Employe ideas for new tools, methods contribute to splendid record of war plants. Page 54

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CONTENTS

Volume 111—No. 26 STEEL December 28, 1942

NEWS

FEATURES

TECHNICAL

PRODUCTION

MARKETS

"It's a Job For EX-CELL-O THREAD GRINDERS . . . these threaded parts must be hardened and ground to *precision* tolerances . . . and produced plenty fast!"

SINCE EX-CELL-O introduced the original production thread grinding machine seven years ago the standard for threaded work has definitely risen. Closer tolerances are now demanded and maintained. The use of harder and heat-treated material in the making of threaded parts no longer presents difficulties. Numerous parts today have threads ground on them directly "from the solid" (often, where the pitch is a relatively fine one, in a single pass). . . . For instance—*precision thread grinding* is the preferred method today among aircraft engine builders for finishing threads on parts such as crankshafts, engine cylinder barrels, crankshaft bearing and connecting rod bolts, tappet adjusting screws, various studs and many other threaded parts. With work pieces of ample threaded length, frequently one operator conveniently handles two or more EX-CELL-O thread grinding machines. *. . . All of which means important savings in production time!*

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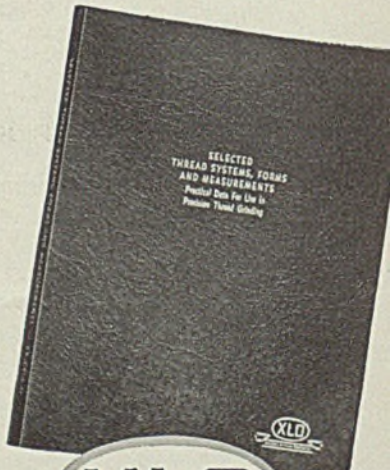

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Precision THREAD GRINDING, BORING AND LAPPING MACHINES • TOOL GRINDERS • HYDRAULIC POWER UNITS • GRINDING SPINDLES • BROACHES • CONTINENTAL CUTTING TOOLS • DRILL JIG BUSHINGS • DIESEL FUEL INJECTION EQUIPMENT • R. R. PINS AND BUSHINGS • PRECISION PARTS

EX-CELL-O *precision*

HIGHLIGHTING

this issue of STEEL

SMALLER PLANTS Although not issued as a mandatory order, a new War Production Board request urges prime contractors to do subcontracting wherever possible. It manifests a real desire at Washington that government work be spread out as far as possible so as to help stabilize our war economy and, in particular, help small manufacturers. Since Nov. 27 the Smaller War Plants Division has found work valued at $107,000,000 for nearly 1600 smaller companies (p. 38). Smaller manufacturers can help the division to help them by keeping this unit advised as to its facilities.

LABOR As the seventy-eighth Congress prepares to open its first session the subject of labor legislation again comes up more frequently in the day's news and it already is assured that an attempt will be made toward more orderly control of labor under the law instead of under the administration's policy of expediency. Many legislators already have gone on record as being opposed to maintenance of membership contracts with plants engaged on government work. Although time lost through strikes in 1942 dropped to the lowest level of the past five years, there again were violations of labor's no-strike pledge to the President (p. 25). It seemed quite clear that some sort of legislative brake is necessary to curb irresponsible union leaders.

NE STEELS The high nickel content of available scrap has made it impossible to produce certain NE steels. Hence a revision has been made in the NE list. Deleted compositions include NE 8022, 8339, 8949, 8715, 9722, 8735, 8739, 8740, 8744 and 8749. In deleting the 8700 series the intention was to conserve molybdenum. The 8600 series has been extended by adding 8635, 8637, 8640, 8642, 8645 and 8650 (p. 27).

IN THE NEWS With the major portion of war plant construction over the peak, demand for fabricated structural steel steadily is declining (p. 24). Two results are materializing. More steel is available for rolling into other sections, and much manpower can be diverted to other work.

More simplification of rolled steel products is under preparation (p. 39). . . Wider use is being made of used equipment to meet essential needs.

New industry advisory committees cover bolts, nuts and rivets, woodworking machinery and industrial hand trucks (p. 38). . . Industrial executives who are having trouble in filling out War Production Board questionnaire now can turn to a new advisory service for assistance.

The tin smelter at Houston, Texas, now producing more than 15,000 tons a year, is to be enlarged so as to have capacity to smelt all ores available to the United Nations (p. 46).

Edward R. Prosser tells how his company's manpower shortage was relieved through obtaining cooperation from educational institutions (p. 40). . . War Manpower Commission is broadening the scope of its Training Within Industry Branch.

Conversion of the Eastern Aircraft Division of General Motors Corp. has been completed and this group of plants now is producing fighter planes and torpedo bombers for the Navy (p. 28). Size of the accomplishment is indicated by the fact that more than 40,000 separate parts are required to build the two planes.

RENEGOTIATION Further experience in administering Public Law 528 proves further that manufacturers have nothing to fear from renegotiation of contracts by the Army, Navy, Treasury and Maritime Commission Price Adjustment Boards (p. 34). The boards have leaned over backwards in order to keep industry's profits position healthy.

TECHNICAL Individual workers are encouraged to use their own initiative and spare time to think up devices and ways to increase production as part of a most effective plant war production drive at the plant of the Glenn L. Martin Co. These suggestions (p. 54) could well be utilized by many other fabricating plants.

Centrifugal force is employed in a new method of applying feed pressure to drill point (p. 56). As a result, many extremely tough drilling problems are licked. "Method can be applied to multiple drilling setups with automatic sequence control to meet the most rigid job requirements," says Author Gerald E. Stedman.

A system for salt-bath temperature control holds desired temperatures automatically throughout any sequence, provides temperature record, gives excess temperature protection, eliminates combustion hazards (p. 60) through use of an unusual combination of control devices.

No longer is it necessary to throw away the thousands of horsepower-hours generated in testing aircraft engines. Now up to 75 per cent or more of the power generated is pumped back into electric service lines (p. 62) to help augment our severely loaded electric power generating systems.

SUPPOSE

He Took "Time-off"..

The doughboy stays at his post come hell or high water. He knows his duty and he does it.

To shirk that duty would mean defeat, even death—and disaster for all of us.

But he cannot carry on the fight alone. He must have guns, ammunition, supplies.

That is our job!

Unnecessary "time off" means lost ships, guns and shells —lost just as surely as if they were destroyed by our enemies in battle.

Stand by our fighters—stay on the job until the fight is won!

INLAND STEEL CO.

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STEEL
December 28, 1942

May Every Stroke Count!

As the old year draws to a close, one is inclined to take stock of one's accomplishments and disappointments during the past 12 months. What is the net result of the year's effort?

Most industrialists probably will arrive at the conclusion that they fared reasonably well, considering the circumstances. They accomplished much, in spite of unprecedented obstacles.

Many will measure their contributions to the war effort by the volume of the production of the plants under their direction. Admittedly this is a proper yardstick. A man who has been able to organize for large-scale output of war goods and to inspire his associates to achieve gratifying results certainly has a right to be proud of his record.

But actual production is not the only measure of achievement in 1942. Manufacturers were called upon during the past 12 months to do many things which their predecessors of previous generations would have found impossible to do. They had to contribute their best to the war effort while working according to rules which would have shocked and horrified their ancestors. The industrialists of 1942 had to exercise a high degree of adaptability to some conditions and circumstances with which they could entertain little sympathy or understanding.

To the credit of these modern captains of industry, it can be said that they wasted little time in grousing about the rules. They put their souls into the job and they produced as no previous crew of American executives has ever produced. With few exceptions, they were "good soldiers" in the best sense of the term.

Could these men have their wish for the New Year, it doubtless would be that circumstances permit them to make their effort in 1943 more effective than it was in 1942. Too many willing persons spent too much time running around in circles in the old year.

Happy New Year, and may every stroke count for victory!

E. L. Shaner

Editor-in-Chief

Million Men To Be Released For Munitions Industries

Vast quantities of critical materials, especially steel, will become available for armament. Construction reached peak in third quarter. U. S. to double Axis steel output in 1943

TREND in structural steel production indicates the construction phase of the war program is nearing completion as far as steel is concerned, Hiland G. Batcheller, director, WPB Steel Division, said last week.

Mr. Batcheller pointed out that production of structural shapes and sheet piling reached a high point in July, 1942, at 481,814 net tons. It has declined steadily since. Production in November was 379,056 net tons and it is anticipated that December output will total less than 350,000 net tons.

Production of steel sheet piling, which reached a peak of 25,224 net tons in December, 1941, declined to 3074 net tons in November, 1942, indicating that the use of steel for improvements to dock and harbor facilities and similar work is nearing the vanishing point.

Shipments of wide-flange beams, used almost entirely for construction work, reached a peak of 144,926 net tons in October, 1941. Shipments in June 1942, aggregated 137,991 net tons and in November, 1942, only 77,679 net tons were shipped.

Production of standard structural shapes has been much more steady than sheet piling or wide-flange beams because standard shapes are used for shipbuilding purposes as well as construction work. This item reached its high point in July, 1942, when 334,505 net tons were shipped. November output of standard shapes was 298,303 net tons.

Steel which no longer is being made into construction products is, however, being used in the production of plates, bars, sheets and other steel products vitally needed in the war effort, and WPB will not approve use of structural steel unless it is directly necessary in the war program.

Construction reached the highest levels in history in the third quarter of this year, according to the Department of Commerce. The department, forecasting a sharp decrease in war plant construction in 1943 and further restrictions on private building, estimated construction expenditures for the year ending would total $13,500,000,000. This compares with $11,000,000,000 spent in 1941.

The decrease in building activity will release 1,000,000 workers as well as large quantities of steel and other materials to the direct war effort.

Military and naval building this year was more than double that of 1941, while factory construction was up 80 per cent. Building of private homes was about halved.

With the war plant construction program rapidly being completed a large part of steel capacity engaged in production for this work will be released to produce for other war needs. Further, private building will be further restricted though indications are the building of war housing to care for expanding requirements in war production centers probably will be fairly well sustained.

Recently Secretary of Labor Perkins stated employment on privately financed construction is expected to drop to an average monthly level of only 290,000 next year, approximately 40 per cent of the 1942 average. At the same time labor requirements for publicly financed construction will decline to a monthly average of 750,000, about 60 per cent of the labor input on such work this year.

The war construction program reached its peak during August when 1,675,000 workers were employed for all public construction. By June of 1943, it is indicated, only 810,000 such workers will be employed on such projects and a further decline during the last half of the year is expected to bring employment to less than 400,000 workers. Employment in private construction is expected to drop to around 180,000 by the end of 1943.

United States steel production next year will approach twice the combined output of Axis' nations, WPB Chairman Nelson said last week in reporting on

WINTER ON THE WAR FRONT, AND——

status of the steel expansion program.

Estimating Axis production at 50,000,000 to 55,000,000 ingot tons, Mr. Nelson said United States capacity already has increased to more than 89,000,000 tons and will approximate 97,000,000 tons on completion of expansion program by mid-1943.

"This has been no easy job," Mr. Nelson declared. "When steel production is expanded, there must be new blast furnaces to make pig iron and new open-hearth and electric furnaces to convert pig iron to steel. These are gigantic projects that consume large quantities of time and materials, including steel."

Pointing out that overall figures do not tell whole story, Mr. Nelson said alloy steel production has shown remarkable progress. Production now is substantially in excess of 1,000,000 tons monthly and will increase further next year. "Tonnages we are now producing," he added, "are more than four times greater than peacetime peaks."

Mr. Nelson listed following comparisons of productive capacity:

January, 1942, open hearth, 77,702,000 tons; December, 78,895,000 tons; goal, 84,241,000;

Bessemer, 6,721,000 tons in January; 6,721,000 tons in December; and 6,721,000 tons goal; electric 3,402,000, in January; 4,666,000, tons in December; and 6,153,000 tons goal.

Shifting pattern of production of certain finished products since start of war follow:

Plates, 750,000 tons in January; and 1,110,000 in December. Bars, 1,050,000 tons in January and 950,000 in December; sheets and strip, 1,150,000 tons in January and 830,000 tons in December; structural shapes, 450,000 tons in January, and 340,000 tons in December; rod and wire, 450,000 tons in January and 350,000 tons in December.

Consumption of iron ore now is running at rate of 10,000,000 tons a month, and with iron ore shipping in Great Lakes closed for the season, the inventory on hand amounts to about 60,000,000 tons.

Discussing coke situation, Mr. Nelson said as result of two new plants brought into production and 17 additional plants to be brought into production by July, 1943, total oven capacity will be increased by 7,084,000 tons to total 57,148,000 tons.

Republic Strike Forfeits Steel For One Merchant Ship, Each Day

PUBLIC appeals for additional war production apparently were lost on 1000 strikers at Republic Steel Corp.'s wide strip mill, now rolling ship plates, last week. The strike at the mill, which daily rolls practically enough plate to build one ship, was in protest against a change in schedules to comply with a Presidential order.

Just what the objection was to the schedule change remained obscure. One Republic worker, returning to his home after reporting to work Dec. 22 and finding the mill closed, declared he didn't "know what the hell it was all about."

Republic officials called the strike "wholly unwarranted" and the National War Labor Board in a telegram to officials of the local United Steelworkers of America union and to Philip Murray, president of the CIO, said:

"This strike is in clear violation of labor's pledge to the President that there shall be no strikes for the duration of the war. Peaceful procedures have been established for the prompt and orderly settlement of labor disputes. Your dispute can and will be settled under these procedures.

"May I ask you, as the responsible leaders of the union, to convey to your members the request of their government that they immediately return to their jobs and remain at them without interruption pending final determination of this matter."

The strikers yielded to the NWLB's demand and returned to work the middle of last week. The case was certified to the board which scheduled a hearing for Dec. 28.

C. M. White, Republic vice president in charge of operations, sent the following telegram to W. H. Davis, chairman of the NWLB, James V. Forrestal, undersecretary of Navy, and Admiral Emory S. Land, chairman of the Maritime Commission:

"Wholly unwarranted strike involving 1000 men in Cleveland plant of Republic Steel Corp. making vitally needed ship plate has been called by grievance com-

WINTER ON THE LABOR FRONT

BY no coaching or design on the part of the editors these two illustrations came to hand almost within the same hour last week—the one at the left picturing the great, barn-like steel huts in which our men in the Aleutians dwell this winter; the one at the right, a photo of the first group of Cleveland industrial workers, furloughed and given a vacation in Florida by their employers, for having "worked hard" on war contracts

mittee of the United Steelworkers of America of Local No. 2265 in direct violation of the union's no-strike pledge in contract between company and United Steelworkers of America executed only last August.

"Strike involves employes' refusal either to agree to present schedules which have been long in effect without double time penalty for seventh consecutive day of work where employe gets two days of rest in each work week or to accept new work schedule of five days of work followed by two days of rest in order to comply with President's Executive Order No. 9240 relative to premium pay for work on seventh consecutive day.

"This plant produces plate needed to build ships to carry men and supplies overseas. Every day lost means the loss of sufficient steel to build nearly one ship. This steel can never be replaced. We have full right under contract to set new work schedules at any time. War Labor Board has already ruled in Phelps Dodge Refining Corp., case No. 499, decided Dec. 4, 1942, that employes must either agree to present schedule without double time penalty or accept new schedule.

"Request you take appropriate action immediately to terminate this unpatriotic and illegal strike."

$3,000,000 "Incentive" Payment "To Boost Workers' War Output"

An "incentive wage system," under which Lincoln Electric Co., Cleveland welding equipment manufacturer, last week distributed almost $3,000,000 among its 1300 employes, was endorsed by James F. Lincoln, president, as a method which, "if properly organized and properly applied, will result in progressively lower prices for the consumer, progressively higher wages for the worker and progressively higher dividends for the owner."

The incentive compensation, averaging $2300 per employe and ranging from $10 to $25,000, with 90 per cent going to shop workers and remainder to management, represented a departure from the bonus plan used by the company since 1918. Mr. Lincoln said the word bonus "smacks of paternalism," whereas the new plan sets up a system "to boost output of all types of labor," providing greater war production and a philosophy which can and does solve the difficulty between labor and management.

Although total paid exceeded last year's distribution by about $1,000,000, Mr. Lincoln said WLB approval was not needed, since calculations were based on pre-war years.

Jack & Heintz Give Vacations in Florida

As insurance against long and tedious factory hours reducing the efficiency of its key workers, the Jack & Heintz Co., Cleveland, is sending groups of employes to Florida for winter vacations.

William S. Jack, president of the company, said the firm is maintaining 11 apartments at Fort Lauderdale and 11 couples are being sent there every two weeks.

This allows four days' traveling time and ten days at the seaside "where employes may enjoy the sunshine and sea air and recuperate, ready to resume their 12-hour day, seven-day week confining jobs in our factory with added enthusiasms and improved physical condition," Mr. Jack said.

Jack & Heintz has been noted for the liberal bonuses paid to employes for extra production, and, in fact, was investigated by a congressional committee in the matter of bonus payments.

Inland Granted Hearing on WLB "Hiring Hall" Order

Inland Steel Co., Chicago, will be given an opportunity Dec. 29 to present comments on recommendations made recently by a National War Labor Board mediation panel on issues involved in a contract dispute between the company and the National Maritime Union. The latter is sole bargaining agent for unlicensed personnel on the company's Great Lakes vessels.

Notification was received in the form of a wire from the War Labor Board, granting a hearing and stating that "interested parties are invited to attend and present comments to the panel's report." The board said an immediate decision would then be given.

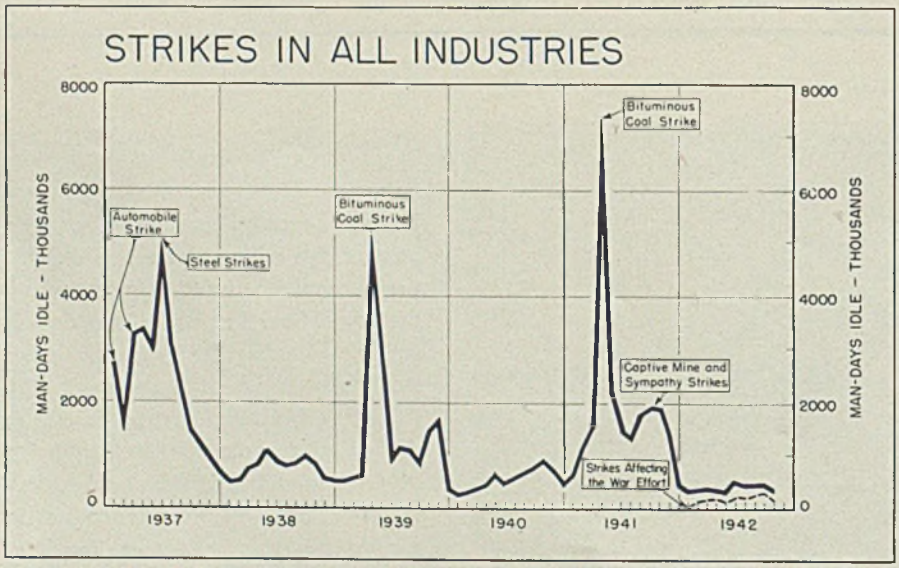
Three other companies are involved in the matter, the Interstate Steamship Co., Bethlehem Transportation Corp., and International Harvester Co. The hearing is being granted on Interstate Steamship Co.'s case.

Inland, which last week charged violation of a Presidential promise in the mediation panel's recommendations entered a protest and requested a public hearing before the full Board. It stated in a wire to the Board that the panel in directing Inland to grant the National Maritime union "not only maintenance, but the hiring hall" for its vessels had gone counter to the President's promise that the government would not order, nor would Congress pass legislation establishing, the closed shop.

Lake Erie Engineering Corp., Buffalo, has put into effect a "half-shift" work plan under which white-collar men may engage in the war effort without leaving their regular employment. The first shift of this kind works from 6 to 10 o'clock in the evening and so many applications have been received that a second shift from 10 to 2 o'clock may be started.

A remarkable feature is that at least 90 per cent of the applicants had had some degree of machine operation.

TIME LOST BY STRIKES AT FIVE-YEAR LOW



MAN-DAYS of idleness due to strikes during the first year of war dropped to the lowest level of the past five years, according to figures of the National War Labor Board. Percentage of time lost in war industries by strikes since Pearl Harbor never has risen above one-tenth of 1 per cent of the man-days worked, according to the board

Modifications Necessitated by Unexpected Nickel Content

MODIFICATIONS in the National Emergency steel composition made necessary by unexpectedly greater amounts of nickel content in scrap now available have been approved by representatives of the War Production Board, the Technical Committee on Alloy Steel of the American Iron and Steel Institute, and by representatives of the Iron and Steel Division of the Society of Automotive Engineers.

The average nickel content of scrap has been steadily increasing, due partly to the influx of new nickel-containing steel scrap generated as a result of our ever-increasing production of war materials, and partly to the conservation measures employed by steel mills.

Consequently, many steel mills find it virtually impossible to hold the nickel content of some of the NE steels below 0.60 per cent as originally specified for many of the NE grades. There is not available efficient carbon steel scrap low in phosphorus and sulphur content to dilute the high nickel scrap, and it is commercially impracticable to reclaim the nickel for any other use or in any other manner.

This condition prevented production in many mills of the NE 9400 series steels which have a specification limit of 0.20 to 0.40 per cent nickel and resulted in "off-analysis" heats in the 8600 and 8700 series.

The high nickel content of the scrap in recent weeks has often prevented alloy steel producers from bringing heats of NE steels within the specified compositions, resulting in last minute switches of heats already in process to steels of higher specified nickel content.

That situation has frequently resulted in the use of greater quantities of virgin nickel and sometimes of other elements such as chromium or molybdenum as well, than would have been necessary if the original intent had been to charge nickel scrap to produce high nickel steels.

To alleviate those conditions and to make more efficient use of the alloying elements derived from scrap, the following revisions in the list of National Emergency steels have been made. Compositions which have been deleted:

NE 8022	NE 8735
NE 8339	NE 8739
NE 8949	NE 8740
NE 8715	NE 8744
NE 8722	NE 8749

In requesting deletion of the NE 8700 series, WPB is attempting to conserve molybdenum and to make possible more flexible use of scrap generated in the steel mills.

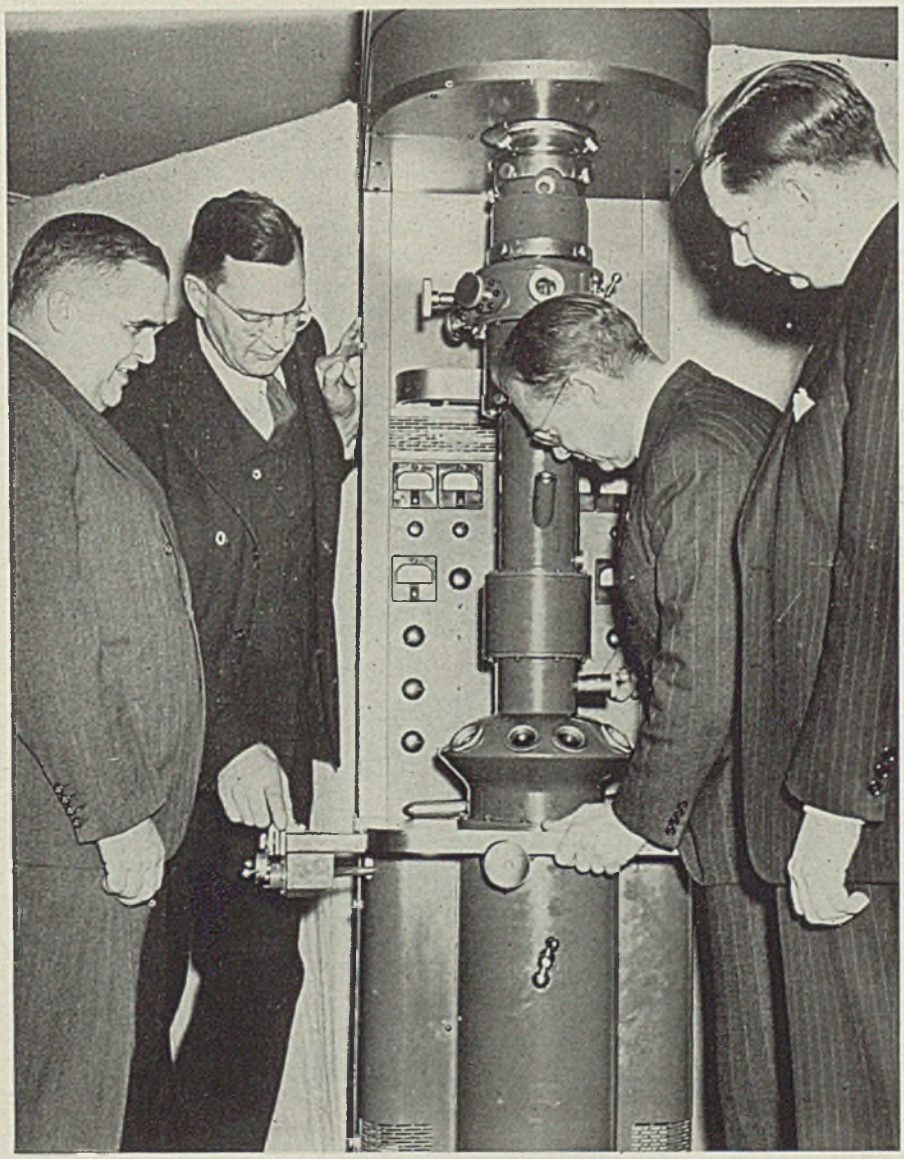
The NE 8600 series has been extended to compensate for the deletion of the NE 8700 series by the addition of the following compositions:

NE 8635	NE 8642
NE 8637	NE 8645
NE 8640	NE 8650

The manganese content of those steels is 0.75 to 1.00 per cent.

The nickel content of all remaining NE 8600 series steels has been changed to read 0.40 to 0.70 per cent, an increase of 10 points in the upper limit. The nickel content of NE 8720, the only remaining 8700 series steel, has been revised to read 0.40 to 0.70 per cent; likewise an increase of 10 points in the upper limit.

In the same manner the nickel content of the NE 9400 series steels has been changed to read 0.20 to 0.50 per cent and the NE 9500 series has been changed to read 0.40 to 0.70 per cent nickel; in both cases an increase of 0.10 per cent in the upper limit.



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NEW RCA electron microscope, which because of its simplicity of operation, is expected to be vital to most all war work and also to private industry, was introduced to a group of scientists and researchers in Washington recently. The microscope has magnifying powers up to 100,000 diameters. Shown around the machine are: Dr. C. B. Jolliffe, RCA chief engineer; Dr. Stuart Mudd, professor of bacteriology, University of Pennsylvania; Dr. V. K. Zworykin, associate director, RCA research laboratory; Dr. R. Bowling Barnes, director of physics, American Cyanamid Co. NEA photo

Auto Plant Makes Planes in 11 Months

Eastern Aircraft division of General Motors first to complete changeover to production

EASTERN Aircraft Division of General Motors Corp. has become the first unit in the automobile industry to convert to complete airplane production, according to L. C. Goad, general manager, who announces five plants which were manufacturing automotive parts or assembling automobiles less than a year ago are now in production of fighter planes and torpedo bombers for the Navy.

Although only 11 months old, Eastern Aircraft has retooled the five General Motors automotive plants the new division absorbed upon its formation on Jan. 21 of this year and is now well embarked on the production of two different planes for the Navy, both designed by the Grumman Aircraft Engineering Corp.

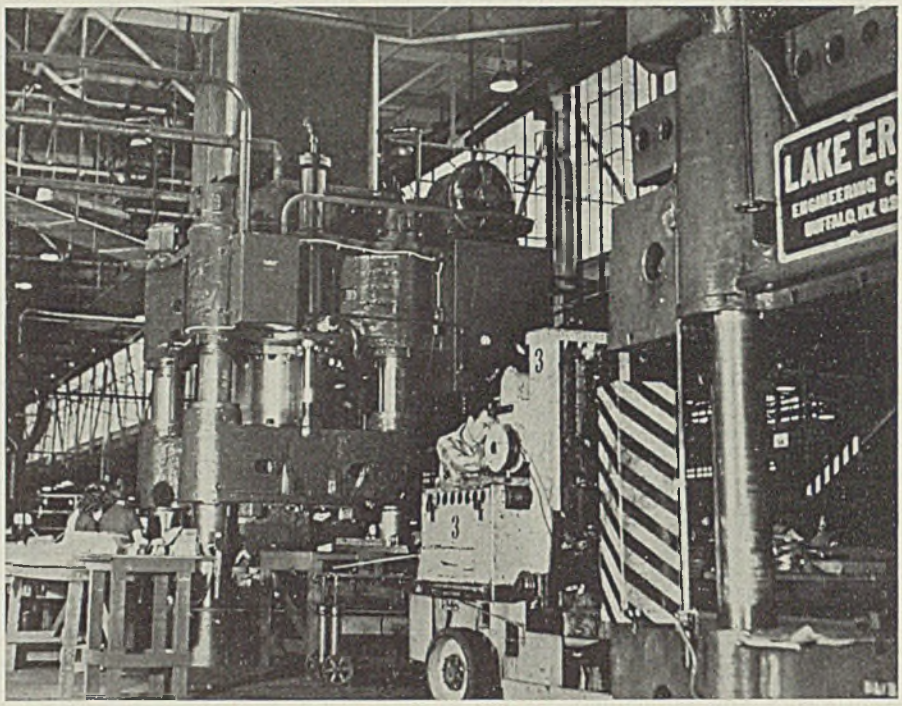
About a half year after a letter of intent was received from the Navy, Eastern Aircraft, from parts furnished by Grumman, had assembled and flown its first airplane. Now Eastern Aircraft is manufacturing its own parts for assembly into the completed planes. The Eastern Aircraft conversion was described as one of the most difficult undertaken by the automobile industry in its shift to war production.

Conversion of Plants Difficult

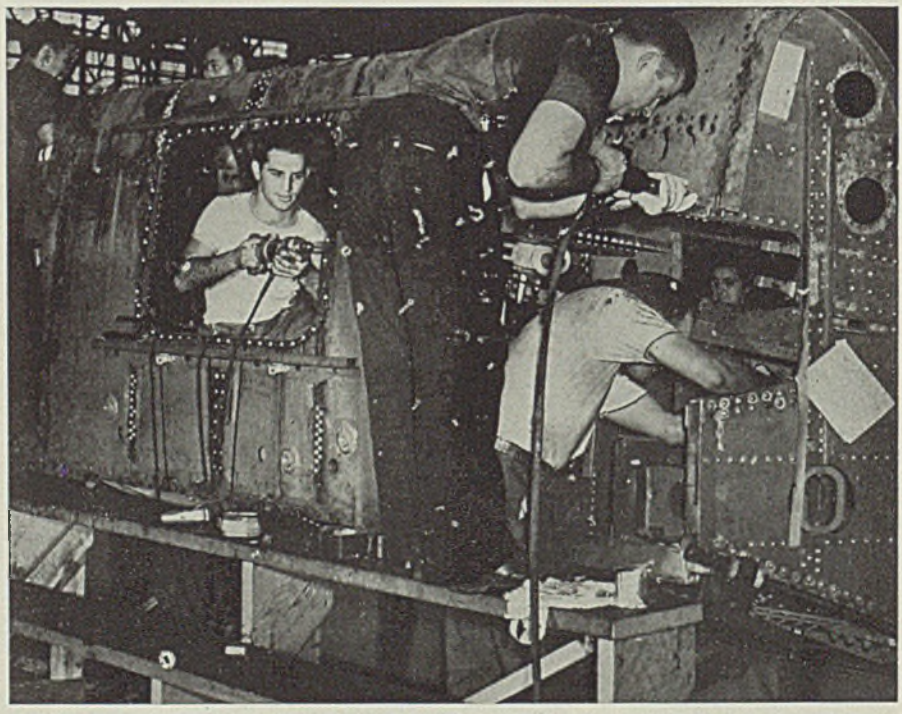
The new division was formed to utilize some 60 acres of floor space in five General Motors plants on the eastern seaboard. Two were formerly Fisher Body plants at Baltimore and Tarrytown, N. Y.; one was an automobile assembly plant at Linden, N. J., another was a Delco-Remy battery plant at Bloomfield, N. J., and the fifth manufactured automobile hardware at Trenton, N. J. In these five plants, none of which was easily adaptable for aircraft manufacture, Wildcat fighters designated by the Navy as the FM-1 and Avenger torpedo bombers designated as the TBM-1 now are taking shape at the hands of thousands of workers, less than 5 per cent of whom had previous aircraft building experience.

To build this new manufacturing project on the foundations of an older industry where the techniques were totally dissimilar, it has been necessary to rip out all the automotive equipment, redesign many sections of the five plants and engineer new processes that would take advantage, where possible, of the mass production experience of automobile days. Nor did the problem end there, for it was equally important that new jigs and fixtures be designed and built, and that new workers be found and trained to take their place on employment rolls now more than 100 per cent greater than the peacetime peak of the five plants, and still climbing.

The physical conversion of the automobile plants took about three months, during which time more than 25,000,000 pounds of tools, machines, fixtures and equipment were removed in the process



Huge hydraulic presses form parts for Avenger torpedo bombers at Trenton, N. J., plant of General Motors Eastern Aircraft Division in the section where automobile hardware used to be inventoried and sealed for shipment to the final assembly factory



Size of the center wing section of the Avenger may be gained from this view of a wing under construction at the Trenton, N. J., plant

of stripping the plants to the bare walls. Only a small percentage of this equipment lent itself to immediate conversion for use in aircraft building.

Then came the problem of tooling up to fabricate the 40,000 separate parts for the two airplanes. Because most airplanes before the war were more or less custom-built by men with long experience in their industry, specific detailed information never before had been compiled in complete form. But now it had to be for the benefit of the automobile people forming the nucleus of employment and the countless inexperienced people being gathered around them. Automobile experience in process engineering also had to undergo radical change to build and operate machine tools that take into account the fluid design of aircraft. Today the best aircraft production methods are being blended successfully with the automotive "know how" and the sense of flow that used to complete one automobile every 60 seconds on the assembly lines at the Linden plant.

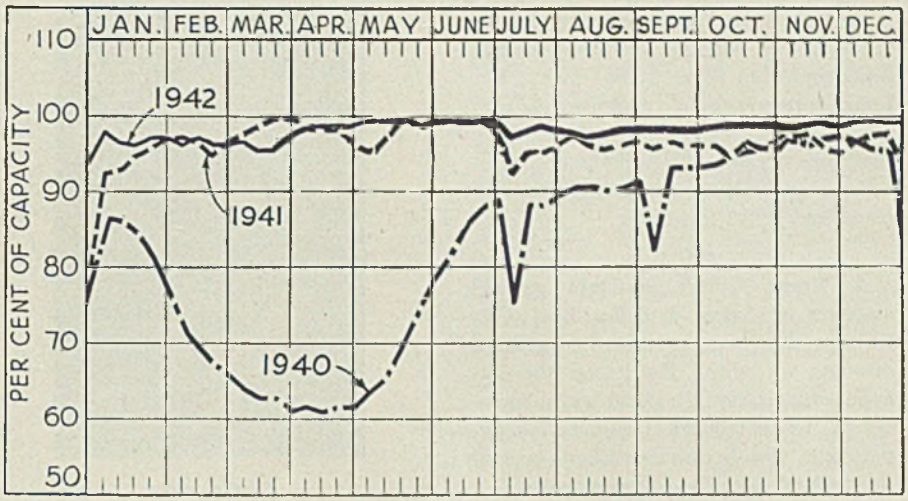
To get into production as quickly as possible, plans were laid to spread out orders to subcontractors and suppliers with the result that 350 outsiders were called on for 2606 parts and assemblies, such as steel and aluminum forgings and castings, rivets, machine parts, etc. In their search for materials and subcontractors, purchasers for the division were led to usual sources. One part is now subcontracted to the service department of a Buick dealer, another is being made by an ornamental iron works.

And over all was the necessity of training workers to achieve the eventual 500 per cent employment increase over peacetime levels that has been set as the ultimate goal. To date more than 1,500,000 man-hours have been spent training workers, many of whom are women.

Confirms Affiliation of W. B. Stout with Consolidated

Confirmation of the reported association of William B. Stout, the Stout Engineering Laboratories and Stout Skycraft Corp. with Consolidated Aircraft Corp., San Diego, Calif., was given last week by T. M. Girdler, Consolidated chairman.

Until recently Mr. Stout had been working in a consulting capacity for the Fisher interests in Detroit, concentrating particularly on the perfection of a small 100-horsepower airplane engine and a small, fool-proof light plane called the Skycar. Presumably he will continue aeronautical research in his new connection.



STEEL . . . . . STEADY

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week continued unchanged at 99 per cent. Four districts made small gains, four declined and four were unchanged. A year ago the rate was 93½ per cent; two years ago it was 80 per cent, both computed on the bases of capacities as of those dates.

Youngstown, O.—Holiday observance had no effect on steelmaking, the rate remaining at 97 per cent with three bessemers and 77 open hearths in production. The same rate is scheduled for this week.

Buffalo — Losing the gain of the previous week, production dropped 2½ points to 90½ per cent as an open hearth was taken off for repairs.

New England — With one open hearth down for repairs the rate remained steady at 96 per cent.

Chicago — Completion of furnace repairs has returned several furnaces to service, the rate advancing 2½ points to 102½ per cent. Steelmaking was not interrupted for Christmas.

Detroit — Production declined 3 points to 89 per cent, though no curtailment was made because of Christmas.

Cincinnati — Advanced 2 points to 89 per cent as open hearths were returned to service.

Central eastern seaboard — Continued steadily at 95 per cent.

Birmingham, Ala. — With 23 open hearths active production continues at 95 per cent.

St. Louis — Reinstatement of three open hearths as scrap supply increased lifted production 6 points to 93 per cent.

Cleveland — Slight adjustment by one producer raised the rate 1 point to 94½ per cent.

Pittsburgh — Slight readjustments caused production to decline 1 point to 97½ per cent.

Wheeling—Lost 1 point to 85½ per cent.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended Dec. 26	Change	Same week 1941	Same week 1940
Pittsburgh	97.5	—1	90	75
Chicago	102.5	+2.5	104.5	79.5
Eastern Pa.	95	None	83	82
Youngstown	97	None	83	78
Wheeling	85.5	—1	90	76
Cleveland	94.5	+1	90.5	75.5
Buffalo	90.5	—2.5	81.5	78
Birmingham	95	None	90	84
New England	96	None	85	86
Cincinnati	89	+2	82.5	73
St. Louis	93	+6	76	79.5
Detroit	89	—3	86	76
Average	99	None	*93.5	*80

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

First Quarter Coal Needs Estimated at All-Time High

Coal requirements for first quarter 1943 will reach an all-time peak, according to a report by the coal and coke committee of the Ohio Valley Transportation Advisory Board, meeting in Cincinnati, recently. The committee is headed by E. C. Perkins, manager of the marketing division, Appalachian Coals Inc., Cincinnati.

The report said in part: "We estimate that national industrial demand during the first quarter will be about 118,000,000 tons. We believe deliveries from retail yards will total about 37,000,000 tons. This indicates a total industrial and domestic demand of 155,000,000 tons, part newly-mined coal and part from existing inventories."

MEN of INDUSTRY

Carl G. Preis has been elected vice president in charge of engineering, American Can Co., New York. Mr. Preis, formerly chief engineer, is also vice president and general manager, Amertorp Corp., a wholly-owned subsidiary, engaged in the manufacture of naval and aerial torpedoes.

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A. Frank Golick, assistant general manager of sales, LaSalle Steel Co., Chicago, has been promoted to general manager of sales. He joined the LaSalle organization in 1939 as a member of the metallurgical engineering department and became assistant general manager of sales the following year.

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W. Roy Widdoes has been named director of personnel relations, Lukens Steel Co. and its subsidiaries, Coatesville, Pa., succeeding **Charles L. Huston Jr.,** recently made assistant to the president. He joined Lukens in 1912 in its time department. In July, 1915, he went to work for the Reading railroad but returned to Lukens that same year, serving in the purchasing department. Since May, 1938, he has been general manager of By-Products Steel Corp., a Lukens subsidiary.

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C. H. Bauer has been named assistant general manager, Warren City Tank & Boiler Division of Taylor-Winfield Corp., Warren, O.

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Frank A. Haag, formerly eastern manager of Kold-Hold Mfg. Co., has been appointed sales manager, with headquarters in the main office at Lansing, Mich. He succeeds **Paul R. Portteus.**

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D. C. Guest, since 1935 sales manager, outside construction department, Graybar Electric Co., New York, will retire Dec. 31. **L. W. Taylor,** associated with the outside construction department since 1937, succeeds Mr. Guest as sales manager, effective Jan. 1.

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W. Mikelson, General Electric Co., Schenectady, N. Y., and **A. M. Swigert,** master mechanic, Chrysler Corp., Detroit, have been appointed members of the sectional committee on classification and designation of surface qualities, American Standards Association, New York.

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Ralph W. Hisey, vice president, Osborn Mfg. Co., Cleveland, has been elected president, Foundry Equipment Manufacturers Association, Cleveland. Mr. Hisey formerly served the associa-

CARL G. PREIS

W. ROY WIDDOES

tion as a director. He has been a member of the Osborn company executive staff for many years and was assistant secretary and secretary prior to being appointed vice president.

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H. W. Hem has joined Howe Scale Co., Rutland, Vt., as research director. He formerly was chief engineer, Toledo Scale Co., Toledo, O.

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M. M. Broad, who resigned from Grant Iron & Metal Co., Detroit, Nov. 1, is now associated with Fisher Iron & Metal Co., Muskegon, Mich., as president, establishing offices in the Michigan building, Detroit. Other officers are: **Jerome J. Fisher,** vice president; **Harry A. Fisher,** treasurer, and **Bernard Fisher,** secretary.

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David L. Cable, sales manager, Ferro Enamel Corp., Cleveland, is now associated with W. B. Lawson Inc., subsidiary of Ferro Enamel.

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B. DeLorenzo has been appointed manager of the heat transfer department, Brown Fintube Co., Elyria, O. A graduate of Massachusetts Institute of Technology, Mr. DeLorenzo formerly was connected with Foster Wheeler Corp., New York.

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Ralph Strang has been named head of the sales engineering department of Morey Machinery Co. Inc., New York. He formerly was chief of the research service unit, Facilities Branch, War Production Board.

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J. H. Cooper has been appointed chief, Resistance Welding Section, General Industrial Equipment Division, War Production Board, Washington. He has been given an indefinite leave of absence by Taylor-Winfield Corp., Warren, O., with which he has been associated the last six years as welding engineer.

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P. W. Foster Jr. has been elected vice president, Foster Wheeler Corp., New York. He has been associated with the corporation since its organization in 1927 and before that was with one of its antecedent companies.

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J. R. Barrett, department manager of the Flint, Mich., plant of Chevrolet Motors Division of General Motors Corp., has been appointed manager of a new aviation division established at the Flint plant, made necessary by substantially increased schedules for Pratt & Whitney aircraft engine parts.

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H. B. Harvey, president, Harvey Metal Corp., Chicago, has been elected president of the Brass Forging Association. **Fred Riggin,** president, Mueller Brass Co., Port Huron, Mich., has been elected vice president of the association.

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Robert C. Corlett has been elected president, Goss Printing Press Co., Chicago. The past few months he has been serving as executive vice president, following retirement of **Martin Brueshaber.** Mr. Corlett will also continue as treasurer. **Joseph A. Riggs,** vice president, has been named general manager. **Fred G. Tuttle,** controller and **Curtis S. Crafts,** secretary, will continue in these posts.

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Frank R. Hanrahan, former president, Cleveland Railway Co., has been made comptroller, Basic Magnesium Inc., Hanna building, Cleveland.

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Fred L. Black, formerly associated with Ford Motor Co., Detroit, has been transferred from the Office of War Information, to the Detroit office of United States Department of Commerce to succeed **Ross Robertson,** commercial agent, who is leaving for a commission

in the Navy. Mr. Black, when he left Ford last January and entered government service, had spent 23 years with Ford in advertising and public relations work.

—o—

C. M. Ballou, Cleveland, has been elected president, Steel Products Warehouse Association Inc. He was associated in executive and administrative capacities with the following: Seventeen years with American Sheet & Tin Plate Co.; five years in general warehouse business; 12 years as Cleveland city street railway commissioner, and subsequently vice president and general manager of the Cleveland Railway Co. Mr. Ballou reports that the association now comprises approximately 70 per cent of the steel warehouses in this country specializing in the distribution of secondary steel products.

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Arthur A. Aranson has resigned as assistant to the president, Crucible Steel Co. of America. Before joining Crucible Steel Co. in November, 1935, Mr. Aranson was assistant manager of purchases, International Harvester Co., Chicago, with which organization he had been associated 30 years.

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J. Mitchell Watson, heretofore associated with the metallurgical staff of McCord Radiator & Mfg. Co., Detroit, has become technical advisor to the Office of Civilian Supply, War Production Board, Washington.

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C. C. Johnston, formerly with the operations planning department of Murray Corp. of America, Detroit, is now associated with Stevenson, Jordan & Harrison, consulting management engineers.

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Lieut. Col. John Slezak, chief of the industrial division, Chicago Ordnance District, has been named deputy chief of the district. He formerly was president, Turner Brass Works, Sycamore, Ill.

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D. R. Guthrie has been appointed personnel manager, Ward Leonard Electric Co., Mount Vernon, N. Y.

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Robert H. Bishop, formerly eastern sales manager, Lighting Division, Sylvania Electric Products Inc., New York, has been made general sales manager, succeeding **Charles G. Pyle**, who has become managing director, National Electrical Wholesalers Association, New York. Mr. Bishop joined the company six years ago.

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George H. Smith, the past three years

C. M. BALLOU

assistant to the president, Chicago & Eastern Illinois railroad, Chicago, has been elected vice president. **Walter M. Templeton**, assistant secretary, succeeds Mr. Smith as assistant to the president.

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Richard S. Falk, personnel manager, Falk Corp., Milwaukee, has resigned as a member of that city's harbor commission on which he served two years.

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Harold Niemeyer, plant superintendent at Seattle for Western Gear Works, has been made general superintendent of the Seattle and Lynwood, Calif., plants. Going with Mr. Niemeyer to Lynwood as general foreman will be **Tony Danninger**, who held the same position in the Seattle plant.

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W. R. Hucks, manager of the Raw Materials Division, B. F. Goodrich Co., Akron, O., has been loaned to the government and has been assigned to the operating division of the Rubber Reserve Co. **R. G. Boyd**, manager of planning and scheduling in the tire division, has been assigned to the allocation division of the War Production Board, while **R. J. Hull**, who will serve on the staff of the rubber administrator, heretofore has been manager of compounding in Goodrich company's tire division.

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William M. Bloomer has been appointed machine shop superintendent, Brillion Iron Works Inc., Brillion, Wis. The company will convert the present machine shop department from a maintenance to a production basis. Mr. Bloomer will supervise the manufacturing department.

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E. A. Seeley, manager of field personnel and training, B. F. Goodrich Co., Akron, O., has been loaned to the Army Ordnance Department's Tank and Automotive Center, Detroit, as executive personnel advisor.

Harry L. McFeaters, chief engineer, Pennsylvania Engineering Works, New Castle, Pa., was elected president, Mahoning Shenango Valley Engineers Society at the annual election of officers in New Castle recently. **Paul G. Dingledy**, Pennsylvania Power Co., was elected vice president; **L. L. Weitzel**, McKay Machine Co., secretary, and **Sid L. Lockley**, Lockley Machine Co., re-elected treasurer. **F. J. Bowers**, Falk Corp., and **Thomas E. Baum**, Atlantic Refining Co., were elected members of the council.

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Lieut.-Col. Frank A. Mickle, granted a leave of absence by the University of Michigan where he is associate professor of mechanical engineering, has been named chief of the simplification section in the development branch of the Ordnance Department's Tank-Automotive Center, Detroit.

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B. D. Kunkle, vice president in charge of the manufacturing staff of General Motors Corp., Detroit, will assume additional duties of group executive over the Cadillac, Oldsmobile, Pontiac, Canadian and Overseas Divisions.

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W. S. Roberts, vice president and general manager of General Motors of Canada Ltd., becomes assistant to Mr. Kunkle.

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William A. Wecker, president and general manager of McKinnon Industries, GM subsidiary at St. Catharines, Ont., succeeds Mr. Roberts as vice president and general manager of General Motors of Canada.

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Thomas Cook, factory manager of McKinnon Industries, succeeds Mr. Wecker as president and general manager.

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D. U. Bathrick, general sales manager of the Pontiac Motor Division until called to Washington last June, will assume charge of the Washington office of General Motors Corp., succeeding **R. H. Grant**, vice president of General Motors, who is returning to Detroit to resume former duties there, but continuing to supervise activities of the Washington office.

—o—

Adolph W. Beck Jr. has been appointed general superintendent of ore mines and quarries, Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., effective Jan. 1, succeeding **Edwin M. Ball**, who will retire. Mr. Beck joined the Tennessee company in 1923, serving successively as underground engineer, division engineer, chief engineer, and last January was made assistant general superintendent.

OBITUARIES

Jerome R. George, 75, designer and constructor of steel mills in the United States and abroad, died Nov. 30 in Beverly Hills, Calif. Prior to his retirement he was vice president and chief engineer, Morgan Construction Co., Worcester, Mass., and president and chairman of the board, Aetna-Standard Engineering Co., Youngstown, O. In 1907 he designed and built the first continuous sheet bar mill, installing it at Youngstown Sheet & Tube Co.'s Campbell plant.

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George C. Wilson, 42, manager of the Middletown sales district of American Rolling Mill Co., died recently in Middletown, O. He was sales manager in the Cincinnati office of Armco until his transfer to Middletown in 1932.

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William Augustin Crotty, 68, sales manager, Central Foundry Co., New York, died in Yonkers, N. Y., Dec. 14.

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Harte Cooke, 71, senior engineer of the Diesel Engine Division of American Locomotive Co., Auburn, N. Y., died Dec. 15. Mr. Cooke was regarded as one of the foremost diesel engineers in the world. At the time of his death he was an instructor of navy men stationed at Cornell University.

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Charles A. Kropp, 77, chairman of the board, Kropp Forge Co. and Kropp Forge Aviation Corp., Chicago, died Dec. 17 at his winter home in Miami Beach, Fla. He was born in Annefors Bruk, Sweden, and came to this country in the late 80's.

