often without payment in kind. In setting up foreign trade relations imports must be allowed to balance exports. And so on.

All this sounds—and is—complicated. The extent to which the postwar world will be made to conform to present thinking is not at all certain. A lot of voices will clamor for attention at the peace table and there is bound to be a lot of bargaining.

Europe Is Our Competitor

However, it is quite likely that there can be no successful attempt to set up policies that go squarely counter to natural economic trade relations. For example, in normal times Latin American countries have shipped large quantities of food and other materials to Europe and in return have bought chemicals, machinery and other manufactured products from Europe. From a purely realistic point of view, American manufacturers should not expect the Good Neighbor policy to bring about a complete change in this relationship. When the seas again are open to commerce and shipping space again becomes available it is sound to expect that there again will be active trading between Latin America and Europe.

In other words, while our position in Latin America from a sentimental point of view should be the best we ever have enjoyed—we will meet competition.

For that reason it is advisable for manufacturers to set up Latin American sales programs without waiting for the war's end so as to be ready to jump in without delay immediately after the last gun has been silenced. The Co-ordinator of Inter-American Affairs for months has been urging American manufacturers to keep alive or intensify their advertising to Latin American buyers, so as to keep the latter informed about American products and arouse their desire to buy American products. Many manufacturers are doing just that. Many have kept their Latin American selling organizations alive, while many more are striving to set up such organizations.

What sort of products will Latin American countries want after the war? In what volume will they want them? The answers to these questions may be suggested by describing certain trends that now are pronounced in the development of the Latin American economy.

Transportation: The railroads in the Latin American countries, in general, are in very bad condition and millions of dollars are being spent to place them in safe operating condition so that they may be used efficiently in hauling iron ore and many other minerals and materials to seaports. The outlook for constructing new railroads depends on what sort of transportation facilities will prove the best in the future based upon actual needs; best opinion is that the postwar period will bring railroad expansion and the laying of new lines of track in Brazil, Mexico and elsewhere.

Air transport now is firmly established through Latin America. Rubber and many other strategic materials are shipped by air. Authorities of the future of Latin American aviation believe that the use of aircraft will be expanded and that the number of airports will be sharply increased as time goes on. A great deal of this work is going on during the war and it will be continued.

Lack Good Roads

A great handicap to the efficient use of the air in most of Latin America is the lack of adequate roads. To help war transportation we have shipped a large amount of road building equipment to various countries in which it is being used in building a considerable amount of through highway but also, and mainly, in building roads from mines and other establishments to airports. Many new sources of materials have been found; new mines are being opened. The roadbuilding program is one that will last interminably; so much is to be

Vice President Henry A. Wallace recently toured Central and South American republics to foster the Good Neighbor policy. Similar missions are doing much to improve trade relations. Mr. Wallace is shown wearing a chamanto, blanket-like shawl, presented by the National Agricultural Society at Santiago, Chile

done. Hence there should be a good permanent market in Latin American countries for roadbuilding equipment, concrete mixers and accessory equipment.

For getting out rubber, minerals, balsa wood, mahogany, quinine, sisal and the many other strategic war materials, motor trucks, motor boats and river vessels figure prominently as links between the primary source and the airport or wharf for loading to final destinations. To step up production programs we have been shipping trucks in considerable numbers, along with tires and accessories such as filling stations, repair and maintenance equipment and so on. Students of the postwar Western Hemisphere economy believe that we will keep on buying the above mentioned raw materials and many other materials from Latin America after the war. They believe, therefore, that the postwar period will find in Latin America a much broader market for automobiles and trucks than in prewar times.

As time goes on the market for imported rubber tires in Latin America probably will be reduced. While Chile, Argentina, Brazil, Venezuela and Mexico already have plants that make tires—they do not yet have capacity for producing large oversized tires used on heavy roadbuilding machinery. Those who have studied the possibilities are inclined to the belief that Latin America will import fewer manufactured rubber goods after the war, inasmuch as eventual manufacture of such goods close to rubber sources seems more logical.

Expansion in petroleum production and refining is expected. There already is a big demand for necessary equipment—a demand which cannot be met now because of the priorities situation.

Mining: This industry has been revolutionized and vastly expanded as a result of the war. We are shipping much improved mining equipment to Latin American countries so as to get maximum production of critical minerals. By intensified exploratory work new mineral deposits have been found and are being developed. These new deposits include principally bauxite, tungsten, beryllium and tin. Where mining used to be thought of in Latin America in terms of gold and silver, the emphasis now is on getting out copper, iron and the other metals that are strategic for purposes of war. Students of our trade relations with Latin America believe that to conserve our own declining mineral resources we will have a permanent policy of bringing in large quantities from Latin America and elsewhere. That augurs a continued and heavy need in Latin American countries for mining equipment of all sorts.

An important development during the period of intensified exploratory work is the discovery in Argentina, Brazil and elsewhere of large deposits of coal which will enable those and neighboring countries to be less dependent on Europe for coal. It is believed that still other coal deposits will be found. Thus coal mining also will be the source of an extra demand for mining equipment.

Metalworking: Students of Latin American trends declare that industrialization is increasing rapidly and will be accelerated after the war, thereby increasing Latin American demands for all sorts of metalworking equipment far beyond any past levels. They base their reasoning on four main factors:

1—Exports of minerals and many other materials from Latin America should be continued at the wartime level or approximately thereat;

2—Power generating plants which are springing up all over Latin America for war production will be available as sources of low-priced current after the war;

3—The iron and steel industries of Mexico and Brazil are being greatly expanded, so that their product, supplemented by imported iron and steel on a proportionately smaller scale than before the war, will supply a natural basis for a metalworking industry;

4—An increasing number of students and engineers from Latin America are working in United States metalworking plants in order to get basic training to be applied later on in manufacturing plants to be established in their own countries.

That there are certain other reasons why metalworking on a much larger scale may be expected after the war will be suggested later on in this discussion.

Agriculture: This is a field of big potentials to many manufacturers in the postwar Latin American economy. Equipment has been sent to Ecuador to aid production of balsa wood for aircraft. Equipment similarly has been sent to Central America in order to get out mahogany for the construction of P-T boats and other types of vessels. Huge programs are under way involving production of rubber, sisal and other fibers, quinine, rotenone and other products of the soil.

Many peoples are being taught new customs. Banana producing Costa Rica is growing beans, lettuce and other garden truck to meet her own requirements and those of Panama. A recent trend has been the introduction of more dairy herds in Mexico and Central America with the result that people there are becoming accustomed to drinking milk. One such herd is located close to Mexico City and the other is in Venezuela. A third, which is to be located in Colombia, has been held up by temporary inability to obtain milk drying equipment; such equipment is necessary where the climate makes it difficult to keep fresh milk from spoiling in storage. Thus a lot of innovations are being tried that undoubtedly will "stick" to a large extent, thereby creating new and increased equipment needs. For example, if the truck garden project sticks in Costa Rica that country will be a good market for garden tools such as rakes, hoes, plows, forks and so on.

Important meat producing countries as Argentina and Uruguay have become conscious of the merits of refrigeration and are clamoring for such equipment which, naturally, is hard to get under wartime conditions. Students of the postwar Latin American economy are convinced that the development of refrigeration is going to be the chief one as far as food of all sorts is concerned. They look for a good postwar demand for modern equipment of all kinds for abattoirs and meat processing plants.

Housing: Wartime developments have made many Latin Americans acutely conscious of the need for sanitation. In moving 50,000 workers to the Amazon rubber country and in moving many thousands to the Itabira iron ore district, Brazil, for instance, for the first time devoted major attention to the housing of workers and to the problem of keeping workers and their families healthy by protecting them against the ravages of malaria and other diseases.

Textiles: A large amount of cotton is raised, particularly in Brazil, Peru, Uruguay and Argentina. A large amount of wool is produced, mostly in Argentina and Chile—from sheep in the former country and from llamas in the latter. There is already a good-sized textile industry; Colombia alone has 56 such mills. It is believed that industrialization will bring sharp acceleration of the textile industry in Latin America.

Leather: Argentina and Uruguay long have been prime sources of hides, output of which largely has gone to the United States and England in normal times. These hides have only been cured prior to shipment, being tanned and manufactured into finished products in the importing countries. Students of the Latin American economy now see possibilities of vast developments in the tanning and leather goods manufacturing industries throughout Latin America.

Communications: Latin Americans are vastly intrigued by the printed page and by the spoken voice. They have

(*Please turn to Page* 72)

PRIORITIES–ALLOCATIONS–PRICES

Weekly summary of orders and regulations issued by WPB and OPA, supplementary to Priorities-Allocations-Prices Guide, published in Section II of STEEL, Dec. 14, 1942

CMP REGULATIONS

No. 1 (Direction No. 2), issued April 6. Requires aluminum mills to hold until May 1 all orders covered by authorizations for delivery of aluminum rod and bar in March, or earlier, in their present position on mill production schedules for April, May, and June. Directs mills to consider orders during April as authorized controlled materials orders in determining the amount of other orders they may accept within the limits of a production directive. If the user of aluminum rod or bar fails to assign May or June CMP allotment numbers with proper certification to its orders before May 1, mills are directed to remove these orders from their production schedules. Provides that no consumer may receive any aluminum rod or bar during second quarter in excess of amounts authorized under CMP for May and June delivery plus amounts authorized under CMP or under pre-authorized releases by claimant agencies for April delivery. If provisions of the Direction unfavorably affect any critical requirements of any consumer because his CMP allotments have been used up for the second quarter, he should submit a CMP-4A form to his Claimant Agency for supplemental allotment.

No. 1 (Direction No. 3), issued April 6. Copper wire mill products approved by WPB for delivery during April may not be displaced in production schedules by any other orders, including authorized controlled materials orders, unless specifically directed by WPB. Authorized controlled material orders calling for May and June deliveries must be accepted and scheduled in accordance with provisions of CMP Regulation No. 1, ahead of orders bearing preference ratings only. Provides that where an order previously placed is converted into an authorized controlled material order, effective date of the conversion is date on which allotment number is received by the producer. Delivery of such orders may be refused if the allotment number is not received in accordance with time limits for placement of controlled materials orders as established in Schedule III of CMP Regulation No. 1.

No. 1 (Direction No. 4), issued April 6. Brass mill products approved by WPB for delivery during April may not be displaced in mill production schedules by any other orders, including authorized controlled materials orders, unless specifically authorized by WPB. Authorized controlled materials orders for May and June deliveries (for other than Navy and Army Ordnance programs designated N-1, O-1, and O-4) must be accepted up to 100 per cent of production directives issued with respect to such programs; if no special directives have been issued, up to 100 per cent of capacity. Production of these orders must be in accordance with CMP regulations, and all orders so accepted must be reported to the WPB Copper Division. Where an order previously placed is converted into an authorized controlled material order, the effective date of conversion is date on which allotment number is received by the producer.

No. 3 (Direction No. 1), issued April 7. Grants assistance until June 30, on orders already placed, to dealers, distributors and jobbers, who are permitted to extend priorities ratings under terms of Controlled Materials Plan Regulation No. 3. This action was taken to prevent discrimination against their rated orders to which allotment numbers have not been applied. Orders without allotment numbers or symbols, placed by dealers, distributors, or jobbers prior to April 7, 1943, calling for delivery not later than June 30, must be deemed of equal rating to orders bearing the same grade of rating with allotment numbers or symbols.

No. 4 (General Direction No. 1), issued April 6. Permits resellers of controlled materials who ship to foreign countries (other than Canada) to accept allotments from their foreign customers, and pass them along to producers of steel, copper and aluminum in this country in placing orders for these items.

No. 5 and 5A (Amendments), issued April 6. Removes automotive replacement parts and automotive maintenance equipment from list of items to the purchase of which preference ratings, assigned under CMP Regulations Nos. 5 and 5A, may be applied. Excludes cellophane and similar transparent materials derived from cellulose having a gauge of less than 0.003 inch and cellulose caps or bands of any gauge.

PRIORITIES REGULATIONS

No. 13 (Amendment), issued April 7. Places various government agencies, including War and Navy Department, Board of Economic Warfare and Maritime Commission, and their agents on same basis as other users and purchasers of idle, excess or frozen materials. Regulation covers transactions by persons who are not regularly engaged in the business of selling such materials. Sales to certain government corporations, such as Commodity Credit Corp., Defense Supplies Corp., Metal Reserve Corp., and Rubber Reserve Co., for stockpiling purposes still are permitted. Permits sales to users on specified ratings except in case of particularly scarce materials such as aluminum, chromium, several forms of copper, pig iron, nickel, steel rails, tin, vanadium, rubber, plywood, raw silk and various chemicals. Omits reference to sale of scrap.

P ORDERS

P-55-b (Amendment): Construction, effective April 9. Permits field officials of WPB to sign orders in their own right, eliminating necessity for countersigning the signature of another WPB official.

P-58 (Amendment): Supplies for South American Mines, effective April 6. Cerro de Pasco Copper Corp., Andes Copper Mining Co., Chile Exploration Co., and Braden Copper Co. must apply periodically for priorities assistance by filing PD-803 for MRO supplies; by submitting applications in writing to WPB for other machinery and equipment for mines engaged in war production. MRO supplies include any minor capital additions which normally are necessary to operation of the enterprise but not in excess of $500 for any one item. These producers are forbidden to obtain MRO supplies under terms of CMP Regulation No. 5. Ratio of inventory to volume of current production limited to the ratio of average inventory to average production for the years 1938, 1939 and 1940.

P-65 (Amendment): Marine Paints, effective April 10. Assigns preference rating of AA-1 to deliveries of material to be incorporated into marine paints for the listed claimant agencies. This rating may be applied or extended in accordance with Priorities Regulation No. 3.

P-73 (Revocation): Tackle Blocks, effective April 8. Revokes order which had assigned A-1-c rating to material used in manufacture of tackle blocks. Control now handled under CMP.

P-76 (Revocation): Steel Drums, effective April 8. Revokes order which had assigned A-4 rating to steel drum manufacturers for procurement of hot-rolled sheet steel. Manufacturers now apply for an allotment number under CMP.

P-144: Farmstead Wiring, effective April 10. Grants rating of AA-3 to farmers, eligible for electric utility connections under order U-1-c and so certified by USDA County War Board, for purchase up to 75 lb. of wire plus necessary accessories from any supplier.

L ORDERS

L-1-h (Amendment): Motor Trucks, Truck Trailers and Passenger Carriers, effective March 31. Authorizes production of heavy trucks in such quantities, of such types and within such periods of time as may be specifically authorized by WPB.

L-157 (Amendment): Heavy Forged Hand Tools, effective April 9. Permits manufacture of coal miners' picks with "lip" eyes, instead of with "adze" eyes.

L-170 (Amendment): Farm Machinery, effective April 8. Establishes quotas for shipments to North Africa, based on a percentage of one-half the total net shipping weight of the 1939 and 1940 shipments of farm machinery, equipment, and repair parts to French Morocco, Algeria, and Tunisia. Increases Canadian quota percentage for certain items on basis of the number of units exported to that country in 1940. Reduces quota percentages to European neutral countries from 61 per cent to 32 per cent, based on average tonnage shipped in 1940 and 1941.

L-176 (Amendment): Portable Electric Fans, effective April 7. Provides for production of certain repair and replacement parts on a limited basis. Permits use of copper and copper-base alloy in production of parts which conduct electric current; in bearings, if no other material is practicable. Each manufacturer's inventory limited to total number of parts of each type sold in preceding six months. Manufacturers now report inventories by 10th of each month on PD-665.

L-192 (Amendment): Construction Machinery, effective April 9. Prohibits production and sale of certain types of machinery and limits production of certain other types only for armed forces and Lend-Lease purposes. Production of specified types of graders, scrapers, joint levelers, listed in schedule D, prohibited after April 30. Items listed in schedule C, including specified types of road discs, dredges, graders, road rollers, sweepers, towers, etc., may be produced only for war agencies. Imposes no restrictions on production of items listed in schedule B, including buckets, drills, mixers, pumps, and sprayers of specified types, except applicable provisions of other WPB regulations. Civilian purchase orders for items listed in schedule A, including angledozers, bulldozers, ladder and wheel ditchers, and specified types of concrete mixers, bituminous patch plants, pumps, power shovels, etc., are subject to approval by WPB. Provides that highest rating carried by essential projects may be assigned to the purchase order for repair parts. Removes restriction of purchase orders for repair parts to 5 per cent of price of equipment. Limits delivery of repair parts to war agencies to not more than 75 per cent of producer's combined production and inventory in any one month, if delivery of larger percentage would prevent filling civilian orders on hand. Parts for reconditioning or rebuilding used equipment are subject to WPB authorization but parts for this purpose used by war agencies, on war agency contracts or for mines, are exempted.

L-246: Pumps, effective April 12. Forbids manufacturers or dealers to accept after May 22 any orders for liquid pumps or parts other than on approved purchase orders; to deliver after May 12 for the fulfillment of other than approved purchase orders. Assigns AA-5 rating to approved purchase orders. Exempts orders for repair parts (1) in an amount not exceeding $500 for any single pump or 50% of the original sales price of the pump to be repaired; or (2) in any amount in cases where an actual breakdown has suspended or threatens to suspend operations.

L-270: Automotive Vehicle Repair and Main-

tenance Parts, effective April 5. Prohibits production of specified maintenance equipment, including combustion analyzers, frame straightening machines, gasoline mileage testers, etc. Limits production of specified items, including axle-bending bars, front-end combination inspecting machines, tire pumps, certain types of automotive jacks, etc., to 20 per cent of amount sold during a base period of 1941. Permits production equal to 75 percent of number sold in base period of 1941 of specified items, including tire air gauges, crank shaft and cylinder grinders, piston pin reamers, transmission jacks, etc. Provides that no producer can use copper or copper-base alloy products in manufacture of automotive maintenance equipment, except: for conducting electric current; in bearings, bushings, and check valves; where non-corrosive metal is required; and when so used, such copper or copper-base alloy products must be reduced to the minimum quantity and minimum gauges, sizes, and grades necessary for proper operation of the equipment. Prohibits use of aluminum, steel or other critical materials where use of less critical material is practicable. Restricts sale or delivery of maintenance equipment by producers to orders bearing preference rating AA-5 or higher.

L-277: Electrical Wiring Devices, effective April 12. Bans use of copper and copper-base alloys in manufacture of electrical wiring devices. Restricts manufacturers' sales to orders rated at A-1-j or higher. Distributors must apply on PD-1X applications to replace supplies sold on unrated orders. Allows manufacturers 30 days in which to put into process their present stock of metal and 60 days to assemble completed parts. Exempts the following: lighting fixtures, portable lamps, flashlights, fuses, fuse cutouts, lugs, mechanical wire connectors, knife blade switches, fluorescent starter switches, relays, push buttons, automatic control equipment or any unit of an electric circuit designed to connect, convey or control electrical energy in excess of 60 amperes or 600 volts. Exempts also electrical wiring devices or parts to be used in aircraft, armament, electric communication equipment, ships, tanks, vehicles, weapons, infra-red heating equipment, exterior lighting equipment, alarm and signal systems, X-ray and physical therapy equipment or any equipment designed for use in combat.

M ORDERS

M-45 (Amendment): Sheet Steel, effective April 8. Provides that WPB may require steel drum manufacturers to set aside a specified inventory of hot or cold-rolled sheet steel to make steel drums under specific order of WPB.

M-227 (Amendment): Copper Chemicals, effective April 6. Specifically restricts use of copper chemicals in plating in every case where use of copper products or copper-base alloy products in plating is prohibited under order M-9-c, governing copper.

PRICE REGULATIONS

No. 17 (Amendment): Pig Tin, effective April 16. Establishes maximum prices at highest price charged by the seller for the same type of anode in a delivery made during March, 1942, to a purchaser of the same class or, if no delivery was made in that month, the highest price at which it was offered for delivery March, 1942. If maximum cannot be determined by this method, producer must calculate a price as far as possible by the same method used in determining prices for a similar anode in March, 1942, and submit it to OPA for approval. Exempts tin anodes from premium provisions for pig tin in special shapes.

No. 49 (Amendment): Resale of Iron and Steel Products, effective April 15. Lists extra charges that may be made by iron and steel warehouses for alloy steels developed for war uses since April 16, 1941, and now employed in the aircraft industry. Extras, priced at rate per 100 pounds, include $1.25 for stress relieving after cold working; $2.50 for aircraft quality; and 40 cents for the extensometer test. Permits following charge for treatment (such as heat treatment by a specialist) given the material at plant not that of a producer or the seller: actual invoice cost to the seller, minus any trucking charge included on the invoice, plus 30 cents per 100 lb., provided that no additional charges may be made, such as for trucking, handling, or risk.

No. 136 (Amendment): Machines and parts and Machinery Services, effective April 10. Provides new methods by which essential producers and suppliers of machinery and machinery services can obtain price adjustments. Any manufacturer whose total sales for 1942 were $500,000 or less and any machinery service supplier whose total sales were $75,000 or less must apply to nearest regional office of OPA. Others will file directly with the national office of OPA.

No. 241 (Amendment): Malleable Iron Castings, effective April 15. Defines how sellers of products composed of malleable iron tell whether their products should be priced under the regulation for malleable iron castings or under some other price regulation. Malleable iron castings are defined as "all ferrous castings sold to railroad and other classes of purchasers having a definite ductility resulting from an annealing process and known as malleable iron, pearlitic malleable iron or by a trade name. The terms includes such ferrous castings sold either with or without subsequent processing thereon, such as machining, galvanizing, plating, and japanning.

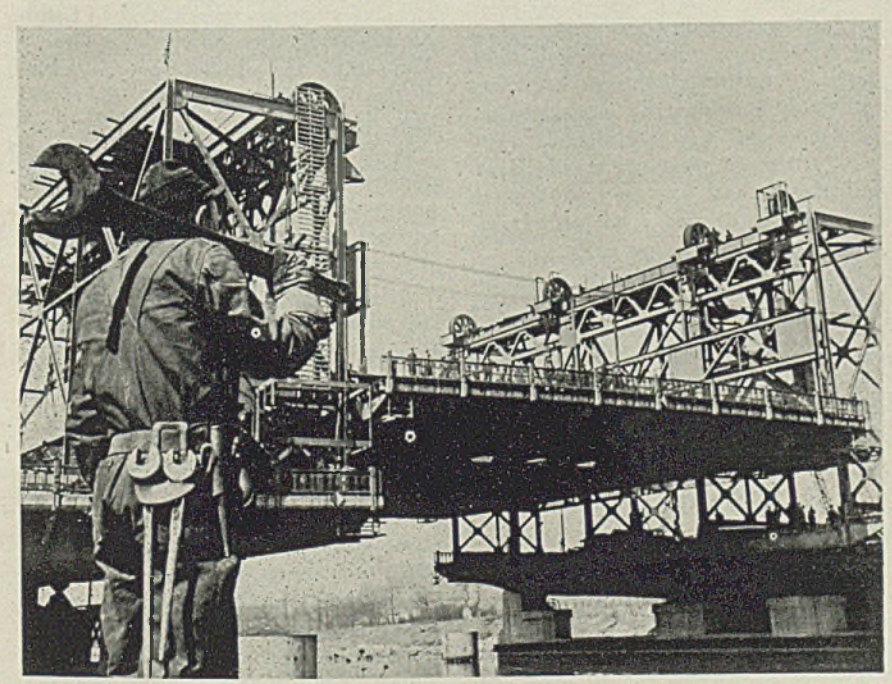
"But does not include:

1. "Malleable iron castings sold in an assembly with other materials (except bolts, nuts, screws, rivets or other industrial fastenings),

2. "Malleable iron castings purchased from the seller on which the purchaser has performed subsequent processing, and

3. "Malleable iron castings sold as another commodity by a regular manufacturer of such other commodity or by a purchaser from such manufacturer."

LIFT BRIDGE OPENS LAKE-TO-GULF WATERWAY



NAVY conversion of an old fixed bridge to a lift-type span in Chicago has opened a Lakes-to-Gulf waterway for naval vessels constructed in Great Lakes yards. Original bridge was too low to permit passage of anything but barges and small boats. NEA photo

$87.7 Billions Spent for War; March High Month

War expenditures by the United States reached a new high of $7,112,000,000 in the month of March. This was $1,031,000,000, or 17.0 per cent, higher than in February. The previous record for monthly war expenditures, January, 1943, was exceeded by 13.7 per cent, or $858,000,000.

Average daily rate of expenditures in March was $263,400,000, compared with $253,400,000 in February, an increase of 4 per cent.

Total Allotments for REA Projects Reach $462,445,466

Allocation of $679,000 of Rural Electrification Administration loan funds to six systems in as many states to cover acquisition and rehabilitation of existing properties has been announced by the Department of Agriculture.

REA Administrator Harry Slattery said that no new construction will be undertaken except in accordance with authorization or regulation of the WPB. This brings allotments to a total of $462,445,466.

Industry Voting on Recommended Standard To Assure Uniform Quality

WASHINGTON

AS A PART of its effort to obtain full co-operation from manufacturers and users of zinc-base die castings in order that government specifications may be met fully, the Conservation Division of the War Production Board points out that Committee B-6 of the American Society of Testing Materials recently recommended that the tentative standard B-86 which was set up by Committee B-6 in 1931 be advanced to the status of a permanent standard and that the matter now is being voted on by letter ballot. The recommendation was based on findings of a subcommittee consisting of D. L. Colwell, Paragon Die Co., Chicago; W. M. Peirce, New Jersey Zinc Co., Palmerton, Pa., and A. Sugar, U. S. Metals Refining Co., Carteret, N. J.

In a letter to the 147 firms in the die casting industry last February, Harvey M. Anderson, deputy director of the Conservation Division, pointed out that the armed services had been unable to use die castings for certain critical parts because of lack of assurance of requisite uniformity of quality of individual castings within lots and between successive shipments from the same supplier.

Inaugurate New Subcommittee

He told of the inauguration of the Technical Subcommittee of the Die Casting Industry Advisory Committee of WPB, which would arrange to visit die casting plants to determine by actual inspection whether the plants are equipped for making spectrographic and X-ray eye inspection of zinc base die castings. Such plants as were adequately equipped and knew how to use the equipment were to be certified to government procurement agencies as producers of "special quality zinc and/or aluminum castings."

It was made clear at the time that special quality die castings will not be used indiscriminately, since they are more difficult and more expensive to produce than ordinary commercial die castings which are suitable for many applications in items purchased by the armed forces.

In a recent report to the Conservation Division, Mr. Peirce of the B-6 subcommittee pointed out that for military uses where zinc die castings are specified high grade metals demanded by government specifications are available.

"Today for nonmilitary uses," he pointed out, "there is the same pressure in the die casting field as elsewhere to find substitutes for more scarce materials and this is apt to lead to the use of seriously inferior grades of metal. Secondary aluminum and copper can, of course, be employed if they are free from the objectionable impurities, but experience has shown that only scrap which has been melted down, cast into pigs and analyzed can be safely used due to the danger of small amounts of solder, foil, etc., finding their way into selected scrap.

"It is timely to post a clear warning today to those less experienced die casters and users that the provisions of these specifications are based on clear-cut knowledge of the permissible limits of composition, and that deviations from the specified maximum impurity limits, especially in the case of lead and tin, even in amounts which seem insignificant to the layman, may prove to be disastrous.

It is pointed out by Mr. Colwell that the standard B-86 provides for maximum tin content of 0.005 per cent and maximum lead content of 0.007 per cent and that these limits must be rigidly maintained in order to guard against intercrystalline oxidation which causes warpage and growth and embrittlement. Failure to adhere to the limits means certain failure of equipment at the fighting front and needless loss of life among our armed men. He urges close examination of raw material, work in process and finished product by accurately analyzing as with the spectrograph. This is all the more necessary in that shortage of zinc and resulting substitutions have tended to bring about an increase in contamination of zinc scrap.

Mr. Colwell, whose office is in the Washington Gas Light building, is government presiding officer of the Technical Subcommittee of the Die Casting Industry Advisory Committee and requests for certification should be addressed to him by companies capable and willing to be certified as producers of special quality die castings.

Latin America Offers U. S. Many Trade Opportunities

(*Concluded from Page* 69)

a passion for expression. In Brazil, for example, the postoffices are equipped with recording machines into which the sender can dictate a letter onto a phonograph disk. The disk thereupon is mailed to the recipient who may, if he wishes, have it read to him on a postoffice phonograph.

Radio broadcasts naturally are popular among Latin Americans and those who are familiar with the market possibilities in those countries believe that we have an almost unlimited potential in the sale of receiving sets—provided we can

Office Machinery: As industrialization proceeds in Latin America, we know from our own experience, that the demand for office machinery will grow. This will include typewriters, tabulating and accessory equipment for which there already has accumulated an unsatisfied demand of considerable proportions.

Chemicals: Students of Latin American economic trends believe that it will be a difficult task for American chemical manufacturers to overcome Germany's prestige as a producer of reliable chemicals. When it was discovered some time ago that Germans were bringing American chemicals into Argentina and selling them under German labels, the effect was to convince many Argentinians that United States chemical products must be pretty good to merit this German approval. However, there are many obstacles still to be overcome if we are to develop a big chemical trade with Latin America.

Engineers from Southern Republics Touring U. S.

A group of 18 mechanical, electrical and civil engineers representing 14 Latin-American countries are visiting industrial plants in the United States under auspices of the Rural Electrification Administration.

Many hold responsible positions with their governments and several are engineering or mathematics professors in their national universities. They are under the direction of Nick Martinez of the REA.

A similar mission was sponsored by the REA last year in which eight republics were represented. A third is planned for next year in which it is hoped that all the Latin-American countries will participate.

Members of the mission include: Roberto Acosta, Cuba; Jorge Arias, Guatemala; Alfredo Bebin, Peru; Hector Cerna, Honduras; Manuel Dapelo, Peru; Federico Del Ponte, Argentina; Arturo Gantes, Chile; Mario Gil, Uruguay; Roberto Ladd, Mexico; Rene Moravia, Haiti; Jose Ordonez, Ecuador; Carlos Palma, Chile; Jose Rivas, Panama; Gabriel Rodriguez, Colombia; Fernando Romero, Colombia; Jose Soto, Costa Rica; Vincente Ugalde, Mexico; Jose Vilela, Brazil.

Broad Scope of Subjects Attracts Record Attendance

By GUY HUBBARD
Machine Tool Editor

HAVING followed machine tool electrification from the days when it was exemplified by a motor with flat belt connection, lag-screwed to the floor, and an open knife switch on a slate slab, "angle-ironed" to the headstock, this writer sees unusual significance in the amazing way in which the eighth annual Machine Tool Electrification Forum went over.

On April 6 and 7, not the usual 100 or so, but 300 important machine tool engineers and company executives literally from Massachusetts to California, accepted a joint invitation from the machine tool industry and the Westinghouse Electric & Mfg. Co. to study such things as electronics, induction heating, and electrical precipitation of cutting oil mist and smoke. In view of this you can depend upon it that machine shops in the not-far-distant future are going to be very different than they are today in every way that modern electrical science can make them different.

Many, including myself, came to the forum still beset with the idea that electronics — like Buck Rogers — belongs to 2000 A.D. We left that idea behind, thanks to Dr. P. Thomas and T. R. Lawson. Electronics as a practical aid in the art of cutting metals has "arrived". Make no mistake about that.

Fog Dispersed

We saw a standard motor, controlled through a relatively small and relatively simple aggregation of cabinet-housed transformers, power tubes, control circuits and knob-and-button panel, run through a stepless range of speeds from that comparable to the minute hand of a clock to maximum for which the motor was designed. What about current? This unit was fed by standard AC. What about pulling power? Remarkable at all speeds, proved by brake tests on the armature shaft. Is this apparatus in the laboratory stage? Far from that. It is available for, and practical for, shop use. We are going to hear a lot about it — and soon — for it is one of several highly promising solutions to that tough shop problem, "How can we get variable speed with alternating current?".

"Does the atmosphere of a machine shop need to be like that of a foggy day in London — or worse?" That has become a mighty serious question, what with women working in shops and with precision gear and thread grinders growing in numbers to such an extent that cutting oil atomized by their large, high velocity wheels fogs lights and windows.

Forum visitors learned from E. H. R. Pegg, how to lick this problem electrically — by practical, commercially available apparatus whose basic principle is that of "electrified" amber or glass rod which attracts feathers.

Attached either to the air conditioning system or direct to a fume and mist creating machine tool, this electrical precipitation apparatus charges or ionizes particles in the air by means of an electrostatic field created by a fine wire carrying 12,000 to 13,000 volt direct current. Charged particles then pass into a nondischarging, uniform electrostatic field created by parallel plates — alternate ones being grounded and the others carrying 6000 volts direct current. There the particles are pulled — like the feathers previously mentioned— to plate surfaces of opposite polarity, while the clean air passes on for recirculation in the shop.

Mysteries of induction heating, as applied to surface hardening of machinery parts — including gears; brazing and soldering; and melting of metals; including iron; were effectively dispelled by Frank Curtis, Van Norman Machine Tool Co., by means of his man-to-man talk, keyed to a colored motion picture. He demonstrated how currents of extremely high frequencies — on the order of 3 10,000 cycles — when passed through water cooled copper coils, set up eddy currents in ferrous parts surrounded by or close to the coils.

Almost instantaneous heating from surface inward results, which — followed by a timed spray quench — results in clean, undistorted surface hardening in a matter of seconds. The complete time cycle reminds me of that of a flint-lock musket, "Click, fizz, bang!" — the "bang" being replaced by the discharge of the completely heat treated part from its heating and quenching fixture.

Dr. Horace Frommelt, director of education, Kearney & Trecker Corp., struck a responsive chord in the hearts of many of his hearers when he told of his early experience in a railway shop to illustrate how *not* to train beginners. After months of effort to pick up the trade from jealous or short-sighted "old-timers", bushy-haired young Frommelt (he still has all the hair) was told by a hard-boiled foreman: "If I stuck you on a broom handle, you wouldn't even make a good window brush!".

With that by way of introduction, Dr. Frommelt then told how Kearney & Trecker, by a balanced combination of tact, patience, visual aids, classroom work and supervised practice on the machines in the shop; is making acceptable mechanics of the unskilled (including women).

Truth of the basic axiom that when all is said and done, the most elaborate machine tool merely is a means to the end of bringing a cutting tool into effective controlled contact with the work, was brought out by W. J. Pelich and R. H. Clark of the Warner & Swasey Co. Dealing with proper tool grinding and its relation to the powering of a machine tool, they showed by slow-motion films the effect of correct and incorrect tools on chip formation, work finish and, by inference, on power consumption. Their paper dealt an effective blow at "overpowering" — one of the critical faults in machine tool design.

Debate a Draw

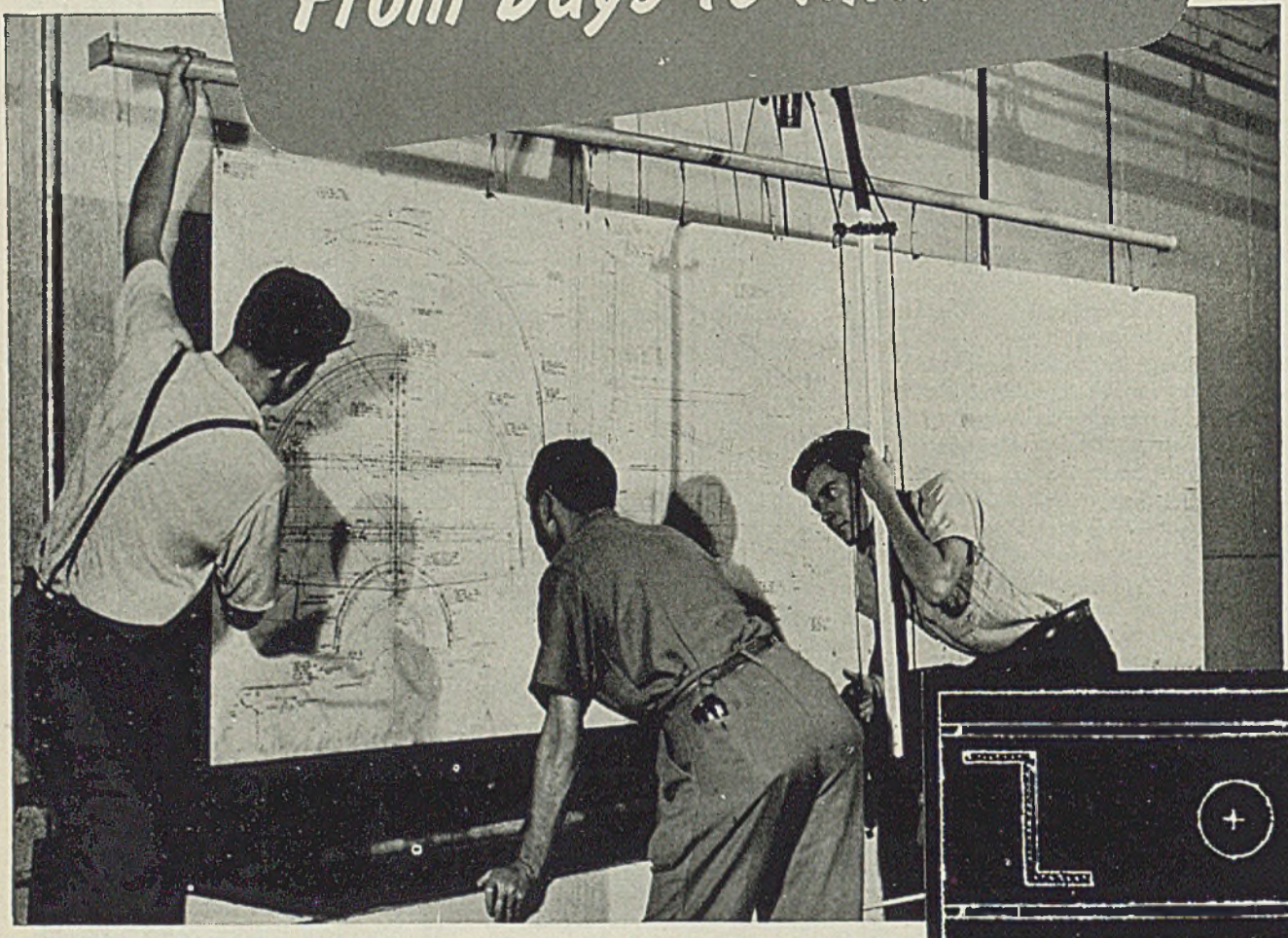
The debate, "Hydraulics vs. Electric Drive", staged by machine tool engineers experienced in both types, was in my estimation a "draw". Both sides presented such convincing cases that it is apparent that each drive has its place, to be determined by careful weighing of all requirements and conditions.

Tell Berna, general manager, National Machine Tool Builders' Association, revealed himself as an actor to be ranked with Cornelia Otis Skinner, through his characterization of the valiant entrance, gradual decay and eventual mental and physical collapse of the typical industrialist who faces the rigors of Washington. Like a cartoon which on the face is all in fun, this sketch by Mr. Berna packed a vital plea for better understanding by business of what its representatives face when they accept Washington appointments, and better understanding by bureaucracy of the talents and experience which these patriotic businessmen bring to Washington.

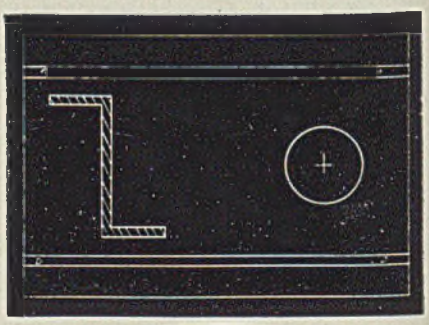
A fitting climax to the Forum was the address by James Y. Scott, president, Van Norman Machine Tool Co., presented at the closing banquet, and broadcast over station KDKA. Born in Scotland, starting as an office boy, and today, at 41, one of the youngest top executives in the machine tool industry — Jim Scott loves America, believes passionately in its future. His stirring talk sent every one of his 300 hearers on their homeward journey charged with new faith in America and its institutions.

THIS CUTS TEMPLATE-COPYING TIME

From Days to MINUTES



Top: Note how the paint film flakes from lines on ordinary steel. Bottom: No flaking or peeling on this PAINTGRIP sheet.



Gone are the days when draftsmen toiled from shift to shift copying costly templates. Now these master patterns are reproduced *in a few minutes* by either of two new processes—electrolytic or photo-loft.*

In many aircraft and other mass-production war plants ARMCO Galvanized PAINTGRIP sheets are used for this exacting job. After a special coat of paint is applied to the bonderized PAINTGRIP sheet, an original full-scale design is drawn by hand. Faster, truer transfers are then made by the new copying methods.

Here are six reasons why ARMCO PAINTGRIP—the *original* bonderized galvanized sheet metal—is used for template work in aircraft plants:

1. It has a protective galvanized coating 2. The neutral phosphate coating on the zinc *takes* and *holds* paint. 3. It is smooth, flat and easy to work. 4. There is no flaking or peeling of paint along scribed lines. 5. There is no chance of error in copying. 6. Extra wide sheets are available.

Could you use bonderized ARMCO Galvanized PAINTGRIP sheets for *your* war-work templates? Write The American Rolling Mill Co., 691 Curtis St., Middletown, Ohio.

**Complete information and names of patent holders will be supplied on request.*

GALVANIZED ★ ARMCO ★ INGOT IRON PAINTGRIP

THE AMERICAN ROLLING MILL COMPANY

By A. H. ALLEN Detroit Editor, STEEL

Manufacturers expected to incorporate finest features of airplane engines in postwar auto, with economy and better performance. . . New NE "lean alloy" steels to be used more extensively

MUCH is being written about the possibility of reducing engine automobile weights to a fraction of current figures by making use of gasoline in the 100-octane rating which permits higher compression ratios and resultant more horsepower from a given weight of engine. This is the fundamental reasoning in considering airplane power plants which currently are moving down to the 1 pound per horsepower level and show possibilities of going even lower.

In airplanes, weight is a vital factor in top performance, particularly in military craft. So every ounce of weight which can be taken out of the power plant is just that much more speed, ceiling, rate of climb or additional armament.. Hence the airplane engine is basically an aluminum alloy cylinder block and crankcase, into which are shrunk forged steel cylinders, with steel crankshaft and connecting rods, and either steel or aluminum pistons, and aluminum cylinder head.

This is a type of construction which at the moment intrigues automotive engineers, but when they look at the cost figures—about $10 per horsepower—and compare them with the average cost of motor car engines in the past—about $1 or maybe $1.25 per horsepower—they shake their heads.

True, much of the cost of an airplane engine devolves from the precision finishes which must be given all parts, and from the meticulous care involved in assembly, test teardown and reassembly. These are unnecessary details in automobile engine building. The basic type of construction is somewhat more costly than the conventional automotive engine, but it could be reduced appreciably from the present level. In fact, there is a strong possibility that some bold experiments will be made in this field when the time is available.

The present automobile engine weighs in the neighborhood of 6-8 pounds per horsepower, and the engine constitutes 15-20 per cent of the weight of the car. It is presumed that if this weight could be cut to, say, 3 pounds per horsepower and stay within the cost limits of automotive practice, the result would be a highly efficient engine with important possibilities. It would have a completely sealed cooling system, using the airplane type coolant and never requiring attention. It would have a high power-to-weight ratio, good economy, and above all it would be *modern*. That word means a lot, for essentially a motor car must be built to sell and you can sell something which is new and different, something which the industry's advertising experts can really get hold of and make the subject of a flamboyant promotion.

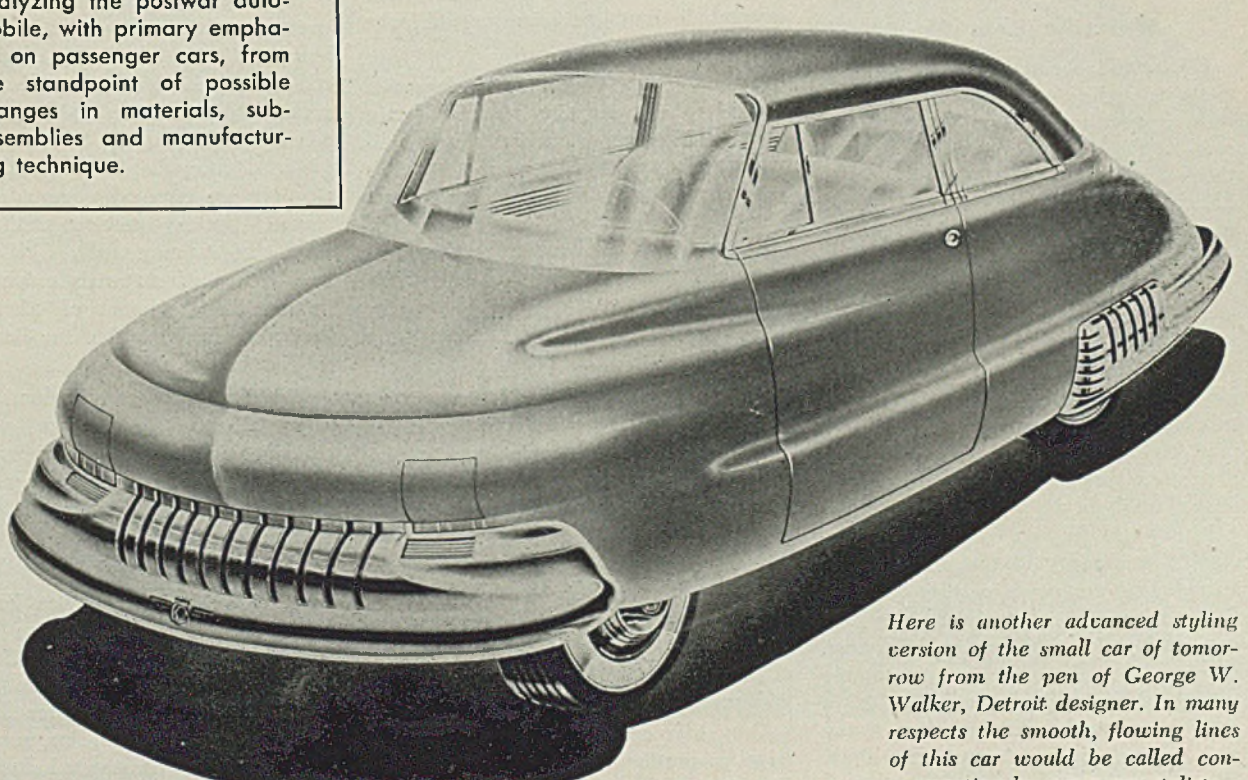
The only trouble with such an innovation is that it would take time to design, develop, tool, test and finally build. It is unlikely such a process could be squeezed into much less than 18 months to two years' time.

But new engine developments are in the wind, make no mistake of that. They will not be the fantastic 50-pound engines, mounted on each wheel, which some of the crystal-gazers profess to see. They *will* be a long step ahead from the best now available in the industry. Chief impetus behind their development will be the higher octane gasolines becoming available in steadily increasing quantities. Fuel of 100-octane rating now is supplied

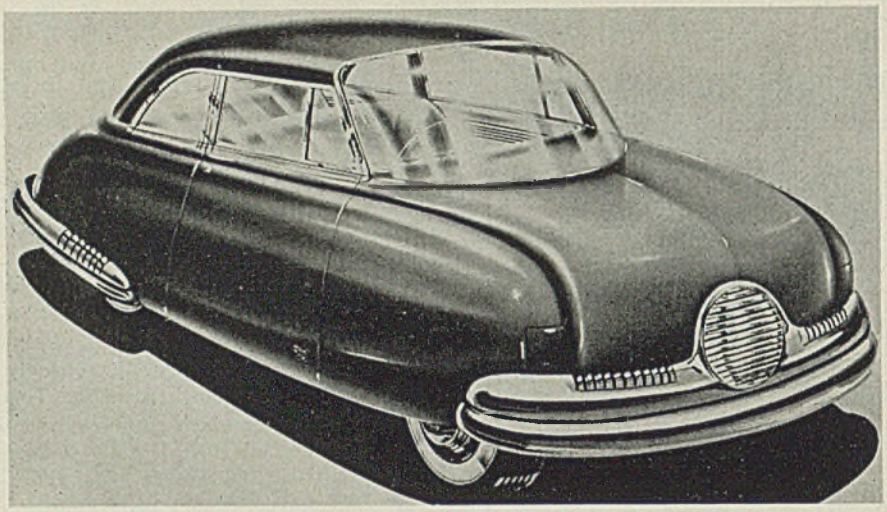
A SPECIAL REPORT TO INDUSTRY

THE POSTWAR AUTOMOBILE

This is the second in a series analyzing the postwar automobile, with primary emphasis on passenger cars, from the standpoint of possible changes in materials, subassemblies and manufacturing technique.



Here is another advanced styling version of the small car of tomorrow from the pen of George W. Walker, Detroit designer. In many respects the smooth, flowing lines of this car would be called conservative by some car stylists



Detroit automobile designers predict that the postwar car will have a curved plastic windshield, concealed headlights, button-controlled door latches, and massive bumpers to give full protection at rear quarters similar to this design

for airplanes; expanded production could eventually make it available for motor cars. However, this would raise the problem of distribution of two types of automobile fuels, since older cars obviously still would require the 72-octane fuel as at present, and other pumps would be set aside to dispense the 100-octane fuel for the high-compression engines of tomorrow.

Theoretically, 100-octane gasoline is the maximum to be expected from refinery practice, but laboratory work has produced gasoline with a rating equivalent to even 300-octane, so the upper limits of fuel volatility and engine compression ratios have still to be explored.

Market for "Lean Alloys"

One thing seems reasonably certain as far as engines are concerned, and that is in respect to the use of alloy steels such as the industry has come to know them—the 3.5 per cent nickel steels, the S.A.E. 4340's and 2512's, the silico-manganese and the others. They are steels of the past, and will certainly give way to the newer NE "lean alloy" steels and their progeny. Motor company metallurgists were among the first to appreciate that "a little alloy goes a long way" in steel and in fact contributed yeoman service in the development of the emergency steels, which are the forerunners of a whole new concept of steel utility in the postwar period.

It may well be as a corollary development that the day of the carbon steels in motor car engines is past, too, for the simple reason that alloy residuals in steel scrap—chromium, nickel, molybdenum, etc.—are building up to measurable amounts, making the production of a plain carbon steel a difficult thing for any steelmaker depending in part upon scrap.

So, we will see crankshafts, connecting rods, camshafts, gears—yes, even intake and exhaust valves—going to the lean alloy steels, not as a conservation measure, but simply because these steels will more than meet requirements and will save money over the higher alloy types. Furthermore, by this time, all steels doubtless will be given the "needling" or "vitamin" treatment involving the addition of minute percentages of boron plus deoxidizer, in such form as grainal, silvaz, bortam, borosil or any one of a dozen other metallic compounds which will then be available at low cost to all steelmakers. The improvements brought to steel by these addition agents in the form of better hardenability and general all-around performance will make their use universal.

Look for a host of new developments in bearings—in the direction of different nonferrous materials such as silver, indium and some other rare earth metals —plus great reductions in the thickness heretofore thought necessary in bearings. The old type of babbitt bearing will gradually become a thing of the past in automobile engines.

Significant changes appear in store for methods of supplying fuel to engine cylinders. Carburetion as it is now understood may slowly give way to direct fuel injection, perhaps in combination with some form of supercharging.

Important advances in filtering—both of oil and air—are just around the corner for auto engines if they can be fitted into the economic limits involved. Much has been learned in desert warfare, for example, about filtering oil and air, enough at least to make some present systems look pretty crude.

Gray iron castings have bulked to a large proportion of the total weight of the automobile engine, and because of their low cost, good vibration-absorbing properties and good performance under extremes of heat and cold, they will likely continue as an important basic material in future engines. But they will be better castings than they are today, possibly made to close limits on chemical specifications, physical properties and the like.

Suppose we draw up a few general specifications for our automobile engine of the not-too-distant future: A power plant weighing 25 per cent less than the present average, with 75 horsepower at 3600 r.p.m. but with high torque at low speeds; fuel economy of 20 miles per gallon; permanently sealed cooling system never requiring attention, winter or summer; oil change required only every 20,000 miles; guaranteed starting at 100 degrees Fahr. or—10 degrees Fahr.; and cost not to exceed $1 per horsepower.

Next week, attention will be focused on chassis and some of the developments which may bring radical changes in these elements.

Aluminum Bar, Rod Users' Orders Protected to May 1

Users of aluminum rod and bar have been granted protection from displacement of their orders for these products in mill production schedules until May 1, under the terms of Direction No. 2 of CMP Regulation No. 1, WPB has announced.

Until May 1 aluminum mills are required to hold all orders covered by authorizations for delivery of aluminum rod and bar in March, or earlier, in their present position on mill production schedules for April, May, and June, 1943. During the entire month of April, mills are directed to consider orders covered by any previous authorization as if they were actually CMP authorized controlled materials orders in determining the amount of other orders they may accept within the limits of a production directive.

However, if the user of aluminum rod or bar fails to assign May or June CMP allotment numbers with proper certification to its orders before May 1, mills are directed to remove these orders from their production schedules.

Annual bridge competition had been discontinued for the duration by the American Institute of Steel Construction. It was held annually from 1928 to 1942. Prizes were granted for the most beautiful large, medium-size, small, and movable bridge constructed during the previous year.

● Too bad for you, Tojo. You thought it couldn't be done. You guessed wrong. You forgot to reckon with the speed and adaptability of American industry to pitch in and supply our fighting men with equipment far superior to that of yours.

Here at The National Bronze & Aluminum Foundry Co., just one of the many thousand companies, producing for United Nations' Victory, special care is taken to see to it that every casting is of top-notch quality. Take this illustration for instance, it shows a casting going through rigid X-ray inspection. And when X-ray inspection is necessary, it receives the same minute care taken in all other operations in the production of National Sand and Permanent Mold Aluminum Castings.

Bye-bye, Tojo!

TENUAL

ALUMINUM CASTINGS

BUY MORE WAR BONDS AND STAMPS!

THE NATIONAL BRONZE & ALUMINUM FOUNDRY CO

CLEVELAND, OHIO

NEW YORK—111 Broadway • CHICAGO—188 W. Randolph • DETROIT—Stephenson Bldg. • LOS ANGELES—405 S. Hill

MAKERS OF QUALITY SAND AND PERMANENT MOLD ALUMINUM CASTIN

Eastern and western aircraft executives meet to outline program for increasing plane production. . . Glenn L. Martin elected president of newly formed National Aircraft War Production Council

LOS ANGELES

TOP executives of major eastern aircraft companies arrived here in the week of April 5 for a series of production conferences with the presidents of Pacific Coast aircraft companies and representatives of Army, Navy and WPB. Purpose of the conferences, the first of their type ever arranged, was to speed output of warplanes through nationwide industrial teamwork and closer co-operation with the armed services and WPB's Aircraft Branch.

Eastern officials included Glenn L. Martin, president of the Martin company; L. D. Bell, president, Bell Aircraft Corp.; Ralph S. Damon, president, Republic Aviation; L. C. Goad, general manager, Eastern Aircraft Division of General Motors; Guy Vaughan, president, Curtiss-Wright, and J. Carlton Ward Jr., president, Fairchild Engine & Airplane Corp. Mr. Martin is president of the Aircraft War Production Council, East Coast, and Mr. Ward is vice president.

At a press conference Monday, Mr. Martin read a brief statement in which he expressed the conviction that the meeting would be productive of greater output of airplanes throughout the country. He declared that today the Axis nations do not have a single airplane that "does not have its master in the ranks of Allied planes."

He pointed out that steady improvements being made in all current models of warplanes are transforming them virtually into new models, but added that an important concern these days is to relay information from the battlefronts promptly so that needed changes can be digested and incorporated into production promptly.

Many Executives Participate

Chief executives of West Coast airplane companies, comprising the board of directors of the Aircraft War Production Council, West Coast, who participated in the week-long conferences, included P. G. Johnson, president of Boeing; Harry Woodhead, president, Consolidated Vultee; Donald W. Douglas, president, Douglas; R. E. Gross, president, Lockheed; J. H. Kindelberger, president, North American; L. T. Cohu, chairman, Northrop; T. Claude Ryan, president, Ryan Aeronautical, and Courtlandt S. Gross, president of Vega.

This group of eastern and western aircraft executives represents about 90 per cent of the industry's airplane production. The eastern group spent the entire week in Southern California, visiting various plants there and participating in conferences. The party then visited Boeing operations in Seattle.

Military and government officials invited to the conferences included Rear Admiral R. A. Davison, aircraft branch, WPB; Col. Nelson Talbott, Aircraft Scheduling Unit, Army Air Forces, Dayton, O.; Dr. A. E. Lombard, Aircraft Resources Control Office, WPB, Washington; Col. D. F. Stace, supervisor, Western Procurement District, Army Air Forces, Los Angeles, and Captains S. J. Ziegler and Lucian Grant, inspectors of naval aircraft, San Diego, Calif.

Principal production conference of the joint eastern and western group was held in the offices of the Aircraft War Production Council in Hollywood.

Highlight of the meeting was the announcement of consolidation of eastern and western councils into a National Aircraft War Production Council, with Mr. Martin as president and Mr. Cohu as vice president. General manager will be Frank Ford Russell, former president of National Aviation Corp., and a director of Bell and Lockheed, who has resigned previous connections and will maintain headquarters at Washington for the duration.

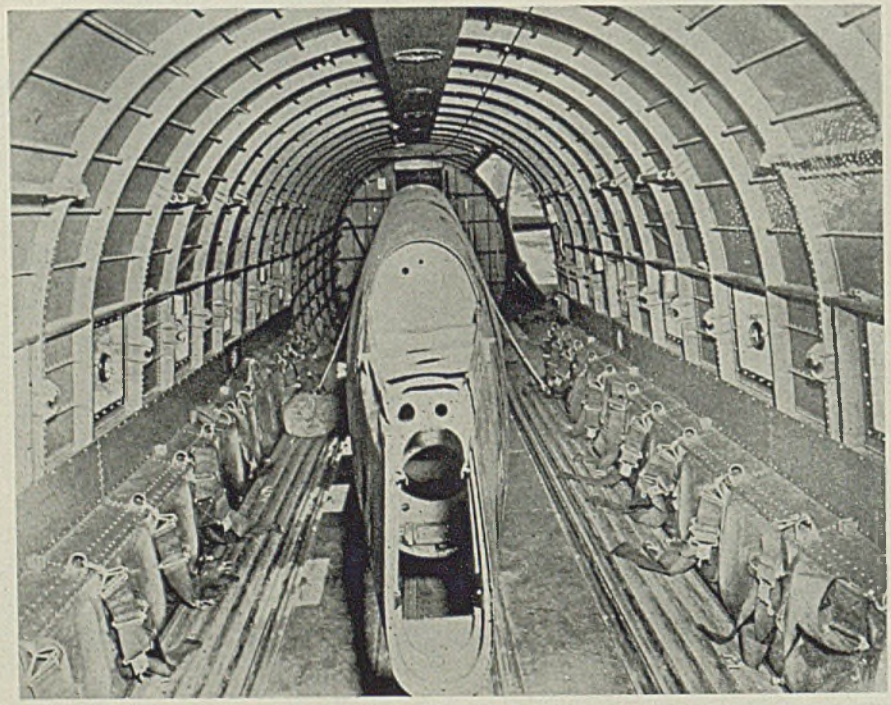
Eventually, it was indicated by Mr. Martin, the Central Aircraft War Production Council, organized about a month ago as an affiliate of the Automotive Council for War Production in Detroit, may be brought into the national AWPC. E. R. Breech, president, Bendix Aviation, is president of the central group. Result of such a move would be virtually complete "war integration" of all airplane manufacturers in the country, with eventual inclusion of principal engine and propeller manufacturers.

Speed Production Information

It was pointed out that the chief reason for organization of the National council at this time was to speed the funneling of factual production information from the various member plants to the armed services for which warplanes are being built. Agreement was also reached by member companies of the National council of the interchange of information and practices relating to field servicing of combat planes.

The West Coast council now has a score or more of committees and subcommittees at work on various problems in aircraft manufacturing and man-

ONE PLANE DOES FLYING FOR TWO



WINGS off and lashed to the floor of a Douglas C-47 Skytrain transport, the fuselage of a British P-40 Warhawk is stowed inside the transport to be taken to a base in Africa for repairs. NEA photo, passed by censor

power. One of the most recent is an engineering manpower group which is attempting to show Army and Navy officials the urgency of maintaining a supply of engineering talent for aircraft companies. It is meeting with some success in this work, the services having agreed to release graduates from engineering training courses at colleges throughout the country to aircraft plants in cases where such men are deficient either physically or in some other qualification considered essential by the services.

While the manpower picture on the West Coast is not serious enough for the district to be designated a critical labor shortage area, it is apparent that increasing numbers of women will need to be called into plants (the figure now for eight principal West Coast plants is about 40 per cent). However, it is felt that the general outlook indicates sufficient manpower and womanpower is available to handle projected airplane output on the basis of present materials supplies.

Engineering committees are working to relieve certain materials shortages, aluminum extrusions for example. Substitution of rolled and heat treated sections for extrusions up to 40 per cent by weight appears a possibility, though some redesign naturally is involved and time is required to move such changes through to production.

Unusual Advertisements Attract War Workers

Indicative of the impact of war production on West Coast industry is the unusual sight of classified advertising sections of newspapers there literally crammed with appeals for all types of industrial help. Recent issue of the *Los Angeles Times*, for example, carried five full pages of Help Wanted classified liners. Many companies are using display space in addition, some even with color headlines. One aircraft company recently featured such display advertising under the red headline, "Men, Now What About the Draft?", and caused more than a little resentment among other employers.

Skilled copywriters are turning their talents to creating classified ads with novel twists to attract personnel. The Aluminum Co. of America in Los Angeles, for example, ran a recent advertisement for men offering "A 100 per cent wartime job with peacetime security". The copy went on to read:

"Listen, men! It's not every day that you get the opportunity to join a 55-year old company.

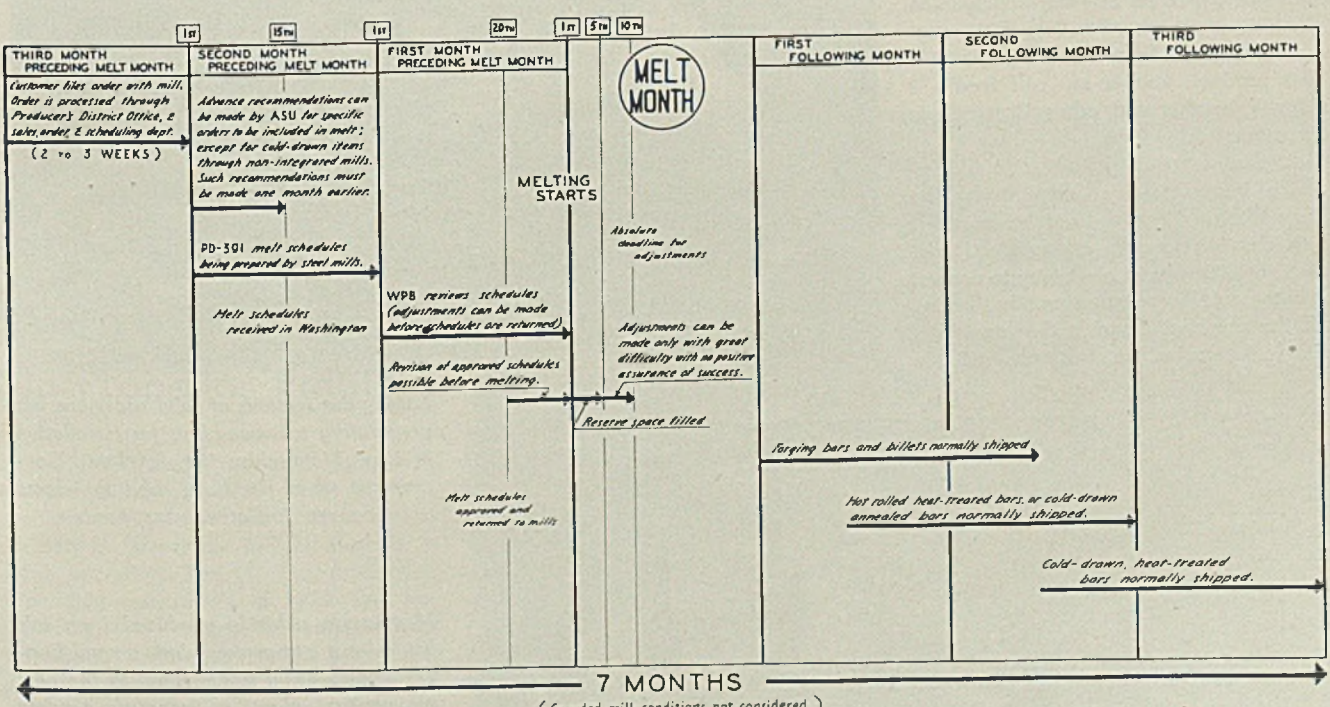
"Listen, men! It's not every day that you get the opportunity to join a company that is the world's largest in its field, is still expanding . . .

"Listen, men! It is our sincere belief that aluminum and Alcoa's engineering skill will make a million peacetime jobs! Insure your peacetime job now. There are unlimited opportunities for rapid advancement."

In addition to the principal aircraft companies, other industrial concerns in the market for help include Los Angeles Steel Casting Co., Consolidated Steel Corp., Fabriform Division of Reynolds Spring Co., Plomb Tool Co., Emsco Derrick & Equipment Co., Southwest Steel Rolling Mills, Alloy Steel & Metals Co., Western Gear Works, Duplicate Parts Co., Western Industrial Engineering Co., American Pipe & Steel Corp., Western Pipe & Steel Co., Rheem Mfg. Co., Thompson Products Inc., Pacific Gear Works, Goodyear and Firestone Rubber companies, and numerous other smaller firms in the Los Angeles area. A Las Vegas, Nev., company advertises for men through the USES.

TIME FLOW OF A STEEL ORDER

TYPICAL EXAMPLE



CRITICAL shortages in aircraft alloy steels often result from failure of purchasing offices to understand the time cycle for the procurement of these products, according to the Material Distribution Branch, Dayton, O. This is caused partially by the introduction of new and untrained personnel into purchasing offices. Pointing out that steel carries the longest production time schedule of any prime material, the branch has issued the above flow chart, illustrating both the time required for procedure under government regulations and the actual production. The chart presupposes the absolute minimum time under the best possible conditions

New Michigan Plant Begins Production

$40,000,000 government project adds 70,000,000 pounds to estimated 600,000,000 pounds capacity in U. S. this year

FIRST metal was poured April 8 at the new government-owned magnesium plant built in Michigan by the Dow Magnesium Corp., operating subsidiary of the Dow Chemical Co., Midland, Mich.

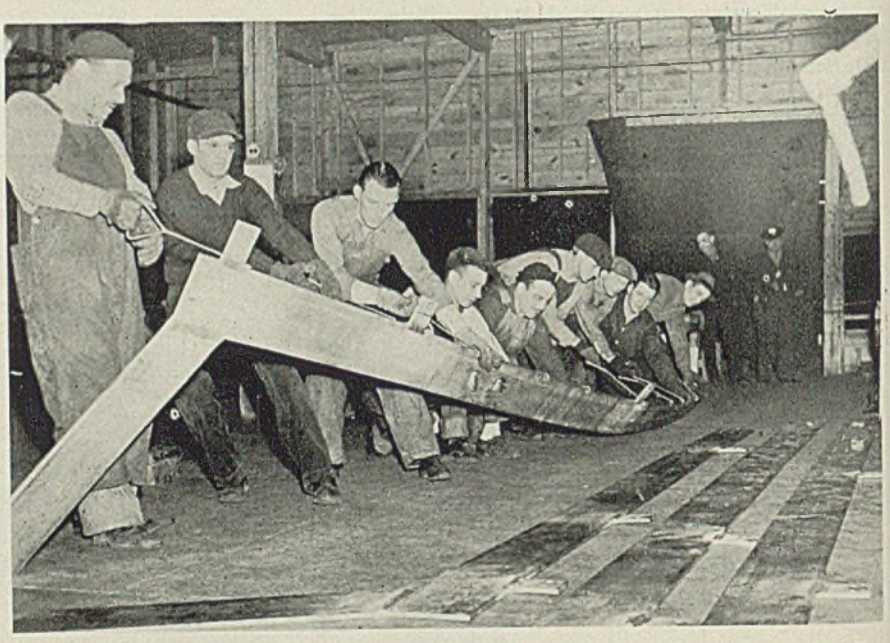
Construction was started in May, 1942, and is expected to be completed within three months. The project will cost more than $40,000,000 and is designed to produce 70,000,000 pounds of magnesium annually. When in full operation 1000 men will be employed, while 400 more will be engaged at a companion plant, 300 miles away in Michigan. This latter plant also is getting into operation to produce magnesium chloride from brine obtained from nearby salt wells.

Eight buildings comprise the metal plant but only part of one unit is in operation. Others will go in as rapidly as completed. In one the magnesium metal will be alloyed with other metals to produce the alloys known as Dowmetal.

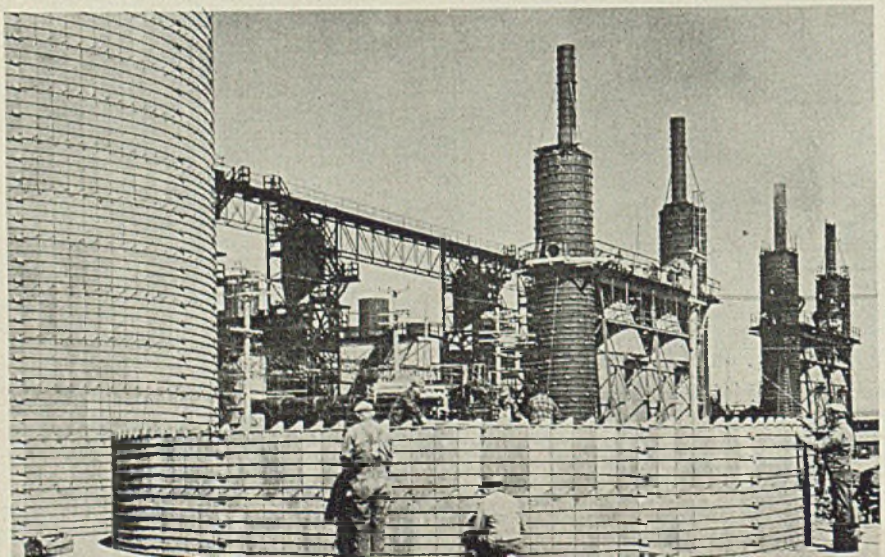
After brine is pumped from wells into storage tanks at the companion plant, it is processed to separate magnesium chloride from metallic impurities. This product, known as "cell feed", is shipped to this and other Dow plants for reduction.