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James E. Long, 66, formerly president and general manager, Western Malleable Casting Co., Los Angeles, died in that city recently.

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Clifford A. Nickle, consulting engineer, General Electric Co., Schenectady, N. Y., and one of the few men in the world to produce artificial diamonds, died Dec. 8 in Schenectady. Associated with General Electric since 1920, Mr. Nickle was a member of the American Society of Electrical Engineers.

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William Wood, 76, former superintendent, Gray Foundry Co., Cincinnati, died in that city recently. Before retirement he had been with the firm 40 years.

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Charles Thorp, 79, senior member of the law firm of Thorp, Bostwick, Reed & Armstrong, which he founded and with which he had practiced law 56 years, died Dec. 14 at his winter home in Miami, Fla. He organized Weirton Steel Co., now part of National Steel Corp., of which he was a director, and was also a director, Edgewater Steel Co., Blaw-Knox Co. and Copperweld Steel Co.

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John H. McKelvey, 61, vice president Laclede-Christy Clay Products Co., St. Louis, died in that city, Dec. 16. He had been associated with the organization 39 years.

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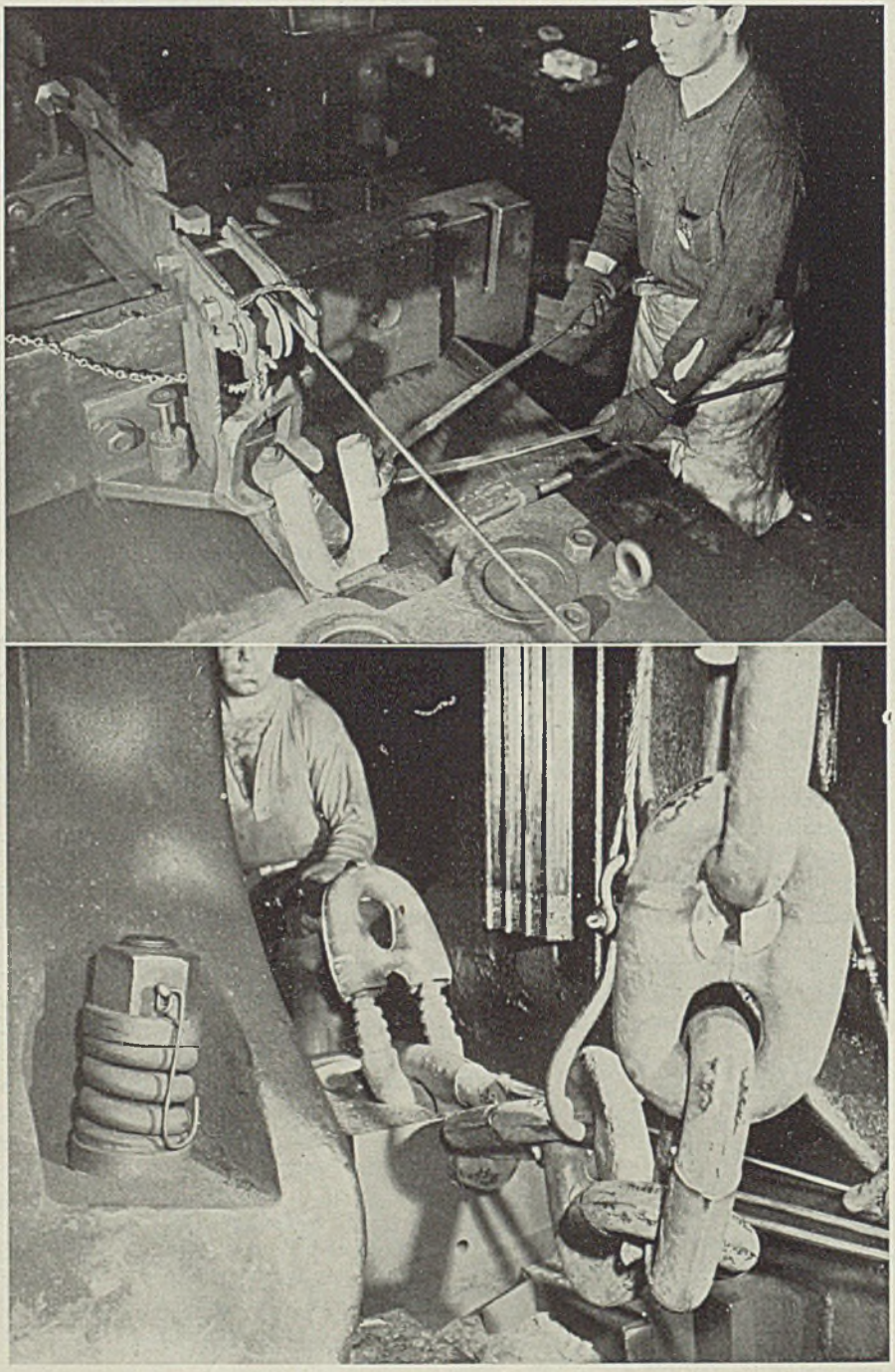
Thomas P. Rittenhouse, 54, chief of the safety division of National Screw & Mfg. Co., Cleveland, died in that city Dec. 13.

CHAIN FOR THE NAVY

IN AN eastern plant making chain for the Navy, a bar of hot steel is bent into shape of one section of a large link, in a single operation, top. Workman subsequently places the prepared section of a link over another section, already connected to the length of chain, and a steam hammer forces the two parts together. Link after link is added until the desired length is reached



PRIORITIES–ALLOCATIONS–PRICES

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

M ORDERS

M-63 (Amendment): Imports of Strategic Materials, effective Dec. 17. Prohibits importation of any commodity listed in the order without specific WPB authorization. Eliminates exemption in favor of importations of List I and II materials under existing contracts. Incorporates various exemption provisions of supplementary order M-63-d, which is revoked effective Dec. 28.

M-11-1: Zinc Dust, effective Dec. 22. Places zinc dust under complete allocation and use control in January and incorporates all provisions regulating zinc oxide and zinc dust under one order. Bans production of zinc dust under toll agreements and limits deliveries to amount specified in allocation certificates.

M-108 (Revocation): Can Enamel, effective Dec. 17. Revokes order governing use of can enamel.

M-116 (Revocation): Closure Enamel, effective Dec. 17. Revokes order governing closure enamel.

M-158 (Revocation): Drum Exterior Coating, effective Dec. 17. Revokes order governing drum exterior coating.

M-126 (Amendment): Iron and Steel Use, effective Dec. 21. Permits use of scrap material in making fireplace grates, weighing not over 30 lb. each, from Dec. 21 to Jan. 6, 1943.

P ORDERS

P-46-b (Amendment): Utilities, effective Dec. 16. Establishes conditions under which gas or electric ranges may be connected in dwelling of domestic consumer. Not more than 15 lb. of copper may be used in connecting electric range; not more than 75 ft. of 1¼ inch steel pipe or its equivalent in other sizes may be used in connecting gas range.

P-84 (Amendment): Plumbing Heating Repairs, effective Dec. 16. Rating assigned under this order cannot be used to obtain any material the transfer of which is subject to a ration order of the OPA.

L ORDERS

L-71-a: Flashlights, effective March 1, 1943. Standardizes construction of hearing aid batteries and permits interchangeability of batteries for vacuum tube type instruments. Until May 31, 1943, 30-volt batteries may be produced with terminals not otherwise permitted by the order.

L-79x (Amendment): Plumbing, Heating Equipment, effective Dec. 16. Prohibits sale or delivery to an ultimate consumer of any equipment the transfer of which is subject to a ration order issued by OPA. Revokes provision which enabled a purchaser to obtain equipment upon filing a signed statement certifying that the item was necessary for the installation of specifically listed farm machinery and equipment.

L-30-d (Amendment): Household Utensils, effective Dec. 17. Permits production of fireplace grates weighing not over 30 lbs. each, during the period from Dec. 21 to Jan. 6, 1943.

L-91 (Amendment): Laundry Equipment, effective Dec. 14. Bans manufacture of commercial laundry and dry cleaning equipment without specific WPB authorization, except for Army or Navy. Deliveries must be authorized on PD-416. Bans use of monel, nickel, nickel silver, and nickel-chrome steels in production of new machinery, unless specified by certain governmental agencies.

L-145 (Amendment): Communications, effective Dec. 16. Substitutes A-1-a rating, instead of A-7 previously assigned, for use by telephone and telegraph companies in obtaining new and used equipment for plant and lines. Permits manufacturer, distributor or dealer to fill any orders bearing A-7 rating provided such orders had been accepted prior to Dec. 18.

L-225: Electrical Conduit, Metallic Tubing, Raceways, effective Dec. 16. Prohibits installations, sales and deliveries on ratings under A-1-j. Conduits and tubing may be installed for extensions less than 12 ft. Restricts use of metal in manufacture of rigid conduit in 1943 to 40% of 1941 output and by individual producers quarterly to 10%; of raceways to 50% and by individual producers quarterly to one-eighth.

L-236: Hardware, effective Jan. 15, 1943. Establishes simplified practices with respect to types, sizes, forms, and specifications for builder's finishing hardware.

AA-1 Priority Assigned to Critical Farm Machinery

Top priority of AA-1 has been assigned by WPB to delivery of critical material necessary to manufacture farm machinery included on the current program.

Recommended by WPB's Office of Civilian Supply, the high rating will be applied to material for new machinery as well as for repair parts for existing equipment. The rating was given to speed work on tillage tools and other equipment needed for the coming spring planting season.

Involved in the priority assignment are 218,900 product tons of steel, in addition to companion materials, which will be marked for delivery during the first quarter of 1943.

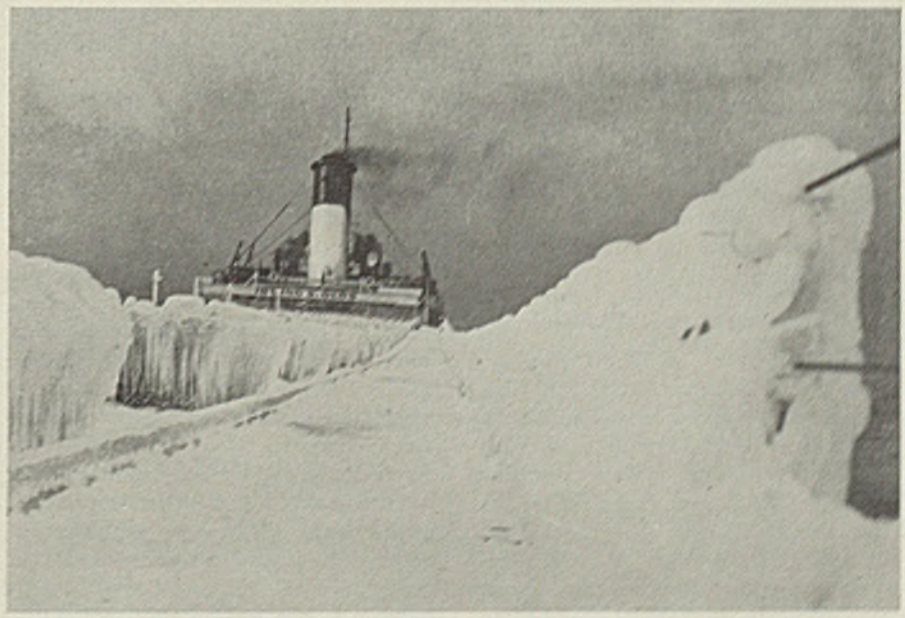
In addition to the farm machinery permitted by Limitation Order L-170, the larger manufacturers who had large inventories of usable materials on hand, have been permitted to use up those existing inventories. The total amount of farm machinery and repair parts thus produced in 1943 will add considerably to the total volume available.

Machine Tool Orders Must Be Accompanied by Certificate

Orders for machine tools placed after Dec. 25 must be accompanied by a photostatic copy of the preference rating certificate under which the buyer obtained his rating, or by a certified copy. The new procedure is ordered in General Preference Order E-1-B, as amended Dec. 19 by the director general for operations.

Purpose of the amendment is to eliminate correspondence between machine tool builders and their customers, by supplying the machine tool producers at once with the information contained in the rating certificates.

WHY ORE IS NOT SHIPPED ON LAKES IN WINTER



"OLE MAN WINTER" gives an effective answer to those who had supposed it to be safe and practical for the Great Lakes fleet to continue operating after it had transported 92,000,000 tons of ore this year. Eighteen inches of ice coated the IRVING S. OLDS, Pittsburgh Steamship Co.'s new 18,000-ton carrier as it tied up for the season

WINDOWS of WASHINGTON

War contractors fare well in renegotiations with price adjustment boards. Earnings average higher than in 1936-39 period. Each case considered on overall performance of government work

CONSIDERABLE reassurance was developed among STEEL's readers by a discussion of Public Law 528 and its administration which appeared in this spot in the issue of Nov. 2, 1942. It was intended to allay fears as to what might happen to government contractors through renegotiation of contracts.

A good deal of renegotiation has been completed since that time and the experience as a whole shows contractors have fared very well and that they have been permitted to enjoy a good profits position. In fact, the price adjustment boards of the Army, Navy, Treasury and Maritime Commission have been more liberal than would have been the case had they sought only to hold down profits.

When many contractors published income statements for the first nine months of this year it was shown that they earned a larger aggregate profit than they enjoyed on the average during the years 1936-39, despite heavier taxes. None of the companies is operating at a loss, although some of them did occasionally during 1936-39. A few of them probably will not net quite as much for 1942 as they averaged during 1936-39. Half of them, however, have already earned, after taxes, more in nine months of 1942 than they averaged annually during 1936-39. A few companies already have earned in nine months of this year ten times more than their 1936-39 average, and several have converted chronic deficits into comfortable profits.

A great many critics of Public Law 528 claimed that renegotiation was unnecessary because "the tax law will eliminate the possibility of inordinate profits". Actually it has been found that the tax law cannot do so; an example explains why:

Expansion Outruns Taxation

The X Company in 1937-39 had average annual sales of $2,200,000. This year its sales will be at least $33,000,000. No tax law could keep up with such war-time expansion. This company which in 1937-39 averaged a net income after taxes of $125,000 this year will net almost $2,500,000 after taxes, an increase in profits after taxes of almost 2000 per cent. In 1937-39 it earned an average of 8.4 per cent of its net worth. This year it will earn 67.7 per cent on its net worth. Its margin of profit on sales, after allowance of taxes, now is 20 per cent higher than during 1937-39. Taxation cannot keep pace with such war expansion without irreparably harming non-war businesses. An 80 per cent corporation tax rate bears heavily on war-curtailed businesses. But it leaves X Company with larger profits than the government intended it to have or than the company desires to retain.

In 14 representative cases that came before the Navy Price Adjustment Board the companies before renegotiation had estimated their 1942 net income after taxes at about $46,000,000. Those profits were about 165 per cent higher than the companies' 1939 profits. They represented a 30 per cent return on the companies' net worth. Contracts are renegotiated on the basis of profits before taxes but in these 14 cases renegotiation resulted in reducing estimated profits after taxes from $46,000,000 to around $27,600,000. Profits of $27,600,000 still show a tidy advance over 1939 profits which were $17,500,000. None of these companies will earn a return of less than 7.2 per cent on its net worth this year. Many will earn very much higher returns. In each instance the Navy Price Adjustment Board sought to fit the profits to the facts, to the contractor's efficiency, to his risks, to his resourcefulness, to his success on new and difficult operations, to his increased volume.

Substitute for Competition

These figures are not intended to serve as precedents binding on the Navy Price Adjustment Board. They are cited merely to reflect the record to date, to disprove allegations that renegotiation of contracts is designed "to see that industry makes nothing" or that it will "ruin companies" or "wipe them out" or "destroy incentive".

The Price Adjustment Boards take the attitude that war business is not competitive business, so that renegotiation can substitute partially for competition. Each of the four boards has a policy of rewarding low-cost, efficient operators. Each contractor is on notice that the lower his costs the better his standing with contract renegotiators. Contract renegotiation furthermore is aimed at serving the same anti-inflation role in the munitions field as OPA price ceilings do in the civilian field, a function recognized by formal agreement between the military services and OPA.

Because the munitions industry is a variegated industry the boards take the attitude that flat profit limitation formulas would give a false appearance of equity. Any formula might bring a windfall to some companies and hardship to others.

For example, the Y Company holds a great variety of munitions contracts. It makes parts for landing craft, aircraft engines, airframes and mines. Its principal contracts are for ordnance supplies. Y Company performs some of this work in its own plant, some in a new plant wholly government financed.

Its ordnance work falls into two categories. One type can be handled by mass production methods. Much of the work is subcontracted—so much so that, although this ordnance work accounts for two-thirds of Y Company's sales, it requires less than one-quarter of Y Company's plant space. Production has been rapid and successful. This year it will be five times larger than the Navy and Y Company had expected.

Tailored to Situation

The second type of ordnance equipment cannot be mass produced. It varies from job to job and always will. It requires frequent retooling and replanning. It can't be farmed out to subcontractors. It requires much more of the Y Company facilities than the first type but contributes much less of Y Company's total sales. Moreover, there will be 35 per cent less of this work this year than the Navy and Y Company expected.

No single profit limitation formula, the Navy board decided, can fit both types of work. A profit limitation based on sales or costs would allow either an exaggerated profit on the first type of work or an insufficient profit on the second type. A profit limitation based on invested capital would magnify the profit on the second type of work at the expense of the work that is subcontracted. It also would raise the problem of distinguishing between work done on government capital and work done with the company's capital. The renegotiators, therefore, distinguished between the two types of work, adjusting the profit to fit the facts.

Here is an illustration as to how the allowable profits are found: The M Company has enjoyed an enormous increase in war business and profits. The company has performed its work well. Its prices are lower than those of other companies doing similar work. It has done an excellent routine job. It is allowed a rate of profit considered reasonable.

The N Company, on the other hand, is treated with greater liberality. It also has had an enormous increase in business and profits, doing its work well and

at comparatively low prices. In addition N Company has been venturesome. It has developed, tested and adopted new methods. It has found ways to save scarce metals. It can now stop consuming one critical metal, substituting one that is less scarce. N Company has done not only an excellent but an extraordinary job. It is rewarded accordingly.

After a settlement has been made the case is closed. Usually a case cannot be reopened excepting in one or two ways: 1—The contractor may reopen the case if a final audit shows that his sales or profit margin during the period covered by the agreement fell a stated percentage below the level contemplated by the agreement; 2—the government can reopen the case if sales or profit margin for the period exceed what the agreement contemplated by the same percentage. Either of these options must be exercised promptly after the final audit is available. Thereafter the case is closed tight.

Aimed Only at Excessive Profits

Many contractors originally felt that the lack of a formula creates much uncertainty. It has been proved by experience that whatever uncertainty exists with reference to renegotiation evaporates in the minds of business men as they have experience with it. It has been their experience that renegotiation is aimed at eliminating excessive profits, not at eliminating profits. They also have found that in renegotiation all legitimate costs of doing business with the government are recognized.

Contract renegotiation usually follows a simple procedure. It may vary to fit the peculiarities of each case. Typically, it follows five steps at most.

Let's take as a typical example the case of the Z Company to which the Navy Price Adjustment Board sent an opening letter on Sept. 9, 1942.

Before it sent this letter the board had determined two facts. First, Z Company had more than $100,000 of government contracts and subcontracts. Second, the four Price Adjustment Boards—Navy, Army, Treasury and Maritime Commission—had determined that the Navy board should handle the case because most of Z Company's contracts are with the Navy. No company need deal with more than one of the four boards.

The Z Company was asked to submit certain preliminary information: Annual reports to stockholders for two prior years; audit reports for two prior years; annual report to SEC if one is made; latest interim financial statement; estimate of current year's sales segregated between government and commercial (only profits from government business are subject to renegotiation); segregation of government orders by purchasing agencies (War Department, Navy, etc.); filled and unfilled balance of prime and subcontracts. The company also was asked to describe its subsidiaries and to explain their conversion to war work.

On Oct. 15, Z Company sent the board its preliminary information. It was turned over to a staff analyst who on Oct. 21 laid before the board a preliminary report covering the company's history, its current business, its record on war work, and its financial status.

If the preliminary report indicates no excessive profit, the board so informs the company and the case practically ends there. However, if audited year-end earnings figures are not yet available, the board reserves the right to review the case when the audit report is finished. At a meeting on Oct. 23 the board decided, on the basis of the preliminary report, that Z Company may earn excessive profits from government contracts. On Oct. 29 the board notified the company that a Navy panel auditor would request additional information. Such additional information usually covers contract status, past and prospective earnings, accounting methods, wages and salaries, backlog of orders, intercorporate relations. Upon obtaining all of this information the board held an executive session with its analyst and officers of the interested government purchasing branches. The case was reviewed and a preliminary decision reached. After that the board held a meeting with Z Company's officers and reached an agreement that was final and binding.

Considers Overall Record

In these cases the board considers the company's overall record on government work. It does not attempt to split up the company's operations by contracts. (Contracts on which final payment was made before April 28, 1942, are an exception; they must be segregated because by law they are exempt from renegotiation.)

The meeting between the board and the representatives of the contractor usually opens with a short statement by the board chairman, giving the genesis and purpose of the renegotiation statute. Exemption of non-war business and of war contracts closed on April 28, 1942, is stressed. Questions about the application of the law to the contractor are disposed of.

The contractor then is asked to state his special problems and accomplishments. He is invited to describe quality and rate of production, inventive contribution, use of patents, co-operation with other manufacturers, economy in use of raw materials, reductions in costs, use of private financing, risks involved in his fixed price contracts, extent of conversion to war production. He is encouraged to develop the respects in which he regards his contribution to the war effort as outstanding. This period of the meeting often lasts from one to three hours.

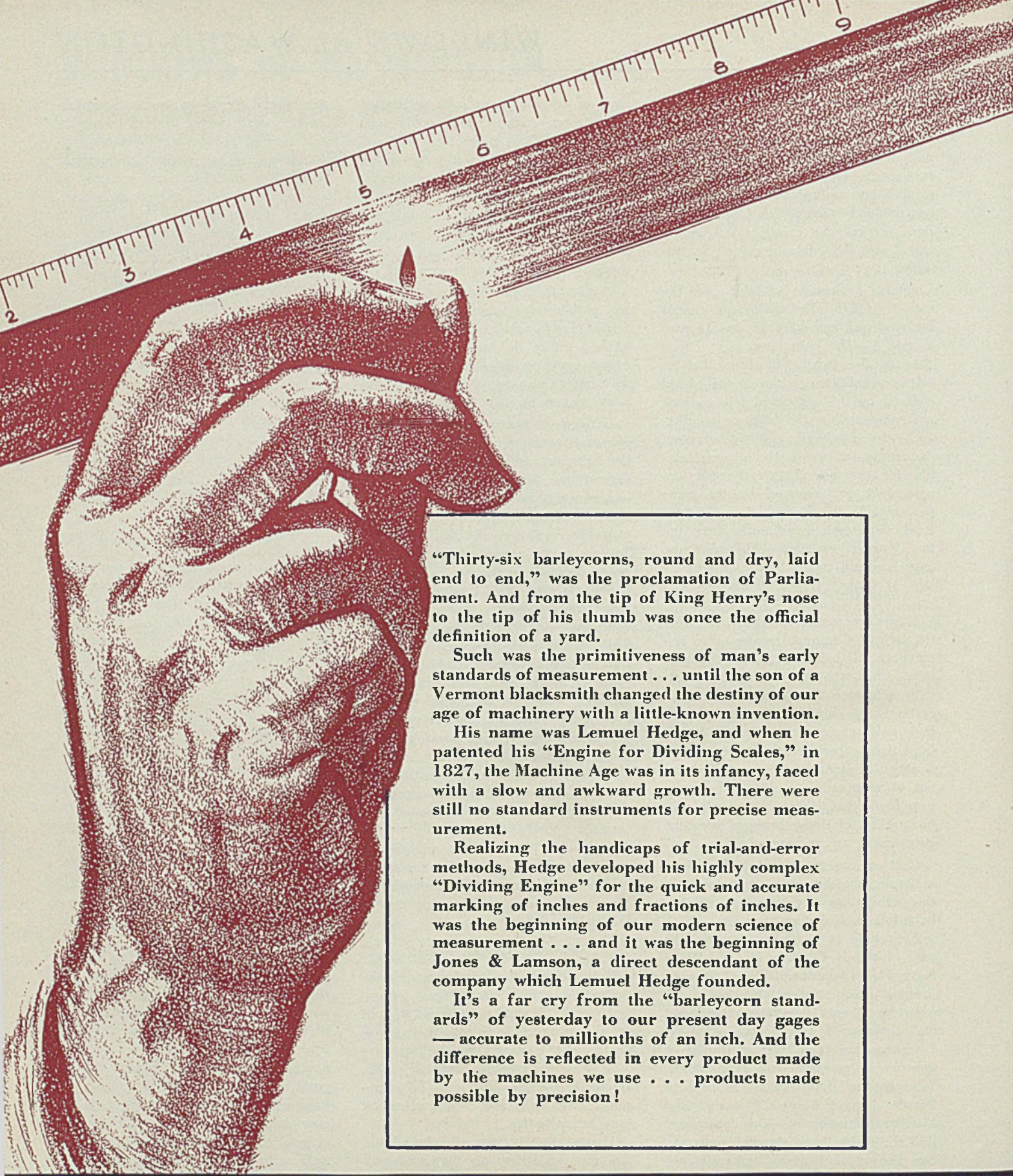
The board then goes into executive session. After considering its final report and its discussions with the contractor the board determines the amount of excessive profits, if any. A record is made of the basis used in arriving at the determination. Methods of recovering the excessive profits are considered at the same time.

Ask Voluntary Adjustments

Representatives of the contractor again are invited into the meeting and the contractor is asked to make, voluntarily, price adjustments that will eliminate excessive profits. The chairman, having alluded to the factors considered by the board, states the determination of the board. Negotiations then begin in earnest. When the board and the contractor reach an agreement the terms of settlement are outlined in detail. The meeting is adjourned to allow the company's officers to submit the settlement to their board of directors. Upon final approval, a contract is prepared and signed by the contractor and the interested government departments.

The final agreement fixes the method by which excessive profits are to be returned to the government. The contractor may reduce his contract price—and setting of reasonable prices in the light of experience may obviate further renegotiations. He may agree that the government shall withhold the amount of the excessive profits from payments otherwise due him. He may credit the government with the amount of the profit or make a cash refund. Cash refunds may be paid immediately or spread over as much as a year like income taxes. A subcontractor may make a cash refund to the government or to his prime contractor for transmission to the government. A subcontractor may reduce his prices, arranging for the benefit to be passed on to the government. Any combination of these methods may be used. The boards choose methods that will not impair a company's working capital or work a hardship on it.

Renegotiation deals with profits be-



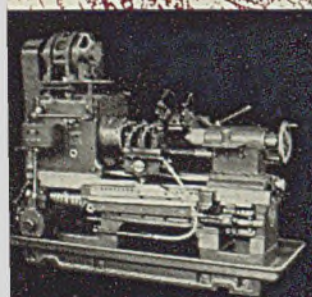
"Thirty-six barleycorns, round and dry, laid end to end," was the proclamation of Parliament. And from the tip of King Henry's nose to the tip of his thumb was once the official definition of a yard.

Such was the primitiveness of man's early standards of measurement . . . until the son of a Vermont blacksmith changed the destiny of our age of machinery with a little-known invention.

His name was Lemuel Hedge, and when he patented his "Engine for Dividing Scales," in 1827, the Machine Age was in its infancy, faced with a slow and awkward growth. There were still no standard instruments for precise measurement.

Realizing the handicaps of trial-and-error methods, Hedge developed his highly complex "Dividing Engine" for the quick and accurate marking of inches and fractions of inches. It was the beginning of our modern science of measurement . . . and it was the beginning of Jones & Lamson, a direct descendant of the company which Lemuel Hedge founded.

It's a far cry from the "barleycorn standards" of yesterday to our present day gages — accurate to millionths of an inch. And the difference is reflected in every product made by the machines we use . . . products made possible by precision!



FAY AUTOMATIC LATHES

AUTOMATIC THREAD GRINDERS

OPTICAL COMPARATORS

AUTOMATIC OPENING DIE HEADS

How many BARLEYCORNS make a FOOT?

Since the days of Lemuel Hedge, we, at Jones & Lamson, have maintained the highest standards of precision workmanship — have continually raised these standards for ourselves and others.

Twenty-two years ago Jones & Lamson pioneered a new method of gaging screw threads. It told, *at a glance*, *the complete story* of how a thread would fit its mating parts. This machine was the Jones & Lamson Optical Comparator. It was the first Optical Measuring and Inspection machine ever designed for practical shop use. Constant research has revealed an unlimited field for Optical Inspection and Measurement. It will not only measure and inspect all screw threads and related parts, but it will measure and inspect many irregular forms that are difficult, or even impossible, to measure mechanically.

We invite any interested person to submit samples, or blueprints of parts, with tolerance to be checked — or Jones & Lamson representatives will study your inspection problems in your own plant.

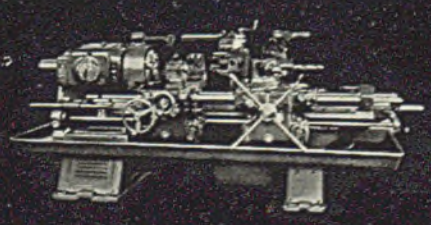
JONES & LAMSON
MACHINE COMPANY

Manufacturers of Ram & Saddle Type Universal Turret Lathes . . . Fay Automatic Lathes . . . Automatic Thread Grinding Machines . . . Comparators . . . Automatic Opening Threading Dies and Chasers

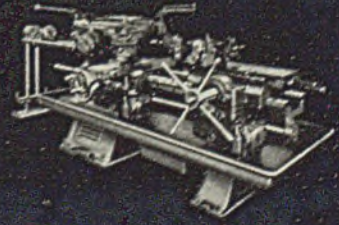
Springfield, Vermont

U. S. A.

PROFIT-PRODUCING
MACHINE TOOLS



SADDLE TYPE
UNIVERSAL TURRET LATHE



RAM TYPE
UNIVERSAL TURRET LATHE

fore taxes. If a company has not yet filed a tax return on its excessive profits, then the excessive amount which is refunded may be deducted from taxable income when the return is filed. If tax has been paid on the excessive profits, the profit to be refunded is reduced by the amount of the tax.

In renegotiation no efforts ever are made to influence company policies. While salaries are considered, they are regarded purely as cost elements. The right of a company to remunerate its officers and employes in accordance with its own judgment is not questioned by the boards.

It was noted above that cases may be reopened if final audits show that profits exceed or fall below expectations by a certain amount. The reopening options always have an expiration date. Expiration of these options closes the case forever. Renegotiation does not hang over war contractors forever, as has been charged. It ends definitely and irrevocably.

Prime War Contractors Asked To Spread Work Among Smaller Firms

INSTRUCTIONS to holders of prime contracts on war work to intensify placing of subcontracts, issued recently over the signatures of Donald M. Nelson and the undersecretaries of the War and Navy Departments, contain no definite directions for compliance and to that extent are not regarded as compulsory. However, they are believed indicative of the intent among government officials to spread war work as far as possible.

Smaller War Plants Division of WPB is gathering momentum in its efforts to engage idle plants and idle departments of companies previously unsuccessful in obtaining war contracts. To Dec. 15 it had succeeded in directing $28,300,000 in prime contracts to 234 small plants, the major portion of this business having been placed within the last six weeks. This does not include subcontracts.

The division's Critical Tools Service, which records available hours on 55 types and sizes of machine tools and offers this available time to contractors, through Nov. 27 had obtained work valued at $107,000,000 for nearly 1600 firms.

Smaller War Plants now has a facilities record file covering about 50,000 firms. Most of these are small plants, although some would be considered small only in relation to the size of other members of their industry and not from the standpoint of number of employes alone.

Plants with idle facilities are urged to see that a record of their equipment is filed on the designated form with the Smaller War Plants Division both in Washington and in the nearest WPB regional and field offices. This will enable the division to nominate contractors to the procurement agencies when contracts are being prepared for placement. Such contracts frequently are placed with one company with the understanding that a certain percentage of the work will be sublet to other manufacturers.

Possibility that under the Controlled Materials Plan subcontractors will be the principal loser in the event material allotments and production schedules of the prime contractor are reduced is recognized and is being studied here. The former might suffer in the event the prime contractor were able to retain for his own plant work which he had previously placed with subcontractors, since he has the responsibility for passing on to his suppliers the allotments covering required material.

In such cases the recommendation is expected to be made that prime and subcontractors share equally in what cut in operations is necessitated by curtailment in manufacturing schedules and material allotments, although there has been no indication that a mandatory ruling to this effect will be issued.

However, WPB, through delivery schedules imposed by procurement agencies, can exert considerable pressure on manufacturers to spread war contracts more widely among the smaller plants.

"Industry Advocate" To Help Businessmen on Questionnaires

Industrial executives who believe they are receiving WPB questionnaires which they cannot answer are invited to take their troubles to James Clay Woodson. Mr. Woodson has been appointed "Industry Advocate" within the WPB.

Mr. Woodson will examine the questionnaire forms sent to industry. It will be his task to balance the need for the requested data against the burden imposed upon business concerns in compiling it. In doing so he will consult with business men, seeing to it that their points of view are fully considered. When Mr. Woodson finds that questionnaires burden industry more than they help the war program, he will inform the office of Survey Standards within the WPB, of which he is a member. This office has the power to veto proposed questionnaire forms.

In addition, Mr. Woodson will act on specific complaints to review the applicability of questionnaires already sent out. In this task, he will succeed Joseph I. Lubin, chairman, Committee of Data Requests from Industry.

Before coming to the WPB, Mr. Woodson for seven years had been vice president and general manager of the Lee Wilson Engineering Co., Cleveland, a leading industrial furnace company.

The work of the Committee on Data Requests included the elimination of 120 forms affecting 25,000 companies and the substantial simplification of 132 forms affecting 125,000 companies.

Metalworking Industry Committees Appointed

Additional industry advisory committees were appointed last week by B. T. Leithead, director of the committees for WPB. They include:

Bolt, Nut and Rivet

Philip T. Williams, chief, Bolt, Nut, Screw and Screw Machinery Production Section, is government presiding officer. Members are:

R. D. Baker, Pittsburgh Screw & Bolt Co., Pittsburgh; W. R. Batty, Standard Nut & Bolt Co., Valley Falls, R. I.; C. L. Brackett, National Machine Products, Detroit; D. B. Ireland, Wolverine Bolt Co., Detroit; A. M. Jones, Buffalo Bolt Co., North Tonawanda, N. Y.; J. C. Miller, Bethlehem Steel Co., Bethlehem, Pa.; C. F. Newpher, National Screw & Mfg. Co., Cleveland; Meyer Paper, Lewis Bolt & Nut Co., Minneapolis; H. M. Smith, Vulcan Rivet & Bolt Corp., Birmingham, Ala.; and R. J. Whelan, Ohio Nut & Bolt Co., Berea, O.

Woodworking Machinery

Rob. B. Peterson, Woodworking Machinery Section, General Industrial Equipment Division, is government presiding officer. Members are:

R. W. Burns, James L. Taylor Mfg. Co., Poughkeepsie, N. Y.; J. A. Cary, Walker-Turner Co. Inc., Plainfield, N. J.; Alvin Haas, Yates American Machine Co., Beloit, Wis.; R. S. Johnson, Mercen-Johnson Machine Co., Minneapolis; E. Von Maltitz, The Plycor Co., Chicago; E. H. Merritt, Merritt Engineering & Sales Co. Inc., Lockport, N. Y.; H. C. Hamlin, Morgan Machine Co., Rochester, N. Y.; and W. B. Turner, Turner Machinery Co., San Francisco.

Industrial Hand Trucks

C. Darling, General Industrial Equipment Division, is government presiding officer. Members are:

A. M. Barrett, Barrett-Oravene Co., Chicago; R. L. Gembill, Globe Co., Chicago; C. A. Glass, Wellington Machine Co., Wellington, O.; F. L. Johnson, George P. Clark Co., Windsor Locks, Conn.; W. H. Whalen, Truscon Steel Co., Cleveland; A. H. Khab, West Bend Equipment Corp., West Bend, Wis.; A. L. Lewis, Lewis-Shepard Co., Watertown, Mass.; S. E. Race, Lansing Co., Lansing, Mich.; and J. F. Thomas, Thomas Truck & Castor, Keokuk, Iowa.

More Simplification of Rolled Steel Products Anticipated

NEW limitations on types and sizes of steel products which may be rolled by mills are expected to be issued soon by WPB as part of the attempt to concentrate production on the more commonly used varieties.

The limitations will take the form of schedules under Limitation Order L-211. This order, issued Oct. 23, authorized the director general to establish standards of sizes, shapes, specifications or other qualifications of steel products. Specifications are drawn up by the Specifications Branch, Conservation Division, in co-operation with other WPB departments, government procurement agencies and representatives of the steel industry.

Principal specifications issued to date cover concrete reinforcing steel and railroad wheels and tires. Other specifications now in course of preparation affect structural shapes, carbon plates, tubing and railroad axles and forgings.

A sharp reduction is in prospect for varieties of mechanical tubing. It is indicated that warehouses will be limited to approximately 500 sizes which they will be permitted to stock, or less than one-third the number previously available.

Sheets and strip apparently will not come under a specifications schedule, since the ratio of demand to rolling capacity of these products is less than in the case of a number of other items. American Iron and Steel Institute is reported to be working on a simplification schedule for bars, a product which has had supply problems, particularly in the larger sizes.

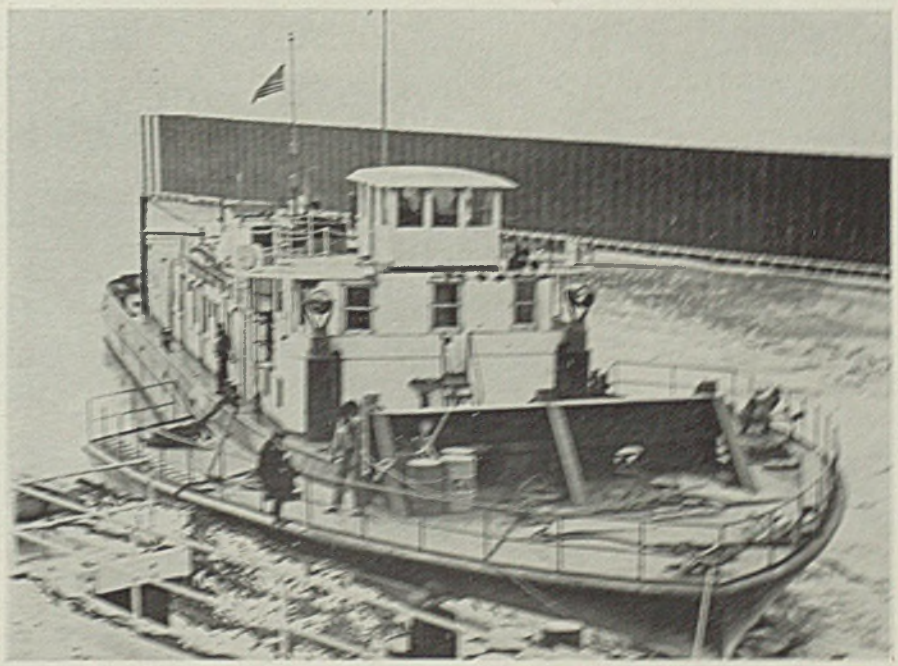
General effect of the various L-211 schedules will be to eliminate types and sizes of steel products which are made in relatively small quantities and which, consequently, are time-consuming for the mills. Although essentially a war measure intended to speed total output, simplification of product varieties is seen as offering advantages in certain instances for permanent practice after the emergency.

Eastman Asks Conventions Only for War Necessity

Abandonment of meetings and conventions that will not contribute importantly to winning the war is urged by Joseph P. Eastman, director of defense transportation. In response to inquiries as to the attitude of his office he announced that associations must make their own decisions, but such meetings would not be justified unless they would help shorten the war.

He pointed out that expanding war production, larger troop movements and rising volume of travel on war business would be a further burden on railroads in 1943. Canceling of meetings will provide a worthwhile saving of transportation facilities and will be a contribution to the war effort.

ICE BREAKER TO KEEP LAKES-TO-GULF LINK OPEN



MODELED after ice-breakers used in the Holland canals, the 75-ft. new Coast Guard cutter, will service the Illinois river this winter and keep war commerce moving between the Great Lakes and Mississippi river. Normally the Illinois is locked by ice from Jan. 1 to early March. NEA photo

WPB Aids Transfer Of Idle Equipment

INCREASING amount of the additional equipment constantly being required by war production plants is being obtained in the form of used units for which the original owners have no present use.

The practice followed by WPB in placing idle equipment into active service is similar to that employed in the redistribution of idle raw materials. It has the same basic aim—to conserve material, manpower and manufacturing capacity for other urgent needs.

The Used Equipment Branch, one of the Resources Agencies of WPB, is directly responsible for this program of satisfying as much equipment demand as possible through used idle units. From a small beginning, this branch has accumulated a list of about a million items of many varieties of power and industrial equipment not required by their owners and available for use in other war plants. It does not handle transfers of machine tools or construction machinery.

Recently the branch has been negotiating weekly the transfer of ownership of several thousand units, about two-thirds of the transactions consisting of sales to buyers seeking used equipment. The remainder have been substitutions of used equipment for new units which buyers originally sought.

The branch acts as a broker or clearing house—without commission—and advises the prospective customer of where the equipment desired can be obtained. Except in the case of power equipment, such as boilers, branch does not attempt to examine the equipment being offered or to guarantee it. Headquarters of the Used Equipment Branch are in the Washington Gas Light building. Neal Andrews is chief.

Co–operation with U. S. Agencies, Schools May Help Solve Problem

By EDWARD R. PROSSER
Assistant Factory Manager
American Bantam Car Co.
Butler, Pa.

IS YOURS a problem of locating the right persons properly trained to fill the rapidly increasing vacancies in your plant personnel?

We of the American Bantam Car Co. found ourselves confronted with just such a problem. Our plant is located in a small midwestern Pennsylvania city where skilled help of the type required on close tolerance work is at a premium. It was imperative that we do something to replace our rapidly decreasing staff of adequately trained young men who were entering the armed forces.

Our executives, in co-operation with the United States Employment Service, the National Youth Administration, Pennsylvania State College and our local school authorities, worked out a solution to the problem which is proving highly successful and which may give other plants in a similar situation some ideas for helping themselves.

F. H. Fenn, president and general manager of the company, suggested methods for training unskilled, draft-exempt men and women in co-operation with the Pennsylvania State College Extension Service.

Find Adaptable Courses

We first contacted Paul McDowell, manager of the Butler office of the United States Employment Service, who introduced to us Conrad C. Spangler of Pennsylvania State College Engineering Science and Management War Training Program. Mr. Spangler presented to us courses of training of such flexibility that they were adaptable to our specific needs and aided us in setting up a course of study.

Our company furnished the instructor for this course from its own personnel and Mr. McDowell aided in obtaining state teacher certification of this man.

Mr. McDowell and his staff recruited candidates to take the course through the United States Employment Service office. These persons then were interviewed by W. E. England, factory manager, and myself to select those who appeared most likely to be able to take and assimilate such a condensed course in the short time necessary due to the fact we were losing male employes of draft age so rapidly and that these vacancies must be filled without delay if production was to be maintained at high levels.

Classes were conducted, in local high school classrooms made available for their use, four hours on two nights each week for approximately 15 weeks on this particular course. Many students were placed in daytime jobs in our plant while still taking their training.

The students' only expense was that for textbooks and supplies, and satisfactory completion of the course entitled each student to the opportunity of employment at the American Bantam Car Co.

We have found this practice very satisfactory and are starting new classes at regular intervals.

Another opportunity for training was found at South Park, near Pittsburgh, where there is located a National Youth Administration center of the residence type that had been developed for training boys in industrial practices. Since the advent of the 18 and 19-year-old draft law this center was converting its facilities to the training of young women.

The center contains fully equipped shops of all kinds including radio shop, tin shop, welding shop, pattern shop, machine shop and foundry where students learn by actual use of the equipment. It also is provided with residences for students, recreational facilities, commissary and a completely equipped hospital for medical and dental care.

Mr. McDowell and his staff recruited young women interested in taking this training and at the present about 30 young women from this area are in residence at the South Park center taking training.

Satisfactory completion of this course also entitles the students to an opportunity for employment at the American Bantam Car Co.

These courses have already begun to show their value and will continue to prove more valuable to us as time goes on and we are able to draw from them just the trained operators we need to fill vacancies.

Lincoln Electric Plans Intensive Welding Course

To answer need for more and faster welding of ships, guns and planes for the armed forces Lincoln Electric Co., Cleveland, has designed a special intensive five-day welding production course. It will be held at the company's plant in Cleveland, the week of Jan. 11. It is designed for foremen, supervisors, production engineers, superintendents, engineers and all executives interested in greater welding production with the purpose of helping to get more welding production more quickly in their plants.

Lectures and practical demonstrations will make up most of the five-day schedule, with opportunity for each man to put into practice new welding methods and procedures. The course will cover proper engineering in application of larger electrodes, better fit-up and special positioning jigs and fixtures.

Application to attend the course should be made in advance to the Lincoln Electric Co., 12818 Coit road, Cleveland.

Film and Book Review Die Casting Development

History, method of production and use of die castings in peace and war work are presented in a three-reel color motion picture of 35 minutes duration soon to be shown at colleges and elsewhere. Castings produced from zinc-base, aluminum-base and magnesium-base alloys are reviewed in the film and an accompanying 148-page book, "Die Casting for Engineers," produced by New Jersey Zinc Co., New York.

Book and the picture describe the alloys now used, elements of die construction, specifications, inspections and tests, methods and tools for flash removal machining practice, jigs and fixtures for machining die castings, finishes, and designs for castings.

War Manpower Commission Broadens Scope of TWI

The War Manpower Commission's Training Within Industry Branch will supplement its JIT, or Job Instructor Program, with JMT and JRT, or Job Methods Training and Job Relations Training, respectively, over the next few months, Cleveland members of the American Supply and Machinery Manufacturers' Association were told by a WMC representative Dec. 10.

Under JMT, a 10-hour course will be given on how to improve on the job, covering such phases as increased production, reduction in scrap loss, etc. The JRT course will cover relations between the employer and employe, usually minor in character but which sometimes lead to labor trouble. These courses will be available after the first of the year.

Series of Mobile Roof Forms Speed Aircraft Engine Factory

ARCHITECTURAL assembly line in mass construction is utilized to a marked degree in building the mammoth Pratt & Whitney aircraft engine plant near Kansas City.

The mass construction line consists of a series of mobile roof forms 80 feet long, standing side by side to the distance of 1000 feet. Each is on wheels fitted to rails. Every seven days the forms roll forward their length; that week the 1000 feet of reinforced concrete roofing and the roof-supporting pillars have been poured, set and except for installations of lighting and other inside fixtures, the building up to that point is ready for machine tools. The whole job has been preceded by pouring the concrete slab forming the floor ahead of the advancing forms.

With the forms in place, it is jacked to position to receive the fabric of reinforcing steel and mesh fitted to the wooden arch to hold the concrete. Five days later the jacks are lowered and the form settles on its supporting brace. At its sides stand the pillars; above the lowered form curves the ceiling with a heavy concrete girder between the columns to carry the arch. Spaced regularly from the girder are a series of ribs, designed to withstand any horizontal thrust exerted by the arch section.

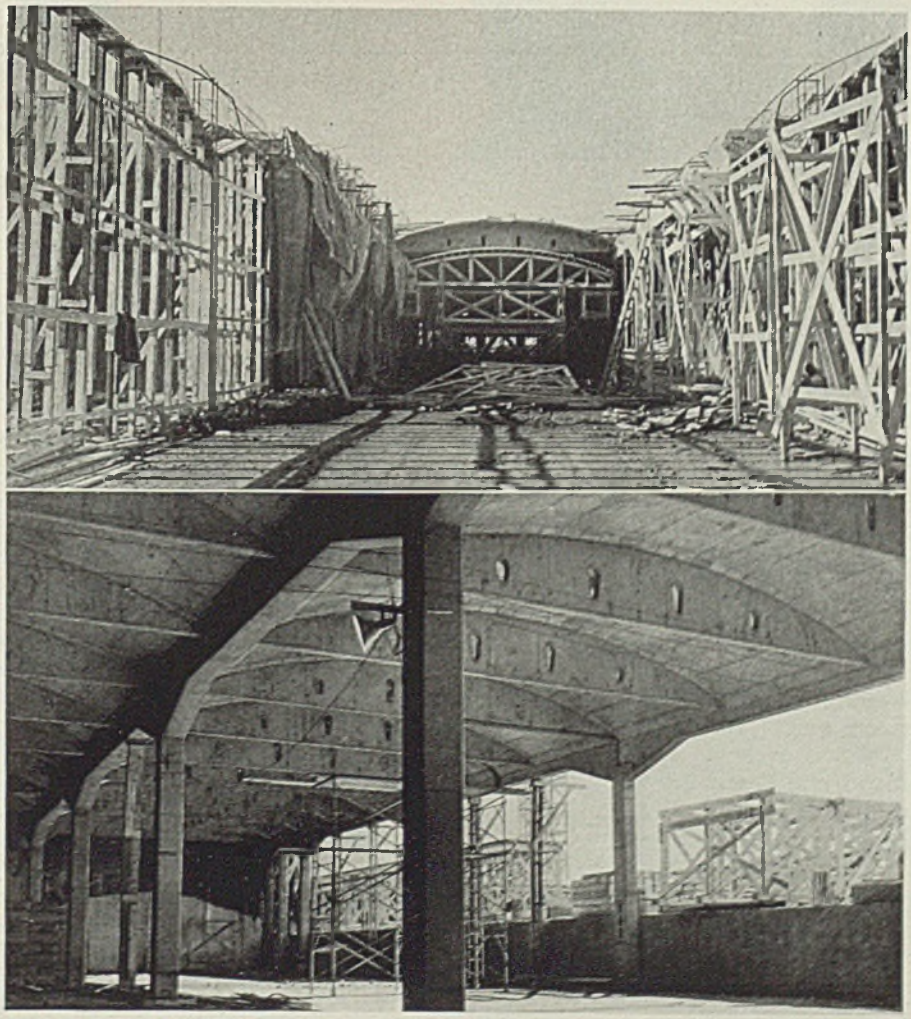
The form, once this job is completed, makes a bay exactly like that of the duplicate forms extending from it for hundreds of yards.

There have been only two materials on which the Long-Turner Construction Co., builders of the plant, have faced no priority problem, weather and mud. The Pratt & Whitney plant is being built in a saucer-like valley which once was the site of an old motor car speedway. From the rocky circle of knolls surrounding the valley, heavy rains washed down additional mud for bulldozers, tractors and heavy trucks to churn into a quagmire. In early December the temperature dropped below 10 degrees.

A framework of tubular scaffolding was erected over the mobile forms receiving their concrete pourings. Like the forms, the framework was on wheels. It was covered with canvas and rolled over the newly placed concrete. With this protection over the top of the slab, heat produced from salamanders on the floor below was sent into the confined framework and prevented freezing until the concrete was cured.

First use of the mobile forms in mass construction such as that of the Kansas City plant was made on a plant now under construction in Chicago. The forms devised by the Long-Turner company are considerably larger, have a greater rapidity of movement and are easier to handle. The Pratt & Whitney plant's construction, Fred G. Dawson, general manager, said, is on schedule.

A leading protagonist for mass production of factories was Albert Kahn, Detroit architect who died recently. Kahn's men designed the Pratt & Whitney plant,—a factory of such size that with completion more than 70 football games could be played simultaneously within its walls.

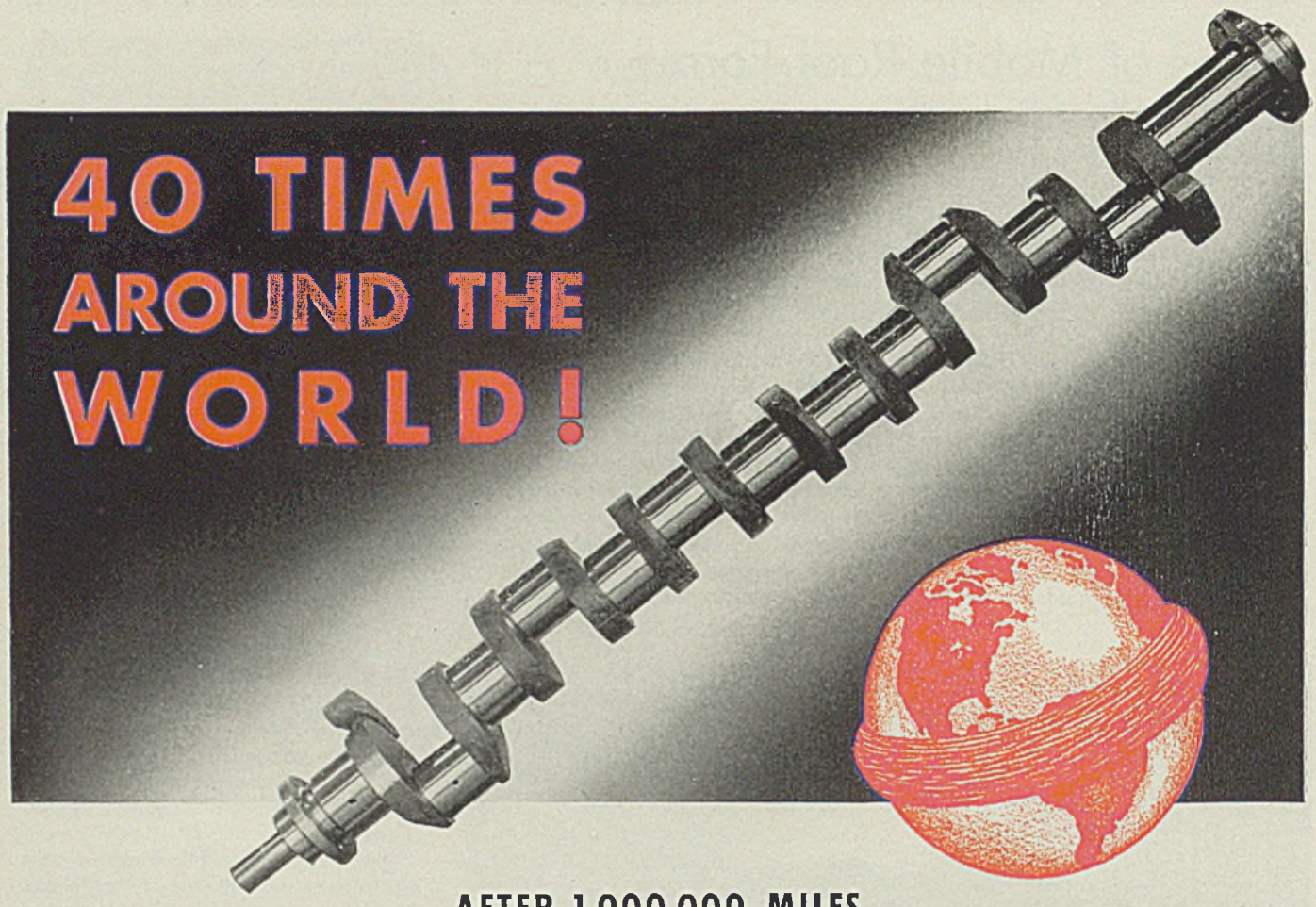


At top is shown a form that has been poured, lowered to a position where it could be moved, and later raised again to receive another section of the roof concrete for the Kansas City Pratt & Whitney plant. Ribs of the roof have openings in the concrete which are to be used for running pipes and other mechanical installations inside the building. The form now goes ahead 80 feet; columns already have been poured and stripped and the reinforcing steel in the beams is in place. The form is on steel wheels which ride rails. Below is an interior view after the mobile forms have been moved on to aid in setting the next section of the factory

Railroad Spends 200 Millions For Extra War Equipment

Since the outbreak of war, the Pennsylvania railroad has provided from its own resources extraordinary expenditures of nearly $200,000,000 for an emergency program of new equipment and repairs.

Report to stockholders, accompanying 3 per cent dividend checks payable Dec. 18, stated that the emergency expenditures were over and above the hundreds of millions of dollars expended by the railroad during this period in normal operations. Program included new rolling stock, cars and locomotives, amounting to $162,234,091 and trackage and other facilities totaling $34,799,631.



AFTER 1,000,000 MILES

TOCCO-HARDENED CRANKSHAFT SHOWS ONLY 1/1000-INCH WEAR!

ONLY 1/1000-inch wear on the crankpins after piling up a service of 1,000,000 miles . . . a distance equal to 40 times around the world! That's the record of one veteran TOCCO-hardened crankshaft on one of the country's fastest streamliner trains. Hundreds of thousands of other TOCCO-hardened crankshafts are giving similar performance . . . giving 5 to 10 times normal life . . . avoiding delays for engine overhauls . . . keeping engines of the United Nations on the straight path to Victory.

TOCCO-hardened crankshafts are used by the firms listed.

Investigate TOCCO for improved and faster hardening, annealing, brazing and heating.

THE OHIO CRANKSHAFT COMPANY
Cleveland, Ohio

THESE ENGINE BUILDERS USE TOCCO-HARDENED CRANKSHAFTS

Caterpillar Tractor Company

General Motors Corporation
Seven divisions making trucks and diesel engines.

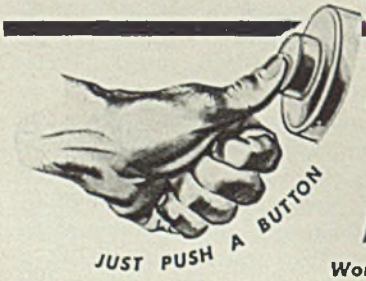
Hercules Motor Corp.

International Harvester Co.

White Motor Company

Worthington Pump & Machinery Corp.

and many others.



TOCCO

World's Fastest, Most Accurate Heat-Treating Process

HARDENING
ANNEALING
BRAZING
HEATING for forming and forging

By A. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

Industry's war output 10 per cent ahead of peak peacetime level. . . . Tooling activity ebbs. . . . Tank destroyer a surprise . . . . Memory of Albert Kahn perpetuated on five continents

DETROIT

YEAREND summary of production accomplishment by the automotive industry for 1942, released by the Automotive Council for War Production, shows rate of output and employment totals already substantially above the peaks reached in peacetime manufacture and scheduled to increase throughout 1943, although at a slower rate than during the current year. Furthermore the steady uptrend witnessed in 1942 may be interrupted temporarily in the coming year because of production changes dictated by war strategy and the fluctuating availability and distribution of raw materials. A few figures tell the story of the year now ending:

Production—Aircraft and aircraft components; tanks; military transport, service and combat vehicles; cannon, guns, shells and related fully-assembled armaments and parts produced by automotive companies in 1942 amounted in dollar value to $4,665,000,000, or 10 per cent above the value of the industry's output of civilian goods in 1941.

Current output—The industry's arms output in December totaled $575,000,000, equivalent to an annual rate of nearly seven billions, in turn the equivalent of producing 10,000,000 cars and trucks a year. Largest number of units ever produced in a year was 5,358,420 in 1929.

Employment—On the payrolls of 775 principal automotive plants in December were 960,000 factory personnel, more than 50 per cent above the conversion low point of 620,000, touched last February, and 26 per cent above the record peacetime high of 761,000 established in May, 1941.

Backlogs—Of the 14 billion dollars worth of war orders on automotive company books now, nearly 50 per cent is in aircraft classifications, with demand increasing. This 50 per cent breaks down into 20 per cent for completed planes, airframes and airframe subassemblies; 25 per cent for aircraft engines and parts, and 5 per cent for propellers and miscellaneous parts. Twenty per cent of backlogs are for military vehicles of 60 different types. Tanks and parts account for another 15 per cent, while ammunition, artillery and small arms amount to 9 per cent of the aggregate. Marine equipment—engines, propellers, barges, amphibian tractors, etc.—comprise another 4 per cent, and machine tools, dies, jigs, fixtures and other products make up the remaining 2 per cent.

The outlook for manpower is not too dark, according to industry spokesmen. They point out that the constant change in relative needs for various types of war goods and in the distribution of basic raw materials already is affecting employment to some degree. In addition, the retarding of certain production schedules in many plants and in many areas will result in reductions in the estimated number of working people required. These two facts, together with increasing productive efficiency that follows increasing experience, will ease the prospective manpower shortages in most automotive centers, which have been distorted beyond their actual proportions.

See Tool Shop Closing

Observers here are looking for steadily mounting mortality among the hundreds of small tool shops and engineering service establishments which have sprung up within the past year or two. Already perhaps a dozen of the latter group have quietly folded up, one reason being that the pressure on engineering and tool design service has slackened, another the fact that larger companies are absorbing more of this work into their own engineering departments.

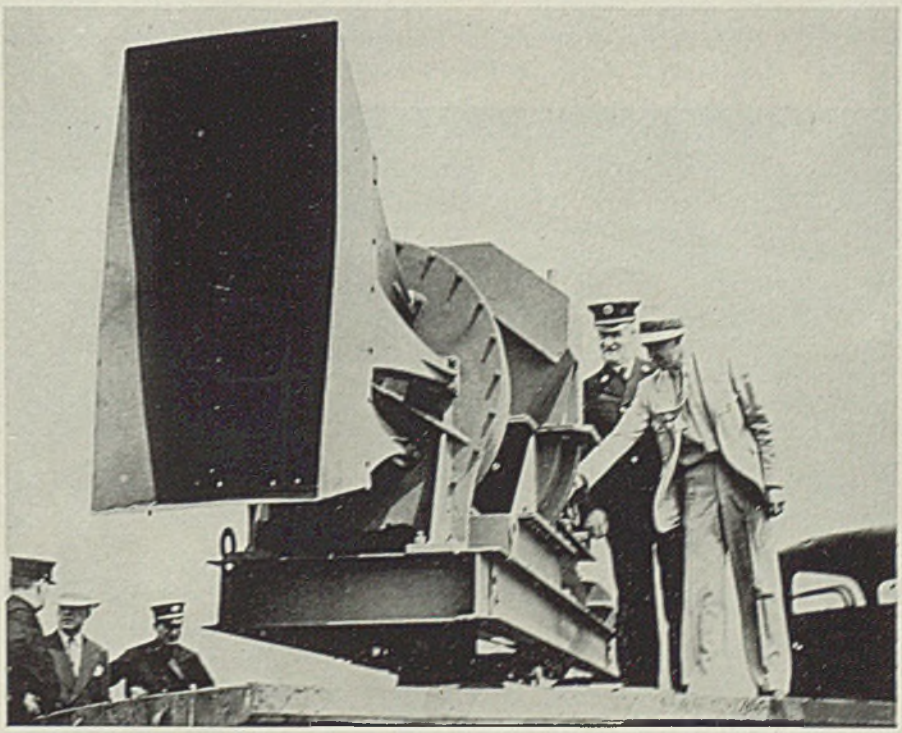
In the tool, die, jig and fixture field, there are literally hundreds of small organizations which have begun business in recent months, some starting with possibly a lathe and a milling machine, four or five operators and $5000 worth of orders. On the basis of mounting orders they were often able to get new machinery before their old established competitors, who did not like this situation a little bit.

Newcomers' Fortunes Ebbing

But the fortunes of the newcomers at the moment are ebbing. For one thing, there has been a considerable re-routing of new machine tools, under supervision of the Ordnance Department, to the disadvantage of the "overnight" shops. Furthermore, new business has been subsiding appreciably. The departure of these neophytes occasions no serious hardships, for many were put together on a shoestring, and the organizer can take his profit, close up shop and try something else without too much difficulty. His employes can still find jobs elsewhere.

Since last April, the Ordnance Department has been establishing what it calls "industry integration committees" (some

AIR RAID SIRENS GROW UP



AIR raid sirens become larger and larger to overcome the competition of the noises of huge cities with factories busy on war work. Above is a recent model produced by Chrysler Corp.

industry members call them "industry disintegration" committees) for the purpose of co-ordinating the activities of all plants producing a certain type of ordnance—tanks, guns, shells, etc. There are about 80 of these committees functioning now and more will be in action over the next few months, so that in six months to a year there will be industry committees functioning to supervise and control all forms of ordnance production.

These committees spring from a sound basic philosophy of Ordnance officials that the talent for organizing a production effort lies within the industries concerned and not in the military organizations they are supplying; hence the industries themselves should be given the responsibility, the privilege if you will, for co-ordinating their efforts.

Modified Tank Routs Rommel

One of the first pictures of the new M-5 self-propelled 105-millimeter howitzer was shown in these pages for Dec. 7, and this ingenious new weapon is credited by British sources with having been largely instrumental in starting the rout of Rommel in Africa. It is nothing more than a standard M-3 tank hull and drive mechanism, with the upper half replaced by a centrally mounted 105-millimeter howitzer, flanked by a lightly armored driver's compartment on the left and by a light antiaircraft gun on a turret at the right. Gun crews stand out in the open and must depend upon speed and mobility of their equipment for protection against enemy fire.

Design of the weapon reportedly was worked out following the recommendation of a U. S. military observer after studying the African situation, and its sudden appearance in the Libyan campaign was a complete surprise. According to Brig.-Gen. Glancy of the Tank-Automotive Center here, there is only one manufacturer of the M-5 at the moment, although several have been active on the program.

Success of the M-5 brings up the question of the relative merit of the tank as it is now designed and the self-propelled heavy gun, which is in effect a tank destroyer. The tank admittedly suffers from lack of protection against aircraft attack, principally because it provides almost no visibility, and also because in the M-4 design the 37-millimeter turret gun was removed so that the 75-millimeter gun could be located in the top turret. In a battle of tanks vs. tanks, the new M-5 seems to outpoint the fully enclosed and heavily armored type of vehicle, but the tank was not designed to be used in this type of fighting; it was conceived as a bruising, breakthrough type of weapon, to cut behind enemy lines and disrupt communications, etc. The open tank destroyer would not appear the better for this type of service, but the African campaign has created a new set of military conditions, to which the new M-5 seems, initially at least, well suited.

Great Figure Passes

The fluorescent lights still burn brightly on the several floors of the New Center building here which are occupied by the sprawling Albert Kahn organization of architects and engineers, even though the master is dead. And all the great plants which he and his associates designed throughout the country to speed the war effort are going full blast, fitting tributes to this dynamic little man who undoubtedly was the greatest industrial architect the world has ever known, and whose works were peculiarly representative of Detroit.

To name all the industrial buildings which were evolved by Kahn and his designers would take pages of print. Some of the most recent and spectacular are the Chrysler Tank Arsenal, the Wright Aeronautical plants, the Ford Willow Run plant, the Glenn L. Martin airplane plants, the Curtiss-Wright plants, Pratt & Whitney plants and a score of smaller ones.

Exponent of the Spacious

For the Navy, Kahn designed naval bases at Midway, Honolulu, Alaska, Puerto Rico, Jacksonville and other points. Beginning in 1928, Kahn engineers built some 521 plants for the Russian government, and trained some 4000 Soviet engineers to operate them. Kahn buildings stand on five continents of the world.

One of the memorable achievements of Albert Kahn was the Ford Highland Park plant, revolutionary at the time because it combined all operations and departments under a single roof. He was always an exponent of the spacious and expansive type of industrial building, not merely because he loved bigness, but because his primary concern always was the matter of utility and efficiency. He was a trained artist and a collector of art treasures, but when it came to industrial plants, the artistic approach was of only incidental moment.

Albert Kahn, dead at 73, came to this country in 1880 from Germany, a poor immigrant with his mother and sisters and brothers. His first job was errand boy for an architect, but his burning ambition and perseverance soon moved him up the ladder to fame and his career reads like the most fanciful success story.

Years ago, when Kahn saw his organization growing to major proportions, he determined to insure its permanency by relinquishing personal control and taking in 25 partners or associate members. So, while the founder continued active until shortly before his death, at times even spending the night on one of his drafting boards to get an early start the next day, the Albert Kahn organization today is carried on the capable shoulders of his associate engineers and architects, together with their 600 assistants. Their canny leader is gone, but his memory is perpetuated throughout industry in concrete and steel.

ALBERT KAHN . . . *"greatest industrial architect the world has ever known"*

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Maximum Swing — 82". Maximum Height of Work — 62".
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Telegraph your Inquiries with Contract and Priority Data for Prompt Action.

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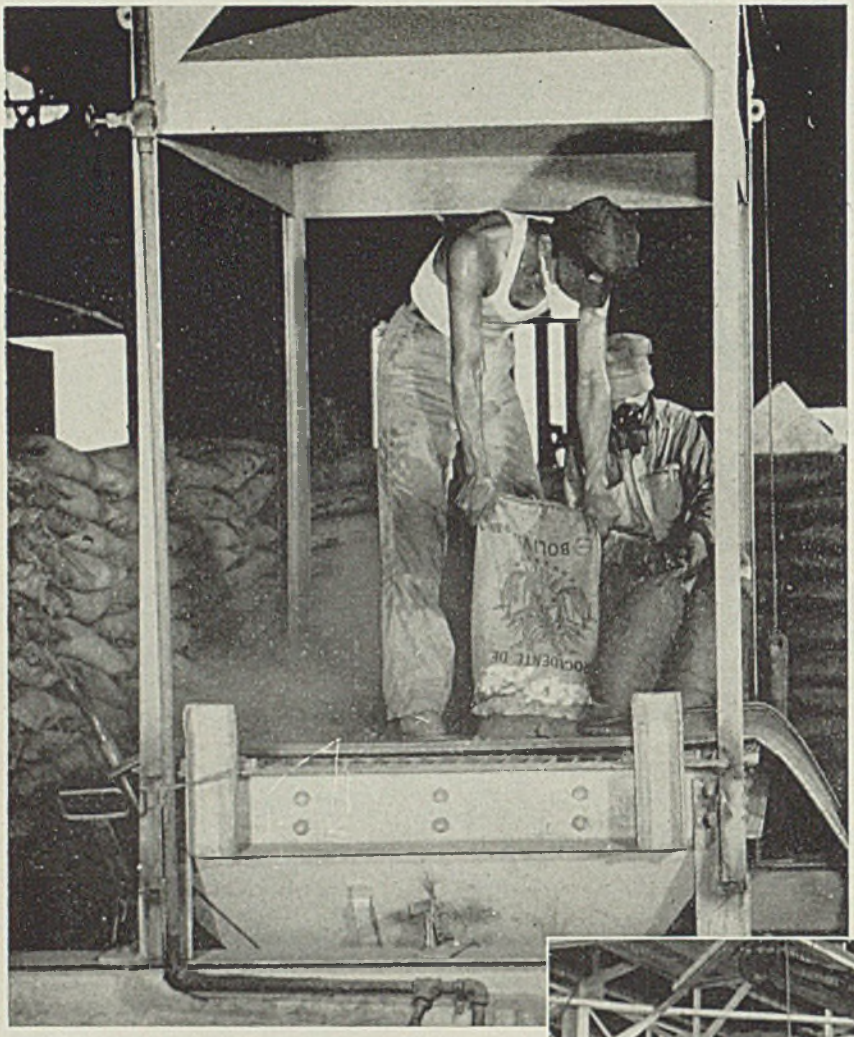
THE BULLARD COMPANY
BRIDGEPORT, CONNECTICUT

Producing at Rate of 18,000 Tons Annually

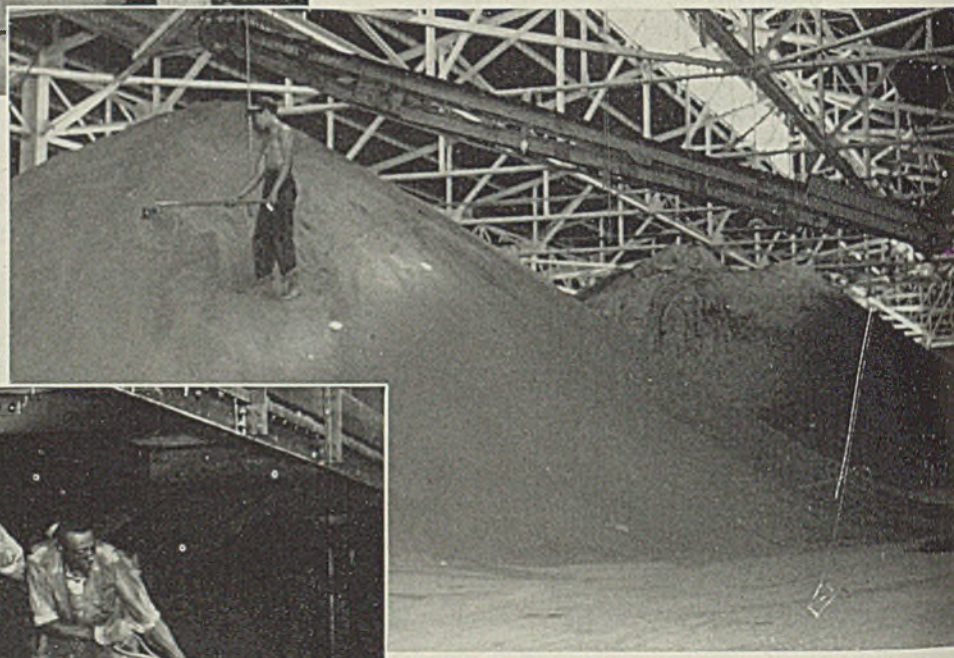
UNITED STATES' tin smelter at Texas City, Tex., soon will be expanded to handle all the ores available to the United Nations, according to Metals Reserve Co., Reconstruction Finance Corp. subsidiary, which is financing the project. The smelter now is producing refined tin at a rate in excess of 18,000 tons a year.

Most of the ores now being smelted are received from Bolivia, but capacity of the plant will be enlarged to handle all ores from Belgian Congo, China, Nigeria, and other sources as insurance against any of the smelters in China, Great Britain and the Congo being put out of operation by enemy action.

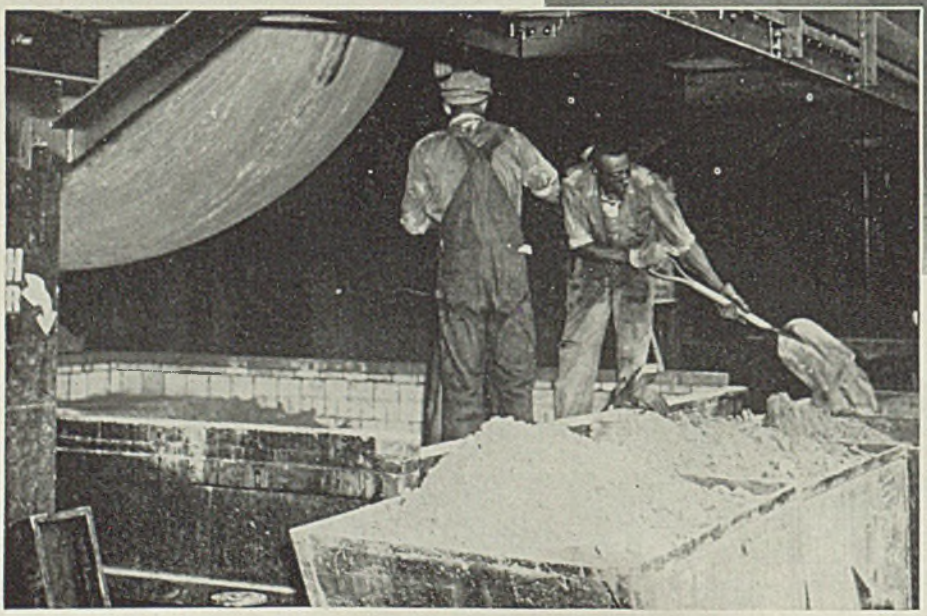
Herewith are presented a series of pictures tracing operations at the new plant. Official OWI photos by Hollem.



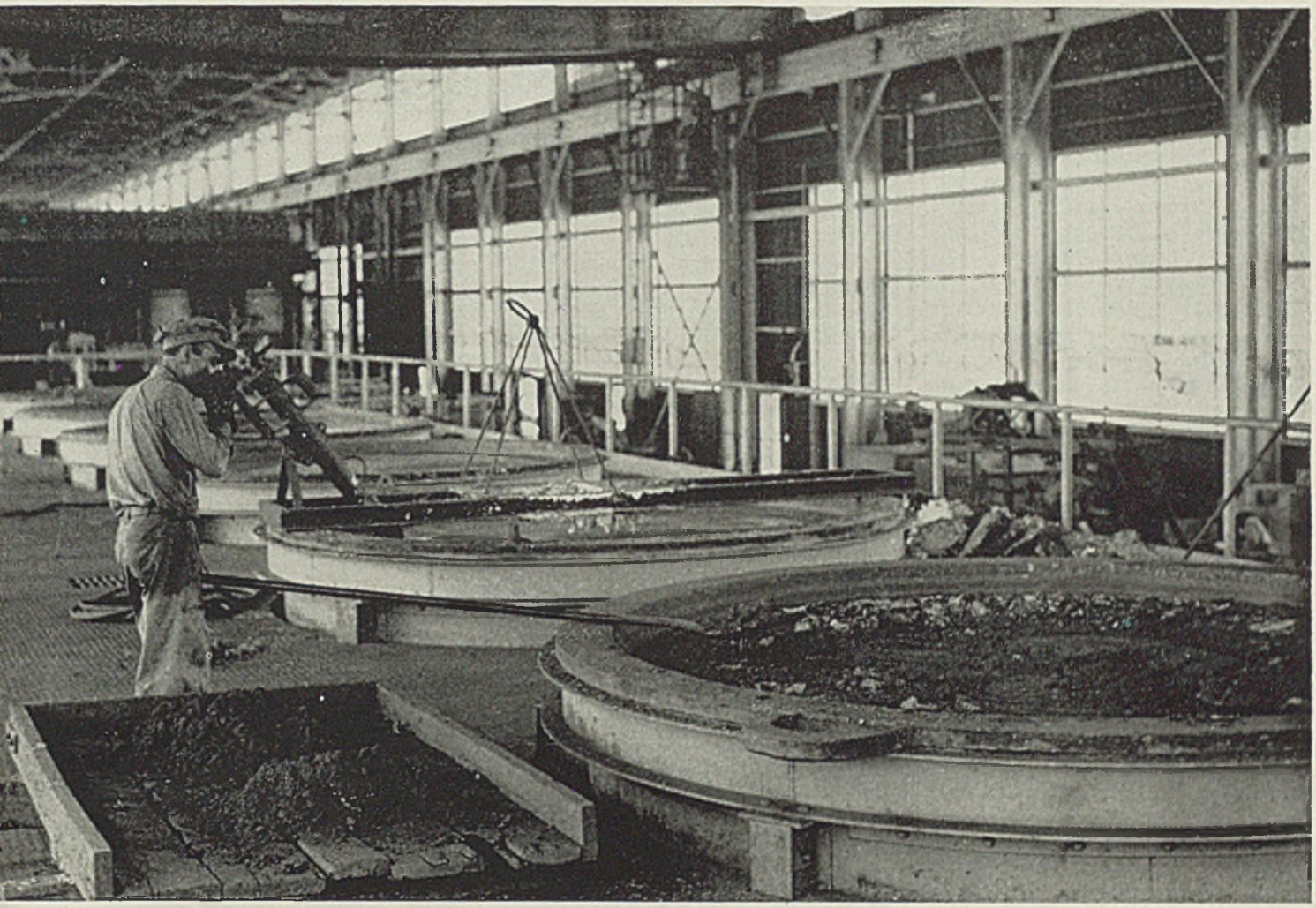
Bags of raw tin ore from South America are emptied, left, into the crusher to reduce the ore to fine particles suitable for the first stages of the smelting process



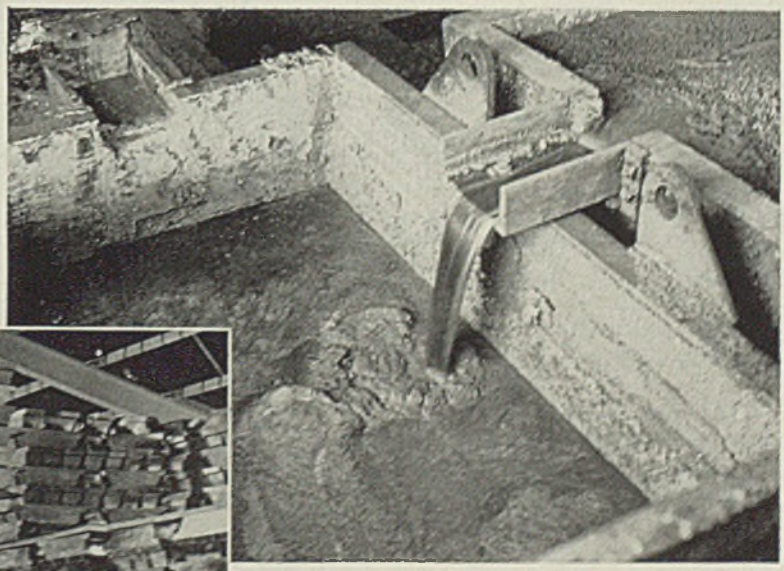
Fine tin ore discharged from the crusher is sorted in large stockpiles, right, in readiness for further operations in the extraction of pure tin for war purposes



Workers remove ore from leaching and bleaching processes and load it on cars, left, to be shipped to furnaces



"Pot boilers" in which the pure metal is kept at a temperature of about 750 degrees Fahr. until it is poured into molds, above. The Texas City plant is believed by Metals Reserve Co. officials to be the finest and most modern in the world



Tapping the furnace, above. Here tin is drawn off into floats which weigh about 18 tons when filled. Metal then is conveyed to polling kettles where dross is drawn off and forwarded to another furnace for remelting

Eighty-pound bars of pure tin stacked in a warehouse, left, have a value of $41.60 each

Kansas Firm to Build Coal Washing Plant in Brazil

McNally-Pittsburg Mfg. Co., with principal office and works at Pittsburg, Kans., has taken a contract from Companhia Siderurgica Nacional, in the state of Santa Catarina, Brazil, for a tipple and cleaning plant to process coal from the three mining districts of Lauro Muller, Urassanga and Cresciuma.

The plant will have capacity for 500 net tons, with entire tonnages reduced to 1½-inch before processing. It then will be cleaned in McNally-Norton automatic washers and McNally-Rheo launders. The 5/16-inch metallurgical coal will be dehydrated in McNally-Carpenter centrifuge dryers. In addition to metallurgical coal this plant will produce steam and power plant coal. The plant will be completed in 1943.

Tennessee Co. Makes Two Millionth Shell Forgings

Workmen in the shell forging plants of the Tennessee Coal, Iron & Railroad Co. at Ensley, Ala., Dec. 16 presented to the United States Army Ordnance Department the millionth 155-mm and the millionth 75-mm shell forgings they had produced. Presentation was during a visit of army ordnance and company officials.

The plant making the 75-mm shell forgings was developed from a pilot plant and delivered its first forging Aug. 1, 1941. The millionth shell passing inspection came out Dec. 14. The 155-mm plant delivered its first forging Nov. 20, 1941 and its millionth Dec. 15.

Tubular Service Builds New Warehouse in New York City

In co-operation with the Army Engineer Corps, which has taken over a portion of the Bush Terminal facilities, Tubular Service Corp. is removing its New York district warehouse from Bush Terminal, Broklyn, to 415 West 127th street, New York, where it is erecting a modern steel tubing warehouse. Building will have two floors and 20,000 square feet of space. It will be in addition to other warehouses operated by Tubular Service in New York, Philadelphia, Pittsburgh, Cambridge, Mass., Cleveland and Cincinnati, stocking every type and grade of steel tube made.

Company's Detroit office has been moved from 17233 Patton avenue to 7330 Oakland avenue. General offices of the firm have been moved to 32 Broadway, New York.

Property of the Wackman Welded Ware Co., St. Louis, has been transferred to the J. & L. Steel Barrel Co., St. Louis, subsidiary of Jones & Laughlin Steel Corp., Pittsburgh. The transfer was part of a sale by the Wackman company of its plant properties, including two in Missouri, two in Louisiana, and one each in Oklahoma and Pennsylvania.

—o—

Wilkening Mfg. Co., Philadelphia, is constructing a new war plant in Scranton, Pa., for production of piston rings for Army aircraft. In its operation of the new plant the Wilkening company will employ upwards of 1200 workers.

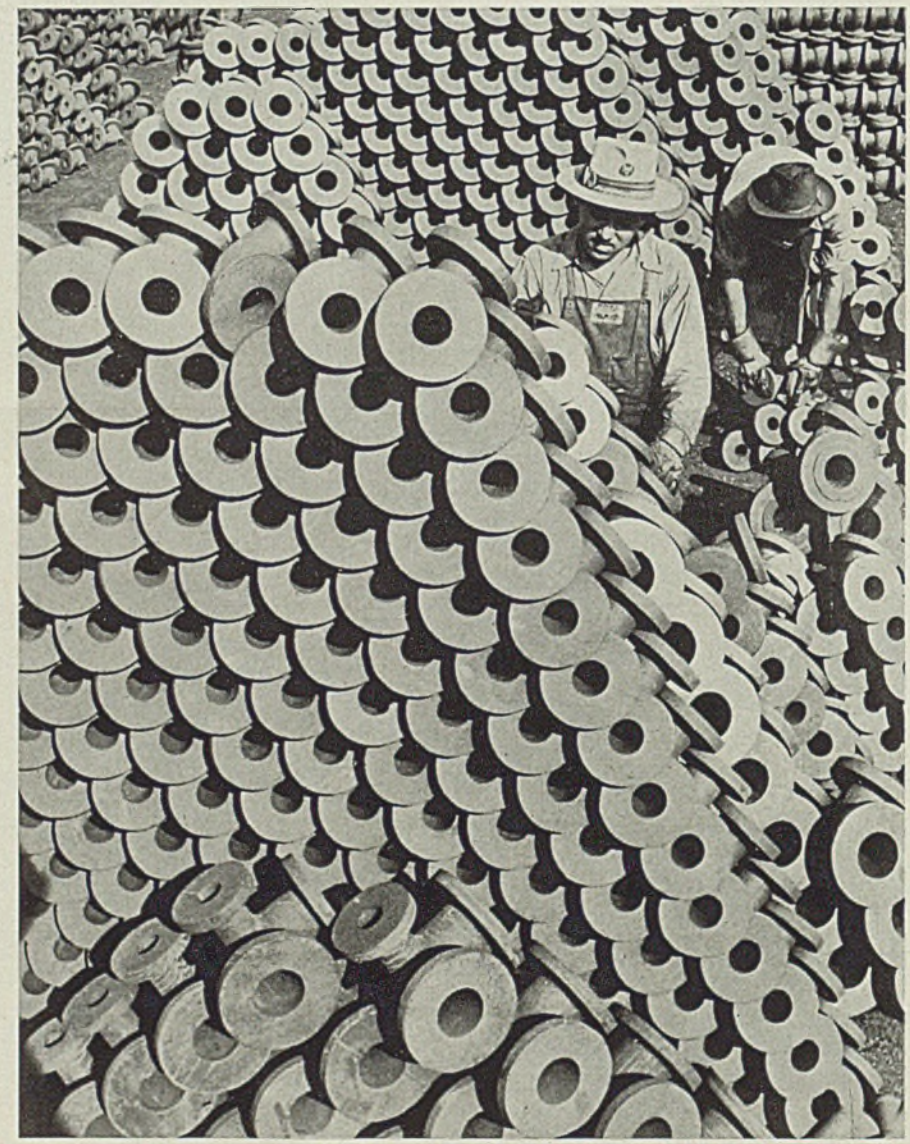
—o—

Hydro-Arc Furnace Corp., builder of hydraulically controlled electric arc melting furnaces, announces the opening of its new manufacturing plant at 561 Hillgrove avenue, LaGrange, Ill. The new plant will house the general office, engineering department and shop.

—o—

Hibbard, Spencer, Bartlett Co., Chicago, wholesale hardware, has leased to the government a 13-story building at 211 East North Water street, containing slightly less than 1,000,000 square feet, for Army Air Force warehousing and offices. Providing for "possessive occupancy", the lease is for the war's duration and six months, and the company will vacate as rapidly as the government needs the space.

VALVES FOR THE FLEET



VALVE castings at a Los Angeles plant make a graphic picture of production necessary to meet demands of a growing fleet. After precision machining, the valves undergo high-pressure testing and rigid inspection before being sent to the shipyards. NEA photo

Methods for Analyzing Content In Steel Discussed at Pittsburgh

PITTSBURGH

SYMPOSIUM on methods for analysis of boron in steel, held last week at University of Pittsburgh, centered primarily on a discussion of three methods of analysis for boron: (1) the distillation-titration method, (2) the colorimetric method, and (3) the spectrographic method.

The session was sponsored jointly by the university and Molybdenum Corp. of America, and the first paper on the program was presented by W. D. Sayre, Duquesne works, Carnegie-Illinois Steel Corp. Mr. Sayre presented his observations on a year's work with the distillation-titration method for boron determination. This method can be used successfully in the determination of quantities varying from 0.0001 to 0.005 per cent of boron. Under general continuous laboratory practice, steels containing small quantities of boron can be analyzed to plus or minus 0.0003 per cent boron. There still are some unanswered questions on the use of this process. Some work has indicated that the amount of borax present in the laboratory glass ware as borates may have an effect on the end result.

The chief disadvantage of this method is the long procedure required. Mr. Sayre reported that with one man operating full time and another man part time, about five determinations per day are all that can be expected with normal laboratory equipment.

New Laboratory Technique

John L. Hague, National Bureau of Standards, Washington, one of the authors of the first paper ever published on this method for the determination of boron, presented some observations on the method from the laboratory of the National Bureau of Standards which have been developed since the publication of the original paper No. 1120. Mr. Hague's remarks included a new technique for determining boron content of the residual matter left as a by-product of the distillation-titration process. Results of these determinations show that in most cases the quantity of boron remaining in insoluble compounds is actually larger than the dissolved boron. In virtually every case the end analysis of standard samples shows that this method gives less than actual content.

The colorimetric determination of boron was described by L. C. Flickinger, Youngstown Sheet & Tube Co., Youngstown, O. This method depends on the use of an indicator known as quinalizarin. Success of this process depends on the constancy of the indicator and of the acid used as a solvent. In general, high purity of concentrated sulphuric acid was found to be most successful as a solvent.

Although the quantity of quinalizarin needed for this method is quite small—in fact so small that one gram will make several thousand determinations — the material is not now being manufactured and there is only a limited supply.

In general, end results as obtained by the colorimetric method are comparable in accuracy to those obtained by the distillation-titration method. The advantage of the process is that under normal laboratory conditions and with the average laboratory technician, 18 determinations in one 8-hour turn have been made consistently by at least one company.

Demonstration of this method was presented by G. A. Rudolph, Youngstown Sheet & Tube Co. Work done in the laboratory of the Jones & Laughlin Steel Corp. was presented by Dick Lewis, who stated that consistent accuracy of the order of plus or minus 0.0002 per cent boron can be obtained.

Technique for determining quantity of boron present through spectrographic analysis was presented by P. R. Irish, Bethlehem Steel Co. Work done at the National Bureau of Standards on spectrographic analysis was outlined by Bourdon Scribner, while the research work done at the University of Pittsburgh using the spectrographic method was described by J. A. Berger, research fellow for the Molybdenum Corp. of America.

In the discussion of spectrographic methods, the difference between soluble and insoluble boron compounds was brought up. To date, there is a lack of knowledge of the metallurgical functions of these two groups. There is some indication that the effectiveness of soluble and insoluble boron compounds varies, and if this premise proves to be true, the spectrographic method of analysis will not prove satisfactory inasmuch as it makes no distinction between the two types of boron compounds, whereas the chemical methods separate and analyze these distinctly.

Scully Steel Products Becomes U.S. Steel Supply

Name of Scully Steel Products Co., United States Steel Corp. subsidiary, will be changed to United States Steel Supply Co., effective Jan. 1. E. E. Aldous, president, announces the new name will involve no change in management or nature of the company's business. Principal reason for the change is to identify the company more closely with other subsidiaries.

General headquarters will remain at Chicago and warehouses are located at Baltimore, Boston, Chicago, Cleveland, Newark, Pittsburgh, St. Louis and St. Paul.

Continental Can Output Absorbed by War Need

Continental Can Co. Inc., New York, J. F. Hartlieb, president, reports in a year-end statement that its production of containers now is devoted practically entirely to food packaging containers and other essential commodities for the armed forces, lease-lend and necessary civilian consumption.

Under urgent call by the government for highest possible production of food, a correspondingly high requirement may be expected for containers of all kinds. Considering the many advantages of tin containers, particularly where food must be shipped long distances or stored under unfavorable conditions it may be expected that they will be available for food packing to the extent that steel and tin can be spared.

Because of military and civilian needs for canned food, that part of Continental Can Co.'s business devoted to packers' food cans, approximately 60 per cent, has been operating on nearly a normal basis. Production of general line cans, normally used for a wide variety of commodities, has been substantially reduced and present production is only for essential government needs. Decline in general line production has been partially offset by government contracts, both as prime and subcontractor, for manufacture of various articles necessary to the war effort, in addition to standard types of cans required for use by the armed forces. A substantial volume of such orders now is on books. Approximately half of this represents machine shop work, which is being carried on in Continental's extensive shops and to some extent in maintenance machine shops at several plants.

Research laboratories are studying new materials and combinations of old materials that may be found suitable for use in packaging some products formerly requiring metal containers.

Whiting Corp., Harvey, Ill., entertained its supervisors Dec. 9 at dinner in recognition of breaking all production records in October.

Survey Shows Industry Looks Forward to New Opportunities

"THE best brains in American industry, which are the best brains in the world, are busy with the problem of insuring that a successful peace follows a successful war" is the summing up of results of a survey of American industry conducted by Walter Dorwin Teague and his organization of industrial designers, New York.

Seeking an answer to the question, what American industry is doing now about its post-war problems, he sent out 2000 letters to presidents of leading corporations asking a number of questions as to current thinking and action looking toward preparations for business after the war. Mr. Teague assumed that as conversion to war has been difficult reconversion to peace will be more difficult, as in the latter case each manufacturer will have to make decisions for himself instead of having them made for him, as in the change to war production.

Responses to the questionnaire were gratifying, and 95 per cent of those responding believed that industry should begin at once to study the problems of peace and 80 per cent already had initiated post-war planning. As a further check, letters were sent to a cross-section of those who had not answered the first series. The percentage among those responding to the second letter was approximately the same as to belief in present planning for after-war conditions.

Emphasis in selection of those interrogated was placed on manufacturers rather than producers of raw materials or service organizations. Industries represented included aviation, automobiles, chemicals, clothing, farm equipment, food, hardware, heating, house furnishings, household appliances, jewelry, machinery, metals, petroleum, plastics, radio, rubber and others.

Majority Planning for Peace

In response to the question of wisdom of laying plans for peace, 95 per cent of the replies were affirmative and the remainder opposed. As to whether major marketing changes are in store, 87 per cent were affirmative. A question as to whether experience in war production had brought to light major improvements applicable to post-war products, 53 per cent said they had and 42 per cent they had not; 5 per cent had no war work.

Of the 84 per cent of those responding to the letters who are actually doing post-war planning, 38 per cent are studying utilization of expanded equipment, 50 per cent are studying future competition, 49 per cent are studying new markets, 24 per cent are investigating shifts in purchasing power, 59 per cent are looking into new materials, 55 per cent are studying new manufacturing processes, 66 per cent are planning for new products or re-design of normal products and 23 per cent are making specific plans for manufacture of these products.

Comments added to the questionnaire by many executives throw added light on the situation. A number of those who believe in immediate plans for peace but have initiated none as yet explain they have been so deeply involved in war conversion that they have had no time for anything else. Importance of adequate planning is stressed in many comments. A leading manufacturer of domestic applications wrote: "In time of peace we failed to prepare for war. We must not in time of war fail to prepare for peace."

Development of new materials and new technological processes is frequently cited. One manufacturer said: "Business has the greatest opportunity for progress after this war that we have ever confronted." Many correspondents cite the drastic changes which already have been introduced into their industries as a result of the war effort.

A few express misgivings as to future relations between government and industry but the prevailing spirit is overwhelmingly confident. They believe the post-war period holds great possibilities of national prosperity and well being, which can be turned into realities through intelligent and thorough planning.

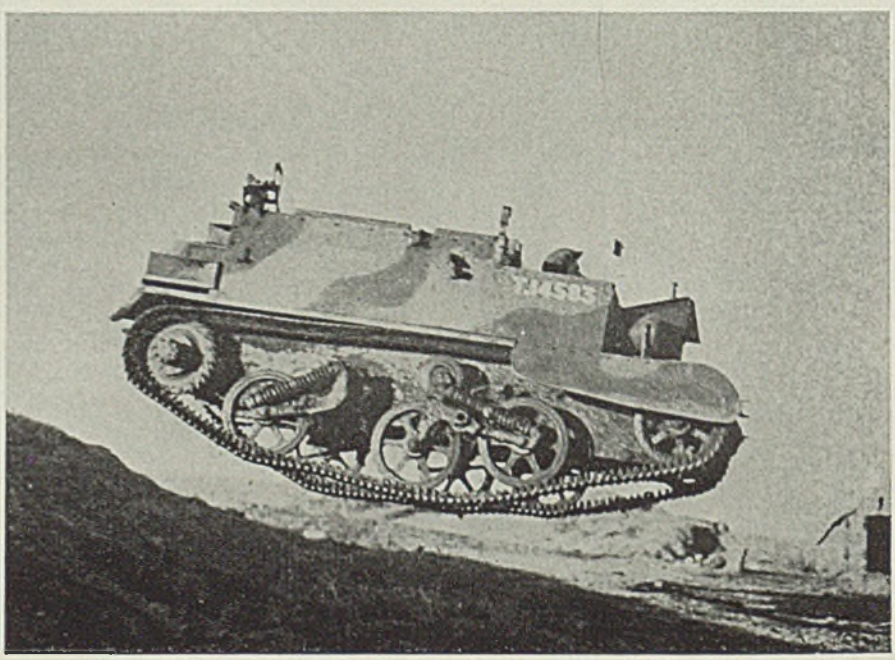
Follansbee Steel Head Confident of Future

While materially aiding the war program, many of the steel industry's developments of the past year will not be fully realized by the general public until production has been reconverted to peacetime applications, says Lauson Stone, president, Follansbee Steel Corp., Pittsburgh, in a review of the past year.

"Because of the long range significance of some of the accomplishments of the industry under emergency conditions," he says, "I am optimistic as to its ability to meet competition of other materials in the post-war period and am less concerned about the effect of competition between large and small units in the industry."

Small steel producers, of which his company is one, he believes, have found new opportunities and new fields in specialization, especially in alloy steels.

GUN CARRIER "TAKES OFF"



SPEEDING Bren gun carrier actually leaves the ground during a reconnaissance drill. The carriers and armored cars are used as spearheads and to bring back information concerning the enemy to headquarters. NEA photo

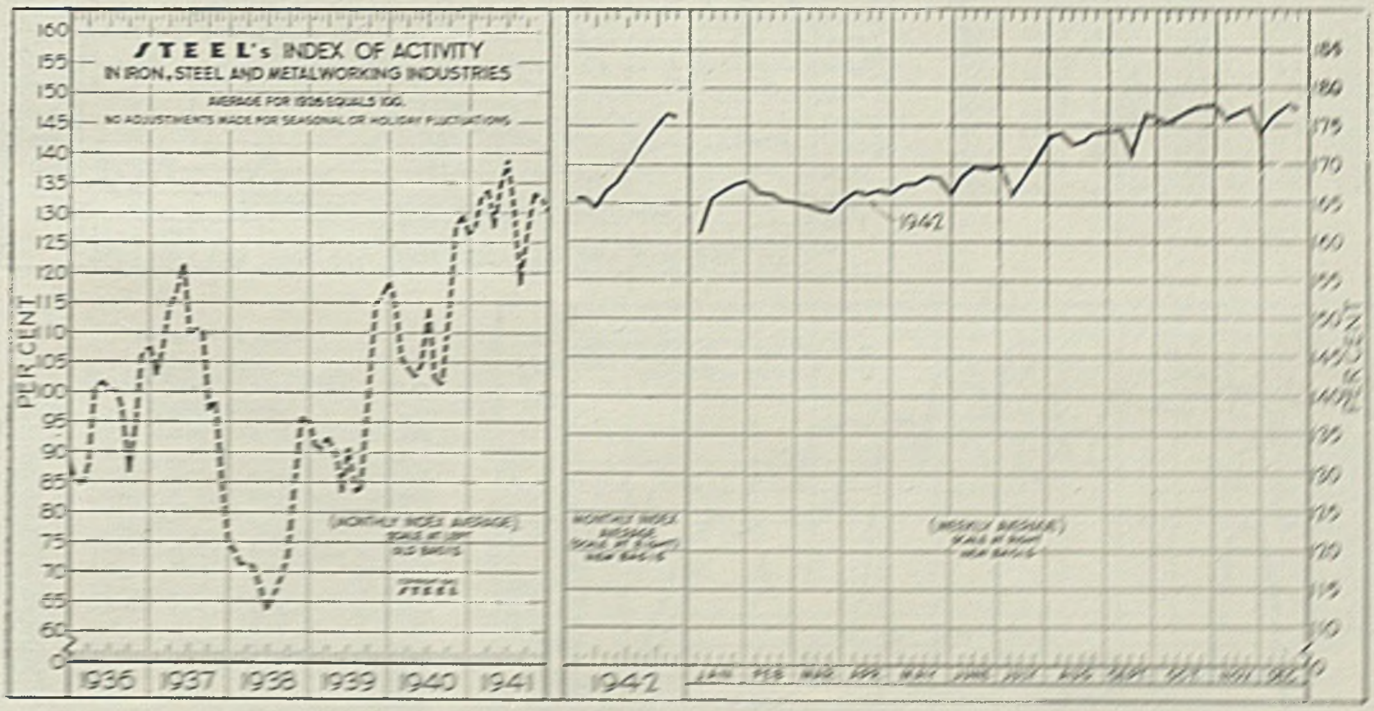
Munitions Output Trend Continues Upward

NINETEEN FORTY-TWO is drawing to a close with output of munitions continuing steadily upward. It appears probable that this trend will prevail throughout most of next year, despite present shortages of manpower and materials. These shortages are expected to be offset to some extent during the coming year by more extensive employment of women, and by expanding production of steel, aluminum and other currently strategic materials.