At the new unit the chloride is converted into metallic magnesium by the Dow electrolytic process, introducing it into electrolytic cells and subjecting it to about 600 volts of electricity to convert it into metallic magnesium, by driving off the chlorine. Pouring the ingot is a simple operation. A workman with a

Dr. Willard Dow, president, Dow Chemical Co., a "spectator" as new Michigan plant of Dow Magnesium Corp. begins production. Employe is pouring first ingot



Laying out sections of solid silver bus bar preparatory to assembling for installation in Dow Magnesium Corp.'s plant. Government silver has been used to release copper for other war needs



Magnesium chloride produced from salt brines at a companion plant several hundred miles away is delivered to the new magnesium plant in covered gondola cars and stored in concrete bins, like those shown here, completed and under construction. Conveyors distribute this "cell feed" from bins to the magnesium cells, some of which can be seen in the background, center

long-handled dipper scoops the silvery-like metal from the top of the cell "melt" and pours it into ingot molds. Each electrolytic cell is capable of producing about 1000 pounds of metal in three heats daily.

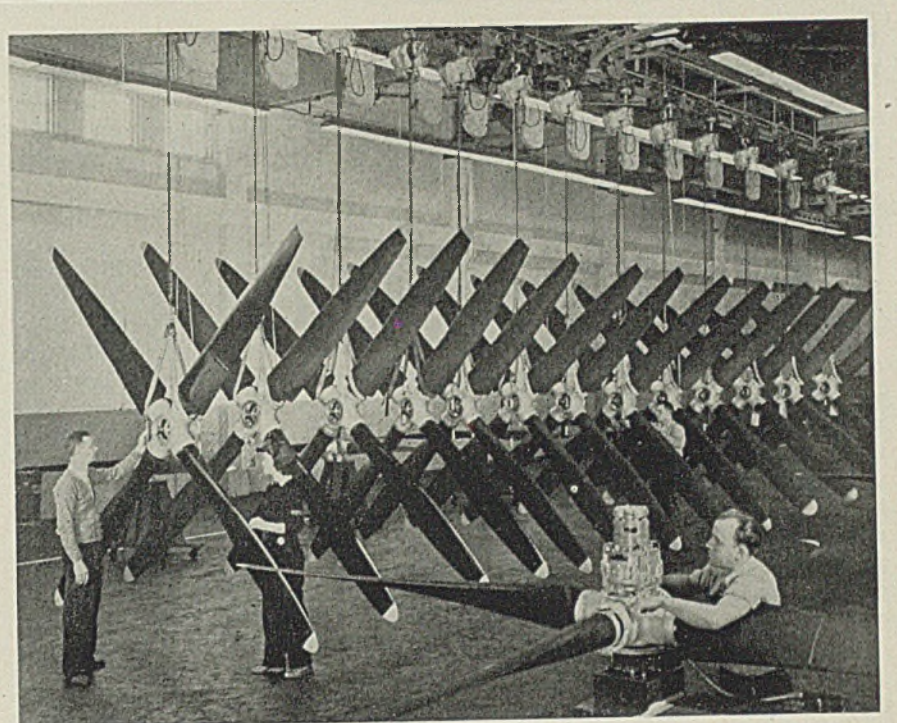
Buildings on the plant site include the cell blocks or melting furnaces, rectification plants, acid plants, power house, alloys; and office structures.

In their construction efforts were made to conserve critical materials. Walls are of brick; wood columns and beams are used almost exclusively in cell buildings, and extensively in others. For conveying chemical-bearing liquids hundreds of feet of a plastic pipe developed by the Dow Chemical Co., are used.

An interesting example of substitution is the use of 900 tons of government-owned silver for bus bars in the electricity system, conserving copper. The value of the silver is estimated at $18,000,000 to $20,000,000. Proximity of Detroit Edison Co.'s power lines was a prime consideration in selection of site, as the plant will use nearly as much electric power as the city of Port Huron.

A day-long inspection by representatives of government, industry and press was concluded with a dinner in Hotel Statler, Detroit, tendered by The Austin Co., plant contractor, in honor of Dr. Willard Dow, president, and other officials of Dow Chemical Co. Speakers included S. C. Kirkpatrick, editor, *Chemical and Metallurgical Engineering*, George A. Bryant, Austin president, and Dr. Dow.

WPB estimates indicate total magnesium production capacity in the United States will exceed 600,000,000 pounds this year. Dr. Dow said that production increased 75 per cent in the three years before the war, and at present is 35 times that of prewar.



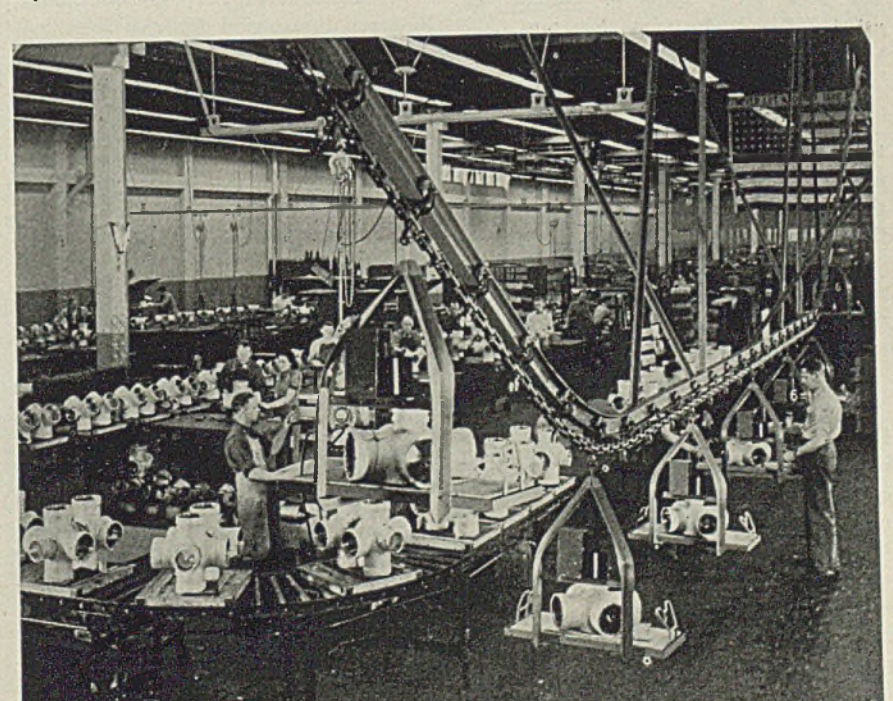
Electric "lifts" help speed production of propellers. Completed propellers are shown moving on conveyors to the final balance room

Miles of Conveyors In Propellor Plant

CONSIDERED the most completely conveyorized propeller plant in the country, Curtiss-Wright Corp.'s newly-enlarged factory in Indiana now is in full operation. The plant, a windowless building constructed of brick but employing wood trusses, is equipped with "miles of conveyors" which have practically eliminated the old method of trucking production materials from one department to another.

Among the innovations which help speed up production are a slat conveyor which extends for hundreds of feet and along which employes assemble gears and cuffs to the blades before final assembly; a paint shop which automatically controls the mixing and distribution of paint and in which blades and other parts are carried through spray booths and drying ovens by conveyors; and a belt conveyor which eliminates all trucking in the hauling of cuff parts.

Finished parts are delivered from the storeroom to all assembly departments on a 3400-foot overhead conveyor, each tray numbered with its destination system. In the power unit and hub assembly departments materials are moved toward completion on roller conveyors. Hundred of feet of monorail with electric lifts speed up the final assembly of completed propellers and carry them through the delicate balancing operation. Other conveyors carry the units through the shipping department to railroad siding where they are loaded on cars by crane.



Roller conveyors are used to move materials to the hub assembly department. Hub section in the final assembly line is shown

Electroweld Tube Plant Bought by Talon Inc.

Talon Inc., Meadville, Pa., manufacturer of slide fasteners, has purchased the controlling interest in Electroweld Steel Corp. of Oil City, Pa. Executives of the Talon company have announced that there will be no change in the personnel or products of the Electroweld organization.

Formerly known as the Oil City Tank & Boiler Works, Electroweld Steel Corp. was reorganized last year and began the manufacture of electric welded tubing, using a continuous mill. A second unit was installed early this year and a third is now in process of installation. Present capacity is believed to be 6000 tons per month. The plant is fully engaged on war contracts and is booked far ahead.

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The following changes in office addresses and personnel of the Application Engineering organization were recently announced by Lincoln Electric Co., Cleveland. Address of the Duluth office is now room 200, Builders Exchange building. H. H. Stahl, of the Philadelphia office, has been transferred to Boston as district manager; R. J. Shepherd, formerly of the Toledo, O., office, to the Philadelphia office; C. M. Richardson, formerly of the Moline, Ill., office to Toledo as application engineer and district manager. W. J. Barrett, from Moline office to Detroit. C. B. Herrick, of the Philadelphia office, has been given leave of absence to assist Jefferson Boat Works, Jeffersonville, Ind., with its welding problems.

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New construction and extensive alterations for war production called for use of 15,901 tons of metal last year at the Bayway Refinery of Standard Oil Co. (N. J.). However, by intensive salvage methods the refinery was able to return 10,720 tons of steel and 152 tons of nonferrous metals as scrap in the same period.

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Eimco Corp., Salt Lake City, manufacturer of mining and industrial machinery, has established an additional complete filtration laboratory in connection with its Chicago office at 111 West Washington street. The filtration engineering staff has been enlarged and Paul Richter has been placed in charge of the filtration equipment department, replacing C. J. Peterson.

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American Smelting & Refining Co. announced in its forty-fourth annual report purchase of a 50 per cent interest in a large nickel property in the State of Goyaz, Brazil. Balance of the company is owned by British interests. The mine not only has a large ore body with high nickel content but also contains cobalt in commercial amounts.

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Farris Engineering Co., Ridgefield, N. J., has been organized to manufacture pressure reducing valves, strainers, steam separators and special filtering devices. The company, which now has a plant in operation, is headed by V. W. Farris, who recently resigned as general manager, Kieley & Mueller Inc., North Bergen, N. J. An affiliated company has been incorporated to carry on consulting work, hold patents and handle licensing.

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South Portland Shipbuilding Corp., South Portland, Me., changed its corporate name April 1 to New England Shipbuilding Corp.

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Manning, Maxwell & Moore Inc., Bridgeport, Conn., has established a new plant in Tulsa, Okla., to manufacture oil relief valves. G. P. Kirchhofer is plant manager; John Scott, superintendent; James S. Schwarberg Jr., office manager and purchasing agent. The company's district sales office, under direction of Malcolm Black, will continue at 317 East Fourth street, Tulsa.

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Meehanite Metal Corp. and Meehanite Research Institute of America Inc. have moved their headquarters from Pittsburgh to the Pershing building, New Rochelle, N. Y. New headquarters will feature enlarged laboratory and research facilities.

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Handy & Harman, New York, has opened an office in Los Angeles, need for which was brought about by the rapid growth in the use of silver brazing alloys in the construction of ships and airplanes. H. A. Folgner, associated with the company's Brazing Engineering Division in New York, has been placed in charge of the Los Angeles office, located in the Bendix building, 1206 South Maple avenue.

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American Screw Co. has moved its Detroit office to new quarters at 5-267 General Motors building.

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Shafer Bearing Corp., Chicago, has purchased a three-story building at 1412 West Washington boulevard, containing 15,000 square feet of floor space, to be used for machine shop, experimental laboratory, engineering department and executive offices.

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Standard Mfg. Co., Corning, N. Y., has moved to a new plant in nearby Big Flats, N. Y. The name of the organization has been changed to Hungerford Corp.

MEETINGS . . .

Metal Trades Association

"Production Keys to Victory" will be the theme of the 45th annual convention and production conference of the National Metal Trades Association in Palmer House, Chicago, May 26-27.

About 600 leading industrialists and management representatives are expected to hear talks on production problems, industrial relations, training programs for personnel, new developments and techniques, and government legislation and its relation and importance to the metal trades industry.

Association's accomplishments in the war program and future plans will be outlined by Roe S. Clark, president of the group and vice president and treasurer, Package Machinery Co., Springfield, Mass.

Electric Metal Makers Guild

Annual meeting of the Electric Metal Makers Guild Inc. will be in Canton, O., June 4-5, Harry F. Walters, president announced. Co-chairmen are Walter Farnsworth, Republic Steel Corp., Canton; Leroy Bash, Timken Steel & Tube Co., Canton, and Chester Williams, Massillon Steel Castings, Massillon, O.

There will be a joint meeting of the castings and ingot divisions on Friday morning, June 4, with separate sessions for the two groups in the afternoon, followed by the annual business meeting in the evening. Separate sessions will be held Saturday morning and a combined meeting in the afternoon. Annual banquet on Saturday evening will close the sessions.

Edward Chelius, Duquesne Works, Carnegie-Illinois Steel Corp., is chairman of the ingot division and Martin McDonough, National Malleable & Steel Castings Co., Sharon, Pa., is in charge of the castings division.

Rolling Mill Committee

First meeting of the newly organized rolling mill committee of the Association of Iron and Steel Engineers will be held in William Penn Hotel, Pittsburgh, May 10. Program will be devoted entirely to blooming and slabbing mills, primary break-down units which process 93 per cent of the steel industry's production.

Technical papers will be presented at 1:30 and 8 p. m. Dinner will be served at 6:30 p. m. The program follows:

"A New Soaking Pit Design" by Joseph Sparks, Swindell-Dressler Corp., Pittsburgh; "Main Roll Drives for Blooming and Slabbing Mills" by Ralph Wright, Westinghouse Electric & Mfg. Co., East Pittsburgh; "Design of Blooming Mill Elements" by H. H. Talbot, United Engineering & Foundry Co., Pittsburgh; "Scheduling the Primary Mills" by Alex Montgomery Jr. and J. B. Holbrook, Carnegie-Illinois Steel Corp., Duquesne, Pa., and "Prevention of Flaking in Hot Worked Sections" by O. A. Bamberger, Republic Steel Corp., Massillon, O.

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American Mining Congress—Coal Mine War Conference in Netherland Plaza hotel, Cincinnati, May 17-18. Key executives will speak on continued progress in mining methods and practices. Conservation of materials, substitutes, accident prevention, postwar markets, and strip mining will be discussed. George F. Campbell, vice president, Old Ben Coal Corp., Chicago, is national chairman.

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American Management Association—Conference for production executives, Hotel Statler, Cleveland, May 5-6, to discuss methods for increasing war production. Case stories from war plants will be presented.

Southern Ohio Pig Iron and Coke Association Disbands

Southern Ohio Pig Iron and Coke Association, organized during World War I, but inactive since 1928, now has ceased to exist, by the recent presentation of a bank balance of $105.10 to the American Red Cross in Ashland, Ky.

Established in the summer of 1918 when blast furnace men of southern Ohio and Kentucky were having difficulty learning how to use by-product coke after running on charcoal, raw coal and beehive coke for more than a century, the association did much to improve blast furnace and coke oven practices during the next decade. It established standard practice for sampling cargoes of Lake iron ores and also formulated a rule for calculating the capacity of blast furnaces.

The organization never was formally disbanded, but as members moved away and many of the blast furnaces were dismantled, it "just faded."

The association had only one president throughout its existence, Ralph H Sweetser, now a consultant in blast furnace practice in New York.

A 32-page directory of federal war agencies in New England, designed to aid New England manufacturers in contacts with governmental agencies, has been published by the New England Council, Boston, Mass. It describes functions and lists key officials of regional and state offices of 39 federal agencies actively engaged in directing the war effort.

Munitions Output Slackened; Ships, Planes Greatest Need

TORONTO, ONT.

PRODUCTION of munitions at a high rate in the Dominion has resulted in filling immediate requirements but urgency for ships, aircraft, radio devices and technical equipment was never so great. This statement was made to the House of Commons by C. D. Howe, Minister of Munitions and Supply.

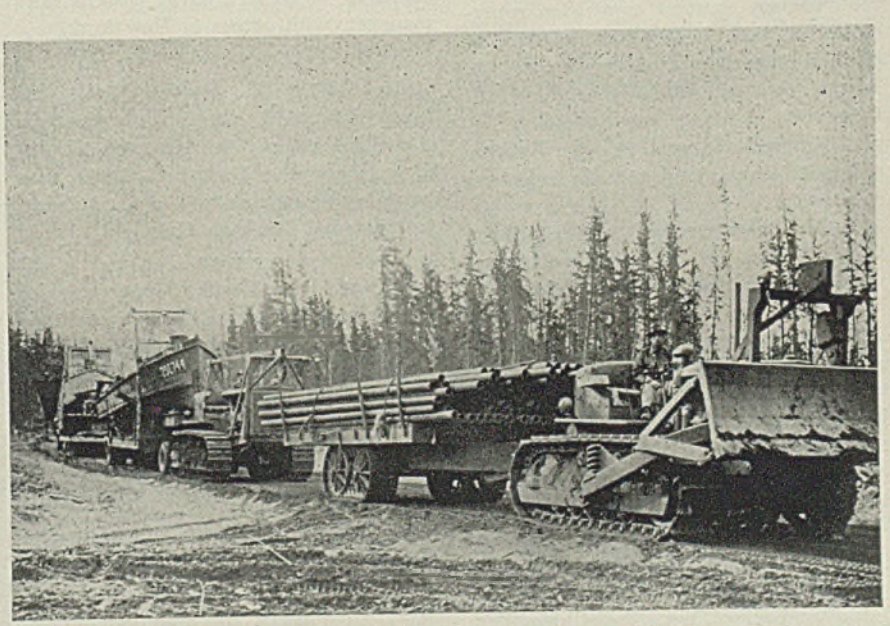
Commenting on a query as to proposed layoff of 1800 men at Canadian Pacific Railway's Angus Plant in Montreal by May 1 and that an output of 1000 guns per month at the Dominion Engineering Works, Montreal, will be reduced to 400 monthly, he said that the Valentine tank, produced at Angus has been outmoded in all countries except Russia. In consultation with the Joint Production Council of the United Nations it was decided that Valentine tanks made in England could be shipped to Russia more easily than from Canada.

Referring to reduced production of shells at National Steel Car Corp.'s Hamilton works he stated that seven-month stockpiles had been created and the shells were not moving forward. Replacement of the machinery by equipment for manufacture of other lines can not be done as resumption may be necessary at any time. The same reason was ascribed for smaller output of guns, production being reduced because plants had caught up with initial requirements.

Further restrictions on use of aluminum have been announced by the Metals Controller. A new order stipulates that except under a release in writing from the controller no person shall use or trade in basic aluminum or aluminum products except for certain purposes, including aircraft production and maintenance, ammunition, tanks and war vehicles and shipbuilding.

An order-in-council prohibits importation into the Dominion of the following goods, except under permit by the Minister of National Revenue: New or used empty containers, including drums, gas cylinders and collapsible tubes, made wholly or in part of metal, intended for packaging goods for sale, storage or shipment; any type of cap, closure or sealing device made wholly or in part of metal.

A new schedule of ceiling prices on cast iron scrap and a few grades of steel scrap has been issued by the steel controller, at slight increases over previous ceilings. A similar change has been made in ceilings on nonferrous scrap, increasing quotations slightly in some cases.



BUILDING the Canol gasoline and oil pipeline through wilds of the Canadian Northwest from the Fort Norman oilfield to Whitehorse on the Alcan highway imposed engineering difficulties. Miles of pipe, many tractors, trucks and engineers' boats traveled by land, lake and river to reach the starting point at Fort Norman. United States engineers built a 16-mile portage road to avoid dangerous rapids on the Slave river. Photo, made late last year and withheld for military reasons, shows a convoy on the portage road. NEA photo

MEN of INDUSTRY

EDGAR N. YOST

A. L. PATRICK

COL. JAMES HAMMOND JR.

G. V. PATRICK

Edgar N. Yost, associated with the Gary Works of Carnegie-Illinois Steel Corp. since 1916, recently as head of the Armor Plate Division of the steelworks, has been appointed division superintendent of the new Armor Plate Plant which is part of the company's Gary Works. His assistant in the Armor Plate Division is **Thomas J. Griffin. E. C. Vedell** is assistant to the division superintendent.

Others appointed in the Armor Plate supervisory force are: **T. H. Sanderson**, superintendent of quality control; **G. P. McAleer**, superintendent of maintenance; **P. W. Bennington**, division industrial engineer; **W. G. Hawley**, superintendent of production control; **W. G. Stuhlmacher**, assistant to division superintendent, fuel; **J. E. Clark**, assistant to division superintendent, power; **G. A. Marks**, assistant works auditor; **O. B. Canaday**, assistant superintendent of plant protection; and **A. H. Kofoed**, assistant superintendent of industrial relations.

S. M. Jenks, general superintendent, Gary Works, also has general supervision over the Armor Plate Division.

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C. S. Kepler has resigned as sales manager of C. B. Hunt & Son, Salem, O., manufacturers of pneumatic and hydraulic pressure specialties, and has taken over the state of Ohio for the sale of the company's products. He is located in Akron, O.

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William W. Klemme has been appointed district manager of industrial sales in Dallas, Tex., for Chain Belt Co., Milwaukee. Mr. Klemme, formerly district manager at Buffalo, has been associated with the company since 1935.

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J. J. McIntosh has been appointed southeastern sales representative for Greene, Tweed & Co., New York, with headquarters at 1106 McLynn avenue, Atlanta, Ga. **B. F. Coombs** has been made Texas sales representative, with headquarters at route 12, Box 495, Houston, Tex.

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A. L. Patrick has retired as president, Cleveland Automatic Machine Co., board. **Col. James Hammond Jr.**, formerly chairman and treasurer, has been elected president and treasurer, and **G. V. Patrick**, vice president, has been elevated to executive vice president.

Colonel Hammond became associated with the Cleveland Automatic Machine Co. as a large stockholder, director and treasurer in 1941. G. V. Patrick joined the company 15 years ago as eastern sales manager, with offices in New York.

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Dr. George H. Spencer-Strong has been appointed director of research, Porcelain Enamel & Mfg. Co., Baltimore, succeeding **Lyman C. Athey**, who has resigned to become vice president, International Products Corp.

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Lt. Col. John Slezak, deputy chief of the Chicago Ordnance District, has been promoted to the rank of colonel. Colonel Slezak is on leave of absence as president of Turner Brass Works, Sycamore, Ill.

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W. C. Bobbitt has been appointed assistant manager of sales in the Philadelphia district sales office of Carnegie-Illinois Steel Corp. Mr. Bobbitt, a Naval Academy graduate, served in the Navy from 1917 to 1929 and joined Carnegie-Illinois in 1935 subsequent to employment in the sales engineering department of Edge Moor Iron Co.

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Wellwood E. Beall, chief engineer, Boeing Aircraft Co., Seattle, has been elected vice president in charge of engineering. **Edward C. Wells**, assistant chief engineer, succeeds Mr. Beall as chief engineer. **Lysle A. Wood**, formerly executive engineer, has been promoted to assistant chief engineer, and **N. D. Showalter** has become chief project engineer. **Albert C. Reed**, chief test pilot and flight test unit chief, will take over supervision of all engineering flight testing formerly under the late Edmund T. Allen.

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M. W. Cardwell has been appointed comptroller, Warman Steel Casting Co., Los Angeles, while **W. C. Burger** has been named sales manager; **E. B. Westall**, plant metallurgist, and **W. B. McCartney Jr.**, production engineer.

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Dr. Leo Schapiro has joined Southwest Steel Rolling Mills, Los Angeles, as chief metallurgist and general superintendent. Dr. Schapiro, an authority of more than 15 years experience in the heat treating, rolling and melting of carbon and alloy steels, was recently assistant chief metallurgist at the South Works of Carnegie-Illinois Steel Corp., Chicago.

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George K. Manning, metallurgist, has been named to the research staff of Battelle Memorial Institute, Columbus, O., and assigned to the division of metallurgical research. He formerly was assistant director of the metallurgical laboratory, Chicago plant of Republic Steel Corp.

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H. F. Clarke has been appointed director of spring mill products, American Steel & Wire Co., Cleveland, succeeding **Leonard C. Peskin**, resigned. Mr. Clarke's first association with the Wire company was in December, 1936, when he started as a technical apprentice at Central Works, Worcester, Mass. In March, 1938, he was transferred to

South Works where he served in various capacities until being named assistant superintendent of the spring mill in September, 1941.

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Jay J. Seaver has been elected a vice president, Day & Zimmerman Inc., engineers, Philadelphia.

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Thomas W. Dinlocker has been elected vice president and treasurer, SKF Industries Inc., Philadelphia, while **Richard H. DeMott** has been made vice president in charge of sales, and **C. P. Collins**, secretary. **William L. Batt**, vice chairman of the War Production Board, retains the presidency.

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Neil C. Hurley Jr., associated with Independent Pneumatic Tool Co., Chicago, 11 years, the past four as vice president and director, has been elected executive vice president. **John A. McGuire** has been elected secretary, and **E. R. Wyler**, vice president, with headquarters in New York. All other officers and directors have been re-elected.

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J. K. Mahaffey is now associated with **George H. Criss**, representing Baker-Raulang Co., Cleveland, in the Pittsburgh territory. The past 26 years Mr. Mahaffey served as Pittsburgh district manager of Edison Storage Battery Division of Thomas A. Edison Inc. Headquarters of Messrs. Mahaffey and Criss are at 1012 Bessemer building, Pittsburgh.

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M. A. Williams, formerly Indianapolis district sales manager for Republic Steel Corp., has become district sales manager of Copperweld Steel Co.'s newly established Indianapolis sales office, with headquarters in the Circle Tower. The territory includes central and southern Indiana, southwestern Ohio and Kentucky. At one time Mr. Williams was a salesman for LaSalle Steel Co., Chicago, and district sales manager for Spencer-Smith Machine Co., Howell, Mich.

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Sidney S. Walcott, president, Richardson Boat Co., Buffalo, has been elected a director, Fedders Mfg. Co. Inc., Buffalo, replacing **Clarence H. Batchelor.**

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Frank O. Parker, formerly sales manager, Acme Steel & Malleable Iron Works, Buffalo, has been elected a vice president, Pratt & Letchworth Co. Inc., Buffalo.

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Saul L. Buschman has been elected president, National Can Corp., New York, succeeding **L. F. Gieg**, resigned. Mr. Buschman resigned the vice presidency of National Can early in 1941 to become president of Canonsburg Steel & Iron Works, Canonsburg, Pa., but remained a director of the can company.

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Ray Ayer, formerly on the central sales staff of **A. vanDerZee**, vice president, Chrysler Corp., Detroit, has been made sales manager of the corporation's Parts Division. **T. E. Waterfall**, heretofore in charge of material priorities and distributing regulations for Chrysler Parts Division and superintendent of depot operations, has been named operating manager. **Lee Lewis**, formerly in charge of the Chrysler parts plant in Kansas City, has been appointed assistant operating manager.

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Henry A. Christy, heretofore superintendent, has been promoted to works manager, C. O. Bartlett & Snow Co., Cleveland, succeeding **C. J. Neville**, now vice president and treasurer. Mr. Christy joined Bartlett & Snow as production clerk in 1923, subsequently becoming assistant production manager, production manager, and superintendent. He was elected to the board of directors in 1942.

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C. R. R. Harris, heretofore vice president and general manager, Kerite Insulated Wire & Cable Co., New York, has become president, succeeding the late Richard D. Brixey.

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W. J. North has been named works manager, J. G. Brill Co., Philadelphia. Mr. North was formerly factory superintendent, Packard Motor Car Co., Detroit, and before that was works manager for Briggs Body Corp. from 1927 to 1940.

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Harold J. Walsh has been elected president and general manager, Lectromelt Steel Casting Co. and Barberton Foundry Co., Akron, O., succeeding the late A. J. Fleiter.

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Peter F. Rossmann, chief of development research in the Airplane Division Research Laboratory of Curtiss-Wright Corp., New York, has been appointed general manager of the Development Division which has been formed to assist war efforts and develop postwar products.

—o—

Elliott C. Grandin has been appointed general sales manager, and **George C. Johnson**, assistant sales manager of Titusville Forge Division of Struthers Wells Corp., Titusville, Pa. Mr. Grandin is also manager of the Ordnance Division of the corporation.

—o—

James Tate, since 1931 vice president and general manager, Delta Mfg. Co., Milwaukee, has joined **Dumore Co.**, Racine, Wis., as director of industrial marketing and research. At one time

M. A. WILLIAMS

HENRY A. CHRISTY

PETER F. ROSSMANN

ELLIOT C. GRANDIN

Mr. Tate was technical editor of *Popular Mechanics* and later managing editor of *Popular Homecraft.*

—o—

Robert S. Gruver has been appointed manager of the Ashland, Ky., division of American Rolling Mill Co., Middletown, O.

—o—

LeRoy L. Wyman, metallurgist, General Electric Co. Research Laboratory, Schenectady, N. Y., has been granted leave of absence to join the staff of the War Metallurgy Committee, National Academy of Sciences, National Research Council.

—o—

Robert W. Pugh has been appointed superintendent, coke oven department, Lackawanna plant, Bethlehem Steel Co., succeeding **Benjamin W. Winship**, who has been granted leave of absence due to illness. **Robert W. Graham** has been appointed superintendent, electrical department, succeeding **Frank D. Egan**, also on sick leave. **Walter J. Widmer** succeeds Mr. Pugh as assistant superintendent of the coke oven department, while **Theodore O. Zittel** takes Mr. Graham's place as assistant superintendent of the electrical department.

—o—

Michael Malachi Carmody has been named sales manager, Paint Division, Aluminum Industries Inc., Cincinnati. Prior to joining the company he was assistant manager of engineering service for Thresher Varnish Co., Dayton, O., subsidiary of Pittsburgh Plate Glass Co.

—o—

A. D. Lewis has been appointed West Coast service and sales representative for Progressive Welder Co., Detroit, with headquarters at 4328 San Fernando road, Glendale, Calif., and will cover that state. Representation in Washington, Oregon, Idaho and Montana is being handled by Shoemaker Aircraft Co., 206 Lowman building, Seattle. Recently Mr. Lewis has been acting as West Coast general manager for Knu-Vise Inc., at the company's Glendale plant, a position he will continue to hold.

—o—

William C. Fork, superintendent, hot strip rolling mills, Acme Steel Co., Chicago, has been named to the newly created position of general superintendent of the entire Riverdale plant. **Walter F. Hinkle**, assistant hot mill superintendent, will fill the position vacated by Mr. Fork, while **James F. Hanihan** will become assistant to Mr. Hinkle.

Mr. Hinkle began his employment with Acme as an engineer in April, 1926,

ROBERT S. GRUVER

NORMAN F. SMITH

and in December of the following year, became assistant hot mill superintendent. Mr. Hanihan started with Acme in 1925 after a number of years in steel mills in the Pittsburgh area.

—o—

Norman F. Smith, vice president and general manager, Osborn Mfg. Co., Cleveland, was elected president, American Brush Manufacturers Association at its twenty-sixth annual convention at Rye, N. Y. After graduating from Dartmouth College in 1925 he became associated with Osborn and has been active with that company the past 18 years.

—o—

A. J. Bronold has been appointed assistant to vice president, Westinghouse Electric & Mfg. Co. Manager of the company's Los Angeles office since March, 1941, Mr. Bronold will make his headquarters in Pittsburgh, and will devote his attention to general marketing policies of the company. Succeeding Mr. Bronold as Los Angeles manager is **Walter G. Willson**, the past 18 years Westinghouse manager at Phoenix, Ariz.

J. R. Fulton has become assistant to the manager, industrial department of Westinghouse. Formerly manager of the company's marine section, Mr. Fulton has been assigned special duties principally in the marine field.

OBITUARIES . . .

H. F. T. Erben, 77, former manager, General Electric Co.'s Schenectady works, died in Schenectady, April 8. In 1887, following graduation from Stevens Institute of Technology, Mr. Erben joined Edison Machine Works, forerunner of General Electric. He became works manager in 1920 and four years later was named assistant to the vice president attached to the general manufacturing department. He retired in 1928.

—o—

John J. Cousins, superintendent of the forge department, American Fork & Hoe Co., Geneva, O., died April 4, in Cleveland.

—o—

Richard N. Keil, 69, secretary-treasurer and general manager, Excelsior Steel Ball Co., Buffalo, died April 1, in that city.

—o—

Robert M. Porteous, 66, service engineer, Herman Pneumatic Machine Co., Pittsburgh, died at his home in West Bridgewater, Pa., April 5. He had been associated with the company in various capacities about 30 years.

—o—

Walter G. Glock, 60, superintendent of the Stark Division hot mills of Republic Steel Corp., died at his home in Canton, O., March 25.

—o—

John F. Keller, 58, general foreman at the Berger Division of Republic Steel Corp., died in Canton, O., March 29.

—o—

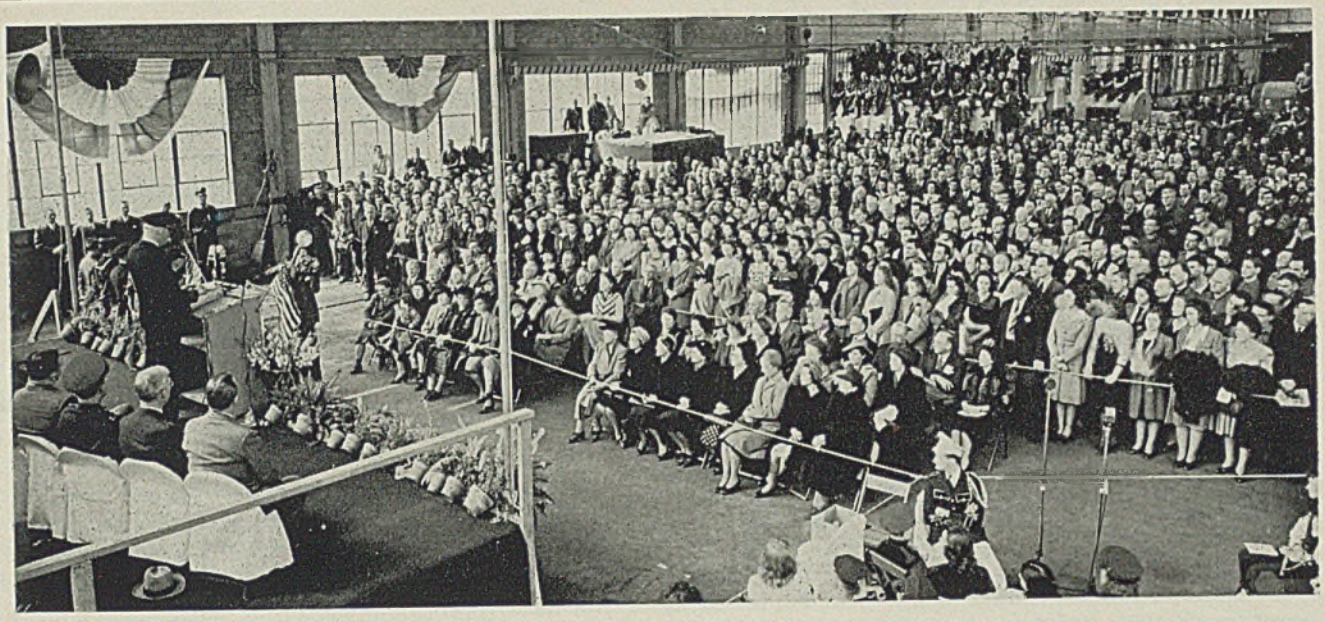
Rufus Lenoir Patterson, 70, chairman of the board, American Machine & Foundry Co., which he organized in 1900, died April 9, in New York.

—o—

Vernon B. Chase, 47, president, Metal Specialty Co., Cincinnati, died April 5. He represented the company in Detroit for several years until his transfer to the home office 18 years ago.

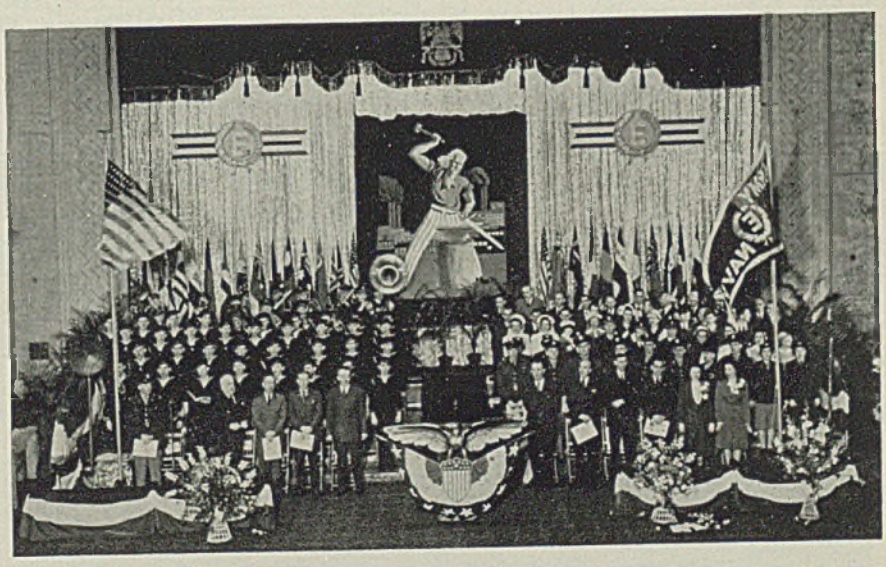
—o—

Edmund Burke, 65, founder, Edmund Burke Engineering Sales Co., Chicago, and an industrial engineer with Crane Co., Chicago, for 30 years prior to 1940, died in that city April 10.



Commander R. G. Walling, U. S. Navy, addresses employes of the Ridgway, Pa., plant of Elliott Co. "Steady, routine, day-in and day-out endeavor is required" to shorten war, he declared in presenting the "E" pennant

George H. Deike, president, Mine Safety Appliances Co., Pittsburgh, accepts the Maritime Commission's "M", above



Queen City Steel Treating Co., Cincinnati, employes witness presentation of joint Army-Navy award, above

Army, Navy, company and civic officials, left, display the flag presented to the Silent Hoist Winch & Crane Co., Brooklyn, N. Y.

BIBLIOTEKA POLITECHNIKI ŚLĄSKIEJ

WPB Preparing New Drive To Collect Copper and Steel

TO MEET expanding war needs for scrap metals, WPB Salvage Division officials are preparing to launch a new and intensive dormant scrap collection drive.

Although copper scrap is considered the No. 1 salvage problem for this year, steel scrap collections also must be maintained at high levels, WPB officials state.

Projected copper needs of 3,300,000 tons for 1943 are expected to be met in the following manner: Production of primary copper, 1,200,000 tons; imports, 700,000; scrap returned from fabricating operations, 900,000; and from dormant industrial scrap and special projects drives, about 500,000 tons.

Paul Cabot, national director, WPB Salvage Division, in commenting on the acute copper situation stated: "Our attitude on copper, brass and bronze is that we have got to now go further than merely getting scrap. We have got to ask for useful articles, for things that are in current use. We want to move all copper, brass and bronze that in the opinion of the owner are nonessential, reasonably replaceable and have no artistic or sentimental value. We believe that most of this material is to be found in homes, banks, office buildings and other institutions."

Change in specifications and designs of military equipment has gone far in spreading available supply of copper, and further substantial savings along this line are indicated in the near future.

Task of meeting the 1943 steel scrap requirements is expected to be more difficult than last year. Drives for dormant industrial and household scrap were highly successful in 1943, but the follow-up efforts will necessitate considerably more digging.

Purchased steel scrap requirements are placed at 25,000,000 gross tons this year, or slightly below the 27,000,000 tons shipped in 1942. This moderately lower estimate is based on the scheduled increase in pig iron production resulting from additional blast furnaces to be brought into service this year. However, an offsetting factor will be substantial increase in the number of furnaces scheduled to go down for relining.

To meet the first half year steel scrap collection quota of 13,000,000 tons, an intensive campaign is underway to collect scrap from farms through the efforts of state salvaging committees, farm implement companies and other groups.

Stocks of steel scrap were reduced moderately during the first quarter this year to 7,000,000 tons. Inventories are currently about 50 per cent greater than a year ago, but this does not mean that the tight situation in some areas has been completely eliminated as yet.

Of the total 1943 steel scrap needs, railroads are expected to supply 2,500,000 tons; collections of industrial scrap should reach about 16,000,000 tons; while 6,500,000 tons must be collected from auto graveyards, farms and special projects.

Steel To Replace Copper in Electrical Wiring Devices

To conserve copper and copper base alloys used in the manufacture of electrical wiring devices, the WPB has issued Limitation Order L-277, which goes beyond Copper Conservation Order M-9-c by barring the use of these metals for the current-carrying parts covered by the regulation. Order M-9-c prohibited the use of such materials for non-current-carrying parts.

Order also will provide distribution control by restricting manufacturers' sales to orders rated A-1-j or better. Also, distributors will have to apply on PD-1X applications to replace supplies sold on unrated orders.

Substitute materials for copper and copper base alloys, such as carbon steel, are available, according to the WPB Building Materials Division. Manufacturers are allowed 30 days to put into process their present stock of metal, and 60 days to assemble completed parts.

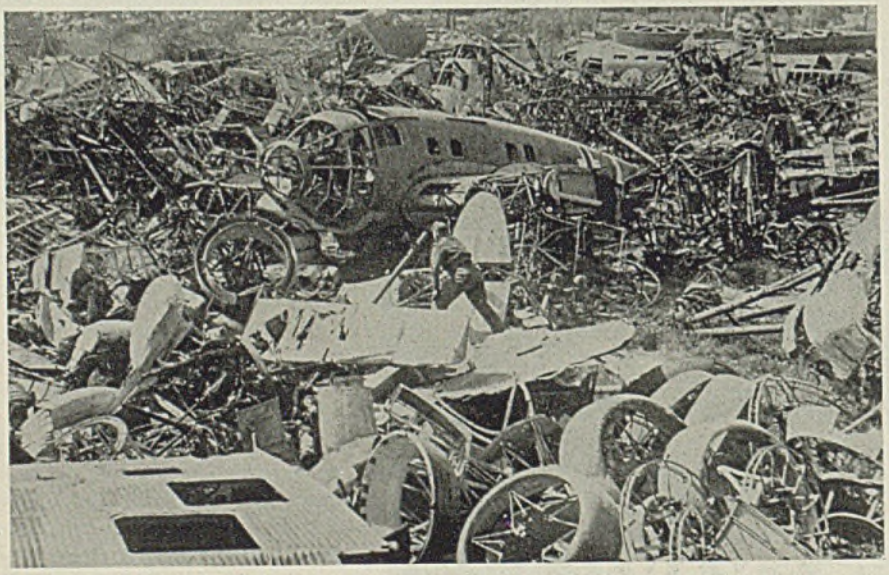
Use of steel will make no appreciable change in the quality or appearance of the various items, the division points out, although copper products might last a little longer. In respect to safety, the use of steel in the parts designated has been approved by the Underwriters Laboratories.

Under the order, "electrical wiring device" is defined as any unit of an electric circuit which does not consume electrical energy, but is used for the purpose of switching, tapping or connecting.

Exempt from the provisions are lighting fixtures, portable lamps, flashlights, fuses, fuse cutouts, lugs, mechanical wire connectors, knife blade switches, fluorescent starter switches, relays, push buttons, automatic control equipment or any unit of an electric circuit designed to connect, convey or control electrical energy in excess of 60 amperes or 600 volts.

The order also does not apply to electrical wiring devices or parts to be used in aircraft, armament, electric communication equipment, radio and electronic equipment, ships, tanks, vehicles, weapons, infra-red heating equipment, exterior lighting equipment, alarm and signal systems, X-ray and physical therapy equipment or any equipment designed for use in combat.

AXIS PLANES SUPPLY SCRAP FOR UNITED NATIONS



JUNK pile of engine parts, fuselages and wings of wrecked Axis aircraft, collected at Castel Benito field near Tripoli. Much of this will be shipped to United Nations' mills, remelted and fashioned into new war material. NEA

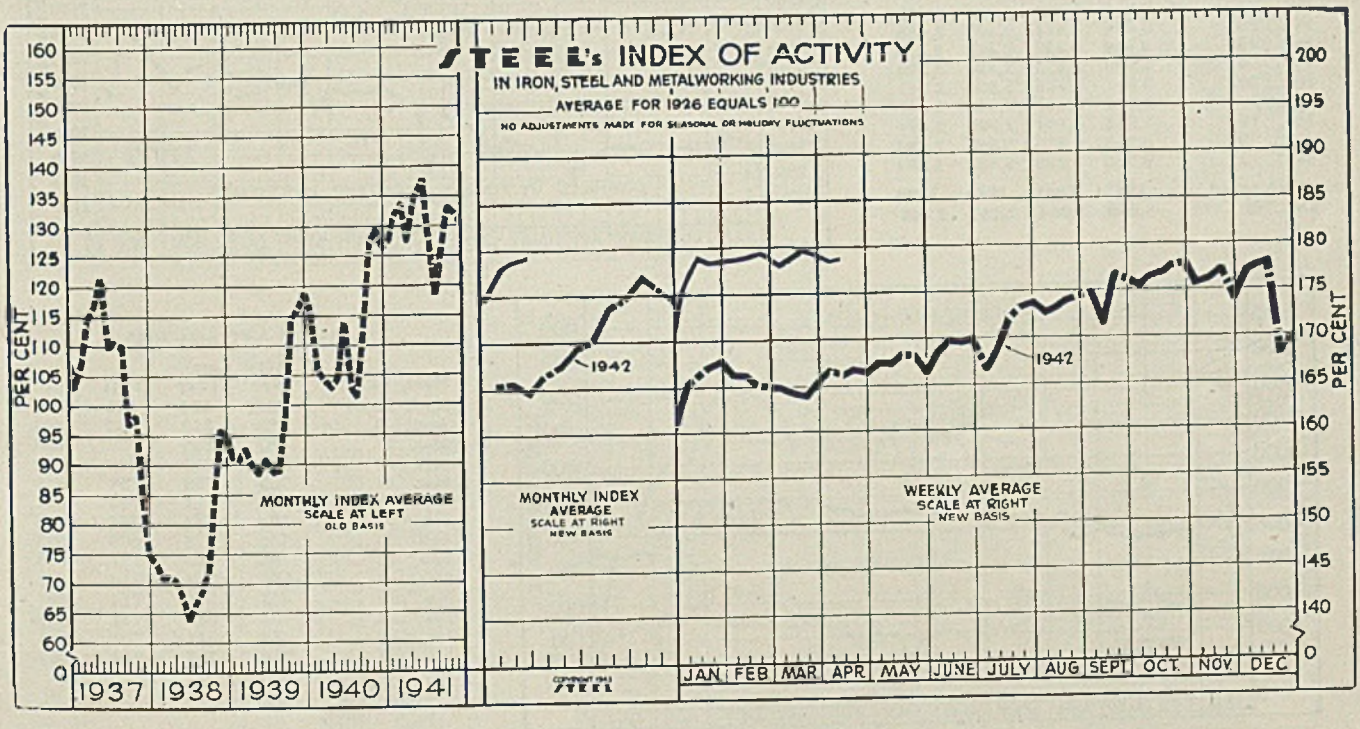
War Industry's 1943 Assignment Difficult

THERE has been no slackening in the intensity of the war effort as industry moves into the second phase of the current program—one of concentration on battle-tested and approved types of combat equipment and supplies. In this phase airplanes and ships take precedence. The aircraft industry is working out a schedule pointed at 100,000 military planes this year, while merchant vessel output passed the goal of five-ships-a-day a month ago.

Further demands of the draft will increase pressure upon industry already handicapped by shortages of trained labor. The expansion of basic metal industries such as steel and aluminum has developed more slowly than was expected and some of these new facilities will not become productive until late in the year. Their products are requisite for completion of the enlarged plane and ship schedules.

STEEL's index of activity edged higher in the week ended April 10, finishing at 178.6 after a drop of 0.7 point in the preceding week. During the period the steel industry held its rate of production at 99.5 per cent of capacity, a practical peak, for the sixth week of the year to date. Preliminary freight carloading reports indicated an increase over the 772,133 cars loaded in the previous week. Electric power distribution totaled 3,882,467,000 kilowatt hours, against 3,889,858,000 in the preceding seven days and 3,320,858,000 for like week a year ago.

Production of steel ingots in March set an all-time record with 7,670,187 net tons. This compares with 6,811,882 tons in February and 7,392,911 tons in March, 1942. Declining construction volume was reflected in the sharp drop in bookings of structural steel in February, from 57,800 tons in prior month to 29,600 tons. Shipments were also lower at 104,800 tons, against 105,700 in January.



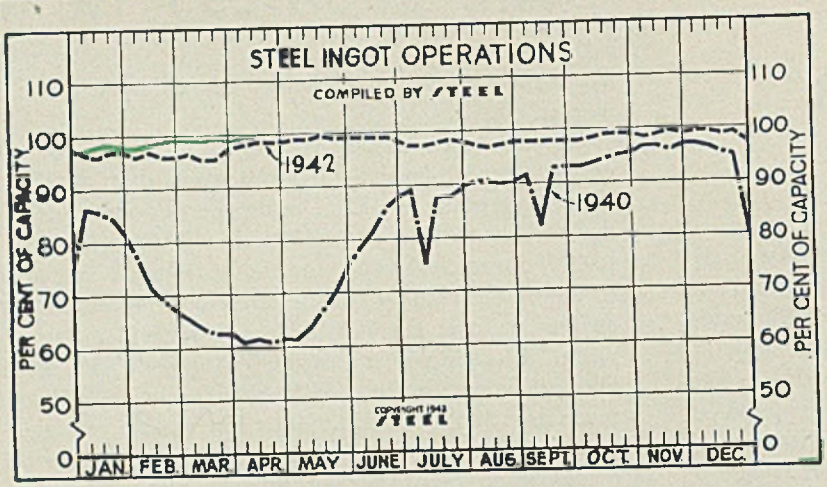
STEEL'S index of activity edged upward 0.1 point in the week ending April 10:

Week Ended	1943	1942
April 10	178.6†	166.2
April 3	178.5	166.7
Mar. 27	179.2	165.5
Mar. 20	179.6	163.9
Mar. 13	179.0	164.1
Mar. 6	178.2	164.8
Feb. 27	178.9	165.0
Feb. 20	179.0	165.1
Feb. 13	178.8	166.2
Feb. 6	178.6	166.3
Jan. 30	178.6	167.9

†Preliminary.

Mo. Data	1943	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932
Jan.	178.1	165.7	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6
Feb.	178.8	165.6	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3
March	179.0	164.6	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2
April	....	166.7	127.2	102.7	89.8	70.3	116.6	100.8	85.0	86.6	52.4	52.8
May	....	167.7	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8
June	....	169.4	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4
July	....	171.0	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1
Aug.	....	173.5	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0
Sept.	....	174.8	126.4	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5
Oct.	....	176.9	133.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4
Nov.	....	175.8	132.2	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5
Dec.	....	174.1	130.2	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2

Note: Weekly and monthly indexes for 1942 and 1943 have been adjusted to offset the forced curtailment in automobile production and to more accurately reflect expanding steel production



Steel Ingot Operations

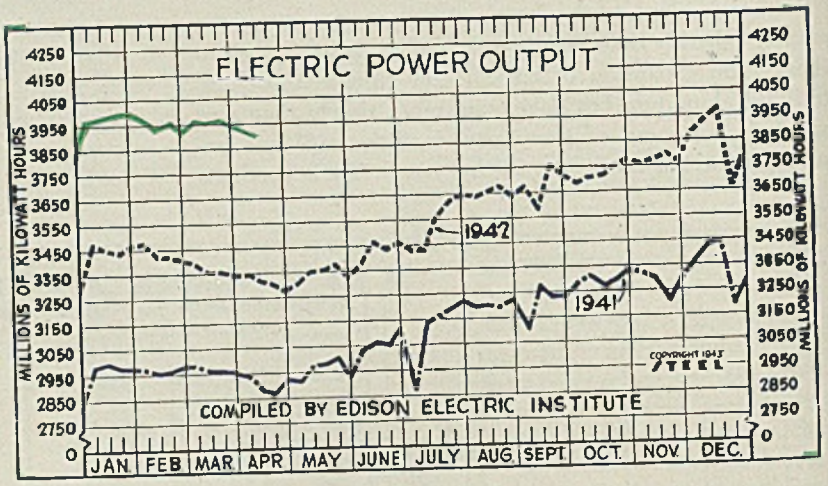
(Per Cent)

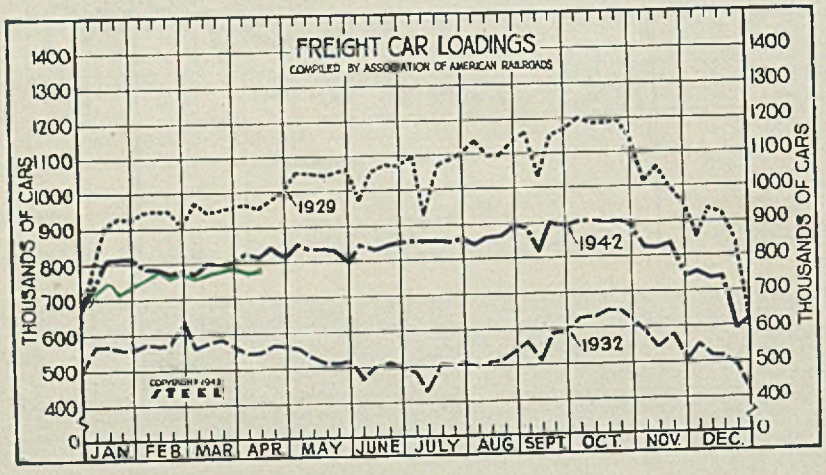
Week ended	1943	1942	1941	1940
April 10	99.5	98.5	98.0	61.0
April 3	99.5	98.0	98.0	61.5
Mar. 27	99.0	97.5	99.5	61.0
Mar. 20	99.5	95.5	99.5	62.5
Mar. 13	99.0	95.5	98.5	62.5
Mar. 6	99.5	96.5	97.5	63.5
Feb. 27	99.5	96.0	96.5	65.5
Feb. 20	99.5	96.0	94.5	67.0
Feb. 13	99.0	97.0	96.5	69.0
Feb. 6	98.5	96.0	97.0	71.0
Jan. 30	98.5	97.0	97.0	76.5
Jan. 23	99.0	97.0	95.5	84.5
Jan. 16	99.0	96.0	94.5	84.5
Jan. 9	97.5	96.5	93.0	86.0
Jan. 2	97.5	97.5	92.5	86.5
Dec. 26	99.0	93.5	80.0	75.5

Electric Power Output

(Million KWH)

Week ended	1943	1942	1941	1940
April 10	3,882	3,321	2,721	2,418
April 3	3,890	3,349	2,779	2,381
Mar. 27	3,928	3,345	2,802	2,422
Mar. 20	3,947	3,357	2,809	2,424
Mar. 13	3,945	3,357	2,818	2,460
Mar. 6	3,946	3,392	2,835	2,464
Feb. 27	3,893	3,410	2,825	2,479
Feb. 20	3,949	3,424	2,820	2,455
Feb. 13	3,939	3,422	2,810	2,476
Feb. 6	3,960	3,475	2,824	2,523
Jan. 30	3,977	3,468	2,830	2,541
Jan. 23	3,974	3,440	2,980	2,661
Jan. 16	3,952	3,450	2,996	2,674
Jan. 9	3,953	3,473	2,985	2,688
Jan. 2	3,780	3,289	2,831	2,558
Week ended	**1942**	**1941**	**1940**	**1939**
Dec. 26	3,656	3,284	2,757	2,465





Freight Car Loadings

(1000 Cars)

Week ended	1943	1942	1941	1940
April 10	780†	814	680	619
April 3	772	829	683	603
Mar. 27	787	805	792	628
Mar. 20	768	797	768	620
Mar. 13	769	799	758	619
Mar. 6	748	771	742	621
Feb. 27	783	781	757	634
Feb. 20	752	775	678	595
Feb. 13	765	783	721	608
Feb. 6	755	784	710	627
Jan. 30	735	816	714	657
Jan. 23	709	818	711	649
Jan. 16	755	811	703	646
Jan. 9	716	737	712	688

†Preliminary.

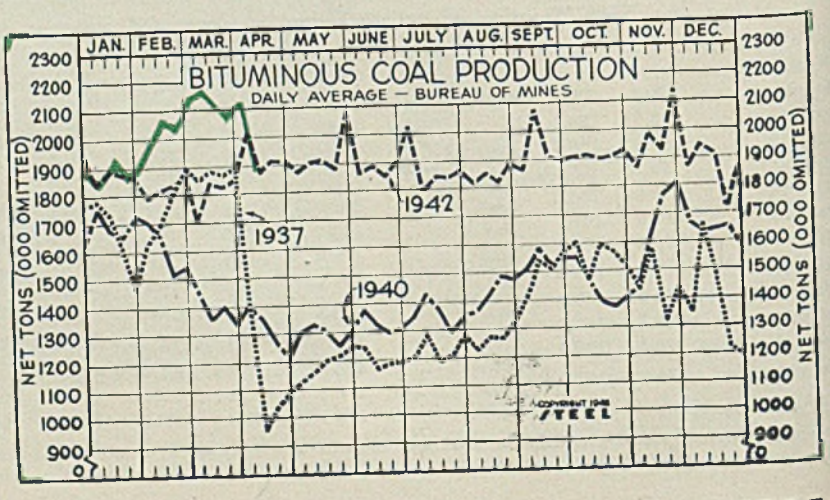
Bituminous Coal Production

Daily Average

Net Tons (000 omitted)

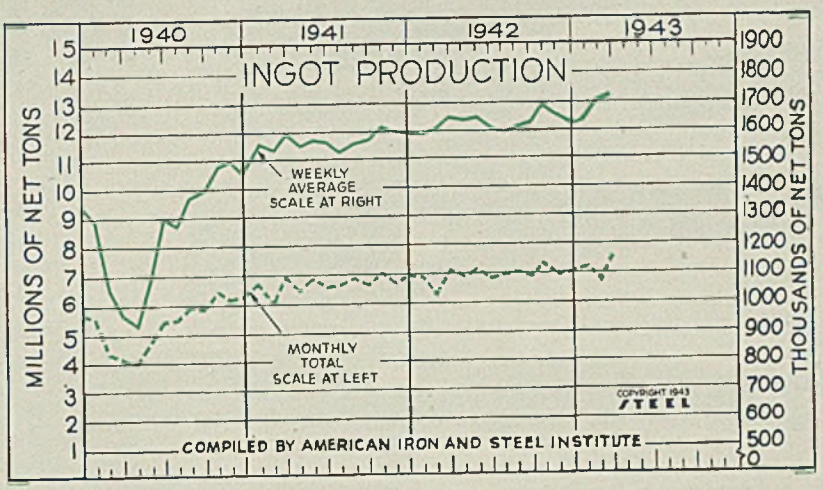
Week ended	1943	1942	1941	1937
April 3	1,863†	2,019	665	1,381
Mar. 27	2,108	1,858	1,950	1,895
Mar. 20	2,060	1,825	1,879	1,871
Mar. 13	2,100	1,842	1,844	1,883
Mar. 6	2,125	1,693	1,791	1,851
Feb. 27	2,113	1,878	1,736	1,897
Feb. 20	2,027	1,833	1,736	1,807
Feb. 13	2,033	1,817	1,736	1,696
Feb. 6	1,980	1,793	1,683	1,634
Jan. 30	1,900	1,866	1,684	1,466
Jan. 23	1,867	1,886	1,656	1,605
Jan. 16	1,929	1,883	1,609	1,731
Jan. 9	1,883	1,842	1,691	1,780

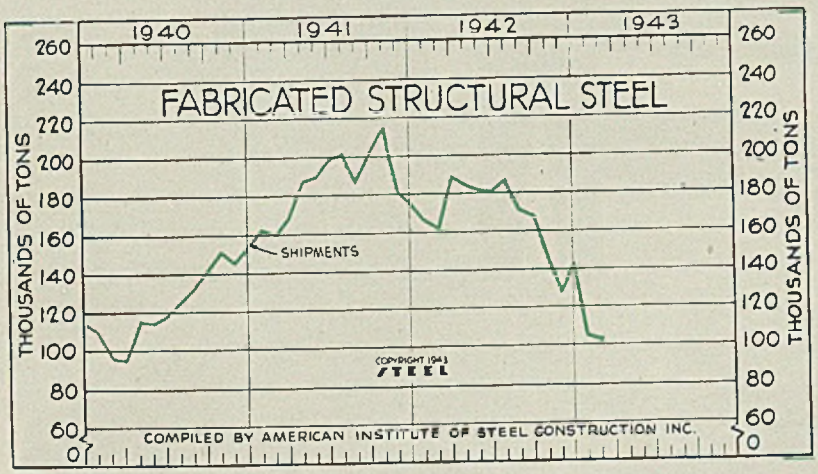
†Preliminary.



Steel Ingot Production
(Unit 100 Net Tons)

	Monthly Total		Weekly Average	
	1943	1942	1943	1942
Jan.	7,408.7	7,124.9	1,672.4	1,608.3
Feb.	6,811.8	6,521.1	1,702.9	1,630.3
Mar.	7,670.2	7,392.9	1,731.4	1,668.8
Apr.	.....	7,122.3	.....	1,660.2
May	.....	7,386.9	.....	1,667.5
June	.....	7,022.2	.....	1,636.9
July	.....	7,148.8	.....	1,617.4
Aug.	.....	7,233.5	.....	1,632.8
Sept.	.....	7,067.1	.....	1,651.2
Oct.	.....	7,584.9	.....	1,712.2
Nov.	.....	7,184.6	.....	1,674.7
Dec.	.....	7,303.2	.....	1,652.3
Total	.....	83,092.2	.....	1,651.2



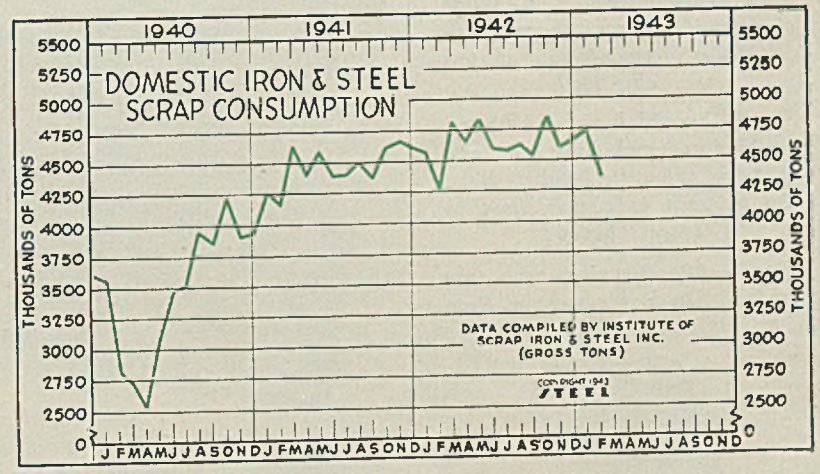


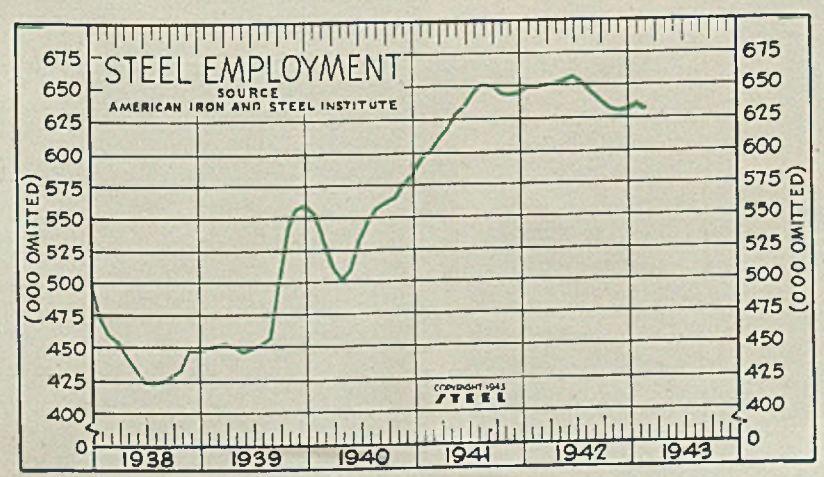
Fabricated Structural Steel
(1000 tons)

	Shipments			Bookings		
	1943	1942	1941	1943	1942	1941
Jan.	105.7	167.8	164.6	57.8	183.4	281.2
Feb.	104.8	164.6	161.4	29.6	228.7	173.6
Mar.	.....	191.3	170.2	.....	248.3	206.1
Apr.	.....	187.2	189.8	.....	314.0	218.0
May	.....	184.2	191.9	.....	161.0	179.9
June	.....	182.7	200.5	.....	184.5	246.9
July	.....	189.9	203.0	.....	125.2	214.8
Aug.	.....	173.9	189.3	.....	80.6	158.7
Sept.	.....	169.8	204.1	.....	68.5	158.8
Oct.	.....	152.9	217.7	.....	50.9	128.7
Nov.	.....	130.4	182.6	.....	49.6	184.0
Dec.	.....	145.3	176.1	.....	67.6	146.4
Tot.	.....	2031.1	2251.1	.....	1755.8	2297.0

Iron and Steel Scrap Consumption
(Gross Tons)
(000 omitted)

	1943	1942	1941	1940
Jan.	4,753	4,590	4,278	3,581
Feb.	4,361	4,276	4,172	2,812
Mar.	.....	4,840	4,662	2,728
Apr.	.....	4,672	4,406	2,548
May	.....	4,857	4,609	3,061
June	.....	4,608	4,406	3,482
July	.....	4,600	4,415	3,526
Aug.	.....	4,645	4,518	3,968
Sept.	.....	4,556	4,392	3,876
Oct.	.....	4,883	4,649	4,233
Nov.	.....	4,621	4,482	3,922
Dec.	.....	4,693	4,634	3,950
Total	.....	55,841	53,623	41,687
Mo. Av.	.....	4,653	4,468	3,474





Steel Employment
(000 omitted)

	1943	1942	1941	1940	1939
Jan.	637	651	598	556	451
Feb.	635	651	603	538	453
Mar.	...	653	613	514	455
Apr.	...	654	621	503	452
May	...	656	632	510	448
June	...	659	638	535	451
July	...	655	648	549	453
Aug.	...	647	654	560	458
Sept.	...	641	652	565	502
Oct.	...	635	646	568	545
Nov.	...	632	645	577	561
Dec.	...	633	646	585	563

HOLLOW STEE

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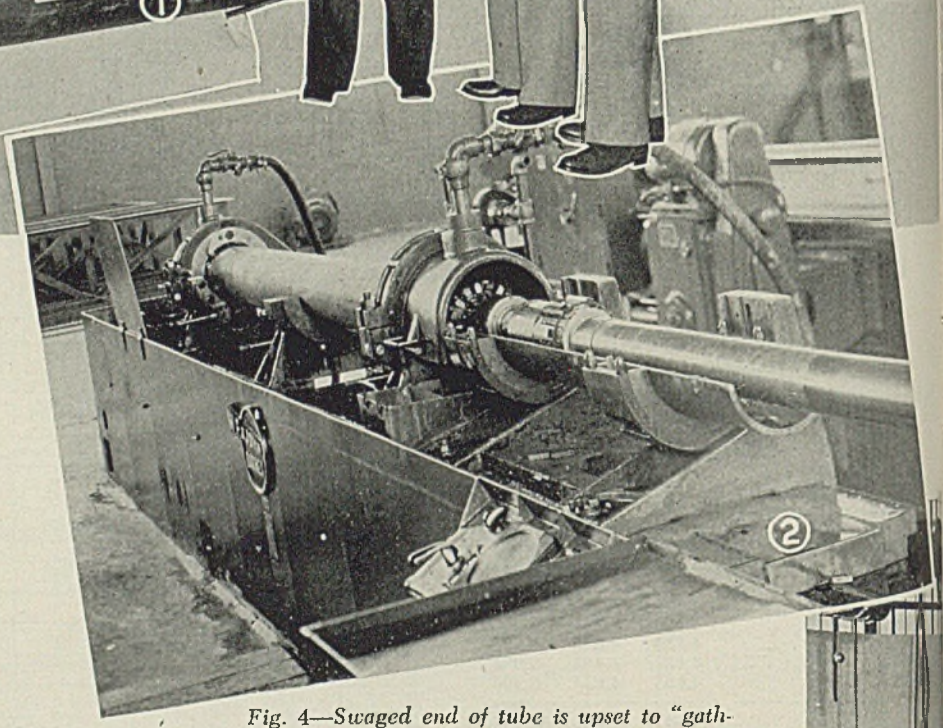
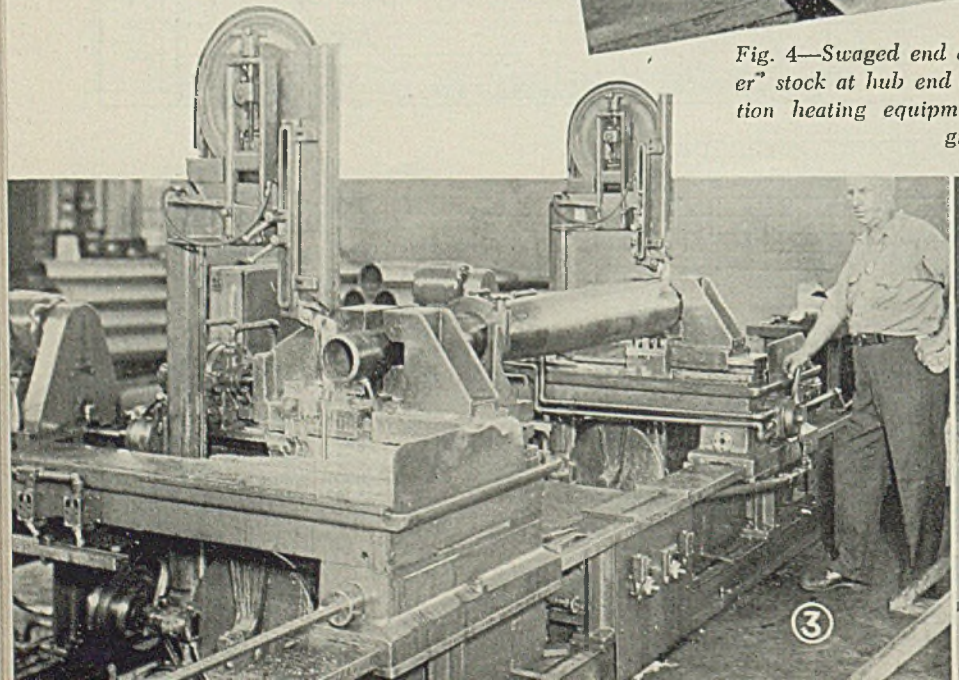


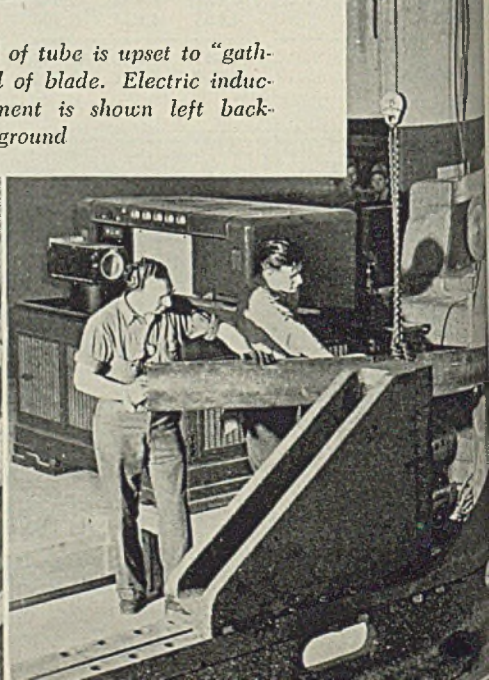
Fig. 1—E. M. Wise and Generals A. W. Vaniman and K. B. Wolfe of Army Air Forces observe various stages in manufacture of steel propeller blades

Fig. 2—Special horizontal honing machine sizes and cleans tube bore of 8-foot alloy steel tube. Hone can be seen in center about to enter tube end

Fig. 3—After swaging, tube ends are cut off in double hacksaw. Note taper of tube here

Fig. 4—Swaged end of tube is upset to "gather" stock at hub end of blade. Electric induction heating equipment is shown left background





ELLER BLADES

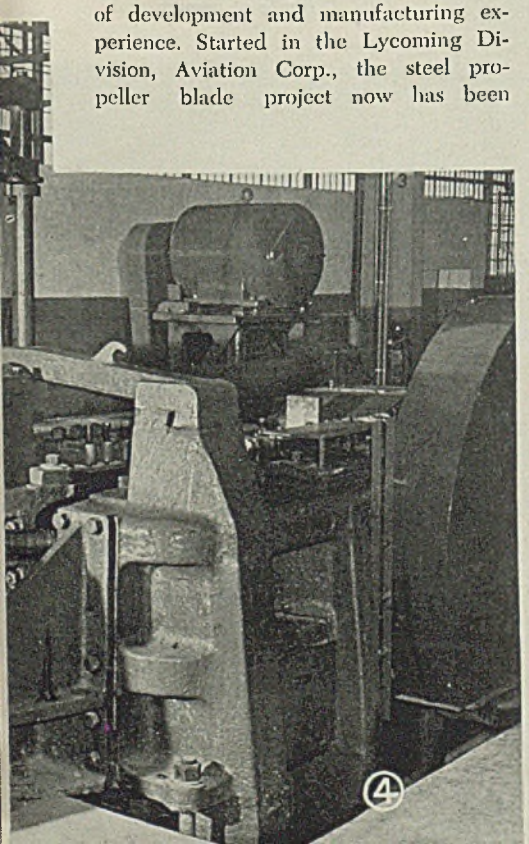
..made from tubing in unusual series of metalworking operations

TABLE I—Steps in Forming Propeller Blade

1—Hone inside diameter of steel tube. See Fig. 2
2—Turn outside diameter on multiple-tool lathe
3—Centerless grind outside diameter
4—Cold swage or neck down one end of tube in 4000-ton press
5—Trim ends in double bandsaw. See Fig. 3
6—Hot upset swaged or shank end to increase wall thickness, Fig. 4; quench in mica flakes
7—Rough bore shank end to admit arbor
8—Heat in electric furnace to admit cold arbor. See Fig. 6
9—Quench tube with arbor in position, shrinking tube on arbor
10—Straighten in hydraulic press
11—Turn outside diameter on copying or duplicating lathe to get proper distribution of wall thickness, locating from center or arbor. See Fig. 5
12—Reheat in electric furnace
13—Heat to release arbor which can be reused after grinding and polishing
14—Abrasive belt grind to adjust wall thickness. See Fig. 7
15—Arc weld header disk into large end of tube, Fig. 8, and weld pipe connection on small end of tube, Fig. 9
16—Cold bend for blade shape in hydraulic press, keeping constant oil pressure on inside. See Fig. 10
17—Flatten tube on hydraulic press, maintaining inside pressure, Fig. 11
18—Form rough blade shape in hydraulic press with constant pressure maintained inside tube
19—Resistance weld to seal tip and to reinforce trailing edge of planform, Fig. 12
20—Shear off excess metal at end to approximate planform of blade, and weld shut
21—Mill tip and trailing edge. See Fig. 14
22—X-ray entire blade to check fillet as well as other possible defects, Fig. 13
23—Final quench-form operation (quench in dies)
24—Machining operations on shank, with blades mounted in cylindrical shuttle. See Figs. 15 and 16
25—Hand filing, finishing, gaging to obtain true airfoil shape
26—Series of inspection, gaging, balancing and polishing operations, including magnetic test, Fig. 17
27—Final inspection and acceptance by Air Force inspectors
28—Ship in wood crates

By A. H. ALLEN
Detroit Editor, STEEL

FABRICATION of one-piece aircraft propeller blades from steel tubing is in itself an intriguing idea. But translating this idea from the blueprint stage to one of the most unusual and spectacular metalworking operations ever conceived represents many years of development and manufacturing experience. Started in the Lycoming Division, Aviation Corp., the steel propeller blade project now has been fully engineered for mass production and transferred to a completely new Middle Western plant, identified as the American Propeller Corp., a subsidiary of the Aviation Corp.