STEEL's index of activity is currently at 177.3, or 10.1 per cent above the 161.0 level recorded at the start of this year. On both a monthly average and weekly basis the index advanced to new highs during the past year. The peak monthly average recorded by the index is expected to occur this month, while on a weekly basis the index reached a high of 177.8 during the period ended Oct. 31.

In the week ended Dec. 19 the national steel rate eased ½-point to 99 per cent, reflecting the need for furnace repairs at some centers. On a tonnage basis ingot output set a new record this year, topping the prior mark in 1941 by about 3,137,000 tons. New records were also established in pig iron production, iron ore shipments and scrap consumption. Most steel producers have been able to build up scrap stocks, but as yet there is no real assurance that present practical capacity operations can be sustained throughout the winter months.

Early estimate of electric power consumption for the period ended Dec. 19 indicates a further gain to a new all-time peak. Currently power output is 15.4 per cent above that registered in the like week a year ago. Revenue freight carloadings declined seasonally during the latest period to about 710,000 cars.

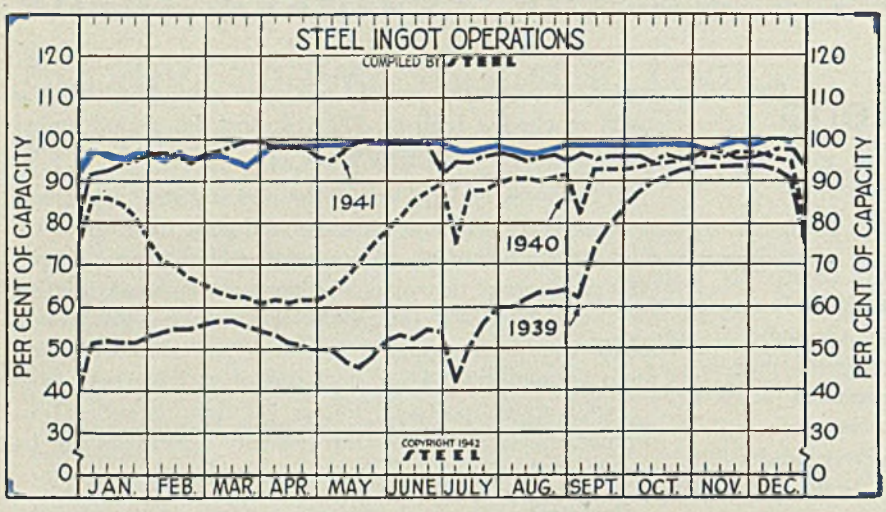


STEEL's index of activity declined 0.3 point to 177.3 in the week ending Dec. 19:

Week Ended	1942	1941	Mo. Data	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931
Oct. 17	176.2	132.4	Jan.	165.7	127.8	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1
Oct. 24	177.7	132.5	Feb.	165.8	132.3	105.2	90.8	71.1	108.2	84.2	82.0	73.9	48.2	56.3	75.6
Oct. 31	177.8	132.8	March	164.6	132.9	104.1	92.8	71.2	114.4	87.7	83.1	78.3	44.5	54.2	80.4
Nov. 7	175.8	134.4	April	165.7	127.2	102.7	89.2	73.2	116.8	106.8	85.6	85.8	52.4	52.8	81.6
Nov. 14	176.2	133.8	May	167.7	134.8	106.8	82.4	67.4	121.7	101.2	81.2	85.7	63.5	54.8	78.8
Nov. 21	177.3	128.4	June	168.4	138.7	114.1	90.2	63.4	109.2	106.2	77.4	81.8	76.2	51.4	72.1
Nov. 28	174.0	132.2	July	171.6	128.7	102.4	83.5	58.2	116.4	106.1	73.6	63.7	77.4	47.1	67.2
Dec. 5	177.1	133.4	Aug.	173.5	[illegible]	106.1	85.2	62.7	110.9	97.1	78.7	63.6	74.1	45.6	67.4
Dec. 12	177.6	134.0	Sept.	174.8	138.4	112.5	98.3	71.5	96.8	98.7	69.7	58.2	63.5	48.5	64.3
Dec. 19	177.3*	132.8	Oct.	176.2	133.1	127.8	114.2	85.6	98.1	94.8	77.0	58.4	63.1	48.4	59.2
			Nov.	176.8	132.1	129.5	116.2	95.9	84.1	105.4	82.1	54.3	59.8	47.5	54.4
			Dec.		130.2	128.5	116.8	95.1	74.7	107.8	89.2	59.8	54.0	48.2	54.2

*Preliminary.

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



Steel Ingot Operations

(Per Cent)

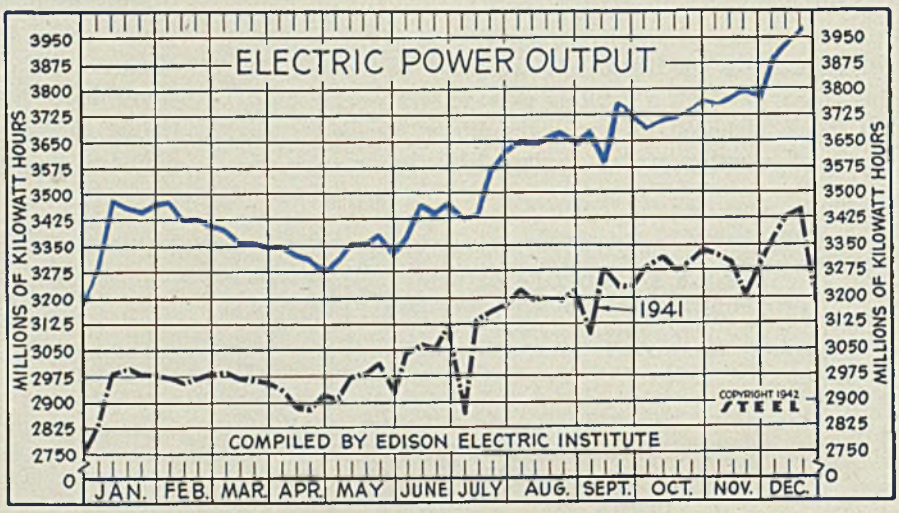
Week ended	1942	1941	1940	1939
Dec. 19	99.0	97.5	95.0	90.5
Dec. 12	99.5	97.5	95.5	92.5
Dec. 5	99.5	96.5	96.5	94.0
Nov. 28	99.0	95.0	97.0	94.0
Nov. 21	99.5	95.5	97.0	93.5
Nov. 14	99.0	97.0	96.0	93.5
Nov. 7	98.5	97.5	96.5	93.0
Oct. 31	99.0	95.5	96.5	93.0
Oct. 24	99.0	95.5	95.5	92.0
Oct. 17	99.0	96.5	95.0	91.0
Oct. 10	98.5	94.5	94.5	89.5
Oct. 3	98.0	96.0	93.5	87.5
Sept. 26	98.0	96.0	93.0	84.0
Sept. 19	98.0	96.0	93.0	79.5
Sept. 12	98.0	96.5	93.0	74.0
Sept. 5	98.0	95.5	82.0	62.0
Aug. 29	98.0	96.5	91.5	64.0

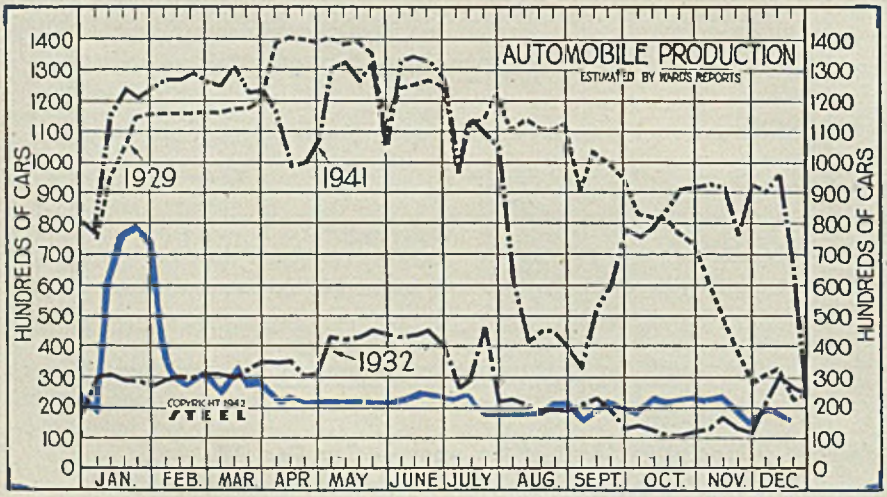
Electric Power Output

(Million KWH)

Week ended	1942	1941	1940	1939
Dec. 19	3,980†	3,449	3,052	2,712
Dec. 12	3,938	3,431	3,004	2,674
Dec. 5	3,884	3,368	2,976	2,654
Nov. 28	3,766	3,295	2,932	2,605
Nov. 21	3,795	3,205	2,839	2,561
Nov. 14	3,776	3,305	2,890	2,587
Nov. 7	3,762	3,326	2,858	2,589
Oct. 31	3,775	3,339	2,882	2,609
Oct. 24	3,753	3,299	2,867	2,622
Oct. 17	3,717	3,273	2,838	2,576
Oct. 10	3,702	3,315	2,817	2,583
Oct. 3	3,683	3,290	2,792	2,554
Sept. 26	3,720	3,233	2,816	2,559
Sept. 19	3,757	3,232	2,769	2,538
Sept. 12	3,571	3,281	2,773	2,532
Sept. 5	3,673	3,096	2,592	2,376

†Preliminary.





Auto Production

(1000 Units)

Week ended	1942	1941	1940	1939
Dec. 19	15.7	65.9	125.4	117.7
Dec. 12	17.8	96.0	125.6	118.4
Dec. 5	19.9	90.2	124.8	115.5
Nov. 28	14.6	93.5	128.8	93.6
Nov. 21	18.3	76.8	102.3	72.5
Nov. 14	20.2	93.0	121.9	86.7
Nov. 7	20.2	93.6	120.9	86.2
Oct. 31	20.9	92.9	118.1	82.7
Oct. 24	20.8	91.9	117.1	78.2
Oct. 17	20.2	85.6	114.7	70.1
Oct. 10	20.3	79.1	108.0	75.9
Oct. 3	19.9	76.8	105.2	76.1
Sept. 26	20.9	78.5	96.0	62.8
Sept. 19	21.0	60.6	78.8	54.0
Sept. 12	19.6	53.2	66.6	41.2

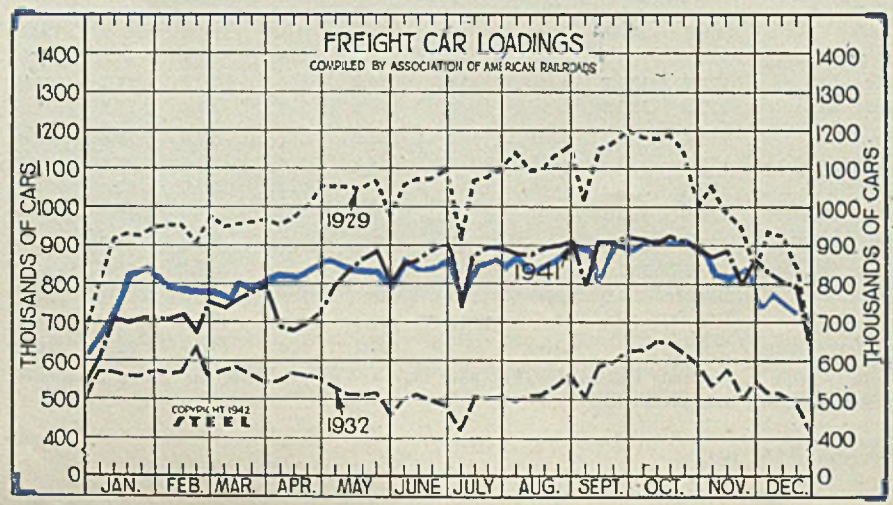
Figures since Feb. 21 last include Canadian trucks and automobiles and United States trucks.

Freight Car Loadings

(1000 Cars)

Week ended	1942	1941	1940	1939
Dec. 19	710†	799	700	655
Dec. 12	740	807	736	681
Dec. 5	760	833	739	687
Nov. 28	844	866	729	689
Nov. 21	836	799	733	677
Nov. 14	827	884	745	771
Nov. 7	829	874	778	786
Oct. 31	891	895	795	806
Oct. 24	903	914	838	834
Oct. 17	901	923	814	861
Oct. 10	910	904	812	845
Oct. 3	908	918	806	835
Sept. 26	898	920	822	835
Sept. 19	903	908	813	815

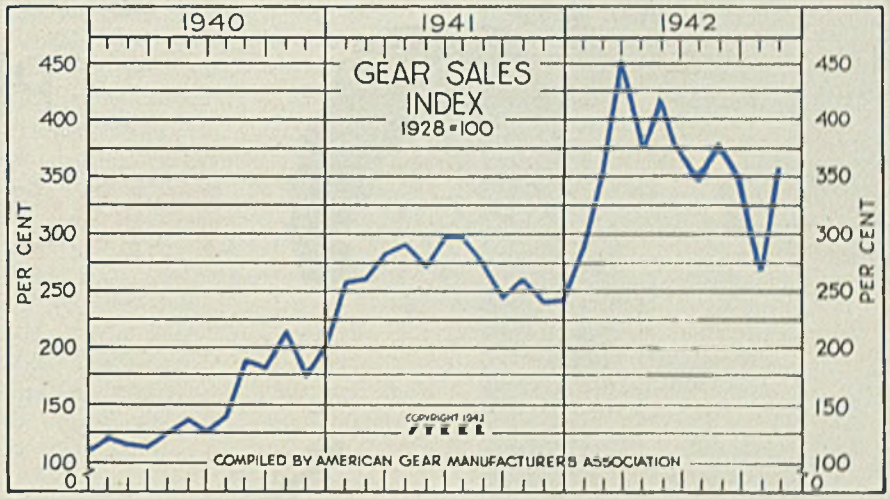
†Preliminary.

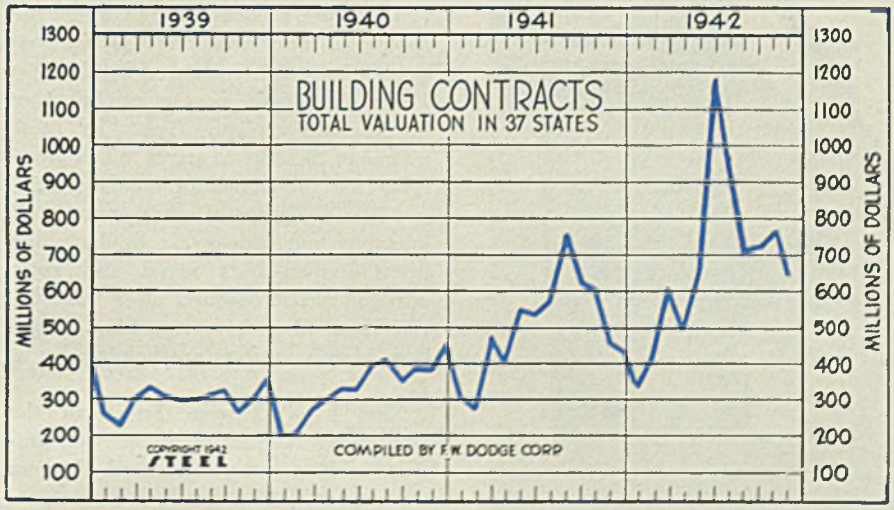


Gear Sales Index

(1928 = 100)

	1942	1941	1940	1939	1938
Jan.	288	259	123	91.0	93.0
Feb.	353	262	116	86.0	77.0
Mar.	455	288	114	104.0	91.0
April	378	292	128	88.0	74.0
May	421	273	133	93.0	70.0
June	373	299	129	90.0	58.0
July	344	298	141	89.0	67.0
Aug.	380	276	191	96.0	76.5
Sept.	351	243	183	126.0	80.5
Oct.	263	261	216	141.0	72.5
Nov.	359	241	173	126.0	72.0
Dec.	...	243	208	111.0	81.0
Ave.	...	269.6	155.0	103.0	76.0





Construction Total Valuation In 37 States

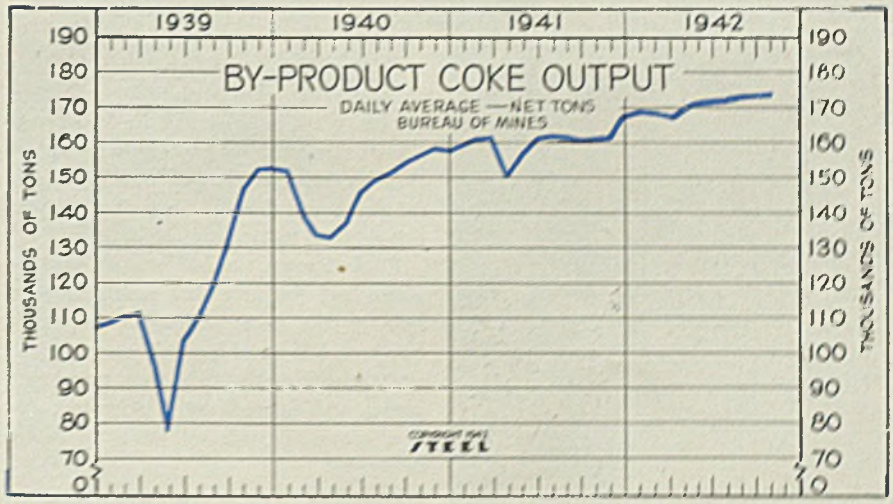
(Unit: $1,000,000)

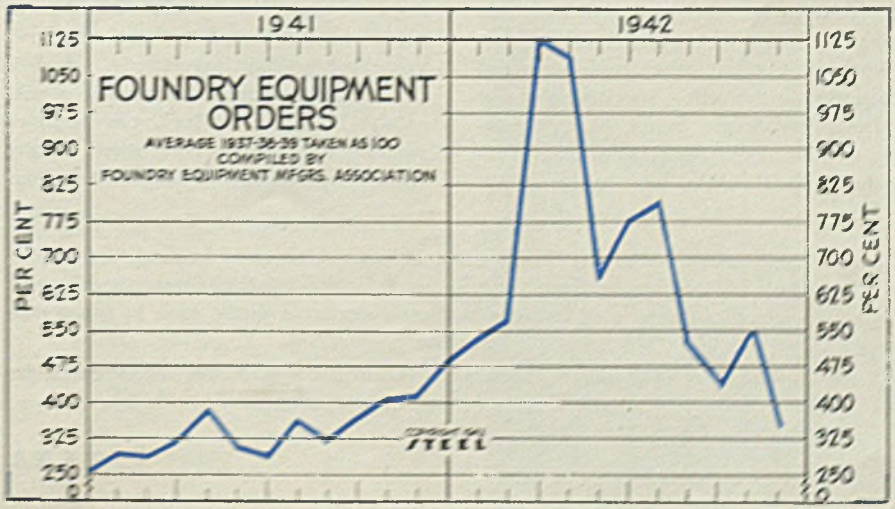
	1942	1941	1940	1939	1938
Jan.	$316.8	$305.2	$190.2	$251.7	$192.2
Feb.	433.6	270.4	200.6	220.2	118.9
Mar.	610.8	479.9	272.2	300.7	220.6
April	498.7	406.7	300.5	330.0	222.0
May	673.5	548.7	328.9	308.5	283.2
June	1190.3	539.1	324.7	288.3	251.0
July	943.8	577.4	398.7	299.9	239.8
Aug.	721.0	760.3	414.9	312.3	318.1
Sept.	723.2	623.3	347.7	323.2	300.9
Oct.	780.4	606.3	383.1	261.8	357.7
Nov.	654.2	458.6	380.3	299.8	301.7
Dec.	...	431.6	456.2	354.1	389.4
Ave.	...	$500.6	$333.7	$295.9	$266.4

By-Product Coke Output

(Daily Average)

	1942	1941	1940	1939
Jan.	168,508	139,129	151,841	108,611
Feb.	168,414	160,789	138,508	109,923
March	167,733	161,268	133,056	110,921
April	168,960	149,144	132,812	97,155
May	170,187	156,318	136,897	77,304
June	170,593	161,201	145,821	102,991
July	170,244	161,731	149,005	108,542
Aug.	171,443	161,709	151,935	118,280
Sept.	172,110	160,193	154,247	130,144
Oct.	172,211	160,344	156,118	146,019
Nov.	...	161,116	155,331	152,219
Dec.	...	167,504	157,743	152,200
Total	...	160,037	147,157	117,892





Foundry Equipment Orders

Monthly Average
(1937-38-39 equals 100)

	1942	1941	1940
Jan.	562.7	285.3	149.0
Feb.	567.9	231.1	135.7
March	1122.4	315.2	188.2
April	1090.3	371.2	145.2
May	655.8	298.7	129.1
June	774.0	281.1	164.8
July	800.8	352.1	194.4
Aug.	510.8	312.9	165.4
Sept.	446.4	282.8	161.2
Oct.	540.9	402.8	264.0
Nov.	556.8	408.8	254.2
Dec.	...	431.2	257.8
Year	...	345.8	184.0

Plant War PRODUCTION

NOT LONG AGO James Chubb, sheet metal worker at the Glenn L. Martin Co. plant noticed that he had to use three separate motor-driven drills to sink a certain kind of hole, Fig. 3. He sat down and thought up a single motor-driven tool to sink the hole, Fig. 2.

Fred Paxson, office worker at the plant, had the idea that rush and pressure in the plant cafeterias might be eliminated if meal periods were spaced slightly differently. He took paper and pencil and figured out a schedule that does eliminate rush and pressure in the cafeterias.

Alfred Hoffman, an employe who handles raw stores, thought that a cartoon idea he had might put his fellow employes in a more grim frame of mind in regard to the Axis. He drew a poster representing Uncle Sam's hand punching a time clock while Hitler and Mussolini and Hirohito look on wincing. Now the poster is all over the plant.

These are random samples of the response of Martin workers to the war production drive, sponsored by the War Production Board, now going full blast at the Martin plant. Taken by itself, no one of these items seems to add greatly to the production of bombers. But put it with dozens of other examples of ingenuity and wide-awake thinking, add up the man-hours saved and spirit created, and it becomes clear what the war production drive is getting at and how Martin workers are helping get at it.

Nine hundred men throughout the plant wear the badge of the war production drive. Eight hundred of them are workers. Not only do they themselves think up plans for improvement of machinery and morale, they encourage their thousands of fellow employes to think up such plans. Red-white-and-blue boxes posted all over the plant receive daily dozens of such suggestions which are sifted and discussed by a committee of seven workers and seven executives. From this committee the suggestions go directly to William K. Ebel, vice president in charge of engineering, Thomas B. Soden, factory manager, and Robert Young, factory superintendent.

The employe who sent in the suggestion gets more than thanks and the knowledge, treasured as it is, that he has helped make things tough for the Axis. Every few weeks liberal cash prizes are distributed to those who have made outstanding suggestions. And if the suggestion takes the form of a patentable machine or tool, the employe receives a generous percentage of any income the company may derive from

Fig. 1—(Left, above)—Gordon Hamer using a power-driven tool he devised for filing hood cowlings. When he was filing these by hand, he did one in the same time he now does four—another example of how the workers themselves devise tools to speed production

Fig. 2—(Immediate left)—Here Jim Chubb is using a single drill he invented for doing three jobs in one operation

DRIVE

. . . . really gets results

licensing it to other concerns.

On top of that, the company has founded a legion of honor, known as "The Order of the Purple Martin." Membership in the order is meant to correspond to the winning by an aviator of the Distinguished Flying Cross. It shows that the plane-builder has, like a winner of the Distinguished Flying Cross, performed with distinction and above and beyond the call of duty. Membership is open both to executives and workers, but another honor is open only to workers. That is the sterling silver merit award pin given for exceptional service and devotion to duty.

At the same time the war production drive committee is fighting on two other all-important fronts. The "Get in the Scrap" campaign has reached the point where it salvages enough aluminum from the building of two bombers to build a third. And on the transportation front the committee has hung up a national record of 4.5 passengers per automobile in its "Share-Your-Car-For-Victory" drive.

Instances of how individual workers have used their ingenuity and spare time to think up devices that help speed production run into hundreds. Hermann Viet found that tons of rivets and other perfectly usable small parts were being swept up each week off assembly floors. Of course the rivets and small parts (dropped in the white heat of production) were carefully salvaged, but by long and expensive hand work. He devised a battery of machines that does the work in a fraction of the time, whisking the salvaged parts quickly back into production.

Douglas H. Kenny found that the crews mounting tires on the rims of beaching and landing gears were using a lot of valuable time and damaging the tires and rims in the process. He devised a tool that slips the tire on instantly—and without damage to rubber or rim.

A worker feeding a 6-foot sheet of aluminum into a dimpling machine needed three hands to manipulate the awkward sheet and the switch and run the machine. Paul Merriman devised a foot switch that speeds up the job and makes it much more accurate.

Driving rivets into cramped spaces was twisting exasperated riveters into knots — physically and mentally — and consuming valuable time. James A. Porter built a riveting hammer with a flexible peen. Another kink in production smoothed out.

The job of applying printed identification tape to tubing and other small parts was taking men hours, and the tape was smudged and even obliterated

(*Please turn to Page 78*)

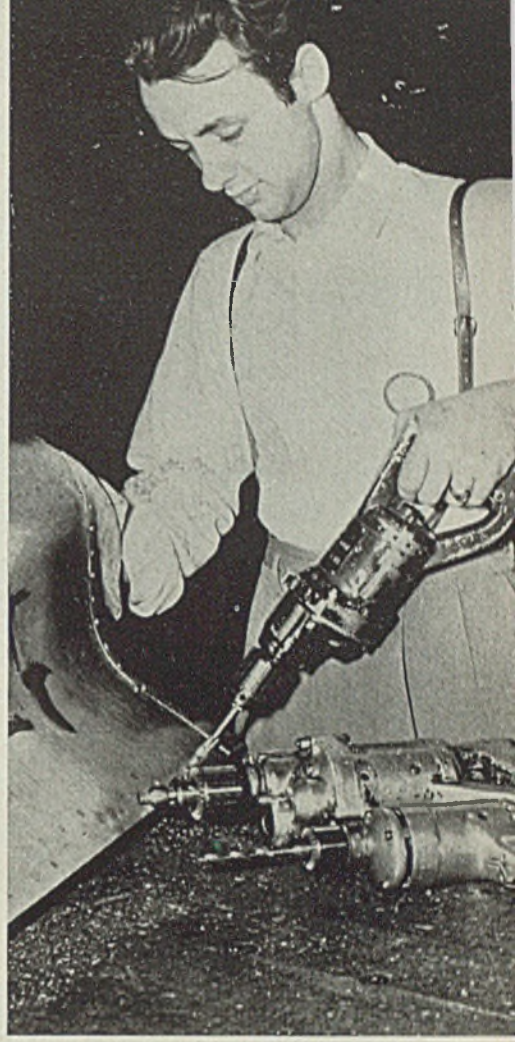
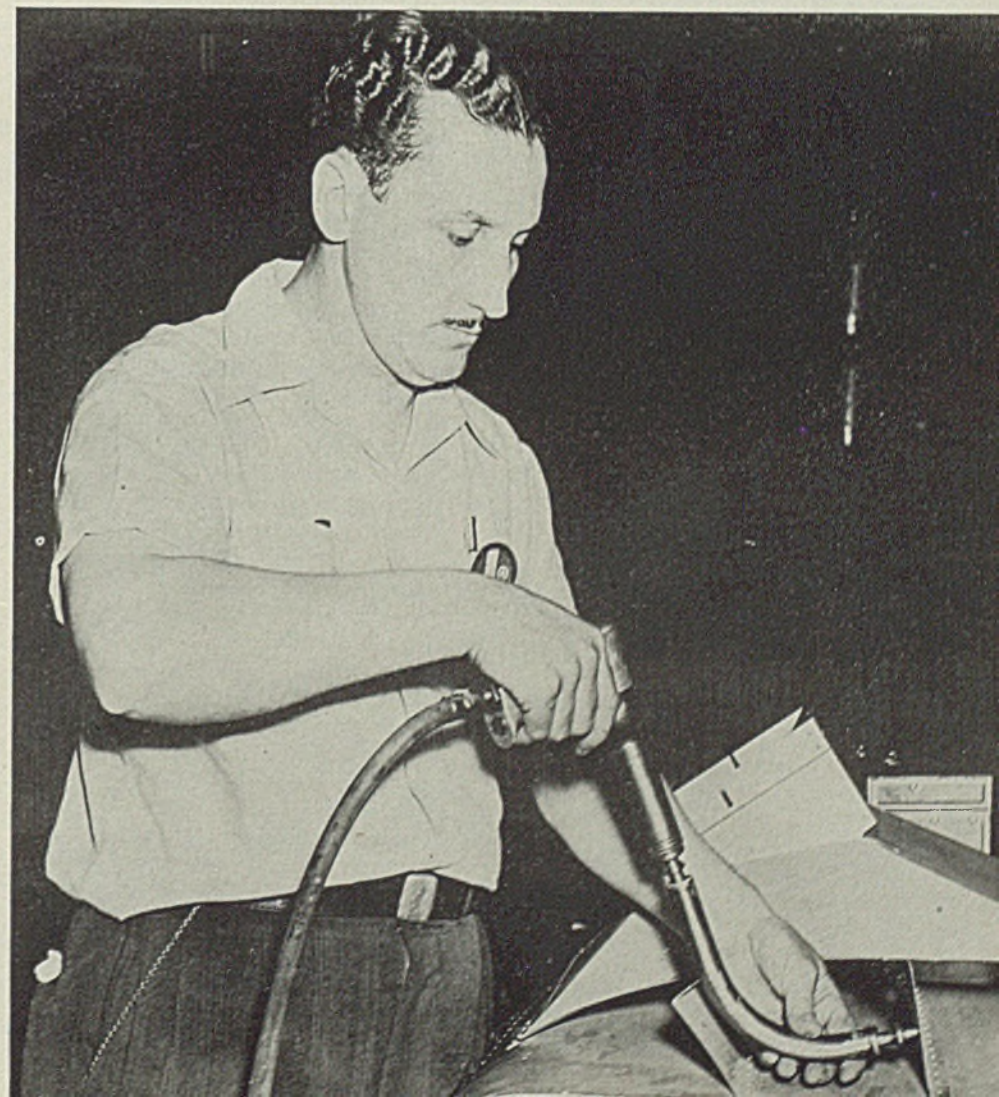
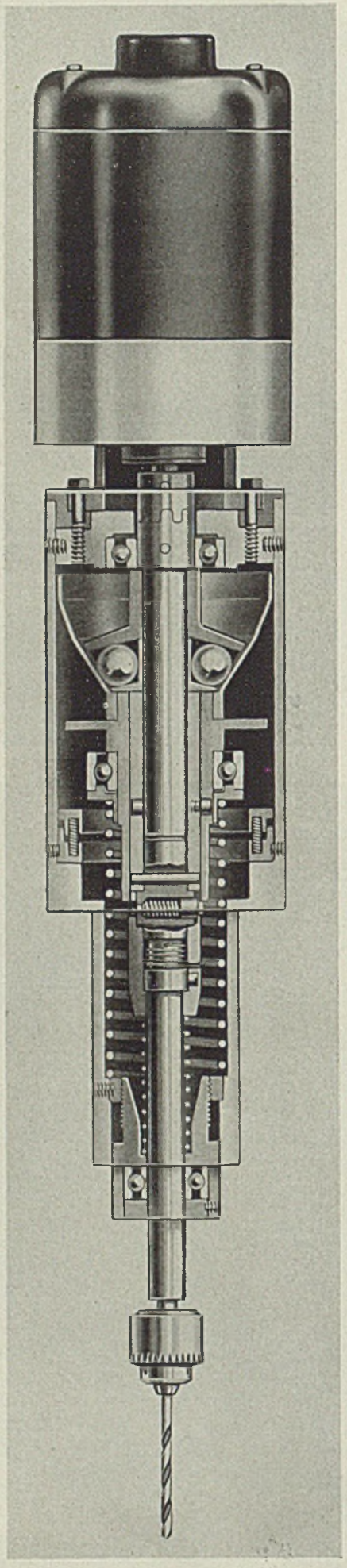


Fig. 3—(Right)—Jim Chubb, Martin worker, using three separate drills for reaming, spot-facing and countersinking holes for dzus fasteners

Fig. 4—(Below)—Jim Porter using the riveting hammer with bent peen devised by him for use in cramped spaces. This has speeded production by making what had formerly been a long irritating job a quick and simple one





By GERALD E. STEDMAN

TOUGH DRILLING JOBS LICKED

. . . . by new method of applying feed pressure to drill point. Scheme works well in handling small diameter drills and in angle drilling. Multiple drilling setups with automatic sequence control meet rigid job requirements

HOW TO GET maximum tool life is a problem of vital importance to war production, so anything that can help solve it is welcome indeed. Unusual parts design, dimensional control with precision tolerances, tough alloy steels, highly finished surfaces, different feeds and speeds make much war work extremely difficult. This helps make clear why on certain comparable automobile and ordnance parts the cost of the former is 25 cents per piece as against $18.80 on the latter.

The matter of the proper care and use of perishable tools is tremendously vital in war production. Such portable tools as drills and reamers in untrained hands lead to unusual hazards of scrap and rejects, with breakage and machine damage that easily becomes abnormally high. There is loss of tool material in excessive dulling and burning. Every tool engineer knows how hard it is to maintain the cutting efficiency of such tools in the hands of the novice. Certain it is that every plant has its own particular headache with this problem. Yet a few plants have been unusually successful in assuring proper care and use of tools, such as small drills where breakage is usually a serious problem.

The dulling, burning and breakage of drills is probably as exasperating as any other phase of this problem. The N. A. Woodworth Co., Ferndale, Mich., has found a method whereby it has achieved 50 per cent better performance and has eliminated 70 per cent of its drill breakage on a difficult drilling operation on a valve clearance adjusting screw —one of the hundred-odd aircraft engine parts for which this company is a leading subcontractor to Wright Aeronautical Corp.

This part is of nickel-chromium material, SAE 3312, requiring 43 operations for its completion. Many of these are of delicate tolerances, and the operational technique of achieving the inside socket radius is, in itself, of particular interest. About midway through its operational cycle, specifications call for the drilling of three holes in this valve clearance adjusting screw. These start at an angle and break away at an angle. The blueprint specifications read: "No. 52 (0.0635-inch) 0.48-inch deep 60-degree countersink to 0.12-inch diameter, three holes equally spaced to each other within 0.02-inch at 25-degree angle."

Fig. 1—Cross sectional diagram of Sensaumatic drill head

Angle Drilling Difficult

One of the peculiar problems of this operation is to drill and lubricate for that length of hole. It is difficult to handle any job of that nature when the angle drilling requirement is more than four times the hole width. Started at an angle, it represents a mean job for the chips to come all the way out. Too, there is a constant tendency to slip. The mortality of bushings and drills was extremely high.

The operation was first accomplished by hand drilling. But no matter how the job was set up nor how skilled the operator, drill breakage, low production and high scrap reached intolerable proportions, and the operation tended to become a bottleneck. To gain a constant drilling pressure, it was evident that uniform feed under controlled timing, with due consideration for exceptional coolant, was necessary. Fixtures, too, were needed to remove the personal element.

Having tried many other setups unsuccessfully, Woodworth technicians learned of the Sensaumatic drill head manufactured by Michigan Industrial Sales Co., Detroit, and decided to try it out. The drive of the Sensaumatic

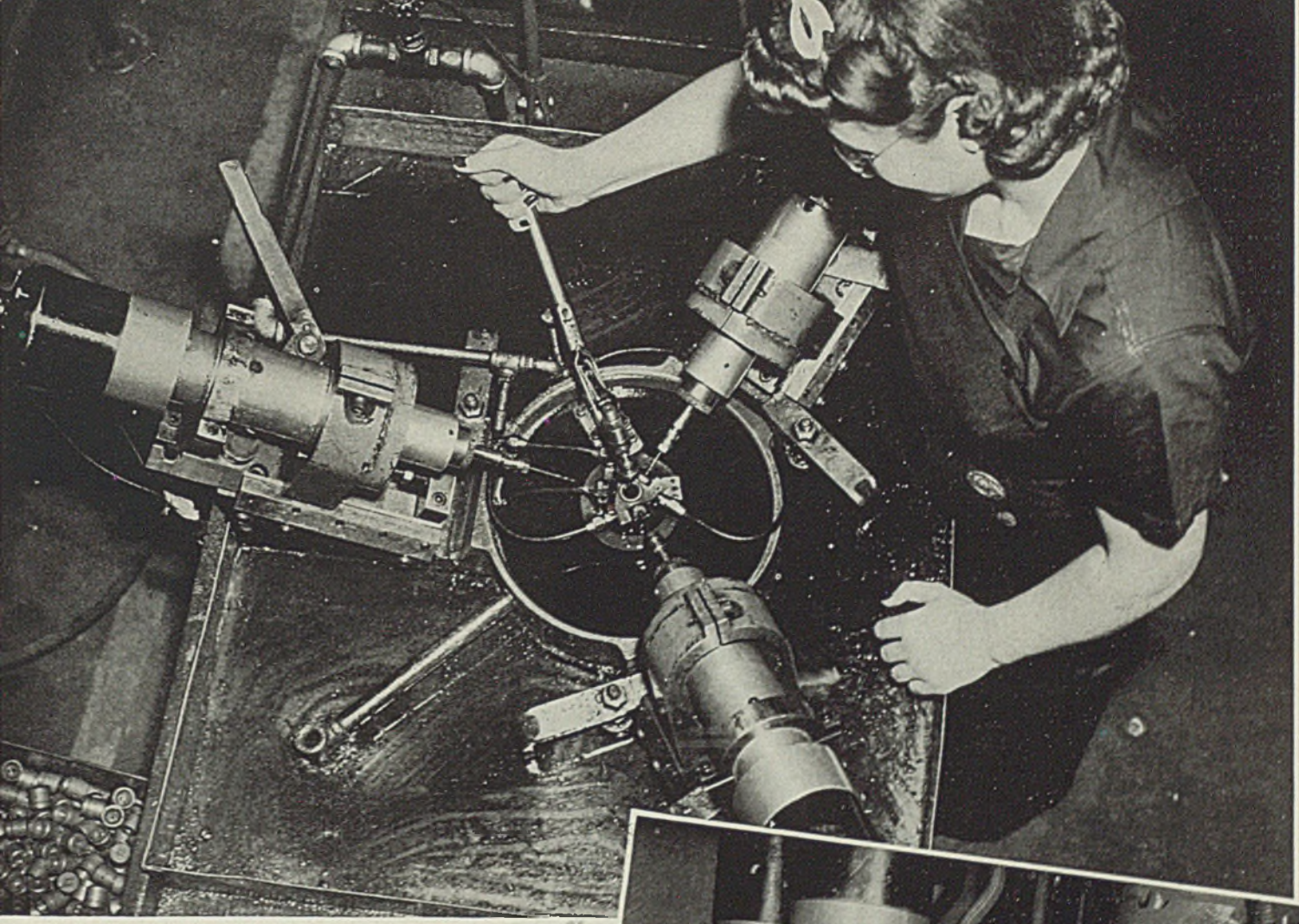


Fig. 2—(above)-Setup of three Sensaumatic drills at N. A. Woodworth Co., Ferndale, Mich., for boring 3 holes at 25-degree angles

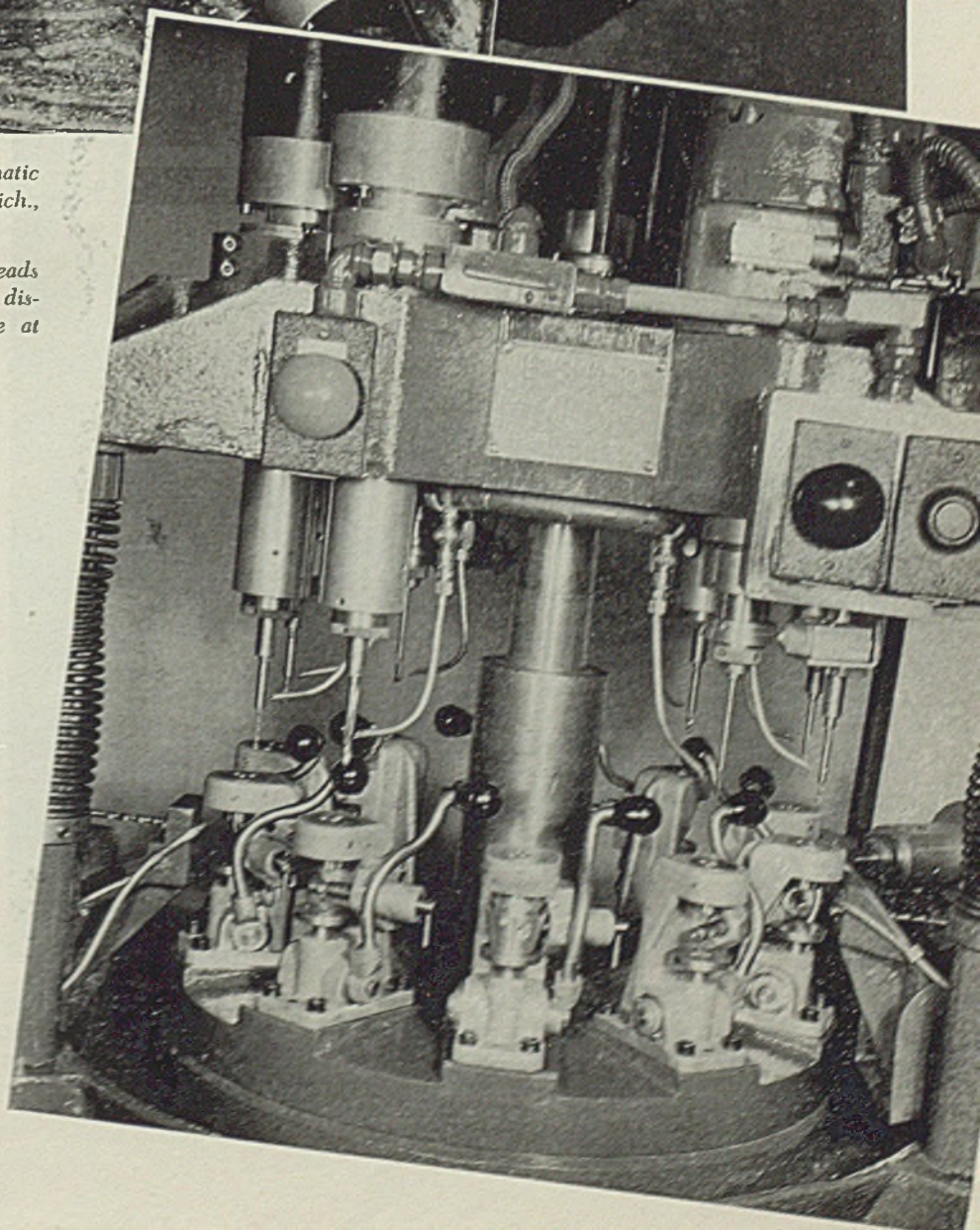


Fig. 3—(Right)—Ten Sensaumatic drill heads and two tapping heads in an automatic discharge cycle are combined in one fixture at F. L. Jacobs Co., Detroit

spindle, shown in cross section in Fig. 1. is accomplished by Claus torque conversion. The drive is obtained by centrifugal force created by the revolution of steel balls inside a cone attached to the spindle. The travel of the balls forces the cone forward. The outward, positive stroke of the spindle is, therefore, controlled by the centrifugal force of the revolution of these balls.

A mechanism for compensating excess pressures provides an even pressure through the entire working stroke of the spindle. Positive, predetermined stop is achieved by the adjustment of a projecting nose piece at the end of the spindle. This can be adjusted, forward or back, within the distance of the limits of the stroke, reaching a tolerance of 0.002-inch or lower. No guesswork is required for the setting.

They built a triad fixture for three of these heads to operate in cycle with a timing device, buttoned to a ½-inch interval sequence so that the drills would not simultaneously meet at the same

point. (See Fig. 2.) Experiments were made with coolants, and Woodworth chemists finally evolved a special formula with a carbon tetrachloride base that works highly effectively. Although carbon tetrachloride fumes are intoxicating and normally would have the operator groggy, that hazard has been eliminated in the special formula used. The uniformity of feed was quite perfectly accomplished by the characteristics of the drill head itself, explained above. All the operator needs do is to feed the fixture and operate the machine simply from a central lever, each drill head returning its drill to coasting position after completion of its operation, leaving a hole of thoroughly reamed finish.

Initial experience with this setup presented some difficulties because the drill heads, necessarily fixtured at a difficult angle for job setting adjustment, were handled too carelessly for such a finely balanced mechanism. However, these have been eliminated, and operation is now completely satisfactory.

Ross A. Neff, Woodworth master mechanic, says: "This drilling operation on the valve clearance adjusting screw had us practically stumped until we found the Sensaumatic drill head. Starting at an angle and breaking through at an angle, drill mortality was almost impossibly high. But the uniform feed of this drill head has helped us greatly. Our initial difficulty was in learning how to adjust its fine mechanism. Had we known at the start what we have since learned, we would have had clear sailing from the beginning. Now we get 50 per cent better performance.

"We are machining 150 pieces per hour with the Sensaumatic setup where we used to get under 75 pieces regularly. Further, our drill breakage has been reduced 70 per cent. Another important factor is our special coolant. We will be glad to give confidential information on this to anyone confronted with a similar problem."

Inventor Well Known

The Sensaumatic drill head is the invention of Philip S. Claus, well known as an engineer, tool designer and mathematician. Among other inventions to his credit is a starter device without spring and a British patent on a parallel-cylinder diesel engine that provides 40 per cent more time for ignition than does the ordinary diesel. Forty years ago he was assistant superintendent of Cadillac Division, General Motors Corp., and his biography is replete with inventive and management achievements among such firms as Burroughs Adding Machine Co., Detroit; Timken Roller Bearing Co., Canton, O.; and Lloyds of England shipyards.

After years of effort, he finally evolved a most ingenious torque conversion. He has associated himself with William F. Damrau Sr., Michigan representative of many leading machine tool and industrial manufacturers. This organization occurred simultaneously with the first acceleration of United States war production, and the perfected drill head is now being manufactured in three sizes by Michigan Industrial Sales Co., Detroit, of which Mr. Damrau is president.

William Damrau Jr., plant superintendent, is a product of Wilbur Wright high school's unique talent-training school described in STEEL, Aug. 31, 1942, p. 50 and regarded as the correct pattern for education in the skilled metal trades. It is interesting to note that Sensaumatic production is almost entirely accomplished by Wilbur Wright students.

The Sensaumatic drill head applies the Claus torque conversion principle in such a manner as to produce a positive centrifugal drive of uniform feed, automatically accomplishing a group of operational advantages such as uniform feed, positive stroke stop, compensat-

WOMAN OF "TOMORROW"

SHAPED to the "curves," these leather garments designed by American Optical Co., Southbridge, Mass., enable women operators to retain that feminine look while protecting them from dangerous flying sparks generated during welding operations. Leather gauntlets and cap, welding helmet and safety goggles—not to mention lipstick—complete the pretty maid's ensemble

ing working stroke pressures, etc. The drill head consists of 30 parts, three of them in movement—the spindle, cone sleeves and balls actuating the cone. The end thrust of the spindle is taken in the unit proper and not on the bearings of the motor. Thus, the only work on the motor is the natural torque required to carry the strictly radial load.

It is claimed that no other tool will drill or counterbore hole after hole to a positive predetermined depth, with a stroke capable of being adjusted to within 0.002-inch, automatically releasing the spindle at the end of the working stroke and returning it, leaving a perfectly smooth surface at the bottom of the hole, and requiring no finish reaming operation. This smoothness of work at the end of the stroke is made possible by the fact that the spindle is not released until its nose piece contacts an adjusting screw, upon which contact it is frictionally held by the adjusting screw to allow the spindle to overrun the nose piece for a few coasting revolutions to permit caming down the control plunger to effect a release for the return of the spindle. There are two springs in the drill head, one to return the cone to rest position and the other to return the spindle to rest position. See Fig. 1.

Eliminates Human Element

Machines which allow the spindles to leave the bottom of the hole immediately tend to leave a burr or mark where the drill leaves the metal. And many drills have no control over the pressure generated. In the Sensaumatic unit, the centrifugal force generated by the balls travelling outward in their conal sleeve, as mentioned above, is controlled to produce the same effective pressure at any point. The longitudinal spindle pressure does not vary during the working stroke. Thus the hazard of the human element is entirely eliminated, and the uniform feed keeps the drill constantly under the metal. The cone curvature changes the calculated curve of centrifugal force to produce this constant point of pressure on the drill. When the drill tends to clog up with chips, the machine practically stops feeding until the chips work themselves out.

This controlled centrifugal force permits unvarying pressure, keeping the drill always under the metal, permitting it to cut at higher speeds. The spindle turns at about 1800 revolutions per minute.

There is practically no burning, dulling and breakage of drills. The usual hazard of higher speeds, caused by the creation of a heavier chip load in the drill lip with attendant heavier heat, is little in evidence.

Different units handle anything up to ⅜-inch in steel and to ½-inch in aluminum. They will drill anything from wood to steel within the capacity range of the particular model. The heads can be located in any position or fixtured at any angle. A micro switch and timing installation for any multiple setup can be used to provide automatic sequence of operations, requiring only feeding and push-button starting and permitting work by unskilled operators.

The positive, predetermined stroke stop, after which the drill coasts a number of revolutions before the caming down of the control plunger releases the spindle's return, makes possible the drilling of blind holes with polished seats to within 0.002-inch. A smooth surface remains after spot facing, counterboring or drilling depth holes. Drilling can be adjusted to sequential or concurrent work stroke to meet at a common point or to cross holes.

Using 10 Sensaumatic drill heads and two tapping heads in an automatic discharge cycle, fixtured by the Detroit Service Engineering Co., Detroit, the F. L. Jacobs Co., Detroit, succeeded in freeing 26 operators on one war production operation for duty on other vital operations.

The new setup is shown on page 57 in Fig. 3. There were also decided savings in loading and cutting time as well as virtual elimination of scrap.

The experience of Packard Motor Car Co., Detroit, in machining a trunion bolt resulted in a production increase of 60 per cent, with almost complete elimination of drill breakage. On another job, Packard cut out a reaming operation, finding that it could get a seat surface automatically by use of these drill heads. Girl operators are employed. A one-purpose Jacobs chuck is used, and common experience is to run 375 pieces before even looking at the drill.

Among other noteworthy installations are those of Pittsburgh Pipe & Coupling Co., Allison Park, Pa.; McDowell Mfg. Co., Pittsburgh; and various divisions of General Motors Corp. and Bendix Aviation Corp.

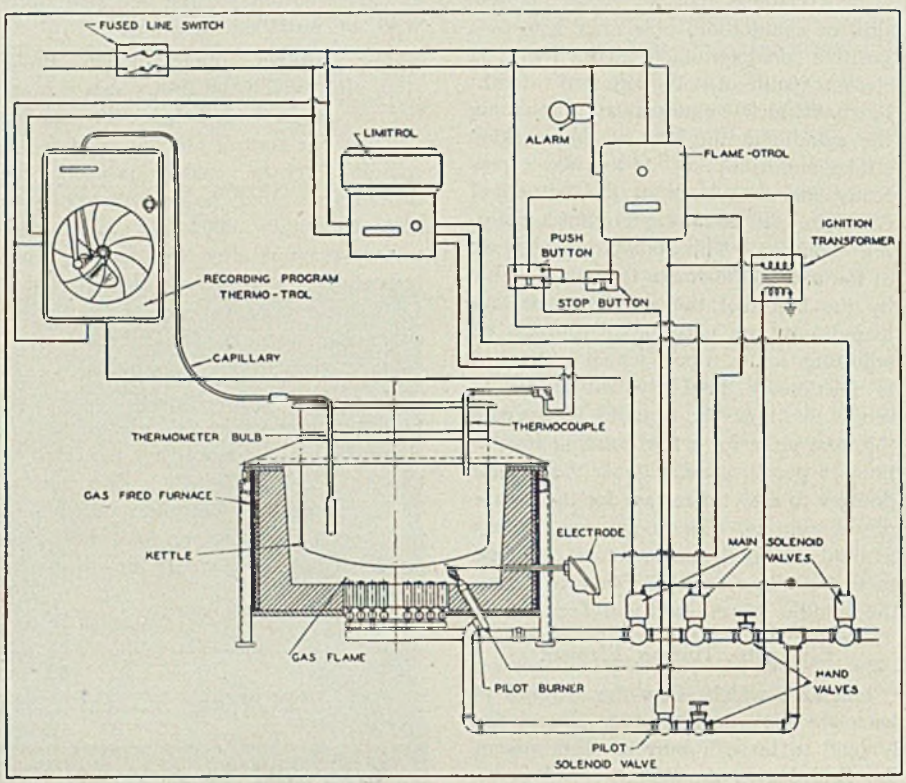
Thus this tool has greatly reduced the problem of maintaining perishable tools as far as drilling of the nature described is concerned. The human element is, of course, one of the greatest causes of drill breakage, for no matter how skilled, an operator finds it difficult to control pressures throughout the entire working stroke.

"POWER BOTTLES" FOR HYDRAULIC SYSTEMS

ALREADY in the war with our fighting services, carbon dioxide gas now is a new source of emergency power through a new device recently developed by Walter Kidde & Co., Bloomfield, N. J. Device consists of a steel bottle filled with compressed gas and connected to the pistons of hydraulic systems used to open bomb-bay doors, lower retractable landing gear etc. When the regular system fails the gas operates the pistons. Each cylinder holds a latent force of 30,000-foot-pounds per pound of gas

Salt Bath TEMPERATURE CONTROL

System holds desired temperatures automatically throughout any sequence, provides temperature record, gives excess temperature protection, eliminates combustion hazards



Schematic diagram of automatic program temperature control for salt baths

THERE ARE a number of ways to control the temperature of gas-fired salt baths and pot-type furnaces. One of the most effective is an automatic temperature cycle or program control system incorporating excess temperature shut-off and combustion explosion protection as shown in the diagram. This particular system was developed by engineers of Wheelco Instruments Co., 847 West Harrison street, Chicago.

The instrument installation is designed to control fuel and to do three things automatically: First, to provide the desired temperature at any period in the process regardless of temperature variations required; second, to provide a record of temperatures experienced during the cycle; third, to give excess temperature shut-off protection or protection against burning materials with low flash points in the event of fuel valve or instrument failure; fourth, to eliminate combustion hazards. It may be applied equally well to either gas or oil-fired equipment.

Enforcement of any desired heating or cooling cycle over any time period is achieved by a Wheelco recording program Therm-otrol. See diagram. A transparent rotating disk, contoured so as to change the position of the temperature control index as it rotates, produces the desired program or cycle control. An index arm with a small wheel that rides on the outside edge of the disk changes the control setting to produce the heating or cooling cycle called for by the rotating disk. This transparent disk is mounted directly over the chart of the recording instrument.

The thermometer bulb of the recording program Therm-otrol is suspended in the furnace or kettle. When the Therm-otrol calls for heat, a solenoid valve, shown schematically in the main fuel line just before the main burner, releases fuel that is ignited by a continuous pilot burner. When temperature has reached the level called for at that period in the process, the Therm-otrol closes the solenoid valve. The main burner then goes out, but the pilot burner remains ignited.

Protection against pilot failure, which would present an explosive condition with ignition failure as the Therm-otrol called for heat, is obtained through a Wheelco Flame-otrol. This instrument employs the ability of a flame to conduct a current. An electrode is mounted so that one end is in contact with the pilot flame. The pilot flame completes a circuit, which, should it be interrupted, would cause the Flame-otrol to close a main line solenoid valve, shown in the drawing second from the burner, and another solenoid valve in the pilot burner by-pass line.

Protection against possibility of valve or control instrument failure upsetting a treatment or process by overheating, or by heating above the flash point in the case of some materials, is obtained by a Wheelco Limitrol. This instrument, set a few degrees above the highest temperature called for in the process, is actuated through a thermocouple suspended in the furnace or kettle. If this excessive temperature is reached, the Limitrol closes a solenoid valve in the main fuel line, shown in the drawing at the extreme right, instantly stopping fuel flow to both main and pilot burners. When fuel is cut off by the Limitrol, operation of the equipment cannot be resumed until temperature of the material is reduced to a point below the Limitrol setting.

In starting up the furnace or kettle, a blower in the fuel supply line, not shown in the drawing, is first started; the Limitrol is set at the excessive temperature shut-off point desired, and the recording program Therm-otrol disk is set at the point indicating start of the process. Now the push button is depressed. If the air pressure switch in the blower line indicates to the Flame-otrol that air pressure is sufficient to operate the burners, the solenoid pilot valve will open. Simultaneously, the ignition transformer will create a spark at the pilot burner tip to ignite the gas. The push button is released when the pilot flame is established, and the Flame-otrol opens the main line solenoid valve. The main burner is ignited by the burning pilot.

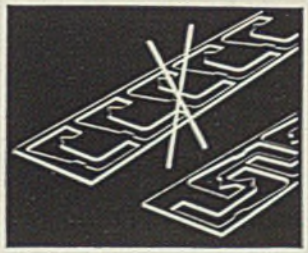
YOU CAN START *right here!*

—to BOOST output of Stainless parts and REDUCE Stainless Steel scrap loss!

TODAY, there are two big questions in the minds of users of Stainless Steel . . . *"How to increase production of Stainless parts?"* and *"How to reduce Stainless Steel scrap loss?"*

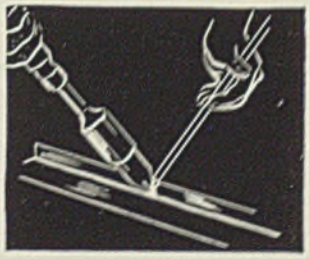
Useful hints to help you answer both questions are on these pages. Read them carefully. Use them to help you do a trouble-shooting job in the production of Stainless parts. Add them to your own "know how" that has come from working out Stainless fabricating problems.

These suggestions are a result of the work Carpenter metallurgists and service men have done in many plants where Stainless is used. Much of their experience is now being made available to you in printed form. And through correspondence with the mill, you can get still more help with your specific problems involving the use and fabrication of Stainless Steel.



Re-check Your LAYOUTS

Another way to conserve Stainless Steel is to re-check layouts on jobs that are stamped from Stainless Strip. The results will be well worthwhile, in terms of metal conserved and time saved. In some plants, skeleton scrap losses have been ***reduced*** *by as much as 20%.*

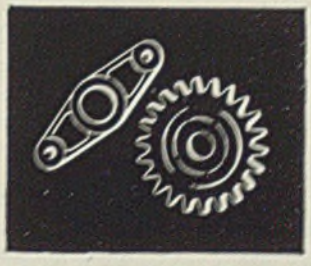


Are You SOLDERING Stainless?

If so, remember that heat is absorbed more slowly by Stainless. Thus, a ***larger*** *and* ***heavier*** *iron should be used. It is not necessary that the iron be hotter, just* ***larger*** *with more heat capacity to allow the solder to flow more freely.* ***Thorough cleaning*** *of the Stainless surface before soldering is a must!*

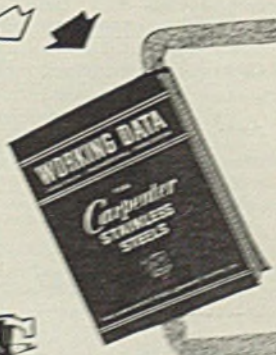
When HEAT TREATING Stainless

. . . be sure that all Stainless parts are absolutely clean—free from any grease or foreign matter—before putting them into the furnace. This will help you avoid excess scale, and cut pickling time to a minimum. And remember that medium or heavy sections are ***soaked*** *at the hardening temperature.*



Watch FORGING Temperatures

Always run furnaces at the recommended forging temperatures, not hotter. To keep operations going full speed, it may be possible to heat ***more*** *bars and billets at the same time. Stainless Steels heat more slowly than other steels.* ***Thorough*** *heating of Stainless bars can help to reduce rejects considerably.*



Here is practical engineering information to help you get the most from every pound of Stainless Steel. This 88-page book, "Working Data for Carpenter Stainless Steels", contains helpful fabricating hints. It provides data about Stainless Steels to solve heat or corrosion resistance problems.

This Working Data book is available to users of Stainless Steel in the U. S. A. If you would like a copy, a note on your company letterhead will start one on its way.

The Carpenter Steel Company, 121 Bern St., Reading, Pa.

Carpenter STAINLESS STEELS

CONSERVING POWER

. . . . by utilizing the energy developed during testing of aircraft engines

UNTIL RECENTLY aircraft engines undergoing test were loaded by placing them in a test cell where they drove an aircraft engine propeller which was adjusted to load them as desired.

All of the power generated was wasted in churning up the air.

Obviously this complete waste of power generated represents an important source of possible savings. Now when the generating capacity of our power systems is being loaded to capacity, any means to conserve power is a direct and important contribution to the war effort.

However, the problem of effectively pumping back the power generated on aircraft engine tests into the electrical power system is not an easy one for it means pumping power from a varying-speed source into a constant-frequency system over a considerable range of aircraft engine speeds and horsepowers.

Engine testing is an exceedingly important phase of aircraft engine production. Each engine must be run under load for a considerable period and then is taken down completely for examination of every part, and then reassembled and given a final run. Most schemes now utilized for production loading of engines, such as calibrated propellers, water brakes, electric brakes and similar devices, all involve disposing of the engine power by complete wastage.

Even a small aircraft engine plant consumes many tank cars of precious 100-octane fuel daily on such tests. Too, engines are growing in size to the extent that difficulties are beginning to be encountered with present power dissipating schemes of testing. To solve this problem effectively, the following system of testing was developed.

Since the first installation of this character consisting of two testing units, at least 75 additional units have been installed. Some of these additional units differ in detail, but they all involve the same problems and the same scheme of operations described here.

Before examining the equipment employed in the new testing scheme, let us first analyze the requirements. This study starts with determining the characteristics of the engines to be tested. Then some means must be at hand for utilizing the power produced by the engines during test. Lastly, a system must be developed which will tie the power source and the power load together satisfactorily.

Except for unusual manufacturing setups, the testing system will only achieve its maximum usefulness if it can accommodate a range of engine sizes. To be specific, assume that the operating ranges of engines shown in Fig. 1 are to be tested. The system must test any engine within the range indicated from the smallest to the largest.

Note also that for a given engine the horsepower output changes rapidly with changes in speed. Not apparent from the diagram Fig. 1, however, are the requirements that any testing equipment must be capable of driving the engine as well as of absorbing power from the engine, for it is desirable to utilize the system to crank the engine upon starting. Also, the system must be able to operate in either direction of rotation.

As regards the matter of utilizing the power generated, there is but one answer—it must be pumped into the power system serving the manufacturing plant if it is to be utilized effectively. This introduces a new factor because it involves the public utility which supplies power to the manufacturing plant. When

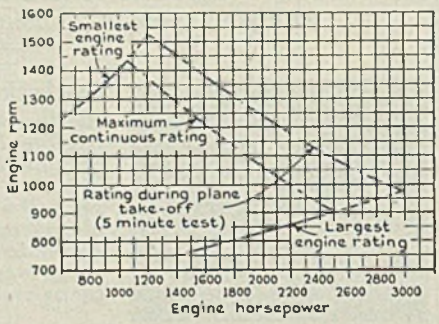


Fig. 1—(Right, above)—Typical curves showing range of engine horsepowers and speeds for which testing equipment should be designed

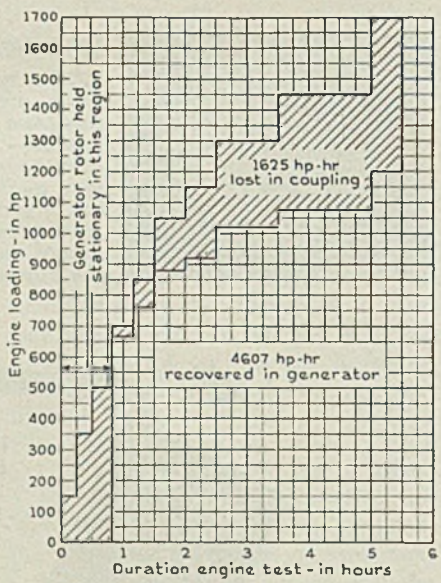


Fig. 2—(Immediate right)—Graph showing that of the total of 6232 horsepower hours delivered by an engine during test, some 4607 horsepower-hours can be recovered in the generator by means of the setup shown in Fig. 3

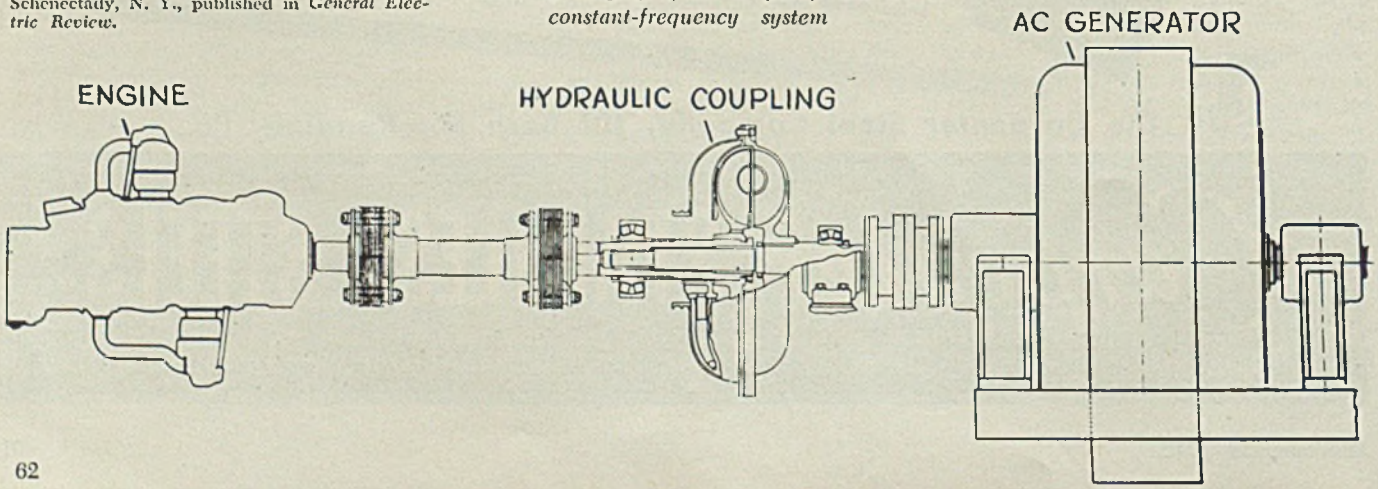


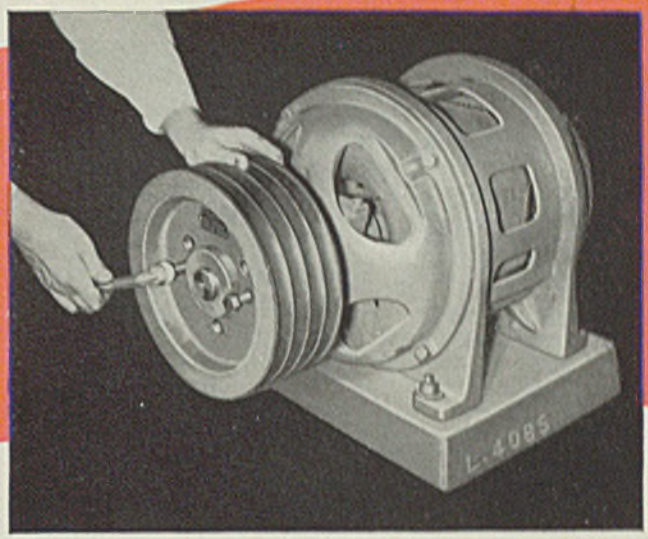
Fig. 3—(Below)—Schematic view of regenerative test stand which enables a drive of varying speed to pump into a constant-frequency system

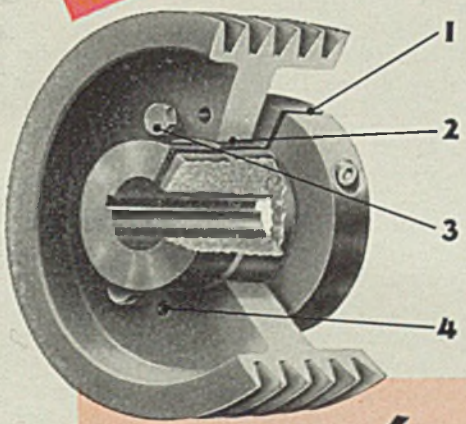
From an article by G. E. Cassidy, industrial engineering department, General Electric Co., Schenectady, N. Y., published in *General Electric Review*.

WORTHINGTON QD SHEAVES

QUICK DETACHABLE

EASY TO GET ON! EASY TO GET OFF!





YET ALWAYS TIGHT ON THE SHAFT

"EASY TO GET ON! EASY TO GET OFF!—YET ALWAYS TIGHT ON THE SHAFT" is a fact that can be proved by one demonstration of the QD Sheave principle.

THE QD SHEAVE IS EASY TO INSTALL OR REMOVE because the QD patented design incorporates a split hub positioned on the shaft with a single cap screw. The rim is pulled up on a tapered fit with the hub by pull-up bolts.

THE QD SHEAVE IS ALWAYS TIGHT ON THE SHAFT because the pull-up bolts exert positive pressure on the tapered rim against the tapered split hub, providing a metal to metal fit.

Note!

1. SPLIT HUB for easy mounting or removal from the shaft.

2. TAPERED FIT between split hub and rim for easy mounting or removal of rim from hub.

3. PULL-UP BOLTS which pull the rim onto tapered split hub for tapered friction drive assembly and positive press fit on the shaft.

4. TAPPED HOLES IN RIM for using pull-up bolts as jack screws to free the tapered friction fit when detaching the rim.

MULTI-V-DRIVE

Dealers everywhere are demonstrating to their customers the time-saving, labor-saving and material-saving advantages of the QD (Quick Detachable) SHEAVE.

MEMBER MULTIPLE V-BELT DRIVE ASS'N

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COMPLETE DRIVES

WORTHINGTON MULTI-V-DRIVES

SHEAVES OR BELTS ONLY

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only a few engines are operating, the effect is to reduce the power utility's input to the plant. When many engines are running, the condition may be reached where the engines pump back more power into the system than can be utilized by the plant, leaving an excess to feed into the utility system. Since the function of a power company is to sell power, this form of testing presupposes hearty co-operation between the power company involved and the engine manufacturer. Obviously without complete co-operation the system cannot work.

The problem of tying the engine and the power system together is essentially a problem of how to pump the power from a varying speed source into a constant frequency system. This is practically the same as trying to tie together a constant frequency power system and a varying frequency power system.

The problem has a number of solutions. For example, the engine might be connected to a direct-current generator and this machine connected to the power system through an adjustable voltage drive. Well known principles involving induction machines might be employed. A synchronous generator with rotating stator as well as rotor also is feasible.

But none of these possible drives will compare favorably from the standpoint of investment and simplicity with the drive illustrated in Fig. 3. This drive consists of a conventional synchronous generator tied directly to the electric power system. The hydraulic slip coupling interposed between the aircraft engine and the generator enables the variable speed of the engine to be transformed to a constant speed for the generator.

In operation, the synchronous machine can be run either as a motor or generator.

TABLE I—Power Distribution

Engine		Coupling Horsepower	Generator Horsepower Delivered to
Speed	Horsepower	Loss	Power System
750	1400	75	1325
900	2500	500	2000
975	3000	780	2220

With the coupling de-energized, the synchronous machine is brought up to speed and synchronized in the same manner as a conventional synchronous motor. Thereafter the coupling is energized to make the synchronous machine "turn over" the engine. The engine is fired and after it is warmed up it is brought up to speed above that of the synchronous machine, which then acts as a generator to pump power back into the electric system. The load placed on the engine depends upon the amount of slip in the coupling. The amount of slip can be controlled. Likewise the load placed on the engine can be varied by adjusting the engine throttle and the degree to which the coupling is energized.

All Horsepower Not Lost

To illustrate the distribution of engine power developed during a typical test run by this scheme, assume that the synchronous machine has a constant speed of 720 revolutions per minute and the largest engine shown in Fig. 1 is to be tested at speeds of 750, 900 and 975 revolutions per minute. Then neglecting machine efficiency, which will not affect the general picture, the power distribution is as shown in Table I.

It will be seen that when the engine is generating 3000 horsepower output, all of the 3000 horsepower is not lost as was the case with systems of the load-dissipating type for only 780 horsepower is lost. The bulk of the power, 2200 horsepower, is made available for useful purposes by the generator.

Some variations of this fundamental scheme of testing can be employed. For example, it will be noted that the generator will act as a load on the engine only when it is driven above synchronous speed. To load the engine at speeds below this value, the absorption capacity of the coupling can be utilized by holding the rotor of the synchronous motor stationary by means of a brake.

The chart, Fig. 2, illustrates a test run of a typical medium-size airplane engine under such conditions using a 900-revolution-per-minute generator connected on the power line. At low engine speeds, the horsepower delivered by the engine is relatively low so the coupling will not be called upon to dissipate more horsepower than required under maximum running conditions. Also, the duration of the test runs at low speeds is short so the horsepower hours lost in the coupling are relatively few in proportion to the total.

It will be noted from the diagram of the test run in Fig. 2 that of the total of 6232 horsepower-hours delivered by the engine during its test run, some 4607 horsepower-hours were recovered in the generator. This means that only 25 per cent of the power generated was dissipated, the remaining 75 per cent being completely salvaged by pumping back into the electric power system.

This development is typical of a number of points having to do with new and better ways of doing things. In the first place, the fact that this new method of testing was brought into actual use is the result of an endeavor by a few persons who had the vision and insistance necessary to break away from well established practice and to delve into the field of improvements. Again, this development is typical of many such in that it brought

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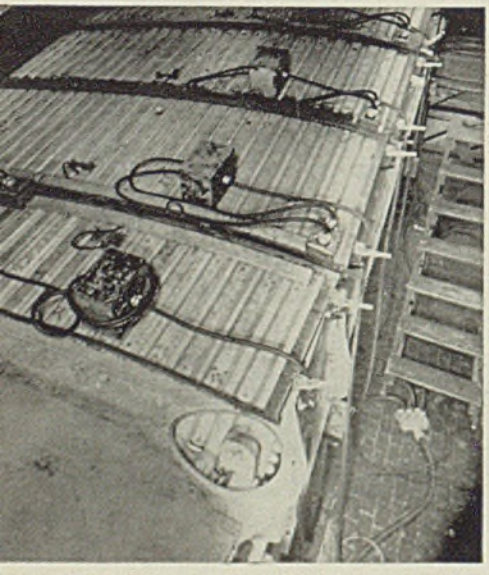
"ARTIFICIAL FEVER" FOR AIRCRAFT SKINS



PRINCIPLES of heat therapy not only eliminate wrinkles in joining thin aluminum skin of airplane wings but also quicken production considerably at the plant of Glenn L. Martin Co., Baltimore.

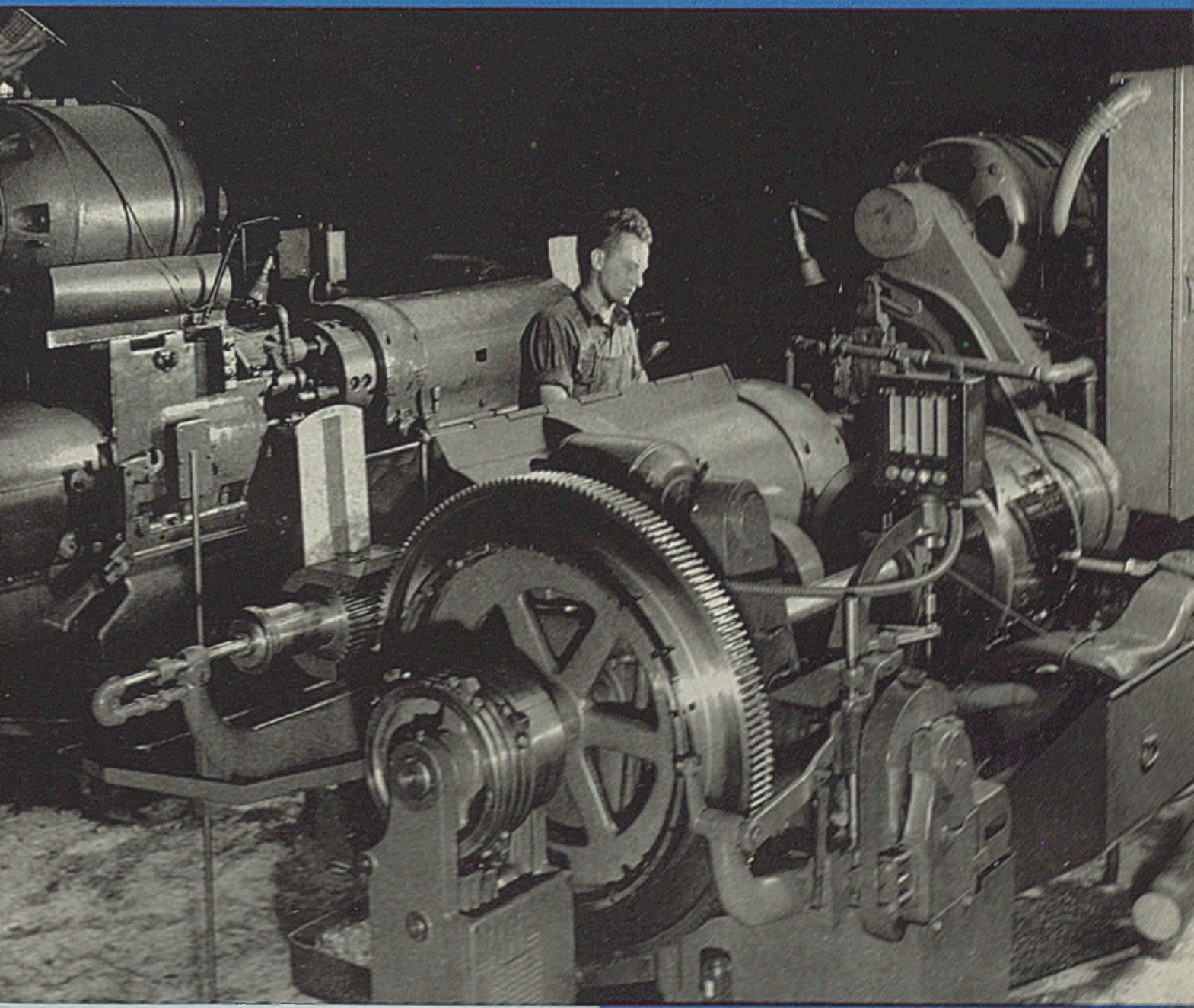
Major difficulty in riveting aluminum skins over spars and ribs has been the unavoidable wrinkling and buckling of the skins under the impact of riveting hammers. Even though slight, this wrinkling impairs the efficiency of the wing.

System of heat therapy devised by Harry F. Kniesche, assistant factory manager, and illustrated at left, is as follows:

Various sheets of aluminum making up a skin are riveted together on a wood frame which has the contour of the wing. The skin next is placed on the wing frame of the airplane and electric heater pads placed on top of the skin, fitting snugly to the contour of the wing. Current is applied, and in a few minutes the skin has temperature of 140 degrees, which causes enough expansion to remove wrinkles and buckles.

Rheostats hold the temperature constant while the expanded skin is quickly stitch-riveted around the edges and along the ribs. Heaters then are removed and the skin shrinks as taut and unwrinkled as a drum head. Production is stepped up as the system permits an entire wing skin to be applied in one riveting operation.

CLEVELAND *Single Spindle* AUTOMATICS CUT COSTS 28%, SAVE 30% TIME, ON GEAR BLANKS FOR KEARNEY & TRECKER CORPORATION



• Here are two 5¾-inch Cleveland *Single Spindle* Automatics in the plant of one of America's most famous machine tool builders—Kearney & Trecker Corporation. Machine tool builders are especially exacting and particular in seeing to it that the machine tools they use live up to their basic purchase consideration—amortization of their cost within a reasonable, given time limit. • These 5¾-inch Cleveland Model A machines are recent additions to a large battery of Clevelands in this well-known plant. Model A in 3¾-inch to 8-inch sizes has 4-speed motor drive, universal camming and variable tool feed; in 1⅛-inch to 2½-inch size, constant speed drive is standard, 2-speed drive optional at slight extra cost. Ask for more detailed information.

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

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CLEVELAND *Single Spindle* AUTOMATICS

MODEL A—Built in 1⅛-inch to 9½-inch capacities inclusive
MODEL B—Built in 1⅛-inch to 2½-inch capacities inclusive

Reclaiming Kirksite Dies

. . . . in aircraft manufacture

A MEANS for swiftly and efficiently repairing the worn or damaged Kirksite dies used for forming sheet aluminum in aircraft manufacture has been developed by the St. Louis plant of the Curtiss-Wright Corp.'s Airplane Division through the adaptation of metal spraying equipment originally designed for use in the automobile industry as a means of remedying body defects on the assembly line. Later, the same method of repair was extended to various moving parts of power machinery and then to spraying aluminum on seaplane parts to prevent corrosion.

Formerly 95 per cent of such worn or damaged dies were replaced with new dies, the old ones being remelted, recast and refinished—a costly process. Now they are made good for much additional work by a single inexpensive reclamation procedure.

Experimental work on the Curtiss process was accomplished by George F. Bean, a foreman in the wood shop. The method has been in use for several months with satisfactory results, which include a large saving both in time and money. The first step and an extremely important one is the preparation of the base metal by blasting the worn or damaged area with carborundum abrasive, usually a No. 50 angular steel grit.

This process cleans the area to be built up and also creates the slightly rough surface which facilitates adhesion of the sprayed metal. The zinc wire used is melted and sprayed on the dies by a metalizing gun which resembles a paint spraygun. This metal spraying process has proved just as serviceable on contours as on flat surfaces. As much as ⅛-inch has been sprayed on worn Kirksite dies with satisfactory results.

The metalizing process is relatively simple to learn, and a workman should become proficient in the operation of the spray gun after 15 hours or less of practice. After the spraying process has been completed, the die is easily machined to the tolerances required and appears to serve as well as a new die.

A similar process is applied to both form and draw dies of hot rolled steel, to many types of jigs and fixtures and to bearings, cams and bushings of tool steel, whose replacement or repair becomes necessary in the maintenance of production machinery. In this type of work, as much as one-sixteenth inch has been built up by metal spraying. By use of the proper metal wire in the spray gun, the repaired area remains sufficiently

(*Please turn to Page* 91)

Fig. 1—Worn Kirksite die generally considered as being beyond repair. Note die has already been marked for scrap

Fig. 2—Here the same die is shown being sandblasted in preparation for reclaiming by metal spraying. Photo taken through window in sand blast room shows sand blast in operation

Fig. 3—Die is now sprayed with melted zinc blown from the gun by compressed air. Wire can be seen feeding into the gun at extreme right

Fig. 4—Now worn die is ready for use again after reconditioning which includes machining after metal spraying. Machining to tolerances required is not difficult. All photos from Curtiss-Wright Corp., St. Louis Airplane Division, Robertson, Mo.

Minute men to arouse sleeping Scrap.....

Steel salesmen, along with the salesmen of all other industries, are the Minute Men of 1943. Their task is to arouse dormant scrap—in your plant, in every shop they can reach.

Be on the alert for this modern Minute Man's urgent call. His job is threefold:

1. To remind you of the objectives of the WPB Dormant Scrap Drive and enlist your scrap.
2. To help you determine what may be considered dormant scrap.
3. To help you start your dormant scrap on its way to hungry steel furnaces.

So long as an enemy is in the field, scrap need will be critical. The Minute Men are pledged to help you keep it rolling for the duration.

25-42E

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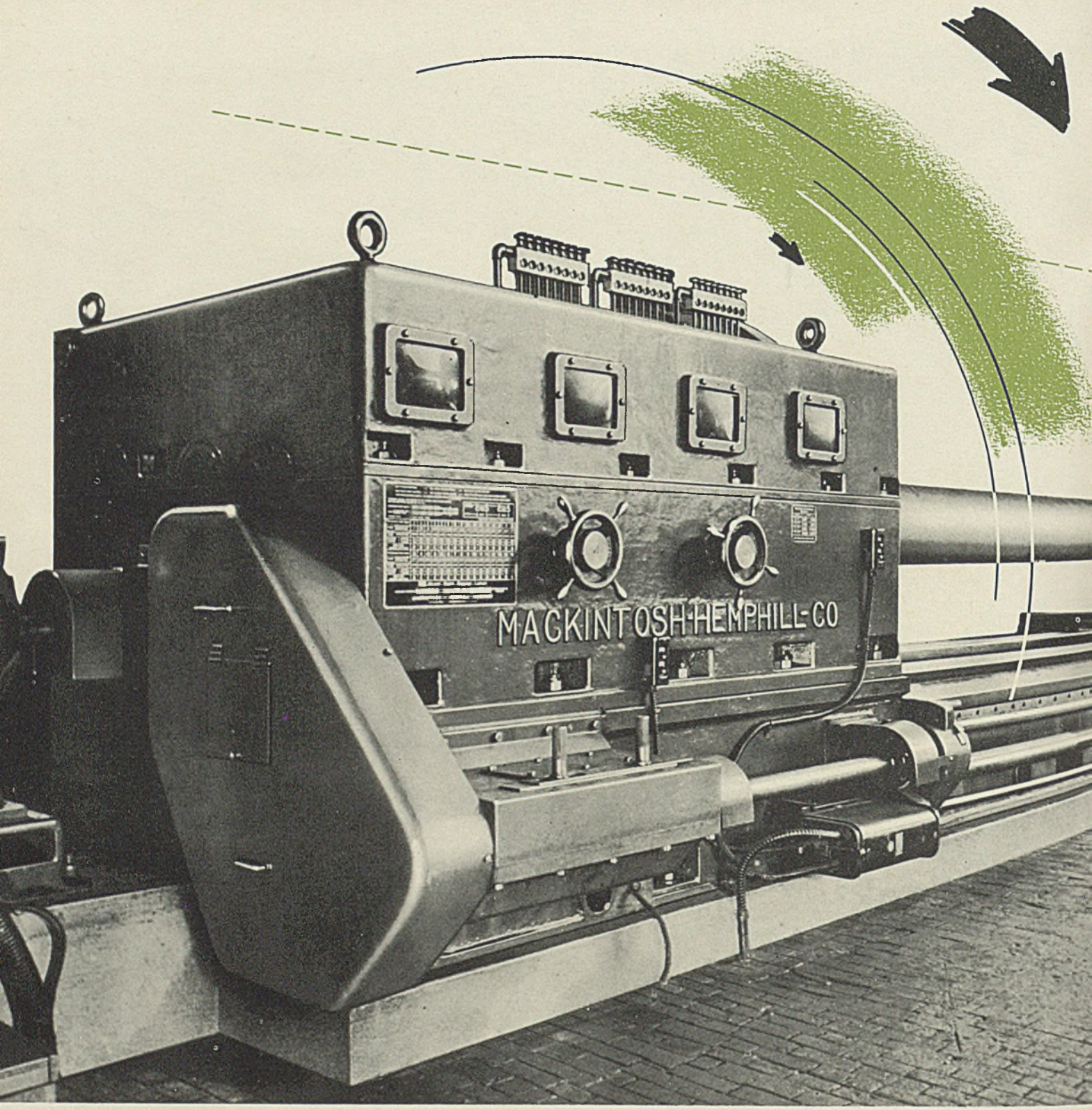
THE YOUNGSTOWN SHEET AND TUBE CO.

Youngstown, Ohio

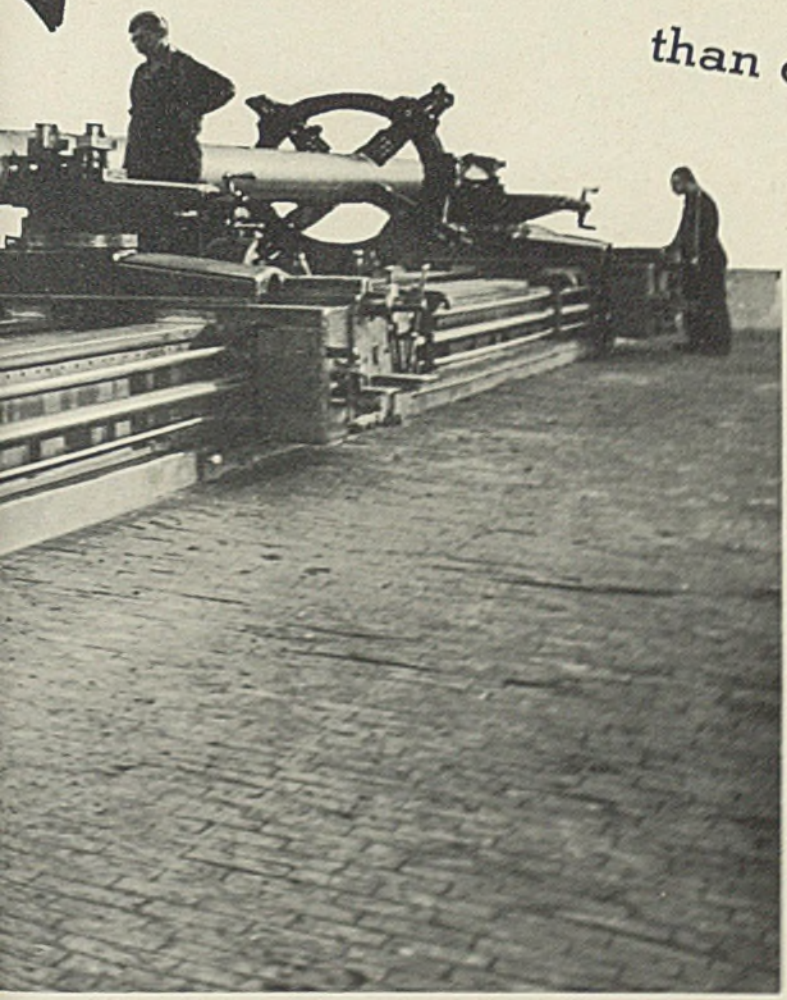

MACKINTOSH-HEMPHILL-CO

Mackintosh Heavy-Duty Engine Lathes

remove metal

2 to 3 times faster

than ordinary heavy-duty tools



Mackintosh-Hemphill Heavy-Duty Engine Lathes have three fundamental improvements over previous designs. They are: 1. A new head stock design. 2. An improved carriage with a new method of power feeds. 3. A new arrangement of the bed and ways. Each of these was accomplished without unnecessary devices and auxiliary parts. These lathes are thoroughly proved in every respect and many are now operating in plants all over the country.

The economic advantage of the Mackintosh Heavy-Duty Engine Lathe is five fold:

1. Heavier cuts with greater accuracy in turning and tapering. Roughing cuts up to ½ inches by 2 inches deep are readily obtainable on many classes of work.
2. Heavy duty roughing, finishing, and tapering, simultaneously, on the same machine with greater efficiency.
3. Cutting of any length of taper by one set-up which reduces the over-all time from one-half to one-quarter of that necessary with standard taper attachments.
4. Accuracy of the taper is not dependent on the skill of the operator in making a set-up.
5. Lower maintenance and operating cost.

Mackintosh Heavy-Duty Engine Lathes are produced in the following sizes:

SIZE OF FACE PLATE	CENTER TO CENTER
42 inches	15 to 50 feet
48 inches	15 to 60 feet
60 inches	15 to 85 feet
72 inches	15 to 85 feet

Write for complete engineering and operating details

Since 1868—Pioneers, Engineers and Builders

MACKINTOSH-HEMPHILL COMPANY . . . Pittsburgh and Midland, Pa.

Other Mackintosh-Hemphill Products:

"Tartan" Process Rolls . . . Rolling Machinery . . . Sheet Straighteners . . . Slitting Cutters . . . Shears . . . Leveller Plates . . . Special Equipment . . . Iron-Steel Castings . . . And the New Extension Straighteners for Solid rounds, pipe, tubes—for cutting and polishing

HOW TO GET THE MOST OUT OF YOUR LATHES

No. 4 in a series of suggestions made by the South Bend Lathe Works in the interest of more efficient war production

Keep Your Lathes in Trim

The old proverb, "An ounce of prevention is worth a pound of cure", is as applicable today as when first expressed by some long forgotten sage. Lathes and other modern precision tools must be "kept in trim" if they are to give the long, trouble-free service that is expected of them.

Although the adjustments required to "keep the lathe in trim" are few and simple, they are important and should not be neglected. And even though the lathe is rigidly constructed and will stand some rough handling, it should be protected from unnecessary abuse.

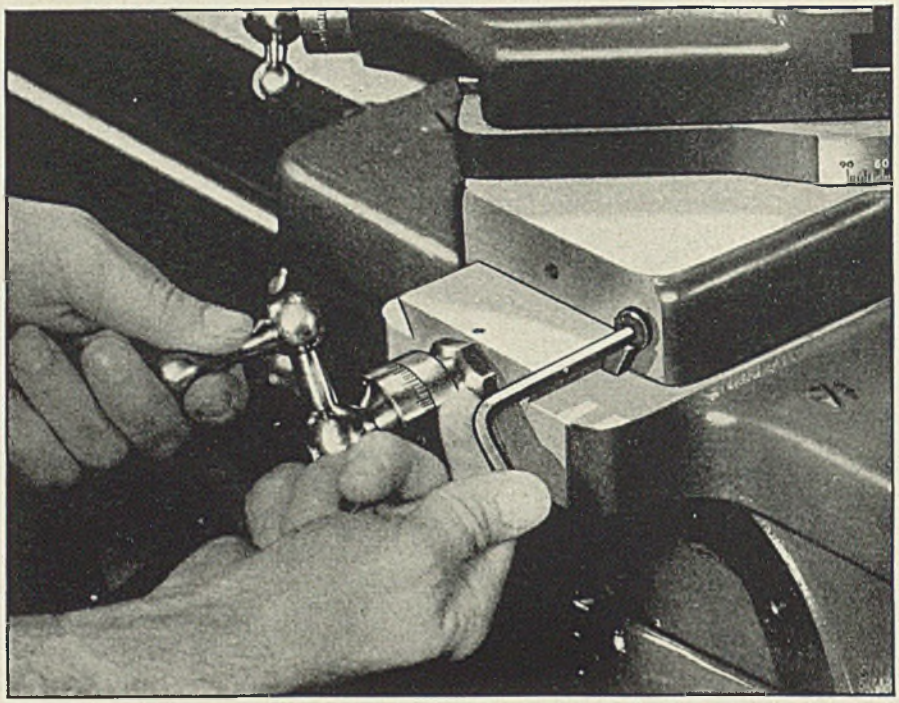
Power Transmission

Maximum efficiency as well as maximum production depends on the effective transmission of power to the lathe spindle. The motor, being the source of power for the lathe, should develop its full rated power and should operate at a uniform speed. If for any reason the line voltage drops below the rating for which the motor is constructed, the motor will not deliver full power. For this reason the current should be checked at the motor occasionally and the correct line voltage maintained.

To transmit the power from the motor to the lathe spindle efficiently, all belts must be properly adjusted. If the belts are too loose they will slip, and if they are too tight they will cause loss of power through friction. The belts should be just tight enough to transmit the required power without slipping. Precision belt tension adjustments provided on South Bend Lathes make it easy to keep the motor V-belts and flat cone pulley belts properly adjusted.

Dovetail Slide

All dovetail slides on South Bend Lathes are equipped with gibs which may be adjusted to eliminate play. When the adjustment of the dovetail gibs is neglected, looseness of the slides may cause the tool to chatter or may result in inaccurate work.



Adjust the dovetail gibs to insure accurate work

The gibs should be tight enough to assure the necessary rigidity, but not tight enough to bind and make the dovetail slides hard to operate.

Tailstock Adjustment

The alignment of the tailstock top should be checked frequently as any misalignment will cause the lathe to turn a taper. To test alignment, place a bar of steel, 1 inch or larger in diameter, between centers and machine two collars of equal diameter not less than 4 inches apart. Then, take a very light finishing cut across both collars without changing the setting of the cutter bit. Measure both collars with a micrometer. Any difference in the diameters indicates misalignment. Correct the alignment by turning the tailstock top set-over screws until both collars can be turned to the same diameter.

Don't Abuse the Lathe

Just because the lathe is made of iron and steel is no reason to expect it to stand abuse. Never use the lathe bed as an anvil. Don't use a crowbar to straighten a shaft between the lathe centers. Never rap chips out of a file by striking it on the lathe bed or tailstock.

Write for Bulletin H4

Bulletin H4 giving more detailed information on keeping the lathe in trim will be supplied on request. Also reprints of this and other* advertisements and bulletins in this series. State quantity wanted.

*H1, "Keep Your Lathe Clean"
H2, "Oiling the Lathe"
H3, "Installation and Leveling of the Lathe"

SOUTH BEND LATHE WORKS

South Bend, Ind., U. S. A. — Lathe Builders for 36 Years

ELECTROSTATIC ORE CONCENTRATOR

. . . . appears to have important possibilities

TO CONCENTRATE metallic ore containing tin and other war metals from low-grade deposits, an experimental electrostatic ore separator has been developed at the Westinghouse Research Laboratory, East Pittsburgh, Pa., which extracts the ore suitable for smelting. This device was recently demonstrated before a group of metallurgical experts, including university professors and representatives of the United States Bureau of Mines. If this separator is as efficient in actual mining operations as in laboratory tests, it may prove to be a valuable aid in easing America's tin shortage.

Most promising results with this new Westinghouse research development, according to G. W. Penney, manager of the Electro-Physics Division, have been attained with low-grade ore samples from a recently developed tin deposit in a southern state. This sample deposit containing 1 per cent tin when separated by this device yielded a concentration of metallic ore containing about 70 per cent tin.

The foot-wide metal drum of the laboratory separator turned with a surface speed of 12 miles an hour, sorted in one minute the ten million particles making ten pounds of ore. Two neat piles of particles were deposited. One contained rock and sand and a small percentage of tin; the other, nearly all tin with a small amount of rock and sand.

The electrostatic separator can sort dry mixtures of any two materials provided one is fair insulator and the other has appreciable conductivity. The separation principle is similar to the attraction of iron filings to an ordinary magnet, except that the attraction is electrostatic. Ore ground to the fineness of sand trickles through a trough and falls onto a rotating metal drum. Here it receives high voltage electrical charges from a series of fine wires a short distance from the drum's surface. Since the metallic particles are good conductors of electricity, the electrical charges seep through them and into the metal drum.

The metal particles lose their charge and fall off at the bottom before the drum completes a half turn. The poorer conducting sand and rock particles retain their charge and cling to the drum until pulled off by a series of positively charged wires which they pass on the opposite side of the machine during the second half revolution.