The detail of manufacturing and inspection operations is suggested by the observation that a single blade during processing travels the full length of four lines of equipment stretching the length of the plant — close to a mile of operations, all arranged in sequence to facilitate handling and to eliminate backtracking.

The blade starts out as an approximately 8-foot length of chromium-nickel-molybdenum steel tubing about 9 inches in diameter and weighing approximately 300 pounds. See lower item, Fig. 1. After traversing the multitude of machining, forming, welding, trimming and grinding operations, this weight has been reduced to less than 100 pounds. The finished steel blade weighs no more than an equivalent forged aluminum propeller blade of the same size, yet it has considerably more strength as well as resistance to abrasion and impact.

A consideration of some of the operating loads on propeller blades of airplanes today will give at least a partial understanding of the forces to be contended with, and how the steel blades meet them. American Propeller engineers point out that airplane take-offs and dives impose the highest loads, the average propeller developing centrifugal loads up to 100,000 pounds with twisting moments as high as 10,000 inch-pounds. Bending moments, resulting from the combination of thrust, torque and centrifugal force acting on the deflected blade, range from 20,000 to 65,000 inch-pounds for the larger blades. Operating steadily, stresses range from 25,000 to 30,000 pounds per square inch.

Hollow steel blades in the larger diameters are meeting the ever-increasing loads and more severe operating conditions that go with engines of greater horsepower, even providing weight reductions over other types of blades. Improved design and manufacturing methods, better steel, as well as improved magnetic and X-ray inspection methods in recent years have made it possible to produce hollow steel blades that admirably fulfill the severe service requirements.

In reviewing the detail procedure involved in fashioning a hollow steel propeller blade from tubing to the finished part, it may be well first to

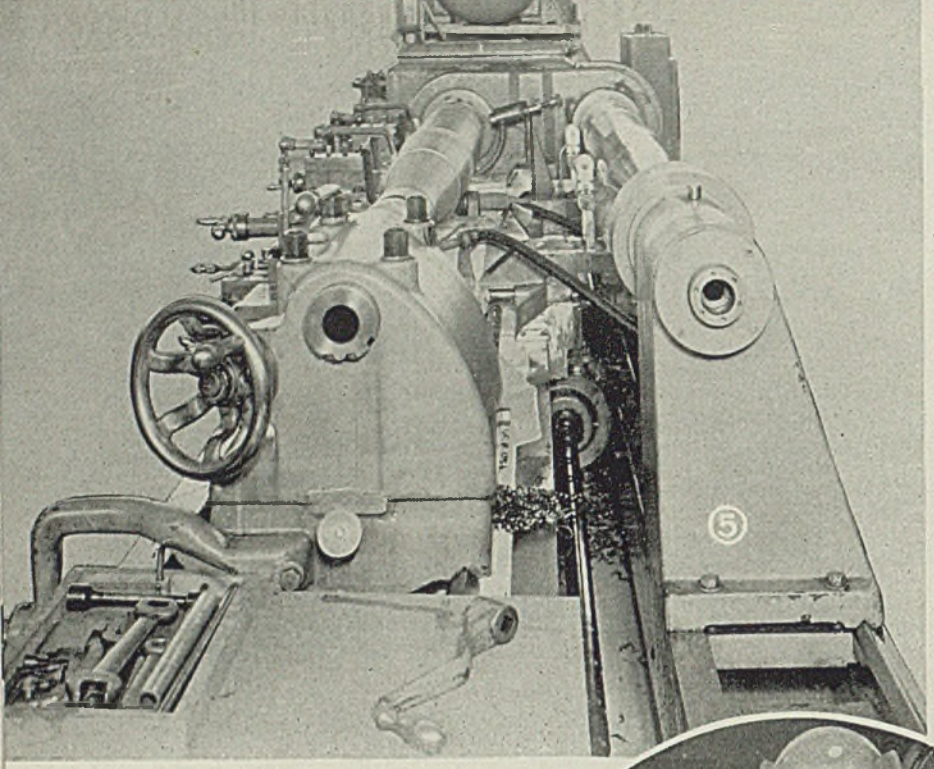


Fig. 5—Contour forming of wall thickness is done on heavy copying lathe, working from master tube or templet at right. Tube wall must be thicker on leading edge

Fig. 8—Steel disk or header is arc welded into tip end of tube. Hole is for relief valve

Fig. 6—Tube is heated to admit arbor which then is shrunk on by quenching both. Here arbor is being lowered into tube in furnace. Note levers which slide furnace covers

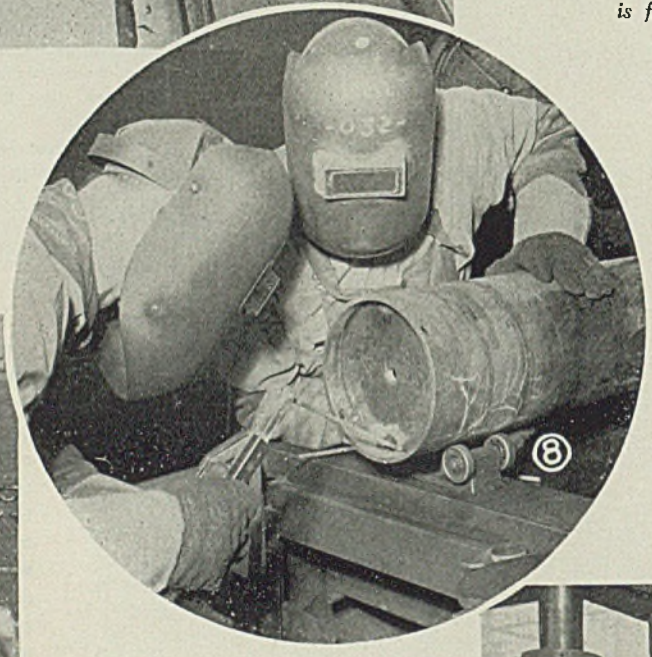


Fig. 11—Bent tube then is flattened in hydraulic press. Fluid is allowed to escape from small valved opening in right hand end

Fig. 12—Automatic resistance welder makes seam weld to seal tip, another seam weld to reinforce trailing edge. Note special fixture for holding blade at proper angle

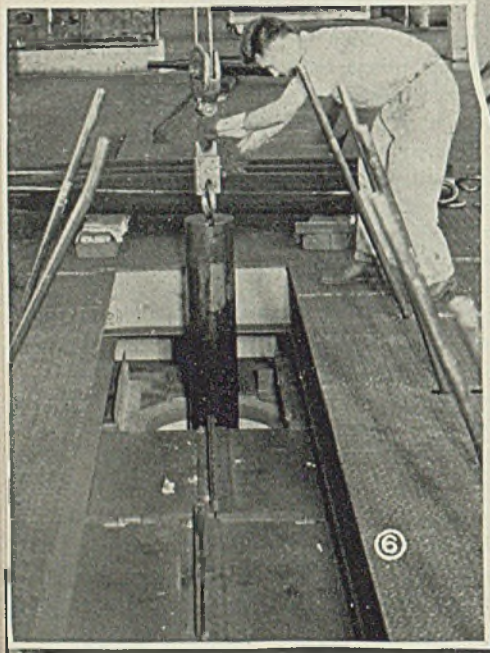
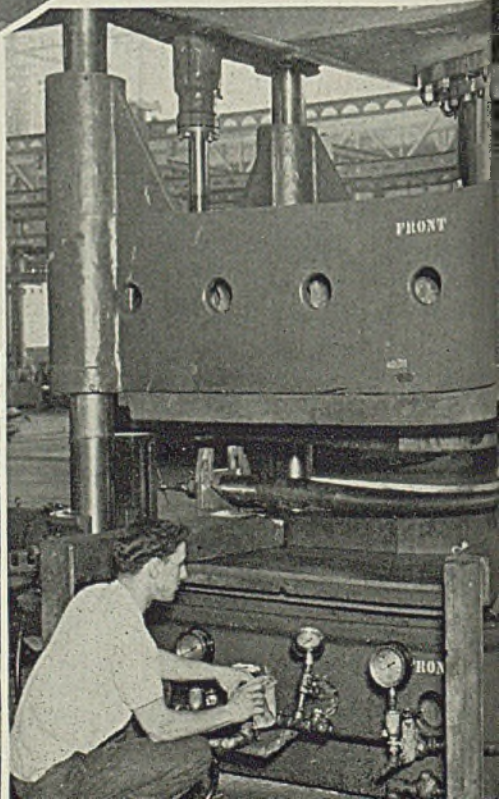
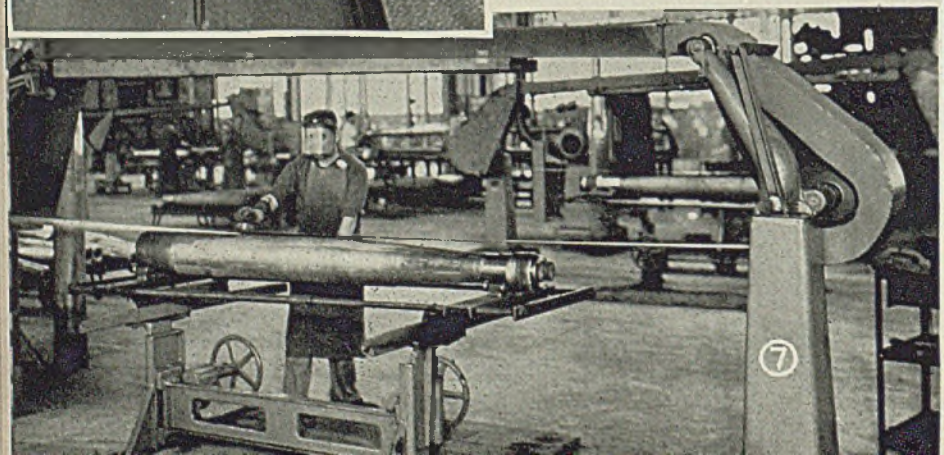


Fig. 7—Belt polishers remove extra metal to produce exact wall thicknesses desired; also are used in final finishing operations to remove stock to balance blades





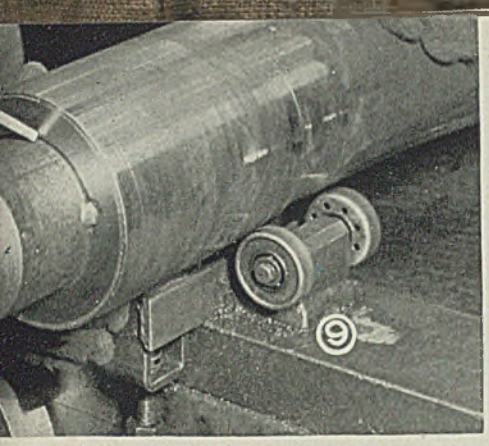


Fig. 9—Arc welding threaded pipe connection in hub end to permit introduction of fluid which is held under pressure during forming operations, acting as a flexible "mandrel"

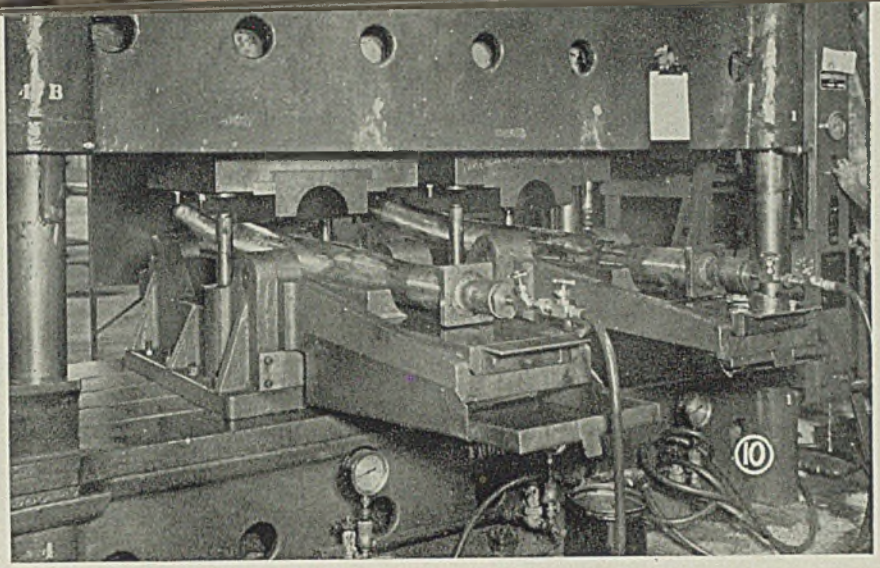


Fig. 10—Tubes are bent cold two at a time in hydraulic press. Hose lines supply fluid pressure inside tube during bending operation

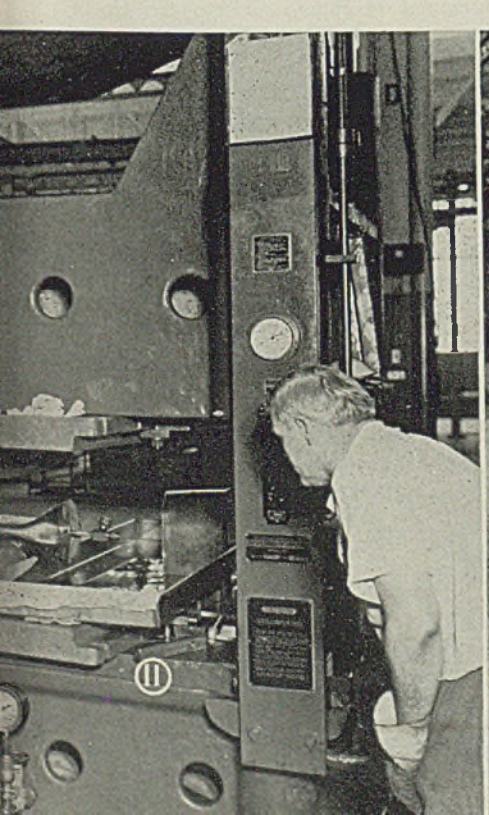
list the principal steps involved, then return to specific analysis of the unusual methods and equipment utilized. The process starts with incoming shipments of cold-drawn or hot-rolled seamless tubing. These are first annealed in electric furnaces in which the tubes are suspended vertically. Subsequent operations are listed in sequence in Table I. Propeller blades in various stages of production from raw tube to finished unit can be seen in Fig. 1.

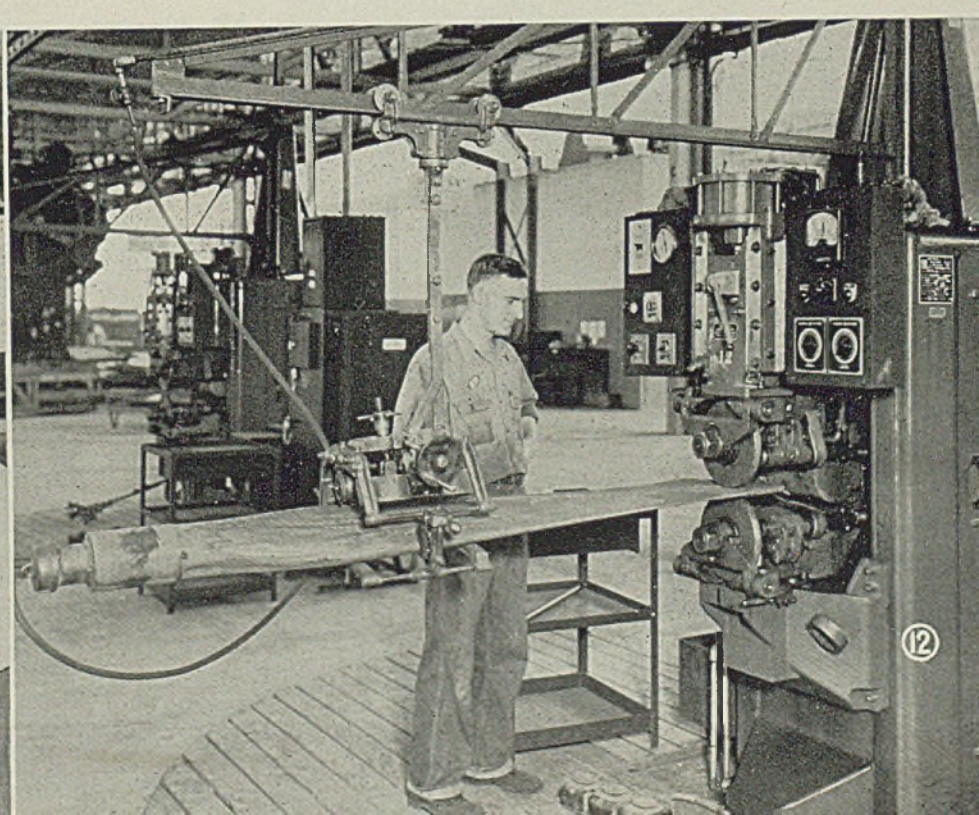
The sequence of operation is detailed and designed for large production. For example, including initial annealing, there are several separate reheating operations involved, each of which is accomplished in its own electric induction heating equipment. Further, the plant layout calls for two adjoining lines of blades to be going through the manufacturing sequence. This setup allows two different designs of blades to be produced at the same time.

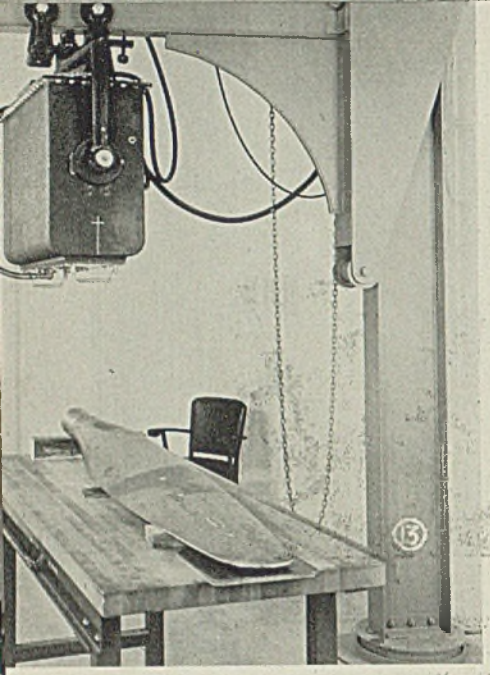
Many of the steps involve operations which have never before been applied on a practical scale — for example, swaging the tube down to a uniform taper for roughly 40 per cent of its length (operation 4, Table I). To handle this tough job, special 4000-ton mechanical presses had to be designed, weighing approximately 375 tons each and towering 20 feet above the floor as well as extending a considerable distance below the floor. Power is supplied to the swaging press by an electric motor through V-belt drive. Separate foundations are required for each of these four swaging units, believed to be the largest mechanical presses ever built.

In the swaging operation, the tube is fed into dies which rotate and advance it slowly between each stroke of the press, the total vertical travel of the dies being only 1 inch. Gradually, the steel tube is molded down in diameter.

Now let's examine the heavy-duty horizontal honing machines, Fig. 2, which operate automatically, sizing the inside of the tube to the required tolerance and removing any surface imperfection in the steel (operation 1, Table I). These honing machines remove approximately eight to ten times the amount of stock handled in conventional honing operations. The rigidity of machine construction and precision of control necessary to do this job in a reasonable length of time can well







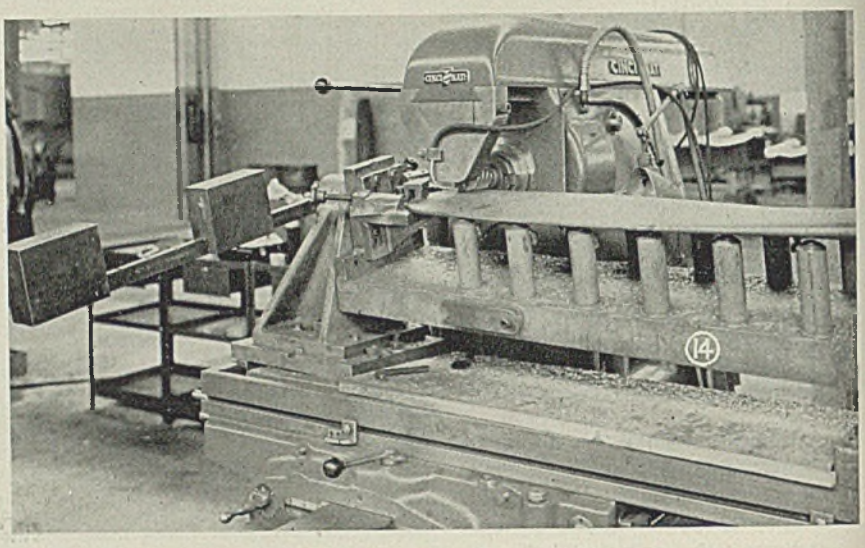


Fig. 13—After cutting off excess metal at tip, full length of blade is X-rayed to check for defects. Lead numbers placed over sections identify them on X-ray negatives

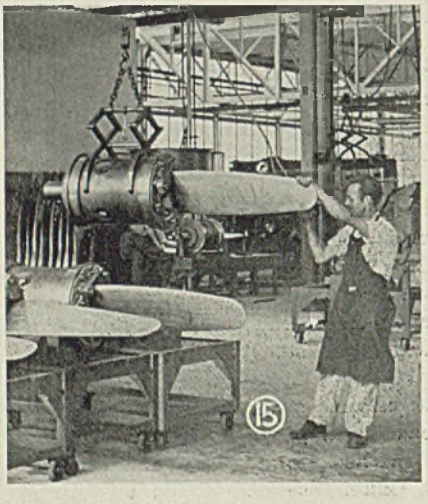


Fig. 14—Special milling machine and holding fixture for milling tip and trailing edge

Fig. 15—Blades are mounted in special shuttle for easy chucking during machining of hub

be imagined, particularly when it is kept in mind that the steel used is one of the toughest materials obtainable outside high-alloy class.

To understand the need for the lengthy series of forming and shaping operations, which include swaging, upsetting, contour forming, bending, flattening, preforming, trimming and final forming, it is necessary to have an understanding of the complex shape of an airplane propeller blade. Its cross section varies constantly from the shank to the tip. The camber side is rounded, while the face side is comparatively flat, yet the entire blade must follow a slight twist from the shank out to the tip. Curvature of the rounded or leading edge also varies throughout the length, while the sharp or trailing edge becomes sharper as it approaches the tip where the front and back of the blade are practically flat against each other.

The initial swaging is required to give the flare as the blade widens out from the shank. The upsetting is necessary to provide extra stock on the shank end so it can be machined and ground to fit on the hub assembly. Bending is essential to make the leading edge seamless and of proper planform when subsequent operations change the circular section of the tube into airfoil shape. "Planform" is a term used to describe the contour of the blade placed flat; "airfoil" is the designation applied to the shape of the cross section. Contour forming is done on a duplicating lathe from a master templet and is necessary to provide extra wall thickness tapering from the shank and at those portions of the tube which become the leading and trailing edges after later operations.

(*Please turn to Page* 131)

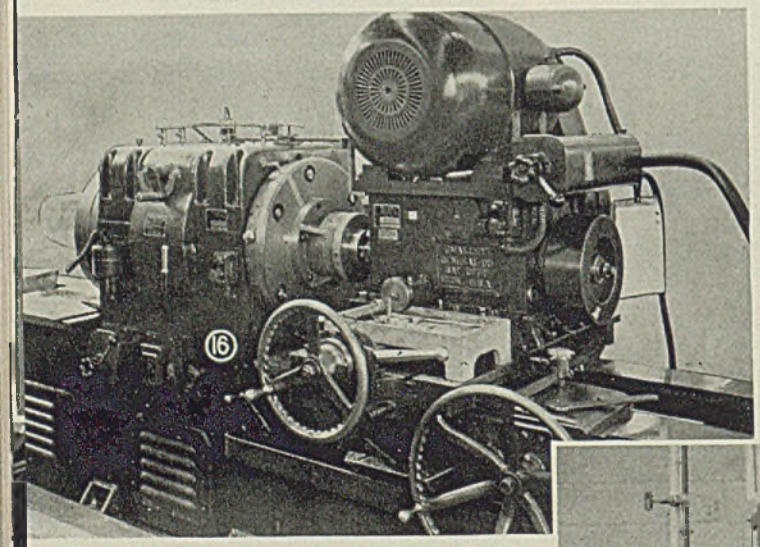
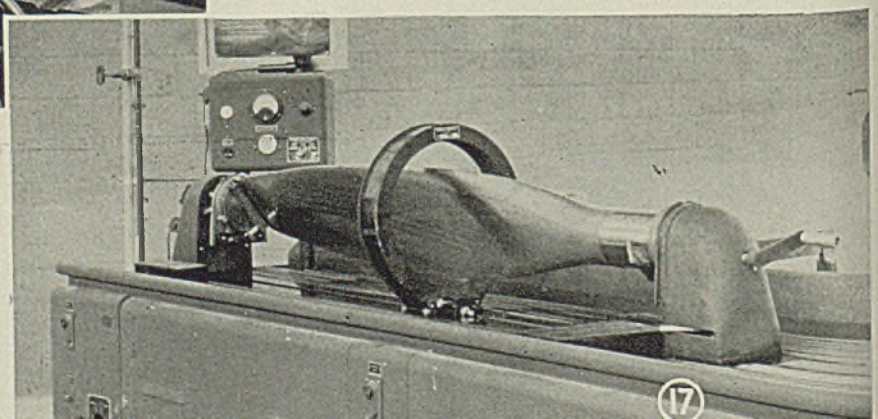
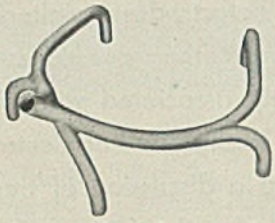


Fig. 16 — Special machine cuts threads in hub end of blade. Note shuttle carriage

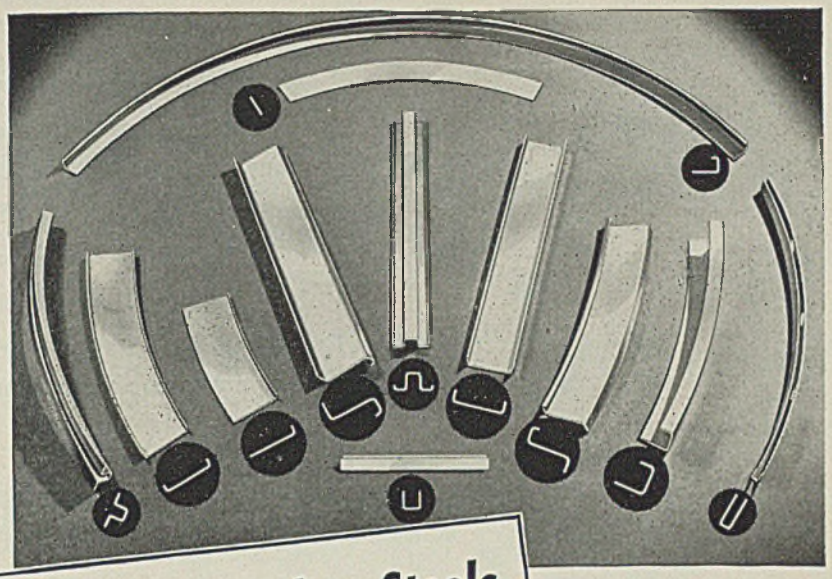
Fig. 17 — One of several Magnaflux inspections of blade during manufacturing



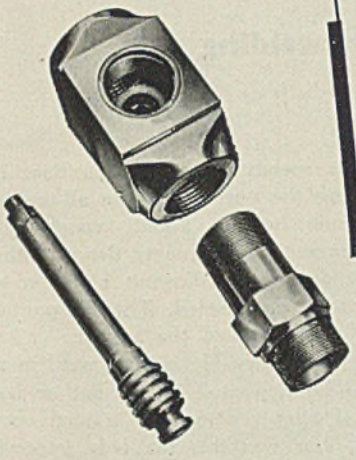
Intricate shapes *like these present fewer fabricating difficulties when Carpenter Stainless Strip is used. These aircraft moldings show some of the forming possibilities open to the designer who works with this versatile strip.*



About the toughest heat resistance job *a metal has to tackle is fighting the high temperatures and the corrosive action of aircraft exhaust gases. This exhaust collector ring made from Carpenter Stainless Strip, in the form of welded tubing, gives long trouble-free service on the job.*



How Carpenter Stainless Steels are Helping to SPEED OUTPUT —and lick tough design problems



It's no trick at all *to speed the production of smooth-working valve parts like these when you use Carpenter Free-Machining Stainless Steel. In service, this Carpenter Stainless eliminates trouble from galling and seizing of valve parts.*

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Carpenter STAINLESS STEELS

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

By HAROLD LAWRENCE
Metallurgist and Welding Engineer

WHY have more electrodes been available for direct current than for alternating-current welding? What advances have been made recently in developing new electrodes for alternating-current welding? These and many other questions are here answered by an authority closely associated with electrode manufacture. He also presents a background of electrode development over the years, including a discussion of trends in electrode development and outlook for the future.

NEW ELECTRODES

. . . . expand uses of alternating-current arc welding

PRODUCTION for war has stimulated the welding industry as much if not more than any other fabricating group. For this war is truly a war of machines, all of which employ welding and thus requiring skilled welders in their manufacture. Welding skill is not necessarily a simple one to acquire, notwithstanding the almost unbelievable progress made in apprentice training programs designed to turn out the men so desperately needed to weld ordnance *materiel*.

Arc welding demands deposition of high quality weld metal that meets rigid Army, Navy and Air Force specifications. The neophyte welders are expected to do such work under welding conditions that are not always ideal, for the layer-outs and the fitup crews in many instances have had little more experience than the welders themselves.

These considerations alone would be enough to give the nod to alternating-current welding, for green men and variable fitups are a poor combination for direct-current welding. The presence of magnetic blow in direct-current welding is the primary headache. Magnetic blow in certain types of weldments reaches gale-like intensities that are difficult to appreciate without first hand experience with this phenomenon. And poor fitup serves to aggravate an already bad condition. But the use of alternating-current welding is like pouring oil on the raging sea, for magnetic blow subsides, allowing the welder to devote his full attention to the placing of his weld metal.

Alternating-current welding was tried during World War I. It was not very successful at that time. The process was all right, but it was obviously ahead of its time. The main drawback was the lack of electrodes designed for application by alternating-current.

Arc welding did not really start to progress until the 1930's. Then the introduction of coated electrodes with outstanding properties and the cost reductions brought about by an intelligent conversion to welded designs caused an amazing growth of the industry.

Newly invented electrode coatings permitted weld deposits that were perfect under X-ray examination. Absolutely clean welds could be made in the flat position of course. Gas-free welds were possible in the vertical position. And none of these characteristics were lost in overhead welding where the laws of gravity were seemingly defied.

In the early 30's it was realized that the coated electrode ought to allow greater speeds in the flat position. Increasing the current on the all-position electrode brought about considerable spatter and a low quality deposit. Some other means for allowing high current densities was needed. The flat-position "hot" rod supplied the answer.

Now unbelievably smooth weld metal could be deposited in the flat or horizontal fillet positions by trained operators. Nor was this the only improvement noted. X-ray cleanliness was maintained with, if anything, a greater consistency while physical properties were better than those obtained with the all-position electrode.

While these two electrode types formed the background of metallic arc welding activities, it was recognized that a "cold" electrode with not quite so outstanding deposits was desired for general purpose work. The weld metal need not be entirely gas-free and the ductilities need not be the very best obtainable. By the mid-30's all three types were available for use. The trend to welded construction gathered momentum. Competition became increasingly keen. The need for cutting costs was imperative.

The all-position electrode did its best work in diameters of 1/8, 5/32 and 3/16-inch. When the diameters became larger than these, the quality of the deposit suffered somewhat, although it was still quite good and much better than bare or washed-wire deposits. Nor were the larger diameters suited to vertical and overhead welding. So this type in diameters greater than 3/16-inch never became exceedingly popular. As long as the "hot" rods were

(*Please turn to Page* 124)

TABLE I — The All-Position Electrode for Direct-Current Welding

	As welded	Stress Relieved
Yield strength, psi	52,000-56,000	47,000-51,000
Tensile str'gth, psi	62,000-66,000	60,000-64,000
Elongation, % in 2"	22-28	27-32

Notes:
—AWS-ASTM A233-42T Classification No. E6010.
—Following diameters recommended for vertical and overhead welding: 5/32, 1/8, 5/32, 3/16-inch.
—Following diameters recommended for flat and horizontal welding: 3/32, 1/8, 5/32, 3/16, 5/32, 1/4, 5/16-inch.
—Recommended current: Direct only.
—Recommended polarity: Reverse only, electrode positive.
—General: Produces deposits that will meet requirements for X-ray soundness. Fillet welds have flat contour. Digging arc with comparatively deep penetration. Range of correct amperages is relatively narrow. Produces considerable spatter when used at high current values.

ABSENTEEISM?

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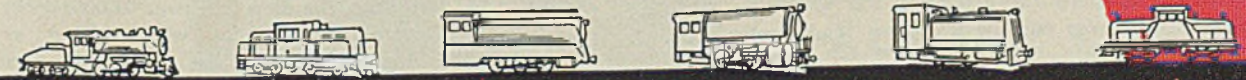

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Electrodeposition of . . . .

Silver ON Magnesium

After cathodic cleaning, silver can be plated on magnesium satisfactorily provided proper anodic treatment is given the surfaces. This preplating is key to plating magnesium with a nobler metal. Although the thin silver deposit is porous, its decorative value is high

By FRANCIS J. BOWEN
And
L. I. GILBERTSON
State College of Washington
Pullman, Wash.

ELECTRODEPOSITION of the nobler metals on active metals such as aluminum and magnesium from aqueous electrolytes presents a number of difficulties. A cleaned magnesium surface reacts very readily with water, displacing hydrogen. Silver is displaced by magnesium from neutral and acid solutions. These considerations impose certain restrictions upon the electrodeposition of silver upon magnesium in that an alkaline plating bath must be used. However, with a plating bath of a pH above 10.6, a film of magnesium hydroxide forms on the magnesium, preventing the adherence of the silver plate.

Our problem was to find a surface pretreatment that would provide an adherent basis for plating from an alkaline bath. In the past, many methods have devised by which magnesium can be coated with such compounds as the oxide, chromate, dichromate, fluoride, or selenide. The methods involve either simple immersion or electrolysis. None of these methods has proved satisfactory yet for the plating of silver on magnesium.

The cyanide-carbonate silver plating bath commonly used for silver plating is not suited to the electrodeposition of silver on magnesium. The deposits are loose and the basis metal becomes badly pitted during plating. Elimination of the carbonate from this bath tends to reduce the pitting and to partially eliminate the reaction of the electrolyte with the cathode but does not produce satisfactory silver deposits.

Magnesium Hot Rolled

The magnesium metal used in this research was produced by electrothermic reduction, distilled, extruded and hot rolled. Cathodes measuring 2.5 x 4 x 0.5 centimeter were plated in glass cells containing 200 mil-liters of electrolyte. Anodes were 999+ fine silver.

During the course of this work it was observed that rough cathodes pitted more readily than smooth cathodes; hence the magnesium was polished to a bright finish before treatment and plating. For polishing we used successively finer emery paper, finishing on a cloth-covered wheel with six-hour treatment with alumina and liquid soap.

Degreasing: Vapor degreasing methods proved unsatisfactory, resulting in non-adherent silver plate. Satisfactory cleaning was accomplished by the action of alkaline baths that were employed later in the preplating cycle.

Preparation of the Metal Surface: The following procedure is satisfactory for preparing the magnesium surface for silver plating.

Cathodic cleaning in a bath of the following composition:

Sodium carbonate	7.5 oz./gal.
Trisodium phosphate	14.7 oz./gal.
Sodium hydroxide	3.7 oz./gal.
Ammonium lauryl sulfate	0.2 to 1.0 oz./gal.

This cleaning operation is carried out for 1 to 2 minutes at a current density of 216 amperes per square foot at a temperature of 60 to 90 degrees Cent.

Cold water rinse.

Anodic treatment in a bath of the following composition: Trisodium phosphate (12 hydrate) 33.4 oz/gal. This anodic treatment is carried out at 60 to 80 degrees Cent. using a current density of 275 to 375 amperes per square foot for 3 to 6 minutes. A gray film is formed on the surface of the magnesium which is adherent, smooth and stable.

Cold water rinse.

Copper strike in a bath of following composition:

Copper cyanide	0.67 oz./gal.
Potassium cyanide	13.3 oz./gal.

This strike is at 270 amp./sq. ft. current density, for 1 to 30 seconds depending on the condition of the metal surface or until the magnesium is covered with copper. The temperature is 20 to 25 degrees Cent.

Cold water rinse.

Plating in a bath of the following composition:

Silver cyanide	1.1 oz./gal.
Potassium cyanide	1.5 oz./gal.
Boric acid	1.3 to 4 oz./gal.

The anode-to-cathode area ratio was 1:6 because larger anode areas shortened the life of the bath and produced discolored plate. The current density was 1.8 to 4.3 amp./sq. ft. and the temperature was 20 to 25 degrees Cent.

Silver in Film Form

The silver electrodeposited on magnesium by this treatment was in the form of white, smooth, hard, adherent silver films. Plates which were allowed to lie exposed to the air in the laboratory for several months remained adherent and appeared the same as when plated, except for a normal amount of tarnishing. These films were found to be porous and were not, therefore, suitable for protection of the magnesium surface.

Discussion: The problem of plating an active metal such as magnesium is largely one of preplating treatment. In this research, the fluoride treatment described by W. S. Loose, Trans. Electrochem. Soc. Preprint 81:6 (1941) was tried but it was not possible to secure desirable silver plates following our preplating operations. This appeared to be due to an action taking place between the fluoride deposited on the magnesium and the electrolyte.

Although heavy silver plate (1.6 millimeter and thicker) was quite readily removed from the magnesium after plating, the films (not over 0.00001-inch) were very adherent when plated as described. It may be possible by first plating more heavily with copper, then buffing and plating with silver, to produce less porous silver deposits. However, this appeared to involve so much additional treatment as to make it unworthy of further consideration.

From a paper presented before the eighty-third general meeting of the Electrochemical Society, Pittsburgh, April 7-10, 1943.

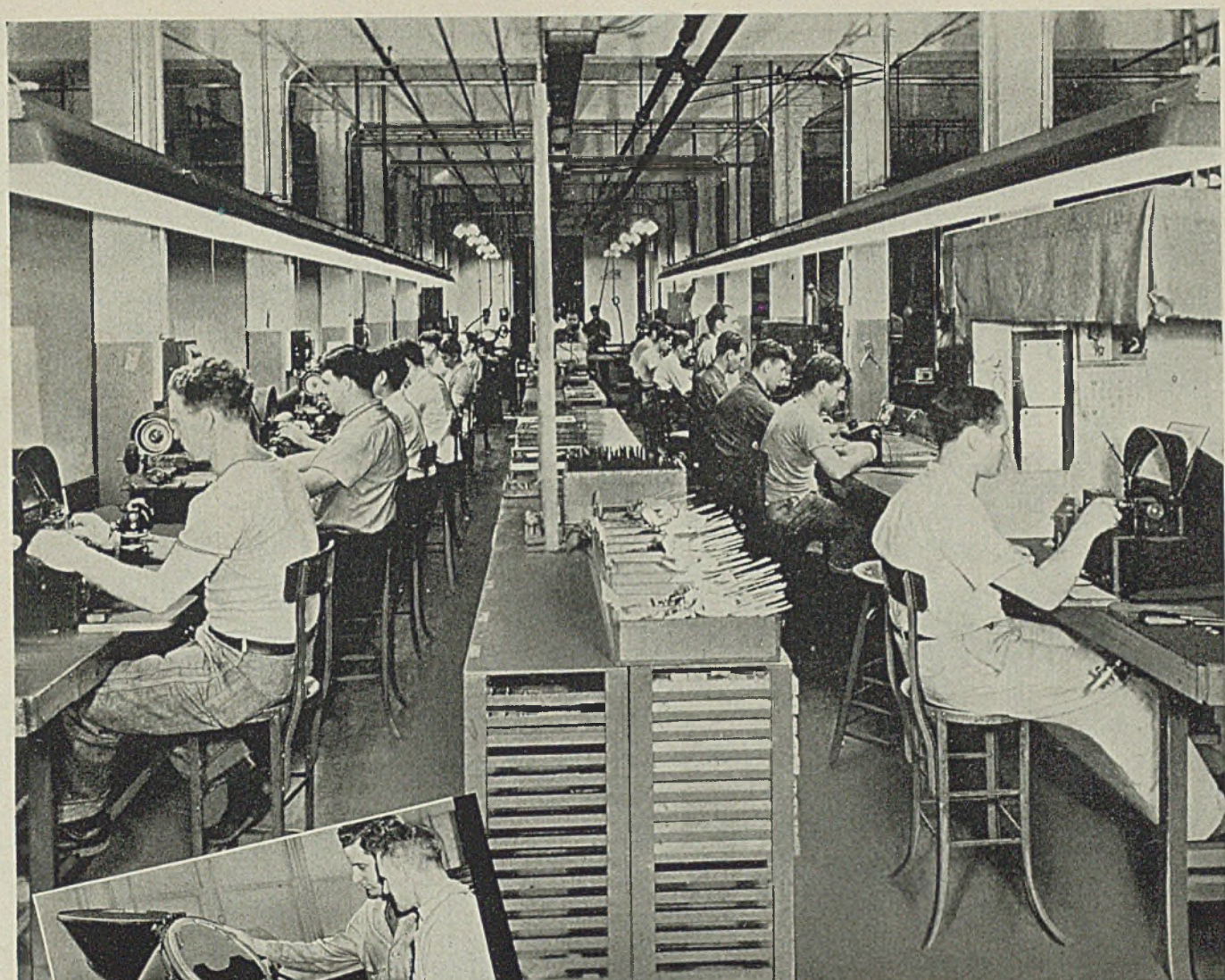
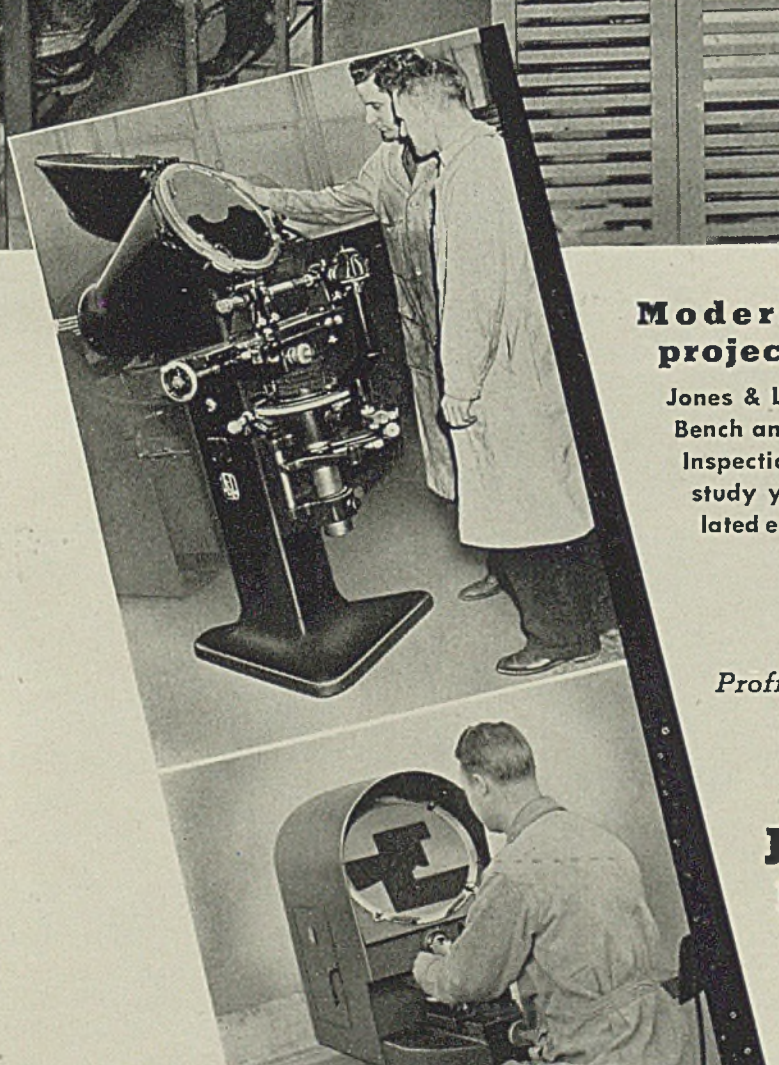


Photo Courtesy The Eastern Machine Screw Corp.



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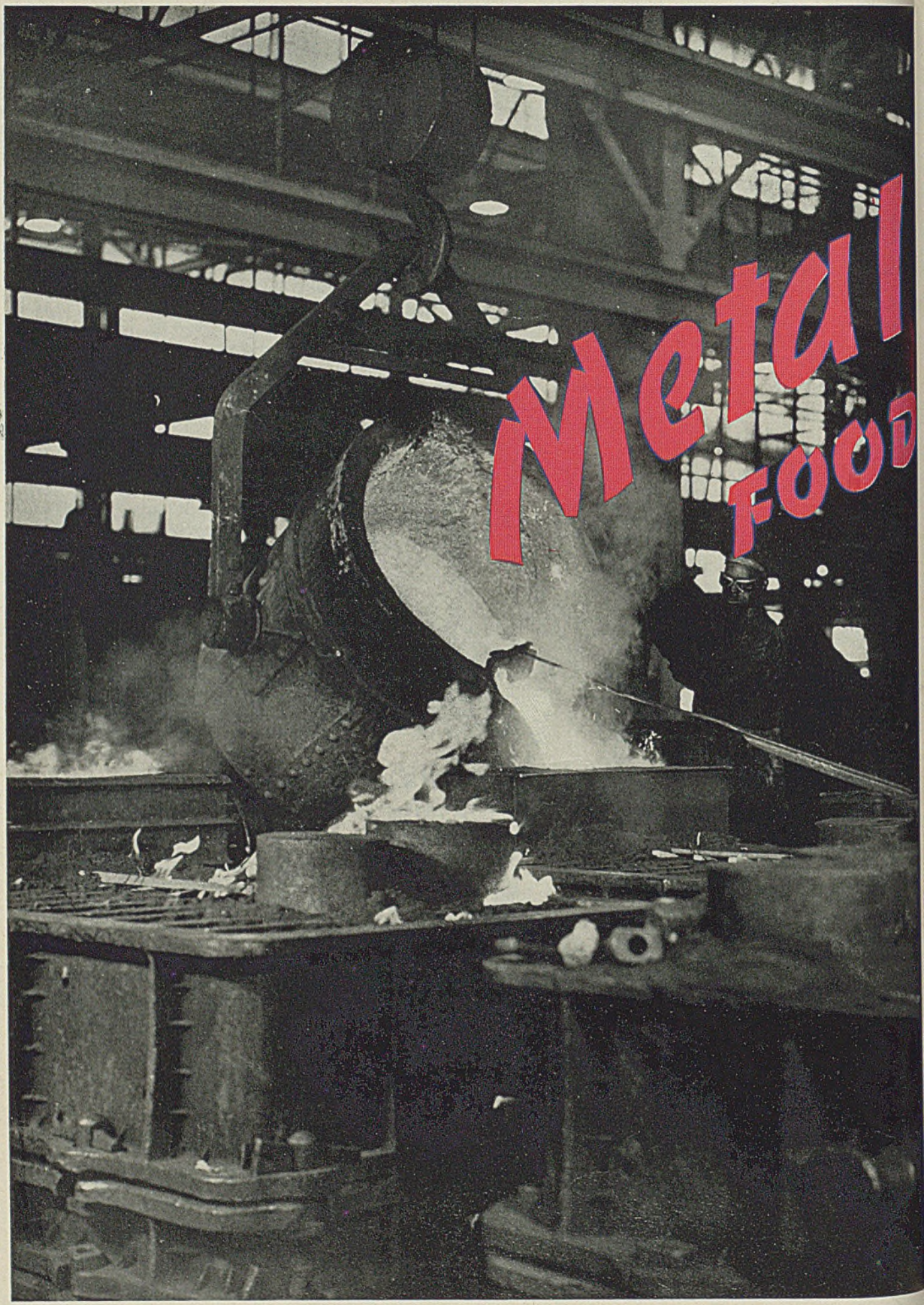
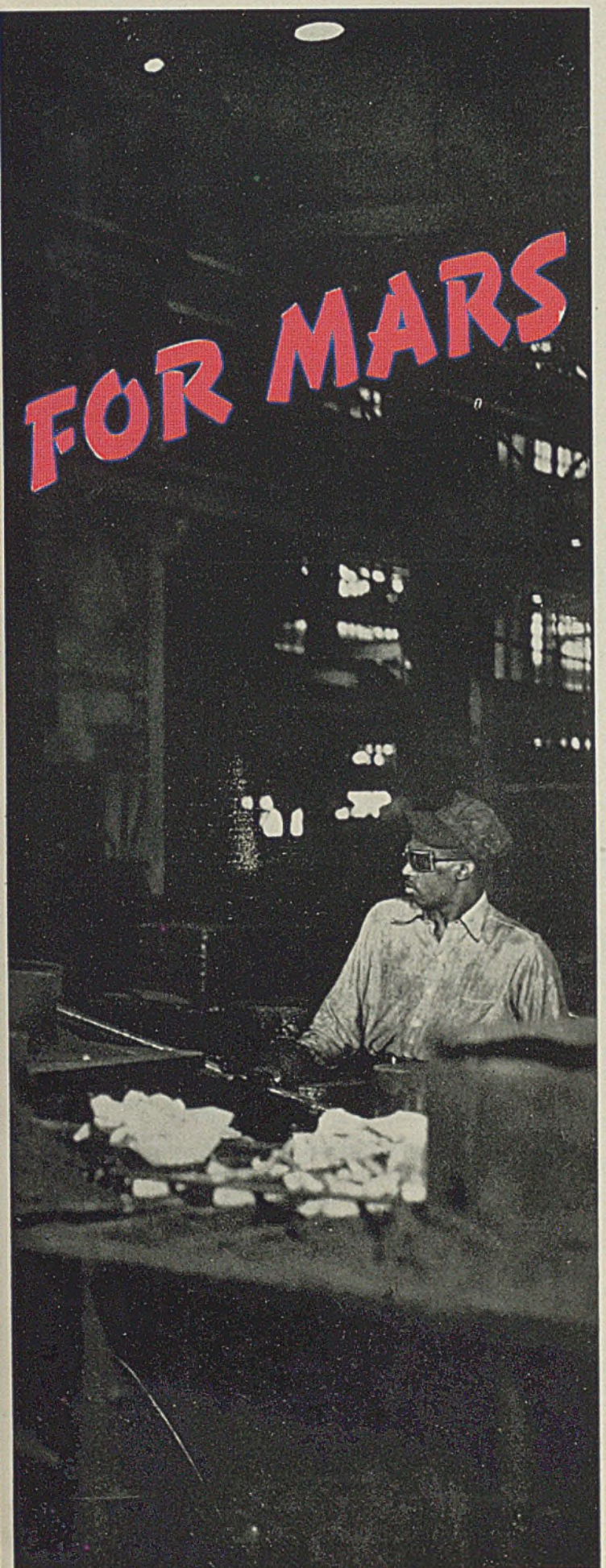

Metal
FOOD



Many tons of alloy-contained metal finds it way into machine tool castings

MAN has known and used metals for eight or ten thousand years. During that time tribes, nations, and whole empires have raised themselves to power on the strength of the metals they possessed, and conversely, whole civilizations have been pulled down into the dust because new metals and alloys were pitted against them.

The pyramid-building Egyptians, with their copper weapons, were felled by the bronze swords of the Hyksos warriors from Asia. In turn, bronze-weaponed armies met defeat when they encountered the long iron swords and steel-tipped spears of the Hittite hordes from northern Asia Minor.

At times varying qualities of the same metal have decided an issue. There were the Kelts who invaded Italy in about 200 B. C. bearing 4-foot swords of soft iron. They were met by Romans equipped with 2-foot swords forged from tough Toledo steel. Records show that a Keltic warrior would strike one blow and then stop to straighten the blade with his foot so that he might strike again. The Kelts never reached Rome because too few survived to strike a second blow.

As the primitive weapons of those early times compare with our present day war equipment, so do their few known metals and alloys seem puny beside the 71 metals and thousands of alloys in the service of modern armies. But although the picture is now much more complex, the central theme is still the same: a warring nation is only as strong as its supply of metals.

Some years ago our government indicated seven deficiencies in the diet of our war machine. These were termed the "Strategic Metals"—metals vital to our armed forces but which in the main came from overseas. It was apparent that by cutting our supply lines an enemy could deal damaging blows to our war machine without sending a soldier to our shores.

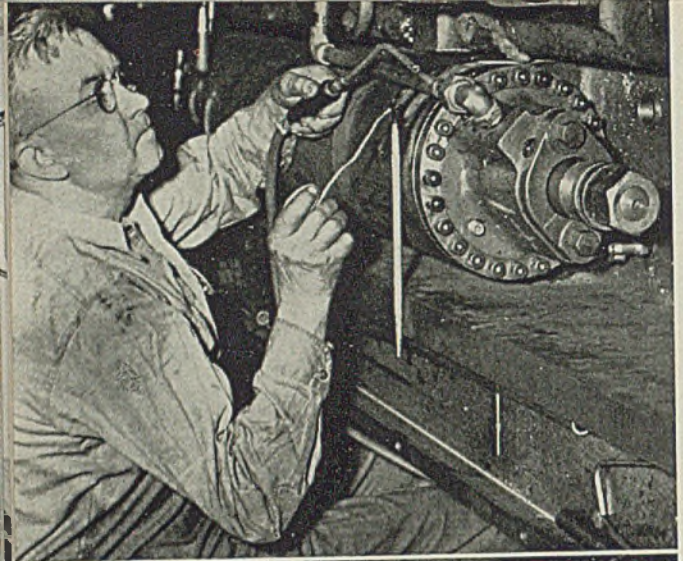
That is just what our enemies have done in most instances. Of our seven strategic metals, only one—nickel—can come to us over prewar supply lines. The others—antimony, chromium, manganese, mercury, tin, and tungsten—must be found in new places or substituted for. In the meantime, we must remember the plight of the Kelts with their inferior metals and resolve to treat our existing supplies of metals as though they were gold itself.

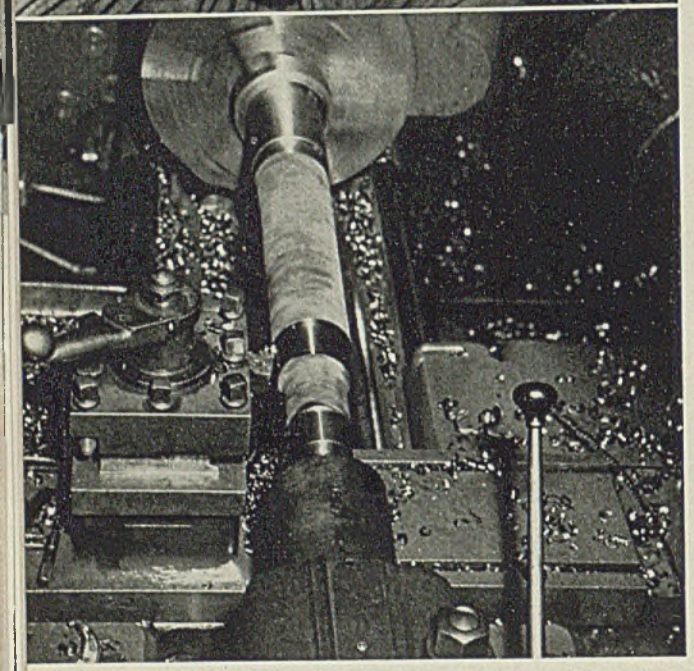
Antimony: In peacetime we use almost half the world's output of antimony. Now we need much more of this alloying metal, because it has the unique property of hardening lead.

For years no other sources could compete with the rich Chinese antimony mines. When the Japs ran wild, Bolivia and Mexico began sending us large amounts. Several deposits have been discovered in Idaho, and may provide us with plenty of the metal if secured in time.

Chromium: Chromium has many important uses, from the bright trim on household equipment to its use in stainless steel and high-grade steels used in tools and dies. Smaller amounts, in conjunction with nickel, make tough steels for hard-working shafts, spindles, and gears.

From *The Milling Review*, Cincinnati Milling Machine Co., Cincinnati.





Upper view, left—Tin in form of solder is being applied to a pipe joint in the bed of a hydro-tel

Lower view—Strategic metals teamed together. Cutting tool is tungsten-carbide, the milling machine spindle forging being turned is a high-grade chrome-nickel steel alloy

Chrome-nickel steel also helps shells plough their way through heavy armor—and provides armor plate to resist such shells. The ability of chrome alloys to resist heat makes them valuable in the construction of heat-treating equipment.

Much of our chromium came from Rhodesia, South Africa—a long and difficult ocean haul in these times. Turkey and the Philippines were also important sources. Cuba alone remains accessible among our former sources, and her deposits are low grade.

Government expeditions are hard at work throughout the country, however. Thus far they have reported large deposits of low-grade ore in at least eight states.

Manganese: Manganese is A-1-A on the metallurgits's list, for he has not learned to make steel without it. Of the strategic metals, we use by far the most of manganese. About 14 pounds is needed for every ton of finished steel. Its presence clears steel of sulphur and other impurities, disperses air bubbles and blowholes, and increases tensile strength by making steel alloyed and less porous.

Our sources of manganese have been the African Gold Coast, Russia, Brazil, and the Philippines. All are difficult or impossible to reach; Russia needs her supplies as badly as we do. Brazil's supplies are potentially rich.

To counteract lost sources, American engineers have helped step up production in Brazil and also Cuba and Chile. Here at home the Bureau of Mines and the Geological Survey have found deposits in some ten states.

Mercury: Mercury is not such a weak spot as it was in 1917. Deposits of cinnabar, or mercury ore, are now being worked in Texas, Nevada, Oregon, and California. The latter state operates more than 50 mercury mines.

Mercury is vital in the manufacture of explosives, is essential to scientific and research instruments, drugs, disinfectants. Spain was once our chief source, but indications are that the pressure of necessity has pushed us well along the road of self-sufficiency.

Nickel: Despite the fact that only traces of nickel have been found in the United States, the men who run our war machine aren't much disturbed. Just north of Lake Huron in Canada, in a 600 mile square strip of land, lies 90 per cent of the world's known supply of nickel. The headache comes from the greatly increased demand. Our war machine thus far has swallowed up supplies faster than mine production can replace them.

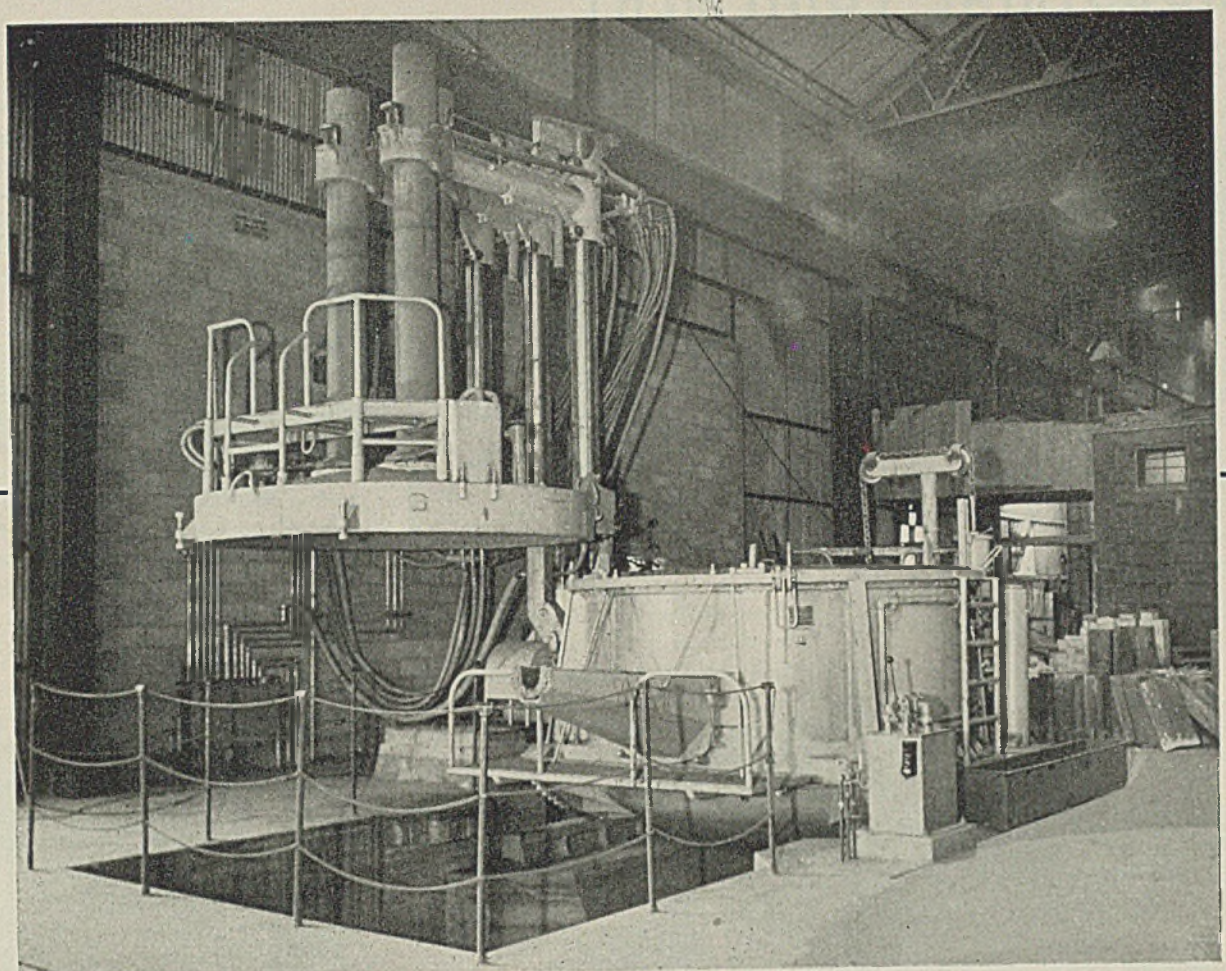
Tin: Tin has been in the employ of Mars for centuries. Bronze weapons were doing the war god's bidding 2000 or 3000 years before Caesar invaded England to get from the Cornish mines the tin his legions had to have to be victorious. Strategic then, it is even more so now. Trucks, tanks, scout cars, planes, battleships—all demand tin for bearing alloys and bronze fittings. From 5 or 6 pounds for a jeep to 20 tons for a battleship our armed forces must have huge amounts of tin.

With nine-tenths of our supply cut off, our metallurgists are faced with a real test. A good start has been made by increasing efforts to salvage tin from plated metal. Another has been made in Texas, where the government is building a $3,500,000 smelter to refine Bolivian ore. Tinless bearings, solder made of silver instead of tin, cans coated with special lacquers instead of the familiar tin, are some of the experiments metallurgists are pushing with favorable results. The answer to our tin problem seems to be "Substitute."

Tungsten: Tungsten, number seven on our alphabetical list, is familiar as the filament in your electric light bulb, and also as the alloy in high-speed tool steels and sintered carbide tools which may bring the country's production speed up to a victory speed.

Practically all of our tungsten came from China before the war—a statement which would seem to sound our doom. But the picture is not entirely black. We have a stockpile of modest size; some comes from Mexico, Bolivia, and Argentina; and low-grade deposits in some western states are being worked with a little success.

Molybdenum brightens our tungsten situation, too. We have a large mountain of rich ore in Colorado, and metallurgists have succeeded in making high-speed tool steels with about 8 per cent of molybdenum and a small amount of tungsten, whereas with tungsten alone about 18 per cent was required. The big problem with molybdenum, however, is that of getting it mined and refined.



Roof raised and rotated ready for charging.

step UP production
step down costs

THIS top charge type 10 ton Lectromelt furnace is speeding production of alloy steels through its simplicity of design which permits faster charging and greater capacity. Users of top charge Lectromelts are reporting increased tonnage per man hour, lower power consumption and savings in electrodes and refractories. They are built in standard sizes from 100 tons down to 250 pounds capacity.