Some experimenting also has been carried on with this device in connection with the beneficiation of iron ores. This work was done in the Minnesota range, using low grade residue which had been obtained as a by-product in beneficiation processes.

Because of the almost limitless supply of these low grade ores, it is felt the applications of the electrostatic separation process may eventually become important commercially in the event this reservoir is called upon to replace dwindling supplies of high-grade ore.

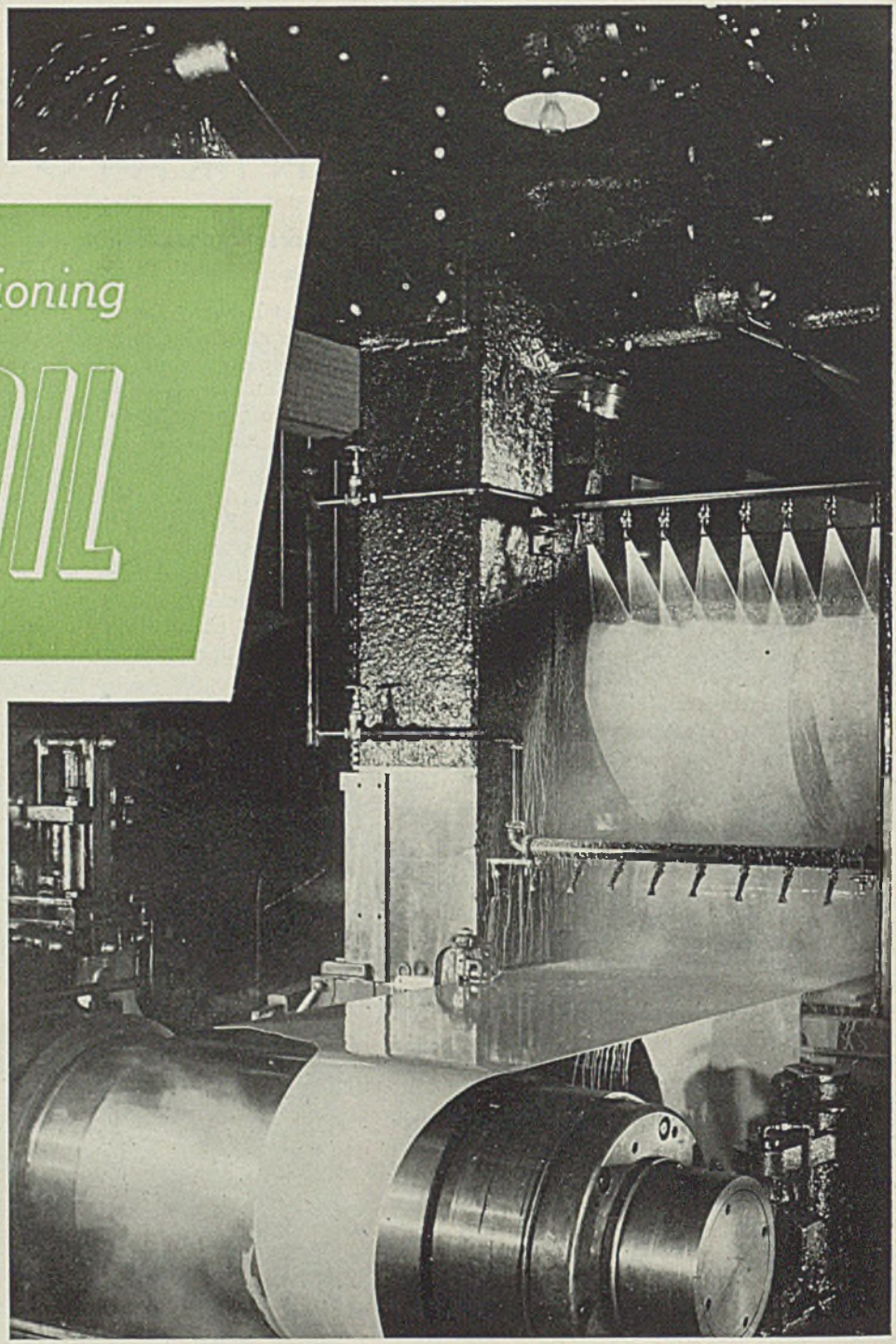
Tests were made on a laboratory basis to determine the feasibility of separation by this method. Results were satisfactory insofar as the recovery of iron was concerned. Because of the fact that no large scale separation has been attempted, cost studies have not yet been made to determine whether or not the process might be satisfactory from that standpoint.

Two commercial grades of ore mined by two leading producers were used as material for the tests. One sample contained 23.8 per cent iron, the other 42.1 per cent iron. The former sample after separation showed 55.5 per cent iron, the latter 57.5 per cent iron.

Procedure on the iron samples included a drying operation, followed by crushing and screening. The material was then passed through the separator, the tailings removed and the concentrate collected. Because this was a laboratory procedure, the quantities involved were small. However, a projection of one of these samples into quantities shows that for every 100 tons of ore with iron content of 42.1 per cent, 66.5 tons of concentrate with iron content of 57.5 per cent would be obtained, and 33.5 tons of tailings with 11.5 per cent iron content would be eliminated.

In this new device, which may develop into a valuable machine for ore beneficiation, finely ground ores poured into the trough at top trickle through onto rotating drum where they are held by electrical charges. Parallel copper wires spaced a short distance from drum surface draw off metal particles on this side of machine. Similar wires on other side remove sand from drum. Machine easily steps up ore content 15 to 20 per cent

Salvaging and Reconditioning PALM OIL



By MAURICE RESWICK
Engineering Division
Standard Oil of Pa.
Pittsburgh

PALM OIL is usually received in steel tierces, and dumped into a sump tank after the drum is warmed sufficiently to change it from a semisolid or viscous state to a liquid. In common with other solid and semisolid fats palm oil changes from a solid to a liquid quickly at a temperature of about 96 degrees Fahr. Palm oil is kept heated in the tank at an average temperature of 160 degrees Fahr. and the liquid pumped to the mill stands, where it is applied by spray to the top and bottom backup rolls. As it impinges on the relatively cool roll surface, the liquid palm oil loses its fluidity, becoming more viscous and the copious flow of cold water assists in this change without washing it off, so long as the pressure of the stream is not high enough to shear it off.

Even when applied to the roll surface through only two outlet nozzles, the entire surface of the work rolls gradually becomes evenly with palm oil, partially emulsified with water, so that lubrication over the entire width of the strip is assured. Just what happens at the contact area of the work rolls with the strip is problematical. The temperature of the strip is sufficiently high to change the water into a cloud of steam, and to liquefy the palm oil to a thin film, and a portion of the palm oil is carried over to the next pass either as a surface film or by absorption in the grain of the steel.

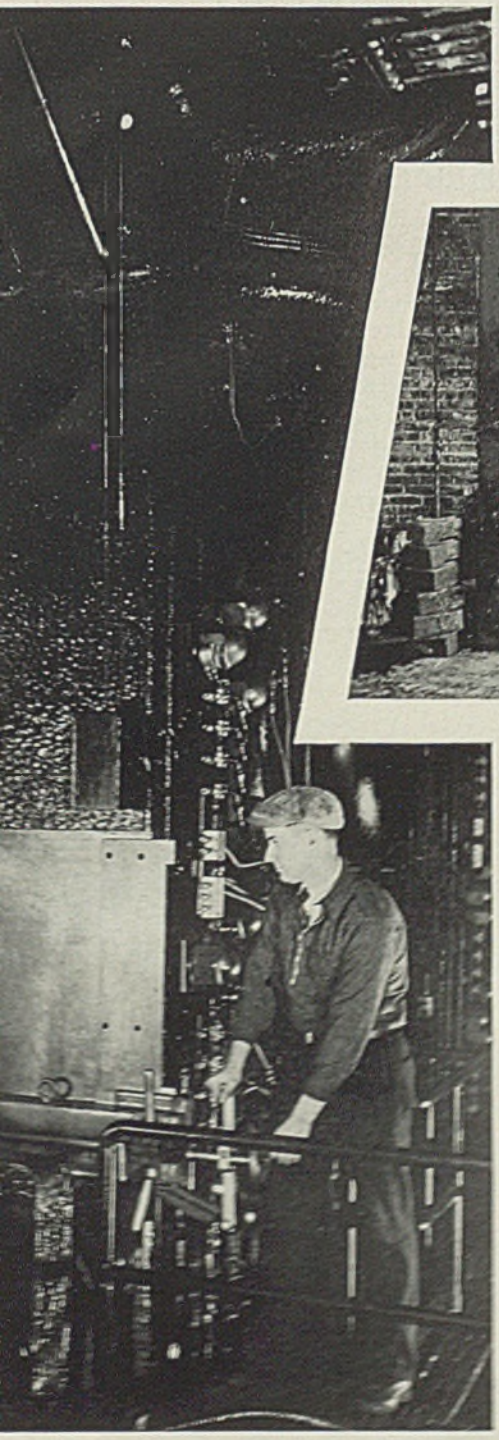
For rolling sheet stock or for breakdown either on single stand or tandem mills, the roll oil problem is not acute. The external friction of the strip against the rolls is relatively small so long as the finished gage is over 16. Straight mineral oil of a light viscosity meets all requirements of a roll oil.

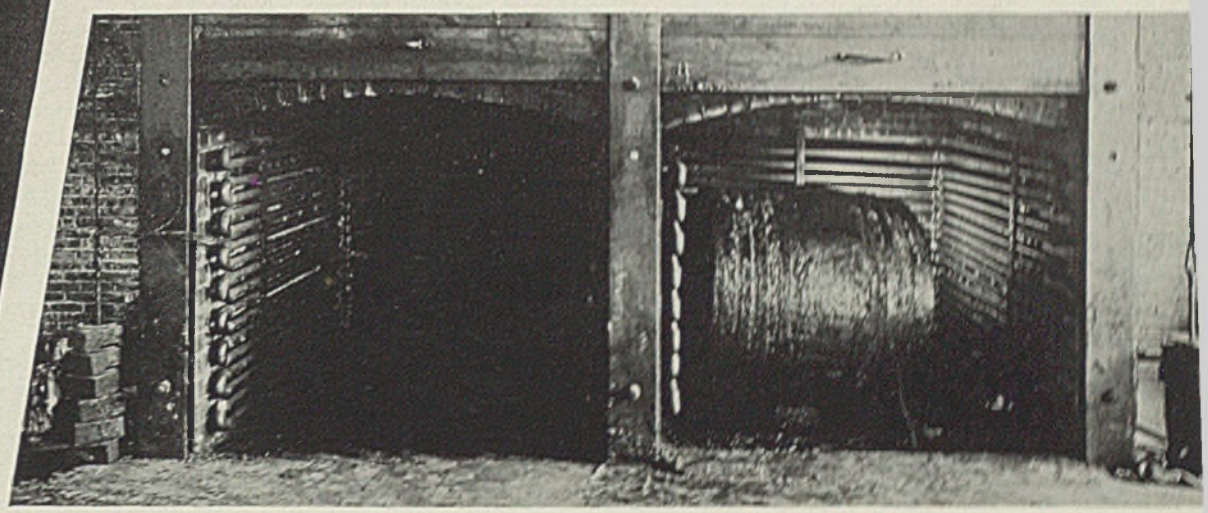
In rolling to tin plate gage, however, more lubrication is necessary, and resort is made to emulsion of water with soluble oil, water with a soluble oil or other emulsifying agent plus palm oil, or palm oil straight.

The quantity of palm oil used per ton of strip is a controversial subject, and depends on local conditions, such as mill design, whether 4 or 5 stands, gage, surface finish, method of application, etc. Some mills report 6 pounds per net ton and even lower, but about 8 to 9 pounds per ton of strip is common practice, distributed as follows: 1 pound per ton applied after pickling as a rust inhibitor and also as the lubricant on the first stand, and the remainder distributed over the mill stands. The largest quantity is used on stands Nos. 3 and 4 in 5-stand mills, and on stand No. 3 in 4-stand mills. It is only on special occasions that palm oil is applied to the finishing stand.

Palm oil being of vegetable origin and

From a paper presented at the annual meeting of the Iron and Steel Engineers, Pittsburgh, Sept. 22-24.





Four-high mill, left, for cold rolling steel strip. Compartments lined with steam coils, above, are ideal for converting palm oil into a liquid state

of variable quality, undergoes minor chemical changes in composition while it passes through the rolling operation. It partially disintegrates, oxidizes, forms metallic soaps, and picks up considerable mill dirt and metallic particles, as evidenced by change in color from yellow to dark brown. In reconditioning palm oil for re-use, all emulsified water and impurities must be removed.

Methods of salvaging and reconditioning of palm oil gathered at the mill pit vary from simple to the most elaborate systems. The principle involved is one of removal of contaminants by heat, settling, filtration, and centrifuging. The system may be home-made or purchased from manufacturers who specialize in such equipment.

A simplified diagrammatic layout of a system for the clarification of palm oil as sponsored by the Sharples Corp., is shown in accompanying diagram. The palm oil sludge from the trench or sump under the cold mill is pumped to a settling tank through a 6-inch mesh screen. The charge of sludge in this tank, which may contain 40 to 60 per cent moisture, is heated to 250 to 260 degrees Fahr., the tank being totally enclosed to carry the corresponding pressure of the water vapor.

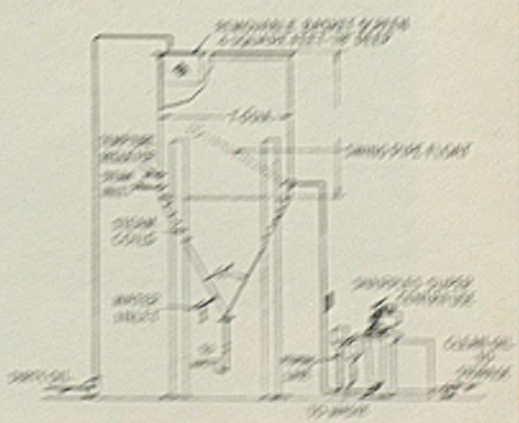
After the sludge has been held at this temperature for 10 to 12 hours, the major portion of the water and dirt will have settled out and are discarded as waste from the bottom of the cone.

Palm oil at 250 degrees Fahr. is drawn off through the floating suction arm directly to a centrifuge in which it is purified at a throughput rate of 160 to 240 gallons per hour, depending upon the condition of the oil and the degree of purification required. The tanks are installed in duplicate to permit the equivalent of continuous operation.

The amount of palm oil recovered varies between 50 and 75 per cent of that used on the cold mill. It has been the practice of some mills to sell the purified palm oil to soap manufacturers, but the most recent trend is to re-use it on the mill with admixture of fresh palm oil. Operating costs are said to average between 0.8 and 1.0 cents per pound of reclaimed palm oil, including all fixed charges.

Heretofore mill operators were not over-enthusiastic about palm oil replacement, so long as they felt that an abundant supply of it is available at low prices. Under existing war conditions, with the disappearance of domestic supplies in sight, everybody from the management to the mill operators is concerned about the situation, and is on the lookout for a replacement which may eventually prove better even than palm oil.

While using the closed circulating system for cooling and lubrication, involving not more than 5 per cent palm oil to the "solution," should not have a difficult problem in finding a replacement among domestically available emulsifiable fats or proprietary chemical compounds, the mills using the dead system of water for cooling and roll oil for lubrication are facing a real problem. Not the least



Sharples system for clarification of palm oil

phase of this problem is any change in procedure and application of the roll oil from the established practice. The line of least resistance is obviously a product which in its physical properties resembles that of palm oil.

A product of this description has recently undergone a severe test in the Pittsburgh district on a cold roll tandem mill with promising results as an effective lubricant to replace palm oil. From the standpoint of economy, it is of interest to note that the usual tax of 4 cents per gallon, or approximately ½-cent per pound, which applies to fluid lubricants, does not apply to this palm oil replacement, since at 77 degrees Fahr. it is of stiff grease-like consistency, but reverts to a fluid when heated to the temperature at which palm oil is normally used. This means a saving of approximately 4 cents per ton of strip, on the assumption that 8 pounds of lubricant is used per net ton.

From the standpoint of availability it is to be noted that all ingredients used in the manufacture of this replacement for palm oil are of domestic origin with no limitation on quantities.

Recovery of palm oil replacements of the type mentioned, which approaches palm oil in its physical properties, is simpler than for 100 per cent palm oil. Being a compounded product of petroleum base, it does not vary in quality, and the ingredients may be chosen so that they will not undergo chemical changes in the mill to the same extent as the natural product. Essentially, heating is all that is required to settle out the water and coarse foreign particles, and centrifuged, if desired as a refinement, to remove the finer particles of mill dirt. The clarified product is then ready for re-use on the mill.

Additional information on palm oil is available in the May 18, 1942 issue of STEEL, p. 69. —The Editors.

Wax Impregnated Paint Resists Cutting Oils

An improved wax-fortified paint is announced by S. C. Johnson & Son Inc., Racine, Wis. It is said to remain new-looking longer, the wax impregnation providing dirt resistance, sustained light values and less cleaning effort.

According to the company the embodied wax also presents added resistance to scratches, guards against greases, grime, cutting oils and cleaning agents. It is applied by conventional paint methods, and is being offered in a variety of colors for use on metals, brick, wood or concrete.

PANGBORN INSTALLATION OVERHAULS LOCOMOTIVES IN TWO DAYS

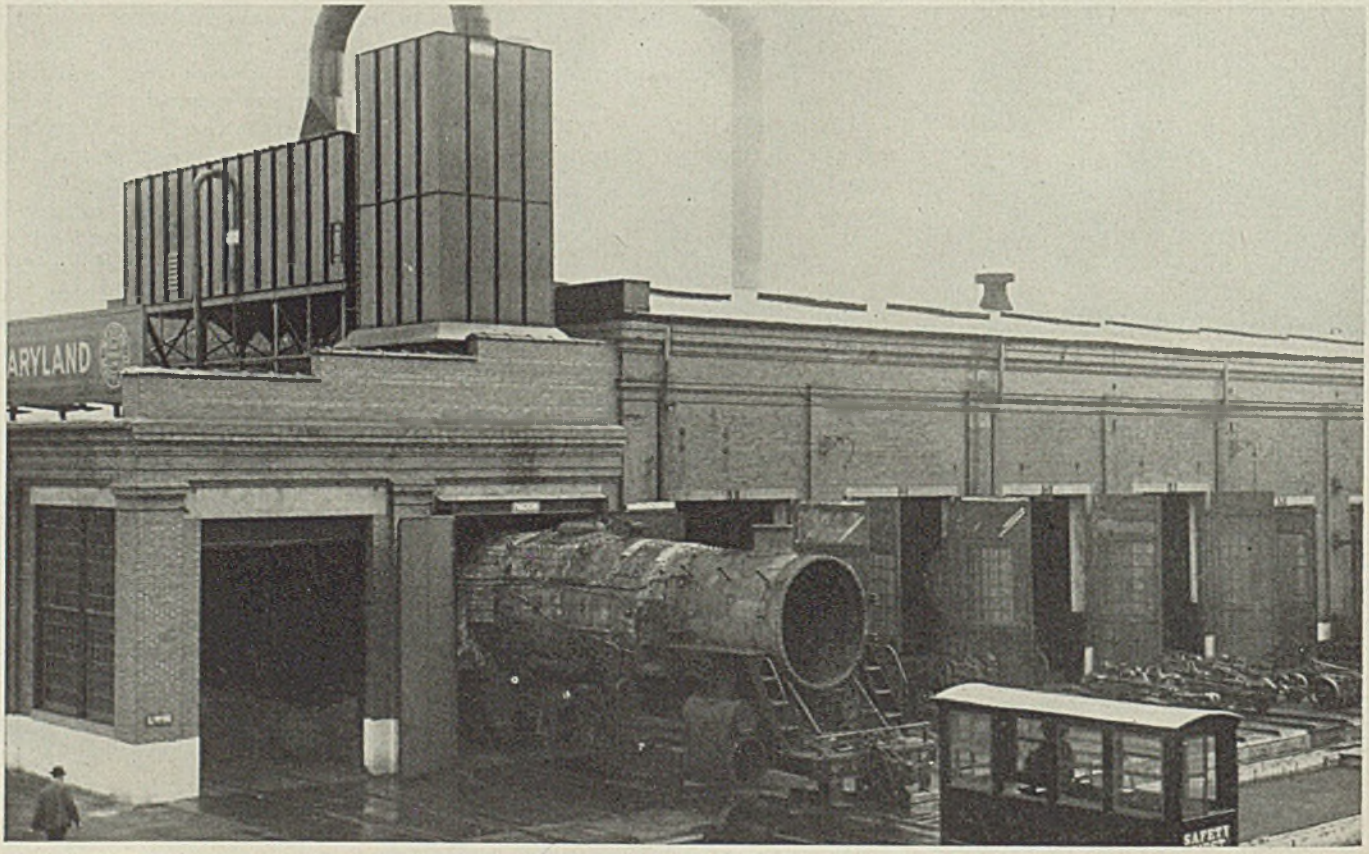
TO SPEED up regular, periodic boiler-tube cleaning and overhauling of locomotives, Pangborn Corp., Hagerstown, Md., recently installed in the main repair depot of the Western Maryland railroad, a large modern steel-blast cleaning room, high, wide and long enough to accommodate the largest locomotive made.

The room is equipped with "day-bright" lighting fixtures and ventilated by powerful blowers. An overmounted dust collector keeps visibility and working efficiency of the room at maximum peak during the whole time it is in active operation.

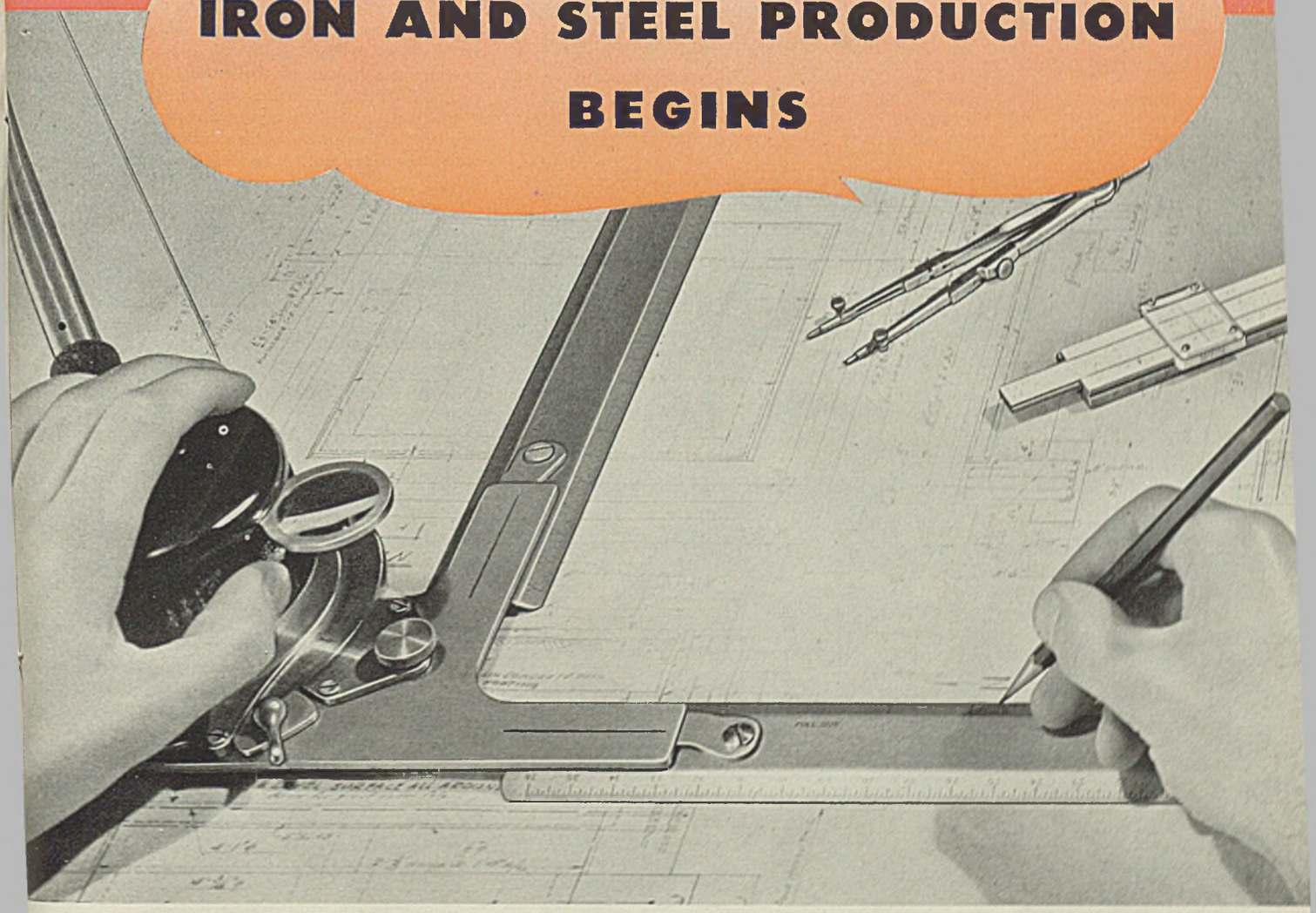
Locomotives are stripped of all external plate and fittings, the bodies and boilers being pushed into the room as shown in the accompanying illustration below.

The doors are closed and a special elevator hood from the dust collector is lowered into position on the front of the engine boiler section for removing the dust.

Then two operators, clothed in protective rubber aprons and air-fed helmets, direct powerful streams of steel abrasive propelled by compressed air from nozzles, over the metal parts to be cleaned. In less than two days the entire job is completed and ready for reassembly. Formerly, this work occupied a crew of men using wire brushes and live steam for several weeks.



Here IS WHERE IRON AND STEEL PRODUCTION BEGINS



THE production capacity and operating efficiency of iron and steel plants begin with the *engineering* employed in their design and construction. The pressure of war-time production clearly reveals the quality of that engineering.

During 1942, four new world's records for one month's pig-iron production were made—each in a different plant employing McKee design. These records, as well as the huge tonnages being produced in many other McKee-built plants, are a tribute to the engineering skill of this organization.

The same quality of advanced engineering which helped to establish 1942's production records is available to you in the McKee organization. Backed by the experience gained in world-wide operations since 1906, McKee services embrace every step of iron and steel production from ore beneficiation to pig and ingot.

Arthur G. McKee & Company

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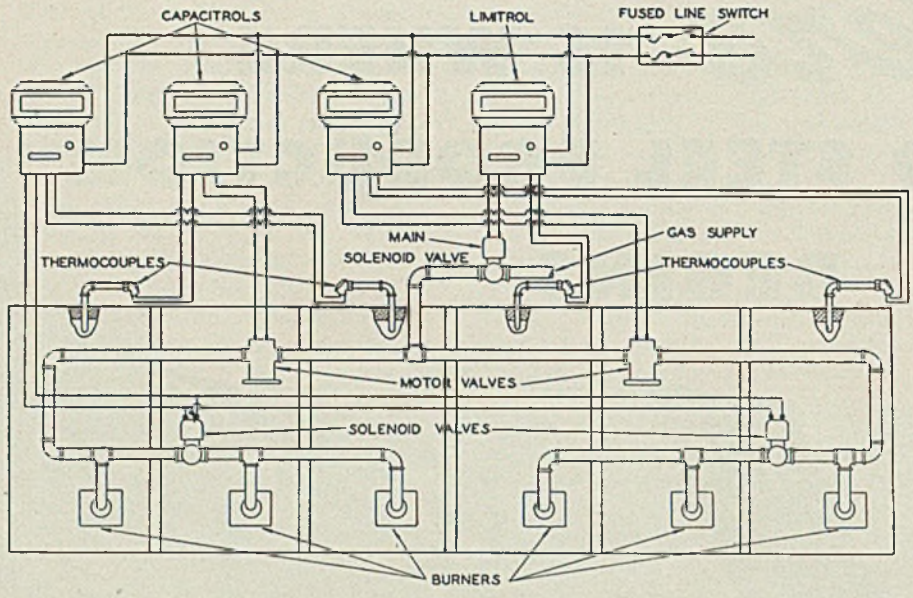

Drawing showing application of temperature controls to eliminate heat losses and maintain even temperatures in multiple-burner furnaces or ovens

AVOIDING HEAT LOSSES

In Multiple-Burner Furnaces

A TEMPERATURE control application which maintains even heat throughout a multiple-burner furnace or oven regardless of heat loss at the door or doors, and which gives protection against excessive temperature in event of thermocouple break or upon failure of control apparatus, is revealed by Wheelco Instruments Co., Chicago.

Examination of the accompanying drawing shows the application adapted to a furnace with doors at both ends. To replace heat lost at the doors and maintain the entire furnace at even temperature, burners are controlled so those at the extreme ends burn while those toward the center are out.

One control instrument, shown at the left, actuates two solenoid valves installed at the center of the furnace. Two thermocouples at respective ends of the furnace actuate two other temperature control instruments which, in turn, operate two motor valves. The latter are installed so one controls all burners on one end of the furnace, and the other valve all burners at the other end. This permits operation of the furnace with a higher temperature at one end than at the other.

When starting up the furnace, both motor and solenoid valves are held open as the instruments call for heat. The two instruments controlling the motor valves, actuated by thermocouples at the ends of the furnace, are set at the temperature desired within the furnace, while the remaining temperature control instrument, connected to magnetic valves just ahead of the burners within the furnace, is set slightly lower. When the center of the furnace comes to within a few degrees of the desired temperature, the third instrument closes off fuel to the center burners, leaving the end burners hold the furnace to heat by means of the other two instruments.

When operating the equipment on a continuous car-type principle with a temperature at the start of the process or treatment differing from the temperature at the end, control instruments at the ends of the furnace are set accordingly, while the instrument controlling center burners is set at an in-between point.

In either continuous car or batch-type operation, the temperature control arrangement provides the exact temperature desired at all points within the furnace, offsetting heat lost at the door or doors.

Protection against instrument thermocouple or control apparatus failure is provided by a Limitrol which, when actuated by a thermocouple mounted at the center of the furnace, shuts off fuel supply to all burners through a solenoid valve installed in the main gas supply line. This instrument also is set a few degrees higher than the maximum temperature indicated by the highest of the temperature control instruments, and shuts down the equipment if this excessive temperature is reached.

Rust-Proof Paints Simulate Aluminum

Two rust-proof paints closely simulating aluminum paint in color is announced by Rust-Oleum Paint Corp., Evanston, Ill. Known as No. 18328 silver gray and No. 906 fume-proof gray, each of these finishes has a special field of application.

The first is for outdoor and some indoor use on metal, concrete, brick and wood. It provides a high gloss finish and dries in about six to eight hours. The other is for use in heavy industrial districts and where smoke, brine, dampness or fume conditions are severe. It withstands temperatures of 450 degrees Fahr. and all weather conditions.

No Skilled Workers Needed With This Brazing Method

High frequency induction heat, used in a brazing operation on certain war parts produced at a General Electric plant in the east is reducing the time for the operation from 4 minutes to 40 seconds, simultaneously eliminating the need for highly-skilled workers to perform the work.

"The operation previously was done with torches," J. P. Jordan of G E's Radio, Television and Electronics department, explains. "Besides cutting the time for the operation drastically, this method of brazing allows the use of women operators, produces a uniform joint and, because of the uniformity, eliminates subsequent inspection."

In using this method of brazing, the part to be heated is placed in a water-cooled, copper tubing coil and current is passed through the latter at frequencies in the order of 500,000 cycles per second. This current generates the pulsating magnetic field which heats the part.

Two Welding Manuals

Electric Welding, by M. S. Matteson; paper, 31 pages, 8½ x 10¾ inches. Published by Bruce Publishing Co., Milwaukee, for 90 cents.

Oxyacetylene Welding, by M. S. Matteson; paper, 64 pages, 8½ x 10¾ inches. Published by Bruce Publishing Co., Milwaukee, for 90 cents.

These two books are by the instructor in welding at the Boys' Technical high school at Milwaukee, and contain 24 lessons each, designed to present fundamental facts about the two methods of welding so the operator may use them successfully. The explanatory matter has been kept as simple as possible, to give the student more time to learn by actual doing.

Ships are Forgings

And ships are a primary need of the day—fighting ships, troop transports, supply ships, tankers and other craft for use on inland waterways, in coastal service and in the inter-continental hauling of vast quantities of men and materials.

We're beating plow shares into swords 168 hours a week making rugged, stress resisting ship forgings for stem and stern, fighting tower and keel, and a thousand places in between.

While our facilities are crowded, we still want to serve more ship, tank, plane, gun, ordnance and machine tool builders. We'll stretch our production capacity. burn more midnight oil, do the impossible to assure rapid, intelligent handling of their forging needs.

It is our fervent desire to speed the day when free men can again travel the high seas, engage in free enterprise and follow the normal pursuits of industry.

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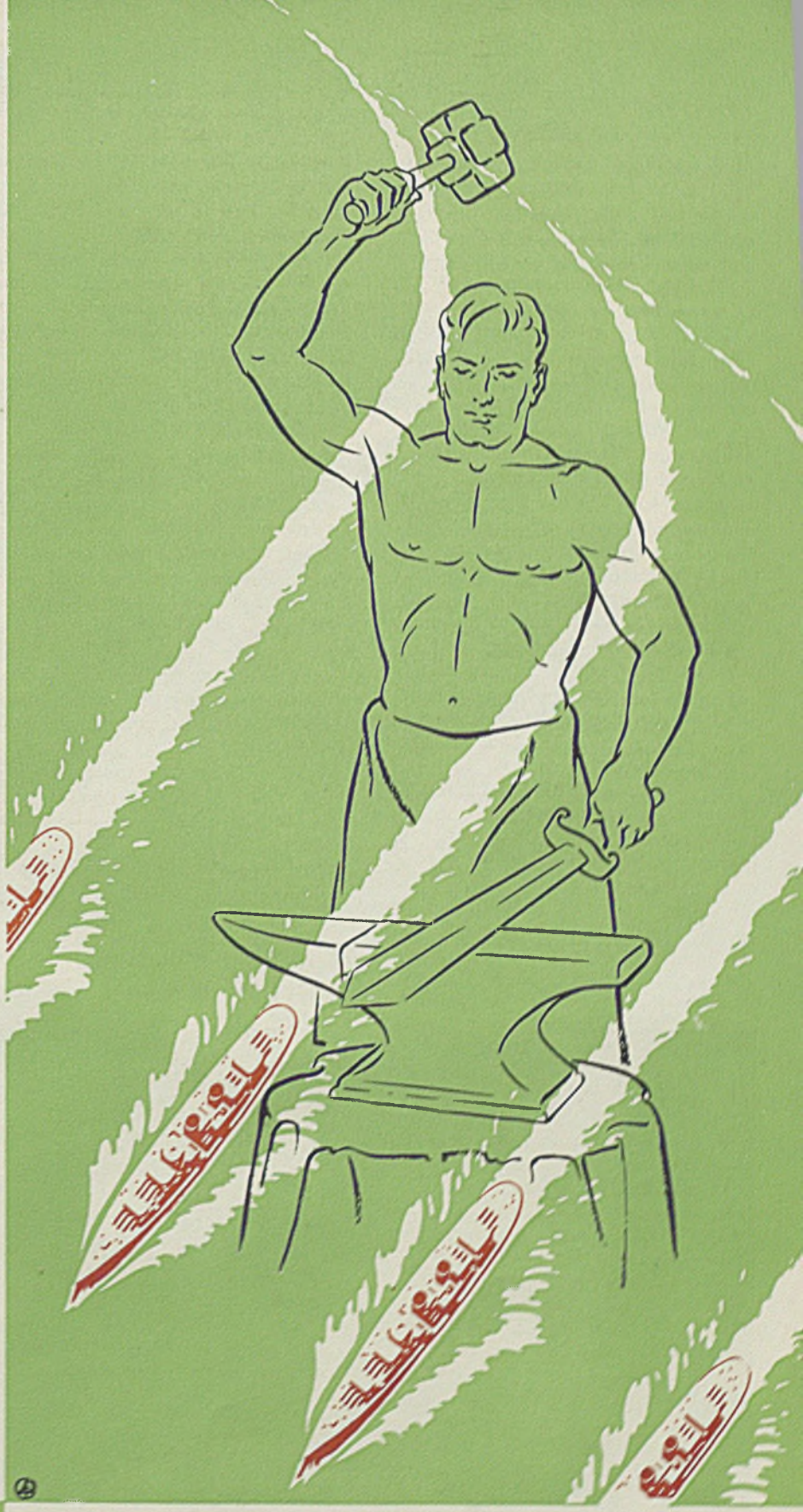


SERVING INDUSTRY SINCE 18 37 OVER 100 YEARS

KROPP FORGE CO.

KROPP

Production Drive

(*Concluded from Page* 55)

in the process. Howard Critchlow Jr. and Joe Marecki worked out a simple device that both prints the tape and applies it in minutes rather than hours and without smudging or obliteration.

Meanwhile Martin executives try not to be outdone in contributions by the workers. Reid B. Gray, chief of engineering laboratories, invented the self-sealing tank for planes and an ingenious derivation of it that permits the carrying of oil and gasoline in boxcars, barges, trucks, and other vehicles hitherto devoted to carrying dry freight. His invention, known as the Mareng cell, is now under study by officials like Jesse Jones, Secretary of Commerce, and Joseph B. Eastman, director of the Office of Defense Transportation, as a possible answer to the oil and gasoline shortage on the Eastern seaboard.

Harry F. Kniesche, assistant factory manager, invented a system of "heat therapy" that does away with what had been the major difficulty in riveting aluminum "skins" over spars and ribs to make plane wings. The pounding of riveting hammers had always produced unavoidable buckles and wrinkles which interfered with the smooth flow of air over and under the wing, thus impairing the efficiency of the wing and the whole plane. Kniesche thought up a heating pad which heats the skin to a temperature that takes out the wrinkles and buckles and at the same time enables the men to get the skins on the wings much more quickly.

Other executives have turned in equally valuable devices for speeding the outflow of bombers, but the fact remains that it is the workers, operating through the War Production Drive committee, who are thinking up and turning in the bulk of the new ideas. The following are just a few of them:

Joe Holthaus — a power-operated cleaning brush that cleans the hulls of big flying boats, preparatory to painting, in sixty per cent of the previous time.

Frank Valentine—a locating tool for spot-welding stiffeners on pilot seats. Sounds simple, but his idea means three seats are produced as against two before.

John W. Queen—a tool for checking reservoirs to pistons for correct alignment. This doubled production on the job.

Gordon Hamer — a rotary file and guide which eliminates hand filing of skin. Saving in time: thousands of man-hours.

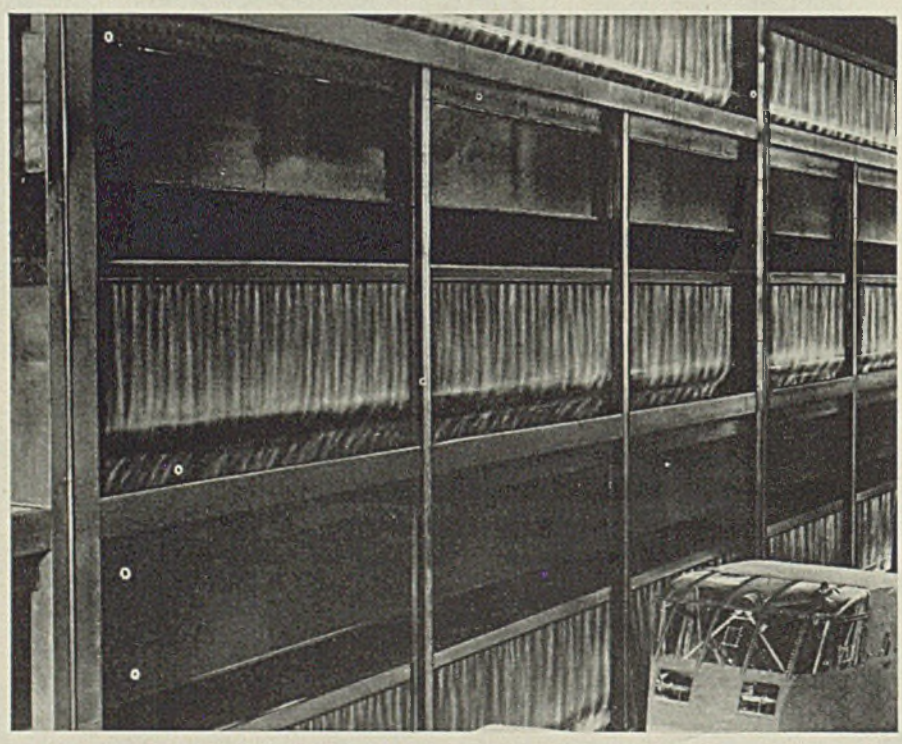
Fred Rau—a safety lock for crane controllers. There hadn't been any crane accidents, but by the law of averages there would eventually have been. Now, thanks to Rau, there won't be.

Even with such heads-up invention by workers of speed-up devices, even with their poster campaign and share-rides campaign, even with the company's co-operation by the awarding of cash prizes and royalties and membership in the coveted Order of the Purple Martin, the story is not all told. Forty men from the company are ranging the country from border to border and from coast to coast, speeding up production by getting peacetime factories on a wartime basis.

They have gotten firms that made bottle caps for soft drinks to turn out wing spars for bombers. Firms that used to make awnings now turn out parachute slings. Milk can people now make exhaust stacks for bombers—and there are dozens of instances just as picturesque. Nor did they happen by accident, for Martin men helped the manufacturers rearrange their plants, redesign their equipment, retrain their personnel. Result: many more bombers than Martineers could roll out single-handed.

Even that doesn't round up the whole story of how 900 Martin members of the war production drive committee are going to bat for their country and with every possible help from the company. But if Hitler and Hirohito and Mussolini could read this they'd get a pretty good inkling.

TRIPLE-DECK SPRAY BOOTH FOR AIRCRAFT



THREE SETS of water curtains, one above the other, wash the air and carry out fumes and overspray from this huge 150-foot spray booth recently installed for a large mid-west aircraft manufacturer by Binks Mfg. Co., Chicago. Believed to be one of the World's largest booths, the unit is over 30 feet high

Develops New Method To Speed Grinding

Newly developed method incorporating in equipment the use of surface-coated abrasive belts for producing faster and better finishes is reported by Minnesota Mining & Mfg. Co., St. Paul. It is said to be a time saver in grinding, finishing or polishing a wide variety of pieces.

The method consists of the use of a backstand idler unit, utilizing a newly perfected segment face contact wheel and surface coated abrasive belts. Any company's present lathe or setup equipment can be used, or a complete backstand unit acquired for this purpose.

The segment face wheel with coated abrasive belts also is incorporated into a swing grinder for sanding billets, bars and tubes. Pedestal mounted or suspended from overhead rail, it is effective for repair grinding, beveling and surface grinding.

An illustrated booklet detailing the method is being offered by the company to those concerns wishing to push production.

PENNSALT CLEANER

Reg. U. S. Pat. Off.

On U. S. Army tanks, the rims of the "bogie wheels" are brass-plated before their rubber "shoes" are put on. If the brass-plating is unsatisfactory, a poor rubber-coating job results.

A manufacturer had the problem of stripping unsatisfactory brass-plating from the tank rims. He was using a boiling chromic acid bath, but the job took an hour and entailed considerable evaporation of the acid. Since chromic acid is on priority, he wanted to speed up the operation in order to conserve this critical material.

A Penn Salt representative saw that a Pennsalt Cleaner could help. Result? The Pennsalt Cleaner stripped the brass in one-fourth the time formerly required, and cut down the time in chromic acid to *one-fifteenth*, thus effecting a substantial reduction in the chromic acid lost by evaporation. It did everything the customer needed, from a brass-removing standpoint, and subsequent re-plating of the rims was entirely satisfactory.

This was a tough problem to solve, but Penn Salt engineering, backed by the complete line of Pennsalt Cleaners, was equal to the task. In the family of Pennsalt Cleaners, there is at least one which will facilitate some metal cleaning operation in your plant. Let the Penn Salt technical staff help you with your problem. Phone or write to Pennsalt Cleaner Division, Dept. S.

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NEW FASTENING

combines "blind" rivet with nut-and-bolt action

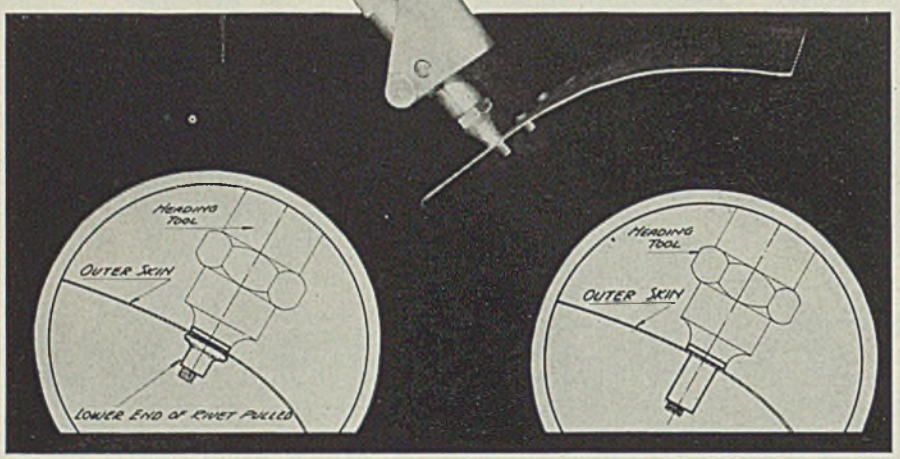


Fig. 1— Hand tool for setting up Rivnuts. Inserts show, right, Rivnut inserted from the outside on a tool and ready for heading; left, lower end of Rivnut pulled up by tool to form head on inside of work

WHEN Goodrich de-icers were first being tested experimentally on air mail planes by one of the major commercial airlines, they were attached to the airfoils by means of rubber cement. The de-icers quickly proved their value in allowing the airline to operate through weather which grounded planes not so protected. But attachment by cement, while successful to a degree, was not deemed sufficiently satisfactory.

General acceptance of de-icers, therefore, depended upon the development of some mechanical means of attachment. Research engineers of the B. F. Goodrich Co., Akron, O., had been working diligently on this problem. The result of a long and wide range of investigation was the Rivnut. The first de-icer installation using Rivnuts proved a success at once.

From this point on, Rivnut applications increased rapidly. Most engineers became acquainted with this device primarily through its use as a de-icer attachment. Yet it was so obviously the solution to some of their more difficult problems that the result was a rapidly expanding field for the development.

It came to be used as a dual purpose device—as a means of attachment and as a "blind" rivet, or as a combination of both. Its simplicity and versatile utility are important. An observer watching his first demonstration of upsetting a Rivnut usually requires a second and slower demonstration in order to understand what happens. The fact that the Rivnut may be securely installed in a "blind" or inaccessible spot by working only from the accessible side appears equally hard to understand at first.

Actually the Rivnut is a threaded tubular rivet. Fig. 2 is a cross-sectional view showing its construction before upsetting. Fig. 3 is a view after upsetting. This, too, shows what is meant by the "grip".

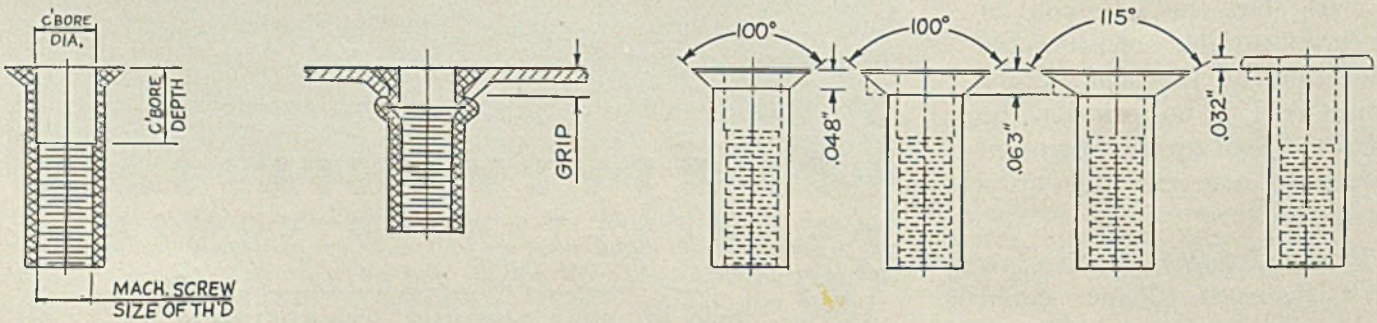
Through extensive research, a positive relationship between counterbore depth and grip range has been established. For any particular counterbore depth, there is a corresponding grip which is considered theoretically perfect for that depth. However, the nature of the Rivnut is such that it will form an entirely satisfactory bulge in a grip somewhat greater and somewhat less than the perfect grip. This is known as the "grip range".

For practical purposes, therefore, standard counterbore depths of specific increments have been established which cover an equal number of consecutive and non-overlapping grip ranges. The number of standard grip ranges for each type of Rivnut has been placed at six, with a total overall variation from minimum grip to maximum grip of 0.160-inch. This variation has been found sufficient for most service conditions. However, it is entirely possible to furnish Rivnuts in grip ranges greater than standard.