PITTSBURGH LECTROMELT FURNACE CORPORATION
PITTSBURGH . . . PENNSYLVANIA

MOORE RAPID *Lectromelt* FURNACES

Rivet Bucker

Aero Tool Co., Burbank, Calif., is offering a new bench model automatic rivet bucker that enables one girl to both buck and rivet in one operation. It uses a standard rivet set that is synchronized with an air cushioned bucker.

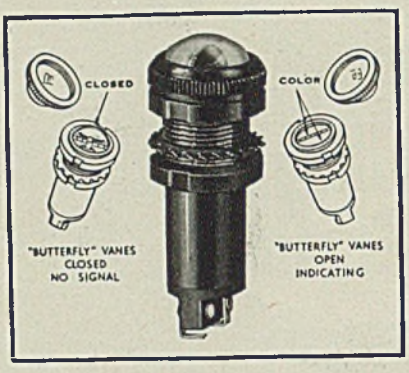
The bucker, the company reports, is always perfectly aligned with the rivet set and eliminates the inaccuracies and labor required with manual control. A treadle control frees both hands of the operator thereby increasing speed or production.

When the rivet set contacts the rivet, the bucking bar is always against the shank. No predetermined setting is required, even with varying lengths of rivets, it is said. The bucker features a 15-inch throat, but other sizes are available. All parts other than the yoke are interchangeable with a portable model recently announced.

Signal Indicator

Littelfuse Inc., 4757 Ravenswood avenue, Chicago, announces a new No. 1534 Signalette signal indicator that works in daylight, under "black light" and no light for use in aircraft. It operates by fluorescence under "black light" from the usual sources within aircraft. A radium-active fluorescent paint used on the indicator shows signals in total darkness. The unit is said to do away with the blur occasioned by transmitted light, as from lamps in present use.

Indication is free from glare in daylight as well as night-time use and does not dim out in sunlight—instead it gets stronger. Another improvement is the unit's nonshatterable protection. It carries a transparent plastic cap which withstands severe tests of shock or explosion; and permits free penetration by ultra-violet rays.



Body of the indicator houses a solenoid, the armature of which is connected with the "butterfly" indication vanes by a simple lever hookup. The fluorescent "butterfly" opens instantly to show signals, reflecting the proper indicating light. "Butterflies" are furnished in red, amber and green. When not indicating the Signalette is black.

Women's Gloves

Edmont Mfg. Co., 506 Orange street, Coshocton, O., announces a new glove for women workers which offers complete hand protection again solvents, acids, chemicals, caustics and other corrosive materials. They are reported to be reinforced with a fabric lining which makes them virtually snagproof and tear resistant.

Dust Masks and Caps

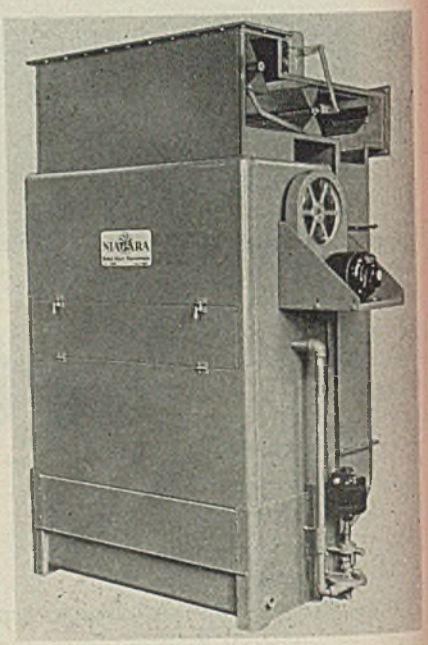
Aldine Paper Co., 373 Fourth avenue, New York, is offering new Aldex dust masks and caps for use by employes as protection against dust and moving machinery. Wearers of the mask breathe freely and may converse without removing masks, it is said. The caps may be used by both male and female workers to protect the hair and head from dust-laden air, moving machinery or both.

Both masks and caps are made of a vegetable fiber paper product which can be stitched, washed and ironed like fabric. Tiny pores permit free and unhampered air passage, yet dust particles of ordinary size will not penetrate.

Temperature Control

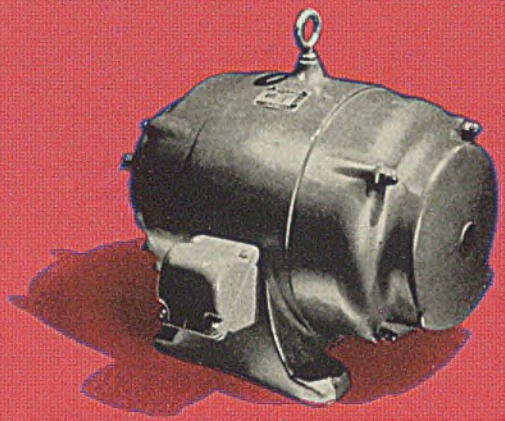
Niagara Blower Co., 6 East Forty-fifth street, New York, is offering a new method of automatic temperature control for its Aero heat exchanger used for cooling industrial liquids. The method is based on controlling amount of outside air passed through the evaporative cooling chamber rather than altering the flow of liquid being cooled.

Accuracy, it is said, is improved, with the cooling effect directly proportioned to load changes. Water savings are increased and when the heat exchanger is used to cool oils or compounds, there is no settling of solids, restricted flow or clogging of tubes to interrupt operations.



The apparatus comprises a recirculating air duct to which outside air is admitted by dampers controlled by a thermostat in the liquid line where it is always in contact with the full flow of the liquid being cooled. Only minimum amount of outside air is admitted, keeping spray water temperature above freezing. With this control, the heat exchanger can be used to cool water, oils, solutions, compounds, coolants, chemicals and process materials in such varied fields as heat treat quenching.

(*Please turn to Page* 118)

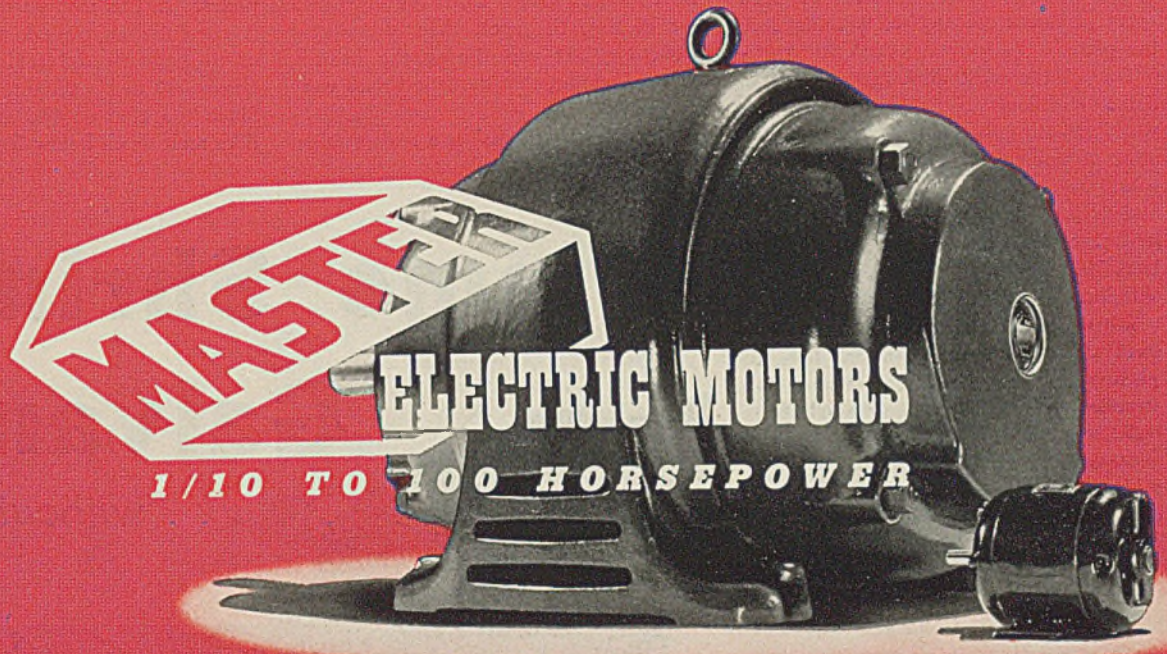


EXTRA PROTECTION OUTSIDE

The cast iron frame and end shields are so constructed that the internal working parts of the motor are fully protected from falling dirt or dripping liquids.

EXTRA PROTECTION INSIDE

Windings are protected from unusual moisture or dirt conditions by special "baked in" insulation treatment which greatly increases the life of the motor.



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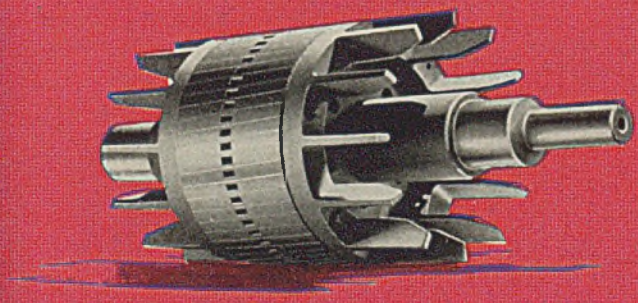
THE MASTER ELECTRIC COMPANY • DAYTON, OHIO

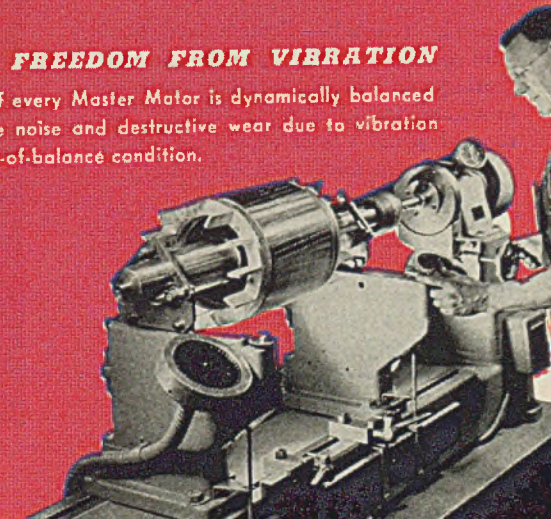


EXTRA RUGGED CONSTRUCTION

Unusually heavy alloy steel shafts and oversize bearings add greatly to the durability of Master Motors. In Squirrel Cage motors the rotor windings are cast integral with the rotor laminations.

EXTRA FREEDOM FROM VIBRATION

The rotor of every Master Motor is dynamically balanced to eliminate noise and destructive wear due to vibration from an out-of-balance condition.



Flame Shrinking Galvanized

. . without generating

IN SHIPBUILDING work and much other construction involving the fabricating of plates, the process known as flame shrinking is of importance for it makes it possible to eliminate the buckling which often results from welding operations.

Such flame shrinking is accomplished by heating the plates in a sequence of closely spaced spots, as is shown in Fig. 2 at the left. A brief explanation of the shrinking action would show that it resulted from the upsetting action when a spot is heated. As the metal in this spot expands, the cold metal around it restricts its movement radially so the metal must expand in a direction perpendicular to the surface of the plate, resulting in an "upsetting" action. When the heat is removed, the metal begins to shrink in all directions, thus producing tension in a radial direction from the center of the spot. A series of such spots produces the desired shrinkage in the plate.

One of the most difficult problems in flame shrinking is encountered when working with galvanized plates—the creation of zinc fumes, causing "fume" sickness. Since much plate for shipbuilding and other construction work is galvanized, zinc fumes have been a serious drawback to effective utilization of flame shrinking. At the same time, speedy construction of lightweight galvanized steel ships demands extending the application of flame shrinking. In ship construction, flame shrinking of shell plate, bulkheads, floors and deck plates is often necessary to eliminate buckling or bulging incidental to arc welding. The process is particularly useful where such plates are ½-inch or less in thickness.

The employment of the oxyacetylene flame for spot heating, followed either by all-water or mixed compressed-air-and-water quenching, is common practice. However, on shrinking galvanized plates, the zinc protective coating was not only burned but severity of the flame action roughened the coating to such a degree that sanding was necessary to restore the surface for painting.

With the conventional methods, burning of the galvanized plates was severe and frequently the plates were so weakened that they had to be replaced because of the irreparable damage done to the zinc protective coating.

Under the conventional methods the force of the flames usually caused the molten zinc of the galvanized coating to flow outward, thus enlarging the apparent circumference of the spot as shown in the righthand group of spots in Fig. 2. The dark outer ring of these spots actually represents a crust of burned zinc from the galvanized coating. The center of the spot thus was thinned and weakened.

Such heating operations were also accomplished by generation of large amounts of zinc fumes. In fact, in confined spaces or compartments it was necessary to employ crews large enough so the men could take turns relieving each other. This difficulty occurred because conventional flame shrinking involved first heating the spot, then subsequent quenching. It was during the heating cycle, of course, that the zinc fumes were produced.

That "fume sickness" is a real problem is evident from the fact that in some war industries it takes a toll of 40 per cent of the man-hours of those shrinking galvanized metal. While it has been estimated that the claims of fume sickness by workmen have been about 25 per cent malingering, workers claiming the mildest form of fume sickness—severe headaches, the fact remains that the turnover of men in shrinking crews was terrific. Few men like this type of work. In addition production was cut, for it was necessary to use two men who took turns at the torch, each man working 15 minutes and then changing off. Despite this, each shrinker lost an average of 6 days a month from fume sickness.

To eliminate these difficulties Bill Moore, Fig. 2, with Shrinker Stanley Goska perfected the Albina Engine & Machine Works' & Shipyards' fumeless method of shrinking galvanized metal plates. In this method the heating cycle is carefully controlled, the temperature of the spot heated seldom rising much above 600 degrees Fahr., it is estimated. Since the zinc on the galvanized plates does melt much below 750 degrees Fahr.,

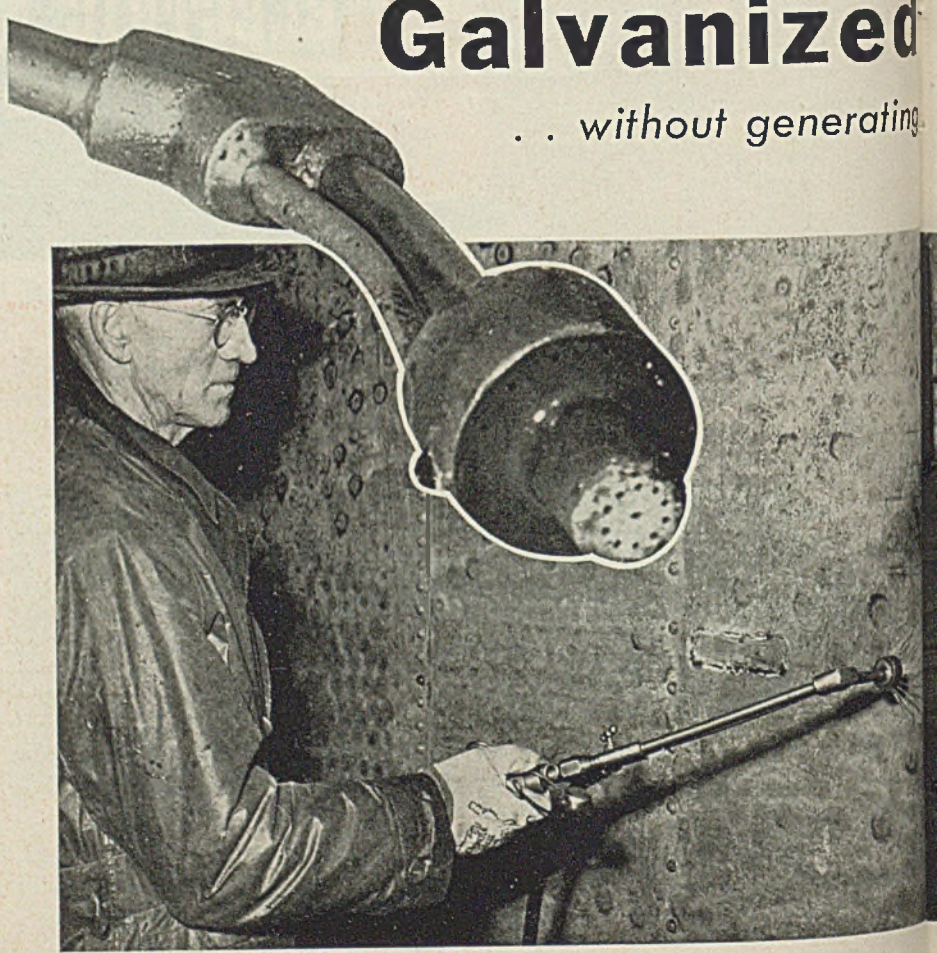


Fig. 1. (Right) — Combination torch with quenching ring affords controlled heating and quenching cycle employed in a new method of flame shrinking galvanized plates. Inset shows closeup of torch tip with quenching ring

Fig. 2. (Opposite page)—Result of conventional method of flame shrinking galvanized plate is to produce spots like those shown at the right. Black areas are crusts of "burned" zinc. New improved method of flame shrinking eliminates this effect as shown by group of spots at left

Plates

obnoxious fumes

By AL LAKE
Albine Engine & Machine Works Inc.
Portland, Ore.

very little of the zinc is melted and none of it is vaporized to produce fumes.

The significance of the improved flame-shringing method developed at Albina shipyards is that it entirely eliminates the generation of fumes. It has entirely done away with the need for the wearing of respirators by the workmen and it has enabled the cost of the ventilating systems needed to carry off the gases when working inside of tanks and close quarters to be reduced 50 per cent.

No new equipment except the combination heating and quenching torch are required.

Most important, it now enables the shrinkers to put in a full 8-hour shift without taking time off to recover from the zinc fumes formerly encountered. This means that fully 50 per cent of the workers now are released for other work in cases where two-man teams were formerly employed.

Also significant is the fact that the plates retain their smooth surface, thus eliminating the need for sanding, for the galvanized surface is not injured and the painting may proceed at once after the shrinking operation.

It also has the great advantage that other craftsmen, such as electricians, pipe fitters, ship fitters, welders, etc., can now work in the same compartment where the flame shrinking is being done, thus greatly speeding up production operations which no longer need be held up waiting for the flame shrinkers to complete their work. The production increases that result are important.

The method employs a combination flame and water quench, obtained with the device shown in Fig. 1. The torch tip is a standard Airco style No. 9803 torch with an 11-hole tip. The holes are made with a size No. 60 drill, ten of the holes being made on a ⅜-inch diameter with the eleventh hole in the center as shown in the insert in Fig.1. A water quenching ring with numerous small holes fits around the head of the tip, a valve shutoff being supplied in the torch handle.

The flame used is a high oxidized one. It has been found that a *slightly* oxidized flame is of greater heat intensity than a neutral flame. But a *highly* oxidized is actually a "cooler" flame. About 15 pounds oxygen to 10 pounds acetylene pressure is employed at the start. The torch is lighted with a neutral flame, that is to say, oxygen 1.05 to acetylene 1.00 and the flame then "starved" at the torch by turning down the acetylene valve. Original pressure is maintained in the hose. "Starving" the flame of acetylene "cools" it. When the inner flame cones become an intense blue, about 5/32-inch long, the correct flame adjustment has been achieved. The quenching water spray is then turned on and the heating commenced.

The torch is positioned ¾ to 1 inch away from the galvanized surface and is held steadily in one spot until the metal is cherry-red in color and a barely perceptible "flowing" is noticed on the surface of the heated spot. At this instant the flame is withdrawn but the water is allowed to continue to play upon the plate for several more seconds. This "freezes" the galvanizing which had begun to flow.

The real secret of the success of this method is obtaining the correct flame by means of a proper gas combination and controlling the temperature of the plate by quenching through the continuous flow of water from the quenching ring and by removal of the flame at the proper moment. Withdrawal of the flame at the exact moment can be learned only through experience. However, practice under the eye of a man proficient in the method makes a learner become an expert within an hour or two.

Spots are made about 1 inch apart. See the spots in the lefthand group in Fig. 2. These were made by the improved flame-shrinking method described.

Experiments have shown that when the method is employed using a highly carbonized flame that not nearly as clean a job results although no fumes are generated or burning occurs. The highly oxidized flame adjustment described produces the most satisfactory all-around job, however.

The method has been tested on metal plates up to ½-inch in thickness. On thicker plates it is better to use torches on each side of the plate — the men working on opposite sides of the *same spot*.

Shrinking galvanized steel with this flame is done successfully anywhere that black steel would ordinarily be flame shrunk. At Albina shipyards this flame is used to supply heat for bending angle irons, iron pipe, in fact all structurals that may have a galvanized coating and that requires heating for fabricating.

No accurate test has been made of the flame's heat but it is estimated that the gas combination gives a work temperature of some 600 degrees. However, on a ½-inch plate the heat often runs higher yet no burning of the zinc coating appears to occur, indicating it is well below the vaporizing point of the zinc.

It has been found that men do not seem able to perfect their shrinking from verbal or written instructions. Therefore, a shrinking school has been established at the Albina shipyards where

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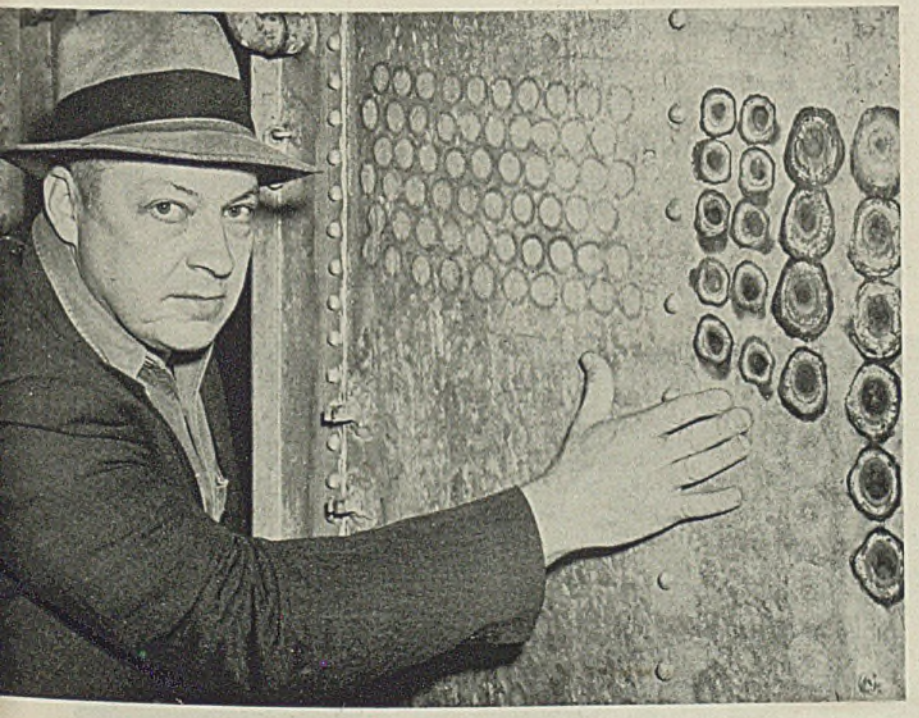
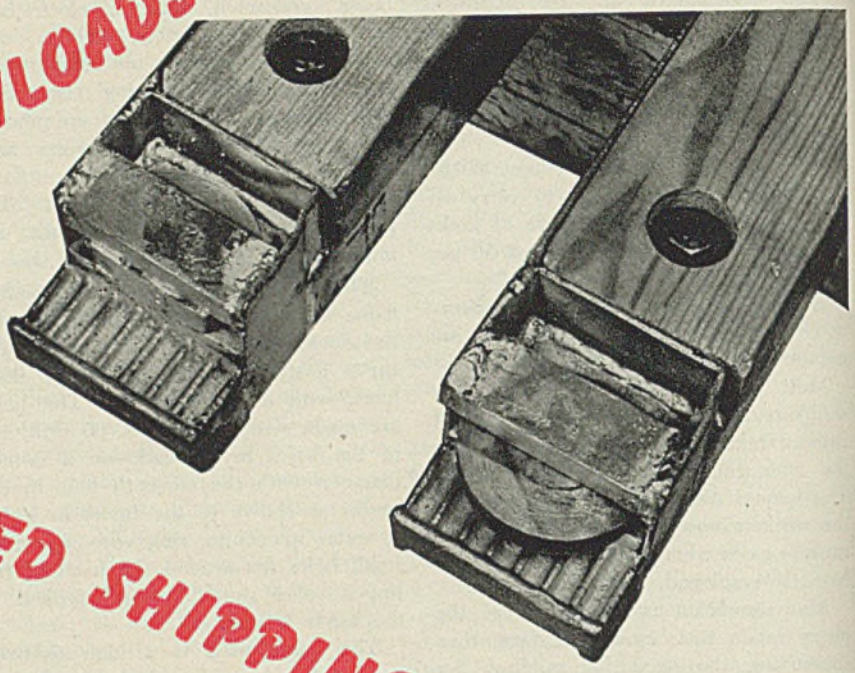


—INCREASED PAYLOADS —DECREASED SHIPPING DAMAGE



. . . . . result from use of loader-equipped freight cars

By E. S. EVANS
President
Evans Products Co.
Detroit

(Concluded from Last Week)

THE LOADER is composed of permanent vertical steel members secured at car posts on the inside walls of the car and detachable toothed longitudinal rails or "wall members," the width of one section only, which operate between the vertical members. These can be raised or lowered individually to any desired elevation from car floor to eaves at half-inch intervals. This half-inch close adjustment makes it possible to tighten in a box car almost any type load so that all slack can be removed.

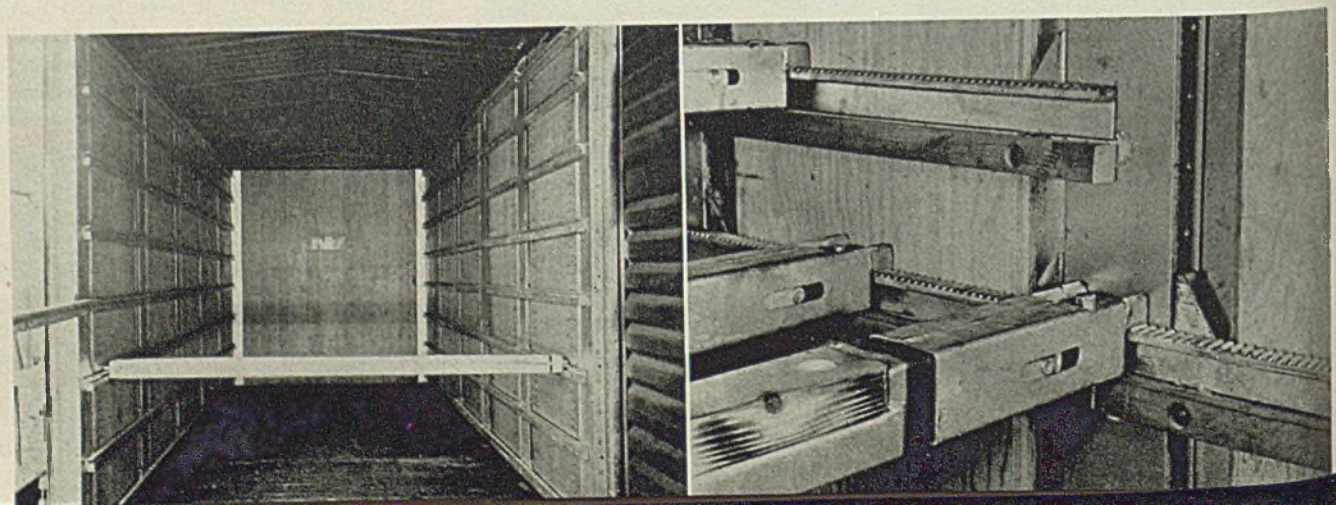
The wall members support sturdy cross members, one of which is shown in Fig. 9, which are used to brace and hold the load. The cross members can be adjusted to half-inch intervals horizontally on the wall members. This cross adjustment is of great value in forcing the cross members tightly against the load at any desired position throughout the entire length of the car, thus preventing shifting of the load and damage that results therefrom. The numerical markings on the side panels of the car, visible in other views (see STEEL April 5, 1942, p. 125, and April 12, p. 114) assure level placing of cross members.

The cross beams are made in two ways: One is a steel Z-bar reinforced with wood for added stiffness; the other is the same type of beam, eliminating the Z-bar and

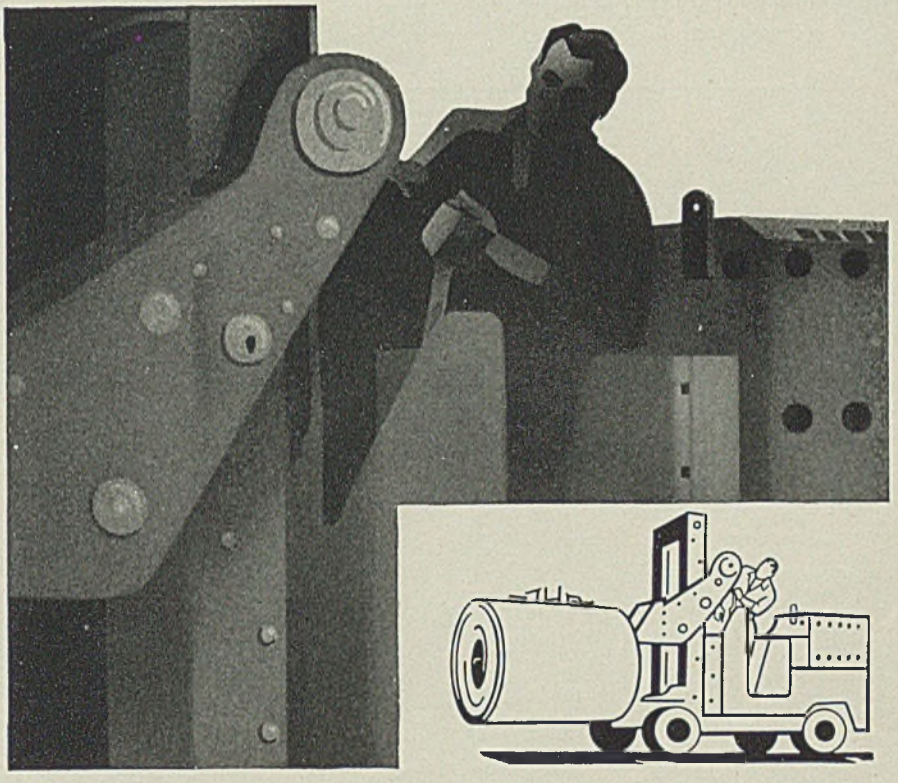
Fig. 8. (Above)—Here is shown cross beam locking device; open at left and closed at right. A socket wrench operates the lug from the opposite side of the cross beam

Fig. 9. (Left, below)—Utility loader system installed in freight car. Sectional wall members may be lowered or raised at half-inch intervals as desired. The sample cross beam shows quick easy method of holding the load in place

Fig. 10. (Right)—This closeup shows construction and location of cross beams and wall members. Note that cross beam can be placed anywhere along the wall member and even over a junction of two wall members



THIS POWER must not fail



Battery industrial trucks are literally the internal supply lines of our war industries. They keep materials on the move all the way from incoming to outgoing carriers. Their power-units are their strength . . . they must not fail.

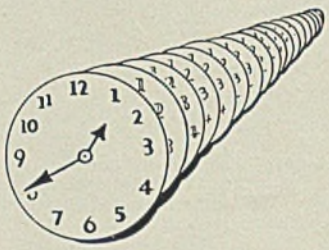
And that's the biggest single reason why over half the battery industrial trucks of America are powered by Edison Alkaline Batteries. They provide the most dependable battery power the world has ever known, an Edison invention. Dependability is the reason for their success in mines, on railroads, throughout industry and aboard ship. Electrically, chemically, structurally, they are made to order for today's stringent demands.

INDUSTRY NEEDS THE DEPENDABILITY OF

Edison Alkaline BATTERIES

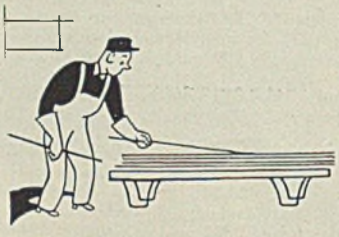
168 Hours per Week!

Modern industrial trucks are working 168 hours a week. This is necessary to keep war production lines adequately supplied with materials. Other trucks, not so modern and, up to this time, never even considered for such continuous service, can be batteried to give the same kind of service. Write our nearest office for suggestions.



Alibis are Seldom Alkaline.

For every production dip there must be a suitable explanation. Few material-handling delays have ever been attributed to failure of an alkaline battery. Its performance is predictable. It does not fall down on the job without warning. On such reliability are production records written.



Skid Racks. Many war plants are producing parts machined to close tolerances which require careful protection against damage in handling through the subsequent processes. By the use of skid racks they have not only avoided spoiled work but have also saved many handling motions. And, they have avoided time losses that could never be retrieved. When a plant is on a war schedule, there's no time left!

Edison Storage Battery Division
Thomas A. Edison, Inc.
WEST ORANGE, N. J.

using only wood except at the ends. All packages rest against wood surfaces.

Fig. 10 is a closeup showing the construction and setup of Z-bar cross beams. Note the expansion joint on each beam, allowing for variable car widths. As can be seen, the cross beam can be placed anywhere along a wall member, even over a junction of two bar members placed at the same height.

Locking the Load: For positive protection against movement of the load, each cross beam is held securely in place

(*Please turn to Page* 129)

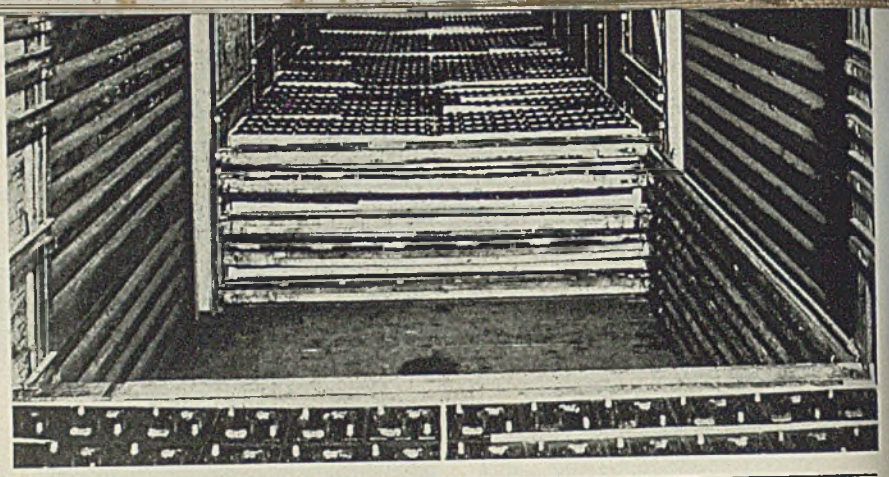


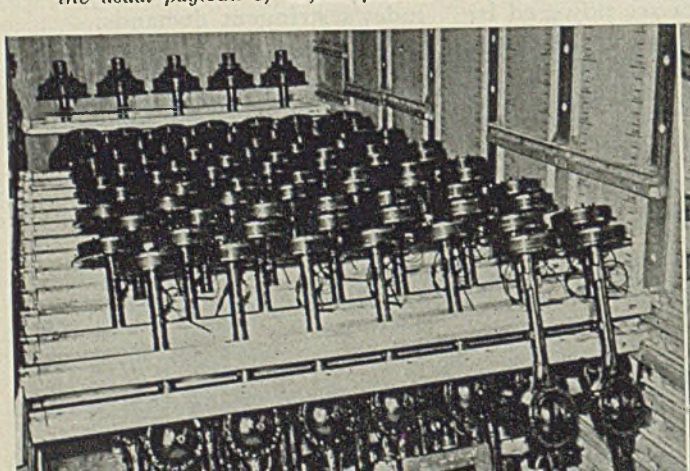
TABLE II—Advantages Achieved by Use of Utility Loader

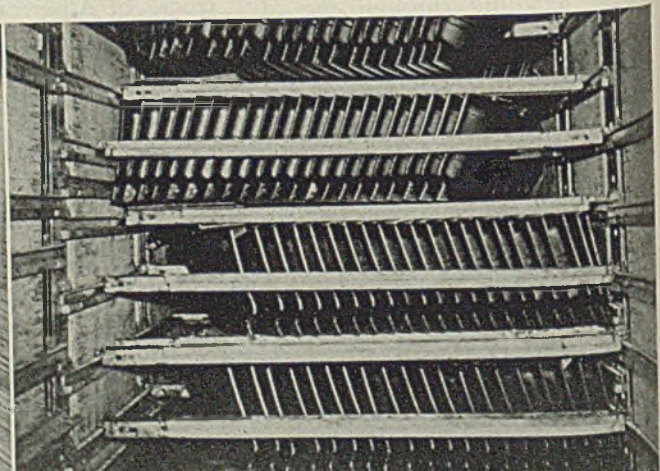
Stampings	No. of Loads	Savings: Loading Labor	Savings: Dunnage Plus Freight on Dunnage	Savings: Damage Claims Per Load	Savings: Estimated Total Per Load	Weight of Average Load, Tons	Increase Payload in Tons	Remarks
Auto sheet metal stampings	17	$20	$60	$31	$111	17	4	
Batteries—								
Delco	7	15	40	140	195	20	29	Normal damage is approx. $60 for each 1000 shipped. Based on 2400 batteries shipped (Utility loader) we have used $140 damage.
USL	1	10	35	60	105	20	20	
Electric Storage	3	8	85	60	153	20	20	
Willard	3	10	30	136	176	15	15	Normal damage is approx. $68 for each 600 shipped. Based on 1200 batteries shipped (Utility loader) we have used $136.
National	1	10	25	60	95	20	20	
Stoves (enamel)	14	5	20	51	76	20	4	Seventeen out of fifty-four stoves normally damaged in 40-foot cars. Shippers advise $5 damage per stove to be conservative. We used $3 per stove.
Coca-Cola kegs, bottles, etc.	12	5	15	20	40	16	3	Loads made to prevent present damages.
Auto service parts	8	7	20	10	37	20	None	
Consolidated freight	16	4	11	10	25	20	3	
Water softener in steel tanks and bags	1	20	40	50	110	20	5	
Transformers	3	35	25	20	80	17	None	Load can be increased 100 per cent, no extra decking cost.
Airplane parts	4	10	30	50	90	5	5	
Rice bags and packages	2	10	30	60	100	33	17	Result—four additional loads given.
Oil and grease	11	15	40	50	105	20	5	
Furniture	6	5	20	60	85	11	..	
School desks and chairs	5	5	10	See Remarks	15	15	10	American Association of Railroads reports $2,296,976 paid in claims in 1941.
Lamps	1	5	20	25	50	11	1	
Farm implements	7	25	50	See Remarks	75	30	5	AAR reports $93,754 paid out in claims in 1941.
Refrigerators	2	5	20	See Remarks	25	16	None	AAR reports $5,320,548 paid out in claims during 1941 for manufactured articles.
Wine	1	..	..	See Remarks	..	..	..	AAR reports $492,209 paid in claims in 1941.
Steel conduit	1	15	32	See Remarks	47	35	3	
Axles—auto and truck	2	10	50	See Remarks	60	30	5	AAR reports $468,770 paid in claims in 1941.
Auto trim and hardware	2	4	11	See Remarks	15	16	None	AAR reports $468,770 paid in claims in 1941.
Hoist equipment	1	..	20	See Remarks	20	20	None	
Mosaic tile	1	5	20	See Remarks	25	25	3	AAR reports $421,893 paid in claims in 1941.
Machinery	2	10	30	See Remarks	40	22	..	AAR reports $609,402 paid in claims in 1941.
Electrical goods	11	5	20	See Remarks	25	21	4	AAR reports $5,320,548 paid in claims during 1941 for manufactured articles.
Paper	3	5	15	See Remarks	20	32	5	AAR reports $2,343,853 paid in claims in 1941.
Boilers—gas fired	8	15	20	See Remarks	35	15	3	AAR reports $609,402 paid in claims in 1941.
Coffee	1	..	..	See Remarks	..	35	14	
Warehouse trucks	1	..	..	See Remarks				

Fig. 11. *(Above)—This car carried* 90,000 *pounds of batteries as compared to the usual payload of* 40,000 *pounds*

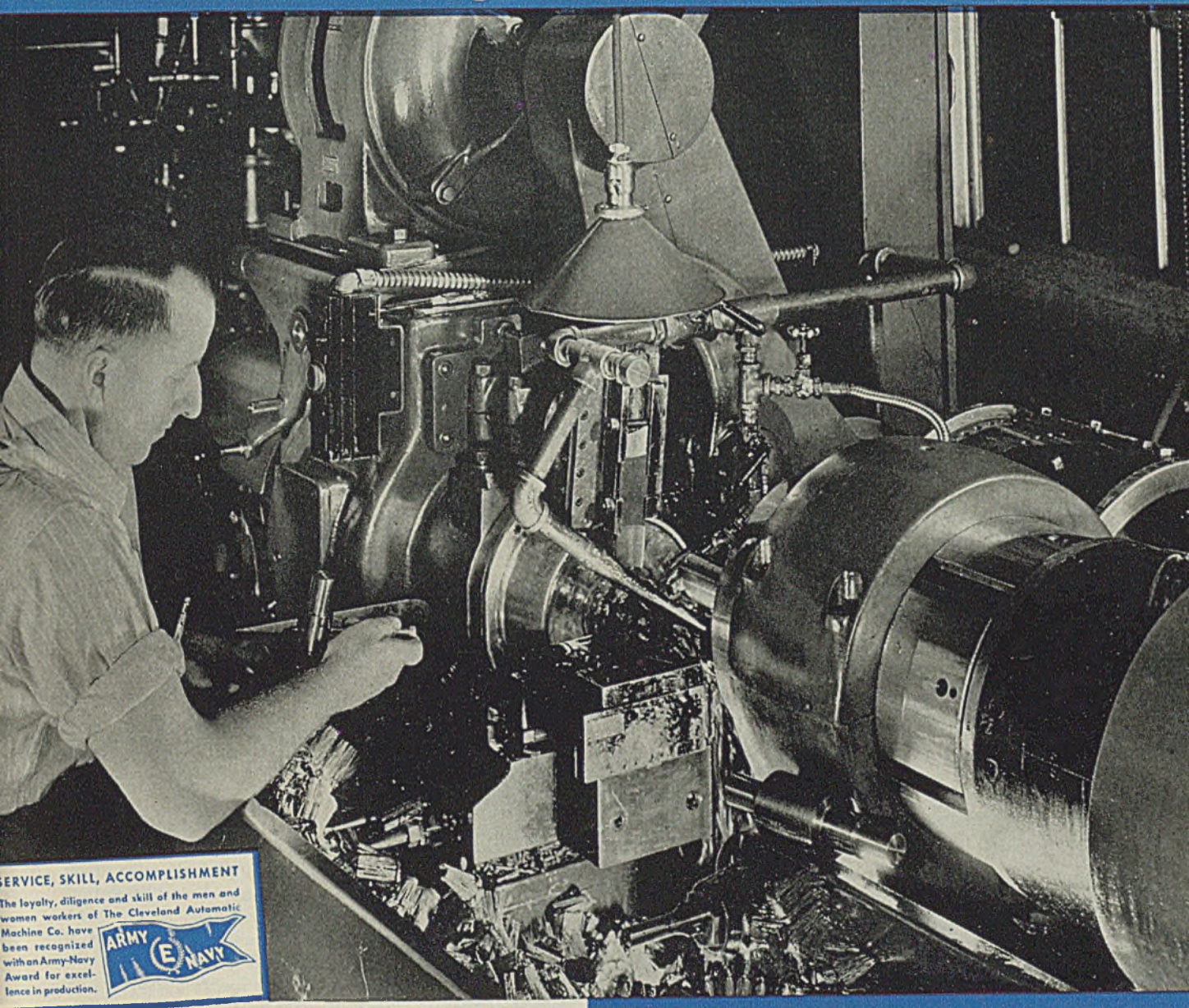
Fig. 12. *(Left, below)—Precision in holding the load is often important. These axles were held accurately at the angle desired during shipment*

Fig. 13. *(Right)—Note how all space from floor to roof can be utilized*





MICHIGAN TOOL COMPANY STEPS UP PRODUCTION OF CONE-DRIVE PINION BLANKS » » WITH USE OF NEW CLEVELAND *Single Spindle* AUTOMATICS



TYPICAL of small lot, short run jobs assigned to Cleveland *Single Spindle* Automatics is the production of cone-drive pinion gear blanks at Michigan Tool Company. Operations include rough turning and forming both ends. Several machines and operators on jobs similar to this can sometimes be released for other work by the use of a Cleveland. Nine times out of ten Clevelands materially increase production, reduce costs.

THE CLEVELAND AUTOMATIC MACHINE COMPANY

2269 Ashland Road, Cleveland, Ohio

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CUT COSTS WITH

CLEVELAND *Single Spindle* AUTOMATICS

MODEL A—Built in 1 1/16-inch to 9 1/2-inch capacities inclus
MODEL B—Built in 1 1/4-inch to 2 1/2-inch capacities inclus

Advanced Practices at Servel Foundry Keep Scrap Low in Casting . . . .

Aluminum

(Concluded from Last Week)

THE NEXT STEP in assembling the cores and molds is to settle the cope core to the drag by the use of four hooks, Fig. 11. The halves then are clamped with special Servel-designed clamps, and the joints between the halves are mudded with fire clay. This final assembly takes place on the gravity conveyor that takes the molds into the pouring zone, Figs. 11 and 12.

Tilting-type Campbell-Housefeld furnaces with 600-pounds capacity melting pots are used. Two men, using 15-pound ladles, pour the molten metal into the molds in sequence as the conveyor carries the molds past the pouring station, Fig. 12.

The pouring mixture is approximately 60 per cent remelt. The remelting of gates and risers is done in a 10,000-pound open-hearth reverberatory furnace which is designed for adding and drawing (charging and pouring) at the same time. Remelting is accomplished at the lowest possible temperature, about 1300 degrees Fahr. During remelting, some magnesium is lost so a sufficient amount is added during the remelt to bring the alloy back to the specified analysis. Individual analysis is made of each remelt heat.

The first alloy mix is held in the melting pots till it reaches 1300 degrees Fahr. It is then transferred to the chlorinating furnace where chlorine is bubbled through it. The chlorinating tubes are of cast iron and are of special Servel design. After chlorination, titanium is added. Each heat pours between 10 and 15 castings as well as two test bars. One bar is broken for tensile strength and the second is shipped with the castings for testing by the customer.

After pouring, the molds proceed on the gravity conveyors by timed movement for knockout, Fig. 13. Mold

Fig. 11—Closing the mold at the beginning of the pouring conveyor line

Fig. 12—Pouring molds on the conveyor line

Fig. 13—Core knockout at end of pouring conveyor line

Fig. 14—Sawing gate from casting using heavy bandsaw

Fig. 15—Testing a batch of castings for leakers, using kerosene poured into rocker-arm boxes

Cylinder Heads

For Aircraft Engines

clamps are removed. A Jeffreys conveyor and core knockout vibrator are used. The latter is equipped with a magnet to remove rods and core wires. This sand is crushed, elevated into a hopper, reconditioned and again used as a backing sand. Fresh sand is always used for facing.

The castings are then placed on a stand and a Thor chipping hammer knocks out the barrel, rocker arm and intake cores. Each casting is moved to a second table where anchor wires are pulled and the excess crush strip, about 1/32-inch thick, is knocked off. Here also the heat number and casting number are stamped on the casting.

At the band saw, a 4-inch solid ring of gate and risers is sawed off, Fig. 14, and the riser on the oil line boss is removed. Here, samples from each heat are sawed for microscopic analysis for porosity and other defects. If the first special test ring is bad, a second is sawed. If that does not pass analysis, the entire heat is scrapped. About half the weight is cut off. Tanewitz band saws are used.

Castings are then loaded on a truck large enough to accommodate the castings from each heat. They are taken to a room-type sand blast where No. 50 steel grit is employed. This blasting set-up uses a Servel-designed 3-inch nozzle with 80 pounds air pressure.

After the first blasting, each casting is inspected for sand holes, casting defects, broken fins. Next the kerosene test is applied, each casting being filled level with kerosene, Fig. 15. By the time the entire batch has been thus filled, inspection can immediately occur in rotation to spot leakers.

Wherever the casting has been sawed, such as on rocker boxes and bottom, the rough-sawed surfaces are ground smooth. Excess finning is also ground away. This is done on a grinding stand with a stationary grinding wheel, while an electric portable is used to grind away the parting fins between the cope and drag. The burrs are then chipped out between the fins, along with any rods that have failed to leave the metal and thus require removal. This is a hand chipper operation, Fig. 16. A Keller burring tool and air gun are used to ream the fins. A Buckeye D. Soutter air drill is employed to clean out any burned-in sand.

After this work and subsequent inspection, the casting is ready for final sandblast. No. 40 mesh sand, 50-pound Diamond Special, washed silica is used, the sanding being done in a booth. A special nozzle is used with the same 80-pound air pressure.

Castings are then loaded into baskets for solution heat treatment in a Lindbergh cyclone furnace, Fig. 17. When the work is pulled from the furnace, it is quenched in circulating air on a special rotating table, Fig. 18. These Lindbergh furnaces are especially de-

Fig. 16—Cleaning between the fins is a job that requires expert hand work—done on special stands shown here

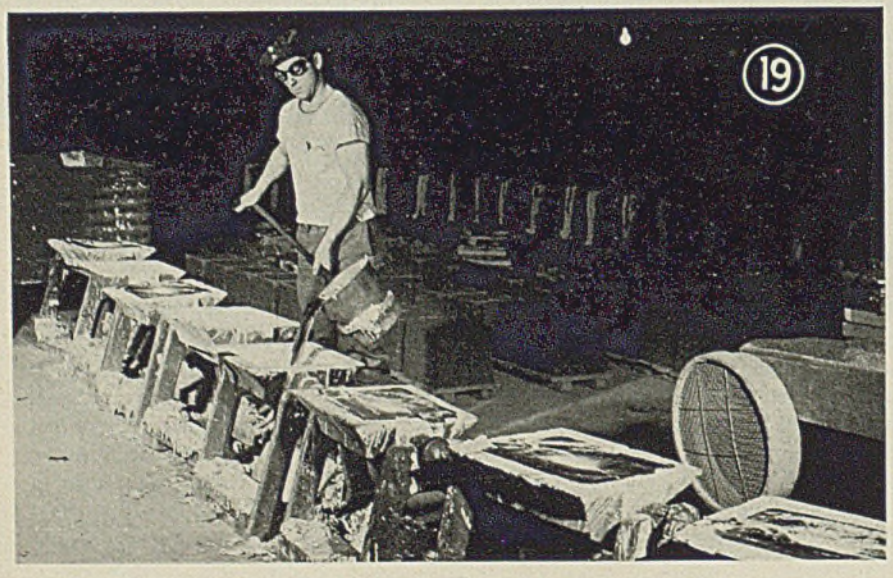
Fig. 17—Load of cylinder head castings entering heat-treating furnace

signed for the job. A special fixture, Figs. 17 and 18, holds 65 castings. An overhead hoist is used to place the loaded fixture in the furnace. These gas-fired furnaces are automatically controlled to within plus or minus 5 degrees Fahr. of the working temperature, for the heat treatment of this alloy requires close temperature-control limits. If maximum, specified temperature is exceeded, inferior physical properties would result. Prompt transfer of the work from the furnace to the quench is also important.

After initial heat treat and quench, the castings are returned for an aging and tempering treatment to improve physical properties, particularly yield strength. Each casting is checked completely for hardness by the Servel physical testing laboratory and held to a narrow brinell range in the final inspection.

The castings are then packed in cardboard cartons and shipped by truck to the Jacobs plant in Pennsylvania. The huge Servel engineering laboratory, under the direction of widely-known Dr. William R. Hainsworth (Servel vice president, and president of American Society of Refrigeration Engineers), makes complete analyses of virgin pig, remelt metal, test bar and ring samples.

The many special Servel fixtures to be found throughout its foundry practice are particularly impressive. Many of the fixtures were built in the department's pattern shop, including the revolving fixture for spraying cores, the special gage setup for truing the barrel and port assembly, the three-jaw vise that fits into the cylinder head permitting it to be rotated through any horizontal or vertical arc of movement to clean out fins, and the similar special vises for holding the head during burring and reaming.



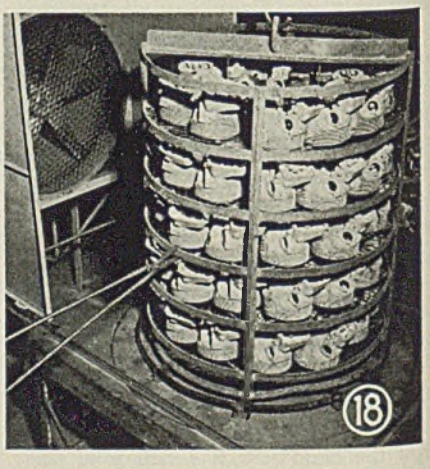


Fig. 18—Air quenching is done on this special setup employing a rotating table which revolves the loaded fixture in front of a powerful fan

Fig. 19—Pouring remelt aluminum into ingot molds

Shopping for the elastic limit?

THE rubber shortage (and until synthetics prove more abundant) is imposing certain hardships upon Gladys—the beautiful receptionist. Through the medium of her smile alone, will she be able to subdue the impatience of the outer-office Lotharios.

But then there's the patience of we engineers in our search for a spring product that will not only perform to its maximum energy—but will return to normalcy without acquiring a set; that will not fatigue nor crystallize prematurely. Such problems, while of little concern to the average consumer, must be dealt with *scientifically* before attempting to develop their market. Equally essential to the satisfactory performance of a spring product—are the operating specifications for the given spring. With this data available, our engineers are then capable of *scientifically designing* and *technically producing* a product that will achieve maximum results. The evolution of such practice is the Lee-Built SCIENTECH Spring—and a Specification Form, thus headed, will be mailed you upon request—to help you obtain longer life and trouble-free spring performance.

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Thomas Flexible Couplings correct parallel and angular misalignment, and remember, please, backlash does not exist, therefore stresses, cross pull, and thrust on the bearings as well as fatigue from backlash do not wreck the very vitals of your connected machines.

Thomas Flexible Couplings have no wearing parts, neither do they require lubrication. Hence, they last a lifetime, and thus protect your machinery longer than any other type of coupling. Your maintenance costs and time-out periods for repairs hit a new low, while your sustained production strikes a new high. Altogether there are FIVE reasons for Thomas Flexible Couplings giving you these worth-while benefits, and remember, please, that no other type, style, or design have them all

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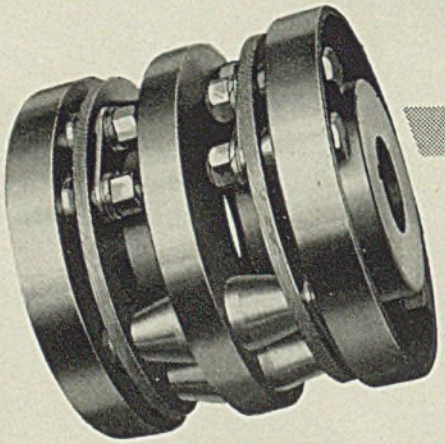


5 ADVANTAGES

1. They eliminate backlash entirely.
2. They require no lubrication which collects harmful grit.
3. They are free from wearing parts which cause breakdowns.
4. They have fixed torsional rigidity.
5. They eliminate all end-thrust.

THOMAS FLEXIBLE COUPLING CO.
WARREN • PENNA.

Industrial Equipment

(*Continued from Page* 106)

wire drawing, cutting, grinding and machining coolants; chemical process cooling, plastics, petroleum products; engine jacket water, air and gas compressor jackets etc.

Caliper Type Fixture

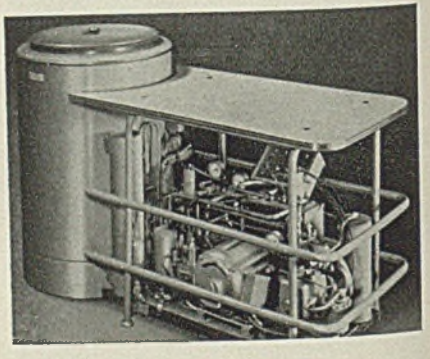
Trico Products Corp., Buffalo, is introducing a new caliper type fixture for gaging internal dimensions with a Micro-Chek precision inspection instrument. It quickens the checking of inside diameters, recesses, or internal dimensions, regardless of shape of piece being inspected.

The movable table used for squaring up the piece is adjustable up or down for positioning the calipers at any desired point from the edge of the hole to the full caliper depth capacity. The table is spring counterbalanced to give it a constant upward pressure, to facilitate the checking of the hole along the full depth, if it is not desired to lock the table. The calipers are pulled together, or collapsed, through thumb pressure pad, located below the table.

Chilling Unit

Motor Products Corp., North Chicago, Ill., announces a new Deepfreeze model D-70 industrial chilling unit — a 2-stage type — which provides a wide range of sub-zero temperatures. It has a maximum capacity of -70 degrees Fahr. and removes 800 B.t.u. per hour at that temperature.

This performance, it is reported, makes it suitable for such work as providing sub-zero cold for testing of air-



craft instruments and parts, for testing of plastics, rubber, and a wide variety of the materials used in war production. It also may be used for retarding the aging of aluminum rivets, for storing annealed aluminum alloy metals and for shrink-fit assembly of parts.

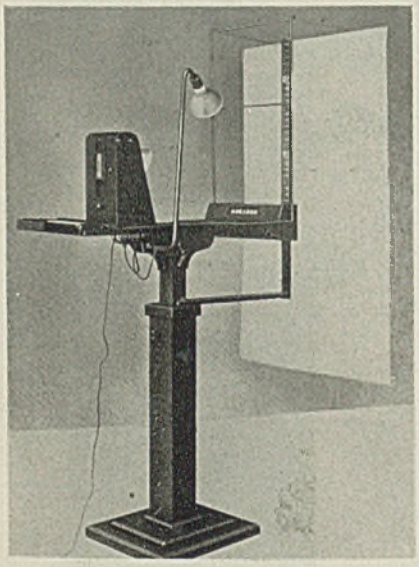
Like other chilling units, the D-70's

chilling chamber consists of a double wall cold cylinder which entirely surrounds walls of the chilling compartment. Interior diameter of the cylinder is 18 inches, depth is 30 inches. Sturdiness is imparted by the inside walls 10 gage steel construction. Unit's overall height is 37 inches, length 67 inches, width 36 inches. It is powered by a ¾ horsepower 110-220 volt motor.

Other features include; two compressors with refrigerated heads, a temperature control which is adjustable from atmospheric temperature to 70 degrees below zero, a specially designed expansion valve which is electrically controlled, and a dehydrator charged with silica jel.

Identification Unit

Photographic Equipment Inc., 210 East Park way, Pittsburgh, reports a new model B identification unit for use



by industrial organizations. Improvements include a white washable background, self-levelling easel base, increased counter-weight capacity, fingerprinting equipment, easily demountable light brackets for increasing portability, elevator-can't-slip ratchet lock, and a choice of size of numbers. The unit, which takes pictures at a moment's notice, takes as many as 100 pictures per 8-hour day. Each film roll contains 24 exposures, and the loaded magazine can be inserted in the camera in 7 seconds.

Carbide Tool Grinder

Hammond Machinery Builders Inc., 1611 Douglass avenue, Kalamazoo, Mich., is offering two new belted type carbide tool grinders which feature multi-V-belt drives—drives that offer no elec-

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ROUND . . . FLAT . . . SHAPED

A FEW WIRES TYPICAL OF ROEBLING'S BROAD SPECIALTY PRODUCTION

FINISHED STEEL *That's ready to go!*

SHAPED WIRES

FLAT WIRE TO SPECIFICATIONS

ROUND WIRE FOR REINFORCING BATTLESHIP FUELING HOSES!

WOUND between the plies of built-up suction hose, this Roebling round wire provides a spiral backbone that gives the finished hose greater resistance to stretching, crushing, kinking . . . As ready-to-go as the battlewagons it helps refuel, it is typical of dozens of Roebling wires that are ready for your final production when you get them. To their manufacture, Roebling has brought all the skill of generations of wire craftsmen.

Have you a wire problem right now that Roebling's ready-to-use flat, round and shaped wires can help solve? If so, put it up to our facilities, knowledge and skill. Prompt action on war orders.

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ONE *Steel that gives you . . .*

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2. Greatly Increased Tool Life
3. Smooth Finished Parts
4. High Physical Properties
5. Excellent Impact Resistance
6. Good Torsional Values
7. High Case Hardness
8. Great Core Toughness
9. Reduce Carburizing Time
10. Unusual Ductility
11. Minimum Distortion

SPEED CASE STEEL has *Physical Properties* equal to or higher than all other comparable steels . . . with great *DUCTILITY* . . . excellent *IMPACT* and *TORSIONAL* values.

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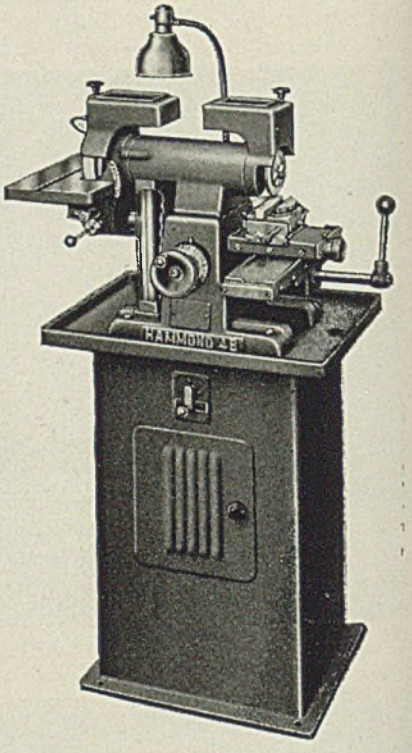
MANUFACTURERS OF COLD FINISHED CARBON AND ALLOY STEEL BARS

trical specification limitations and dampens motor vibrations.

One of these units, the 4B chip breaker and cup wheel grinder is said to be smooth and vibrationless in operation. The chip breaker side, the right side of the machine, provides precision tool setting and accurate groove grinding with a diamond wheel. Brake is provided which quickly stops wheels when reversing on single-phase current. Drip feed tanks with adjustable valves for diamond wheel grinding are integral parts of the wheel construction and accommodate either 4 or 6-inch diameter wheels.

A unique any-angle vise is one of the outstanding features of the 4-B. It is of double cradle design, which upon setting can be instantly locked into one

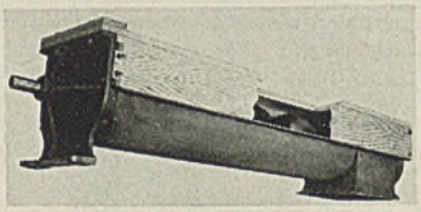


rigid piece with thumb levers. Its jaws are 3 inches long and space between them is 1 1/16-inch. With knee at lowest point, the distance from the bottom of the 6-inch chip breaker wheel to the bottom of the vise jaws is 1¾ inches. The cross slide of the machine upon which the vise rides is fed by a hand wheel calibrated to 0.001-inch and travels 3½ inches. The longitudinal slide moves the vise above it horizontally, reciprocated by an adjustable hand lever which has an 8-inch stroke. The longitudinal slide, like the cross slide, also travels on dovetails with adjustable gib. Knee upon which the cross and longitudinal slides are mounted raises and lowers by a hand wheel at the front of the

machine calibrated to 0.0005-inch. Left side of the machine is equipped with silicon carbide cup wheel. This side also is provided with an 8 x 14-inch tilting table, adjustable to any angle desired between 25 below to 15 degrees above horizontal. The new model 6-B carbide tool grinder is of the same general construction except it is a machine which provides cup wheels on both ends, and also has a large 8 x 14-inch surface ground tilting table.

Screw Conveyor Trough

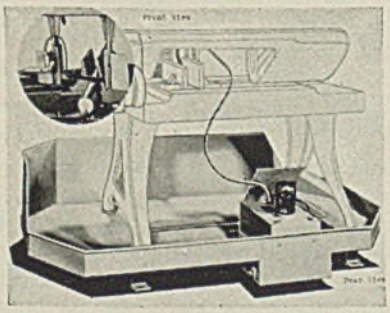
Link-Belt Co., 2410 West Eighteenth street, Chicago, announces a new screw conveyor trough consisting of a combi-



nation of steel bottom, wooden sides, and wooden cover board, lag-screwed together to form a complete, tight enclosure. This combination is said to be adapted to all standard screw conveyor fittings; will readily connect with existing steel trough. The curved bottom is offered with steel no heavier than No. 10 gage. It has the added advantage of being removable by unscrewing of the lag screws securing it to wooden trough sides, facilitating cleaning and replacement.

Coolant System

Gray-Mills Co., 213 West Ontario street, Chicago, is offering a new model S-20 coolant system for horizontal band



saws. It is designed so the entire system is easily attached or removed.

The unit has a pump of ample capacity mounted in a coolant return pan, which in turn is attached below the saw to the

Better BLACK Oxide Finishes

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Whatever black finishing process you use on war supply items, fast-working, specially designed Oakite degreasing and de-scaling materials speed surface preparation, give you the successful start essential to any BLACK oxide finish . . . help you obtain better results . . . keep costs low.

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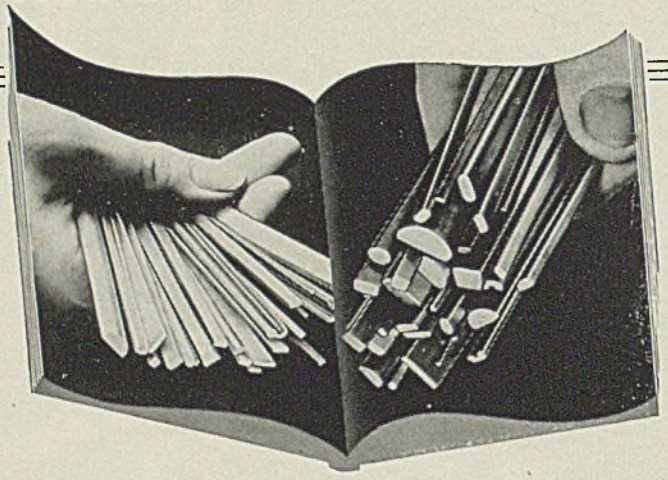
OAKITE MATERIALS...METHODS...SERVICE

CLEANING FOR EVERY CLEANING REQUIREMENT

WHAT OF WIRE TODAY?



Yes! WHAT OF WIRE?

There is little prospect for improvement in delivery or allocation conditions. *Be Scotch as you handle wire you must have.*

FOR SHAPED WIRES it is good sense to use only standard analyses and shapes.

FOR WELDING WIRE, start right by insisting on getting wire of correct analyses, of proper characteristics for the kind of welding you are doing and of the diameter for greatest efficiency—leaning toward larger sizes. Don't permit bending of electrodes. See that there is no wasteful, excess deposit in the weld. Insist that each electrode is used down to the holder.

FOR GENERAL WIRE, eliminate "specials" from specifications if you have not already done so and, again, see that there is no waste.

If we can help, call on us—remembering that the wire needs of the armed forces and those working directly for the war effort have first call, as you would have it.

PAGE FOR WIRE

PAGE STEEL & WIRE DIVISION

Monessen, Pa., Atlanta, Chicago, New York, Pittsburgh, San Francisco

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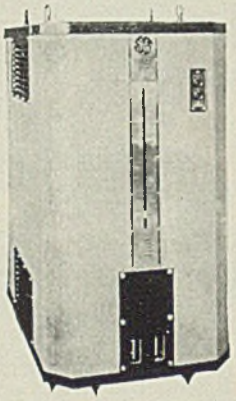
legs. Being larger than the saw itself, all fluid is caught by the pan and returned to the pump for recirculation.

Anti-splash shields guard the pump and operator from oil. Another feature is the oil feed tube which is slotted to fit the saw blade thus assuring a full distribution of oil over the blade.

Welding Transformer

General Electric Co., Schenectady, N. Y., has introduced a new line of heavy-duty alternating-current welding transformers designed for Unionmelt welding. Welders are in 750 and 1000-ampere sizes for 220, 440, and 550-volt power.

Features include built-in capacitors and built-in primary control. Motor-operated, remote adjustment of the welding current permits operator to make



current adjustments without leaving the work. The equipment's integral reactance design permits full output to be obtained without use of high or multiple open-circuit taps.

Ample ventilation and arrangement of ducts permits two welders to be mounted side by side without the need for extra space between them for ventilating air.

Current output of each welding transformer is indicated by a large scale on the front of the case.

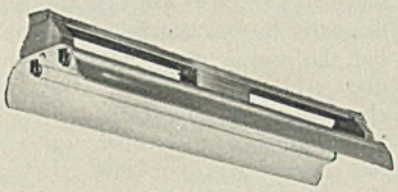
Fluorescent Fixture

Mitchell Mfg. Co., 2525 North Clybourn avenue, Chicago, announces a new Mitchelite fluorescent fixture that meets all WPB and United States Bureau of Standards regulations, including the latest WPB Amendment to Limitation order L-78. At the same time, it retains every good lighting feature of the past and adds new, improved features that make it more simple, more flexible, more economical to install and maintain.

Each of the models can be used for

both individual and continuous row lighting, for surface or suspension mounting. A new-type, easy-fit wireway channel simplifies the problems of wiring and mounting for continuous rows.

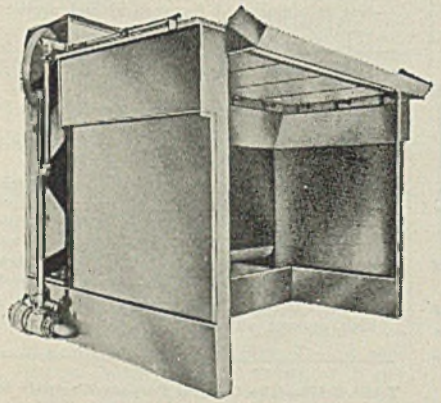
Units can be connected end to end in continuous rows more quickly than before. New-type wireway also permits locating ballast on "outside". Re-



flectors are non-metal Lumenite. High gloss baked enamel finish gives high reflection factor. Reflector can be installed easily or removed from end pieces in a few seconds. The company is offering four models. Model No. 2075, illustrated, is 50-inches long, 14-inches wide, 9½-inches high.

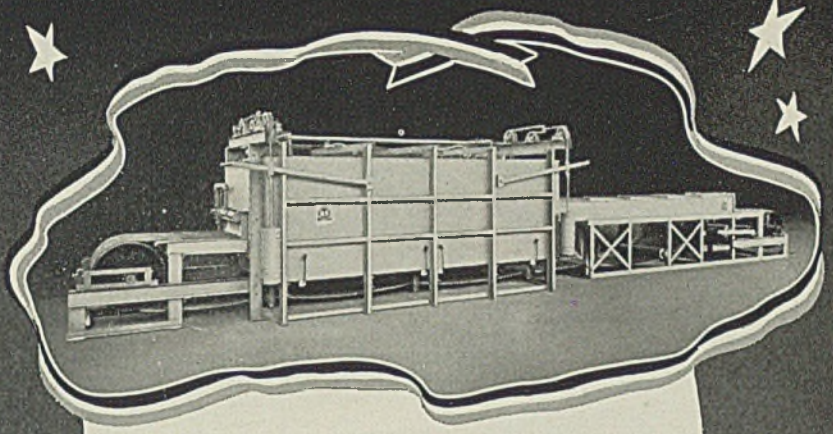
Paint Spray Booths

Aqua-Restor Division, Mayer Mfg. Corp., 56 Division place, Brooklyn, N. Y., announces a type FLRS-7 standardized floor-type paint spray booth featuring rear and side water-impingement



walls. It employs the patented Aqua-Restor super-turbulent chamber introduced some time ago.

In operation, the side and rear walls of this booth are continuously covered with a sheet of water which is completely controlled. Workers, and articles being painted, are never showered. Because method of air cleaning requires no spray nozzles or moving parts, work stoppages for servicing are reduced to a minimum, it is reported. Economies are effected through low horsepower pumping needs and high reclamation averages for all types of pigments used in connection with the booth.



Victory Stampings Bright Annealed

For the bright annealing of Victory stampings, 'round the clock production and minimum manual effort, consider this R-S Electric Continuous Bright Annealing Furnace. The woven wire belt, cooling chamber, atmosphere unit and variable speed drive all contribute to the excellence of the finished product.

This particular installation is only one of the outstanding examples of R-S Furnace perfection. Whether your heat treating requirements call for small furnaces, medium-sized units, the large car hearth type or any other type, call on R-S for better-than-average deliveries.

FURNACE DIVISION
R-S PRODUCTS CORPORATION
122 Berkley Street Philadelphia, Pa.

If you are interested in car hearth furnaces with central station operation, write for the illustrated R-S Car-Hearth Bulletin No. 68-F.

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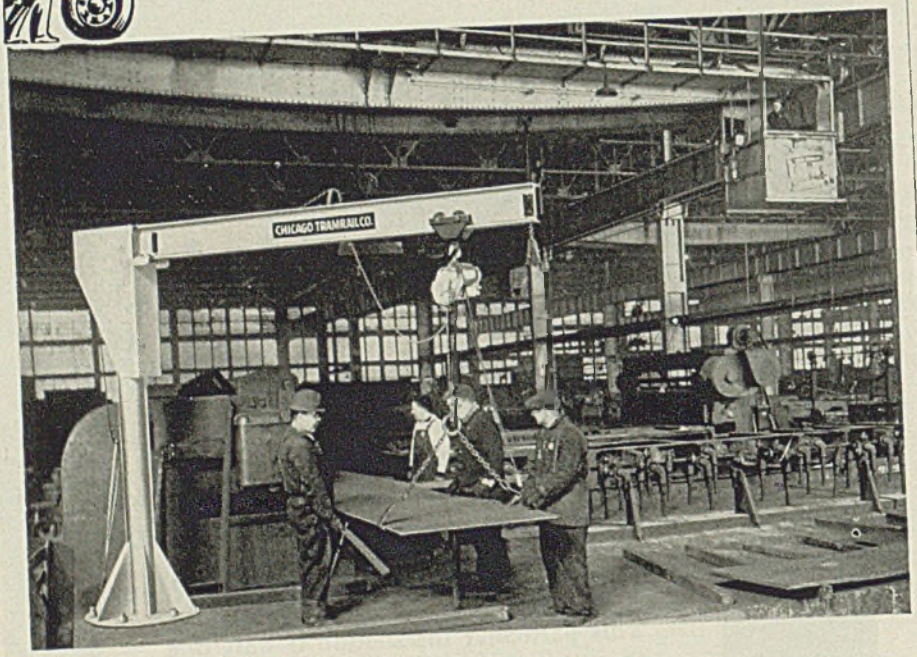
R-S Furnaces of Distinction

ANNEALING CONVECTION CAR HEARTH
ROTARY HEARTH CONTINUOUS CONVEYOR SALT BATH
FORGING METAL MELTING PLATE AND ANGLE HEATING

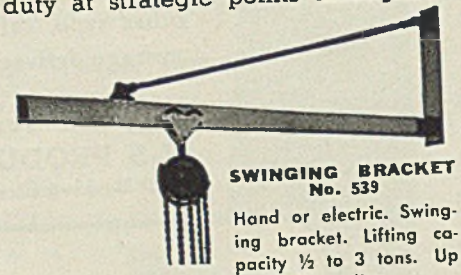
BUY WAR BONDS

You wouldn't use a crane to change a tire...!



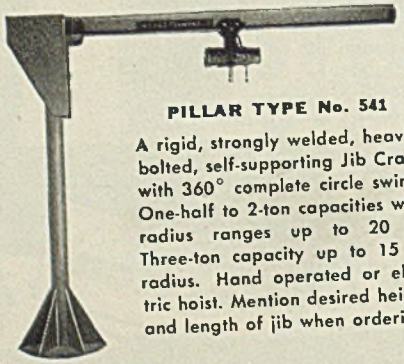
BY the same token a massive, heavy duty overhead crane should not be employed to do a job that can be done by a nimble Jib Mounted Crane.

The reasons are obvious. On duty at strategic points throughout your plant these active "little giants" with lifting ability up to 2000 lbs. and free rotary swing take over and carry on *after* major loads have been delivered via overhead. Thus overhead equipment is released for extra heavy duty. Production speeded up. Cost of operation reduced. Man-power conserved.



SWINGING BRACKET No. 539

Hand or electric. Swinging bracket. Lifting capacity ½ to 3 tons. Up to 20 ft. radius.



PILLAR TYPE No. 541

A rigid, strongly welded, heavily bolted, self-supporting Jib Crane with 360° complete circle swing. One-half to 2-ton capacities with radius ranges up to 20 ft. Three-ton capacity up to 15 ft. radius. Hand operated or electric hoist. Mention desired height and length of jib when ordering.

Circulars illustrating and fully describing very latest types of Jib Cranes designed for heavy duty handling units will be sent upon request.

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CHICAGO TRAMRAIL COMPANY

2912 CARROLL AVE. Phone KEDzie 7475 CHICAGO, ILL.

New Electrodes

(*Continued from Page 98*)

available with weld deposits as good in the larger diameters as they were in the smaller diameters, there was no real reason for insisting upon the larger diameters of all-position electrodes.

The general purpose electrodes were not expected to give X-ray perfect deposits. In the smaller diameters the weld deposits were not bad. In the larger diameters there might be more porosity but this was a matter of little consequence in the applications where these electrodes were applied.

The all-position electrode was a direct-current reverse-polarity electrode. When used with direct current and straight polarity, it took on a close resemblance to a Fourth-of-July sparkler spewing drops of molten weld metal over an area considerably wider than the joint. With alternating current its behavior was equally bad.

The flat-position electrode, however, could be used with either reverse or straight polarity. It was logical that such an electrode might be used with alternating current where the polarity

TABLE II—The Flat-Position Electrode for Direct or Alternating-Current Welding

	As welded	Stress Relieved
Yield strength, psi	52,000-56,000	47,000-51,000
Ultimate str'th, psi	62,000-67,000	60,000-65,000
Elongation, % in 2"	25-32	30-36

Notes:

—AWS-ASTM A233-42T Classification E6020.
—Not recommended for vertical and overhead welding.
—Following diameters recommended for flat and horizontal fillet welding: ⅛, $\frac{5}{32}$, $\frac{3}{16}$, $\frac{5}{32}$, ¼-inch.
—Following diameters recommended for flat welding: ⅛, $\frac{5}{32}$, $\frac{3}{16}$, $\frac{5}{32}$, ¼, $\frac{5}{16}$, ⅜-inch.
—Recommended current: Direct or alternating.
—Recommended polarity: Reverse or straight.
—General: Produces deposits that will meet requirements for X-ray soundness. Fillet welds have slightly concave contour. Fluid deposit with comparatively deep penetration. Range of correct amperages is relatively wide. Produces little spatter when used at high current values.

TABLE III—The General Purpose Electrode for Direct or Alternating-Current Welding

	As welded	Stress Relieved
Yield strength, psi	52,000-62,000	47,000-57,000
Tensile str'gth, psi	62,000-70,000	60,000-68,000
Elongation, % in 2"	17-23	22-27

Notes:

—AWS-ASTM A233-42T Classification E6012.
—Following diameters recommended for vertical and overhead welding: $\frac{5}{32}$, ⅛, $\frac{5}{32}$, $\frac{3}{16}$-inch.
—Following diameters recommended for flat and horizontal welding: $\frac{5}{32}$, ⅛, $\frac{5}{32}$, $\frac{3}{16}$, $\frac{5}{32}$, ¼, $\frac{5}{16}$-inch.
—Recommended current: Direct or alternating.
—Recommended polarity: Straight, electrode negative.
—General: Produces deposits that will not always meet the requirements for X-ray soundness. Fillet welds have a convex contour. Smooth arc action with shallow penetration. Range of correct amperages is relatively *wide*. Produces *little spatter* when used at high current values with a short arc

results measured up to all expectations.

Likewise the general purpose electrodes were tried with alternating current. Once more the results were pleasing. This was understandable because the general purpose electrodes worked well with straight-polarity direct current and almost as well with reverse-polarity direct current. Since then the welding fraternity has learned that most electrodes that perform well with straight polarity are suited to alternating-current welding.

Welding transformers built to give acceptable current characteristics for alternating-current welding became available. Many shops installed a few units for trial. In general these units were so disposed as to be available for use with the flat-position electrodes and with the general purpose electrodes. Where large welding shops had different welding departments engaged on specific types of work, machines were located with respect to the work performed.

Heavy construction, where corners proved troublesome to even the best of welders because of magnetic blow, became a natural field for alternating-current welding. Likewise the pressure vessel and boiler industry found that alternating-current welding gave them consistent quality in some places where direct-current welding was less suitable.

TABLE IV—The General Purpose Electrode for Alternating (or Direct)-Current Welding

	As welded	Stress Relieved
Yield strength, psi	52,000-61,000	47,000-56,000
Ultimate str'th, psi	62,000-70,000	60,000-68,000
Elongation, % in 2"	17-22	22-27

Notes:

—AWS-ASTM Classification No. E6013.
—Following diameters are recommended for vertical and overhead welding: 3/32, 1/8, 5/32, 3/16-inch.
—Following diameters are recommended for flat and horizontal welding: 3/32, 1/8, 5/32, 3/16, 7/32, 1/4, 5/16-inch.
—Recommended current: Alternating or direct.
—Recommended polarity: Straight or reverse.
—General: Produces deposits that will not always meet the requirements for X-ray soundness. Fillet welds have convex contour. Smooth arc action with shallow penetration. Range of correct amperages is relatively *narrow*. Produces *considerable spatter* when used at high current values.

TABLE V — The All-Position Electrode for Alternating-Current Welding

	As welded	Stress Relieved
Yield strength, psi	52,000-60,000	47,000-55,000
Tensile str'gth, psi	62,000-69,000	60,000-67,000
Elongation, % in 2"	22-28	27-33

Notes:

—AWS-ASTM A233-42T Classification No. E6011.
—Following diameters recommended for vertical, overhead, flat and horizontal welding: 5/32, 1/8, 5/32, 3/16-inch.
—Recommended current: Alternating only.
—Polarity: Not involved.
—General: Produces deposits that will meet requirements for X-ray soundness. Fillet welds have flat contour. Digging arc with comparatively deep penetration. Range of correct amperages is relatively narrow. Produces considerable spatter when used at high current values.

Camouflaging Many a Battery

KEYSTONE Wire

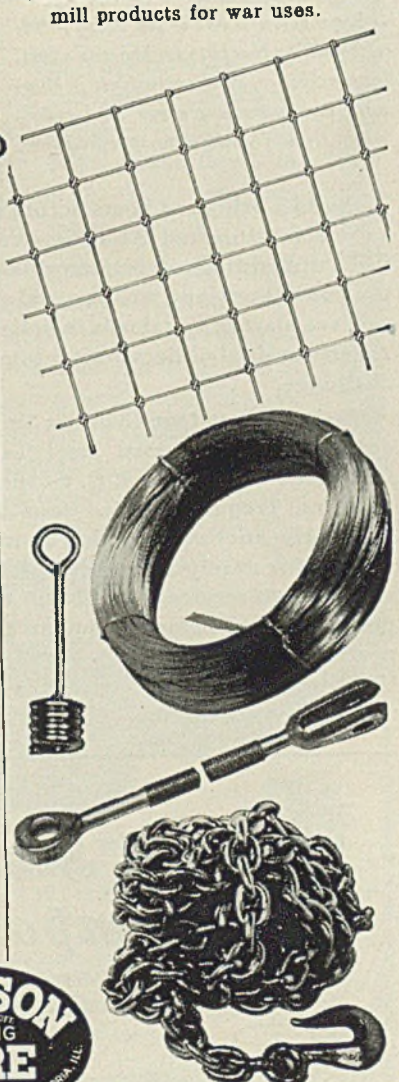
The enemy never locates many a well placed battery which is blasting him backward. That's where today's highly developed art of camouflage scores heavily. And many tons of wire fabrics lend ease, speed and thoroughness to the camouflage expert's capable hand.

Each artillery unit thus concealed contains many parts made of wire mill products, too. The same is true of planes, ships, tanks and ammunition. These examples indicate why Keystone's productive facilities are "drafted until Victory".

And when Victory begins to shine clearly through the smoke of war, some appreciable production released for civilian uses may be anticipated.

KEYSTONE STEEL & WIRE CO.
PEORIA, ILLINOIS

Just a few of thousands of wire mill products for war uses.



Special Analysis Wire for All Industrial Uses

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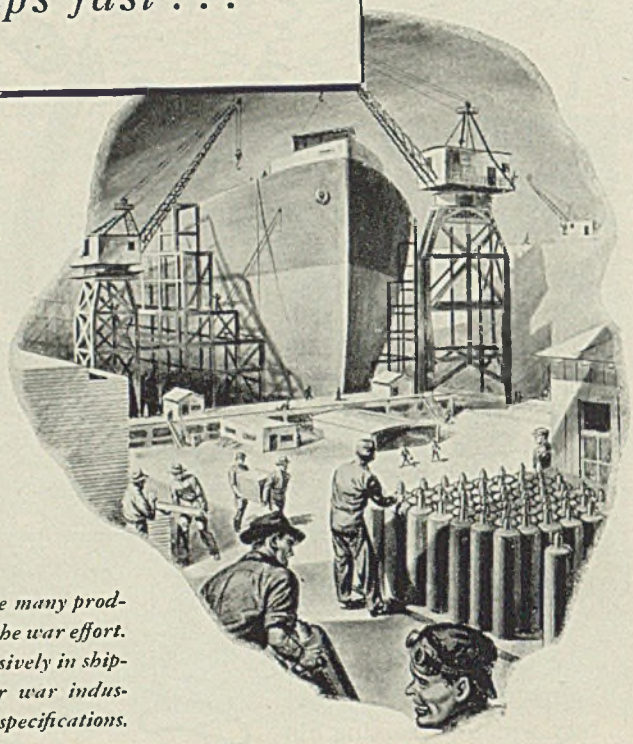
It takes a lot of cylinders to build ships fast . . .



Shown below is one of the many products built by Hackney for the war effort. This cylinder, used extensively in shipbuilding and many other war industries, is cold-drawn to specifications.

To build a bridge of boats across the submarine-infested Atlantic—calls for shipbuilding of mammoth proportions. Acetylene welding and cutting are playing a vital role in helping American shipbuilders meet the Axis' challenge.

Hackney Acetylene Cylinder Shells cold-drawn by Pressed Steel Tank Company, are built to I. C. C. specifications. Frequent, varied tests are part of Hackney's production control system. For example, each cylinder is subjected to service tests of 500 lbs. per square inch before shipment. The performance records of Hackney Cylinders in the field, have proved the reliability of the exhaustive tests they are forced to undergo.

If you are building products important to the war effort, it may be that you, too, can utilize Hackney facilities for the design and manufacture of deep-drawn shapes and shells —for new product parts—for improving existing equipment—for solving many a war-created problem. And remember the Hackney Deep-Drawing Process helps conserve material, man-hours and equipment—assure adequate strength while reducing weight. Write today for complete information—see how Hackney experience and facilities can benefit you.

Pressed Steel Tank Company

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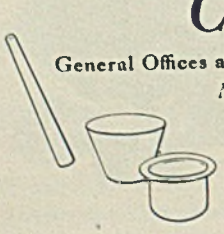
Milwaukee, Wisconsin



DEEP-DRAWN
SHAPES AND SHELLS

But alternating-current welding would not solve all of the problems. No quality vertical and overhead welding was possible with alternating-current welding units. The small shop could not use alternating-current equipment because a complete range of electrodes could not be had. The cheaper price of many small alternating-current welders as compared with the direct-current counterparts was a lure for the small shop owner. But he had to await the introduction of suitable electrodes before he could afford to buy alternating-current equipment.

A few years ago there were no alternating-current electrodes to perform all of the tasks accomplished by the direct-current products. Today the picture is changing. Now let's examine how and why.

Because the current returns to zero many times a second, electrodes for alternating-current welding require greater arc stability than those for direct-current welding. The same thing that determines the polarity of an electrode in direct-current welding is responsible for its behavior with alternating current — its chemical composition. The primary difference between alternating-current and direct-current electrodes is found in the arc stabilizing materials present in the coating.

One of the first electrodes designed for use with alternating current was of the general purpose type. A smooth and stable arc action with alternating current was obtained by the design. Good build-up with little penetration was typical of this electrode. Performance with the smallest alternating-current transformers was good, even with those having exceptionally low open-circuit voltage. The introduction of this electrode enabled the alternating-current welding process to compete on more nearly even terms with the direct-current process.

However, it was not until we entered World War II that alternating-current welding electrodes came into their own. For WPB was anxious to have the alternating-current welding process find more universal application. Neither priorities nor directives sufficed to get anywhere near the necessary number of direct-current welding machines into the hands of critical users. These machines took some time to build, and they used up more critical materials than alternating-current machines. Welding machines thus became a definite bottleneck.

Our supply of electric current was being strained at the same time. Therefore the greater efficiency of the alternating-current welding units was also a desirable feature. Although the power factor was poor on the trans-

formers, this condition was easily rectified by means of capacitors. Likewise the heavy single-phase loadings could be overcome by foresight and planning for more equal distribution of the equipment on existing lines.

Furthermore when an alternating-current machine is standing idle there is almost no current demand. On the other hand, a direct-current motor-generator set has appreciable current requirements even when running idle because of windage and other losses.

But more than a desire to expand alternating-current welding was necessary. A considerable portion of the war demand for welding electrodes exists in the shipyards. Here all-position electrodes form the bulk of the electrode requirements. Despite tremendous progress in the direction of welded sub-assemblies, much shipyard welding must be done in the vertical and overhead positions. Specifications insist upon the use of an electrode that will deliver an elongation in 2 inches of at least 22 per cent. Since there was no alternating-current electrode on the market that would accomplish this feat consistently, the shipyards were limited in their possible adoption of the alternating-current welding process.

Intensive work, however, was done to develop an alternating-current electrode that would deposit welds of suitable quality. *Last year, two all-position alternating-current electrodes appeared.* Thus far a limitation in size exists and the all-position alternating-current electrode will exhibit the required ductility in a maximum diameter of 5/32-inch. But this restriction, if the past performance of the welding industry is any criterion, will soon be lifted. Should acceptable properties in the 3/16-inch diameter be forthcoming, alternating-current welding in the shipyards becomes possible in every single application where the direct-current method has been successful.

Nothwithstanding the fact that manufacturers are going all out for war production right now, they are not oblivious of the future. Coming is the return of the competition that forms the back-bone of the American system of free enterprise so essential to our high standard of living. What about alternating-current welding then? Valuable equipment cannot be scrapped at the end of the war. It must be used.

Right now every mild steel welding job may be done with equal facility by either the direct-current or the alternating-current welding method. A definite boundary exists at the mild steel level. There are few electrodes available for alloy steel welding.

Without question this condition is a result of demand. With the number

THIS IS WHAT HAPPENS WHEN SWEATING ROBS THE BODY OF SALT

THAT IS WHY AMERICA'S LEADING MANUFACTURERS FURNISH SALT TABLETS TO WORKERS

When men sweat, one of the most essential body minerals — salt — is dissipated. Vitality is sapped. Lassitude sets in. Heat-Fag follows and even cramps or prostration result if salt lost through sweating is not replaced.

Beware of Heat-Fag. It is a dangerous, insidious force that brings on fatigue — renders men inalert—slows down reactions. Often it is the direct cause of industrial accidents. As salt is sweated out, the worker tires, becomes careless — a slight miscalculation — and another costly accident is chalked up. Heat-Fag has again taken its toll.

Production-minded men know that Salt Tablets are a "must" for workers who sweat and do hot work. That's why they are always available in leading industrial plants...why they are recognized as the simple, easy and sanitary way to replace the body salt sweated out.

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(Less than 30 seconds)
This is how a Morton Salt Tablet looks when magnified. See how soft and porous it is inside. When swallowed with a drink of water, it dissolves in less than 30 seconds

Case of 9000, 10-grain Salt Tablets, $2.60
Salt-Dextrose Tablets case of 9000, $3.15

Place MORTON'S DISPENSERS at all Drinking Fountains.
They deliver salt tablets, one at a time, quickly, cleanly — no waste. Sanitary, easily filled, durable.
500 Tablet size - $3.25
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of alternating-current units in operation steadily climbing, a demand for alloy electrodes with good alternating-current characteristics will materialize; if not during the war certainly thereafter.

Following, logically, the usual dictates of the law of supply and demand, electrodes for many of the obvious post-war needs will be designed and produced.

Low-alloy high-strength steels have found their place in mobile equipment for war. In the field of weight saving without the sacrifice of strength, these steels are a "natural". Acceptable low alloy electrodes have kept pace with the progress of the designers. But the majority of these electrodes have been restricted to direct-current work. A few, however, will do the job with alternating-current. And before long, others are certain to be added to the growing list.

High alloy applications are now direct-current welding projects almost without exception. There never has been any reason why they should be otherwise. However, largely due to the magnetic properties of many of these electrodes, magnetic blow has been a serious matter in all too many cases. To increase production, to maintain quality and to reduce costs, a trend to alternating-current electrodes for these weldments is inevitable.

Nonferrous welding comes the closest to being an absolute direct-current field as any. Here the welding work has been of relatively small volume as compared to the amount of welding performed in the ferrous metals. But there are excellent reasons for suspecting alternating current will be put to use on nonferrous welding, too.

Repair and maintenance has become a valuable part of the contribution of the welding processes to industry. In many cases hard-surfacing deposits have outlasted original equipment. Once more the usual hard-facing electrodes have been direct-current products. But alternating-current rods will do these jobs well and should become available before long. Ease of application without metal waste, when it is remembered that most hard-facing electrodes are expensive, provides a ready reason for alternating-current developments in this direction.

Both Type Welders "in the War"

Both direct-current and alternating-current welding sets are performing yeoman's service in fabrication for war. There are reasons for using either type of equipment. Thus far there are certain jobs which cannot be accomplished by the alternating-current process by itself.

Still the desires of WPB should be kept in mind. Newly developed alternating-current electrodes are increasing the range of application of alternating-current welding. Patriotic fabricators, as well as those desiring improved deliveries of welding equipment on order, have often found their solution in alternating-current transformers. And the performance of these units in the hands of the ordinary welder has far exceeded expectations.

Elimination of magnetic blow, reduction of repairs, necessitated by bad work, contraction of electric power demands, all of which mean more work with less cost, provide a powerful incentive for the increased use of alternating-current welding. The absence of electrodes capable of equal performance with the existing direct-current types that originally held up the advance of alternating-current welding has been and is being eliminated rapidly. The result is bound to aid the war effort and the following period of readjustment.

IV ANNOE 8770

THE BRODEN CONSTRUCTION CO.
SUBSIDIARY OF THE BRODEN ENGINEERING CO., INC.
ENGINEERS - BUILDERS
WIRE MILL AND COLD ROLLING EQUIPMENT
22800 LAKELAND BOULEVARD
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EUCLID BRANCH P.O. BOX 3017

November 11, 1942

Horsburgh & Scott Company,
5114 Hamilton Avenue,
Cleveland, Ohio

Subject: "Har-Dur" Gears.

Gentlemen:

Regarding the application of "Har-Dur" gearing in steel mill equipment built by us, wish to state that "Har-Dur" gears not only outlast gears of ordinary steel four to five times, but give better all around performance while their initial cost is only about 50% more.

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We have used "Har-Dur" gears for about eight years, and incorporate them as a standard item in our equipment.

Yours very truly,
THE BRODEN CONSTRUCTION COMPANY
F. J. Keller
General Manager

F.J.Keller/LH

★ This shows just one of many letters that tell what an excellent job "HARD-DUR" Gears are doing. "HARD-DUR" Gears not only have involute teeth that are produced to very high standards of accuracy, but the tooth form is preserved because the material is scientifically heat-treated and is highly wear-resistant.

Send note on Company Letterhead for 488-Page Catalog 41

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE • CLEVELAND, OHIO, U. S. A.

Increased Payloads

(*Continued from Page* 112)

by a locking device—both on the vertical and horizontal planes—which is easily locked by the half-turn of a socket wrench applied to a load. In Fig. 8 the lock is shown open at the left and in the locked position at the right. One half turn of a socket wrench operates the lug. The locking mechanism positively prevents the motion of cross members in any direction, regardless of whether load pressure is up, down or lengthwise.

Labor and Operation: The Utility loader is designed to be used with a minimum effort by ordinary crews. No special training is necessary to handle this equipment. The wall members are unlocked and lifted in position by pulling them from the wall inward; when they are in position and are dropped, they automatically lock. The cross members can be put quickly in place, tightened and locked into position in a minimum of time. No nailing, screwing, bolting or anything of the sort is needed.

Cross members not needed for the use of any particular load can be secured at the eaves of the car. Though many thousands of special cars with detachable members are in use, pilferage has never been an important item.

Due to its high factor of safety, the equipment has long life and low annual maintenance, probably running between 5 and 6 per cent.

Unit Proves Profitable

The average saving to the railroads and shippers per trip is $65.50. Each loader car should average 20 trips or more per year, which would equal $1310 saving the first year—more than the original cost of the loader. Of this saving $530 goes directly to the railroads and $780 to the shipper.

Table II lists the advantages achieved by shipment of various commodities in loader-equipped cars. Savings in cost per load ranged from $15 for auto trim and hardware, and also for school desks and chairs, to $195 for storage batteries. Payloads also rose, the greatest increase being for batteries—29 tons.

Fig. 11 shows a loader-equipped car carrying 90,000 pounds of batteries. The usual payload in an unequipped car is 40,000 pounds. Upon arrival every battery in this load was inspected, and no damage of any kind was found.

Precision in holding the load in place is of extreme importance in shipping many materials. The axles shown in Fig. 12 were securely held at a predetermined angle, allowing no movement whatsoever. When inspected at destination, all axles were in exactly the same position as when loaded. As will be noted in Table II, savings in dunnage and loading labor amounting to $60 were also achieved by use of the loader in this instance.

Note what a compact load the automobile front fenders shown in Fig. 13 make placed from floor to roof to utilize all available space. In this instance savings amounted to $111 per load.

Four railroads already have cars equipped with Utility loaders and nearly 300 of such devices are in use on cars or are in process of equipment for operation in federal ordnance plants. However, a box car equipped with one of these loaders is definitely a general utility car. *To date the loader has been able to meet the requirements of every load suited to the conventional box car submitted by shipper or railroad. Odd sizes and shapes, fragile or hazardous loads in a single car load present no problem* for the loader secures the load in such a way as to practically eliminate all damage.

It requires about 100 man-hours to install a loader in an old box car and about 50 man-hours to install one in a new box car. Thus the time needed to equip existing box cars with the loader would be equivalent to a little more than 1/18-trip per box car (based on an average of 20 trips per year or one trip every 18 days), but the loader would add the

A BETTER DOOR
either way you look at it!

As you can see from this "two-side" illustration of the Kinnear Wood Rolling Door you can get the efficiency, space-saving *coiling upward* action of Kinnear Steel Rolling Doors in spite of wartime contingencies. And at the same time you'll have durability and protection that has been thoroughly proved on numerous installations for many years!

The interlocking slat curtain of the Wood Rolling Door is assembled for strength, weather protection and smooth coiling operation. Spring counterbalanced and storing itself compactly above the opening, it affords the maximum economy of manpower and space — as well as war vital materials! It is built in any size, manual or motor operated, and suited to old or new installations. Write today for complete details. THE KINNEAR MANUFACTURING COMPANY, 1780-1800 Fields Ave., Columbus, Ohio.

A SAVING WAY FOR DOORWAYS

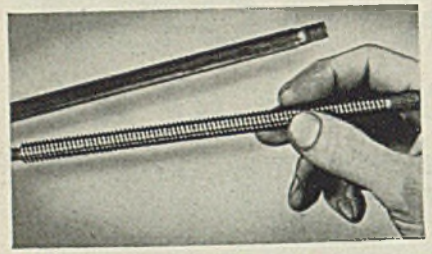
KINNEAR ROLLING DOORS

Advertisement

PRECISION PARTS

PUTTING SOME VERY SPECIAL SCREWS TO HITLER

Like most of the precision work that Ace men and women are now machining and grinding with an accuracy that makes paper seem mattress-thick, this jack-screw has an unmentionable part in war aviation. Let's just say it helps add many miles per hour to fighter planes.



Double lead, close tolerance.

But that needn't keep us from telling you that it is over six inches long and that its thread tolerance is "plus 0, –.0005"." And if you study it carefully you'll see that it has a dual lead—two threads parallel with each other.

There's only one way to get accuracy like that into thousands of Acme threads. You have to grind the threads, and if you have to grind them in quantity you'll be wise to send them to Ace. For Ace knows production-grinding, and can perform tricks of Centerless, Thread, and Surface Grinding that are imperative in wartime and will be equally imperative to your post-war product. Our Thread-Grinding department is now at capacity, but for all other metal parts which combine accuracy and volume, have an Ace up your sleeve. We will welcome samples or sketches.

Capacity open except in threads.

ACE MANUFACTURING CORPORATION

for Precision Parts

1249 E. ERIE AVENUE, PHILADELPHIA

equivalent of 62/3 trips per car per year, plus damage and dunnage elimination. Equipping a portion of existing—or new—box cars with the loader would give capacity equivalent to the building of one new freight car for every three loaders installed—at great saving in time, labor and car building facilities. It would also save 66 per cent of the steel essential for new box cars, including practically all metal plate needed by the Navy and for armor plate use.

One loader requires only 11 per cent of the steel necessary to build a new box car. This is low-carbon strip stock and small structural steel shapes. It does not need the large, critical sheets required for box-car manufacture. A 50-foot box car requires 54,000 pounds of steel. It takes but 2525 pounds of wood and 6800 pounds of steel to equip one freight car with the loader, but to get equivalent capacity in a new box car would require 17,000 pounds of steel.

Installed in a wooden box car, the loader will brace the car both laterally and longitudinally, which tends to eliminate the weaving and wracking to which such a car is subject, thus strengthening it and lengthening its life.

Flame Shrinking

(*Concluded from Page* 109)

this improved flame-shrinking method is taught. Most learners graduate within the extremely short period of two hours. The school is open to all employes of war industries and is conducted without charge.

Intensely war minded, many Albina workers spend their spare time developing labor-saving and health-saving devices and processes. Scores of these are now in operation at the plant. Any war industry may have details of these plans and specifications for the asking, for Albina workers feel that all such wartime improvements belong to the nation and those who create them refuse all offers of remuneration.

New Gum Solvent Cleans Hydraulic System

A gum solvent in concentrated form developed by E. F. Houghton & Co., 303 West Lehigh avenue, Philadelphia, obviates flushing and loss of production time when added to the oil in a hydraulic system whenever there is evidence of poor indexing or improper operation. It is used in small proportions of 3 to 5 per cent of the oil in the system.

Known as gum solvent B, it puts any accumulation of sludge, gum or contamination into solution, leaving the hydraulic systetm clean when the worn oil is later drained.

The NAME *and the* PRODUCTS *ARE*

SUPERIOR

HOT AND COLD ROLLED STRIP STEEL CARBON *and* ALLOY *including* STAINLESS

SUPERIOR STEEL CORPORATION

CARNEGIE, PENNSYLVANIA

Propeller Blades

(*Continued from Page 96*)

Since this contour forming has to be done within limits of a few thousandths of an inch, the problem of chucking the tube in a lathe was a tough one. The answer proved to be the use of a steel arbor, somewhat longer than the tube at this point, which is shrunk into the tube after the tube end has been rough bored to receive it. Tube is then heated to admit the cold arbor. Next the tube is quenched, shrinking it on the arbor (operation 7, 8 and 9, Table I). Arbor is removed later by heating both tube and arbor. The arbor and blade assembly are straightened in a hydraulic press before the contour forming operation.

Since the arbors are used over and over again, they show a tendency to grow under the repeated heatings and coolings, making it necessary to dress them frequently by grinding.

Finally, the flattening, preforming, trimming and finish forming operations are required to obtain the necessary airfoil shape, as well as planform, and to remove excess stock.

Interior Cushioning Prevents Breaks

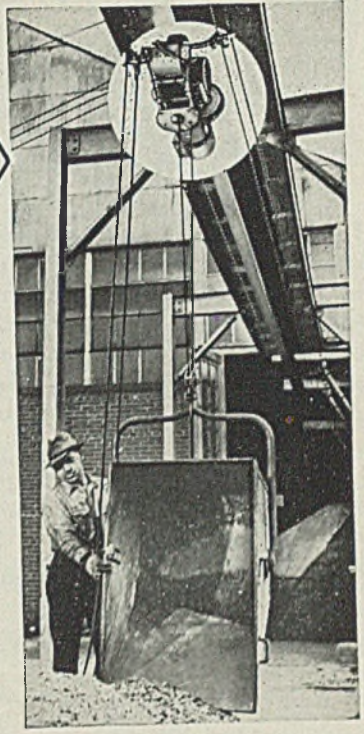
Any steel tough enough to make a suitable propeller blade will easily wrinkle, crease or even crack under the forming operations here involved. To overcome this, Lycoming engineers worked for several years on a means of providing a proper cushioning on the interior of the tube to prevent buckling and cracking. The answer proved to be in the use of liquid and gas pressures which provide an effect similar to a sort of flexible mandrel over which the blade shape may be pressed.

Upsetting the shank end to provide extra wall thickness is interesting (operation 6, Table I) because at this stage the tube still weighs better than 250 pounds, making it somewhat difficult to handle. Conventional electric induction heat-treating equipment is used, Fig. 4, except that the quenching system is omitted. The tube is chucked horizontally in the heating fixture and is brought up to forging heat at the shank end in a matter of seconds. A chain hoist is used to swing the tube around into a two-stage horizontal upsetter which makes two strokes to "gather" the hot steel at the shank end as shown in Fig. 4.

Still hung from the hoist, the tube is swung vertically and placed in a steel rack with the hot end downward. Along the bottom of the rack are boxes filled with flake mica. The hot end of the tube is placed in these flakes so that the heated portion is covered by

On the Job

Over 3 Years —and no repairs!



THE PROBLEM: To increase boiler capacity without investing in new boilers and enlarging the building.

SOLUTION: The boilers were built down and fire box capacity increased. A ½-ton *Reading Electric Hoist* with built-in trolley was installed.

RESULT: Boiler capacity boosted ⅓ and ash handling speeded, without adding to the building.

When this **Reading Electric Hoist** *had been on the job for three years, the Plant Manager said, "We have had no repairs on the hoist, just regular oilings."*

READING CHAIN & BLOCK CORPORATION
2102 Adams Street, Reading, Pa.

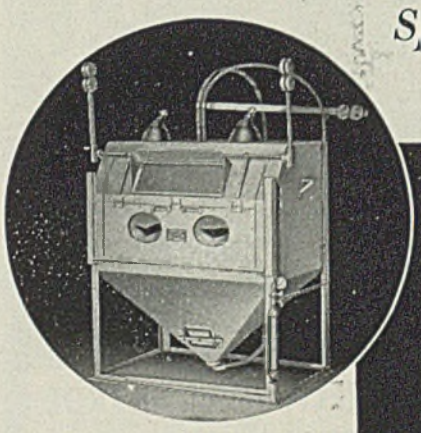
ASK FOR your copy of "Modern Materials Handling Magic." A note on your company letterhead will start it on the way. 16 pages, 20 illustrations to help you get the equipment best suited to your needs.

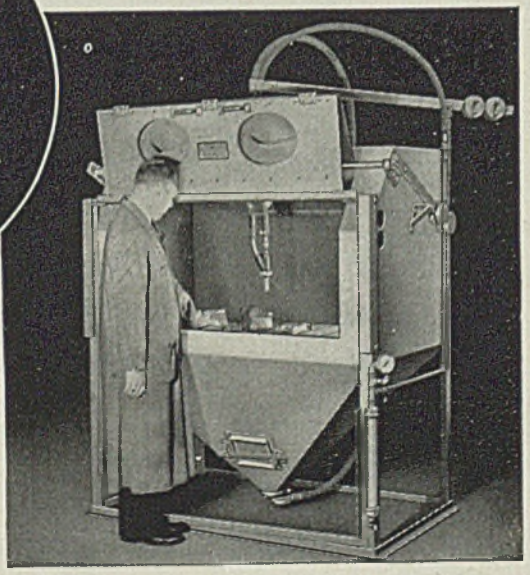
READING CHAIN HOISTS·ELECTRIC HOISTS OVERHEAD TRAVELING CRANES

RUEMELIN
BLAST CLEANING CABINETS

Speed Up Production!

Ideal for Brass, Aluminum and Grey Iron Foundries





Available in four standard sizes. Handles sand or steel abrasives. Sturdily constructed. Furnished complete with bag type filter for controlling dust. Write for Bulletin 32-A.

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Also manufacturers of Blast Cleaning Rooms — Tubular Cloth Dust Filters—Abrasive Elevators—Welding Fume Collectors.

RUEMELIN MFG. CO., 3882 N. Palmer St., Milwaukee, Wis., U. S. A.

A3635-3/5R2

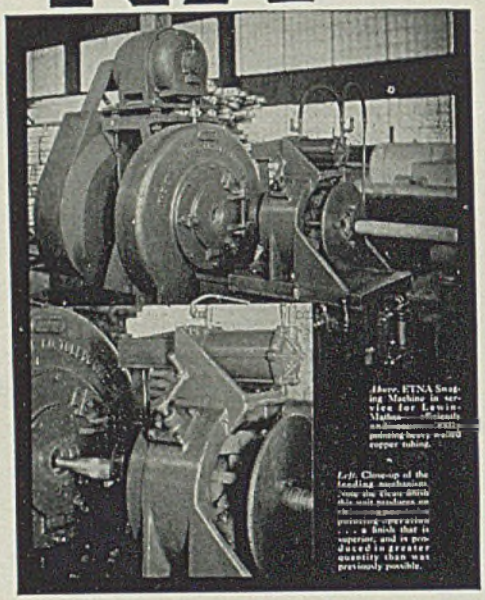
LEWIN-MATHES Got the right answer at

ETNA

They had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so Lewin-Mathes did the safe and logical thing—they put their swaging job up to Etna.

The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points *more* copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from 3/8" to 4" and the experience to help you get the most out of this type of machine.



IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING... "Ask ETNA About Swaging"

ETNA MACHINE COMPANY
TOLEDO OHIO

It's *AUTOMATIC* PRECISION CONTROL
FOR SCIENTIFIC COMMERCIAL STEEL TREATING

Flame Hardening • Annealing • Aerocasing
Bar Stock Treating and Straightening
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METAL TREATING INSTITUTE

THE LAKESIDE STEEL IMPROVEMENT CO.
5418 Lakeside Avenue CLEVELAND, OHIO Phone Henderson 9100

them. This provides a means of slow cooling.

Following the lathe work (operation 11, Table I) in which wall thickness is built up for the leading edge, Fig. 5, and subsequent removal of the locating arbor, it is essential to obtain a careful check on this wall thickness. Thus turned tube is gaged at a number of "stations" along its length and usually found to require further stock removal, perhaps only a few thousandths of an inch. Mechanical polishers, machines with endless emery cloth belts, Fig. 7, are adapted to this work (operation 14, Table I).

Of particular interest is the seam welding (operation 19, Table I) used to seal the tip and to reinforce a portion of the trailing edge of the blade after bending, flattening and rough forming the blade shape. The resistance welding machines, Fig. 12, are equipped with two motor-driven circular welding electrodes and automatic timing controls.

The weld is made to outline the shape of the tip. But to be doubly sure of complete sealing, a further weld is made straight across the tip about 2 inches from the end. These welds must be pressure tight to allow building up the internal pressures required for subsequent forming operations.

Blade Heated for Shearing

After the welding, the blade is heated by electric induction to facilitate shearing off the excess metal outside the weld. Finally the sheared edge itself is welded as further insurance that the end will remain tightly sealed. The latter weld eventually is smoothed off by subsequent machine and finishing operations such as the milling (operation 21, Table I) shown in Fig. 14.

A novel type of fixture or shuttle, Fig. 15, has been developed for holding the blade during the several grinding operations necessary on the shank end.

Because of its complicated shape, a propeller blade is a difficult part to chuck in a machine tool. Much time would be consumed in setting up the part every time it was transferred to another machine, so a cylindrical shuttle frame was devised into which the blade is set accurately before the start of the machining operations. Then locked in the shuttle the blade can be moved from machine to machine and by chucking the shuttle (see Fig. 16) instead of the blade, the setup for each new operation is made quickly and accurately.

Scores of belt polishing machines such as that shown in Fig. 7 are required in final finishing operations on the blades. These machines comprise a

drive motor and pulley set on a pedestal, with an idler on a separate pedestal. Over the pulleys is slipped an emery belt. Below the lower belt is the carriage or bed of the machine on which the blade is mounted for polishing. Blocks of wood, lead and felt are used to force the traveling belt against the blade.

The degree and speed of stock removal are controlled by the operator, as in Fig. 7. He must be skilled in manipulation of the backing block against the constant-speed belt.

The degree of inspection and gaging necessary in processing such propeller blades is beyond anything to which the metalworking industry has been accustomed. For example, in the sequence of operations received here, several separate magnetic tests, Fig. 17, are carried out at various stages, these tests being both longitudinal and transverse in character. Any small surface cracks or flaws which develop during the processing are detected readily by this magnetic inspection, and defective blades eliminated from further operations.

Blade X-rayed by Sections

An added precaution is the complete X-ray examinations of the entire blade. The X-ray department, Fig. 13, is housed in a separate "building within a building" and through it all blades must pass before proceeding to final testing and finishing. Each blade is marked off into sections and a separate X-ray negative made of each section. The negatives then are lined up alongside each other on a viewing screen while skilled operators study them to detect any flaws. Extremely minute defects can be detected easily in the X-ray negatives while it is a costly procedure to fully X-ray every blade, this is of small moment when stacked against the necessity for taking every precaution to insure airworthiness in the finished product.

All blades must be carefully balanced in the final stages of manufacture. Balancing tests are made in individual draft-proof rooms erected along the final line which the blades traverse. The blades are balanced horizontally and vertically. When completed the blades are not only balanced but are of uniform weight and have the same horizontal moment so that blades of the same design are completely interchangeable with one another. When an out-of-balance condition is found, a slight polishing on the outside surface at a critical point usually corrects it.

Blades are protected against corrosion with a type of finish which eliminates the objectionable glare of the polishing blade.

DUE TO WAREHOUSE SERVICE!

A tank factory needed steel shafts in fifteen days! Bissett accepted this order . . . and beat the promise! Perhaps a similar problem in *your* plant can be solved by Bissett engineers.

BUY WAR BONDS

NORMALLY CARRIED IN STOCK

N.E. Steels and Standard S.A.E. Steels, both Carbon and Alloy, Hot Rolled and Cold Drawn • Chisel Steels • Cumberland Ground Shafts • Drill Rod • High Speed Tool Bits • Shim Steels • Tool Steels • Tool Steel Tubing • Boiler Tubing.

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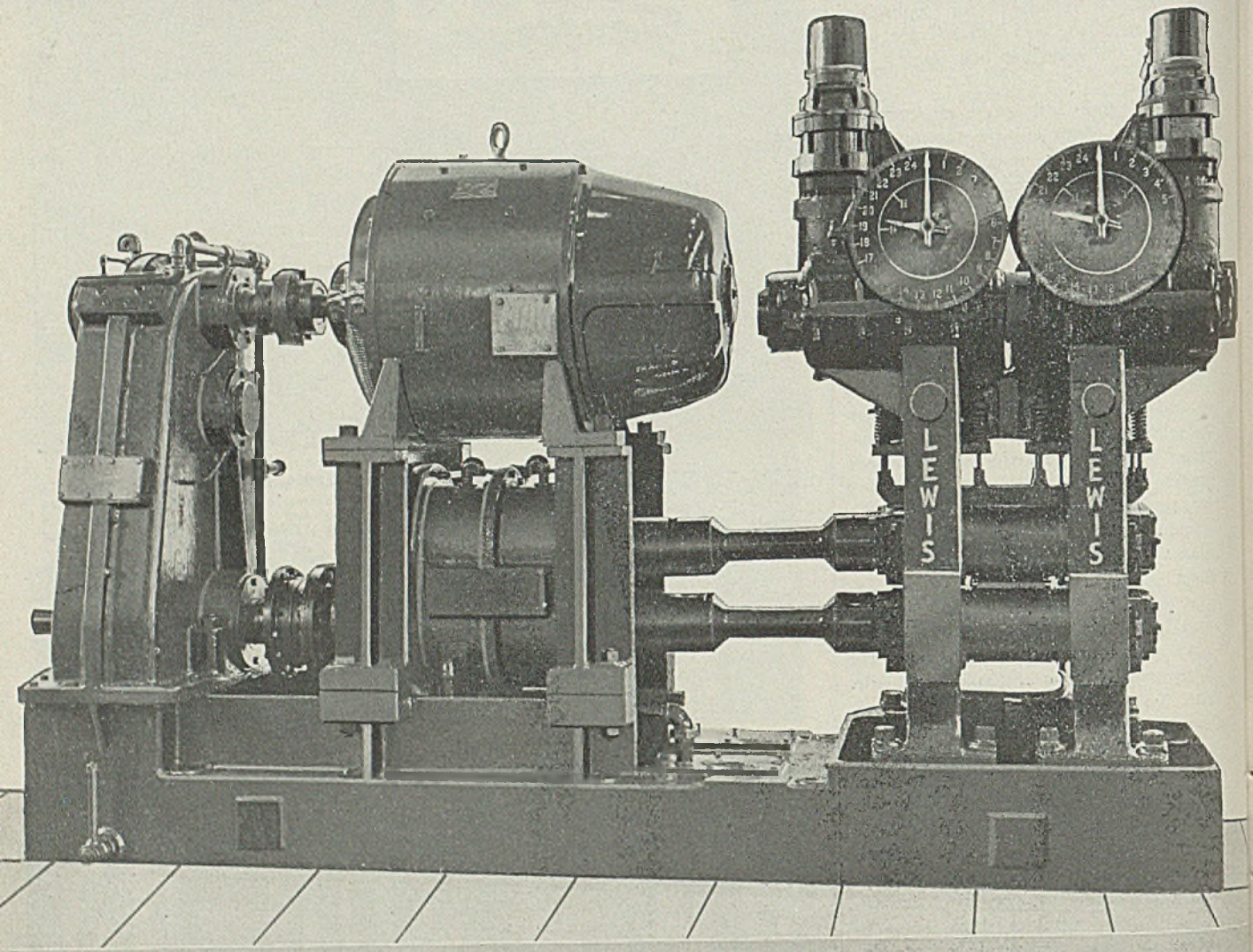
OHIO SHEARS

Solid Steel—*all grades*
Laid Steel—*hi-speed and carbon*
Rotary Shears and Slitters

THE OHIO KNIFE CO.

CINCINNATI
OHIO • U.S.A.

THIS LEWIS MILL SAVES FLOOR SPACE



The photograph shows a good example of how Lewis has designed a sturdy Six Stand Tandem Cold Strip Mill to combine precision rolling with minimum bulk. This mill is equipped throughout with anti-friction bearings. It has universal spindles. Screwdowns are motor operated.

Lewis Rolling Mill Machinery is always abreast with the latest improvements in rolling mill practice.

LEWIS
Rolls and Rolling Mill Machinery step up tonnage

LEWIS FOUNDRY & MACHINE
DIVISION OF BLAW-KNOX CO.
PITTSBURGH, PA.

Most Second Quarter Steel Covered by CMP

Consumers lacking numbers have little chance. . . Some PRP orders being canceled. . . Warehouse prices face revision with freight rate change. . . Scrap supply holding well

DEMAND
Exceeds capacity.

PRODUCTION
Down ½-point to 99 per cent.

PRICES
New warehouse schedule in effect.

SINCE April 15, which marked passing of the period in which rated orders as of March 22 could not be displaced by CMP orders, steel producers are in better position to appraise delivery schedules.

Most consumers under Production Requirements Plan obtained validation of their orders and some who did not were advised by Washington that all allotment numbers would be applicable within a few days, and anticipating little delay. Those who have not been given assurance of getting allotment numbers believe they have little chance of obtaining delivery, because of the volume of CMP orders on mill books, which from now on will take precedence.

Mills are not fully booked for second quarter on some products but small possibility exists of many PRP orders getting on schedule for this, the last quarter before the Controlled Materials Plan becomes fully effective. A number of rated orders are being canceled outright, with mills encouraging this step as much as possible.

• • •

Some new orders are being received with promises that allotment numbers will follow within a few days. These are not being scheduled until the numbers are received. In some particularly urgent cases WPB advises mills to prepare to handle the tonnage, pending receipt of numbers.

In general little tonnage is now available for second quarter in sheets and bars. Large rounds and flats are out of the question and nothing is available in alloys, rollings yet to be scheduled for June. Some plate tonnage yet to be placed may be rolled before the end of the quarter. Shapes can be had in June and at least one producer of narrow hot-rolled strip can deliver in May. Much depends on specifications even where some products seem sold out as small lots can be worked into schedules with earlier orders.

Buying is less active than a month ago, a lull interpreted as a breathing period between quarters. It also is taken as indicating further efforts by consumers to pare down excess stocks before effective date of CMP.

However, third quarter buying is increasing and in some cases allotment numbers for plain carbon steel have been received for November shipment. In case of specially treated alloy steels CMP orders have been issued for still later delivery.

Steelworks operations held close to capacity, declining ½-point to 99 per cent, mainly a result of a drop at Pittsburgh, other changes being minor. Pittsburgh declined 1½ points to 98½ per cent, Youngstown 1 point to 97, eastern Pennsylvania 1 point to 94 and Cleveland 4 points to 92. Wheeling advanced 4 points to 93, Cincinnati 8 points to 93, New England 5 points to 100 and Detroit 2 points to 96. Rates were unchanged at Buffalo, 90½; St. Louis, 93; Birmingham, 100; and Chicago 100½.

Steel warehousemen in the four Atlantic Coast zones recently set up by OPA have been compiling delivered price schedules in accordance with the new regulations and now are faced with an entire change, effective May 15, as a result of the order by the Interstate Commerce Commission, suspending to the end of the year the freight rate advance of March, 1942. New prices show little variation from those previously in effect, some being slightly higher or lower, but with no sharp changes. OPA has announced extra charges by warehouses on National Emergency steels, mainly for special treatment or quality.

• • •

Opening of Lake Superior to iron ore carriers is several days in the future, icebreakers being unable to clear the Straits and St. Mary's river. Some ore is being loaded at Escanaba and cargoes have reached Cleveland and the Lake Michigan ports. Continued cold has made loading difficult because of frozen ore. Probable first shipments from Duluth and Superior now are expected about April 25, an unusually late date. Last year almost 7,000,000 tons had been shipped by that time.

The navigation season will offer some relief in scrap supply, considerable accumulations at the head of the lakes being ready to move as soon as ships are available. Melters in the Buffalo district expect increased receipts when the barge canal opens, bringing tonnage from the East. The situation in general is easy, steelmakers being well supplied and adding to reserves in a few cases.

Composite steel and iron prices maintain their unchanged status in absence of action by Office of Price Administration. Average finished steel composite is $56.73, semifinished steel $36, steelmaking pig iron $23.05 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	Apr. 17	Apr. 10	Apr. 3	One Month Ago Mar., 1943	Three Months Ago Jan., 1943	One Year Ago Apr., 1942	Five Years Ago Apr., 1938
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$62.00
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	40.00
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	23.02
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	12.60

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	April 17, 1943	March 1943	Jan. 1943	April, 1942
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.49	2.49	2.49	2.49
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.22	2.22	2.22	2.22
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	April 17, 1943	March 1943	Jan. 1943	April, 1942
Bessemer, del. Pittsburgh	$25.19	$25.19	$25.19	$25.19
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.39	25.39	25.39	25.39
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.30	24.30	24.30	24.06
No. 2X, del. Phila. (differ. av.)	26.265	26.265	26.265	26.265
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.54	31.54	31.54	31.54
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.65	140.65	140.65	125.63

Scrap

Heavy melting steel, Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke

Connellsville, furnace, ovens	$6.50	$6.50	$6.00	$6.00
Connellsville, foundry, ovens	7.75	7.75	7.25	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.

(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

Alloy Steel Ingots: Pittsburgh, uncropped, $45.00.

Rerolling Billets, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36.25; Duluth (bll.) $36.00.

(Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co. $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives.)

Forging Quality Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.25; Duluth, $42.00.

(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points.)

Open Hearth Shell Steel: Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $52.00; 12-18 in., $54.00; 18 in. and over, $56.00.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., $1.90.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., $2.00.

Do., over 9/32—47/64-in., incl., $2.15. Worcester add $0.10; Galveston, $0.27. Pacific Coast $0.50 on water shipment.

Bars

Hot-Rolled Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.51c; Phila. del. 2.49c; Gulf Ports, dock 2.52c, all-rail 2.59c; Pac. ports, dock 2.80c. (Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points. Joslyn Mfg. Co. may quote 2.35c, Chicago base. Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced in its 8-inch mill.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.82c.

(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.55
		(.20-.30 Mo)	0.60
2300	1.70	4340	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.70	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.47c.

Turned, Ground Shafting: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.28c; New York del., 2.35c; Pacific ports 2.65c.

(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.41c; Phila. del. 3.39c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.68c; Pacific ports 4.05c.

(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage.

base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.

Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	....
65	7.15c	7.90c	....
58	7.65c	8.40c	....
52	8.45c	9.20c	....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.22c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box $4.50.

Tin Mill Black Plate. Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.30-2.55c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c. (Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill, Central Iron & Steel Co. 2.20c, f.o.b. basing points.)

Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.

Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.28c; Phila., del., 2.22c; Gulf ports, 2.47c; Pacific ports, 2.75c. (Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points and 2.50c, Phoenixville, for export.)

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

Bright basic, bessemer wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Wire Products to the Trade:

Standard and Cement-coated wire nails, polished and staples, 100-lb. keg	$2.55
Annealed fence wire, 100 lb.	3.05
Galvanized fence wire, 100 lb.	3.40
Woven fence, 12½ gage and lighter, per base column	.67
Do., 11 gage and heavier	.70
Barbed wire, 80-rod spool, col.	.70
Twisted barbless wire, col.	.70
Single loop bale ties, col.	.59
Fence posts, carloads, col.	.69
Cut nails, Pittsburgh, carloads	$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	56	33	½	24	3½
¼ & ⅜	59	40½	¾	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	....	....
1¼"	13	9.26	10.67	....	....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2½"	12	16.01	18.45	15.16	..
2⅝"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	..
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	..

Rails, Supplies

Standard rails, over 60-lb., .fo.b. mill, gross ton, $40.00.

Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.

Supplies: Angle bars, 2.70c; tie plates 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base, per lb.
18.00	4	1	-	67.00c
1.5	4	1	8.5	54.00c
	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

CHROMIUM NICKEL STEEL

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	..	..
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F.	19.50	22.50	29.50	18.75	24.50
440A	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	§§18.00	19.00	....	....	

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices; wasters 75%, wastewasters 65%, except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

⅛ x 6 and smaller	65½ off
Do., ¼ and ⅝ x 6-in. and shorter	63½ off
Do., ¾ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	50 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

	U.S.S.	S.A.E.
Semifinished hex.	62	64
⅞-inch and less	59	60
1-1-inch	57	58
1⅛-1½-inch	56	..
1⅝ and larger	..	..

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*6.50
Connellsville, foundry	7.50- 8.00
Connellsville prem. fdry.	7.75- 8.10
New River, foundry	8.50- 8.75
Wise county, foundry	8.00
Wise county, furnace	7.00

By-Product Foundry

Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	†12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

*Operators of hand-drawn ovens using trucked coal may charge $7.00, effective Feb. 3, 1943. †$12.75 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balk, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.62	26.12	27.62	27.12
Brooklyn, N. Y., del.	27.65			28.15
Birdsboro, Pa., del.	25.00	24.50	26.00	25.50
Birmingham, base	†20.38	†19.00	....	....
Baltimore, del.	25.61	....	....	....
Boston, del.	25.12	....	....	....
Chicago, del.	†24.47	....	....	....
Cincinnati, del.	24.30	22.92	....	....
Cleveland, del.	24.12	23.24	....	....
Newark, N. J., del.	26.24	....	....	....
Philadelphia, del.	25.51	25.01	....	....
St. Louis, del.	†24.12	23.24	....	....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	....	26.53	26.03
Syracuse, del.	26.08	....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.17	24.67	25.67	25.17
Muskegon, Mich., del.	27.38	....	....	27.38
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.47	24.97	25.97	25.47
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.45	25.95	26.95	26.45
Duluth, base	24.50	24.00	25.00	24.50
St. Paul, del.	26.76	26.26	27.26	26.76
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston, del.	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	....	24.50
Hamilton, O., base	24.00	23.50	....	24.00
Cincinnati, del.	24.68	24.68	....	25.35
Neville Island, Pa., base	24.00	23.50	24.50	24.00
§Pittsburgh, del. No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	21.50	....	....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	....	....
Baltimore, del.	26.05	....	....	....
Steelton, Pa., base	....	24.50	....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.89	25.39	....	26.39
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	26.08	25.58	26.58	26.08
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

High Silicon, Silvery

5.00-6.50 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.

Charcoal Pig Iron

Northern

Lake Superior Furn.	$28.00
Chicago, del.	31.54

(For higher silicon irons a differential over and above the price of base grades is charged as well as ... Nos. 5 and 6.)

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 Islands, Pa.	$23.50
Neville Island, Pa.	$23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.81, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorous content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Ohio	43.00

Second Quality

Pa., Ill., Md., Mo., Ky.	46.55
Alabama, Georgia	38.00
New Jersey	49.00
Ohio	36.00

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$31.00
Wire cut	29.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all

rail	$25.00-28.00
Do., barge	25.00-28.00
No. 2 lump	25.00-28.00

(Prices effective Nov. 23, 1942)

Ferroalloy Prices

Ferromanganese: 78-82%, carlots, gross ton, duty paid, Atlantic ports, $135; Del. Pittsburgh $140.65; f.o.b. southern furnaces $135; Add $6 per gross ton for packed carloads $10 for ton, $13.50 for less ton and $18 for less than 200-lb. lots, packed.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36.

Electrolytic manganese: 99.9% plus, less ton lots, per lb. 42.00c. Ton lots 40.00c. Annual contracts 38.00c.

Chromium Metal: Per lb. contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: 66-70%; per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

	Car loads	Ton lots	Less ton	Less 200 lbs.
2% C.	19.50c	20.25c	20.75c	21.00c
1% C.	20.50c	21.25c	21.75c	22.00c
0.20% C.	21.50c	22.25c	22.75c	23.00c
0.10% C.	22.50c	23.25c	23.75c	24.00c

Spot ¼c higher

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybdic Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb., in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrophosphorus: 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

Ferrosilicon: Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

	Carloads	Ton lots
50%	$ 74.50	$ 87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

Spot prices ¼-cent higher.

Silicon Metal: Contract basis per lb., f.o.b. producers plants, freight allowed; 1% iron; carlots 14.50c, ton lots 15.00c, less-ton lots 15.25c, less 200 lbs. 15.50c.

Silicon Metal: Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

Silicon Briquets: Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

Silicomanganese: Contract basis freight allowed, 1½% carbon; in carloads per gross ton $135; ton lots $147.50. Spot $5 per ton higher.

Silico-manganese Briquets: Contract basis in carloads per pound, bulk freight allowed 5.80c; packed 6.05c; ton lots 6.30c; less-ton lots 6.55c; less 200-lb. lots 6.80c. Spot prices ¼-cent higher.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%, Contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Vanadium Pentoxide: Technical grade, 88-92 per cent V_2O_5; contracts, any quantity, $1.10 per pound V_2O_5 contained; spot 5 cents up.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) Contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ¼-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy: carlots 10.00c; ton lots 10.50c, less ton lots, 11.00c.

Borosil: 3 to 4% boron, 40 to 45% Si., $7 lb. cont Bo., f.o.b. Philo, O.

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (13 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	AISI hot bars 2300 series	AISI hot bars 3100 series
Boston	3.98[1]	3.85[1]	3.85[1]	5.66[1]	3.71[1]	4.06[1]	5.06[1]	5.11[14]	4.68[14]	4.13[21]	3.46	7.75[23]	6.05[23]
New York	3.84[1]	3.67[1]	3.61[1]	5.56[1]	3.58[1]	3.96[1]	3.96[1]	5.00[13]	4.60[1]	4.09[21]	3.51	7.60[23]	5.90[23]
Philadelphia	3.84[1]	3.67[1]	3.61[1]	5.29[1]	3.53[1]	3.94[1]	4.29[1]	5.03[15]	4.89[25]	4.09[21]	4.79	7.57[23]	5.87[23]
Baltimore	3.83[1]	3.78[1]	3.60[1]	5.28[1]	3.40[1]	3.93[1]	4.28[1]	4.90[1]	4.88[20]	4.08[21]	....	....	....
Washington, D. C.	3.95[1]	3.80[1]	3.80[1]	5.35[1]	3.60[1]	4.10[1]	4.45[1]	5.15[17]	5.10[20]	4.03[21]	....	....	....
Norfolk, Va.	4.00[1]	4.05[1]	4.05[1]	5.45[1]	3.85[1]	4.10[1]	4.10[1]	5.40[17]	4.50[24]	4.15[21]	....	....	....
Bethlehem, Pa.*	....	3.45[1]	....	....	....	....	....	....	....	....	....	....	....
Claymont, Del.*	....	....	3.45[1]	....	....	....	....	....	....	....	....	....	....
Coatesville, Pa.*	....	....	3.45[1]	....	....	....	....	....	....	....	....	....	....
Buffalo (city)	3.35[1]	3.40[1]	3.62[1]	5.25[1]	3.25[1]	3.82[1]	3.82[1]	4.75[15]	4.30[19]	3.75[21]	3.52	7.35[23]	5.65[23]
Buffalo (country)	3.25[1]	3.20[1]	3.62[1]	5.25[1]	3.15[1]	3.82[1]	3.82[1]	4.65[15]	4.20[19]	3.65[21]	....	....	....
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[2]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[12]	4.00[24]	3.65[21]	....	7.45[23]	5.75[23]
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[12]	4.00[24]	3.65[21]	....	....	....
Cleveland (city)	3.25[1]	3.58[1]	3.40[2]	5.18[1]	3.35[1]	3.50[1]	3.50[1]	4.62[13]	4.05[24]	3.75[21]	3.20	7.55[23]	5.85[23]
Cleveland (country)	3.25[1]	3.58[1]	3.30[1]	5.18[1]	3.25[1]	3.50[1]	3.50[1]	4.62[13]	3.95[24]	3.65[21]	....	....	....
Detroit	3.43[1]	3.65[1]	3.60[1]	5.27[1]	3.43[1]	3.43[1]	3.68[1]	4.84[12]	4.30[24]	3.80[21]	3.40	7.67[23]	5.97[23]
Omaha (city)	4.10[1]	4.15[1]	4.15[1]	5.75[1]	3.85[1]	4.20[1]	4.20[1]	5.52[10]	4.77[24]	4.42[21]	....	....	....
Omaha (country)	4.00[1]	4.05[1]	4.05[1]	5.65[1]	3.75[1]	4.10[1]	4.10[1]	5.52[10]	4.77[24]	4.42[21]	....	....	....
Cincinnati	3.60[1]	3.68[1]	3.65[1]	5.28[1]	3.42[1]	3.67[1]	3.67[1]	4.92[10]	4.37[24]	4.00[21]	3.45	7.69[23]	5.99[23]
Youngstown, O.*	....	....	....	....	....	....	....	4.40[12]	....	....	....	....	....
Middletown, O.*	....	....	....	....	3.25[1]	3.50[1]	3.50[1]	4.40[12]	....	....	....	....	....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	4.85[10]	4.10[24]	3.75[21]	3.50	7.35[23]	5.65[23]
Chicago (country)	3.40[1]	3.45[1]	3.45[1]	5.05[1]	3.15[1]	3.50[1]	3.50[1]	4.75[10]	4.00[24]	3.65[21]	....	....	....
Milwaukee	3.63[1]	3.68[1]	3.68[1]	5.28[1]	3.38[1]	3.73[1]	3.73[1]	4.98[10]	4.23[24]	3.88[21]	3.54	7.33[23]	5.88[23]
St. Paul	3.75[2]	3.80[2]	3.80[2]	5.40[2]	3.50[2]	3.85[2]	3.85[2]	5.00[2]	4.35[2]	4.34[21]	3.83	7.70[23]	6.00[23]
St. Louis	3.64[1]	3.69[1]	3.69[1]	5.29[1]	3.39[1]	3.74[1]	3.74[1]	4.99[10]	4.24[24]	4.02[21]	3.61	7.72[23]	6.02[23]
Indianapolis (city)	3.60[1]	3.70[1]	3.70[1]	5.30[1]	3.45[1]	3.75[1]	3.75[1]	5.01[10]	4.25[24]	3.97[21]	....	....	....
Indianapolis (country)	3.35[1]	3.45[1]	3.40[1]	5.05[1]	3.20[1]	3.50[1]	3.50[1]	5.01[10]	4.00[24]	3.97[21]	....	....	....
Memphis, Tenn.	3.90[5]	3.95[5]	3.95[5]	5.71[5]	3.85[5]	4.10[5]	4.10[5]	5.25[11]	4.66[24]	4.31[21]	....	....	....
Birmingham (city)	3.50[1]	3.55[5]	3.55[5]	5.83[5]	3.45[5]	3.70[5]	3.70[5]	4.75[10]	4.78[24]	4.43[21]	....	....	....
Birmingham (country)	3.40[5]	3.45[5]	3.45[5]	5.83[5]	3.35[5]	3.60[5]	3.60[5]	4.75[10]	4.78[24]	4.43[21]	....	....	....
New Orleans (city)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	3.95[4]	4.20[4]	4.20[4]	5.25[26]	4.95[10]	4.60[21]	5.00	....	....
New Orleans (country)	4.00[4]	3.80[4]	3.80[4]	5.75[4]	3.85[4]	4.10[4]	4.10[4]	5.15[26]	4.95[10]	4.60[21]	....	....	....
Houston, Tex.	3.75[3]	4.25[3]	4.25[3]	5.50[3]	3.75[3]	4.30[3]	4.30[3]	5.25[26]	5.43[10]	4.50[22]	....	....	....
Los Angeles	4.35[4]	4.60[4]	4.90[4]	7.15[4]	4.95[4]	4.90[4]	6.70[4]	5.95[18]	7.15[6]	5.70[22]	....	9.55[23]	8.55[23]
San Francisco (city)	3.95[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	4.50[7]	6.60[19]	7.55[19]	5.55[23]	....	9.80[3]	8.80[3]
San Francisco (country)	3.85[7]	4.25[7]	4.55[7]	6.25[7]	4.45[7]	4.40[7]	4.40[7]	6.50[19]	7.45[19]	5.45[23]	....	....	....
Tacoma	4.20[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.70[6]	6.63[24]	5.75[23]	....	....	....
Seattle (city)	4.20[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.35[6]	5.45[6]	5.70[6]	6.63[24]	5.75[23]	....	....	8.00[4]

*Basing point cities against which warehouses equalized freight as of April 16, 1941, and which must now be used in calculating lowest combination prices.

NOTE—All prices except cold-rolled strip and AISI hot-rolled bars fixed by Office of Price Administration in amendment No. 10 to Revised Price Schedule No. 49.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 3999 pounds; [6]—300 to 1999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, any quantity is base.

Ores

Lake Superior Iron Ore
Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore
Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	13.00

Foreign Ore
Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore
(Equivalent OPA schedules):
Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.
(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (f.o.b. Columbus, Mont.)	
48% 3:1	43.50

less $7 freight allowance

Manganese Ore
Including war risk but not duty, cents per gross-ton unit, dry, f.o.b. cars, New Orleans and Mobile; 5 cents higher at Norfolk, Baltimore, Philadelphia, New York; adjustments for analysis variations. (Based on OPA schedules.)