Fig. 2—(Left) Typical flush-type Rivnut before heading as it appears sectioned

Fig. 3—(Center)—Section through same Rivnut as in Fig. 1 but after heading. Sheet has been dimpled to accept the countersunk head to make a flush fastening

Fig. 4—(Right)—These are four standard types of Rivnuts. Note the key under the head of three of them on the right, used to prevent the Rivnut from turning in the work



SYSTEM

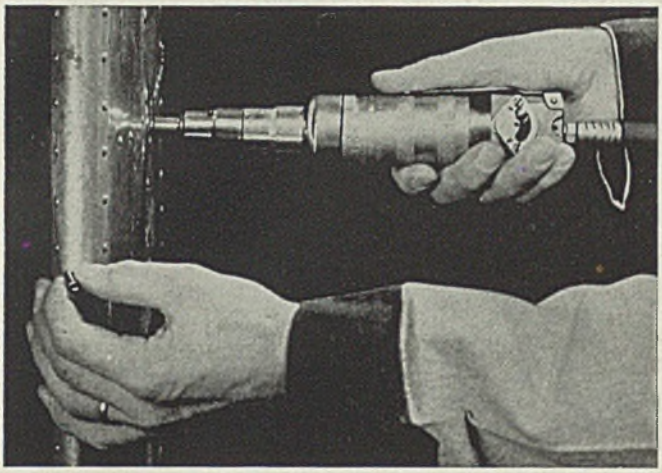


Fig. 5—(Above)—This is the Chicago Pneumatic Tool Co.'s CP No. 301-R Rivnut driver that can upset Rivnuts at rate of 15 or more per minute

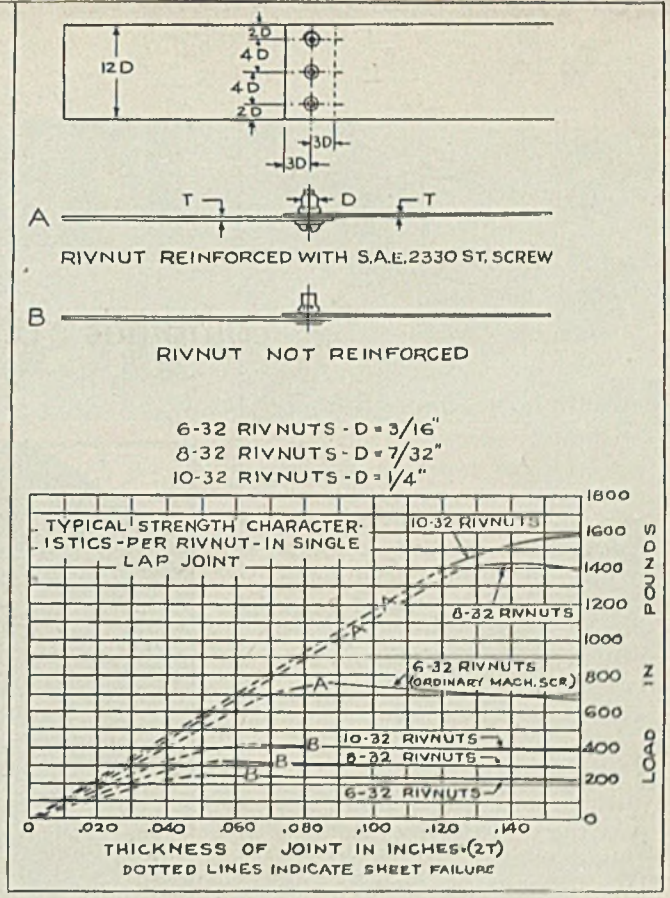


Fig. 6—(Right)—Shear tests in single lap joints, 53S-W Rivnuts in 24S-T plates. Chart shows typical strength characteristics in single lap joint

Material employed is 53S-W aluminum alloy, one of the most corrosion resistant of the practical aluminum alloys. This material was chosen only after extensive research and in collaboration with the Aluminum Co. of America. For the information of economy-minded weight-control engineers, the Rivnut is about one-quarter the weight and one-third the cost of any similar attaching device. Of simple one-piece construction, it is accurately machined and inspected. It is ready to use in the "as received" heat-treated condition, requiring no refrigeration.

Accompanying charts, Fig. 6, indicate the strength characteristics of Rivnuts as determined in the physical testing laboratory of the B. F. Goodrich Co. Nominal chemical composition and physical properties of 53S-W aluminum alloy can be found in the publications of the Aluminum Co. of America.

The first Rivnuts were made in the flat-head types. With the impetus of the defense program, demands for higher speeds and greater lift caused aerodynamicists to "clean up" airfoils and surfaces. This resulted in the development of flush riveting and the use of countersunk types of Rivnuts.

Standard Rivnuts at present are manufactured in three sizes, which are designated by the machine screw size of thread, i.e. 6-32, 8-32 and 10-32. Each one of these sizes is made in four different types, and each type is six different grip ranges. Each type can be furnished with open or closed ends, and with or without a key under the head, except the very thin-headed countersunk type. The key is used for added torsional resistance when flat-head types are employed. The key is also available on countersunk Rivnuts, although it is not used for all installations of this type. Closed-end Rivnuts are used in and around flotation compartments, etc., particularly on seaplanes. See illustrations of standard types, Fig. 4.

Many special types and sizes are made to suit particular applications. An example is the ¼-inch thick-headed Rivnut used by manufacturers of transport airplanes as a spacer between and as an attachment for soundproofing and insulation.

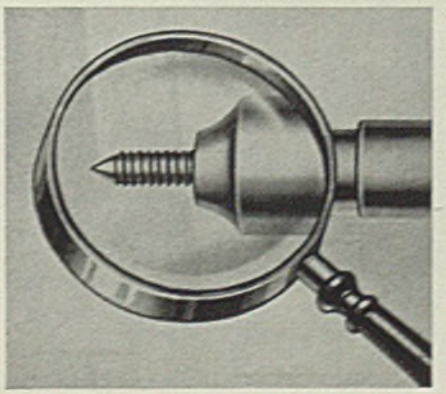


Fig. 7—Closeup of threaded mandrel and anvil at tip of the CPT driver shown in Fig. 5

When Rivnuts are used for flush riveting, the hole in the Rivnut is filled "blind" rivet with nut-and-bolt action . . with a special headless plug screw. These screws are also used in the de-icer attachment to fill the hole when de-icers are removed for summer operation.

Rivnuts can be installed by the use of hand tools at the rate of about four per minute. The hand tool shown in Fig. 1 is the original design, known as the "straight" heading tool. Tools of 45 and 90-degree angles also have been developed at the request of aircraft engineers. A keyseating tool, similar to the straight heading tool in appearance, is used for cutting the key slots for attachment Rivnuts.

Recent increases in aircraft production, however, have created a demand for still faster installation. Therefore a pneumatic power tool has been developed by the Chicago Pneumatic Tool Co. in co-operation with the B. F. Goodrich Co. This unit is capable of installing Rivnuts at the rate of 15 or more per minute after they have been placed in the prepared holes. Easily operated with one hand, this power tool has opened up many new applications for this joining system.

Holding Rivnut in one hand, operator inserts mandrel in head of Rivnut and applies tool power until the Rivnut head touches the anvil. See Fig. 7 for close-

(Please turn to page 90)

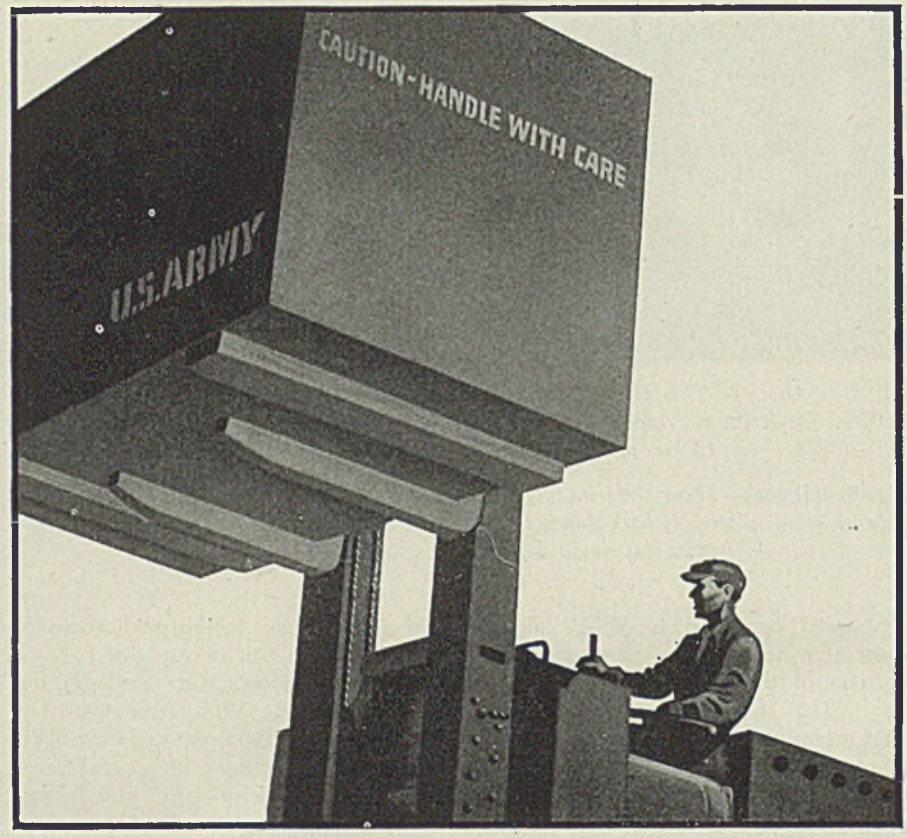
Hours Lost Through Accidents. Reduction of lost-time accidents, as everyone knows, is an excellent way to increase war production. If any appreciable number of such accidents results from manual handling of materials, the solution may lie in power trucking—with a big gain in efficiency as a bonus. The safe way is also the efficient way.

Transportation Job. The whole country is admiring the way the railroads are handling their war-time job. But within industry itself, *inside* transportation is performing comparable marvels. Many old plants are producing several times their former capacity per-square-foot and per-work-hour, solely because the *flow* of production and materials has so much improved. To keep production flowing at peak efficiency requires a truck power unit that is not subject to failure on the job—one whose performance is predictable. Another way of saying, "alkaline batteries."

Are You on Our List? Edison's house publication, "Storage Battery Power," is an up-to-the-minute source of authoritative material-handling information. If you're not on our list you can be readily by simply sending us your name and business address.

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

PEAK POWER needed for war



It is true that all power units in material-handling trucks are specifically *rated*. But it's power *delivered* that wins in war production. When the trucks are powered by alkaline batteries they stay on the job, turn out the work expected of them, are not subject to lay-ups for repairs. In many war plants, alkaline batteries are today working much harder than their operators ever expected they would—and are standing up admirably under such peak demands.

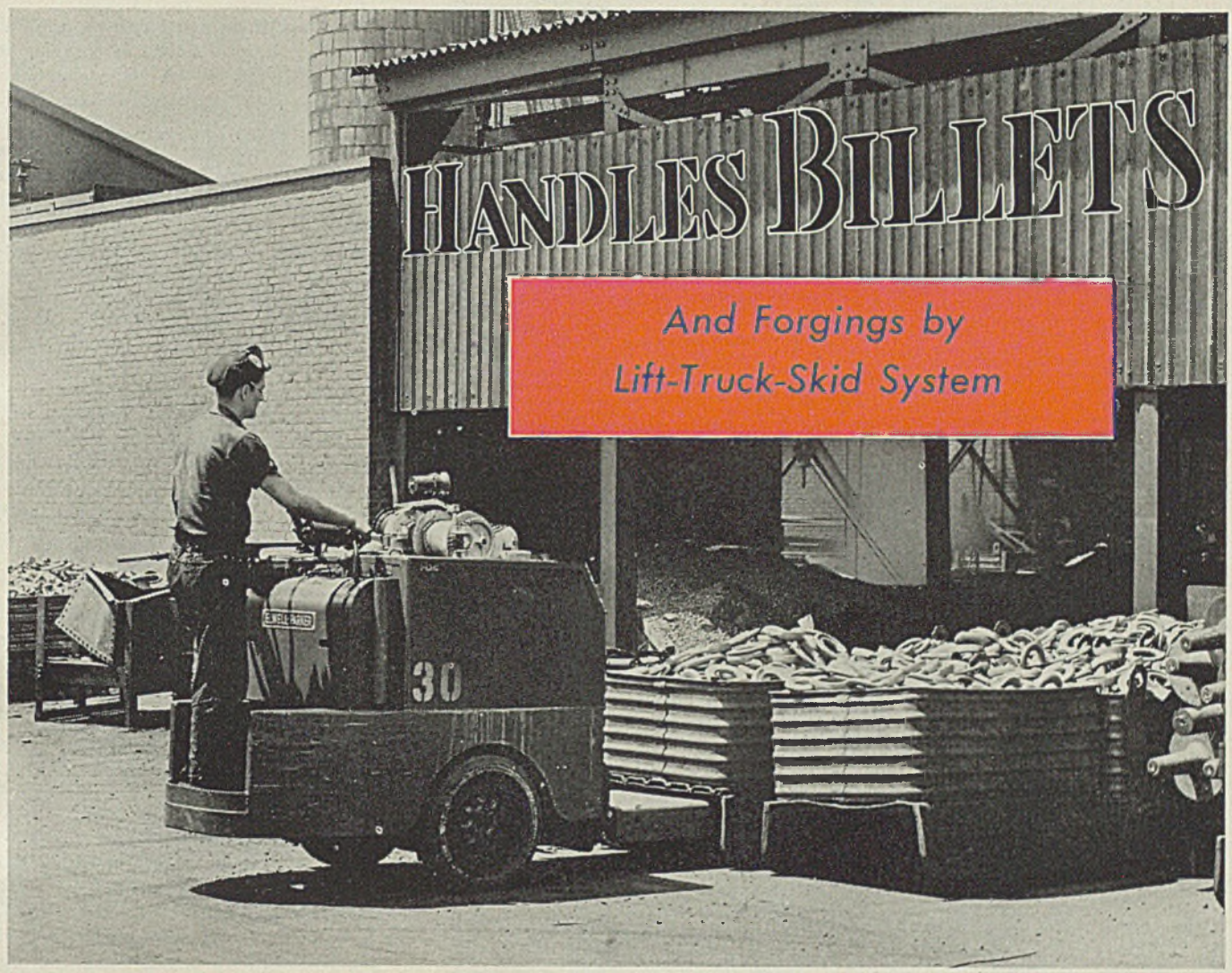
All this is not something which just happened. It is the nature of this modern type of power unit. Ruggedness comes from Edison steel-construction, its self-preservation chemical principle, and its foolproof electrical qualities.

INDUSTRY NEEDS THE DEPENDABILITY OF

Edison Alkaline BATTERIES

HANDLES BILLETS

And Forgings by Lift-Truck-Skid System



By GEORGE E. STRINGFELLOW
Division Manager
Storage Battery Division
Thomas A. Edison Inc.
Orange, N. J.

ALREADY ENGAGED in the production of forgings largely for aircraft parts before the United States entered the war, a Massachusetts plant of the Wyman-Gordon Co. is today working around the clock seven days a week.

With the principal exception of the use of overhead equipment for handling heavy work in process in the shear house, the forge shop, or the inspection department, the general method of handling materials in and between all departments is the lift-truck-skid system.

The manner in which skid boxes, racks and platforms are used to receive work from the individual processes and deliver it to temporary storage or the next process eliminates lost motions; while the location of the three main departments—shearing, forging and inspection—with temporary storage areas between, provides substantially straight lines of travel.

The raw materials, consisting principally of steel and aluminum bar stock, are handled by overhead traveling cranes in a storage yard adjacent to the shear house where the stock is cut to length.

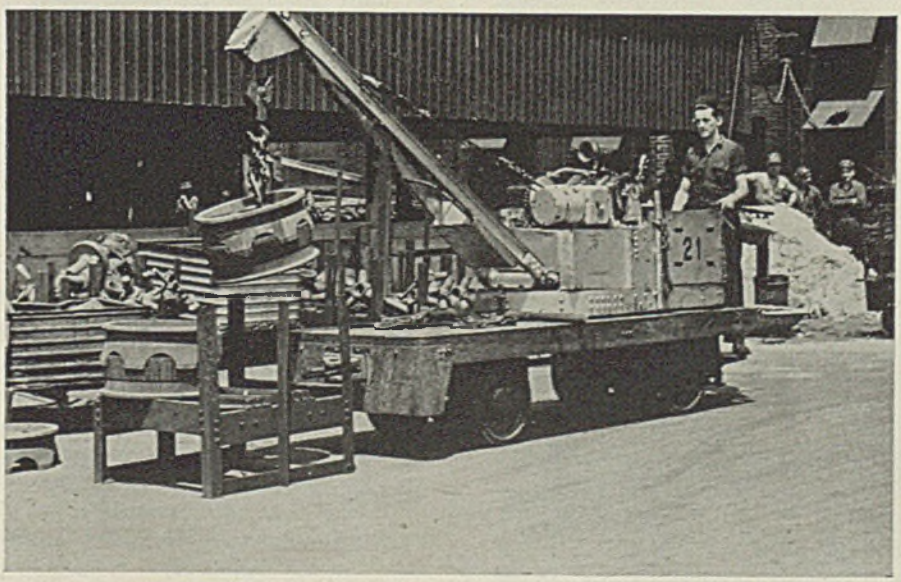
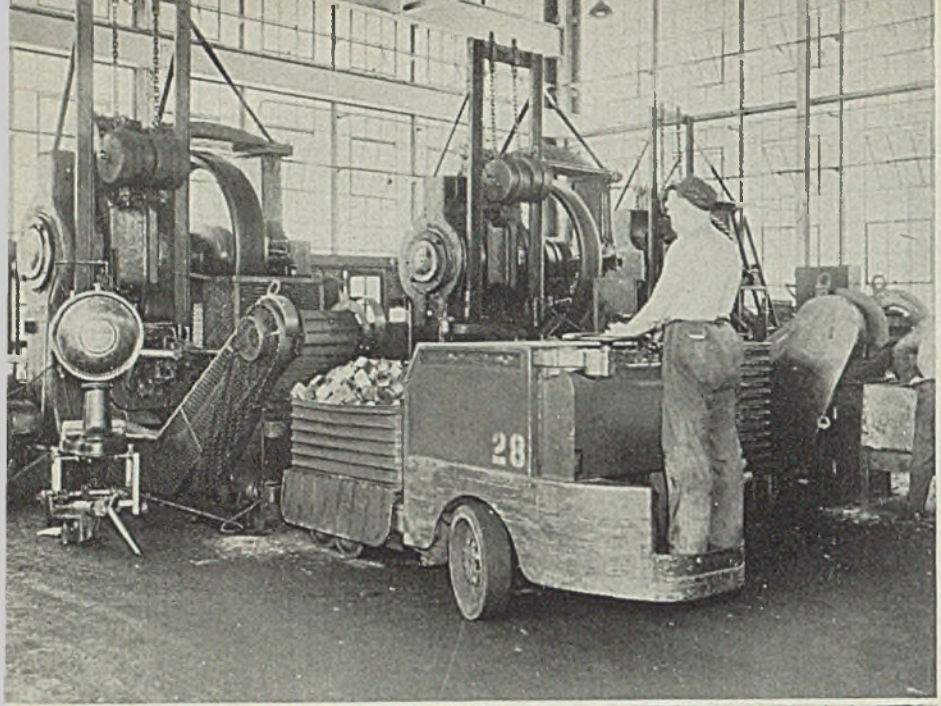
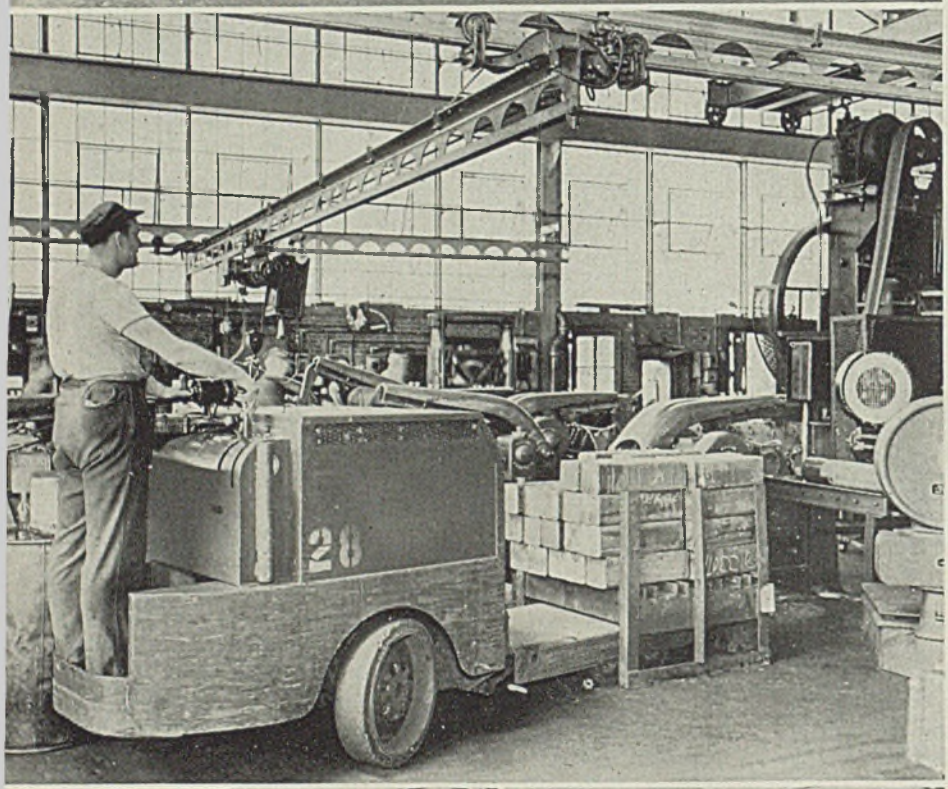
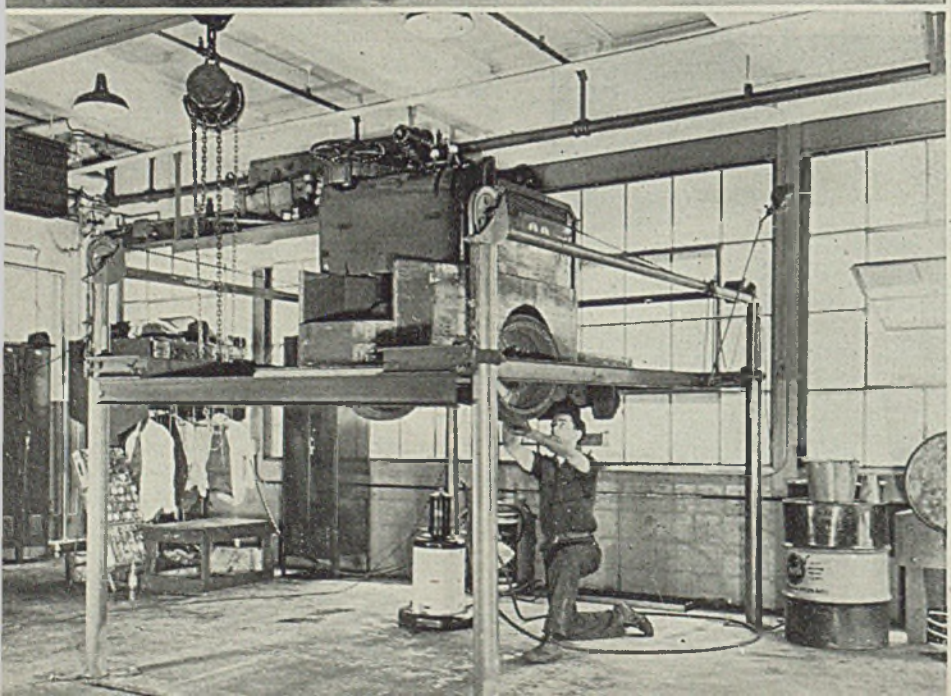


Fig. 1—(Above)—Skid box being picked up here is new double platform type which overcomes tendency to warp from heat of forgings. Note badly warped platform of old type box alongside

Fig. 2—(Left)—Battery-powered crane truck is kept handy. It picks up odd pieces, helps load heavy work as shown here. All photos from Storage Battery Division, Thomas A. Edison Inc., Orange, N. J.







Steel stock is sheared to length or, if of a cross-sectional diameter of 5 inches or more, it is cold-sawed. The aluminum stock is cut to length cold by thin abrasive wheels.

All stock goes directly into skid boxes or onto skid platforms as it is cut to length, and it is here that the heaviest skid load (up to approximately 5 tons) accumulate. Low-lift trucks of corresponding carrying capacities replace the loads with empties, then carry the loads to intermediate storage in the yard between the shear house and the forge shop.

Double Bottoms Help

The next step is to the forge shop, where the loads are left beside the furnaces. The forgings are dropped into skid boxes as they leave the hammers, and the skid loads are next taken to another storage area between the forge shop and the heat-treating department.

This work is hot and formerly had a tendency to warp the steel skid boxes so that the runners flared out, reducing the underclearance. The difficulty has since been overcome by the use of skid boxes with double bottoms, providing an air space to retard heat conduction.

After heat treating, the forgings are taken to a second storage yard for cooling, and from there to the shot-blast room for cleaning. They are next taken to the inspection department. At the individual machines the incoming work is taken from one skid container, and the finished work is put in another. As in the other departments, finished loads are replaced by empties and then taken to stock areas and to outgoing carriers by battery lift truck.

Truck operators are assigned to definite portions of each department and thus know what material is running and

(*Please turn to page* 89)

Fig. 3—(*Top, left*)—*Skid handling starts in the shear house shown here. Long billets are fed from outside storage through opening in wall at left where conveyor carries them to the shear. Sheared sections fall on flight conveyor which discharges them into skid box*

Fig. 4—(*Center, left*)—*Shear house contains both hot and cold shear facilities as well as equipment for cold sawing. A battery of cold saws is just beyond the truck here. Note especially heavy skid utilized for handling these billet sections and overhead monorail system serving the saws*

Fig. 5—(*Bottom*)—*Special cable-driven hoist picks up trucks for speeding chassis lubrication and other maintenance work*

Offers Chart Type Guide To Aid Abrasive Users

A handy chart which for the first time includes abrasive cloth gadgets in a form which will guide the technical force as well as the men right on the finishing jobs themselves is being offered by Behr-Manning Corp., Division of Norton Co., Troy, N. Y.

According to the company, these gadgets were developed especially to meet war needs. They already are being used to perform a myriad of operations such as deburring holes, rounding out corners, beveling edges, cutting radii on the edges of holes, polishing concave and internal surfaces, shaping, removing flash and scale, and countless other jobs.

The abrasive cloth gadgets in the forms illustrated on the chart began as specialties for metal finishing and polishing operations that could not be performed conveniently by other tools, the company states.

Safety Organ To Inform "Employe Paper" Editors

The Safety Clipper is the name chosen for the new publication American Optical Co., Southbridge, Mass., is publishing for use by editors of employe newspapers or magazines in promoting industrial safety.

By reprinting the material appearing in the miniature newspaper, it is felt, those in charge of employe publications can help persuade workers to use goggles, protective clothing and safety devices supplied to them, thereby contributing to the success of the current safety drive sponsored by the government, National Safety Council and industry.

The first issue of this safety organ already appeared, and editors are invited to contact the optical concern in order to be placed on the mailing list.

Permission is not necessary to reprint any article or illustration that appears in the new publication. In addition, electros, photos and cartoons will be supplied gratis, according to the company.

H. K. Porter Offers Substitute Tanks

In order to keep serving the process trade during the emergency, H. K. Porter Co. Inc., 4975 Harrison street, Pittsburgh, is offering Agitator-equipped wood tanks of cypress, redwood, long leaf yellow pine, fir, oak, and poplar for the storage of water, oil, chemicals, and various solutions. They are being offered in all shapes and sizes up to 100,000 gallons capacity.

INDUSTRIAL EQUIPMENT

Portable Turnstiles

Percy Turnstiles Co., 101 Park avenue, New York, is introducing on the market portable turnstiles for employe inspection at roadway entrances. It is for im-

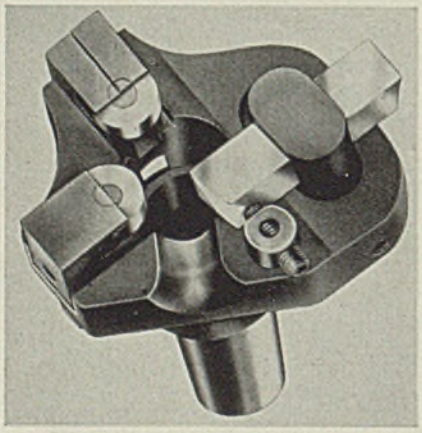
mediate use where set down and does not have to be fastened to the pavement.

Removable chains close the gaps compelling passage through the arms of the turnstiles. Equipment includes turnstile, base-plate and guide railing mounted together as a portable unit.

Designed especially for war plant service, the unit is available with foot-pedal control for gate guard, or in token-controlled models operated by employes' time disks. It can be obtained with two-way operation (both entrance and exit through the same machine) or for one-way passage only. It also can be equipped with automatic registers for counting employes passed in one or both directions.

Screw Machine Tool

Boyar-Schultz Corp., 2110 Walnut street, Chicago, announces a new model B box screw machine tool for use in making heavy cuts with sustained ac-

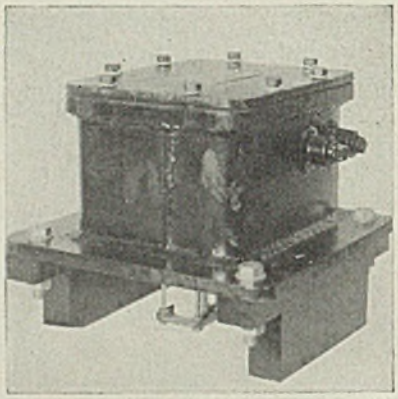


curacy. It features swivelling tool bit and separately adjusted rollers that make possible delicate adjustments with great ease. Its rigid construction and space for chips and coolant, are important factors in producing quality finished parts to close tolerances.

Arc Detector

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., introduced recently a new HCL detector for inerteen transformers, representing a new method of protection which minimizes damage to transformer windings by its quick detection of very small arcs. It is more sensitive and faster in operation than conventional pressure relief devices, it is said, and may be used to give prompt warning of even very small arcs by detecting the presence of HCL gas formed by the decomposition of the liquid.

Because the detector operates almost as soon as the arc occurs, it reduces the possibility of high pressures forming within the tank. For example, the de-



tector will operate in approximately 85 seconds from a 1 kilovolt ampere arc, when presure might still be less than 2-pounds per square inch. It can be used to operate an alarm, or to operate the circuit breaker.

Turret Trucks

Nutting Truck & Caster Co., Faribault, Minn., announces new Salsbury turret trucks which feature fully automatic clutches and self-shifting transmissions. These are being offered in lift, cargo and tractor types. Another feature embodied in the units is the engine-over-drive-wheel power assembly contained within the turret.

Steering is done with the driving wheel. Main frame of power plant is mounted rotably in ball bearings which permit steering in any direction over a 360-degree arc.

To reverse direction of travel, operator simply reverses turret and drive-wheel in one motion. The power turret is a completely independent unit and is easily removable for servicing.

The lift-type turret truck features an exclusive articulated design which rides loads evenly over sharp dips, steep ramps and uneven travel surfaces, Loads are kept practically level.

Power specifications are the same for all three types of trucks. Power plant is

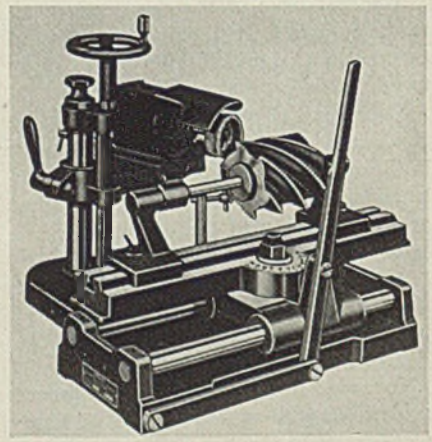
a single-cylinder, 4-cycle, air-cooled engine. It provides a maximum speed of 8 miles per hour under full factory rated loads.

The self-shifting transmission provides infinitely variable drive ratios between 60:1 in "low" and 20:1 in "high." Drive ratios are controlled by travel speed. Automatic clutch engages as engine is accelerated, disengages when engine idles.

The three types of trucks are known as the model SLT (lift type) with foot-operated hydraulic lift for picking up loaded skids; model SCT (cargo type) with platform for carrying tools, parts, boxes, etc.; and model STT (tractor type) for pulling trailer trains.

Cutter-Grinder

Berco Mfg. Co., 429 West Superior street, Chicago, is offering a new Hilco universal cutter-grinder with special index dividing head. It features extreme flexibility; low-cost set-ups without dis-



turbance to production grinders; wide cutter range applicability; and absence of vibration.

The unit may be set up in just a few minutes for any other type cutter. It is said to grind to perfect sharpness any concave, convex, helical, straight, tap-

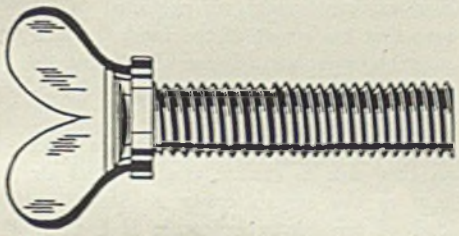
ered, angle or special cutter up to 6 inches in diameter and any saw up to 18 inches in diameter—regardless of cutting angle required.

The dividing head is the heart of the grinder. It has seven index circles consisting of micrometer placed holes or stops which insure perfect uniformity of cutting edges in the finished cutter, regardless of the number of teeth or cutting surfaces. A bench type machine, the grinder occupies little space. It is only 21 inches long, 17 inches deep and 17 inches high, and weighs approximately 135 pounds.

Thumb Screws

Ohio Nut & Bolt Co., Berea, O., recently added to its line new one-inch thumb screws developed to meet certain war needs. These are made by a cold-forging process making them available in mass production quantities upon short notice.

The thumb screws feature a wide wing



spread with shoulders of same diameter as a lock washer. Thumb screws also are offered with assembled washer so that the washer can not be lost when the screw is removed. The company recently worked out tools for a complete range of standard sizes.

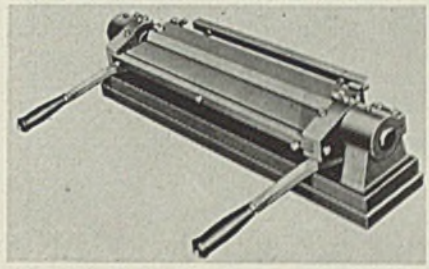
Hand-Operated Brake

O'Neil-Irwin Mfg. Co., Minneapolis announces a new hand-operated No. 3 Di-Acro brake of 18-inch capacity which features an accuracy guaranteed to a tolerance of 0.001-inch in all duplicated work. Its maximum full width folding capacity—using both brake handles—is 24-gage steel plate.

Construction of the brake allows contact surfaces to be readily removed for changes or replacements. Its heavy main base casting is of machine tool grey iron. Main bearings are of drill-rolled steel to grey iron, adjustable for wear and alignment. The folding plate of the unit is hardened and heat treated to resist wear.

Complete adjustments of all contact surfaces are provided, allowing vertical and horizontal adjustment for accurately duplicating either obtuse or acute angles, as permitted by natural working radii over the entire capacity range on material formed.

Precision adjustable stops also are provided for holding to die tolerances, the degree of angularity in all duplicated



work. According to the company, forming work involving two or more different operations on a single part frequently may be worked in sequence with the folding surface offered by the brake.

Magnetic Starter

General Electric Co., Schenectady, N. Y., is offering a new line of alternating-current combination magnetic starters for full-voltage starting of induction motors up to 7½ horsepower. Units in the line consist of a fusible motor-circuit switch and a magnetic starter incorporated in one compact unit to conserve space and installation time, to provide greater protection for equipment and operators.

The motor-circuit switch features silver-surfaced, snap-action contacts of the roller type. New Vystipe fuse clips hold the fuses in place securely by means of screw fasteners at each end, assuring good contact and preventing the fuses from being displaced if subjected to short-circuit conditions. Bimetallic overload relays are adjustable for either hand or automatic reset and protect the motor from overheating

caused by repeated overloads, sustained overloads or too frequent starting.

The starters are enclosed in general purpose, cabinet-type, all-welded steel cases. Flush-type doors of the cases close into deep L-shaped flanges, making a particularly tight joint between the case and the cover. An interlock prevents opening the door until the switch is "off".

Factory Sweeper

Moto-Mower Co., 4600 Woodward avenue, Detroit, announces a factory sweeper capable of outsweeping a whole crew of men. Easy to operate, it can be made to turn right or left under its own power by means of a separate clutch on each wheel of the tractor, controlled at the handle bar.

Unit is said to pick up heavy metal machinings as easily as the lighter dust and dirt. For the plant with great floor space—a sulky is available as optional equipment. Other innovations that have

been added are a spray which can be adjusted so that it just lays the dust but doesn't wet the floor and a heavy bumper for the larger models.

Three models are offered, two are motorized. Illustration shows the Commander model—the tractor used in its construction is the same as that used in the Commander lawn mower and it may also be adapted as a snow plow.

Valve Clearance Mill

Snyder Tool & Engineering Co., Detroit, is offering a new 3-spindle, hydraulic valve clearance mill for aircraft pistons. It is said to deliver triple the production obtainable with a single spindle machine.

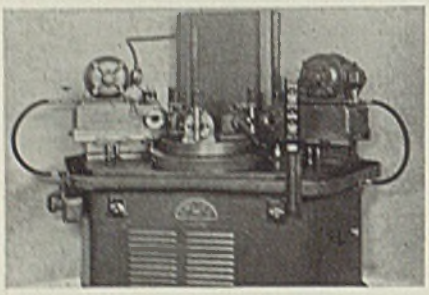
The two milling spindles are mounted in tapered roller bearings and are individually driven through V-belt drives. The quill construction allows for no axial adjustment of 1 inch for cutter positioning and for tool wear.

Indexing is by means of a standard 3-station Geneva index mechanism, no

electrically powered, self-contained unit. A heavy, index positioning pin enters the locating bushings automatically after indexing.

The machine features a welded steel base within which the hydraulic equipment is housed. Coolant is contained in a reservoir in the rear of the machine and the cover of this reservoir functions as a removable chip tray.

The piston is positioned manually with a pin engaging the wrist-pin holes

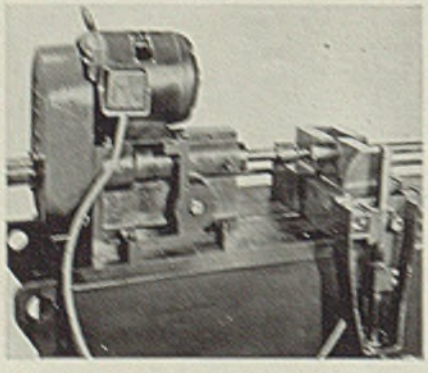


of the piston and is clamped by means of a simple cam action in the fixture. Operation is semi-automatic and is arranged so that after loading the fixture, a push button must be pressed for each cycle.

Work cycle consists of an index followed automatically by the infeed of the cutters into the work. While one piston is being located the other two are receiving their successive cuts.

Centering Machine

Pines Engineering Co., Aurora, Ill., announces a 2-spindle automatic centering machine for bars up to 6 feet long. In action; one chuck and one head are stationary on the machine, and the other chuck and head are movable for ad-



justment to accommodate different lengths of bars. For centering pieces from 18 inches down to 6 inches long, one chuck is removed from the machine.

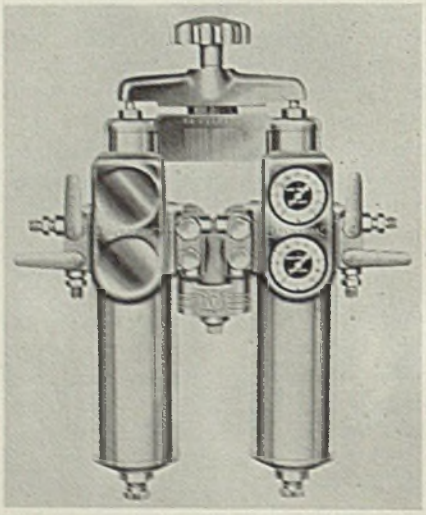
Chucks are both actuated by air cylinders directly connected through a rack and pinion on the screw for opening and closing the jaws. A cam on the key shaft for advancing the two spindles actuates a 4-way solenoid-operated air valve through a limit switch, closing the chucks automatically.

Adjustments are provided for aligning the chuck jaws with the spindles to compensate for wear. The capacity of the chucks is a maximum of 5-inch diameter round bars.

In the illustration, regularly provided guard is removed to show rack actuating mechanism for the chuck.

Air Transformer

DeVilbiss Co., Toledo, O., is offering a new heavy-duty air transformer, the double barrelled type HLC, with a capacity in excess of 100 cubic feet per minute, for use on automatic spray-painting installations where a large volume of regulated clean air is needed. Though both function independently, the two pressure regulators in this transformer



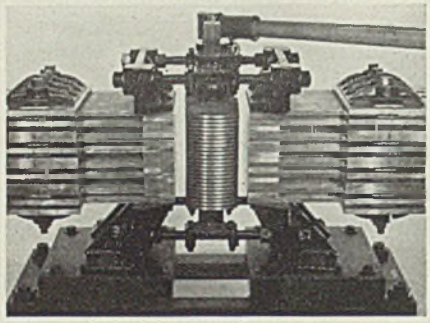
are simultaneously controlled by a single knob, making adjustment quick, easy and positive.

Filtering and condensing mechanisms are permanent, all metal, type, which never require replacement of any of their parts. The fast-acting regulator diaphragms are of reinforced, oil-proof synthetic rubber and are chatterproof. Connection to the main air line is made at a single inlet port.

30,000-Ampere Switch

Electrical Engineers Equipment Co., Melrose Park, Ill., recently developed a 30,000-ampere switch which not only carries 30,000 amperes continuously without any undue rise in temperature, but also can be closed and opened with not more than 10-volts potential difference across the switch in the open position. To eliminate much of the wear and burning, its contacts are designed so they automatically advance and seat on new points to assure clean and perfect contact surfaces.

Switch blades of the unit are pivoted in the center, allowing all manual effort to be applied to contact pressure of the



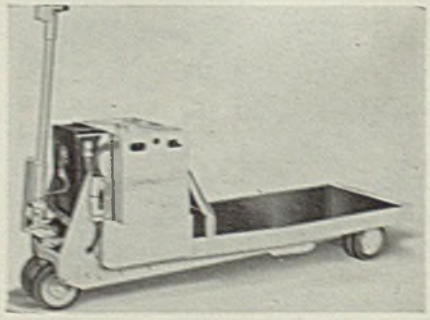
switch contacts. To keep heat losses at a minimum besides keeping sufficient cross sectional area in the contacts, a large number of butted-joint contacts are embodied to streamlined current flow. Furthermore, means are provided to insure that each unit of the blade as well as each unit bar of the clip carry its proper share of the total amount of current in the switch.

Two individual switch bases are used on this unit to realize unobstructed air flow to the switch contacts. Strain on load of the contact pressure is entirely taken up by insulated tie rods from switch clip to switch clip.

Hand-Lift Truck

Lift Trucks Inc., Cincinnati, announces a motorized hand-lift truck having rear-wheel drive and automotive gear transmission with excess motor and battery power. Called the Hydroelectric it is capable of handling 5000-pound loads continually from 20 to 24 hours.

Maximum loads are lifted easily



through a powerful hydraulic ram. Then, by pressing the patented finger control, heavy loads are moved forward or backward without effort. According to the concern, any inexperienced man can operate the lift truck.

Handling Billets

(*Concluded from page 84*)

therefore what material to bring from storage. They also keep watch of the progress of work at the various operations on their routes and take care of both delivery and removal of work at the proper intervals to prevent delay. At shift changes, the relief operator quickly familiarizes himself with these details.

At any of the storage areas and in any of the departments, at any time of day, the scene is one of concentrated activity, with skid loads on all sides and with anywhere from two to six industrial trucks constantly shifting loads. As in many other plants that are working hard, the truck operators have become surprisingly expert both in gaging distances and in steering and lifting, so that they pick up and deposit loads with extreme precision.

Prewar battery capacities were 11 kilowatt-hours, but during the past 2 years the company has changed over to 16-kilowatt-hour batteries, as replacements became necessary, and has also adopted batteries of the higher capacity for use in new trucks as they were added.

The 11-kilowatt-hour batteries are exchanged at 8-hour intervals, usually at 3 p.m., 11 p.m. and 7 a.m., corresponding to shift changes, whether full rated capacity has been withdrawn or not. The 16-kilowatt-hour batteries are exchanged at 12-hour intervals. Use of the larger batteries requires only one spare per truck and saves badly needed space on the charging bench.

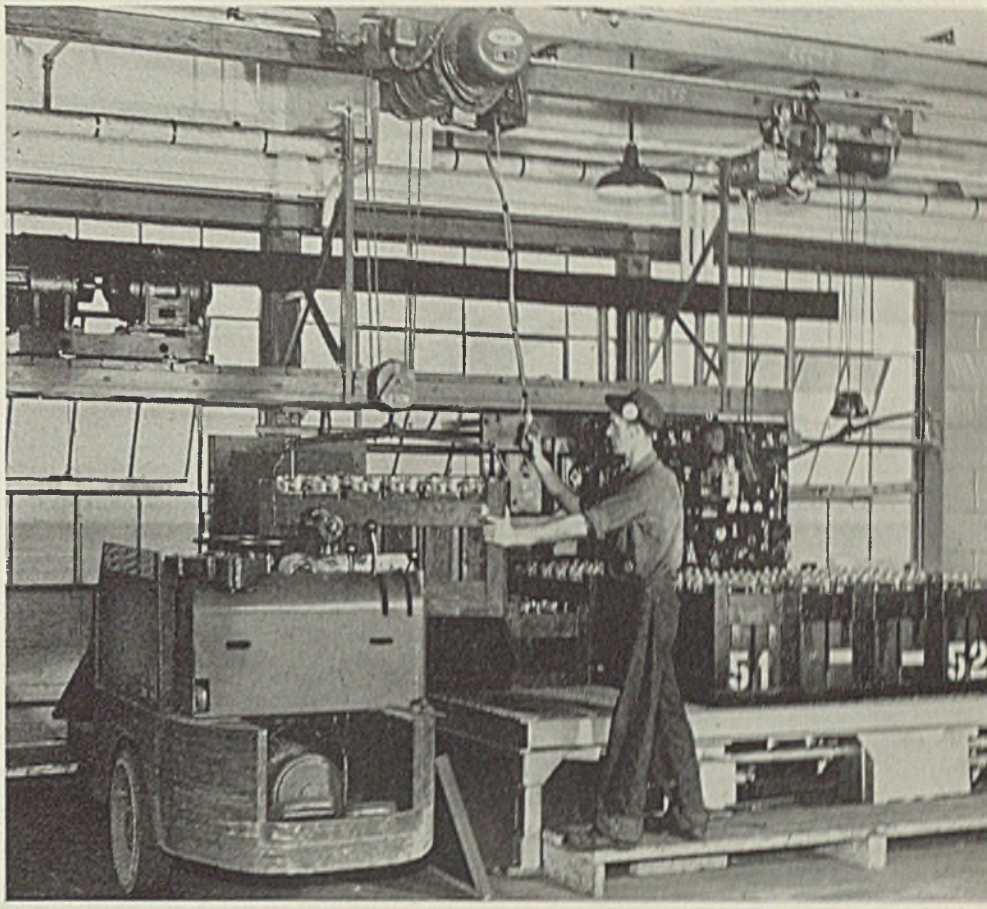


Fig. 6—Two electric overhead monorail hoists—a big and a little one—make the job of changing batteries a matter of only about two minutes. Note special grabs which hook onto the batteries. Large hoist is rated 1-ton capacity

An overhead electric hoist suspended from a tramrail is used to handle the batteries between the truck and the charging benches. Approximately 2 minutes is required to exchange batteries in one truck.

Films To Aid Workers Handle Carbide Tools

Designed to expedite training of new workers in the use, care and handling of carbide tools, Carboloy Co. Inc., Detroit, developed, and is making available for general distribution a series of six educational 35-millimeter silent slide films.

Strictly non-commercial in character, the films are intended to enable users of carbide tools to increase production, save time, reduce tool costs and tool consumption. They are based largely on experience gained over several years in the operation of a training course at the Carboloy plant. The complete program of visual education comprises the six films and a copy of each of the films reprinted in a booklet for reference by the trainee following the showing of the film. Each booklet also contains appendix reference material, charts, etc., of value in the daily use and handling of carbide tools.

The films will be distributed by Carboloy at print cost for use as pertinent part of the current war training programs by industrial concerns and educational institutions, etc. Arrangements also are being made for loaning the films free to educational institutions through film libraries maintained by colleges in many states.

The set of six films, covers the following subjects: What is cemented carbide?; designing cemented carbide tools, brazing cemented carbide tools, chip breakers and their applications, grinding single-point carbide tools and putting cemented carbide tools to work.

Revere Copper Offers Manufacturers Guidebook

A comprehensive new guidebook which gives factual information on copper and copper alloys is being offered gratis by Revere Copper & Brass Inc., 230 Park avenue, New York, to manufacturers engaged in war work.

Indexed and organized for easy reference, it provides information on the technology and properties of copper and copper base alloys, welding technique, specifications, manufactured forms, pipe and tube dimensions and weights, etc.

A section of the booklet is devoted to the facilities of the Revere technical advisory service.

Bulletin Gives Pointers on Welding Thin Metals

Manufacturers of products fabricated from thin metals can receive simple answers to wartime welding problems in a new booklet, *Weld Thin Metals*, recently published by Allis-Chalmers Mfg. Co., Milwaukee.

Metals as thin as 32-gage—aluminum, stainless steel, monel, inconel, nickel, galvanized iron, terne plate, castings and others—can be welded by company's new Weld-O-Tron which, according to the bulletin, has been successfully used in many different welding assignments. In addition to offering the bulletin, Allis-Chalmers invites fabricators to send samples of materials to its welding research laboratory.

Fastening System

(*Concluded from page* 81)

up of threaded mandrel and anvil at tip of Rivnut driver.

Now the Rivnut is inserted in its hole, power is applied and the Rivnut upset. Throttle valve on tool is moved to reserve position, mandrel reverses itself and backs out of the thread hole in the Rivnut.

Optionally, the Rivnut can first be inserted in the hole and then upset by the power driver. This is the method utilized for maximum production, one operator inserting Rivnuts, another driving them.

Fig. 1 Illustrates the hand method of installing Rivnuts with the straight heading tool. The Rivnut is threaded upon the mandrel of the tool until the head contacts the anvil. It is then placed in the prepared hole, and sufficient force is exerted outwardly by leverage on the mandrel to collapse the column of the Rivnut at the counterbored portion. This forms a bulge on the opposite and usually inaccessible side of the work, literally pulling up the Rivnut by its boot straps. The mandrel is then unscrewed from the Rivnut, completing the installation.

With this fastening system it is possible to make repairs to planes in flight, securing patch plates from the inside of the plane.

Applications Multiply

As mentioned previously, the Rivnut was originally designed as a de-icer attachment. It is still the only blind type of fastener fully approved for this purpose. Its primary use was, therefore, as a nut plate, and in this capacity it was soon adapted to other demountable types of attachment.