Brazilian, 48%	73.8c
Brazilian, 46%	71.8c
Caucasian, 51%	75.3c
Caucasian, 50%	74.8c
Chilean, 48%	73.8c
Indian, 50%	74.8c
Indian, 48%	73.8c
South African, 48%	73.8c
South African, 46%	71.8c
(Duty Free)	
Cuban, 51%	86.5c
Cuban, 48%	85.0c
Cuban, 45%	82.0c
Philippine, 50%	85.0c
Domestic, 48%, f.o.b. mines	96.0c

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Bars per 100 lb.	Basic open-hearth Billets per G T	Electric furnace Bars per 100 lb.	Electric furnace Billets per G T
	Chemical Composition Limits, Per Cent									
NE 1330	.28-.33	1.60-1.90	.20-.35	.....	.....	.....	$ .10	$2.00	....	....
NE 8020	.18-.23	1.00-1.30	.20-.35	.....	.....	.10-.20	.45	9.00	$.95	$19.00
NE 8442	.40-.45	1.30-1.60	.20-.35	.....	.....	.30-.40	.90	18.00	1.40	28.00
NE 8613	.12-.17	.70- .90	.20-.35	.40-.60	.40-.70	.15-.25	.75	15.00	1.25	25.00
NE 8720	.13-.18	.70- .90	.20-.35	.40-.60	.40-.70	.20-.30	.80	16.00	1.30	26.00
NE 9255	.50-.60	.75-1.00	1.80-2.20	.....	.....	.....	.40	8.00	....	....
NE 9262	.55-.65	.75-1.00	1.80-2.20	.20-.40	.....	.....	.65	13.00	....	....
NE 9415	.13-.18	.80-1.10	.40-.60	.20-.40	.20-.50	.08-.15	.80	16.00	1.30	26.00
NE 9442	.40-.45	1.00-1.30	.40-.60	.20-.40	.20-.50	.08-.15	.85	17.00	1.35	27.00
NE 9537	.35-.40	1.20-1.50	.40-.60	.40-.60	.40-.70	.15-.25	1.20	24.00	1.70	34.00
NE 9630	.28-.33	1.20-1.50	.40-.60	.40-.60	.....	.....	.80	16.00	1.30	26.00
NE 9642	.40-.45	1.30-1.60	.40-.60	.40-.60	.....	.....	.85	17.00	1.35	27.00

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

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, ACID OPEN-HEARTH AND FOUNDRY GRADES													
					Low Phos. Grades Bar		Heavy Structural, Plate			Foundry Steel		Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
	OPEN HEARTH GRADES*	Mixed Bor., Turn., Machine Turnings	Cast Iron Borings	Shoveling Turnings	Billet, Bloom Forge Crops	Crops and smaller; Punchings, Plate	3 ft. and less	2 ft. and less	1 ft. and less	2 ft. and less	1 ft. and less			
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$15.00	$16.00	$17.00	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville.	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Bethlehem	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Buffalo	19.25	14.25	15.25	16.25	24.25	21.75	20.75	21.25	21.75	20.75	21.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	14.50	15.50	16.50	24.50	22.00	21.00	21.50	22.00	21.00	21.50	17.50	19.00	20.50
Detroit	17.85	12.85	13.85	14.85	22.85	20.35	19.35	19.85	20.35	19.35	19.85	15.85	17.35	18.85
Toledo	†15.35	12.85	13.85	14.85	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Chicago	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Kokomo	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Duluth	18.00	13.00	14.00	15.00	23.00	20.50	19.50	20.00	20.50	19.50	20.00	16.00	17.50	19.00
St. Louis	17.50	12.50	13.50	14.50	22.50	20.00	19.00	19.50	20.00	19.00	19.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	12.00	13.00	14.00	22.00	19.50	18.50	19.00	19.50	18.50	19.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	12.50	13.50	21.50	19.00	18.00	18.50	19.00	18.00	18.50	14.50	16.00	17.50
Seattle	14.50	9.50	10.50	11.50	19.50	17.00	16.00	16.50	17.00	16.00	16.50	12.50	14.00	15.50

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails 3 ft. and under	Scrap Rails 2 ft. and under	Scrap Rails 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	$21.00	$22.00	$23.50	$24.00	$24.25	$24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	15.50	16.50	17.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

*Open Hearth Grades refer to No. 1 heavy melting steel. No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, No. 2 busheling, $2.50 under No. 1 heavy melting steel, auto springs, crankshafts, $1 over No. 1 heavy melting. †Toledo open-hearth grades cover only No. 2 busheling.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $3.50 less; (material from which Nos. 1, 2 and 3 bundles made is $4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grades of prepared scrap."

Remote Scrap: Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½, refinery; dealers may add ¾c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 12.25c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 14.25c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, corroding or chemical, 6.40c, E. St. Louis for carlots; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York State, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester-Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less than 2000 lbs.

Secondary Aluminum: All grades 15.00c per lb. except as follows: Low-grade piston alloy (No. 122 type) 14.50c; No. 12 foundry alloy (No. 2 grade) 14.50c; chemical warfare service ingot (99½% plus) 14.50c; steel deoxidizers in notchbars, granulated or shot, including ingot containing over 2% iron, Grade 1 (95-97½%) 14.75c, Grade 2 (92-95%) 14.50c, Grade 3 (90-92%) 14.00c, Grade 4 (85-90%) 13.50c, Grade 5 (less than 85%) 12.50c. Above prices for 30,000 lbs. or more; add ¼c 10,000-30,000 lbs.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 20.50c lb.; add 1c for special shapes and sizes, including 3-lb. ingot and 12-lb. round ingot; incendiary bomb alloy 23.40c, 50-50 magnesium-aluminum 23.75c, ASTM B80-41T No. 11 25.00c, ASTM B94-40T No. 13 25.00c, all others 23.00c. Prices for 100 lbs. or more; for 25-100 lbs. add 10c; for less than 25 lbs. 20c; incendiary bomb alloy f.o.b. plant any quantity; carload freight rate allowed all others for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.75-99.79% incl. 51.62½c; Grade C, Cornish refined 51.62½c; Grade D, 99.0-99.74% incl. 51.12½c, Grade E, below 99%, 51.00c.

Antimony: American, bulk, carlots, f.o.b. Laredo, Tex., 99.0-99.8% grade 14.50c, 99.8% and over (arsenic 0.05% max.; no other impurity to exceed 0.1% 15.00c. Add ¼c for less-carlots to 10,000 lbs.; ½c for 9999-224 lbs.; 2c for 223 lbs. and less.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: Prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz. $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $15 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $2.11 lb.; 100 lbs. or more on contract, $1.50 lb.

Indium: 99.5%, $10 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y., 44.75c per ounce.

Platinum: $36 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A, B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 28.75c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c, Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Bare, soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlots 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat, mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameters 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.50c Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu; 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled, carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400-lb. bbls. 39.00c f.o.b. Graselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c, f.o.b. Niagara Falls.

Scrap Metals

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ⅝c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze			
90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil., 5%	9.250	9.000	4.625
Phos. br., A. B. 5%	11.00	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	3.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbitt-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 8.00c; Muntz metal condenser tubes 7.50c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of shipment, respectively for lots of less than 1000 lbs.; 1000-20,000 lbs. and 20,000 lbs. or more; plant scrap only. Segregated 2s solids 10.00c, 11.00c, 11.50c; all other solids 9.50c, 10.50c, 11.00c; borings and turnings 7.50c, 8.50c, 9.00c; mixed solids 8.50c, 9.50c, 10.00c, mixed borings and turnings 6.50c, 7.50c, 8.00c.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings, old zinc 7.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c; add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clippings 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 136

Hot and cold-rolled sheet sellers are practically booked up for second quarter, and it is believed that when the delivery situation becomes fully clarified, some buyers, even including those who have obtained CMP allotment numbers, will have to scour the market for positions before July 1. Some sellers now feel they have more orders than they can handle, although they point out that on tonnage that came to them after direction No. 1 was issued and before April 15, they made no definite promises as they could not be sure where they stood. Meanwhile, some CMP orders have been issued for delivery as late as November on plain carbon grades.

Some producers are able to take further tonnage of galvanized, long ternes and electrical sheets for second quarter delivery.

Narrow cold strip producers are accepting delivery orders for July rolling, CMP allotment validation to follow later. Mills booked through second quarter to the extent of production quotas, are tentatively taking considerable such tonnage for third quarter. Transition of old orders from PRP to CMP is slower than expected. Some rerollers still have 50 per cent of May and June tonnage under the rating system. Annealing equipment is heavily engaged and shipments with some mills are approximately 75 per cent of plant capacity, geared to quotas. Belt links and small arms ammunition account for much consumption, also aircraft, landing mats and new products, as changes in the war program develop.

Demand for alloys is active; orders placed now are for June melting and nearly four months is required between the time of placing alloy orders and finishing of cold strip.

Bars . . .

Bar Prices, Page 136

While the delivery situation has not yet become fully clarified, it appears that bar sellers generally are virtually booked up for the entire quarter. This is especially true of cold-drawn and alloy bars. In fact, on the latter, August appears about the best that can be done and some sellers report they have little, if any, alloy tonnage available before September. Meanwhile, some orders carrying CMP allotment numbers are being received for fourth quarter delivery. One of the larger eastern bar sellers asserts, however, that such orders as he has received for that position have involved only special treatment alloy bars.

Plates . . .

Plate Prices, Page 137

Some effort is being made by plate sellers to obtain War Production Board permission to ship small miscellaneous tonnages of plates without which several large jobs cannot be completed. These include some bridge jobs which have been hanging fire for a considerable period, particularly one in which virtually all the steel is available with the exception of a small tonnage of plates. April shipping schedules are maintaining the same level as March tonnages, and in all probability May schedules will show little change. The gradual decline in construction steel continues, with the slack being taken up rapidly by heavier shipments to other consumers, principally shipyards.

Pipe . . .

Pipe Prices, Page 137

Cast iron pipe demand has slackened materially, with backlogs lower and deliveries improving. Shipment on 20-inch and smaller on AA-1 priority is possible in two to three weeks. With war requirements largely filled, demand is mainly for small miscellaneous orders, with overall requirements kept down by restrictions on use of iron pipe and substitute materials. Deliveries on most of the latter are more extended than on cast pipe. Foundries are handicapped in building substantial and balanced inventories of cast pipe because of close control of pig iron allocations.

Wire . . .

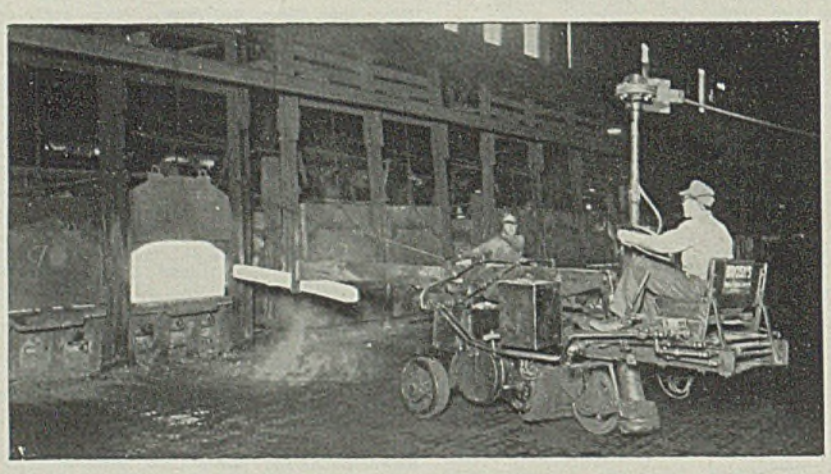
Wire Prices, Page 137

New orders for wire are off slightly, and shipments are maintained. On some fine wire specialties mills are booked through second quarter and some volume is being turned down. There are scattered holdups, including music wire for lend-lease, with indications some consumers have over-ordered in view of changes in war production programs. This has not reached serious proportions, but results in considerable revision and dislocation in finishing schedules, material requiring long processing notably affected, with annealing a bottleneck at most mills. Wire required for aircraft is not affected, with demand heavy.

Coarser wires, except for scattered

DRAFTED to DO the TOUGH JOBS!

"BROSIUS" SPECIAL EQUIPMENT



BROSIUS Auto Floor TONGS CHARGER

The Brosius Auto Floor Charger shown above has a capacity of 2,000 pounds and is serving heating furnaces and a mill.

These machines are also built for serving melting furnaces, and as manipulators for manipulating pieces under hammers and presses.

With a range of capacities from 2,000 to 20,000 pounds, a Brosius Machine can be obtained to meet most any charging or manipulating problem. More than 100 now in operation in U. S. and abroad. Write us for additional data.

Edgar E. BROSIUS Company

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PITTSBURGH, SHARPSBURG BRANCH, PA.

Brosius Equipment is covered by patents allowed and pending in the United States and Foreign Countries

large war contracts, such as bullet core steel, are slackening. Such contracts, however, maintain the overall tonnage. Low carbon flats continue to drag. Rope mills are consuming large tonnages. Rods are more evenly distributed, although integrated producers are frequently giving up to other mills tonnages which they could use themselves.

New orders are mostly under CMP with validation of old priority ratings to that system still proceeding, not without considerable confusion. It would appear numerous consumers are not yet familiar with buying details under the system and are depending on mills to keep them straight, adding to clerical details. Not before June will finishing operations be geared entirely to CMP on some products.

Rails, Cars . . .

Track Material Prices, Page 137

While several fair-sized domestic freight car lists are under contemplation, they are not yet on active inquiry, and probably will not be unless Washington indicates approval of the equipment for construction in the last half of this year. Tentatively, at least, the government will permit the construction of 44,000 freight cars for domestic account in second half, in addition to the 20,000 approved for building in the current half. The Pere Marquette has placed 12 freight locomotives with Lima Locomotive Works, Lima, O., for delivery next January.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 137

Buying concrete reinforcing bars rolled from new billets in March showed approximately 40 per cent increase over February. Relaxation of restrictions on use of various sizes of this material will have little effect on April tonnage and there is some question as to its effect on May business. Billet steel bar producers do not expect substantial increase in May directives over April although there has been some growth in orders from jobbers, to round out stocks. First conferences between mills and WPB officials begin within a few days and it is probable that requests for additional tonnage during May will be relatively small.

Demand for reinforcing bars in the Chicago area has slackened in the past few days, following the award of several hundred tons on two projects in the preceding week. Requirements on two more jobs, one a war plant addition and the other a highway project, were placed last week, and one new plant addition came out for bids. Not more than four or five jobs with any sizable tonnage are now awaiting award. Because of the general quiet, competition among bar suppliers is keen.

Pig Iron . . .

Pig Iron Prices, Page 138

Some pig iron suppliers note an increase in number of applications for May delivery, though the total tonnage is not increased. The large number of orders is not taken to mean an increase in melt but that numerous foundries found themselves low on stocks at the same time and asked replenishment.

Because of smaller supply of charcoal pig iron, due to suspension for furnace repairs and labor difficulties at two points in the midwest, some consumers are substituting special analysis iron. Supply of foundry and basic iron is ample for all essential purposes but advantage of this situation is not being taken generally to blow out stacks for relining. Suspension by the Riddlesburg, Pa., stack is expected at any time and the furnace at Chester, Pa., now producing basic, is expected to change to ferromanganese soon.

Shipments of basic and malleable iron are maintained in New England, but allocations of No. 2 foundry are slightly lower this month. Two New York blast furnaces normally supplying part of the tonnage for this area are down for relining and the reduced tonnages allocated to these are being shipped from inventory, resulting in temporary revision of sources of supply. The Everett furnace production will be absorbed, with some drawing in reserves. Steelworks, operating at capacity except for frequent minor repairs, require about the same tonnage each month. Malleable foundries are busier than gray iron shops and the decline in melt is centered mainly in No. 2 foundry iron. Slackened demand for cast iron pipe has lowered allocations to these foundries.

Scrap . . .

Scrap Prices, Page 140

Little change has taken place in the scrap situation, sufficient material being received to support steel production and

opening of spring is expected to add to collections. Manpower shortage is a deterrent in most districts and scrap is not being prepared as rapidly as desired.

Dealers in the Chicago area have been able to add to labor forces since higher wage rates have been authorized, but still do not have enough to man all equipment. Railroad material shows an improvement as the grip of winter gradually loosens.

Cincinnati melters have ample supply for current needs and many have accumulated some inventory. One mill has an embargo on all grades but No. 1 heavy melting steel and No. 1 bundles. Labor is a continuing problem and requests have been made for permission to increase wages to hold experienced men. County scrap has not started to move in this district after the winter slack.

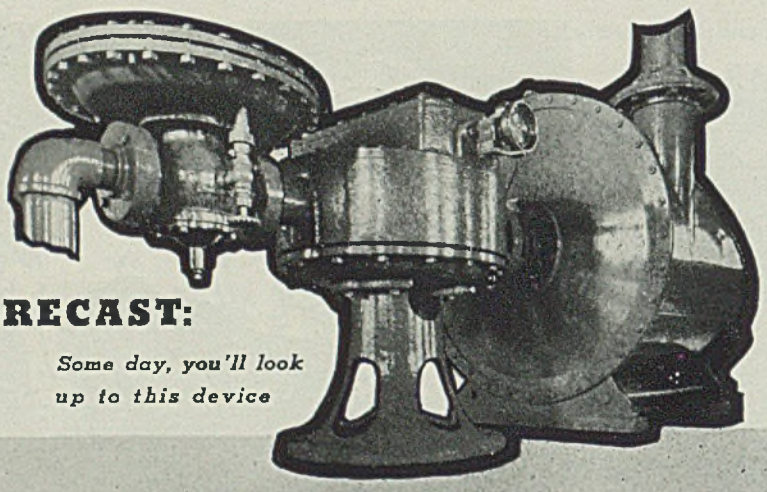
Eastern Pennsylvania has better supply since allocations to western Pennsylvania and eastern Ohio have been cut down. Except for one large consumer mills are holding back shipments of turnings and one mill is accepting no scrap, while another with less than 30 days supply is pressing for heavier grades of melting steel. Sellers doubt if suspension May 15 of the freight rate increase of a year ago will affect shipments, except for some delay until after the change takes place.

While shipyards currently are heaviest consumers of steel in New England, production of scrap by that industry is relatively light compared with others. Most scrap from shipbuilding is low phosphorus steel, desirable in quality and size. Little of it moves through dealers and most goes direct to mills, with some exceptions. This scrap is largely derived from shearing, burning and fitting, the ratio being larger from subcontracting shops than from shipyards, especially among flame cutters.

A moderately easier situation has developed in the scrap market in the St. Louis area, no melter now using material from reserves and several have been able to add to stocks this month. Much scrap is of inferior grade but sufficient good material is being shipped to give a fair balance.

The leading consumer in the Buffalo district has used considerable scrap from reserves recently but has sufficient for capacity operation for about six weeks. By that time shipments by lake and barge canal are expected to help the situation. Dealers are converting turnings to short shoveling grades, which are more acceptable than the unprepared, long turnings.

Dealers in scrap with dock facilities at Duluth and Superior are preparing material for early cargoes, considerable accumulation having been built up during the winter.



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KEMP of BALTIMORE

Jobber Prices Face Freight Rate Upset

With inauguration of the new method of determining ceiling warehouse prices in the East for heavy steel lines under amendment No. 14 to Revised Price Schedule No. 49, OPA dollars-and-cents maximums are effective as of April 15 for the four zones along the Atlantic Coast on such items as sheets, bars, plates, structurals and strip, in carbon, alloy and stainless grades.

In view of the decision of the Interstate Commerce Commission to suspend for seven and a half months the freight rate increase granted in March, 1942, averaging 4.7 per cent on the commodities affected, the warehouse price sched-

Tool Steel Scrap

Cents per pound, to consumers f.o.b. shipping point

Tungsten Types

(For each 1% tungsten contained)

Solid scrap containing over 12%	1.80c
Solid scrap containing 5 to 12%	1.60
Turnings, millings containing over 12%	1.60
Do., 5 to 12%	1.40
Turnings, millings, solids under 5%	1.25

Molybdenum Types

Solid scrap, not less than 7% molybdenum, 0.50 vanadium	12.50
Turnings, millings, same basis	10.50
Solid scrap, not less than 3% molybdenum, 4% tungsten, 1% vanadium	13.50
Turnings, millings, same basis	11.50

Mixed Scrap

(Molybdenum and Tungsten Types)

Solid scrap, each 1% contained tungsten	1.60
Solid scrap, each 1% molybdenum	.80
Millings, turnings each 1% tungsten	1.40
Millings, turnings, each 1% molybdenum	.70

PROBLEM No. 763
FOR [redacted]
DATE JUNE 19, 1942

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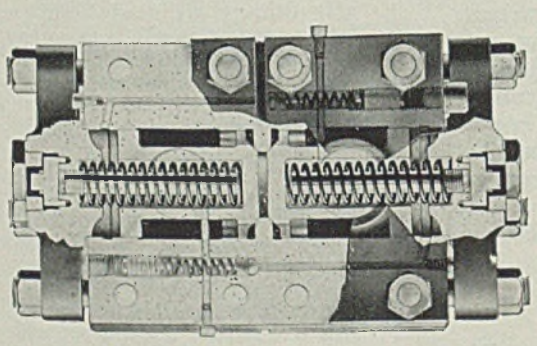
Relieves excessive pressure from the high side to the low side, independent of which side of the system happens to have excessive pressure.



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—and for hundreds of other wartime jobs

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● In the hundreds of vitally important jobs where solder is used today in production of war equipment, there can be no compromise with quality. Only solder that holds with bulldog grip—that *won't let go*—is good enough for the exacting work of war!

● That is why Kester Cored Solders are found on production lines everywhere, their superiority and specialized fitness for every task helping to put a fighting heart into Allied war machines. They're expediting production, too, because just the right amount of alloy and flux are applied in one sure, simple operation.

● Kester Rosin-Core Solder protects electrical circuits for communication and control against service difficulties of every sort. The patented plastic rosin flux won't cause corrosion or injure insulating material. Like Kester Acid-Core Solder for general applications, Kester Rosin-Core Solder holds tight under vibration, bending, shock and expansion and contraction of temperature extremes.

● Kester engineers will glady assist you with any production problem involving solder. Write fully, without obligation.

SILVER-LEAD ALLOY—Kester is prepared to offer, for test on your work, a wartime solder of silver and lead, in both cored and wire form.

KESTER SOLDER COMPANY
4222 Wrightwood Avenue, Chicago, Illinois
Eastern Plant: Newark, N. J.
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KESTER
Cored Solders
STANDARD FOR INDUSTRY

ules will be subject to revision May 15, the effective date of the ICC order.

Announcement of the freight rate change only two days before the new warehouse prices were to apply found various leading warehousemen with delivered price schedules already worked out, with no provision for including the revised prices to be set up in 30 days to conform with the new freight rates. New schedules will be compiled later.

The new prices restore a greater uniformity between city and country prices and thus result in some general variation from recent schedules, but in most cases the changes are not great, one way or the other.

The aim of the new system is to establish a precise pricing method, convenient for the seller and so simple the buyer easily can check quotations and invoices. With extension to the remainder of the country the program eventually will apply to more than 1300 general steel warehouses. The fifth zone will include part of all of 11 eastern and midwestern states.

A meeting of 150 warehousemen was held in Philadelphia, April 13, presided over by E. L. Wyman, head of the Warehouse and Jobbers' Section, Iron and Steel Price Branch of the Office of Price Administration. He instructed the jobbers that only extras specifically listed may be charged. He urged distributors to apply promptly to OPA with respect to such additional extras as they believed should be included. He suggested that jobbers within a district pool their ideas for possible changes to save time in individual correspondence. Delivered prices, he said, must be carried out to the third decimal where necessary.

J. Paul Hellstrom, of Mr. Wyman's section in Washington, assisted in answering questions. Also present were J. E. Degnan of the OPA Washington office and J. R. Mills and J. T. McConnell of the OPA New York office.

Warehouse . . .

Warehouse Prices, Page 139

Extra charges that may be made by steel and iron warehouses for alloy steels developed for war uses since April 16, 1941, and now employed in the aircraft industry, were announced last week by OPA in amendment No. 14 to Revised Price Schedule No. 49. Extras that now may be added for the first time in the maximum prices of the NE alloy steels are priced at the rate per hundred pounds and include $1.25 per hundred pounds for stress relieving after old working, $2.50 for aircraft quality and 40 cents for extensometer test. A charge also is permitted for treatment, such as heat treatment by a specialist, given the material at an outside plant, not that of the producer or the seller. This charge is the actual invoice cost to the seller, minus any trucking charges included on the invoice, plus 30 cents per hundred pounds, provided that no additional charges may be made, such as for trucking, handling or risk.

Chairmen have been named for zone subcommittees of the Steel Warehouse and Jobbers Advisory Committee to OPA, which assisted in preparation of the new zone maximum prices under Revised Price Schedule No. 49, as follows: Zone 1—Richmond Lewis, C. C. Lewis Co., Springfield, Mass.; Zone 2—W. G. Carter, Faitoute Iron & Steel Co., Newark, N. J.; Zone 3—Leslie Edgcomb, Edgcomb Steel Co., Philadelphia; Zone 4—George Park, Egleston-Park Inc., Norfolk, Va

Nonferrous Metals . . .

Nonferrous Prices, Page 141

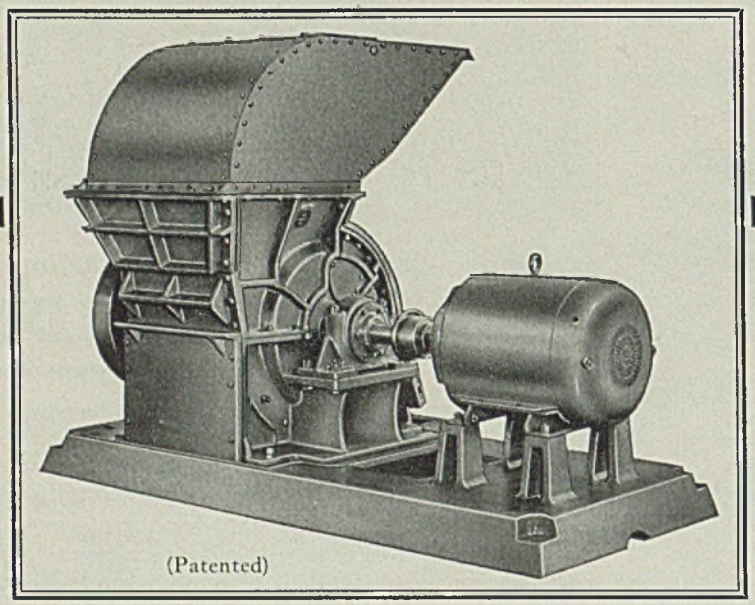
New York — Allocations of copper for May delivery are nearly complete; domestic production will be absorbed, supplemented by fill-ins from MRC inventories with withdrawals promptly replaced, but dependent largely on arrivals. Minor revisions controlling the use and sales continue.

Copper and copper-base alloys are barred in the manufacture of electrical wiring devices for current-carrying parts under limitation order L-277. Incidentally, considerable steel and copper-coated steel wire has been installed for current transmission, also for telephone lines. This will require replacement with copper and copper-alloys after the war.

The shipbuilding program demand is heavy for cable and manganese bronze propeller wheels. Foundries casting the latter are frequently confronted with off-grade copper scrap to meet exacting specifications.

Customers of copper wire mills, also brass, and users of aluminum rods and bars, are given protection on approved tonnage for delivery before May 1; unless there are specific directions to the contrary mill production schedules hold to promised delivery orders.

In the transition to the controlled ma-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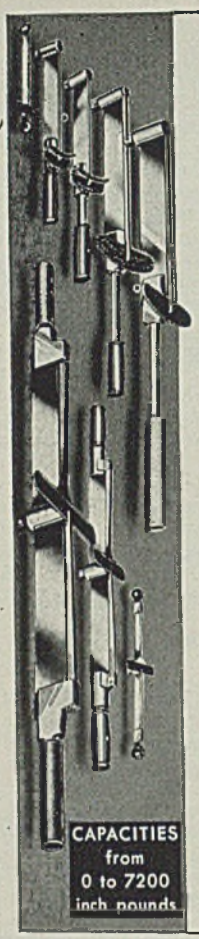

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Each day brings new uses for STURTEVANT TORQUE WRENCHES, new applications where they speed production, increase operation control and assure product quality. These patented flat beam wrenches, produced by the pioneer manufacturer of accurate torque wrenches, have double-faced dials, readable from any working angle, practically indestructible and above all are *permanently accurate!*

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Army-Navy Spec. AN-QQ-S-684

SAE 4140 HOT ROLLED
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NE 8630 COLD FINISHED
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NE 8740 C.F. AND H.R.
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Army-Navy Spec. AN-QQ-S-763

SHEETS

SAE 4130X
COLD ROLLED, NORMALIZED
Army-Navy Spec. AN-QQ-S-685

18-8
STAINLESS COLD ROLLED
Army-Navy Spec. AN-QQ-S-772

TUBING

SAE 4130X
SEAMLESS COLD DRAWN
Army-Navy Spec. AN-WW-T-850

SAE 4130X
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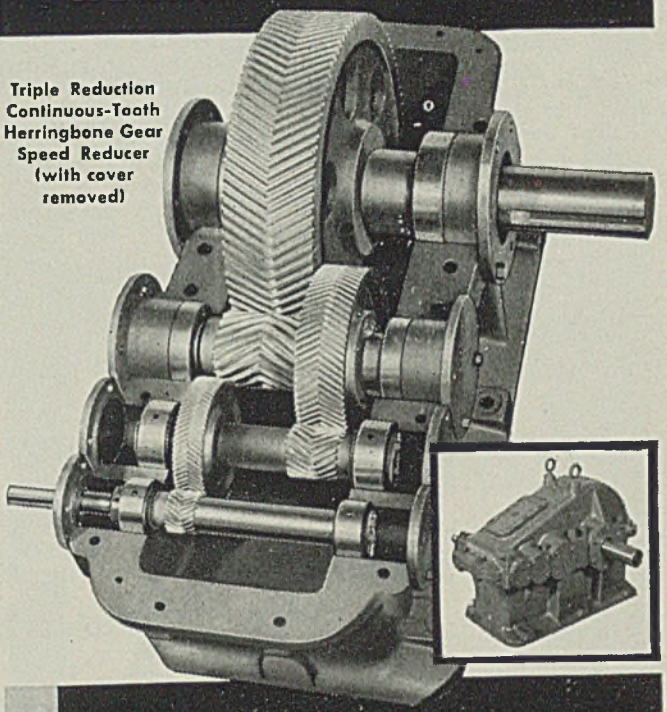

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These units are the product of an organization with over a half-century of gear making experience and have a wide use in many different industries.

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terials plan, confusion is centered largely among the fabricators who often gear production with other materials not under control or distributed under various regulations. Not until third quarter is CMP expected to be fully in force and operating smoothly.

Establishing a new record, American Brass Co. and Anaconda Wire & Cable Co. shipped 1,413,609,645 pounds of manufactured products last year; this was announced in the report of the Anaconda Copper Mining Co. for 1942.

That a fair tonnage of zinc is being added to reserves is indicated, for total output for some months has not been going into consumption.

A special provision in the price schedule for pig tin allows greater leeway in pricing tin anodes.

Aggregate sales of lead are ahead of last year, supplies are considered ample and any deficiencies in the domestic supply are made up by imports. Based on a recent inquiry, 3,000,000 pounds of lead for bullets, Frankford Arsenal, Pa., awards at the ceiling price went to Pennsylvania Smelting & Refining Co., Franklin Smelting & Refining Co., Bers & Co. and George Saul, all Philadelphia.

Carnegie-Illinois Issues New Stainless Steel List

Carnegie-Illinois Steel Corp. has issued list No. 15 covering stainless steel produced by that company. Base prices remain unchanged from former lists, but several grades have been eliminated from the present compilation and a few added. The grades eliminated include 309-S, 311, 317, 325, 329, 330, 420-F, 440 and 441. New grades included in the list, which is dated April 1, 1943, and which were not included in list No. 14, which was issued Jan. 1, 1942, include 440-A, carbon content of .60-.75, 16 to 18 per cent chrome and manganese 1 per cent maximum; 440-B and 440-C are similar steels except carbon content is increased to .75-.95 and .95-1.20, respectively.

Base prices on these three steels are the same as for No. 420, at 24.00c per pound for bars, 28.50c for plates, 33.50c for sheets, 23.75c for hot-rolled strip, 36.50c for cold rolled strip, and 20.40c for forging billets.

Another new steel has been added to the list, standard type No. 443, which contains .90-1.25 copper, in addition to a range of 18 to 23 per cent chrome and .20 maximum carbon. Base price on 443 is the same as 442.

Our Duty For the Duration

In a total war, the efforts of every man, woman and yes, child, count in the final victory. Our obligation consists of (a) helping to conserve precious tin supplies, and (b) seeing to it that proper bearing metals find their way into every shop, mill and plant where war production is in full swing. Our primary obligation is being met by supplying Cadman Acorn Brand Babbitt Metal only in cases where its peculiar properties are vital, and where investigation proves that it is necessary. This practice will save tin. Our secondary obligation is being met by supplying BEARITE, a low tin base (less than 1½% tin) babbitt metal for all bearing applications having rotary motion. BEARITE has been proven by 20 years of general use, and gives comparable service.

BEARITE

A. W. Cadman Mfg. Co.
PITTSBURGH, PA.
CHICAGO: MANHATTAN BLDG. PHILADELPHIA: 18 W. CHELTEN ST. NEW YORK: 270 BROADWAY

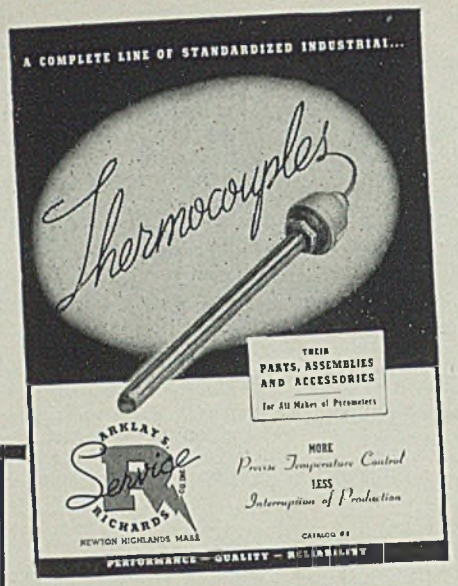
Canada . . .

Toronto, Ont. — War production in Canada is to become more specialized in the future. In this connection it is stated that production of some lines of tanks, guns and shells will be curtailed, while output will be speeded in ships, planes and radio equipment. Curtailment in output of materials, in which substantial stocks already have been established, will turn larger quantities of steel into the more essential war channels and also make available additional tonnages for essential civilian requirements. As far as the civilian group is concerned, however, only the most needed are being supplied, including rolling stock manufacturers and some types of special electrical equipment. Canadian steel mills are still supplying only about 60 per cent of domestic war needs. Steelmaking operations are holding at virtual capacity, with some rolling departments producing well above their rated capacity.

While there has been some reduction in number of orders placed in the Canadian market in the past few days, tonnage volume in new orders is sustained. The larger consumers, including shipbuilders, machine gun and small arms makers and producers of heavy field guns, are furnishing most of the new business and steel shipments on these accounts are well ahead of those for last year. Many smaller orders now are being filled out of warehouse, with an increasing flow of small lot orders coming to the dealers.

Demand for ship plates is gaining and since Canadian mills are maintaining capacity production and imports from the United States have been increased, available supply is said to be equal to domestic requirements as far as war production is concerned. Fresh plate orders are appearing continually with most of the new business for new types of ship construction, for which contracts have been placed recently. Boiler makers are speeding operations and taking larger tonnages of plate.

Some decline is reported in sheet sales, due to the fact that most of the larger war consumers are already covered to the end of second quarter. However, there has been no slowing in consumption of sheets, and backlogs for delivery over the next couple of months are only slightly



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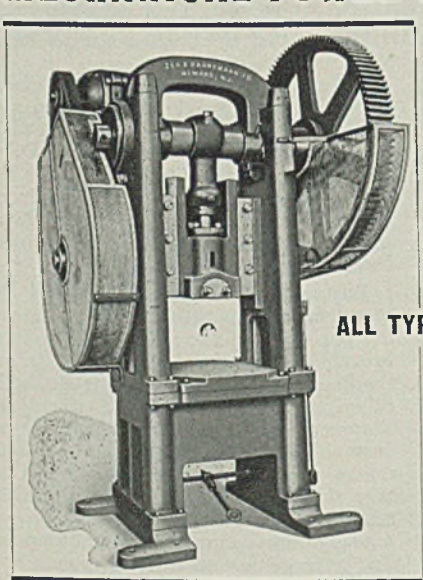

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ROLL AND DIAL FEEDS · DOUBLE ACTION
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below the year's peak. Some sheets are being made available to electrical equipment makers for production of stoves and other essential civilian goods.

Sales volume is fairly steady in merchant bars but no special tonnages are involved. New orders continue to appear from war plants, with deliveries running to larger tonnages than a year ago. Mill representatives also report a brisk flow of small orders from subcontractors producing small parts for radios, aircraft etc., which is in addition to the heavy tonnages going to plants making guns and other top-ranking war materials. Most of the new business, however, is in alloy steels.

Merchant pig iron sales dropped below 8000 tons last week, largely due to the fact that many melters recently had placed orders covering requirements for the next two or three months. The daily melt is holding at about 75 per cent. Foundry and malleable iron are providing most of the new business, while basic iron sales are restricted to odd car lots.

While local dealers report general betterment in receipts of steel scrap, they also state that only small quantities of iron scrap are appearing on the market and supply is well below actual needs. Most current offerings are from local sources, and while some salvage drives have been started in rural communities none of this scrap has yet appeared on the local market. Labor shortage is holding up operations in a number of yards and is forcing dealers to build fairly large stock piles for future handling.

Steel in Europe . . .

London—(*By Radio*)—Heavy demand for plates and sheets is being exerted by war industries of Great Britain to maintain output of needed armament. Pressure for all classes of semifinished steel shows no lessening as finished steel requirements increase. Coal mining interests are seeking considerable steel tonnage for maintenance work. Pig iron supply is sufficient and is meeting all needs

Equipment . . .

Pittsburgh—Current backlogs in the hands of steel mill equipment manufacturers are at the lowest level since peacetime. There is considerable activity in the export market, particularly for Russian equipment, with additional estimates and specifications now moving. Whether any considerable percentage of this paper work will be converted into actual business depends primarily on the attitude of the office of lend-lease administration. Russian inquiries embody practically every type of mill for the production of almost all steel products, with a schedule indicating which mills would be desired first.

Some studies are being made by various manufacturers as to the possibility of introducing new lines of equipment to supplement demand from steel mills. One concern, at least, is considering seriously entering the machine tool field in large scale operations. This company has built specialized machine tools, particularly of large size, in the past and feels that its considerably expanded equipment must look to new applications if it is to be maintained at a reasonable rate of operations. Other companies are considering seriously the new businesses being developed as an outgrowth of the war, particularly synthetic rubber and miscellaneous nonferrous metals.

Boston — While unprecedented demand for cutters and machine tool wearing parts, end mills, reamers, drills, taps, broaches and other attachments is extending deliveries, pressure is easing in other directions, with few exceptions. Shipments continue heavy, well in excess of new orders for most units; shipments are also declining slightly. Certain sizes of automatic screw machines are still tight and grinding machines on top urgency listings for aircraft operation average five months or more.

Backlogs are still substantial but are gradually declining. New orders are largely for one to three tools, buying having developed where restrictions have eased somewhat. Machines for the aircraft industry are given top priority and are the backbone of current purchases. Few large contracts for complete unit tooling are out. Several shops are filling gaps with war contracts for products other than machine tools and subcontracting is less active, although for small parts screw machine facilities are still in substantial demand.

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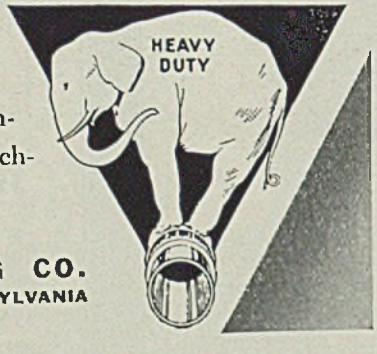

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SUB-CONTRACT OPPORTUNITIES

Data on subcontract work are issued by regional offices of the War Production Board. Contact either the office issuing the data or your nearest field office. Write, don't telephone, and mention key letters and numbers appearing before each item to assure prompt attention and avoid delay.

Minneapolis Office, Contract Distribution Branch of WPB, 334 Midland Bank building, is seeking contractors for the following:

No. S-402: Carbon chamber. Requires automatic screw machines. Quantity is 112,000, early delivery, urgent, AA-1 priority. Material is naval brass rod. Tolerance, .0005. Drawings at Minneapolis office. Contractor will assist in obtaining material.

No. S-403: Shackle bolts with grease hole and groove. Lengths, 3¾, 4, 4½, 5, 5¾ and 6 inches. Diameter, 7/8-inch. 14 USF threads per inch. Quantities, 250 to 5000 of each size. Early delivery. Commercial tolerances. Material, SAE 1020 or X-1020.

No. S-408: Knurled collar, spacer. Requires machining on turret lathes. Quantity, 550 to 1650, with deliveries spaced over five weeks. Material is steel, Nos. 3135 and 3250, furnished by prime. Commercial tolerances.

No. S-407: Aircraft engine parts. Pennsylvania aircraft manufacturer seeks subcontractors in this area for finishing 4600 pistons and 7600 cylinder barrels per month. Steel forgings for cylinder barrels and aluminum alloy castings for pistons will be furnished. Operations include machining, grinding, drilling, etc. Tolerances mostly .002 and .005, although one or two are finer.

Philadelphia Office, Contract Distribution Branch, Production Division, WPB, Broad Street Station building, reports the following subcontract opportunities:

Chase-14-1: A Pennsylvania prime contractor requires continuing machining facilities for two sizes of aviation cylinder barrels of AMS 6382 steel forgings about 7½ inch O.D. x 9¼ inches long. Total quantity per month, 13,650. Minimum tolerance, .001. Equipment or equivalent required, Bullard multimatic, Lodge & Shipley lathe, Fay automatic, Bryant internal grinder, Excello thread grinder, Magnaflux. Also requires corresponding sizes of cylinder heads 8 x 12 x 9 inches overall, of Aluminum Co. alloy 142T61. Total quantity 2750 per month, assembled on respective size cylinder barrels included in the above quantity. Minimum tolerance, .001. Equipment or equivalent required, W & S turret lathe, Cincinnati-Bickford drill, multi drill, radial drill, Delta drill press, Cincinnati automatic mill, Hall planetary mill, Garvin mill, vertical mill, Excello diameter borer, Kellerflex machine, Gehnrich oven. Prime contractor, who is currently producing these items, will supply all castings, rough-turned and bored forgings, inserts and studs, etc., all of which are available for immediate production. Priority, AA-1.

New York office, Contract Distribution Branch of WPB, 122 East Forty-Second street, New York, reports the following subcontract opportunities:

S-14-21711: An Ohio concern is seeking subcontracting facilities requiring an A-1 shop having thread grinder capable of grinding jackscrews up to 18¼ inches in length with an O.D. .8255. 4 lead Acme thread, 10 threads per inch, thread 7026-inch helix angle. Tolerances, plus .005, minus .0000 must be maintained throughout the operation. In addition, threading facilities must be available in connection with lathe and brazing work. Quantities, 5000, with delivery of 50 to 100 per week. All materials furnished by prime. Material, X4130 chrome-molybdenum steel.

S-14-21736: A New York City instrument manufacturer requires subcontracting facilities on hand screw machines, preferably B & S No. 0 and No. 2. Also Swiss automatic machine such as Peterman, Sesco or Beechler or equivalent. Materials, steel, brass or aluminum, to be furnished by prime. Quantities range from 3500 units on hand screw machines to 36,000 units on Swiss automatic.

Chicago office, Contract Distribution Branch of WPB, 226 West Jackson Boulevard, is seeking contractors for the following:

A C Spark Plug Division, GMC, Flint, Mich., attention A. S. Fuhrman. Priority, AA-1. Part, centerwire screw. Production requirements 50,000 pieces per day for at least three months, possibly longer. Contractor will furnish enough material to get the job started and until subcontractor can obtain own material. Material, cold-rolled steel. Equipment, 9/16-inch capacity six-spindle automatic screw machine.

Allis-Chalmers Mfg Co., Milwaukee, Wis., attention Paul S. Godfrey. Priority, AA-1. Job covers machining of winch cases. Production requirements immediate and urgent. Contractor supplies fabricated steel plate ready for machining. Material, hot-rolled steel. Equipment, 5 and 7-inch horizontal boring mills, 60 and 72-inch arm radial drills, 72 and 84-inch double housing planers.

American Can Co., 104 South Michigan avenue, Chicago, attention C. H. Erikson. Priority, AA-3. Spout and cap, 2,250,000 required at rate of 60,000 per day. Subcontractors to do entire job. Material, white metal. Equipment, die casting.

Bell & Howell Co., 7100 McCormick Boulevard, Lincolnwood, Ill., attention Clinton S. Davis. Priority, AA-1. Parts, cells, retainer tube and eyepiece cell. Quantity, 12,000 of each. Subcontractors preferred in Chicago area, not over 100 miles distant. Material, brass. Equipment, 1¼ and 2-inch capacity single-spindle automatic screw machine, 1½ and 1¾-inch bar capacity turret lathes.

Continental Can Co. Inc., 4633 West Grand avenue, Chicago, attention M. J. Hunter. Priority, AA-1. Parts, bushing and nut. Quantity 54,000 of each, 42,000 by May 1 and 12,000 additional by Sept. 1. Contractor will furnish the brass stock. Equipment, 1¼ and 1½-inch single-spindle automatic screw machine, plain No. 1 horizontal milling machine.

Electric Sprayit Co., 1415 Illinois avenue, Sheboygan, Wis., attention R. J. Corrigan. Priority AA-1. Job covers cutting of gear teeth on two items. Quantity, 34,100 of each, at 200 per day of each, beginning June 1. Contractors will furnish completely machined blanks for cutting. Equipment, three-inch straight bevel gear generator.

General Electric Co., 1635 Broadway, Fort Wayne, Ind., attention Robert E. Bengert. Priority, AA-1. Part, brake coil housing, 1 x 2 inches. Production requirements 300 or more per week, starting as soon as possible. Total requirements possibly more than 3000. Contractor will furnish material on consignment. Equipment, 4½-inch bar capacity turret lathe, plain No. 2 horizontal milling machine, 6 x 14-inch T.T. hand milling machine, ⅝-inch drill capacity two-spindle bench drill.

J. P. Seeburg Corp., 1510 North Dayton street, Chicago, attention A. E. Neuhauser. Priority, AA-1. Part, lead screw. Contractor will supply brass bar stock. Quantity 15,000. Dimensions, ¼ x 6½ inches. Equipment, ⅝-inch bar capacity turret lathe, 6 x 18-inch external plain cylinder, 5 x 18-inch external thread grinder.

F. W. Stewart Mfg. Corp., 4311 North Ravenswood avenue, Chicago, attention J. H. Jacobsen. Priority, AA-2X. Part, two different size nuts to be formed from .058-inch cold-rolled steel. Subcontractor to do complete job, including furnishing material and dies. Stamping will not be sublet separately. Quantity, 25,000 of each. Equipment, 12 x 30-inch precision lathe, plain No. 2 horizontal milling machine, hardening equipment, five-ton open-back inclinable press, 4 x 20-inch single-spindle automatic chucking lathe, cadmium plating equipment.

STRUCTURAL SHAPES . . .

SHAPE CONTRACTS PLACED

782 tons, bridges for Alcan Highway; 455 tons to Dominion Bridge Co. Ltd., Montreal, Que.; 103 tons to Worden-Allen Co., Milwaukee; 224 tons to Mississippi Valley Structural Steel Co., Decatur, Ill.

REINFORCING BARS . . .

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5000 tons, for Alcan Highway, to Missouri Rolling Mill Corp., St. Louis.

215 tons, highway bridge, Cicero avenue over Chicago & Western Indiana railroad, Chicago, for Illinois state highway division, to Joseph T. Ryerson & Son Inc., Chicago; Thomas McQueen Co., Forest Park, Ill.; bids March 19.

200 tons, addition to airplane engine parts plant, Studebaker Corp., Chicago, to Concrete Steel Co., Chicago; Consolidated Construction Co., Chicago; bids April 5.

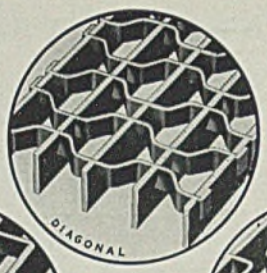
REINFORCING STEEL PENDING

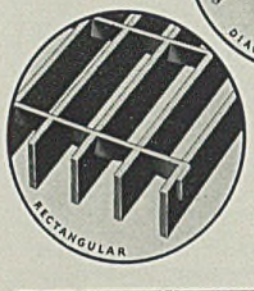
250 tons, packing plant addition, Wilson & Co., Cedar Rapids, Iowa; bids April 17.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Pere Marquette, twelve 2-8-4 type freight engines, to Lima Locomotive Works, Lima, O., for delivery in January, 1944.





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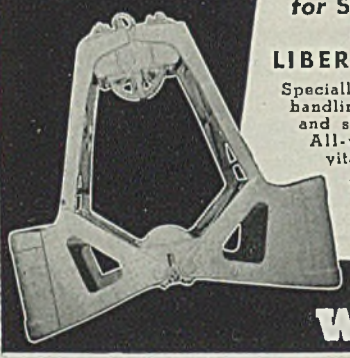

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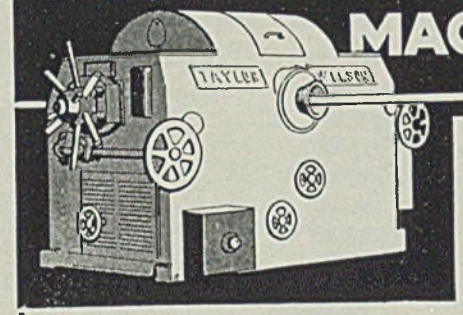

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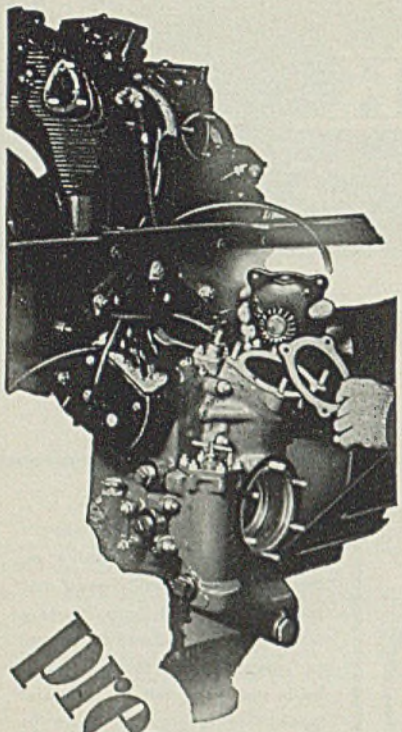

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OHIO

AKRON, O.—Firestone Tire & Rubber Co., Firestone parkway, is erecting a storage building for added facilities, costing $18,000.

CLEVELAND—Aircraft Nut Corp., 2029 East 102nd street, has been organized by Harry A. Fagan, president; Charles P. Egensperger, secretary-treasurer, and Gerald C. Forstner, vice president. George Saks, 1106 Marshall building, is handling legal details.

CLEVELAND—Brush Development Co., 3311 Perkins avenue, has leased 60,000 square feet in the Friedman-Blau-Farber building at East Thirty-seventh street and Perkins avenue for the duration.

CLEVELAND—Parker Appliance Co., 17325 Euclid avenue, has awarded contract to The Austin Co., 16110 Euclid avenue, for one story, 35 x 50-foot boiler house and one story, 40 x 400-foot warehouse. Estimated cost is $200,000.

CLEVELAND—Cleveland Industrial Diamond Tool Co., 3001 East 128th street, has leased a one-story, 40 x 50-foot space at 4713 Euclid avenue, for light machinery work.

CLEVELAND—Pontiac Improvement Co., C. F. Gutsman, 3328 Vega avenue, is having a 45 x 180-foot building at 3634 Euclid avenue improved, which has been leased by S. K. Wellman Co., F. F. White, 1374 East Fifty-first street, for light machine shop.

DESHLER, O.—Concast Corp. has been incorporated to manufacture and sell machinery parts, tools, dies and mechanical appliances by James A. Roberts, agent, Paul E. Roberts and Gertrude M. Fleck.

LORAIN, O.—Thew Shovel Co., East Twenty-eighth street and Fulton road, South Lorain, has acquired the Radiant Mills property to be used for its parts, shipping, accounting and billing departments, thereby releasing space at the main plant for production purposes.

MANSFIELD, O.—Althouse & Jones, architects, 28 Park avenue, will soon let contract for one-story, 90 x 160 ft. for Hartman Electric Co., 37 East Fifth street. Cost will be $40,000.

NEWTON FALLS, O.—Timken Roller Bearing Co., which operates plants at Canton and Wooster, is negotiating with Republic Steel Corp. and Defense Plant Corp., for the lease of Newton Steel Co. plant here, for the duration, to manufacture certain defense products. The plant was completely remodeled last year.

PENNSYLVANIA

PITTSBURGH—United States War Department, Col. Herbert D. Vogel, district engineer, Federal building, Pittsburgh, plans manufacturing plant in Crawford County, to be operated by General Chemical Co., F. Scherzinger, purchasing department, 40 Rector street, New York. General contractor, W. E. Wood Co., 4649 Humboldt street, Detroit.

MICHIGAN

ADRIAN, MICH.—City is having plans prepared for water filtration and pumping plant costing $200,000. Finkbeiner, Pettis & Strout, 725 Nicholas building, Toledo, O., engineers.

CONNECTICUT

NEW HAVEN, CONN.—Wire Rope Corp. of America Inc., 464 Congress avenue, is building factory addition, Daggert street, costing over $40,000. Leo F. Caproni, 1221 Chapel street, is engineer.

NEW JERSEY

PERTH AMBOY, N. J.—Kincaid Mfg. Co., 17 East Forty-second street, New York, has awarded contract for electrical work to Bachman Electric Co., 218 Smith street, for one story, 60 x 250-foot plant addition.

ILLINOIS

CHICAGO—Permanent Mold Castings Co., 120 South LaSalle street, has been incorporated with 1000 shares of common, by J. A. Gubics, H. W. Biringer, and L. Jarson, to engage in manufacture of castings, molds, dies, etc. Correspondent: Fagenholz & Steiner, 120 East LaSalle street.

CHICAGO—Acro Metal Products Corp., 134 North LaSalle street, has been incorporated with 100 shares of common, by H. Clorfene, D. McCabe and L. D. Groton, to deal in metal products, too's and dies. Correspondent: Rappaport & Rappaport, 134 North LaSalle street.

CHICAGO—Kropp Metals Inc., 29 South LaSalle street, has been organized with 1000 shares of common, by R. A. Kropp, J. Morrell, R. B. Kropp, to manufacture metals and metal products. Correspondent: Gilbert F. Wagner, 105 West Adams street.

INDIANA

FORT WAYNE, IND.—Studebaker Corp. of America, South Bend, Ind., is building addition to aircraft engine gear plant here. Giffels & Vallet Inc., 1000 Marquette building, Detroit, architect-engineer. General contractor, Wermuth Inc., 4300 New Haven road, Fort Wayne. Project being financed by Defense Plant Corp.

KOKOMO, IND.—Miller Packing Co. is rebuilding plant, to cost $50,000 or more, including equipment.

MUNCIE, IND.—Goodyear Co., St. Marys Division, St. Marys, O., is remodeling plant. Cost will be $40,000 or more with equipment.

MARYLAND

BALTIMORE — Armiger Construction Co., 2128 Maryland avenue, has contract for alterations to distillery at 400 South Central avenue for Defense Plant Corp., Washington. Lessee, Carrollton Springs Pure Rye Distillery Inc.

BALTIMORE—H. J. Dudley, 102 West Chase street, has contract for manufacturing building and two additions at 1301 Wicomico street for Defense Plant Corp. Revere Copper & Brass Co., lessee.

BALTIMORE—W. E. Bickerton Construction Co., 101 West Twenty-second street, has contract for alteration and addition to plant at Mount Washington for Maryland Bolt & Nut Co. at cost of $14,800. Crout, Snyder & Crandall, 20 East Lexington street, engineers.

BALTIMORE—Joseph E. Lewis Co. Inc. has let contract to Frantz Construction Co., 10 West Chase street, for addition to building at 1303 Carroll street.

SPARROWS POINT, MD.—Rheem Mfg. Co. has taken bids for addition to manufacturing building.

GEORGIA

ATLANTA, GA.—Brice Building Co., 215 South Eighteenth street, Birmingham, Ala., has contract at $65,000 for diesel engine plant here for Southern Railway.

AUGUSTA, GA.—Defense Plant Corp. has increased its contract with Lombard Iron Works, Augusta, to provide additional equipment for plant; cost $41,000.

KENTUCKY

MARION, KY.—Defense Plant Corp. has authorized increase of $70,000 in its contract with Corod Minerals Corp., Marion, to provide plant facilities.

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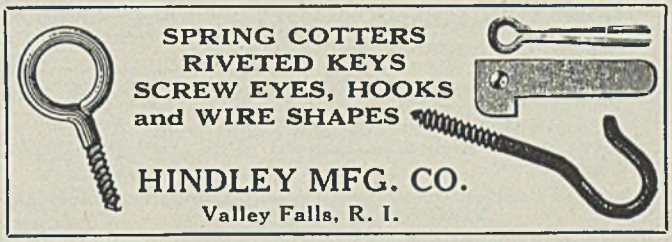

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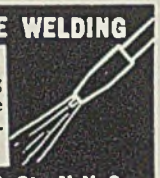

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MISSISSIPPI

JACKSON, MISS.—Ludlow-Martin Steel Co. Inc., H. M. Ludlow, president, 836 Commerce street, will erect two one-story buildings at cost of $30,000.

SOUTH CAROLINA

CHESTER, S. C.—CAA, Candler Field, Atlanta, Ga., has let contract to H. E. Wolf Construction Co., St. Augustine, Fla., for airport facilities, at $930,000.

FLORIDA

SARASOTA, FLA.—Electric Co. has contract for electric distribution system costing under $50,000. United States Engineer Office, Jacksonville, Fla., in charge.

WEST VIRGINIA

BERKELEY COUNTY, W. VA.—Explosive Products Corp., Fifteenth and G streets, Washington, is taking bids for manufacturing plant at Light Farm on Williamsport pike here. Approximate cost $150,000. Workman's Housing Corp., 2000 West Twenty-fifth street, Cleveland, architect and engineer.

VIRGINIA

RICHMOND, VA.—Capitol City Iron Works, P. J. Carverich, 3010 Poplar street, has permit for steel asbestos frame addition, costing $10,000.

MISSOURI

LEBANON, MO.—Laclede Electric Co-operative has allotment of $216,000 to bring electric service to 900 customers.

ST. LOUIS—Emil Willbrandt, 6970 Cornell street, has awarded contract to E. A. Brunson Construction Co., 4052 Forest Park boulevard, for alterations to factory at 865 Kingsland.

ST. LOUIS—Defense Plant Corp. has increased its contract with McDonnell Aircraft Corp. to provide additional equipment for plant in Missouri to cost $150,000.

ST. LOUIS—Defense Plant Corp. increased its contract with White-Rodgers Electric Co., St. Louis, to provide additional equipment for plant in Missouri; cost $150,000.

WISCONSIN

APPLETON, WIS.—Kurz & Root Electrical Mfg. Co. will build one or two-story, 35 x 70-foot factory addition. R. M. Connelly is engineer.

FOND DU LAC, WIS.—J. Brenner Co., 47 Third street, Oshkosh, Wis., will construct one story, 45 x 100-foot warehouse-factory building.

TEXAS

NEW BOSTON, TEX.—City, J. R. McGee, mayor, has applied to FWA for additional funds for water and sewer improvements to cost $317,700. Gieb, La Roche, Dahl & Chappell, Texas Bank building, Dallas, Tex., engineers.

TROUP, TEX.—General Refractories Co., Real Estate Trust building, Philadelphia, will erect 100 x 680-foot brick building with kiln, 500 feet long, and several smaller kilns. Cost will approximate $215,000.

CALIFORNIA

SAN LEANDRO, CALIF.—Nelson Specialty Welding Equipment Co., 440 Peralta avenue, has let contract to D. W. Nicholson, 1701 San Leandro boulevard for 100 x 100-foot factory. Miller & Warnecke, Financial Center building, Oakland, Calif., architects.

WOODLAND, CALIF.—Weaver Tractor Co., Nineteenth and T streets, Sacramento, Calif., has awarded contract to Charles F. Unger, 2426 Seventh street, Sacramento, for warehouse. Estimated cost is $50,000. Harry J. Devine, Cronan building, architect.

OREGON

ALBANY, OREG.—Buildings vacated at Lewis and Clark College, Albany, Oreg., will be converted into an electrometallurgical laboratory by the Department of Mines, at an estimated cost of $500,000.

CANADA

LONDON, ONT.—Federal Foundries & Steel Co. Ltd., 529 Philip street, has given general contract to H. L. Sifton, 192 Sherwood avenue, for plant building to cost, with equipment, about $25,000.

KINGSTON, ONT.—Kingston Shipbuilding Co. Ltd., Ontario street, has had plans prepared by its own staff and will let contracts soon for plant additions to cost, with equipment, about $21,000.

RENFREW, ONT.—Dominion Magnesium Co. Ltd., 18 Rideau street, Ottawa, in association with C. D. Howe, minister of munitions and supply, Ottawa, has given general contract to Foundation Co. of Ontario Ltd., 1158 Bay street, Toronto, for alloy mill building at its plant at Haley's Station near here. Estimated cost, with equipment about $100,000.

SAULT STE. MARIE, ONT.—Algoma Steel Corp. Ltd., Wilde street, has given general contract to McLarty & Hanna, 173 Spring street, for further addition to its steel plant here to cost about $60,000.

TORONTO, ONT.—Aluminum Co. of Canada Ltd., Sun Life building, Montreal, has had plans prepared by J. C. Meadowcroft, architect, 1154 Beaver Hall Hill, Montreal, for two-story plant addition at 158 Sterling road here, to cost, with equipment, about $120,000.

TORONTO, ONT.—Link Brass & Copper Co. Ltd., 110 River street, Karl Link, president, has given general contract to N. M. Roberts, 18 Valleyview gardens, for plant addition, to cost, with equipment, $10,000.

TORONTO, ONT.—Steel Co. of Canada Ltd., Hamilton, has given general contract to T. Robert Page, 18 Toronto street, for addition to Swansea plant here to cost, with equipment, about $17,000. Plans have been prepared by Molesworth & Secord, architects, 18 Toronto street.

TORONTO, ONT.—Cansfield Electrical Works Ltd., 260 Geary avenue, C. E. Cansfield, president, has had plans prepared by Earle L. Sheppard, 57 Queen street West, for plant addition to cost, with equipment, about $15,000.

TORONTO, ONT.—Dominion Bridge Co. Ltd., 289 Sorauren avenue, has given general contract to Anglin-Norcross (Ontario) Ltd., 57 Bloor street West, for addition to plant to cost about $10,000. Company to supply structural steel.

WALLACEBURG, ONT.—Wallaceburg Brass Ltd., Wallace street, has had plans prepared and will let contracts soon for plant addition to cost about $20,000.

WESTON (TORONTO) ONT.—Canada Cycle & Motor Co. Ltd., Dufferin street East, has given general contract to Ramsay Contracting Co., and work will be started at once on plant addition to cost $25,000.

WOODSTOCK, ONT. — Truck Engineering Ltd., 165 Wellington street South, H. V. King, manager, has had plans prepared and will let contracts soon for plant addition to cost, with equipment, about $28,000.

MONTREAL, QUE.—Crane Ltd., 3800 St. Patrick street, has given contract to Concrete Construction Ltd., 1082 Decarie boulevard, for plant addition to cost about $10,000. Anglin Norcross (Quebec) Ltd. has contract for pipe shop for same company, to cost, with equipment, $375,000. Construction work on both projects to be started at once.

SHERBROOKE, QUE.—Canadian Fairbanks-Morse Co. Ltd., Belvedere street, F. T. Thompson, manager, has started preliminary work in connection with new plant addition, estimated to cost, with equipment, about $10,000.

SACKVILLE, N. B.—Enterprise Foundry Co. Ltd., Enterprise street, is having plans prepared for rebuilding foundry plant recently destroyed by fire. Construction and new equipment will cost approximately $65,000.

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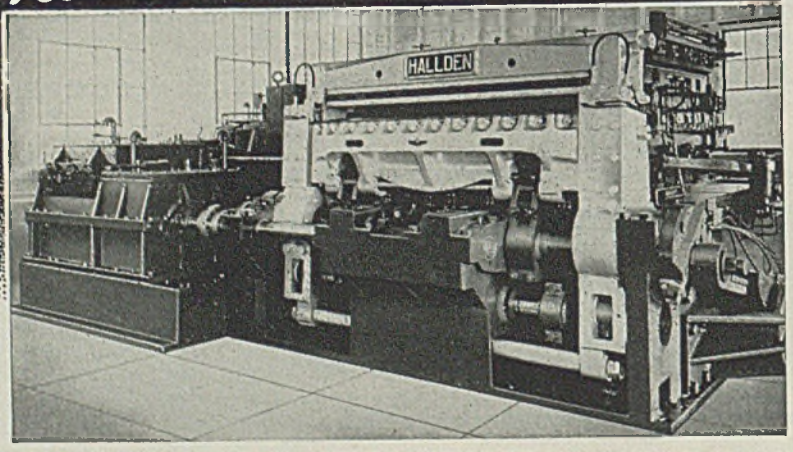

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1—Used No. 50 Perkins Stamping Press—20 Ton capacity, 3" stroke, complete with motor and individual drive.....$250.00

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"But there's a Pay-Roll Savings Plan already running in my plant."

Sure, there is—but how long is it since *you've* done anything about it? These plans won't run without winding, any more than your watch! Check up on it today. If it doesn't show substantially more than 10% of your plant's pay-roll going into War Bonds, it needs winding!

And you're the man to wind it! Organize a vigorous drive. In just 6 days, a large airplane manufacturer increased his plant's showing from 35% of employees and 2½% of pay-roll, to 98% of employees and 12% of pay-roll. A large West Coast shipyard keeps participation jacked up to 14% of pay-roll! You can do as well, or better.

By so doing, you help your nation, you help your workers, and you also help yourself. In plant after plant, the successful working out of a Pay-Roll Savings Plan has given labor and management a common interest and a common goal. Company spirit soars. Minor misunderstandings and disputes head downward, and production swings up.

War Bonds will help us win the war, and help close the inflationary gap. And they won't stop working when victory comes! On the contrary—they will furnish a reservoir of purchasing power to help American business re-establish itself in the markets of peace. *Remember, the bond charts of today are the sales curves of tomorrow!*

You've done your bit Now do your best!

THIS SPACE IS A CONTRIBUTION TO AMERICA'S ALL-OUT WAR EFFORT BY

STEEL

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Where-To-Buy Products Index carried quarterly.

(Continued on next page)

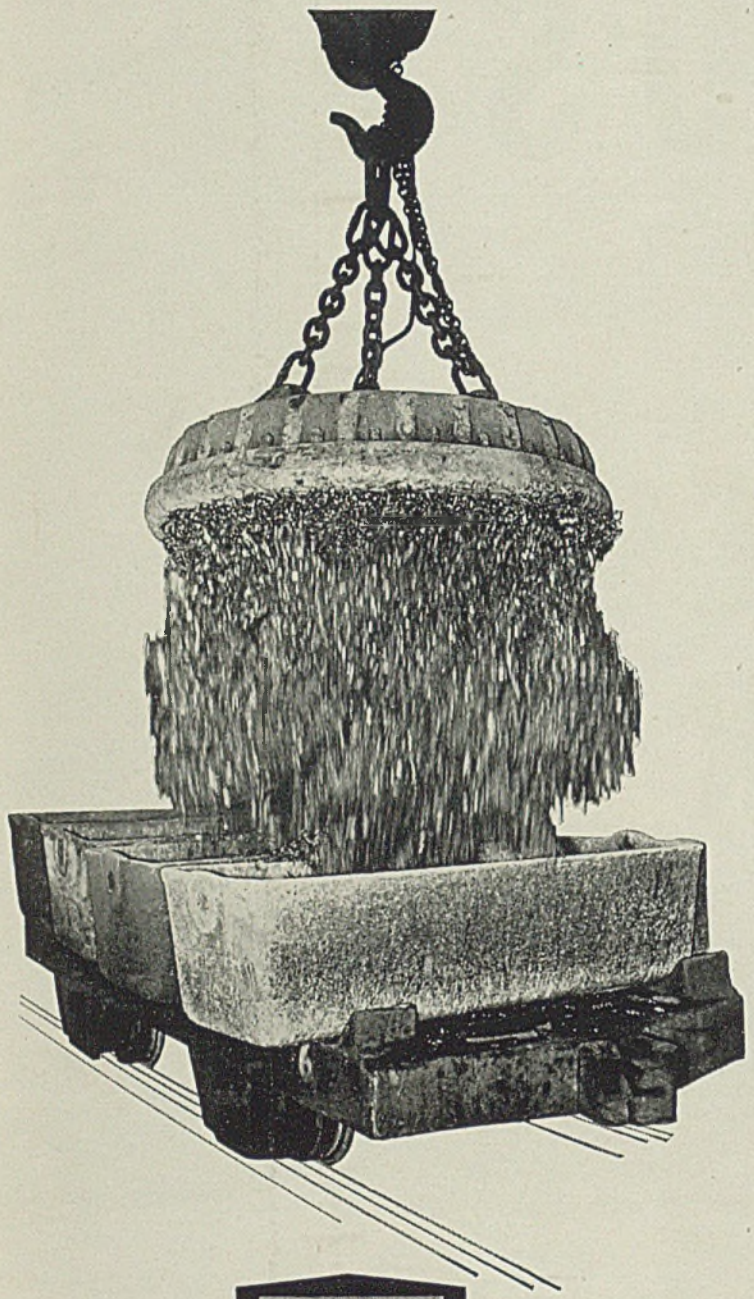
ADVERTISING INDEX

*Advertisements appear in previous issues.

Where-To-Buy Products Index carried quarterly.

(Continued from preceding page)

How much critical Ni, V, Mo . . . is hidden in your "common" scrap?



Thousands of pounds of precious alloying metals, hidden away in common scrap, are every day charged in heats of plain carbon steel, and wasted.

Why does a steel-maker throw away such scarce and valuable material?

Don't blame the steel-maker! When scrap that is purchased as common scrap happens to contain alloying metals, the steel mills cannot make proper use of the alloy content, for it is hidden. And man-hours simply cannot be spared to comb through every part of every carload of scrap and make detailed check-ups, on the possibility of detecting hidden alloys.

Huge tonnages of alloy scrap are continuously circulating from airplane factories and tank arsenals to steel mills, then back again as new alloy steels. This revolving scrap pile is the nation's chief reserve of already-mined alloying metals, above the ground and ready to use.

But unless alloy scrap is classified right at the machine shop or forge where it is produced, unless alloy and common scrap are segregated, these alloying metals, needed so critically in the war effort, are lost for all time.

How important is this matter of alloy-scrap segregation? It is vital. This is an alloy-steel war. If you and we and everyone else ceased to classify alloy scrap, the country's production of fighting alloy steels would drop a calamitous 50 per cent.

That is reason enough, surely, why steel-makers are urging that every pound of alloy scrap be classified, so as to preserve its identity and make it available to help win the war.

BETHLEHEM STEEL

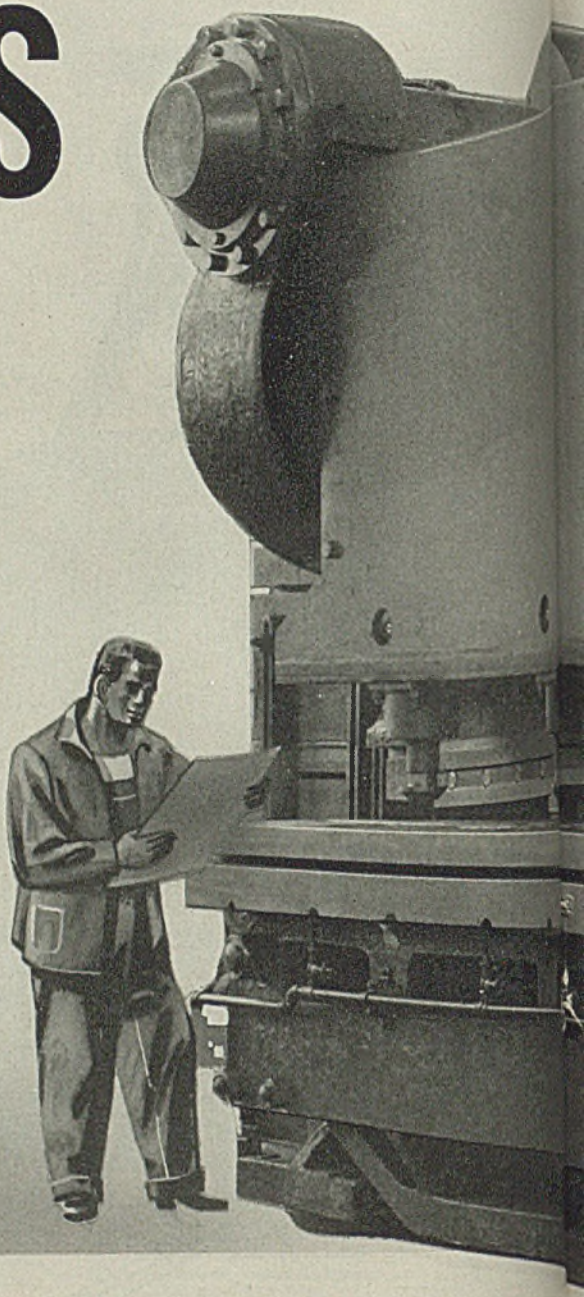
The three suggestions that follow are heartily commended to anyone who wants to do his part to ease the present difficult alloy situation:

(1) Classify every pound of alloy steel scrap.
(2) Keep alloy and common scrap separated.
(3) Keep ferrous and non-ferrous scrap separated.

Our government has issued a classification list showing how alloy steel scrap should be segregated. In case you haven't a copy, let us send one to you. Write to Bethlehem Steel Company, Bethlehem, Pa.

UNITED'S

New PLATE SHEAR



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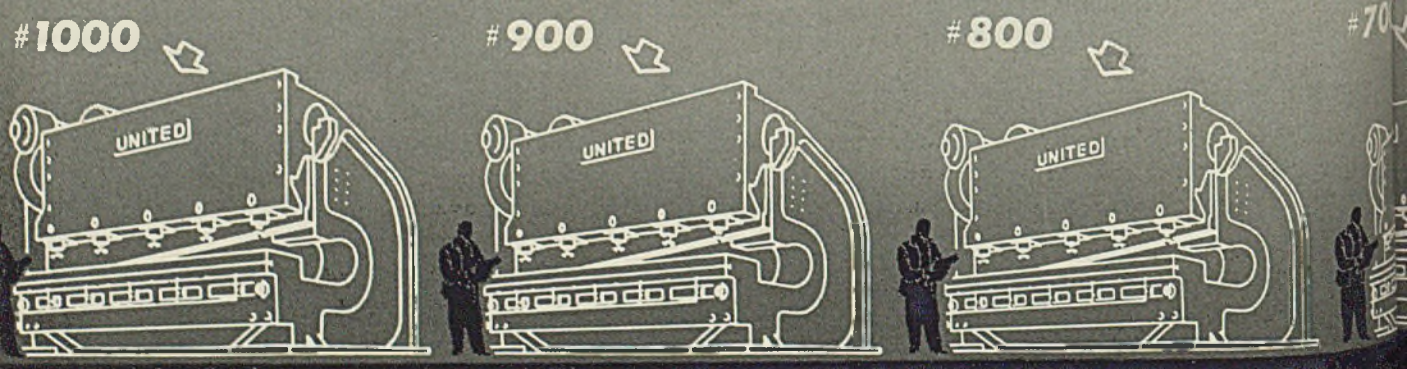

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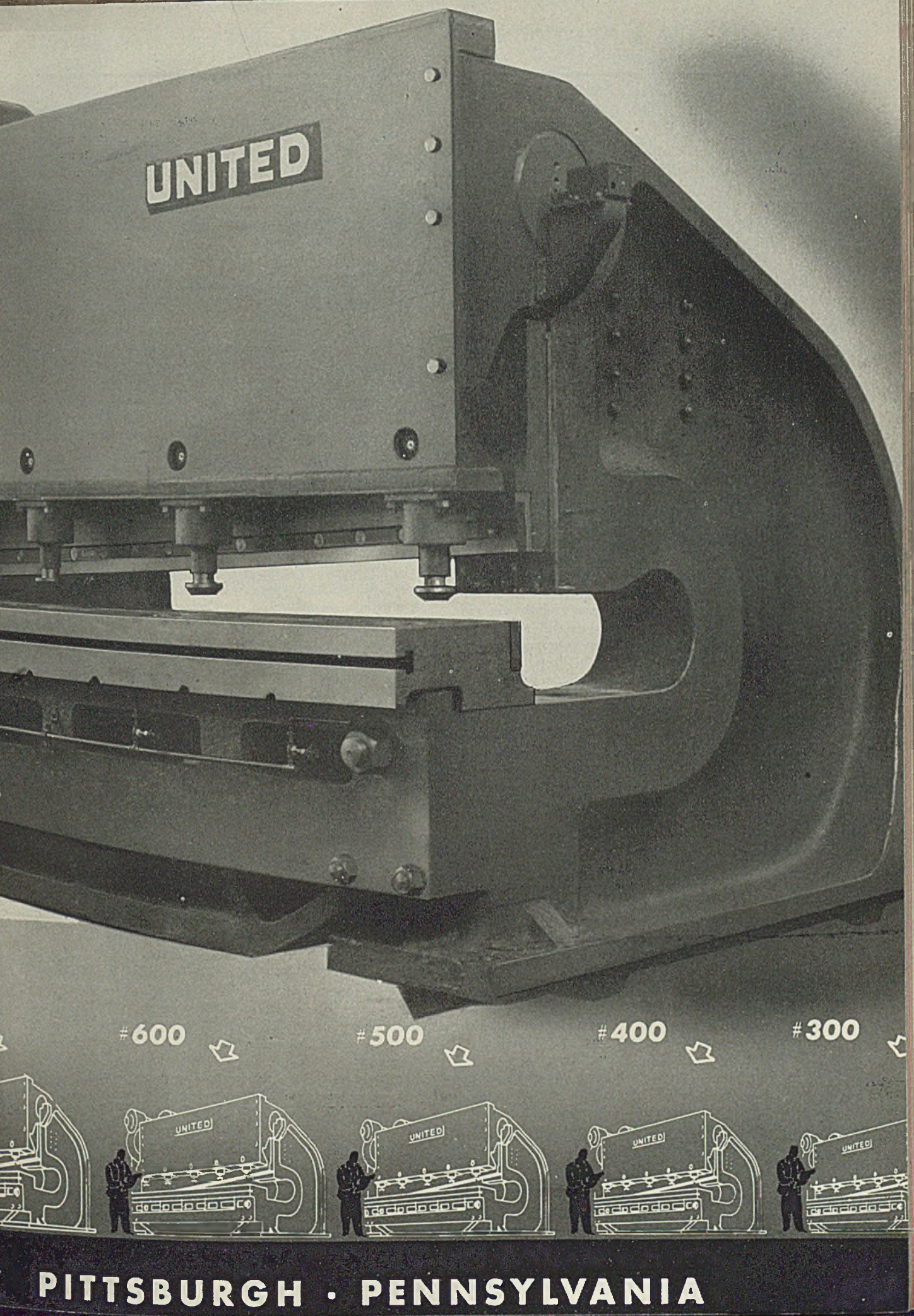


PITTSBURGH · PENNSYLVANIA

BEHIND THE SCENES

Report from the West.

■ As we mentioned here several weeks ago, John Knox, steel plant editor, has been plying his way all through the wild and wooly west lining up some real first-hand information for you in future issues on what has already happened and what may be expected after the war "out thar". Here's a dispatch from John that should give you an inkling of what to expect:

The further I travel along this picturesque Pacific Coast, the more I talk with bankers, chamber of commerce officials, steel manufacturers, fabricators and mill representatives, the more convincing it becomes that something is happening out here that never has happened before. The whole Pacific Coast is a beehive but not much smoke is belching from stacks of industrial plants for the simple reason that low-cost electric power from various hydroelectric plants has cleared the atmosphere. Giants long asleep in the mountains and hills of the Northwest are being aroused from their slumber by the sound of the guns booming in the Far East. Back in the hills of Washington and Oregon minerologists with pick and shovel are bringing into the open many metals which we thought had to be imported into this country. Metallurgists are looking into test tubes in the hope that Oregon silica sands may find their way into aluminum reduction furnaces instead of being shipped from Southern California. Millions of pounds of aluminum are being produced in pig form and shortly will be rolled into sheets on a continuous mill now under construction which resembles in many respects the 4-high continuous sheet mills back in the East. No longer will aluminum be shipped east in pig form to be rolled and then returned in sheet form to the west for fabrication.

The story of the west today is the story of shifting population; the story of shifting population is the story of new markets. The story of new markets is the story of new steel plants. And that is exactly what is taking place. An electric steel plant is under construction in Oregon; another is being considered by WPB for the same state at a cost of 25 millions. Plenty of virgin scrap and low cost power is the stimulant behind the western urge to make steel in its own backyard.

Further down the coast in the region of Los Angeles and San Francisco there is just as keen activity. Here again one encounters the large influx of folk from middle western states—not only an influx but a determination to make the coastal cities their permanent location. Say what you will, the climate and scenery are altering whatever plans these western folk have had for the future. Make no mistake, the Los Angeles-San Francisco area is buzzing and plans for the future are so visionary that one staggers at their proportions.

Everything has been done to provide suitable housing for the shifting population but the growth has been in such proportions that housing conditions still are inadequate in many of the industrial cities. Eventually this will be changed for everywhere the sound of the hammer and the saw is heard; piles of lumber are scattered over wide expanses; row after row of houses are taking shape; and soon grass seed will be scattered. Time and time again in certain cities transportation facilities have been increased only to fall far short in the movement of the masses to and from work. Buses, street cars and private automobiles move workers to and from plants in masterly fashion though horns are used profusely and buses wend their way in and out of traffic that makes Fifth avenue look like a back alley.

Then there is the Kaiser steel plant now taking shape over in Fontana with its dynamic organization. So many false statements have been made concerning Kaiser's operation at Fontana that I was determined to look into every nook and corner—and mind you, with an open mind—in order to find out if the stories I heard back East were true. You can tell the boys back home that they have been greatly misinformed concerning this plant tucked away in 1300 acres of farm land. Such stories that the plant can't get a ladle crane, that the open hearth construction is being held up because of chrome brick shortage, that magnesium isn't being made, that too many minerologists are being employed, etc. are just so much idle talk.

Have it understood, and underscore what I am about to say: I am not trying to fight Kaiser's battle. I merely entered his plant with an unbiased mind. I saw every nook and corner. No question which I submitted was left unanswered by the Kaiser organization. Tell the boys back East for me that this plant at Fontana is a permanent fixture on the Pacific Coast. Tell them to be patient until I can get back to my desk and give them a story that will shake them out of their complacency. Tell them that I'll be facing my typewriter about the middle of May and that I intend to interpret in great detail the transformation that is taking place all along the Pacific Coast, the intensive thought that is being given to post-war conditions and a few untold details concerning Kaiser's steel plant and his organization —all first hand information gathered on a 7500-mile trip under adverse traveling conditions.

So long, for now. I'll be pulling in Cleveland in a few weeks with a loaded brief case and plenty of first-hand information.

J. D. Knox

Golf Rationing

■ One of the cleverest little pieces of promotion we've seen just hit our desk this morning from Struthers Dunn Inc., Philadelphia (Relays, Timers and Solenoids).

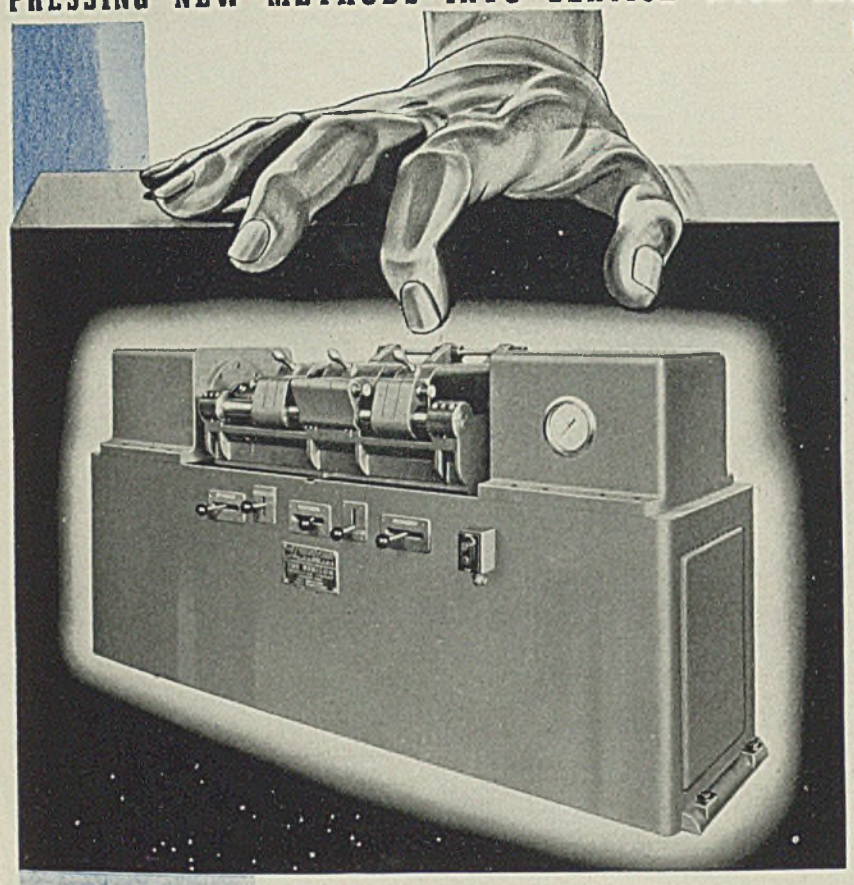
It is a "G" Basic Golf Ration Book, complete with a sticker for your car and eight different unit coupons entitling you to such things as "Bragging about the time you almost made a hole-in-one", "Playing the 19th hole", "Playing poker, bridge or craps", "Looking for lost balls", etc.

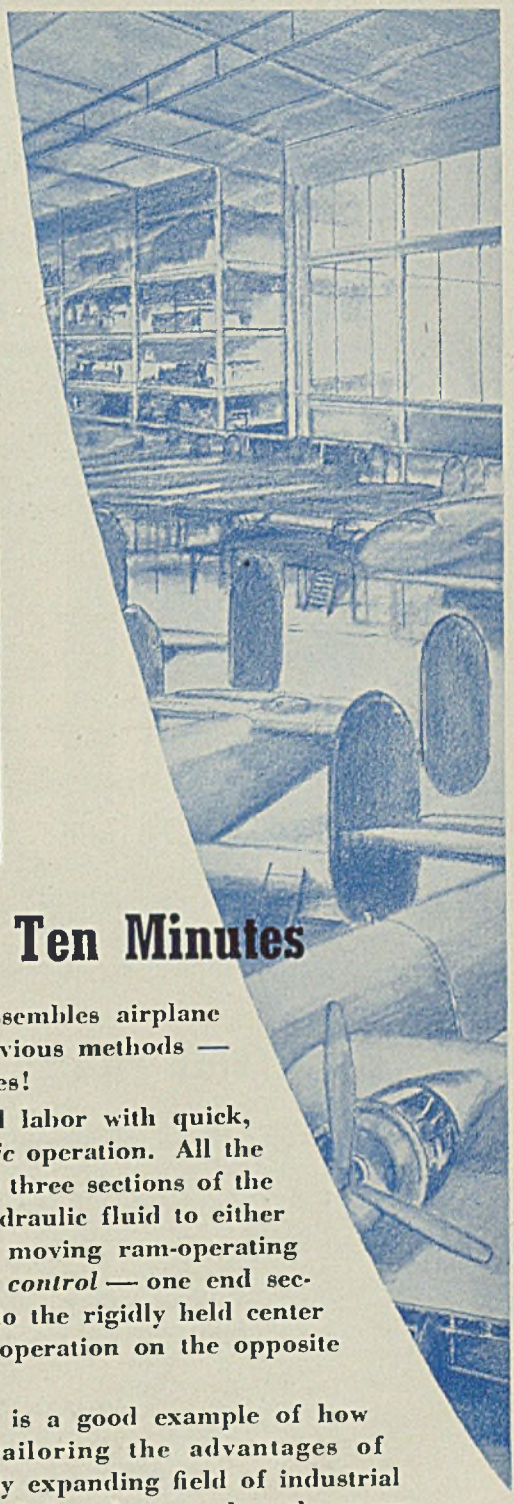
Instructions are to remove the proper coupon and paste it on the head of the nearest bald-headed man as a matter of record. No coupons are necessary for trips to the men's room, and coupons are not transferable but they tell us you can get all you want if you just drop a line to the company at 1321 Arch street, Philadelphia.

Vol. 112, No. 17, April 26, 1943, issue of STEEL, published every Monday at Cleveland, Ohio. Entered as second class matter at the post office, Cleveland, O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6; 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00.

Editorial Contents—Page 43

PRESSING NEW METHODS INTO SERVICE WITH INDUSTRY'S NEW RIGHT HAND



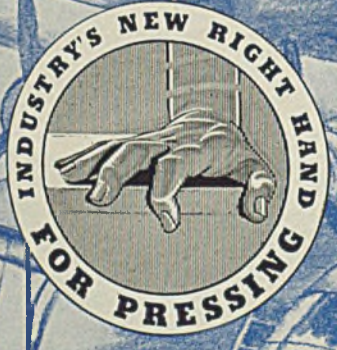


Three *Extra* Crankshafts Every Ten Minutes

The streamlined press shown above assembles airplane crankshafts *four times faster* than previous methods — cuts the job-time from *10* to 2½ minutes!

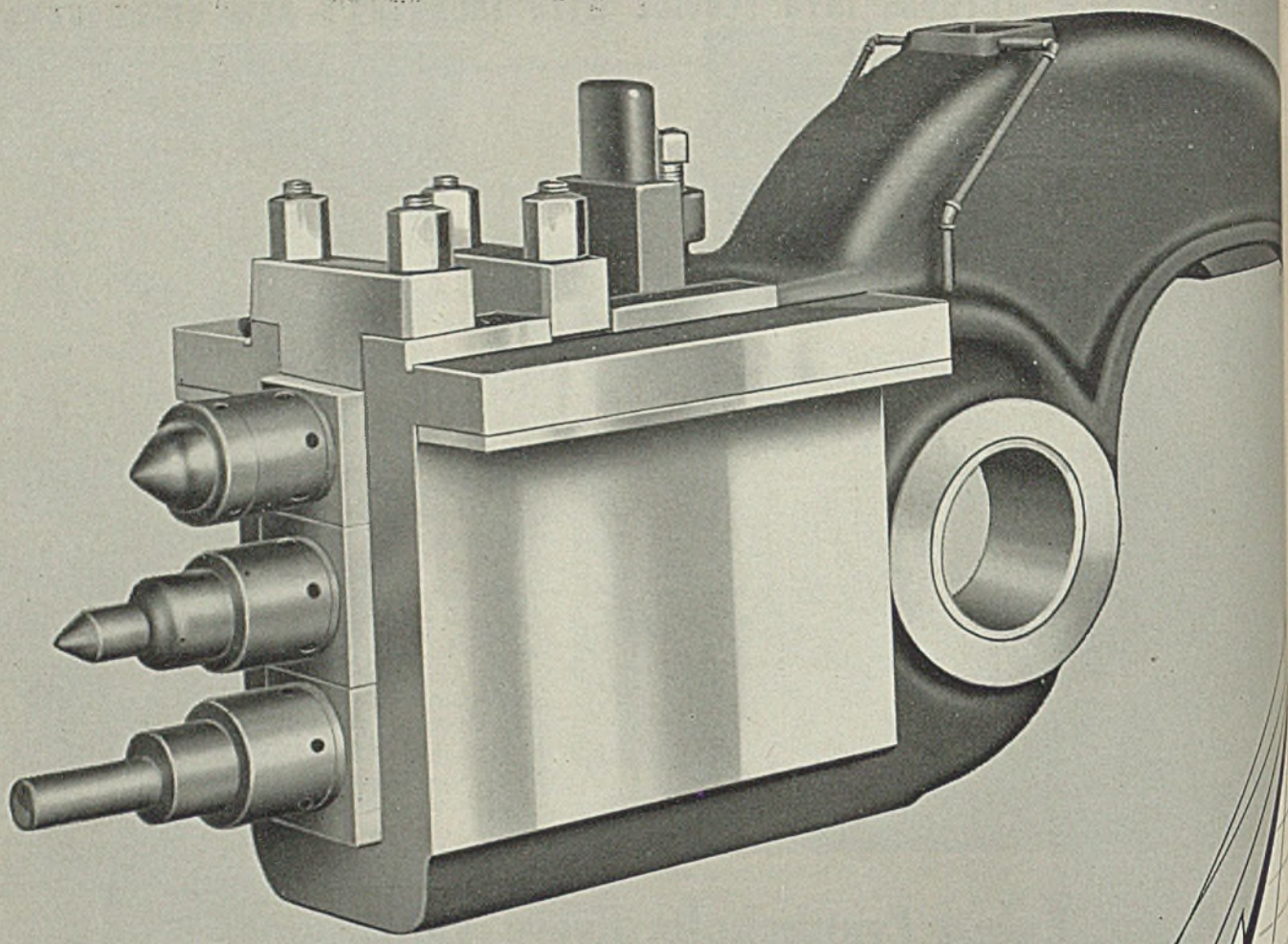
It replaces tedious, painstaking hand labor with quick, accurate, semi-automatic *oil hydraulic* operation. All the workman has to do now is lock the three sections of the shaft in the fixture, and direct hydraulic fluid to either the right or left ram. Then by moving ram-operating levers — *with fingertip pressure control* — one end section of the shaft is assembled to the rigidly held center section. He then repeats the operation on the opposite end of the shaft.

This time-saving equipment is a good example of how Denison Engineers are tailoring the advantages of HydrOILics to a constantly expanding field of industrial operations. They will be glad to show you how the exceptional *smoothness, flexibility and accuracy* of oil hydraulic *power, speed, and control* can be applied to your products or production. Write or wire today, or call your Denison representative.



The DENISON Engineering Co.
1163 Dublin Rd., Columbus, Ohio

DENISON
EQUIPMENT in APPLIED
HydrOILics



EXTENDED PILOTED HEADING SLIDE

Forgings to micrometer accuracy with holes ready for broaching are possible only because of this Extended Slide . . . originated and first used by National . . . a feature so basically sound that it has defied every effort at improvement.

Always First Across the Finish Line!

Not luck . . . but an ability to gauge machine forging needs with accuracy . . . is responsible for the fact that National's engineers have been "first to finish" with every major development in forging machine design.

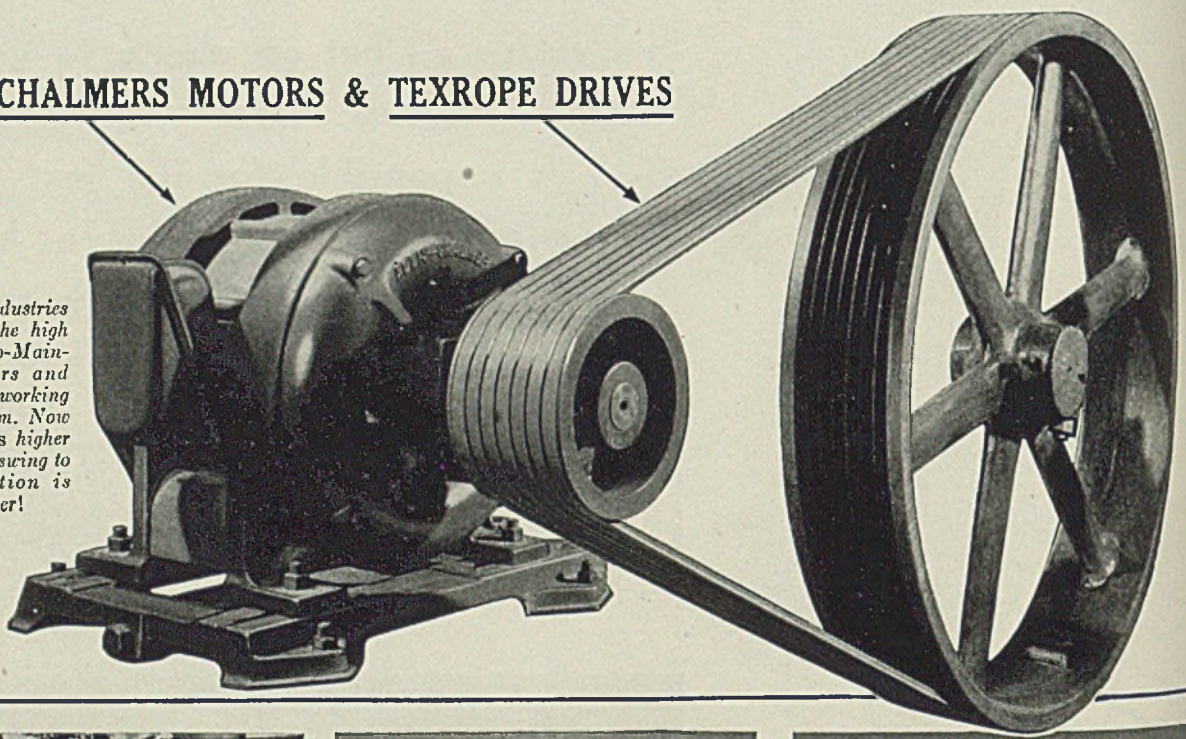
NATIONAL
MACHINERY COMPANY
TIFFIN, OHIO

NATIONAL HIGH DUTY FORGING MACHINE — Built in 1-inch to 9-inch sizes.

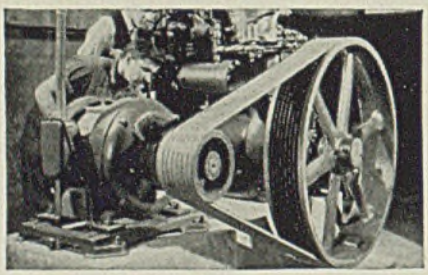
IN PEACE AND WAR--

Give this an "E" for

ALLIS-CHALMERS MOTORS & TEXROPE DRIVES

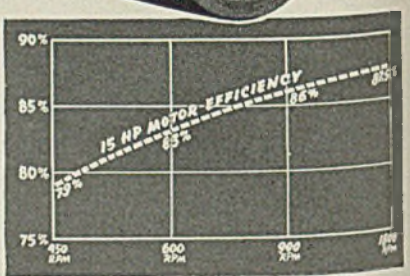


Thousands of industries already know the high efficiency of Lo-Maintenance Motors and Texrope Drives working together as a team. Now that war forces higher efficiencies, the swing to this combination is stronger than ever!



1 In most applications, an 1800 rpm motor with Texrope Drive will ably do the job of a lower-speed, direct-connected motor —at lower cost in money *and materials!*

2 When you buy an 1800 rpm instead of 450 rpm 15 hp squirrel-cage motor, for example, 600 lb are saved. And *you* save well over $200 — with drive figured in!



3 Note that efficiency rises from 79% for the 450 rpm motor to 87.5% for the 1800 rpm motor. The 1800 rpm motor saves you over 30 kw/24 hr. day.

A-C MILWAUKEE

WE WORK FOR VICTORY

WE PLAN FOR PEACE

ALLIS-

Combination Efficiency!

☛ Using high-speed motors with Allis-Chalmers Texrope Drives and single-speed motors with Allis-Chalmers Vari-Pitch Sheaves and Speed Changers has always been good practice. Today it's a vital practice!

☛ Such combinations give sharply higher efficiencies —at lower cost in man-hours, money and materials!

☛ As America's only builder of both motors and V-belt drives, Allis-Chalmers has long studied and advocated their use in proper combination.

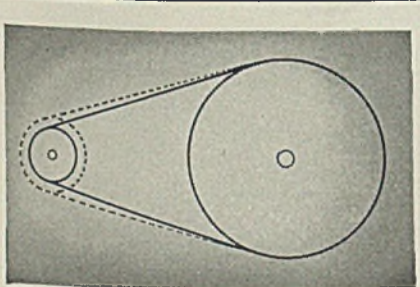
☛ Today you benefit from Allis-Chalmers pioneering when you ask for—and get—the right combination of Lo-Maintenance Motor and Texrope Drive!

BUILDING the largest variety of capital goods in the world, Allis-Chalmers know-how is in many ways unique — and is *completely* at the service of American war industry.

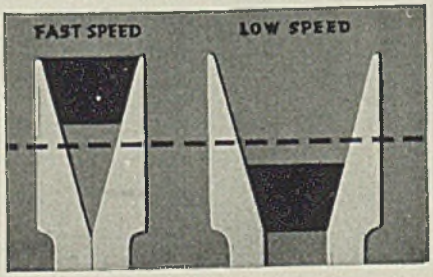
Allis-Chalmers, builder of Lo-Maintenance Motors, *originated* the multiple V-belt drive and Vari-Pitch Sheaves.

Today there's every patriotic *and business* reason for using material-saving, money-saving single speed and high-speed motors — made flexible and more efficient by Texrope Drives.

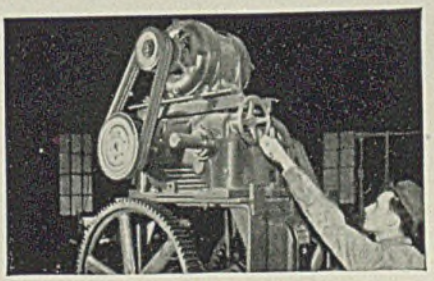
Don't hesitate to call on Allis-Chalmers district offices for engineering data or recommendations — or write direct to ALLIS-CHALMERS MFG. CO., MILWAUKEE, WISCONSIN. A 1581



4 Infrequently needed speed changes can be had by changing from one size motor sheave to another. Juggling *complete* drives, range is 1:1 to 7:1.



5 With the Allis-Chalmers Vari-Pitch Sheave, you can increase or decrease speed by adjusting sheave diameter . . . obtaining an *unbroken* series of speeds!



6 Allis-Chalmers Vari-Pitch Speed Changer gives you infinite changes at the turn of a wheel — within 3.75 to 1. It's compact, flexible, *efficient!*

CHALMERS

LO-MAINTENANCE MOTORS
TEXROPE DRIVES

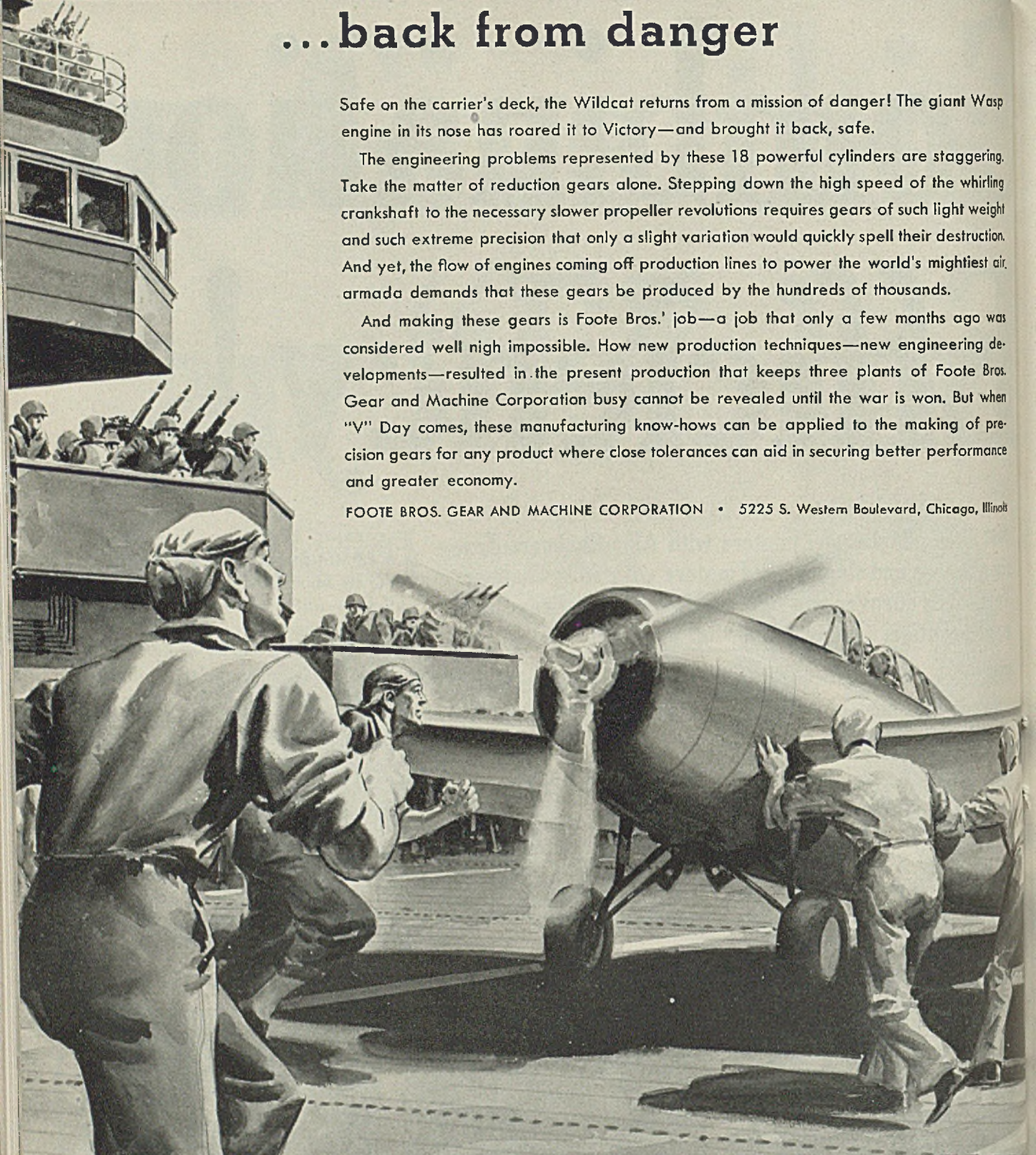
...back from danger

Safe on the carrier's deck, the Wildcat returns from a mission of danger! The giant Wasp engine in its nose has roared it to Victory—and brought it back, safe.

The engineering problems represented by these 18 powerful cylinders are staggering. Take the matter of reduction gears alone. Stepping down the high speed of the whirling crankshaft to the necessary slower propeller revolutions requires gears of such light weight and such extreme precision that only a slight variation would quickly spell their destruction. And yet, the flow of engines coming off production lines to power the world's mightiest air armada demands that these gears be produced by the hundreds of thousands.

And making these gears is Foote Bros.' job—a job that only a few months ago was considered well nigh impossible. How new production techniques—new engineering developments—resulted in the present production that keeps three plants of Foote Bros. Gear and Machine Corporation busy cannot be revealed until the war is won. But when "V" Day comes, these manufacturing know-hows can be applied to the making of precision gears for any product where close tolerances can aid in securing better performance and greater economy.

FOOTE BROS. GEAR AND MACHINE CORPORATION • 5225 S. Western Boulevard, Chicago, Illinois



The Grumman Wildcat pictured here has been the Navy's first line fighter since Pearl Harbor. O'Hare, Thatch, Gaylord and other Navy Aces became famous in the cockpit of this tough plane.

ARMY E NAVY

FOOTE BROS.

Better Power Transmission Through Better Gears

CONSERVE **STEEL!**

CONSERVE **WEIGHT!**

CONSERVE **TRANSPORTATION!**

MAKE YOUR PRODUCT OF

N-A-X

HIGH TENSILE

DUCTILITY
ITS INHERENTLY FINER GRAIN MAKES ALL THE DIFFERENCE
STRENGTH

When you build your product of N-A-X HIGH TENSILE you conserve 3 ways—you conserve steel, you conserve weight, and you conserve transportation.

With N-A-X HIGH TENSILE, you need less steel to provide a given strength factor. That saves steel! You can build lighter without any sacrifice of strength. That saves weight! And when you save weight you save transportation—and that's a vitally important factor today in speeding our war effort.

N-A-X HIGH TENSILE is the answer to many a production problem today. Its high ultimate strength, high yield point, unusual ductility, easy weldability, and its unusually high resistance to impact and fatigue in sub zero cold or blistering heat—makes N-A-X HIGH TENSILE a superior steel for hundreds of exacting applications.

Why not investigate N-A-X HIGH TENSILE for your product? A Great Lakes Engineer will be glad to show you how this unusual steel can be used to advantage. Send for new booklet on N-A-X 9100 Series—and useful Hardenability Chart.

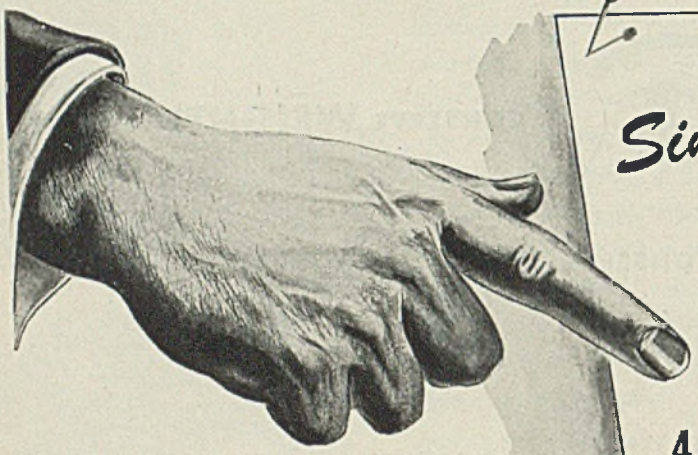
GREAT LAKES STEEL CORPORATION
Detroit, Michigan
Sales Offices in Principal Cities

NATIONAL STEEL

Division of
NATIONAL STEEL CORPORATION
Executive Offices · Pittsburgh, Pa.

Casualty List

from the Home Front



Since Pearl Harbor:

46,500 Workers Killed

165,000 Workers Permanently Disabled

4,000,000 Accidents Reported

450,000,000 Man-Days Lost Due to Accidents

So far in this war, "accidents"—both on and off the job—have proven a more devastating enemy than the Nazis and Japs combined. Government figures show that, since the start of the war, there have been many more casualties—both killed and injured—among American industrial workers than the total military casualties of all our armed forces.

Every day since Pearl Harbor, over 11,000 war workers have been killed or injured—on or off the job. And the tragedy of it is that most of these accidents could and *should* have been prevented.

What can we do to stop this appalling loss of manpower? The National Safety Council has proved time after time that accident rates *can* be cut—*50 per cent and more,* in factories and industrial communities that use its preventive measures.

SAVE **Manpower** for **Warpower**

The Birdsboro Steel Foundry and Machine Company has for years conducted prevention campaigns to cut down accidents on the job, in the home and on the highway. In addition we have now joined in the nation-wide accident-prevention campaign being conducted by the War Production Fund to Conserve Manpower.

This campaign—instituted by American industry, with the endorsement of the President and the War Production Board—is being conducted to help facilitate a vastly expanded program of the National Safety Council for the protection of American war workers.

The War Production Fund offers the management of American business an opportunity to be of *practical* help in the vital task of stamping out industrial accidents. Full information can be obtained from the address below.

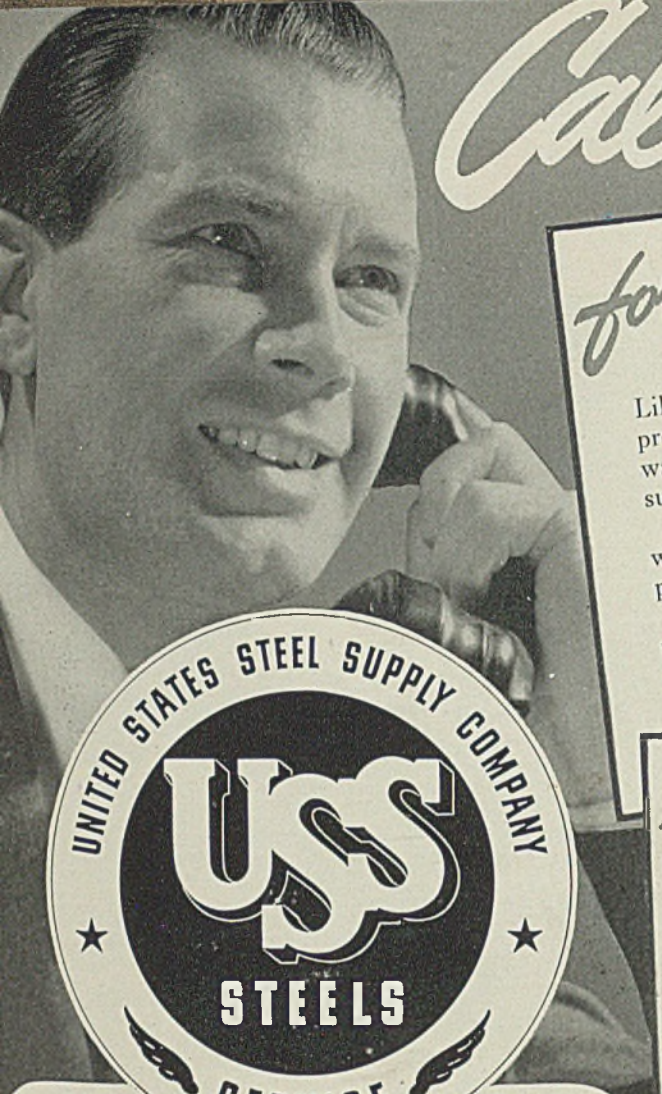
For further information, write to

War Production Fund to Conserve Manpower

Chrysler Building, New York, N. Y. LExington 2-0280

William A. Irvin, National Chairman

BIRDSBORO STEEL FOUNDRY AND MACHINE CO., BIRDSBORO, PA.



Call us

for GENERAL PURPOSE STEELS

Steel products, tools, machinery and equipment

Like yours, our first job is to speed war production. So, if your production on a war job is in danger of being slowed down for want of some piece of steel—call our nearest warehouse. Many such calls have kept wheels turning.

Although our stocks are not what we wish they were, what we have can be yours—in a hurry—subject, of course, to priority restrictions.

If we don't have what you need, we'll do everything we can to help you find a source of supply. So try us—note our phone and teletype numbers below, at the left.

for NATIONAL EMERGENCY ALLOY STEELS

These new alloy steels were developed as substitutes for the old style alloy steels to save critical materials such as nickel and chromium. They cover a wide range of properties—were especially designed to meet present conditions. In fact, many "NE" steels are actually out-performing the steels previously used.

We welcome your inquiries and will gladly assist you in determining the grades best suited to your needs. Telephone, write or wire the warehouse nearest you.

for AIRPLANE MATERIALS

Our Chicago Warehouse has been designated by the War Production Board as a warehouse to distribute the following aircraft products:

WD-X-4130 Sheets, *Open Hearth, Normalized, Pickled and Oiled to Spec. AN-QQ-S-685, Condition N. All gauges .016 to .50 sheets 18 x 72".*

Stainless Steel Rounds, *Spec. AN-QQ-S-771.*

Stainless Sheets—*Spec. AN-QQ-S-772. Spec. AN-QQ-S-757.*

These materials are for use in airplanes and available at our Chicago Warehouse only. If you are eligible for these materials, phone, write or wire: United States Steel Supply Company, P. O. Box MM, Chicago, Ill. Telephone, BRUnswick 2000—Teletype CG. 605.

UNITED STATES STEEL SUPPLY COMPANY

USS STEELS

SERVICE

CHICAGO,	1319 Wabansia Ave., P. O. Box MM	BRUnswick 2000 *Teletype CG. 605*
BALTIMORE,	Bush & Wicomico Sts.,	GILmore 3100
BOSTON,	176 Lincoln St., Allston, P. O. Box 42	STAdium 9400 *Teletype BRTN. 10*
CLEVELAND,	1394 E. 39th St.,	HEnderson 5750 *Teletype CV: 153*
NEWARK, N.J.,	Foot of Bessemer St., P. O. Box 479	Bigelow 3-5920 REctor 2-6560 *Teletype NK. 74* BErgen 3-1614
PITTSBURGH,	1281 Reedsdale St., N.S.,	CEdar 7780 *Teletype PG. 475*
ST. LOUIS,	21st & Gratiot Sts.,	MAin 5235 *Teletype SL. 384*
TWIN CITY,	University Ave. and Eustis St., St. Paul, Minn.	NEstor 2821 *Teletype STP. 154*

UNITED STATES STEEL SUPPLY COMPANY

(formerly Scully Steel Products Company)

UNITED STATES STEEL

FLASH and

OIL IS AMMUNITION
USE IT WISELY !

DRUMS! DRUMS! DRUMS!

War needs make it extremely important that all empty drums be returned immediately.

INDUSTRIAL TYCOL OILS-GREASES

SCIENTIFICALLY ENGINEERED
FOR EVERY INDUSTRIAL USE

TYCOL
STEEL

FIRE

This is #2 of a series of informative messages concerning the meaning and significance of commonly used tests and terms employed to describe the characteristics of lubricating oils.

TIDEWATER LUBRICANIA

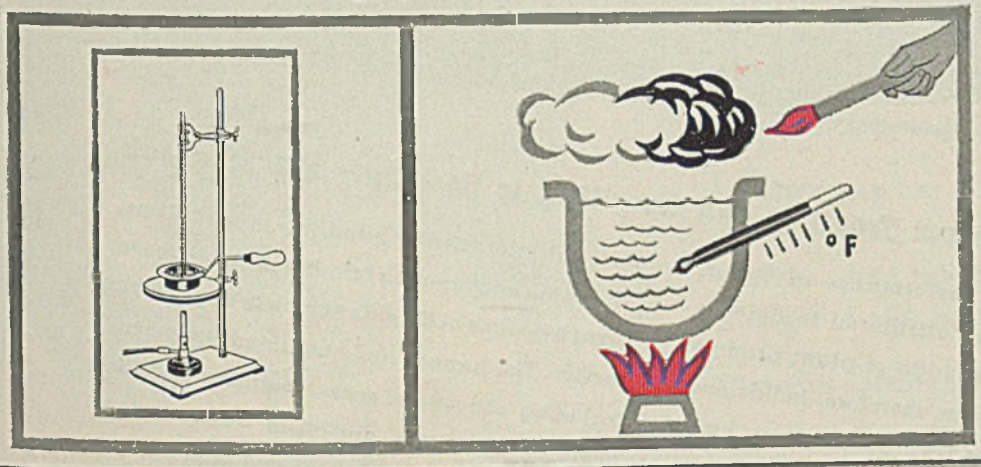
DEFINITION: That temperature at which a lubricating oil will first give off sufficient vapors to ignite when approached by a small flame or spark is termed the flash point—the lowest temperature at which when ignited, the oil continues to burn is called the fire point.

TEST: The flash point and the fire point of lubricating oil are usually determined by means of the Cleveland Open Cut Tester by following a definitely prescribed procedure. The oil under test is heated and a small pilot flame is moved over the cup with every 5°F rise in oil temperature. The first time a flash occurs on the surface of the oil, the temperature of the oil is recorded as the flash point. If the oil is heated still further and tested with the pilot flame, it will commence to burn with a continuous flame. When this occurs the oil temperature is recorded as the fire point.

For most purposes knowledge of the Flash Point alone is sufficient. It indicates the ordinary fire hazard in handling petroleum fuels and similar volatile products. With lubricating oils, Flash Points sufficiently high to avoid undue evaporation losses in service are definitely required.

The following illustrates examples of flash points of typical petroleum products, fire points being somewhat higher:

Gasoline .....below 0°F	Kerosene .....115-150°F
Cleaning Naptha ....110-115°F	Light Machine Oil....325-400°F
Heavy Cylinder Oil..525-625°F	



Tycol lubricants are subject to rigid flash point control during manufacture. Uniformly correct flash points, insuring undiluted products in every grade, are one of many Tycol characteristics contributing to high quality.

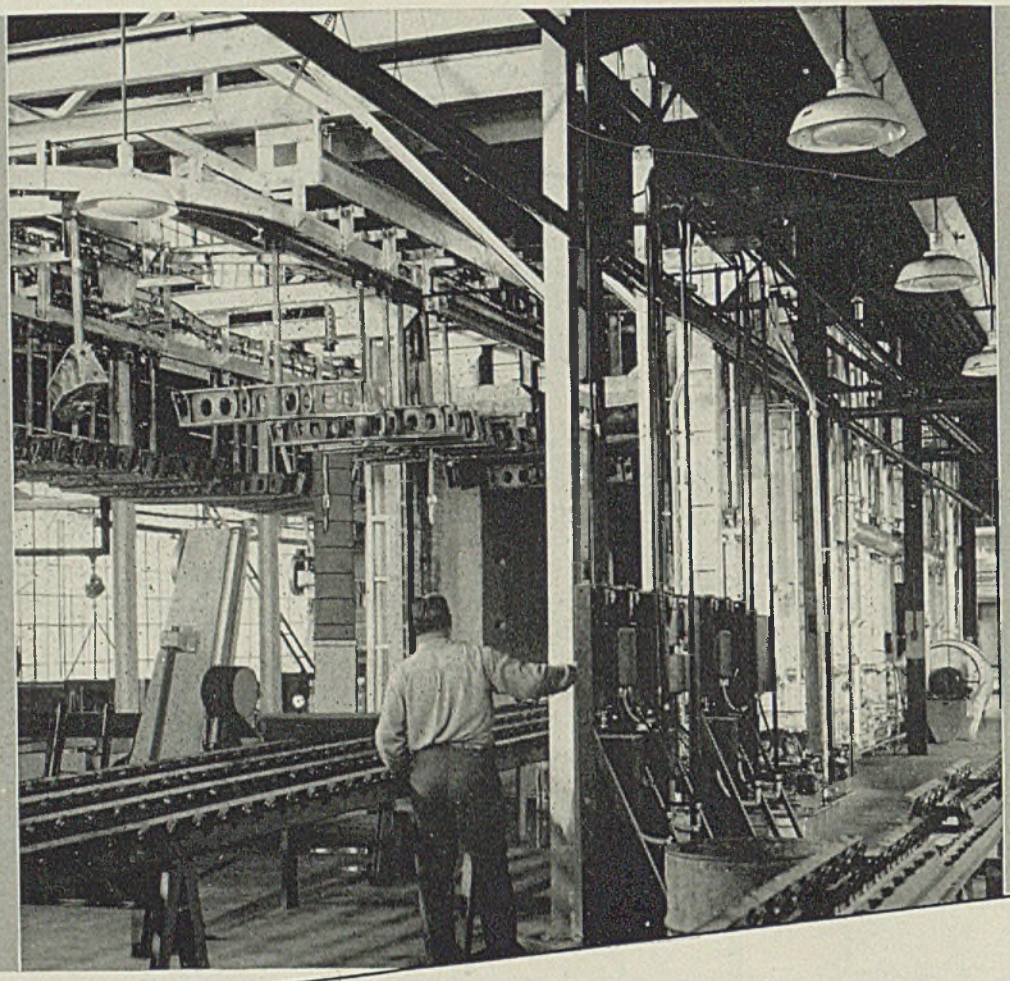
TIDE WATER ASSOCIATED OIL COMPANY

Eastern Division: 17 Battery Place, New York • *Principal Branch Offices:* Boston, Philadelphia, Pittsburgh, Charlotte, N. C.

MAKERS OF THE FAMOUS VEEDOL MOTOR OIL

INDUSTRIAL LUBRICANTS

Salem's Ingenuity Applies to Furnaces And Auxiliary Handling Equipment



Example, Bomb Heat Treating and Handling is Now Only a 3 Man Job

● The outstanding performance of Salem furnaces may well be attributed to Salem's experience and knowledge of plant production operations. Salem, therefore, builds and designs furnaces as well as auxiliary handling machinery, which co-ordinates the operations of all equipment to speed production and lower costs. With this thorough understanding of manufacturing procedure, Salem engineers can also offer dependable furnace designs which will dovetail into existing handling mechanisms. The bomb heat treating furnace, pictured above, gives evidence of Salem's complete engineering service. The furnace and quenching equipment, including conveyors, racks, charging and discharging apparatus, are all of Salem design. This war equipment . . . big and important as it is . . . requires only THREE MEN for operating as well as supervision. Write to Salem about your problem—use Salem's experience in war production equipment.

SALEM ENGINEERING COMPANY

SALEM ENGINEERING CO. . . SALEM, OHIO

Here's a screw driver bit that has more lives than a cat

Apex Phillips Power Bits do wear out eventually, but Apex Reconditioning Service gives them many lives.

When you have Apex-Phillips Bits reconditioned, you not only save important money, but you help our War Effort by conserving a vitally critical material . . . Tool Steel.

Do not scrap your worn out Phillips Bits—send them to us for reconditioning. They will be returned promptly, just as good as new bits.

When you buy Apex-Phillips Bits and use Apex Reconditioning Service you can then be sure your tool cost per thousand screws driven is down to rock bottom.

Write for Catalog #15 for complete information.

APEX

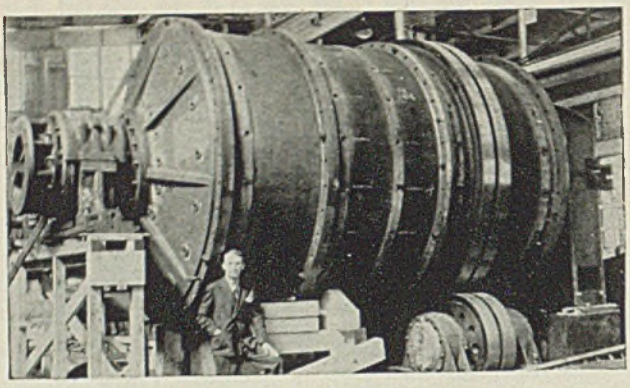
THE APEX MACHINE & TOOL CO., DAYTON, OHIO

Manufacturers of Power Bits for Phillips, Slotted Head, and Clutch Head Screws; and Hand Tools for Phillips and Clutch Head Screws.

Phillips Bit Reconditioning Service for the Pacific Coast at the Burklyn Co., 3429 Glendale Blvd., Los Angeles, Calif.

Meehanite Foundries

Allentown, Pa.
Traylor Engineering Company
Ansonia, Conn.
Farrel-Birmingham Co., Inc.
Bridgewater, Mass.
The Henry Perkins Co.
Brooklyn, New York
E. W. Bliss Company
Buffalo, N. Y.
Pohlman Foundry Co., Inc.
Charleston, W. Va.
Kanawha Manufacturing Co.
Chattanooga, Tenn.
Ross-Meehan Foundries
Chicago, Ill.
Greenlee Foundry Company
Cincinnati, Ohio
Cincinnati Grinders Incorporated
The Cincinnati Milling Machine Co.
Cleveland, Ohio
Fulton Foundry & Machine Co.
Denver, Colo.
The Stearns-Roger Mfg. Co.
Detroit, Mich.
Atlas Foundry Co.
Flint, Mich.
General Foundry & Mfg. Company
Hamilton, Ohio
The Hamilton Foundry & Machine Co.
Hamilton, Ontario, Canada
Otis-Fensom Elevator Company
Irvington, N. J.
Barnett Foundry & Machine Co.
Jeannette, Pa.
Elliott Company
Lewisburg, Tenn.
Marshall Stove Company
Los Angeles, Calif.
Kinney Iron Works
Milwaukee, Wis.
Koehring Company
Mt. Vernon, O., Grove City, Pa.
Cooper-Bessemer Corporation
New Rochelle, N. Y.
Meehanite Metal Corporation
New York, N. Y.
The American Brake Shoe & Foundry Co.
Oakland, Calif.
Vulcan Foundry Company
Orillia, Canada
E. Long, Ltd.
Philadelphia, Pa.
H. W. Butterworth & Sons Co.
Florence Pipe Foundry & Machine Co., (R. D. Wood Company, Selling Agents)
Phillipsburg, N. J.
Warren Foundry & Pipe Corp.
Pittsburgh, Pa.
Rosedale Foundry & Machine Co.
Rochester, N. Y.
American Laundry Machinery Co.
St. Louis, Mo.
Banner Iron Works
St. Paul, Minn.
Valley Iron Works
London, Eng.
The International Meehanite Metal Co., Ltd.
Waterloo, N. S. W.
Australian Meehanite Metal Co., Ltd.
Johannesburg, South Africa
Meehanite Metal Co. (S.A.) (Pty.) Ltd.



This 9 foot x 12 foot Marcy Mill, cast in Meehanite, carries a ball load of 50 tons. Weight on each trunnion—70 tons.

Meehanite WEAR-RESISTING CASTINGS

ARE TOUGH • SOLID • UNIFORM

One of Meehanite's outstanding fields of service is in Wear-Resisting applications. Meehanite castings are a particularly good choice for many such jobs, because their wear-resisting properties can be combined with other desirable features such as high strength, vibration absorption, self lubricating properties, easy machinability, and dependably uniform density and solidity.

5 DIFFERENT WEAR-RESISTING TYPES

Meehanite castings are available in five distinct Wear-Resisting types. Several types are needed because the properties required for various applications change with the type of service. Certain Stamping Dies, for example, might require very different metallurgical characteristics than truck brake drums. In the various types of Meehanite you can obtain: a tough, dense cast metal of high endurance limit; or castings, which when heat treated are file hard and have good anti-friction qualities; or a material particularly suited for ordinary abrasion resistance; or a casting chilled to a hard surface and tough back; or an extremely hard material for resisting the abrasive action of granite, carborundum, coke, etc.

METALLURGICAL CONTROL ASSURES DEPENDABILITY

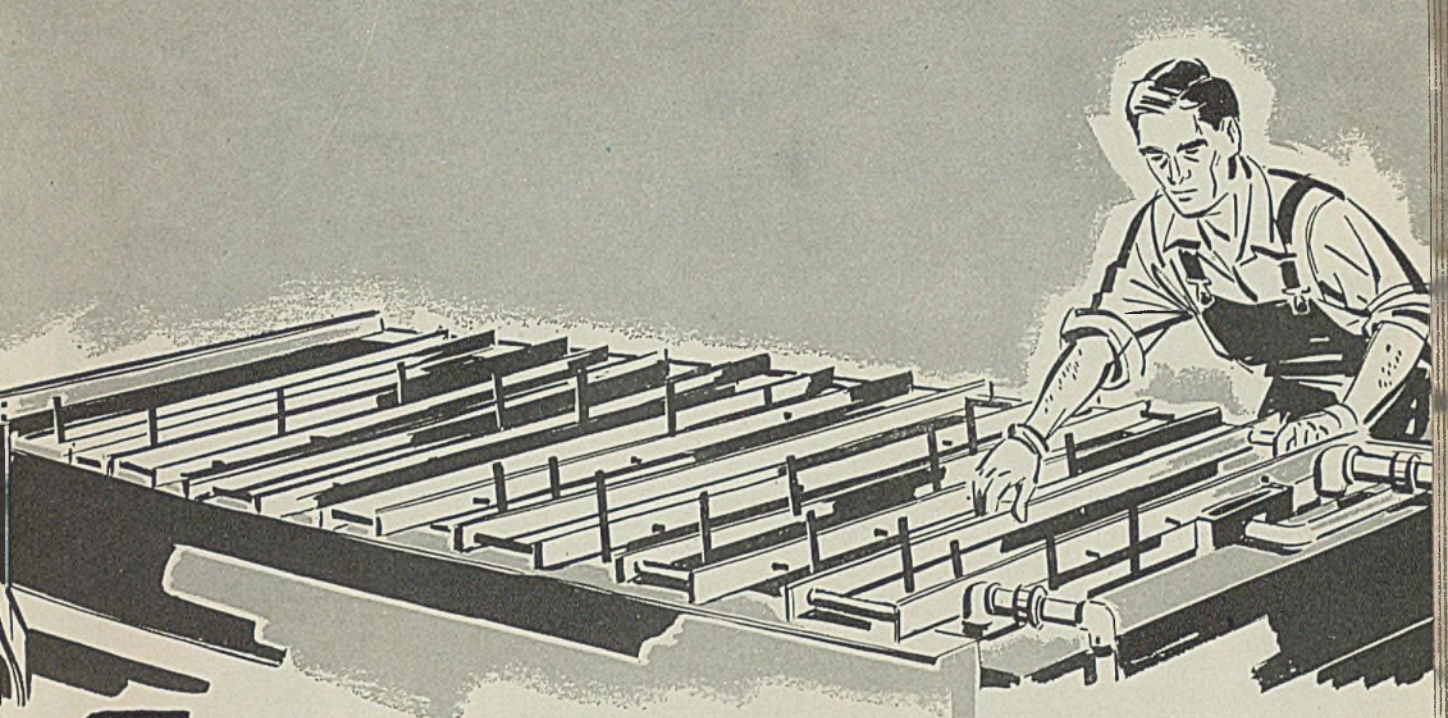
The strict control of physical properties, a dominant characteristic of the Meehanite manufacturing processes, gives you the type of Meehanite best suited to your particular needs. The nearest Meehanite foundry will gladly give you full information on Wear-Resisting or other types of Meehanite castings.

MEEHANITE RESEARCH INSTITUTE • New Rochelle, N. Y.

MEEHANITE
SEND FOR BOOKLET

Engineering Data Book, free to executives, engineers, designers, production men. Price to others, $1.00 per copy.

TO SAVE TIME, LABOR, METAL



7 ANSWERS to your insulation and protective problems

☆ UNICHROME "AIR DRY" RACK COATING

—a tough, easy-to-use rack insulation that saves frequent recoating—withstands hot alkaline cleaners, acid dips, hard chromium solutions and chromic or sulphuric anodizing baths.

☆ UNICHROME "QUICK DRY" STOP-OFF 322

—a fast-drying, resistant lacquer that speeds preparation and handling—specially compounded for cyanide copper, chromium and other plating work requiring an extremely adherent stop-off.

☆ UNICHROME "QUICK DRY" STOP-OFF 323

—a fast-drying, resistant lacquer that speeds preparation and handling—specially compounded for Parkerizing, chromium and other plating work requiring a stop-off that can be peeled off after use.

☆ UNICHROME RESIST SHEET AND ROD

—a solid insulating material that is readily fabricated and extremely resistant to all plating room chemicals—specially suitable for constructing composite plating racks, stop-off shields, insulating gaskets and lattices for preventing short circuits in anodizing tanks.

☆ UNICHROME STOP-OFF COMPOUND 311

—a solid, wax-like formulation that saves preparation time in stopping off complicated shapes—suitable for work requiring resistance to boiling hot cleaners, acid dips and high temperature plating solutions.

☆ UNICHROME RESIST LACQUER BG

—a heavy-bodied, resilient insulating lacquer that has excellent all-round chemical resistance — specially suitable for hard chromium and Parkerizing work requiring a stop-off that can be peeled off after use.

☆ UCILON

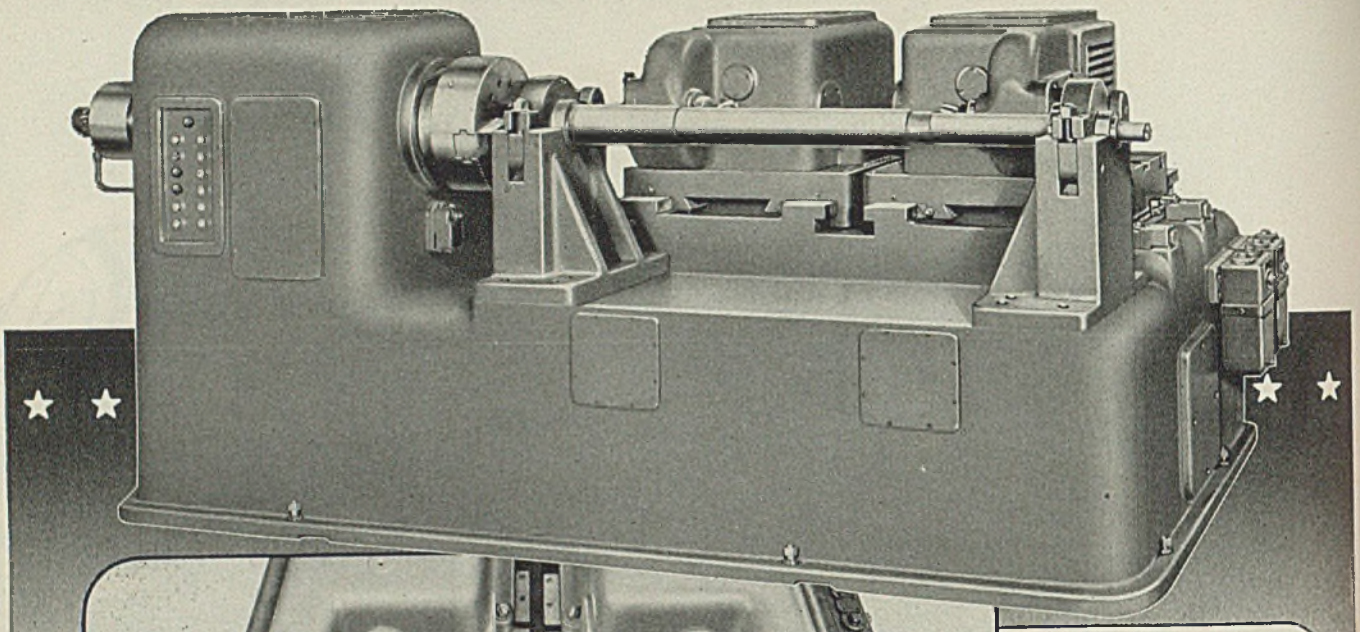
—an air-drying protective coating that is remarkably resistant to the action of both acids and alkalies, salts, cleaning compounds, oxidants and moisture — specially suitable for painting on ducts, equipment and other metal, wood, or concrete surfaces exposed to corrosion.

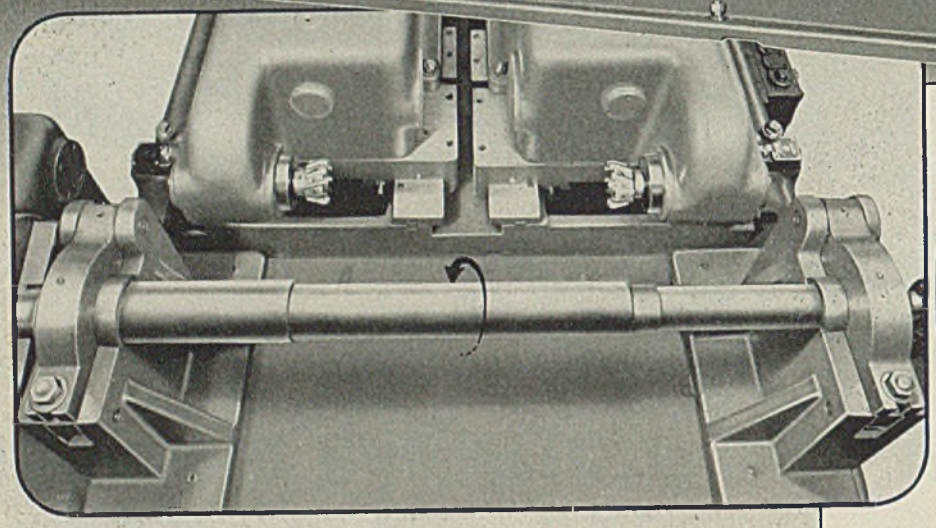
FOR FURTHER DETAILS

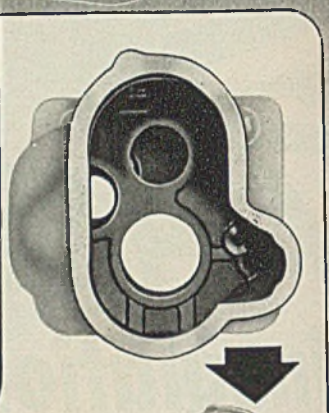
or an initial order, write briefly stating your problem and the work for which the insulation is intended.

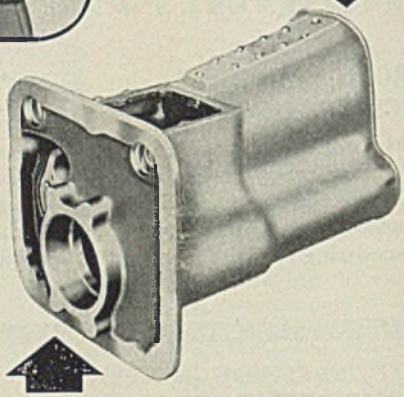
☆ *Trade mark Reg. U.S. Pat. Off.*

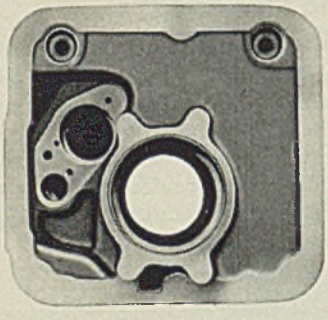
UNITED CHROMIUM
INCORPORATED
51 East 42nd St, New York, N.Y.
Waterbury, Conn. ☆ Detroit, Mich.











CROSS DESIGNS AND BUILDS

Special Machinery

Solving this unusual and difficult manufacturing problem has attracted the widespread attention of production engineers. The work is mounted on an arbor and revolved at a feeding rate while both ends, although dissimilar in shape and contour, are milled simultaneously to assure exact parallelism and squareness with the bore. The automatic operating cycle is controlled from a centralized push button station and excellent results are secured with unskilled labor.

A review of your manufacturing practice will reveal many opportunities to consolidate operations and put them on an automatic basis with improved accuracy and reduced manpower. Cross engineers are prepared to assist you in applying special machinery to your manufacturing problems.

On the cast iron gear box illustrated above both ends, each entirely different from the other, are automatically finished at the same time and in one operation.

CROSS GEAR & MACHINE CO.

Established in 1898

DETROIT, MICHIGAN, U.S.A.

S-4

Extensive facilities available for metal stamping, fabricating and finishing

McKINNEY MANUFACTURING COMPANY—manufacturers in steel for 78 years has large capacity available for stamping, fabricating and finishing 3 to 20 gage metal.

Facilities for sub-contract work include—

500 machines from 10 to 150 ton capacity
with 2-inch to 6-inch stroke for
blanking and forming,
drilling and countersinking,
wire heading,
milling.

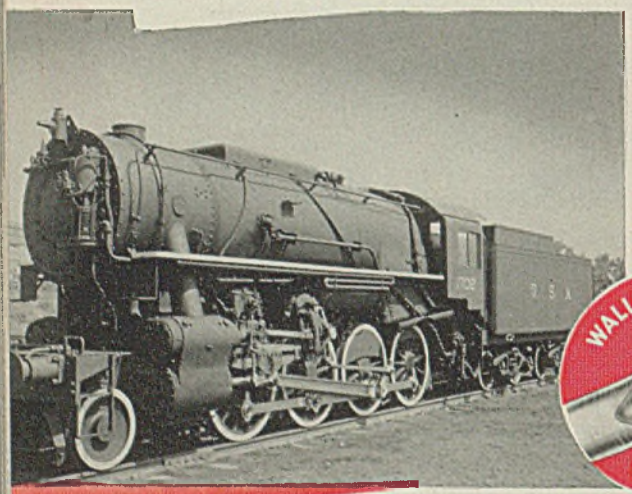
Also large capacity for barrel and tank electro-plating, Bonderizing, Japanning, Sherardizing, paint and lacquer finishing.

McKINNEY *will not* hold up your production line.

Write, wire or phone McKinney Manufacturing Company, War Contract Division, No. 2, 1400 Metropolitan Street, Pittsburgh, Pa.

Giving "BIG BOYS" and "LITTLE TOUGHIES"

the innards to haul the heaviest loads in history

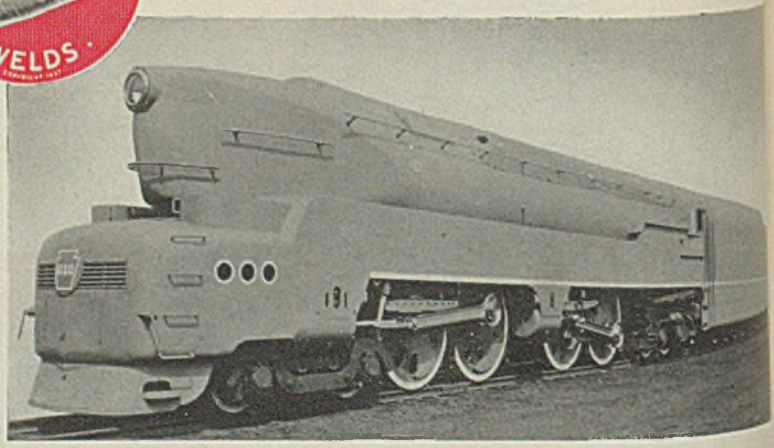


NATIONAL SEAMLESS

Pipe and Tubing

WALLS WITHOUT WELDS

First American War Locomotives to reach Europe. Small in comparison to some of the big locomotives shown here, but they are "army mules" for work. Designed for rough handling and a minimum of repairs. NATIONAL Seamless Tubes used in these locomotives.



From Harrisburg to Chicago with one stop for fuel. These new passenger locomotives are designed for long, fast runs pulling extremely heavy trains. They, too, use NATIONAL Seamless tubes for utmost reliability.

UNITED

Over the great divide. It takes plenty of "umph" to haul long, heavy freights over the Rockies, but these "Big Boys" have the innards to do the job. They use NATIONAL Seamless Boiler Tubes.

IN 1942, American railroads broke all existing records for passenger traffic and freight haulage. Ten months after Pearl Harbor they had hauled *four times* as many troops as they did in the same period of time in World War I. Freight haulage in the first eight months of 1942 jumped 36% in revenue-ton-miles over the same period in 1941. Passenger miles skyrocketed 61%. The estimated total for the whole year is 50 billion passenger miles—the highest total in history!

But these records are expected to be broken again in 1943—for the big push is yet to come. The railroads have shared, too, some of the war burdens of tankers and cargo vessels, helping to move greater quantities of oil, minerals, iron ore, coal and hundreds of other products.

With such a huge task ahead it is obvious that every locomotive will be needed in service every hour possible. Fortunately, many railroads and locomotive builders wisely installed tough, durable, long-lasting NATIONAL Seamless Boiler Tubes and some are getting from 65% to 100% longer service from these tubes. NATIONAL Seamless Pipe has likewise been the dominant choice for the intricate piping systems in most of the finer and larger locomotives and here, too, dependable quality has paid big dividends, especially since the heavy burden of war demands came along.

For hauling the "heavy stuff" railroads have reached a remarkable efficiency. To them belongs unmeasured credit for delivering so much so fast.

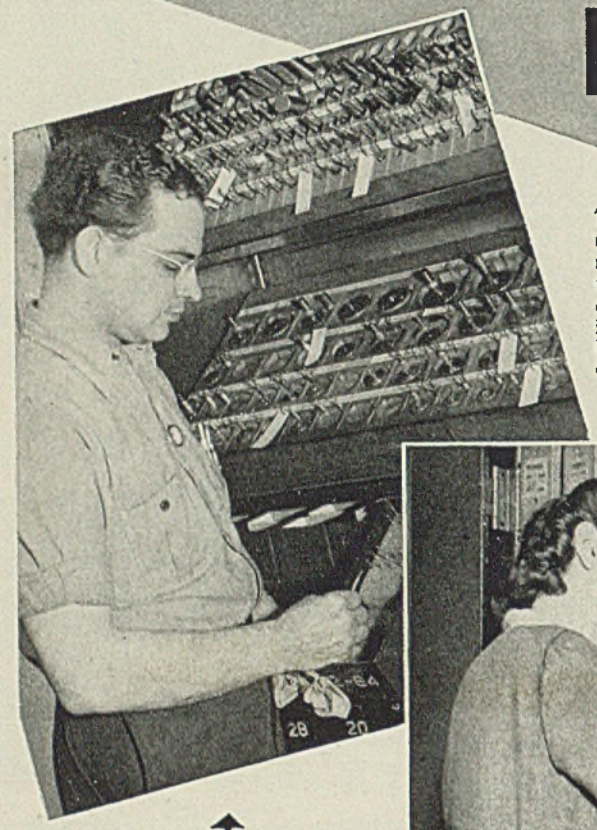
NATIONAL TUBE COMPANY

PITTSBURGH, PA.

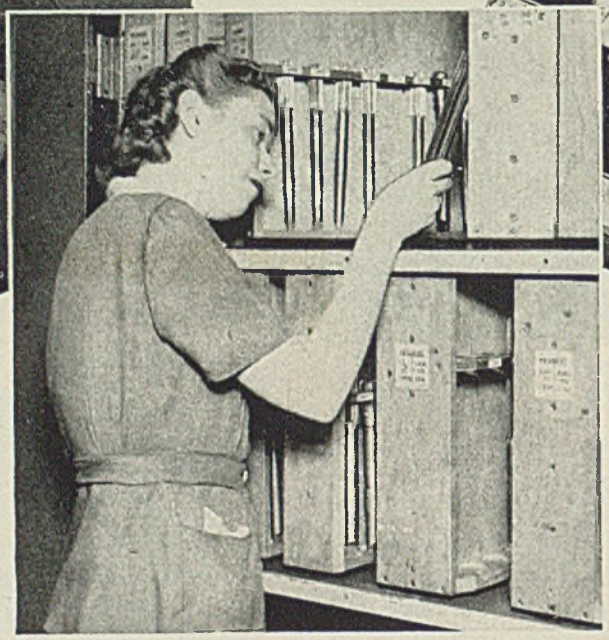
Columbia Steel Company, San Francisco, *Pacific Coast Distributors* — United States Steel Export Company, New York

STATES STEEL

IF THESE WORKERS "Fumble" YOUR MACHINES STAND IDLE



Prominent numbering of the receptacles for small taps and plug and ring gages makes for speedy handling, minimum delay at the tool crib window in this efficient crib arrangement. *Photo courtesy General Electric Co.*



These swinging racks give ready access to reamers, maximum protection to each tool. Quick identification even for inexperienced help is assured by prominent labels in front. *Photo courtesy General Electric Co.*

Installed for temporary storage of small items, these oblong cans have given very satisfactory service. Composition containers might well be substituted if metal ones are not available. *Photo courtesy Brewster Aeronautical Corp.*

EVERY needless minute your costly machines stand idle between jobs means less production for you — and a longer war for all of us.

The photographs here may show you the way to an important saving. For each shows an arrangement that gets tools on the job with no waste of those precious minutes.

No one of these arrangements may fit *your* shop . . . but that's not the point. They may suggest a method adaptable to your requirements.

In checking your tool storage methods, keep these three fundamentals in mind:

1. A place for every tool, with a record to show its disposition when it's out.
2. An easily read and systematic means of identification.
3. Ample protection for keen cutting edges.

There are few places, in your plant where careful planning will pay you more than your tool crib.

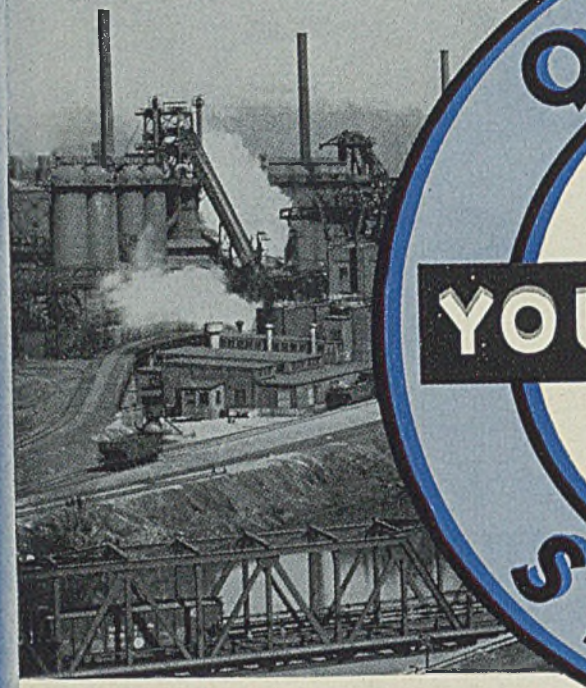
GTD GREENFIELD

TAPS · · · DIES · · · GAGES · · · TWIST DRILLS · · · SCREW PLATES

ARMY NAVY

GREENFIELD TAP AND DIE CORPORATION
GREENFIELD, MASSACHUSETTS
DETROIT PLANT: 5850 Second Boulevard
WAREHOUSES in New York, Chicago and Los Angeles
In Canada:
GREENFIELD TAP AND DIE CORP. OF CANADA, LTD., GALT, ONT.

Tool Conservation Begins in the Tool Crib



QUALITY
TRADE MARK
YOUNGSTOWN
SERVICE

What's behind the TRADE MARK?

BEHIND the trade mark of The Youngstown Sheet and Tube Company is an interesting story. Founded in 1900, its career is a typical American achievement, representing 43 years of steady, substantial growth. As the original plans of its founders have gradually unfolded, Youngstown has been permitted to make material contributions to the welfare of the nation.

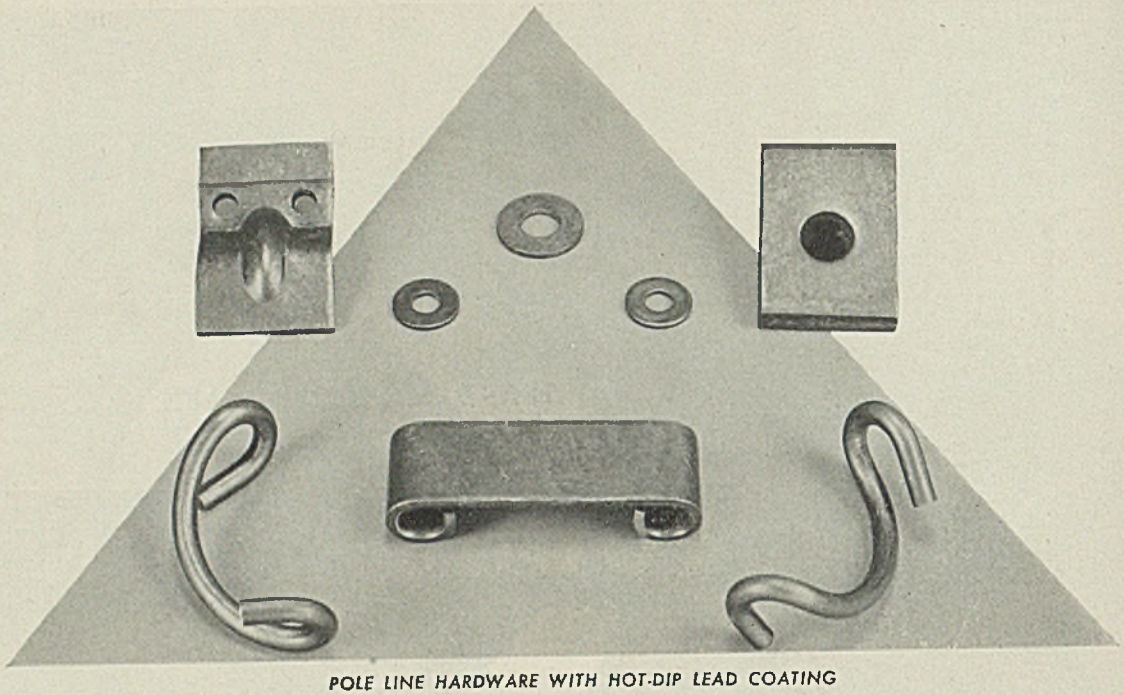
Integrity of purpose, courage, ability, a spirit of venture, the will to serve its customers—these are some of the things that give life and substance to the Youngstown trade mark. They have built the company from its small beginning with only a few thousand tons capacity to a position among the leaders in 1943—with an annual capacity of 4,000,000 tons of steel.

We here at Youngstown are devoting our energies 100% to meeting the emergencies of war now as we did in World War I. When peace comes, we shall devote all our resources to the requirements of our thousands of customers old and new.

The YOUNGSTOWN SHEET AND TUBE COMPANY, Youngstown, Ohio
Manufacturers of
CARBON • ALLOY AND YOLOY STEELS

Pipe and Tubular Products • Sheets
Plates • Conduit • Bars • Tin Plate
Rods • Wire • Nails • Tie Plates and
Spikes • Alloy and Yoloy Steels

25-47F



POLE LINE HARDWARE WITH HOT-DIP LEAD COATING

U. S. GOVERNMENT PIG LEAD AND METALLIC ANTIMONY STOCKS CONSTITUTE A SECOND LINE OF DEFENSE AGAINST SHORTAGES OF COPPER, ZINC AND OTHER STRATEGIC METALS AND MATERIALS...

Samples of lead pipe 2,000 years old, prove that the metal lead can take a beating from the elements which other base metals cannot endure.

Pole line hardware is only one of many groups of materials which can be lead-coated instead of galvanized; nails, chaplets, bolts and nuts, iron pipe, conduits, sheet metal boxes, et cetera.

Lead's resistance to the action of sulphuric acid makes it available to replace rubber linings, pipe, et cetera.

Considerable substitution of lead-base for tin-base bearing metals has already been accomplished.

Hard lead (antimonial lead alloy) is replacing brass in plumbing installations and is being used for name plates and instruction plates.

Shortage of tin has resulted in the development of much thinner lead foil, and of collapsible tubes without any tin.

Lead-base die-castings are being substituted for zinc-base die-castings.

Gaskets and washers in many cases can be made of lead instead of rubber.

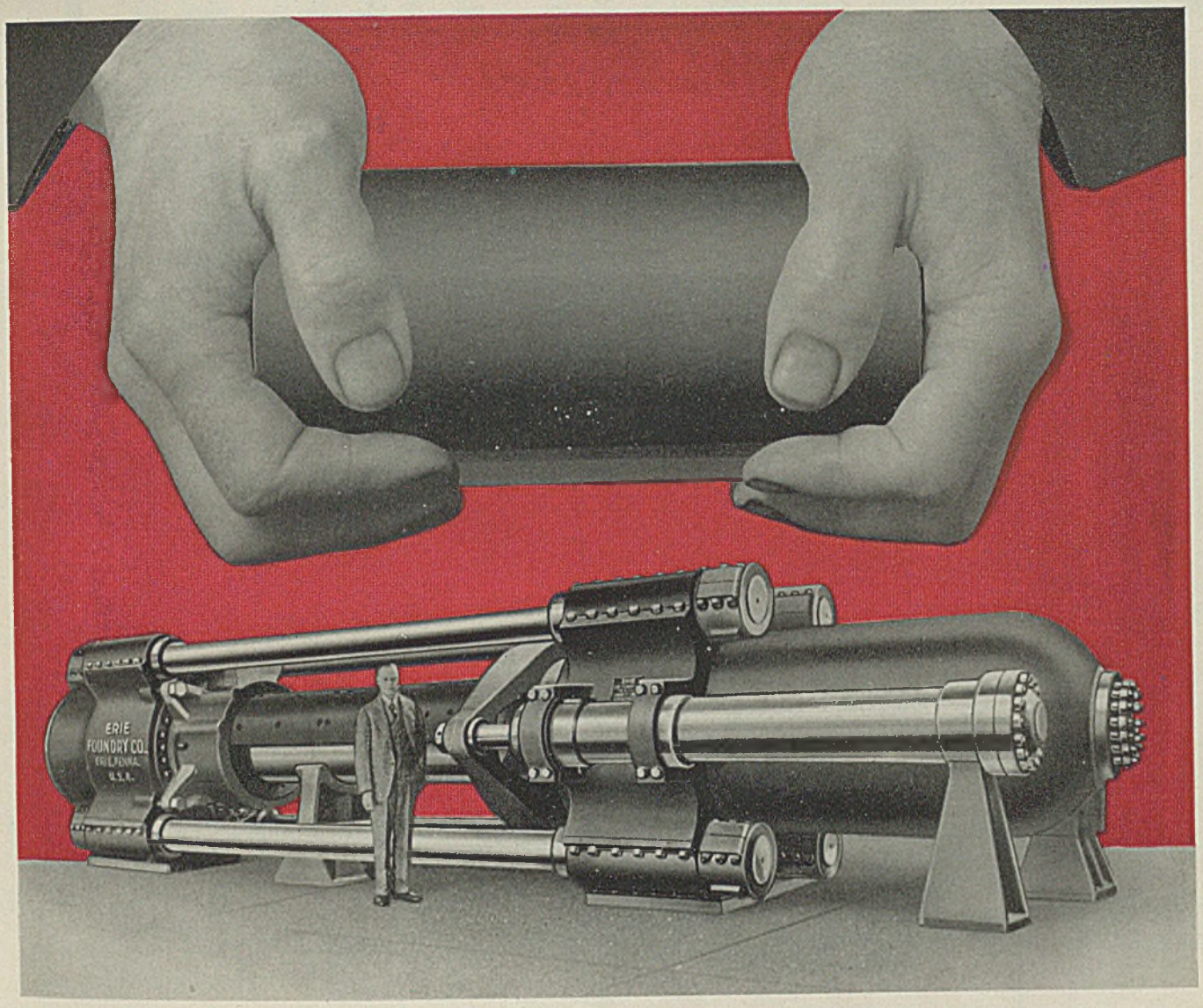
Lead welding can be used to replace soldering in many instances, thus saving tin.

Industry realizes how important it is to develop substitutes for scarce materials, and is really doing a job in this field.

ST. JOSEPH LEAD COMPANY

250 PARK AVENUE • NEW YORK • ELdorado 5-3200

THE LARGEST PRODUCER OF LEAD IN THE UNITED STATES



THE *Squeeze* IS ON CARBON ELECTRODES

The above Erie Foundry 1800 Ton Hydraulic Extrusion Press produces long lasting Carbon Electrodes.

THIS huge extrusion press for making long carbon electrodes up to 30" diameter is one of many that have broken a bottle neck in the war effort.

Erie's complete facilities are devoted to war work.

ERIE

ERIE FOUNDRY COMPANY

ERIE, PENNSYLVANIA, U. S. A.

DETROIT
335 Curtis Bldg.

CHICAGO
549 Washington Blvd.

INDIANAPOLIS
335 Postal Station Bldg.

AUSTRALIA
Associated Machine Tools

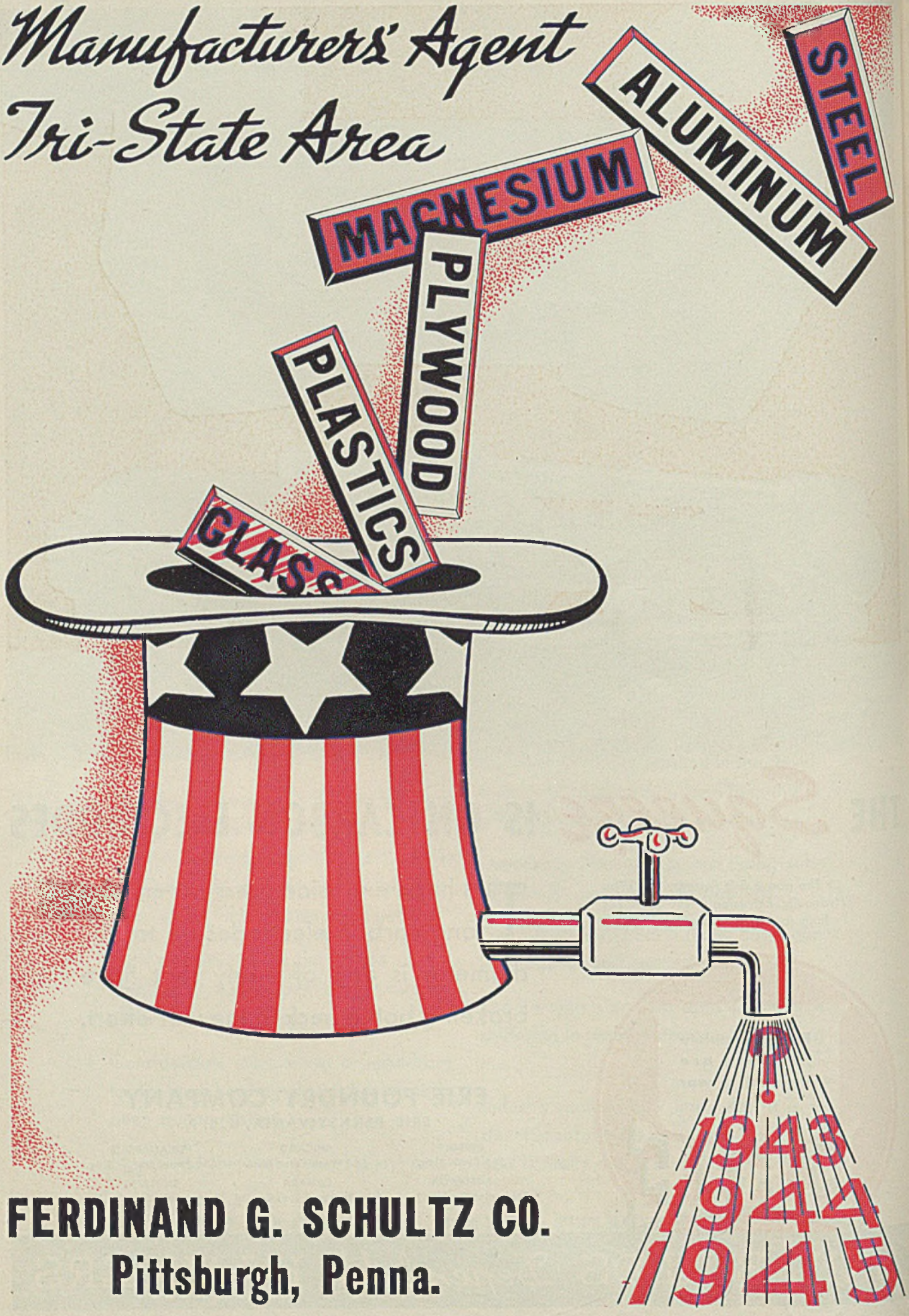
CANADA
John Bertram & Sons Co., Ltd

ENGLAND
Burton, Griffiths & Co., Ltd.

ERIE BUILDS *Dependable* HAMMERS

Manufacturers' Agent

Tri-State Area

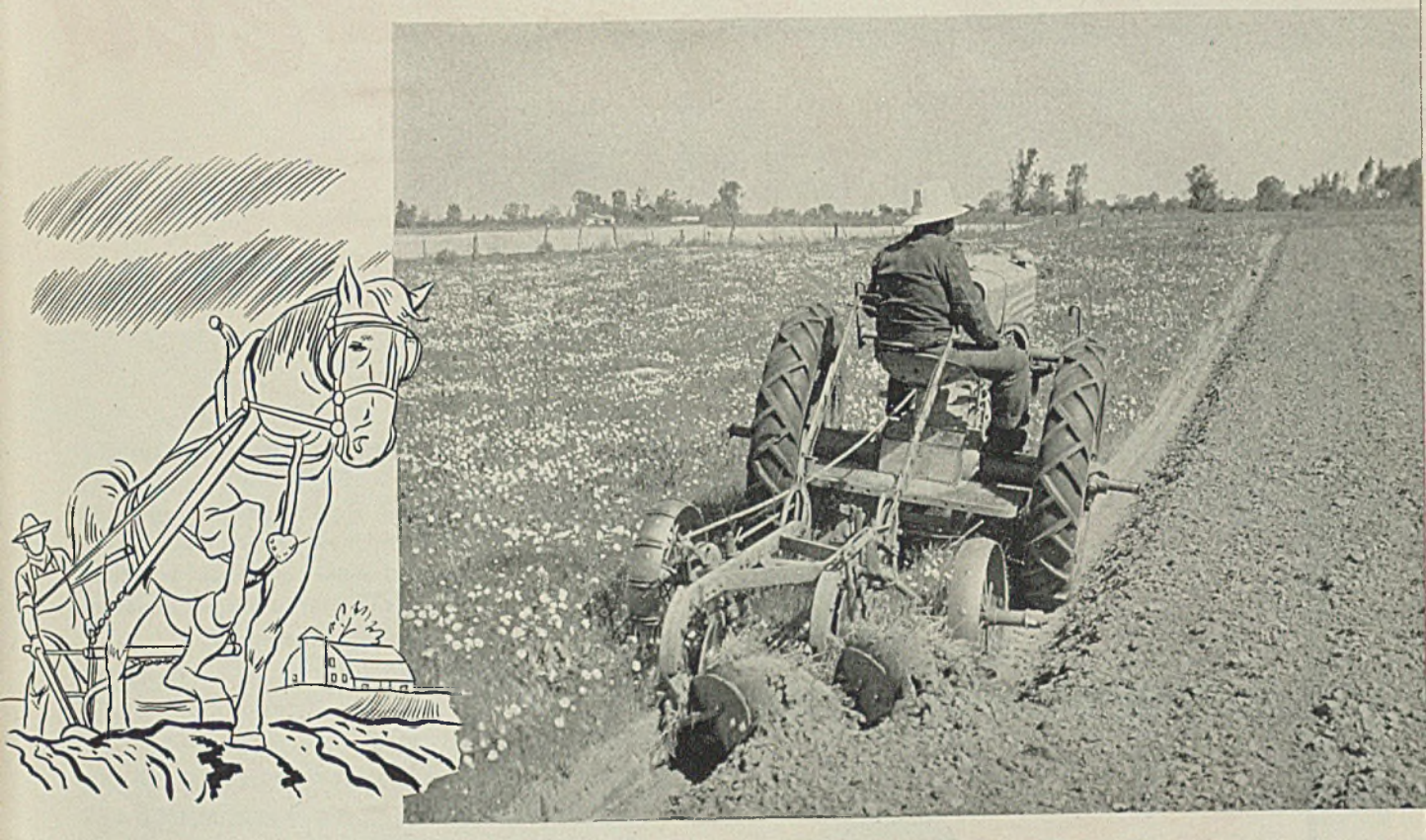


FERDINAND G. SCHULTZ CO.

Pittsburgh, Penna.

1 or 100 Horsepower

...THEY'VE STOOD THE STRAIN FOR 88 YEARS



Back in the days when Farmer Jones was as proud as a peacock of his steel plow and the clean furrow it turned behind one or a team of horses, Upson Quality Bolts and Nuts were on the job holding plows together.

For 88 years these tough, strong headed and threaded products have been holding things together—securely. Now they're tougher than ever—the result of continued improvement in steels and methods of manufacture year after year.

You'll find them in modern farm machinery—in automotive, railroad, marine and petroleum equipment where service is especially severe—in machines and structures of all kinds—and in the mechanized fighting tools which are playing a most vital part in winning the war.

When we beat our swords back into plowshares again, you can look to Republic for bolts, nuts and rivets even better than those which have made the name UPSON famous wherever headed and threaded products are used.

REPUBLIC STEEL CORPORATION
Bolt and Nut Division
Sales Offices • Cleveland, Ohio
GENERAL OFFICES • CLEVELAND, OHIO
Berger Manufacturing Division • Culvert Division
Niles Steel Products Division • Steel and Tubes Division
Union Drawn Steel Division • Truscon Steel Company
Export Department: Chrysler Building, New York, N. Y.

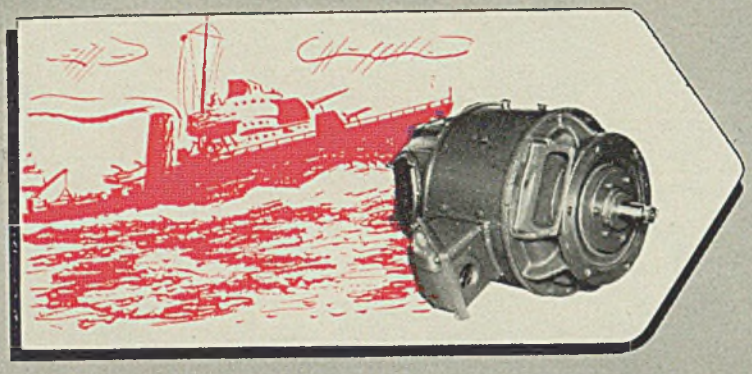
REPUBLIC STEEL PRODUCTION FOR VICTORY

REPUBLIC

Upson Quality BOLTS AND NUTS

Other Republic products include Pipe, Sheets, Tubing, Hot Rolled and Cold Drawn Bars—Carbon, Alloy and Enduro Stainless Steel

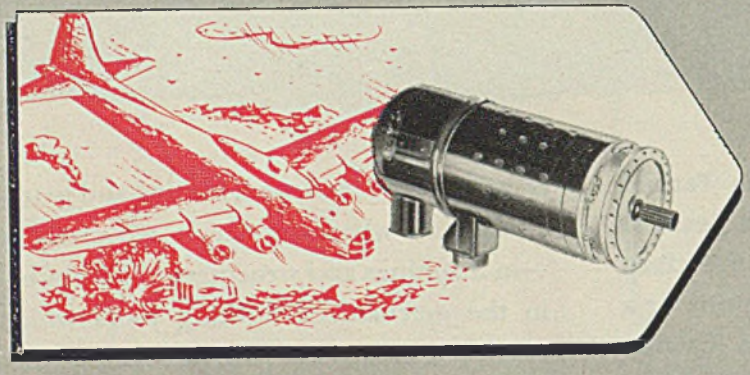
Do You Need



MOTORS FOR NAVAL APPLICATION

In a space of *five weeks*, production of a brand new series of motors was raised 400 motors per week. Scheduled delivery to eight different customers was smoothly established.

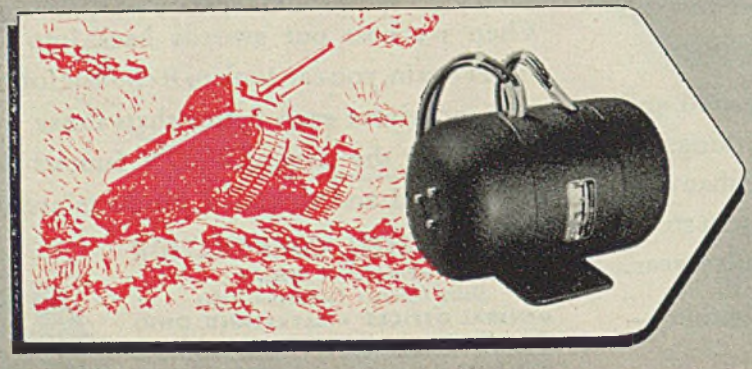
★



A SMALLER, LIGHTER GENERATOR FOR AIRCRAFT

A generator *one-sixth the weight* of comparable industrial types was developed, meeting stringent specifications for high-altitude performance—a typical example of ingenious G-E design.

★



A SPECIAL DYNAMOTOR FOR USE ON TANKS

To power radio equipment in tanks, a special dynamotor with increased capacity was developed. Sample in eight weeks; production in large quantities eight weeks after approval.

Builder of TRI-CLAD Motors ★ AMPLIDYNES AIRCRAFT POWER PACKAGES DYNAMOTORS GENERATORS EVERYTHING IN MOTORS

FIGHTING MOTORS*?

WE MAY BE ABLE TO HELP YOU

WE invite builders of motor-operated combat equipment to get in touch with us in the earliest stages of planning for their motor requirements. We are building so many new and ingenious fighting motors, it's 10 to 1 that we already have something which can be adapted to meet your needs.

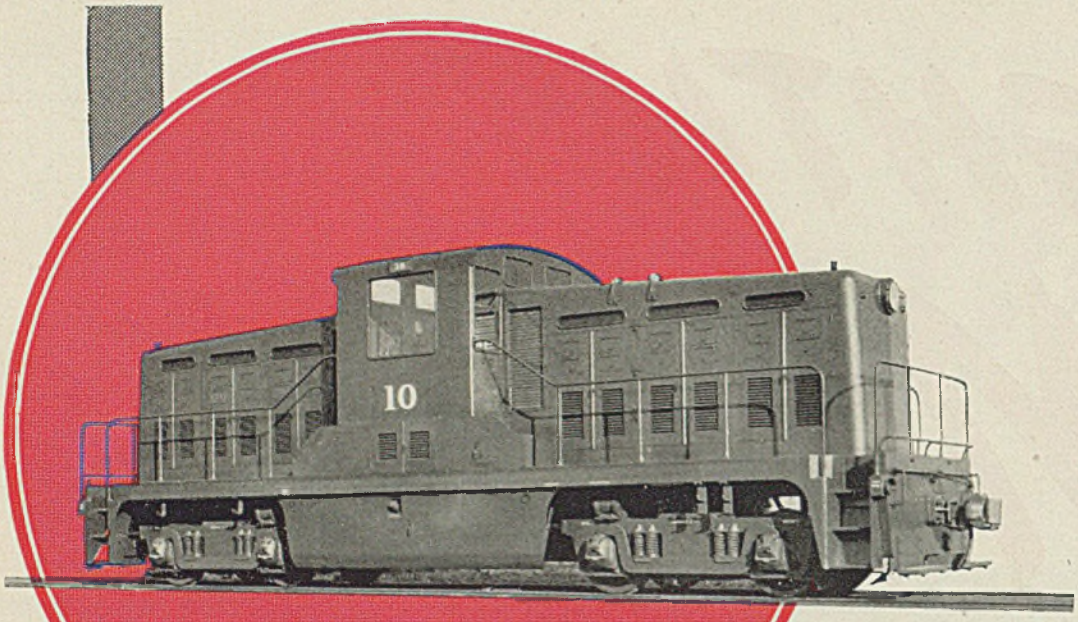
Although we cannot accept any new orders for certain types of fighting motors, we do have, or will have in the very near future, facilities to engineer and build additional fighting motors of other types. We would appreciate the opportunity of reviewing your needs during the earliest stages of your planning, in order to determine how we can help you.

We have the pledge of the more than 1700 design and application engineers in our motor plants to give the fastest service it is humanly possible to give whenever they are asked to help on fighting motors. And even if we must say "No," we believe you will appreciate a fast answer. Get in touch with your local G-E representative to see if the fighting-motor design you need can be adapted to our available production facilities. *General Electric Co., Schenectady, N. Y.*

*"FIGHTING MOTORS" is our term for electric motors in equipment used by our fighting forces—motors which contribute to combat efficiency. In contrast to motors used for production, they may be designed, and produced by the thousands, and declared obsolete—all within a few months.

Fighting motors often require amazing ingenuity in their design, always demand the utmost in reliability, and must be produced with a new concept of speed. They are truly *life or death motors.*

GENERAL ELECTRIC



Whitcomb

LOCOMOTIVES

They're Doing a "Swell" Job

Only an industrial locomotive could reveal the terrific punishment that is dealt out by today's demands of long hours of continuous service, by the efforts to get things done economically and in a hurry. We might follow the figure, and say that a locomotive can't speak—but users of Whitcomb Locomotives say that they speak for themselves. Today Whitcombs are helping to establish new production records that will be written in tomorrow's battle headlines.

If you have a tough production schedule that involves transportation problems find out what Whitcomb locomotives can do for you. You'll find they will take a bigger load at a faster pace and reduce the cost per ton. Some of the features your operators will marvel at are the excellent visibility, convenient location of the controls and the snappy smooth response when they gun the throttle. Your transportation worries will be at an end if you put the job in charge of a Whitcomb. Write today for details.

DIESEL or GASOLINE POWER

MECHANICAL, HYDRAULIC, or ELECTRIC DRIVE

BLW THE BALDWIN GROUP

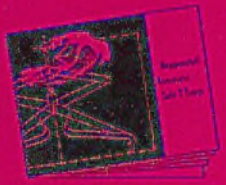
THE WHITCOMB LOCOMOTIVE CO.

ROCHELLE ILL.

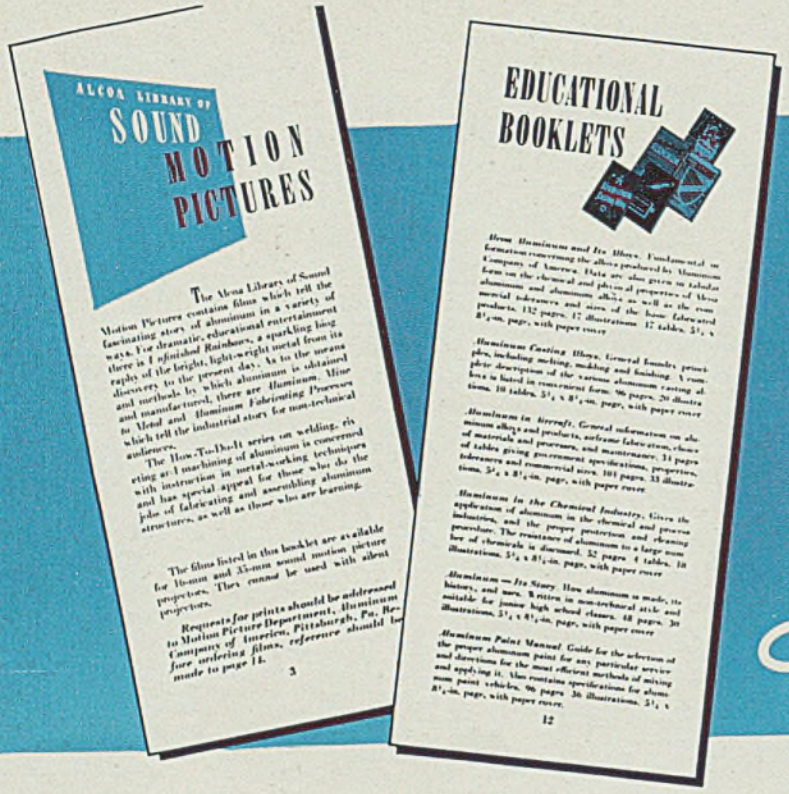
Subsidiary of THE BALDWIN LOCOMOTIVE WORKS

versatile

Versatile is a good word to describe Heppenstall Automatic Safe-T-Tongs used to solve hundreds of different handling problems in applications from coast to coast. Whether it's a load like this  or a load like this  makes no difference because Automatic Safe-T-Tongs are designed specifically for each job.

Safe-T-Tongs are safe and sure and easy to operate . . . fully automatic not power driven . . . no close work by ground crews. This is the way they work: First, you lower them on the object  . . . allow slack and the tongs unlock  . . . the tongs grip as they come up  . . . carry swiftly  . . . then as the load is placed, the tongs lock open again automatically ready for the next job.  Why not write for this highly descriptive book about tongs?  It may give you ideas. Dept. M1 Heppenstall Company, Pittsburgh.

Heppenstall Automatic Safe-T-Tongs



ALCOA DIRECTS THIS MESSAGE TO *Subcontractors*

Are you one of the many companies who are working on airplane subcontracts? It may be the first time you've worked with aluminum, and the job is strange to your workmen. You have received materials and specifications from your prime contractor, but you may need detailed information on some particular phase of the fabricating work.

Aluminum Company of America has prepared both literature and task-instruction motion pictures which are available to you. Often, this material will answer your questions adequately. In some cases, however, you may require help on specific problems.

Alcoa engineers have spent a lifetime developing the best methods for fabricating aluminum alloys. Perhaps we've already helped some airplane builder solve the very problem that has you stymied. We're anxious to pass on all such information as will speed the war effort. Or, if it's a brand-new problem, we're ready to get going on that, too.

A letter or telephone call will start help on its way to you. Contact ALUMINUM COMPANY OF AMERICA, 2112 Gulf Bldg., Pittsburgh, Pennsylvania.

ALCOA ALUMINUM

Beading operations are easily and quickly performed on a Steelweld. This shows the third and final step in wrapping the edge of a body panel around a pipe to secure the rigidity necessary.

STEELWELDS HELP SEAGRAVE BUILD MODERN FIRE APPARATUS

Body panels, hoods, fender aprons, dashes, running boards, gas tanks, and other parts for the pumpers, ladder trucks and fire-fighting equipment made by The Seagrave Corporation, Columbus, Ohio, are fabricated on their two Steelweld Bending Presses.

These parts requiring bending, forming, louvering, beading, punching and notching, are formed a few at the time in production runs as the demand requires. It is easy to switch from one operation to another because it is a quick, simple matter to change the dies.

The satisfactory performance of the first press, a model I-10 installed in 1936, led to the purchase of a second machine in 1941, a model F3-8. The older press handles plate up to $\frac{1}{4}$-inch by 13 feet and the newer machine up to $\frac{3}{16}$-inch by 11 feet.

By replacing sharp welded or riveted corners wherever possible by quickly made, smooth, round, bended ones, the Steelwelds are proving an important factor in providing the modern, sleek appearance characteristic of Seagrave fire apparatus.

GET THIS BOOK!

CATALOG No. 2002 gives complete construction and engineering details. Profusely illustrated

THE CLEVELAND CRANE & ENGINEERING CO.

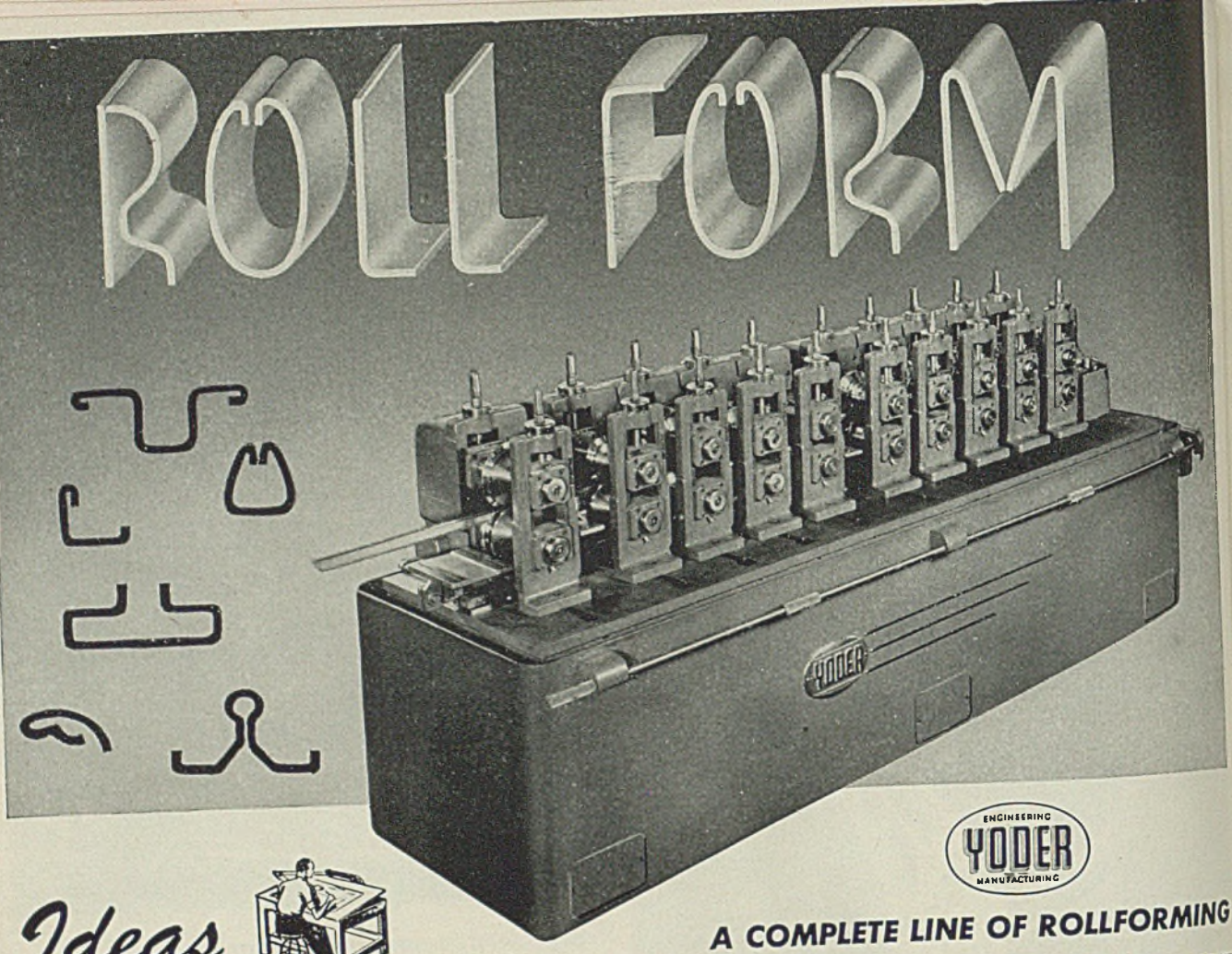
1125 EAST 283RD ST. WICKLIFFE, OHIO.

CLEVELAND

STEELWELD PRESSES

GENERAL SALES AGENTS: THE CYRIL BATH CO., E. 70TH & MACHINERY AVE., CLEVELAND

ROLL FORM



ENGINEERING
YODER
MANUFACTURING

A COMPLETE LINE OF ROLLFORMING MACHINES AND AUXILIARY EQUIPMENT

A wide range of sizes is covered by the complete line of Yoder Rollforming Machines. Also, each machine is designed to produce the greatest range with due regard to efficient operation.

It isn't complete unless Yoder Supplementary Equipment is used in the line!

Rotary gang slitters, side trimmers, recoilers, uncoiler and cut-offs for the proper handling of strip and formed metal are necessary adjuncts to a rollforming machine.

For the utmost in production speeds and the highest quality standards . . . USE YODER ROLLFORMING MACHINES AND AUXILIARY EQUIPMENT!

Ideas

FROM THE DESIGNER'S TABLE!

IDEAS UNLIMITED! The right shapes for strength and they take less metal. All advantages of this high-production machine are at the designers command.

. . . FROM THE WORK BENCH!

"ON THE JOB" WORKERS HAVE IDEAS. Good ones, too! The infinite variety of shapes possibe by rollforming stimulates workers imaginations. Results—many improvements on old products made and suggestions for new products created.

Other HIGH-PRODUCTION MACHINES BUILT BY THE YODER COMPANY

POWER HAMMERS for the speedy forming of sections needed in quantities too limited to justify die stamping.

COMPLETE TUBE MILLS for the continuous and automatic welding and cutting off of tubing in sizes from ¼" diameter, .015" wall to 26" diameter, ¾" wall.

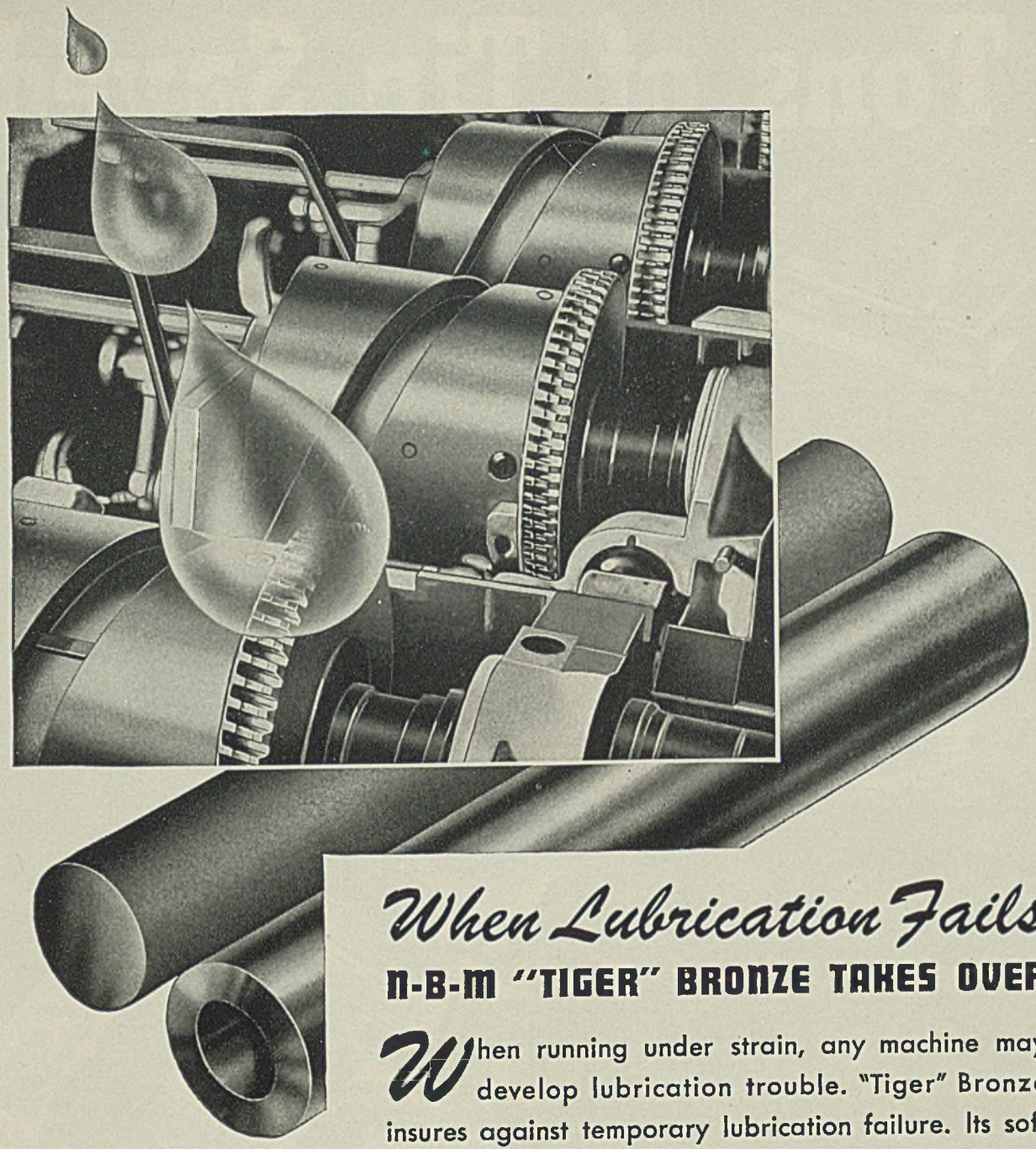
THE YODER COMPANY

CLEVELAND, OHIO, U.S.A.

YODER

SPECIAL PRODUCTION METAL FORMING MACHINE

STE



When Lubrication Fails

N-B-M "TIGER" BRONZE TAKES OVER

When running under strain, any machine may develop lubrication trouble. "Tiger" Bronze insures against temporary lubrication failure. Its soft lead, evenly distributed throughout the metal, lubricates the dry shaft and protects the life of your machinery.

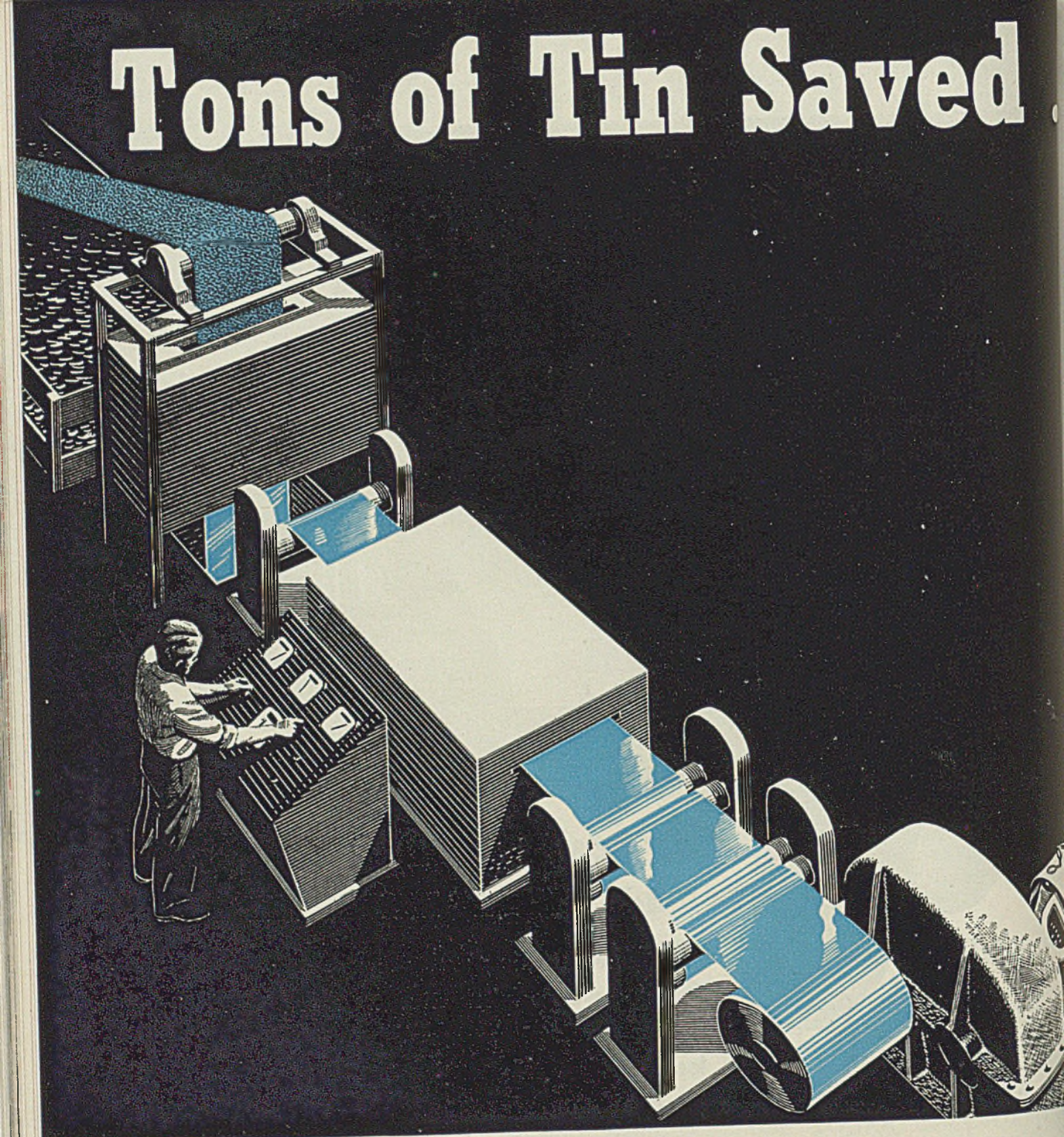
Write for our "Tiger" Bronze Chart—showing the hundreds of sizes of cored and solid bars available—rough and machined.

NATIONAL BEARING METALS CORPORATION

ST. LOUIS • NEW YORK

PLANTS IN: ST. LOUIS, MO. • PITTSBURGH, PA. • MEADVILLE, PA. • JERSEY CITY, N.J. • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

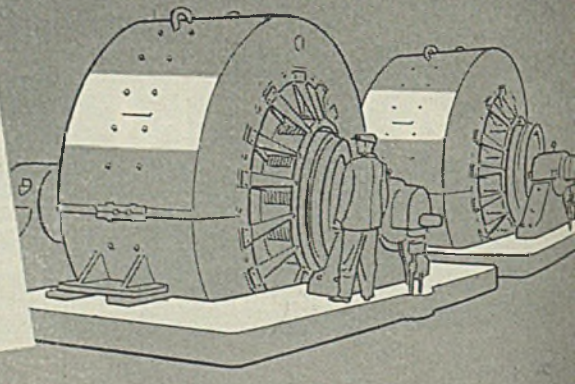
Tons of Tin Saved



SAFEGUARD MAIN-DRIVE MOTORS

Precipitron—Westinghouse electric air cleaner, provides continuity insurance for main-drive motors and MG sets. By removing all air-borne dirt, dust and soot—including particles as small as 1/250,000 of an inch—this electronic device prevents damaging dirt from settling in windings. Result: increased operating efficiency, with fewer shut-downs for repairs. Write for Booklet B-8605.

Westinghouse



BY INDUCTION HEATING

"FLOW" PROCESS

For years, most of America's tinplate was made by the "hot dip" process. This took 1½ pounds of tin for every 100 pounds of steel . . . not too much when tin was plentiful.

But when the Japs took Malaya, things changed in a hurry. Tin became a critical material. Vast quantities of tinplate were needed to preserve food for our armed forces. A method had to be found that would not only save tin, but greatly speed production.

Steel engineers developed a way to electroplate steel strip with a coating of tin only *thirty-millionths* of an inch thick—a method which would save two-thirds of our war-scarce tin. But the problem was to "reflow" the granular, dull-gray coating deposited by electrolysis so it would be perfectly smooth and corrosion-resistant—and do it at speeds that would permit greatly increased production.

Westinghouse engineers were called in. Working closely with steel engineers, they developed a method of high-frequency induction heating with electronic control. Within 7/10 of a second after strip enters the heating coil, its fusion temperature of 450 degrees F. is attained. There is no contact between tinplate and heating coil—no danger of arcing or burning. The "flowing" operation is made an integral part of the tinning line, instead of a separate operation requiring additional handling.

600 kw units are now in operation, turning out tinplate at 500 f.p.m.—as compared with 150 to 200 f.p.m. by old methods. 1200 kw units are being built that will step up delivery speeds to 1000 f.p.m.

Soon a large part of U. S. tinplate will be rolling from production lines using this method. Tons of vital tin will be saved—as a result of close co-operation between Westinghouse and steel industry engineers.

This kind of Westinghouse engineering co-operation is available to *you* at any time, in solving any problem involving electrical power. Just phone your nearest Westinghouse office. Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania. J-94544

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

WESTINGHOUSE ENGINEERING SERVICE

A nationwide corps of engineers offers you electrical and production experience gained through years of working with the steel industry.

In addition to engineering help on specific industry problems involving electrical power, these men can give you assistance on these other vitally important activities:

PRODUCT DEVELOPMENT: engineering of equipment to meet war requirements.

MAINTENANCE: help in making existing equipment serve better, last longer.

REHABILITATION: redesigning and rebuilding obsolete equipment for useful service.

MATERIAL SUBSTITUTION: adapting available replacements for critical materials.

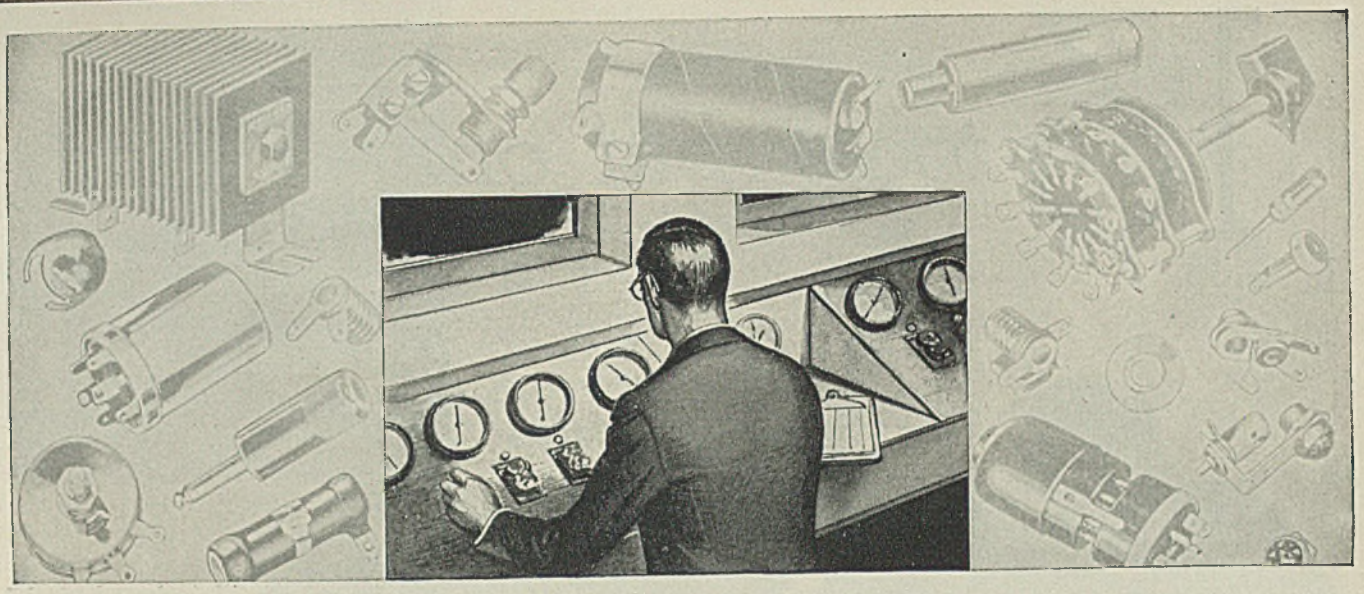
W.E.S. is available to all branches of the steel industry. Put it to use today on your production problems.

A
RUGGED
B'AR
GUIDE
THAT
WON'T
LET
YOU
DOWN

TRANTINYL
BAR MILL GUIDE

Youngstown Alloy Casting Corporatio

YOUNGSTOWN, OHI



Probably Your Mallory Distributor Can Give You Help Like This—

Somewhere in the Middle West is an aircraft engine manufacturer who uses many Mallory Electronic parts in dynamometer test cells. Recently he sent us a hurry call for some Mallory phone jacks to go in the control panel of a new cell being rushed to completion. He had the right priority, too.

It was a standard jack, but as is so often the case with manufacturers immersed in war production, it was out of stock. To produce it, we would have had to start from scratch—"when, as and if!"

But we referred his request to the local Mallory distributor —who filled his needs from stock.

This is just a sample of how Mallory distributors can help. We do our level best to furnish them with adequate stocks so that essential electronic parts to fill small orders with high priorities may be handled promptly.

It will pay you to maintain a contact with your local Mallory distributor. He will give good service, furnish your purchasing department with complete information and prices; your engineering and design departments with application data; work his head off to get you those parts you need for maintenance, test equipment and pre-production models.

P. R. MALLORY & CO., Inc., INDIANAPOLIS, INDIANA

Cable Address—PELMALLO

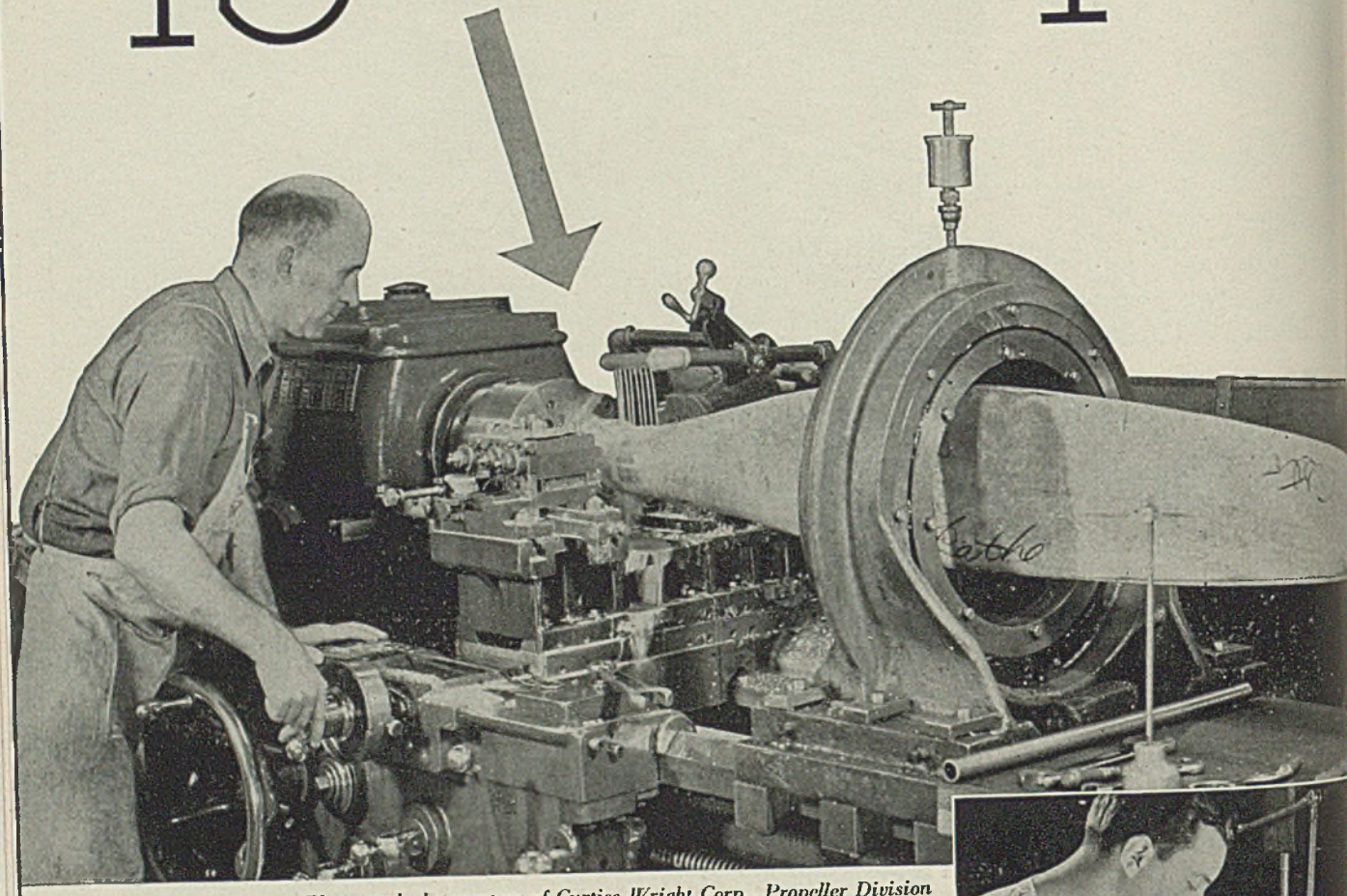
Get acquainted with your local Mallory distributor. Or if you do not know who he is, write us and we will put him in touch with you. And, for good measure, we will send along a copy of the Mallory Catalog for ready reference.

P. R. MALLORY & CO. Inc.

MALLORY

APPROVED PRECISION PRODUCTS

13 *tools..but only* 1 *setup*

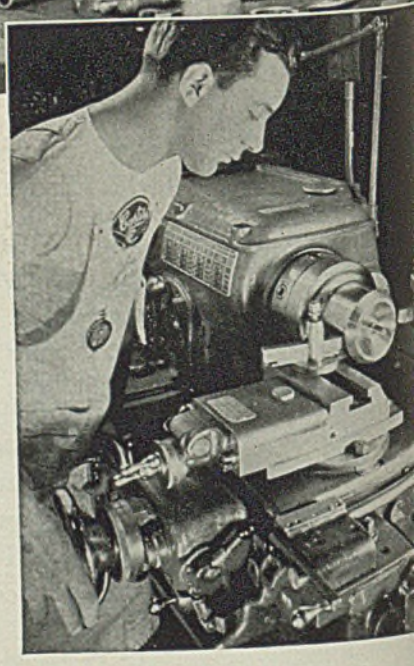


Photographs by courtesy of Curtiss-Wright Corp., Propeller Division

Multiple tool setups are often complicated and expensive, and sometimes prohibitive, but in this case the value of careful job analysis has in practice proved to be productive, accurate and economical.

Requirements in slides, tool function and blade support (details omitted) all combine to the successful machining of propeller hubs, which includes straight turning, taper turning, grooving, etc.

Whether the work be small and delicate or large and rough, our engineers will be glad to work with you in determining efficient methods of machining.



Time is saved. This 12″ Monarc equipped with double-power an feed, for machining both angles bevel gear, simultaneously.

MONARCH LATHES

COVER THE TURNING FIELD

THE MONARCH MACHINE TOOL COMPANY · SIDNEY, OH