In all-metal aircraft construction there are numerous instances where a blind type of rivet must be used. Most of these are secondary structural applications, where the rivet is not particularly specified by the customer—usually the Army or Navy. In these instances, the plane manufacturer uses his own judgment in the selection of the type of blind rivet. Occasionally there is doubt whether a structural application is of primary or secondary nature, and therefore this decision is left to the customer. In some instances the Rivnut is used alone. In others, the strength of the joint is materially increased by the use of a steel or aluminum plug screw. See A, Fig. 6.

It is impossible to list all the varied uses to which the Rivnut has been adapted for attachment and riveting. However, some of the applications to aircraft, include landing and navigation light assemblies, instruments, brackets and fittings, practically all types of fillets and fairings, Fowler flaps, sound proofing, insulation, inspection doors, and access doors for bullet-sealing fuel cells, etc.

It is apparent that this merely scratches the surface of the usefulness of this fastening device. Numerous uses which have been found for the Rivnut in the aircraft industry suggest a still greater range of usefulness in other sheet metal industries.

Alloy Standard Revision Expedites Deliveries

To facilitate ordering and storing, and to expedite deliveries of certain ferroalloys and metals, new simplified ranges of standard sizes of these materials were established recently and now are being produced by Electro Metallurgical Co., Unit of Union Carbide & Carbon Corp., New York.

The new ranges of lump, crushed and ground sizes were chosen to meet essential requirements with a limited number of standard sizes.

The revised standardization enables a manufacturer to carry standard sizes in stock so shipments can be made more promptly, particularly with regard to the finer-mesh alloys and metals, at the same time allowing him to reduce his inventories.

Two Manuals on Plant Protection

Industrial Guard's Manual, by Harry Desmond Farren; fabrikoid, 95 pages, 5½ x 8 inches; published by National Foremen's Institute Inc., Deep River, Conn., for $1.25.

Organization and Training of Industrial Fire Brigades, by Capt. John C. Klinck, Memphis, Tenn., fire department; paper, 119 pages, 6 x 9 inches; published by S. C. Toof & Co., Memphis, Tenn., for $1, with discounts for quantity.

These two books are timely under any conditions but especially so in war days when sabotage may be expected and when special precautions are necessary. The manual for guards covers what every guard should know to give best results in industrial plants. The book covers public and worker contact, riots, panic, mob and crowd behavior, self-protection, first aid, fire protection, sabotage and espionage, plant protection and bombs and infernal machines.

The handbook on organization of fire brigades is by an experienced fireman and is being used as a manual in a large scale training program under way in Memphis, Tenn., and by many business and industrial establishments in other places, as a safeguard against hazards of fire and other destructive elements in the present emergency.

Conserving Power

(*Concluded from Page 64*)

about greater improvement than was originally expected. In this instance the main objective was economy. Not only was this objective attained, but in addition a more effective way of testing large engines was also developed.

Another typical point is that the answer, although relatively simple, as exemplified in Fig. 3, was not at first perceived and was arrived at only by laboriously considering one possible scheme of drive after another.

The scheme shown in Fig. 3 employs the hydraulic coupling in a new role. Previously it had been used either at low slip values or on drives with rapidly decreasing power with increase in slip, such as fan drives. In the engine loading application it will be noted that power increases rapidly with increase in coupling slip.

Lastly, this application reveals that it sometimes is quite as difficult to dispose of power effectively as it is to generate power.

Kirksite Dies

(*Concluded from Page 66*)

soft for machining to the desired tolerances.

The process also has been found useful in repairing damage to certain jigs and dies, caused by errors on the part of a milling machine operator. Where tolerances are small, a milling machine operator may inadvertently undercut a nearly finished jig. By use of metal spraying to bring the part up to specifications, junking of the jig and consequent loss of the many man-hours that went into its construction can be avoided.

Sequence of operations on a typical die is shown in the accompanying illustrations.

Engineering Developments Save Critical Materials

Three developments are enabling the Transformer Division, Westinghouse Electric & Mfg. Co., Sharon, Pa., to conserve large amounts of war-needed materials according to Walter M. Dann, assistant manager of engineering. During the past year 4000 tons of steel, 1000 tons of copper and huge quantities of oil were saved.

The three engineering achievements making it possible to achieve these savings are a new steel, called Hypernik, perfection of a device to permit each transformer to carry its maximum load safely, and development of an improved method of cooling oil in transformer tanks.

These advances were applied to all sizes of transformers, from the 200-ton giants that step up electrical voltages at power stations to the 2-foot units mounted on poles to step down voltages for use in residential districts.

In addition to saving materials, these engineering advances have resulted in better transformers. Shipping and handling have been made easier, and many of the larger units that formerly had to be shipped in parts and assembled in the field now can be made small enough to be assembled in the factory and shipped complete on a single flat car.

Turner Brass Offers Chart on Blow Torches

A 2-color wall chart, entitled "Know Your Blow Torch", labeling all parts of the blow torch and giving lighting instructions and safety hints is being offered gratis by Turner Brass Works, Sycamore, Ill., to defense training schools and industries. The company's only restriction in passing out the charts is that the request be made by a responsible party insuring that the chart will be put to good use.

Foreign Bushing Offered Generally In U.S.; Saves Much Rubber

AVAILABLE for general distribution in United States for the first time, an entirely new line of rubber insulated bushings capable of absorbing vibration and shock and of taking torsional and radial movement without lubrication is now being manufactured by Bushings Inc., 3447 West Eleven Mile avenue, Berkeley, Mich.

Bushings in the line are said to save 60 to 80 per cent of the rubber in one important application alone, and from 10 to 20 per cent of the amount usually required for bushings of the conventional design.

Manufactured in a wide range of sizes, the bushings, known as Rubberflex, employ a thinner layer of live rubber, or synthetics, than commonly used. Peculiarly, the thinner wall increases the life and efficiency of the assembly, it is reported. The rubber is held between an inner and outer cylinder of metal entirely by the elasticity of the rubber itself.

Bond between rubber and metal is mechanical rather than chemical. This not only insures a slip-proof bond for high torsional angles but, of equal importance, it also eliminates the pile of waste rubber scrap that usually results from the assembly of conventional bushings.

Simplicity of manufacture that permits a wide range of sizes and capacities to suit individual requirements without costly tooling charges consists essentially of "shooting" the rubber bushings between an inner and outer metallic member.

The rubber bushing is of greater outside diameter than the outside cylinder and smaller than the inner cylinder. Moreover the relative resistance to slippage on either inner or outer cylinder can be increased or decreased as required. Once the assembly is completed the force of the elasticity of the rubber in both directions keeps the assembly together, it is said. Wear in the usual sense is entirely absent in these bushings since torsional and radial movement is taken in the rubber itself.

Method of manufacture permits the assembly of almost any metallic members. The bushings are currently being employed, in another typical application, as insulating backing for ball, needle, babbitt, bronze and "powder" bearings. In this type of application, the rubber absorbs shock and allows misalignment while protecting the bearing itself against damage.

Production Formerly Limited

Prior to this time, the bushings were manufactured in the United States by a limited number of companies, chiefly automotive, but for a single specific application which was previously approved by Silentbloc Co., a foreign concern. The new United States organization, Bushings Inc., headed by B. C. Doying of Detroit, as president, obtained the exclusive rights to the manufacture and general distribution of the bushings largely on the basis of the experience of R. G. Bradley, who was general sales manager for Harris Products Co., formerly of Detroit.

The original Silentbloc concern was founded in Belgium by Leon Thiry, the inventor, now a resident of this country. The company operates factories in Canada, England, France, and, formerly, in Germany and Italy as well.

Interesting sidelight on the savings in rubber from the design and method of manufacture is the fact that both derive directly from a shortage of rubber that occurred in Europe some 15 years ago. At that time, it is said, the rubber supply there had already reached the stage that United States manufacturers are now facing and the conservation of rubber, even in the most essential uses, was absolutely mandatory.

COMPRESSED AIR "GOES TO WAR"

COMPRESSED AIR is easing women's jobs in the nation's war plants. In form of air chucks, expanding arbors and other devices it is eliminating much hand and arm motion—cutting down worker fatigue. This worker is using an air drill to put a diagonal chamfer on an aircraft engine part. The tool was considered the only machine that could do this operation. Photo courtesy Compressed Air Institute

Most Shears Made For Armed Forces

Meeting for the first time recently, the scissors and shears industry Advisory Committee discussed simplification of scissors and shears for industrial and civilian use—a subject which arose in connection with possible revision of Limitation Order L-140 as it applies to the manufacture of scissors and shears.

At present, almost the entire production of the industry is, directly or indirectly, for military requirements, it was disclosed at the meeting. In addition to Army and Navy requirements for scissors and shears ("sailmakers" type, and other used in first aid kits, airplanes, rubber boats, tanks and many other units) there is an increased demand for these instruments as tools required in production of parachutes, rubber boats, uniforms and all types of equipment constructed with textiles or rubber.

Steelmaking Suffers No Cut By Christmas Observance

Some finishing capacity idle but furnaces run through. . . . Buying better as PRP quotas are known. . . . Ore supply large, to support heavy demand. . . . Scrap situation improves

DEMAND
Increases at year end.

PRODUCTION
Unchanged at 99 per cent.

PRICES
Steady at ceilings.

CLOSING days of the year see no remission in production activity. Christmas is not being observed in steelmaking departments and only part of finishing mill capacity is taking time off for the holiday.

In general the week averaged up well, Friday's loss being compensated by change in schedules on other days. Among foundries there will be few suspensions at the year end for inventories and these will be matched by heavier production before and after.

In finished steel there may be some actual gain over the holidays, plate buying already showing some rise as a number of consumers follow their usual practice of entering orders at the time they send in their No. 298 forms covering requests for deliveries two months ahead. They are supposed to have their orders in at least 35 days ahead of time. This year Christmas fell on the deadline date, hence some leeway is allowed.

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Another factor which may offset holiday influences is receipt by consumers of PRP quotas for first quarter. Some buyers have held back what tonnage they could, until they knew what they could expect under these quotas. While the overall policy of Washington with respect to first quarter quotas is not known, it appears somewhat more liberal and requests have been cut less drastically than for fourth quarter, according to some consumers. The most stringent condition still is in alloy steels, large rounds and flats and semifinished, forgers having great difficulty in obtaining the latter.

Sheet deliveries are tight, even highly-rated tonnage commanding delivery in March from most makers although some cold rollers can ship in February on current orders. Large rounds and flats are as deferred as ever though smaller bar sizes are a little easier, with shipments in six to eight weeks on top ratings. Shapes are easy, with deliveries in three to four weeks on all AA ratings.

The steel industry has been asked to make a voluntary saving in fluorspar in 1943 to prevent an expected shortage in metallurgical grades, which is estimated at about 50,000 tons. Increased production has been attained but not sufficiently to keep up with the high rate of steel output.

Scrap supply in general is considered sufficient to reach well into the winter as melters have fair reserves in most cases and yards have considerable tonnage it has not been possible to prepare under weather and labor conditions. This is expected to come out to replenish stocks over the next few weeks. Special Projects Branch of WPB Conservation Division has practically completed clearing a number of projects which will yield large tonnages of high-grade material. Output of industrial scrap from war production is increasing somewhat but tonnage from automobile wreckers is declining as supply of cars for scrapping has decreased materially.

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Blast furnaces in November consumed 7,227,497 gross tons of Lake Superior iron ore, compared with 7,370,595 tons in October. To Dec. 1 consumption had aggregated 76,173,610 tons, compared with 67,707,421 tons in the same period last year. Ore on hand at lower lake docks and furnaces Dec. 1 totaled 45,031,008 tons, against 38,839,932 tons a year ago, deemed sufficient to meet needs until fresh supplies are moved next season.

Steel production last week was steady at 99 per cent of capacity as efforts to get full tonnage from every unit were continued despite the holiday. Chicago rose 2½ points to 102½ per cent as repaired open hearths were returned to service. Cleveland gained 1 point to 94½ per cent, Cincinnati 2 points to 89 and St. Louis 6 points to 93 per cent as scrap supply was increased. Pittsburgh lost 1 point to 97½ per cent, Wheeling 1 point to 85½, Buffalo 2½ points to 90½ and Detroit 3 points to 89. Unchanged rates were maintained at eastern Pennsylvania, 95; Youngstown, 97; Birmingham, 95; and New England, 96.

As a means of increasing production by elimination of many sizes and grades of steel products which consume mill time additional limitations are expected to be issued by WPB under Limitation Order L-211. Specifications now in preparation include structural shapes, carbon plates, tubing and railroad axles and forgings. It is indicated that mechanical tubing will be reduced to 500 stock sizes, less than a third of present number. A simplification schedule for large bar rounds is being considered, to relieve the squeeze.

Composite steel and iron prices close the year at the level maintained under Office of Price Administration ceilings. Finished steel composite is $56.73, semifinished steel $36, steelmaking pig iron $23.05 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	Dec. 26	Dec. 19	Dec. 12	One Month Ago Nov., 1942	Three Months Ago Sept., 1942	One Year Ago Dec., 1941	Five Years Ago Dec., 1937
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$62.18
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	40.00
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	22.90
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	13.40

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Dec. 26, 1942	Nov. 1942	Sept. 1942	Dec. 1941
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.49	2.49	2.49	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.22	2.22	2.22	2.22
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pittsburgh	2.00	2.00	2.00	2.00

Pig Iron

	Dec. 26, 1942	Nov. 1942	Sept. 1942	Dec. 1941
Bessemer, del. Pittsburgh	$25.19	$25.19	$25.19	$25.34
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.39	25.39	25.39	25.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	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	26.215
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.54	31.54	31.54	31.34
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.65	140.65	140.65	125.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.00
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	21.215

Coke

Connellsville, furnace, ovens	$6.00	$6.00	$6.00	$6.25
Connellsville, foundry, ovens	7.25	7.25	7.25	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table. 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 base, uncropped, $45.00.

Rerolling Billets, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36.25; Duluth (bll.) $36.00.

(Wheeling Steel Corp. allocated 21,000 tons 2" square, base grade rerolling billets under lease-lend during first quarter 1942 at $37, f.o.b. Portsmouth, O.; Andrews Steel Co. may quote carbon steel slabs $41 gross ton at established basing points.)

Forging Quality Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.25; Duluth, $42.00.

(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points.)

Open Hearth Shell Steel: Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $52.00; 12-18 in., $54.00; 18 in. and over, $56.00.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34.00.

(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel sheet bars at $39 gross ton, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., $1.90.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., $2.00.

Do., over 9/32—47/64-in., incl., $2.15. Worcester add $0.10 Galveston, $0.27. Pacific Coast $0.50 on water shipment.

Bars

Hot-Rolled Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.51c; Phila. del. 2.49c; Gulf Ports, dock 2.52c, all-rail 2.59c; Pac. ports, dock 2.50c; all rail 3.25c.

(Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points.) Joslyn Mfg. Co. may quote 2.35c, Chicago base. Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced on its 8-inch mill.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethhlehem, 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 3.27c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.28c; New York del., 2.35c; Pacific ports 2.65c.

(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.41c; Phila. del 3.39c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.68c; Pacific ports 4.05c.

(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage.

base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.

Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.22c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets, 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.30-2.55c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c.
(Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill. Central Iron & Steel Co. may quote plates at 2.20c, f.o.b. basing points.)

Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.

Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.28c; Phila., del., 2.22c; Gulf ports, 2.47c; Pacific ports, 2.75c.
(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points and 2.50c, Phoenixville, for export.)

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

Bright basic, bessemer wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Wire Products to the Trade:

Standard and cement-coated wire nails, polished and staples, 100-lb. keg	$2.55
Annealed fence wire, 100 lb.	3.05
Galvanized fence wire, 100 lb.	3.40
Woven fence, 12½ gage and lighter, per base column	.67
Do., 11 gage and heavier	.70
Barbed wire, 80-rod spool, col.	.70
Twisted barbless wire, col.	.70
Single loop bale ties, col.	.59
Fence posts, carloads, col.	.69
Cut nails, Pittsburgh, carloads	$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

	Butt Weld Steel			Butt Weld Iron	
In.	Blk.	Galv.	In.	Blk.	Galv.
⅛	56	33	¼	24	3½
¼ & ⅜	59	40½	⅜	30	10
½	63½	51	1-1¼	34	16
¾	66½	56	1½	38	18¼
1-3	68½	57½	2	37½	18

	Lap Weld Steel			Lap Weld Iron	
In.	Blk.	Galv.	In.	Blk.	Galv.
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $40.00.
Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.
*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.
Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base, per lb.
18.00	4	1	-	67.00c
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
311	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
*317	50.00	54.00	58.00	50.00	58.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50

STRAIGHT CHROMIUM STEEL

403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F.	19.50	22.50	29.50	18.75	24.50
442	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00

STAINLESS CLAD STEEL (20%)

304	.....	§§18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices; wasters 75%, waste-wasters 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

½ x 6 and smaller	65½ off
Do., ⅝ and ⅝ x 6-in. and shorter	63½ off
Do., ¾ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	59 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.		
⅞-inch and less	62	64
1/16-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*$6.00
Connellsville, foundry	7.00- 7.50
Connellsville prem. fdry.	7.25- 7.60
New River, foundry	8.00- 8.25
Wise county, foundry	7.50
Wise county, furnace	6.50

By-Product Foundry

Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	†12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

*Operators of hand-drawn ovens using trucked coal may charge $6.50, effective Aug. 12, 1942.
†$12.75 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do. less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face. 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.	27.63	.....	.....	28.15
Birdsboro, Pa., del.	25.00	24.50	26.00	25.50
Birmingham, base	†20.38	†19.00	.....	.....
Baltimore, del.	25.67	.....	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	‡24.47	.....	.....	.....
Cincinnati, del.	24.30	22.92	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del.	26.24	.....	.....	.....
Philadelphia, del.	25.51	25.01	.....	.....
St. Louis, del.	‡24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.58	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	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.68	24.68	.....	25.35
Neville Island, Pa., base	24.00	23.50	24.50	24.00
§Pittsburgh, del., No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	.....	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	26.05	.....	.....	.....
Steelton, Pa., base	.....	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.89	25.39	.....	26.39
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	26.06	25.56	26.56	26.06
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

High Silicon, Silvery

6.00-6.50 per cent (base).....$29.50

6.51-7.00	$30.50	9.01- 9.50	$35.50
7.01-7.50	31.50	9.51-10.00	36.50
7.51-8.00	32.50	10.01-10.50	37.50
8.01-8.50	33.50	10.51-11.00	38.50
8.51-9.00	34.50	11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling irons, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn. $28.00
Chicago, del. 31.54

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn..$28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn.. 33.00

Gray Forge

Neville Island, Pa. $23.50
Valley, base 23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.81, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorous Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorous content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

Refractories

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	

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 is ¼c higher

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybdic Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrophosphorus: 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

Ferrosilicon: Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

	Carloads	Ton lots
50%	$ 74.50	$ 87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

Spot prices ¼-cent higher.

Silicon Metal: Contract basis per lb., f.o.b. producers' plants, freight allowed; 1% iron; carlots 14.50c, ton lots 15.00c, less-ton lots 15.25c, less 200 lbs. 15.50c.

Silicon Metal: Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

Silicon Briquets: Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

Silicomanganese: Contract basis freight allowed, 1½% carbon; in carloads per gross ton $135; ton lots $147.50. Spot $5 per ton higher.

Silico-manganese Briquets: Contract basis in carloads per pound, bulk freight allowed 5.80c; packed 6.05c; ton lots 6.30c; less-ton lots 6.55c; less 200-lb. lots 6.80c. Spot prices ¼-cent higher.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot 5 cents per lb. higher.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%, Contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. 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 per pound higher.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) Contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ½-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 10.50c; ton lots 11.00c, less ton lots, 11.50c.

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials. As of April 16, 1941

	Soft Bars	Hot-Rolled Strip Bands	Hot-Rolled Strip Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled	Sheets Cold Rolled	Sheets Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars Carbon	Cold Drawn Bars S.A.E. 2300	Cold Drawn Bars S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.68	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	4.65	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.04	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.52	3.75	8.40	6.75
Washington, D. C.	3.95	4.10	4.45	3.80	3.80	5.35	3.60	....	....	....	4.03	....	....
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	5.50	....	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.37	4.92	3.45	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.50	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.35	5.00	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.38	4.23	4.98	3.54	3.88	8.38	6.98
St. Louis	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.24	4.99	3.61	4.02	8.77	7.12
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Chattanooga*	3.80	4.00	4.00	3.85	3.85	5.80	3.75	....	4.50	....	4.39	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.93	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	5.25	5.00	4.60	....	....
Houston, Tex.	3.75	4.30	4.30	4.05	4.05	5.50	4.00	....	5.25	....	6.90	....	....
Seattle	4.20	4.25	5.45	4.75	4.45	6.50	4.65	7.60	5.70	....	5.75	....	....
Los Angeles	4.35	4.90	6.70	4.90	4.60	7.15	4.95	7.15	5.95	....	6.10	10.55	9.55
San Francisco	3.95	4.50	6.25	4.65	4.35	6.35	4.55	6.40	6.10	....	6.80	10.80	9.80

*Not named in OPA price order.

	S.A.E. Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	6.25	....	8.00	7.85	8.65
Los Angeles	4.60	9.55	8.55	8.40	8.80
San Francisco	5.45	9.80	8.80	8.65	9.05

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland; 300-9999 Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham, Memphis.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Omaha, Kansas City, St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities, New Orleans; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-10,000 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles in Philadelphia: 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco; 1 to 99, Los Angeles; 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

Ores

Lake Superior Iron Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	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	Chemical Composition Limits, Per Cent — 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
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 8339	.35-.42	1.30-1.60	.20-.35	.....	.....	.20-.30	.75	15.00	1.25	25.00
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-.60	.15-.25	.75	15.00	1.25	25.00
NE 8715	.13-.18	.70- .90	.20-.35	.40-.60	.40-.60	.20-.30	.80	16.00	1.30	26.00
NE 8949	.45-.50	1.00-1.30	.20-.35	.40-.60	.40-.60	.30-.40	1.20	24.00	1.70	84.00
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-.40	.08-.15	.80	16.00	1.30	26.00
NE 9442	.40-.45	1.00-1.30	.40-.60	.20-.40	.20-.40	.08-.15	.85	17.00	1.35	27.00
NE 9537	.35-.40	1.20-1.50	.40-.60	.40-.60	.40-.60	.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 100 lb., on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semifinished. 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 AND FOUNDRY GRADES										
				Low Phos. Grades								Alloy-Free	First Cut	
					Bar	Heavy Structural, Plate			Cut Auto Scrap			Low	Heavy	
	OPEN HEARTH GRADES*	Machine Shop Turnings	BLAST FURNACE GRADES*	Billet, Bloom Forge Crops	Crops and smaller; Punchings, Plate	3 ft. and less	2 ft. and less	1 ft. and less	3 ft. and less	2 ft. and less	1 ft. and less	Phos. & Sulphur Turnings	Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$16.00	$16.00	$25.00	$22.50	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Bethlehem	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Buffalo	19.25	15.25	15.25	24.25	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	15.50	15.50	24.50	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Detroit	17.85	13.85	13.85	22.85	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo	...	13.85	13.85	.....	.....	.....	.....	.....	...	.....	.	.....	.....	.....
Chicago	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Kokomo	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth	18.00	14.00	14.00	23.00	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
St. Louis	17.50	13.50	13.50	22.50	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	13.00	13.00	22.00	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle	14.50	10.50	10.50	19.50	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50

RAILROAD SCRAP

				Scrap Rails		
	Heavy Melting Steel	Scrap Rails	Rails for Rolling	3 ft. and under	2 ft. and under	18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	$21.00	$22.00	$23.50	$24.00	$24.25	$24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	17.50	18.50	19.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico. Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

***Open Hearth Grades** refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, No. 2 busheling, $2.50 under No. 1 heavy melting steel, auto springs, crankshafts, $1 over No. 1 heavy melting. **Blast Furnace Grades** prices refer to mixed borings and turnings, shoveling turnings, and cast iron borings.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $2.50 less (railroad grades $3.50 less; material from which Nos. 1, 2 and 3 bundles made is $4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grades of prepared scrap." Graveyard autos not considered unprepared scrap.

Remote Scrap: Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

Sheets, Strip . . .

Sheet & Strip Prices, Page 94

Sheet schedules continue to be crowded, with many producers unable to give delivery on current inquiries much before March, even on high ratings. In cold-rolled the rolling schedules show greater variance and some producers still can offer shipment in February, while others can promise nothing before late March.

Narrow cold strip producers, operating under directives, are at 70-80 per cent of capacity with quotas of finished steel sold through first quarter for the most part. Production about equals shipments, high carbon predominating with heat-treating a choke point with some mills. Revision of hot strip schedules is shifting suppliers in more instances, hot mills normally shipping to one consumer frequently being replaced by another for part of the needed tonnage. Alloy scheduling is confused by frequent last-minute changes before final approval, 90 per cent of the heat required to be earmarked for specific high-rated needs before finally being approved.

For delivery at Hartford, Conn., Baltimore and Charlotte, N. C., Associated Transport Inc., New York, is asking bids on an indefinite number of 30-foot semi-trailers, builders to furnish from 25 to 50 in 1943. These semi-trailers are to be fabricated of stainless steel sheets, shot-welded and are for government freight transportation. Contracts include parts and maintenance.

In some cases sheet mills, though current orders are light, are able to schedule rollings on only small lots with ratings below AA-1 and AA-2, backlogs remaining large. Delivery prospects for first quarter are clouded by the forthcoming change to the Controlled Materials Plan and frequent directives. To meet these conditions most sheet mill schedules are not formulated for more than two weeks ahead.

Plates . . .

Plate Prices, Page 95

Plate demand is firmer and with shipbuilding planned to more than double next year most sellers expect plate mills to be more active than ever. At the same time some producers believe limitations on building construction in particular and better balancing of consumer inventories now in evidence will materially ease the effect of the pressure from expanding ship demand. These interests foresee a highly active year but do not expect demand to exceed available capacity, which at present is not being used to the fullest extent, considering that strip mills could provide more plates if need arose.

Plate production continues at maximum output as a result of increased quotas both for regular plate and armor plate. The temporary hold order which applied to armor plate facilities in the Gary, Ind., works of Carnegie-Illinois Steel Corp. has been lifted and construction work on this new mill, which is being built for Defense Plant Corp. by Carnegie-Illinois Steel Corp., has been resumed. The mill is about 98 per cent

completed, according to a statement made by B. F. Fairless, president, United States Steel Corp., on the occasion of a recent board of directors' meeting. It is assumed this mill will be in production shortly.

Wire . . .

Wire Prices, Page 95

Wire shipments are slightly in excess of new orders; most consumers operating under PRP have not received first quarter allocations and are placing partial requirements under the allowed percentage through January and into February. Ratio of buying continues heavy on high carbon rounds; some low carbon capacity, including tempering equipment, is down and deliveries against some low carbon items can be made in two to three weeks.

Due to curtailments and restrictions on various products, finishing departments are operating at 70 to 75 per cent of total capacity with the number of specialties narrowing. Heat-treating furnaces for high carbon are operating at capacity, seven days a week in most instances. Signal wire, rope strand and barrage cable backlogs are large while increasing requirements for aircraft tend to increase demand for alloys. Except where consumers are operating under PRP, most new volume being placed is rated AA-1. Bulk of rod volume is on directives with non-integrated producers getting semifinished to fill higher rated orders for finished wire, but no excess.

Tin Plate . . .

Tin Plate Prices, Page 95

Output of tin mill products for first quarter probably will be increased materially, though official advice has not been received by all producers as to their quotas. It is reported first quarter quota will be 739,000 tons, which would represent approximately 65 per cent of capacity, contrasted with estimated 35 per cent of capacity in the present quarter.

Rails, Cars . . .

Track Material Prices, Page 95

In view of limitations on freight car construction, deliveries this year will be down from 1941 by about 17,000 cars. Allowing for 2500 cars for December, it is estimated they will run around 70,500.

During the first 11 months commercial car shops delivered 46,269 for domestic account, and railroad shops 13,976, or 60,245 for domestic account. In addition, commercial car shops shipped 7713 for export, making a total of 69,958. Last year, for the entire 12 months, commercial car builders delivered 66,468 for domestic account, and railroad company shops 17,155, a total of 84,623. Foreign shipments of 2386 brought the year's figure up to 87,009.

Shipments in first half of 1943 may run at a substantially higher rate, provided materials are available. Ratings on materials should prove adequate, but there is the possibility of a new realignment once the War Production Board starts balancing war and essential civilian needs in general against supply, under the Controlled Materials Plan. However, at the moment 20,000 freight cars for domestic lines have been approved for construction in the first six months and there has been considerable talk to the effect that 38,000 high-rated cars for export will be turned out during that period. The latter cars carry priorities of AA-1; and the domestic cars, priorities of AA-2-x.

Of the 20,000, approximately 9700 are gondolas and 7500 hopper cars, with the remainder flats and possibly ore cars but there is some question at the moment with respect to ore cars. Perhaps all but 2000 or 3000 on this program represent cars that were ordered some months ago and later frozen.

Car orders so far this year are in excess of 64,000, with about 26,000 for domestic account and 38,000 for export. Last year car orders amounted to 121,499 for domestic account and 11,024 for foreign. However, a number of orders placed last year were subsequently cancelled, perhaps more than 20 per cent, due to later restrictions on construction.

RAILS, CARS . . .

CAR ORDERS PLACED

Central of New Jersey, 5000 tons rails, to Bethlehem Steel Co., Bethlehem, Pa.

Florida East Coast, 14,700 tons rails to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., subject to WPB approval.

Reading, 10,000 tons of 130-pound rails to Bethlehem Steel Co., Bethlehem, Pa.

LOCOMOTIVES PLACED

Nashville, Chattanooga & St. Louis, ten 4-8-4-type steam locomotives and five 1000-horsepower diesel electric switchers, to American Locomotive, subject to WPB approval.

BUSES BOOKED

Twin Coach Co., Kent, O.: Thirteen 31 passenger for Syracuse Transit Corp., Syracuse, N. Y.; nine 32-passenger for New York State Railway Co., Utica, N. Y.; eight 41-passenger for Southern Coach Lines, Nashville, Tenn.; eight 44-passenger for Georgia Power Co., Atlanta, Ga.; two 33-passenger for Central Illinois Electric & Gas Co., Rockford, Ill.; two 25-passenger for Reading Street Railway Co., Reading, Pa.; two 33-passenger for Northern Indiana Transit Co., South Bend, Ind.; two 33-passenger for Southern Indiana Gas & Electric Co., Evansville, Ind.

Structural Shapes . . .

Structural Shape Prices, Page 95

Absence of awards and new inquiries marks the structural steel situation in this district. Activity thus is the lowest in many years, even including the depression. Structural shops still are working on old orders, but backlogs are not expected to provide work for much longer than through February. Plain shapes are available from the mill three to four weeks. Prospects for the industry are not bright and new business is drying up rapidly. Some fabricators are developing ship assembly work and thus take up some slack in their normal operations. However, under the mill quota system less steel is being allocated to structural mills.

A few inquiries are being noted for steel piling, indicating that restrictions against its production may be relaxed.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 95

Absence of new reinforcing bar business makes the present situation colorless. The trade states that business is at the lowest level for many years—even going business during the depression required more steel than is in demand now. For all indications now, nothing in the way of new construction is in sight now, but unpredictables of the war program could easily upset this picture suddenly. Jobs involving less than 100 tons now are considered large. Although the government is trying to divert consumption largely to rail steel, mills making this product have little on their schedules. Rerolling rails, consequently, are available in a surplus.

Pig Iron . . .

Pig Iron Prices, Page 96

Pig iron shipments in December have been expedited in many cases to allow foundries to produce more heavily, allowing an extension of the Christmas holiday to three days without losing production.

Requests for January tonnage in general are about the same as for December. Permission to produce more heating stoves and furnaces is expected to result in large allocations to some small producers which have not been able to convert to war work. An easier situation in cast scrap grades has helped some melters who had been pinched for raw material.

Pressure pipe manufacturers are less active and in some districts the foundry melt has declined somewhat.

Scrap . . .

Scrap Prices, Page 98

Survey by War Production Board indicates a sufficient cushion of scrap steel and iron has been accumulated to carry well into the winter and salvage projects now under way are relied on to furnish additional tonnage for later months. Output of industrial scrap from metalworking operations has increased as war production has grown and may be expected to go further before reaching a peak. Automobile wreckers have furnished probably their largest tonnages as many yards have practically cleared everything and the number of additional cars for wrecking is relatively small.

Special Projects Branch of the Conservation Division has a large number of projects under negotiation, clearing legal difficulties encountered in scrapping bridges, buildings and other structures. Tonnages from these projects will be large when realized. Consideration is being given to salvaging counterweights on large outdoor cranes, replacing them with new weights made from poor quality scrap from the household drive, as weight is the only quality required.

A factor in the long range situation is that the greater part of war production is for foreign destination, armament, finished products and semifinished steel, none of which returns any scrap to this country.

Buffalo consumers continue in com-

fortable position, reserves being sufficient for several weeks. Dealers have added to their yard forces for preparing and shipping their accumulations, men released from lake boats and docks being recruited for this purpose. Cold and snow has retarded shipments from outside but has given opportunity to attack material already in yards. It is claimed all material collected in the household drive has been collected for a radius of 50 miles from Buffalo, but much of it still is in scrap yards.

In the eastern Pennsylvania district heavy breakable cast is scarce and considerable pressure is being exerted for acid and electric furnace scrap. Steelmakers are in comfortable position on heavy melting steel and in the case of turnings are receiving more than they can use effectively. Dealers complain not enough material is being received to keep them busy, due to severe winter weather.

In the Cincinnati district the position is easy, though movement has been slowed by cold weather restrictions on yard work. Foundries are comfortably stocked and are inspecting more closely. Steel mills are accepting all offerings and have reserves for all nearby requirements.

Iron Ore . . .

Iron Ore Prices, Page 97

Blast furnaces in the United States consumed 7,227,497 gross tons of Lake Superior iron ore in November, compared with 7,370,595 tons in October and 6,313,933 tons in November, 1941. Cumulative consumption to Dec. 1 this year has been 76,173,610 tons, compared with 67,707,421 tons in the corresponding period last year.

Iron ore on hand at blast furnaces in the United States Dec. 1 totaled 45,031,003 tons, against 44,415,052 tons a month earlier and 38,839,932 tons a year ago. Ore on Lake Erie docks Dec. 1 totaled 7,151,439 tons, compared with 6,784,039 tons Nov. 1 and 5,290,117 tons a year previously.

Canadian consumption in November was 228,290 tons, in October 228,069

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 8% 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

tons and in November, 1941, 187,094 tons. To Dec. 1 Canadian furnaces had smelted 2,292,493 tons, compared with 69,273,701 tons in the corresponding period last year. As of Dec. 1 Canadian furnaces had on hand 1,521,016 tons, compared with 1,468,191 tons. Nov. 1 and 1,404,584 tons Dec. 1, 1941.

As of Dec. 1 active blast furnaces in the United States numbered 172, compared with 174 a month earlier, and 170 Dec. 1, 1941.

Warehouse . . .

Warehouse Prices, Page 97

Warehouse stocks of certain items continue to improve, but supply is exceedingly tight for all alloy and cold-drawn lines. Demand remains heavy, but is somewhat lighter than existed during the past few months, when buyers were seeking steel almost frantically. The better receipts apply to structurals, plates, bars and a few other hot rolled products, but shortages exist in certain sizes, making for inconvenient unbalance. The NE steels are available in somewhat larger allotments, but they must be dispatched to customers on the waiting list almost as soon as they are unloaded, so that distributors have been unable to build up stocks of any consequence.

Mill shipments to warehouse have declined somewhat although the situation has been eased by recent larger receipts, though most of this material moved out promptly to consumers. Plates, for a time more plentiful in odds and ends, have become scarce again. Stocks of sheets are light and all cold-rolled and alloy items are in small supply, with assortments much broken.

Fluorspar . . .

Fluorspar Prices, Page 96

Voluntary conservation of fluorspar by steel producers has been asked by the fluorspar section of the War Production Board. The plan is to reduce consumption 10 to 15 per cent in the hope of avoiding a shortage of some 50,000 tons of the metallurgical grade in 1943 at the present rate of consumption. At the same time it was made known that substantial tonnages of new fluorspar will be added to the supply through increased production and imports.

Mine shipments of all grades of fluorspar from mines to consumers in 1941 were 320,000 tons, an increase of 80,000 tons over 1940. Requirements for 1943 are expected to be close to 500,000 tons.

To meet these essential needs of the steel, aluminum, and aviation gasoline industries, domestic production has been increased to 350,000 tons this year. But while imperative needs are barely being met at this time, next year's domestic production would, if corrective steps were not taken, drop many thousands of tons. To avoid a potential shortage for war production of 100,000 tons next year, WPB is now carrying on an aggressive program to stimulate production.

The principal fluorspar producing area, the Ohio River Valley in Kentucky and Illinois, produces over 80 per cent of the nation's fluorspar. Miners from this area have been lost to the Army, to military construction, and to higher-paying war production plants, and as a direct result production is falling off. In view of existing manpower shortages in this area, the only hope of keeping up production is for men now working in the mines to get out more ore per man.

Extensive explorations are being made by the U. S. Bureau of Mines and the U. S. Geological Survey to uncover new deposits. Drilling has been completed on several important new sources in the west, and the WPB is assisting in the development of projects in Illinois, Kentucky, New Mexico, Colorado, Utah, and Idaho. These new projects are expected to account for upwards of 40,000 tons. of new fluorspar production per year, a substantial amount of which will come in during 1943.

OPA Rules on Scrap Schedule Questions

Recent price interpretations concerning iron and steel scrap made by OPA include the following:

(1) Price determination, mixed cast and steel scrap: The mixed shipment provisions of the schedule do not apply merely to mixtures of various grades of steel or various grades of cast. These provisions also apply where steel and

cast scrap are mixed in the same vehicle.

(2) Price determination, failure of railroad to submit average price information: Where a railroad company failed to submit average price information for a particular grade within two weeks after Feb. 9, 1942 as required by Section 1304.14(a) or (b), its maximum price for such grade is determined by Section 1304.14 (d), even if the failure to submit such information was inadvertent.

(3) Price determination, shipping points: In the event a shipment of scrap is rejected and reworked and then reshipped to another consumer the scrap assumes a new shipping point computed on the basis of the point from which the scrap is reworked. Thus, where the scrap is shipped by rail after reworking, it is at its shipping point after it has been reworked and loaded on cars.

(4) Price determination, uncut frogs and switches are classified as unprepared No. 1 heavy melting steel under the schedule.

(5) Price determination, black sheet scrap: Black sheet scrap, such as auto body and fender stock, suitable for preparation into No. 2 bundles is unprepared No. 2 bundles and may be sold at a price not to exceed $4 per gross ton below the maximum price for No. 2 bundles. Such scrap is not to be considered as the unprepared form of No. 2 busheling.

(6) Price determination, weights: Under the schedule, payment for all scrap is to be made on the basis of weights at the point of delivery. Where a consumer is a member of a weighing association or has facilities for weighing scrap, settlement should be on the basis of mill weights. Where the consumer does not have weighing facilities, settlement is to be made on the basis of railroad weights. Shippers' weights may not be used to determine the weight at the point of delivery.

(7) Price determination, barge rate and shipping point price: In computing the maximum shipping point price a dealer in scrap need not have yard facilities for handling water shipment of scrap, nor need he have handled scrap by barge movement, to be permitted to deduct the barge rate, the dock charge, and the lowest established switch from his yard to the dock at a particular point. Thus, if there is an established barge rate from point X to the most favorable basing point, a dealer having a yard away from the point X water front, may use such barge rate in computing his maximum shipping point price.

(8) Price determination, quantity shipped and shipping point price: The maximum shipping point price is the same for any one grade of scrap, at any particular shipping point, regardless of the quality of scrap shipped. Thus, a comparison should be made of the computation of the shipping point prices within a basing point where the same switching charge deduction is used, regardless of the tonnage shipped and regardless of whether delivery is by rail or solely by motor vehicle.

Nonferrous Metals . . .

New York—Division of Information, WPB, has issued a pamphlet including a review of production accomplishments

Nonferrous Metal Prices

Dec.	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
1-24	12.00	12.12½	11.75	52.00	52.00	6.50	6.35	8.25	15.00	14.50	35.00

F.o.b. mill base, cents per lb. except as specified. Copper and brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.75
Zinc, l.c.l.	13.15

Tubes

High yellow brass	22.23
Seamless copper	21.37

Rods

High yellow brass	15.01
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.73

OLD METALS

Dealers' Buying Prices
(In cents per pound, carlots)

Copper

No. 1 heavy	9.25-10.00
Light	7.25- 8.00

Brass

No. 1 composition	8.50- 9.00
Yellow brass castings	5.50- 6.00
Auto radiators	6.12½-6.62½
Red brass, borings & turnings	8.00- 8.50

Zinc

Old	4.75- 5.00
New clippings	6.00- 6.50

Aluminum

Clippings	9.75-10.25
Cast	8.75- 9.25
Pistons	8.50- 8.75
Sheet	8.75- 9.25

Lead

Heavy	4.75- 5.25
Mixed babbitt	5.35- 5.50
Electrotype shells	5.00- 5.50
Stereotype, Linotype	6.00- 6.75

Tin and Alloys

Block tin pipe	44.00-46.00
No. 1 pewter	32.00-36.00
Solder joints	7.75- 8.50

SECONDARY METALS

Brass ingot, 85-5-5-5, l.c.l.	12.50
Standard No. 12 aluminum	14.50

MAGNESIUM

(12 pound rod, 4 in. diam.)

99.8% ingot, carlots	22.50
100 lb. to carlots	24.50
Extruded sticks, ¼ to 2 lb.	
Carlots	32.00
100 lb. to carlots	34.00

and problems in the first year of war. Highlights of those portions of the report covering metals were:

Copper—United States supply increased to nearly 3,000,000 tons in 1942 compared with the previous all-time high of 2,460,000 tons in 1941. Despite a supply greater than the entire world output in 1939 and despite the shutting off of all copper to non-essential needs, production in many munitions plants was dislocated because copper was not available. Scrap collection was a most important source of metal, resulting in more than 600,000 tons of refined copper during 1942.

Zinc—Shortages of zinc were anticipated two years ago, and conservation measures were taken in the early days of the national defense program to bring supply into balance with demand. It was not until mid-1942 that zinc again became critical. The United States faces the second year of war with uncertainty of its future zinc supply. During the past year 48 projects recommended by the Zinc Division of WPB were put into construction. These projects include development of new ore deposits, opening of new mines, mills, smelters and refineries. One new smelter was completed in 1942 and four electrolytic refineries with an annual capacity of 216,000 tons were put into operation. The most serious problems now concern ore deposits, which are limited, and the shortage of labor.

Lead—Lead is the one important metal in which a critical shortage did not exist at the close of 1942. United States supply at the end of 1942 was at the rate of 1,308,000 tons per year compared with 1,339,000 late in 1941. About 350,000 tons of this lead were recovered from scrap, a decline of about 10 per cent from 1941 which was more than offset by increased imports. The net gain in available lead supply grew out of restrictions in civilian uses. Principal concern for lead during the year has been to build a stockpile to take care of all contingencies. To this end all possible production has been encouraged, including premium payments of 2.75-cents

a pound above regular price for all production over quota.

Tin—The Longhorn tin smelter in Texas was completed this year and may be expanded to capacity of nearly 100,000 tons. At present it can handle all the tin ore now available to the United Nations. Efforts to recover tin from cans are expected to provide more than 5000 tons of tin a year. A project of great importance is the current expansion of electrolytic tin plate manufacturing facilities. Pre-war tin plate was made by the hot-dipping process, using about 1.5% tin and 98.5% steel in tin plate. The electrolytic process makes tin plate with only 0.5% tin. These new plants will be in operation in time for the 1943 food crop and will save over 20,000 tons of tin per year.

MEETINGS . . . .

Institute of Scrap Iron & Steel Inc.—Opening session of the fifteenth annual convention, Hotel Pennsylvania, New York, Jan. 16-17, will be devoted to addresses by representatives of various government agencies interested in the scrap problem. At the afternoon session problems of yard operators and of brokers will be discussed and recommendations made. An informal dinner is scheduled for the evening of Jan. 16.

American Foundrymen's Association—Apprentice molding and patternmaking contests will be held in 1943 with the winners of local competitions submitted for the national contest at the association's annual conference, St. Louis, April 28-30.

Labor-Management Committees To Study Truck Transportation

Special labor-management committees will be appointed in 25 "critical" cities to survey labor shortages and potential labor reservoirs in the motor transport industry, Otto S. Beyer, director, Transport Personnel Division, Office of Defense Transportation, announces.

Cities named as "critical", because of truck driver shortages are: Akron, Baltimore, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Columbus, O., Denver, Detroit, Hartford, Conn., Kansas City, Los Angeles, Louisville, Minneapolis, New York, Oakland, Calif., Philadelphia, Pittsburgh, Portland, Oreg., St. Louis, Salt Lake City, San Diego, Calif., San Francisco, and Seattle.

Three representatives of the trucking companies in each city and three from the city locals of the International Brotherhood of Teamsters will be named by their principals to each of the special committees.

Objective of the survey will be to devise ways and means completely to utilize truck driver manpower sources within each city so as to avoid among other things, bringing new people into critical localities.

New Sources for Iron and Steel Scrap Sought by War Agencies

WHILE pressure to bring out iron and steel scrap has been relieved somewhat by results of the various drives in recent weeks, officials of the various WPB Conservation Division branches concerned with salvage operations emphasize the necessity for a continued program of scrap procurement from sources other than those tapped by the special campaigns.

Output of industrial scrap derived from metalworking operations has been growing with the expansion in war production and may be expected to climb further. On the other hand, certain other sources are drying up or have tapered materially.

Dormant scrap from industrial plants and household offerings are largely of a nonrecurring nature and cannot be expected to maintain the volume of past months. Auto graveyards also have

furnished more than a normal amount of scrap as a consequence of the concerted effort to junk old cars, and although the jalopies will continue to be dismantled in substantial number, the potential tonnage of scrap from that direction tends downward.

An increasing amount of scrap is expected to come from special projects—abandoned bridges, mines, buildings, etc. Special Projects Branch of the Conservation Division, which handles what legal difficulties must be overcome before such structures can be transformed into scrap, has a relatively large number of such jobs under negotiation. Tonnages will run high individually on these projects, compared with the small lots generally obtained from each of the numerous contributors to the special salvage campaigns.

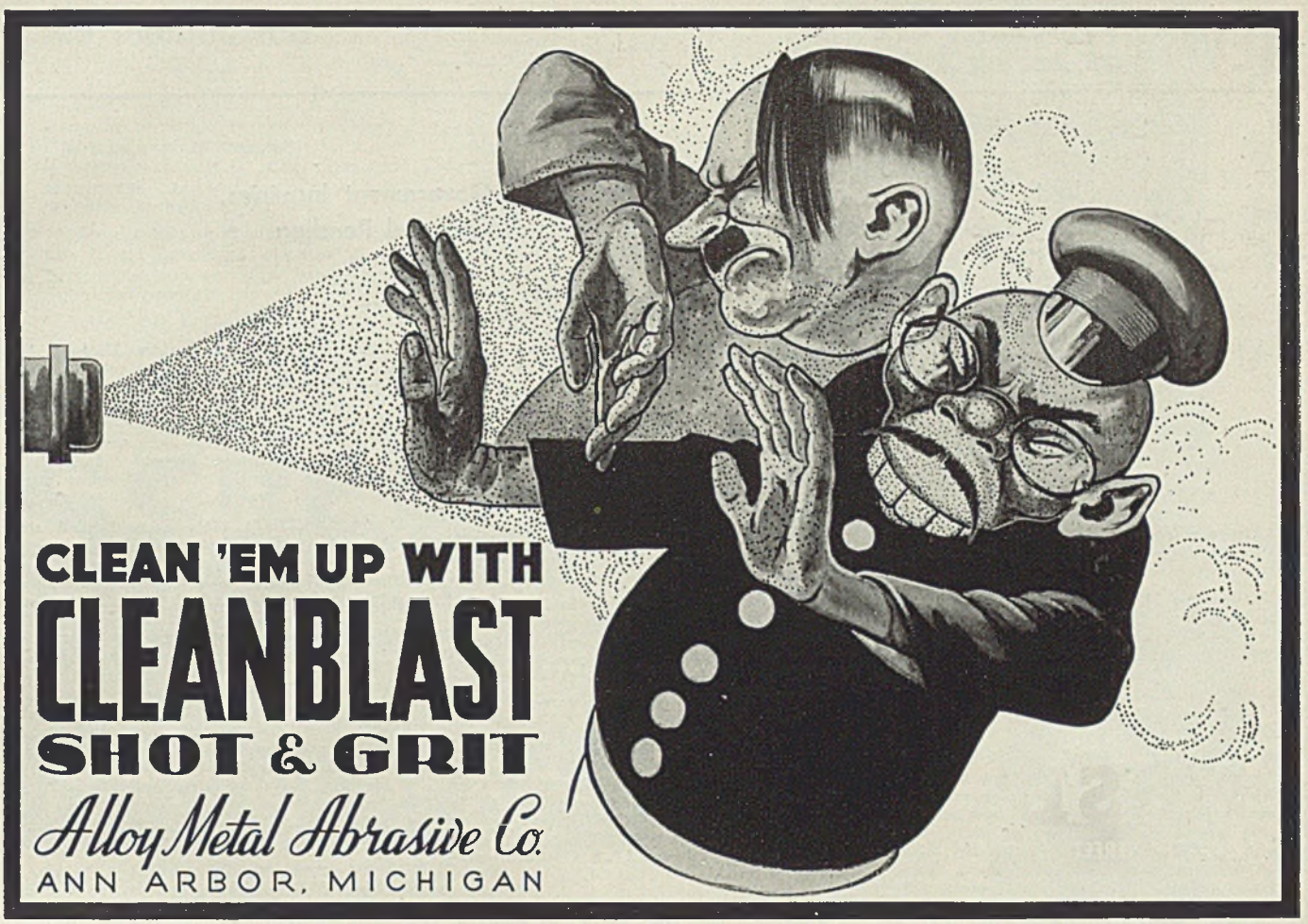
Other possible sources of scrap are being examined. For instance, consideration is being given to the salvaging of counterweights on large outdoor cranes by substituting some of the low quality scrap accumulated in recent drives. These weights are said to be made of material desirable for scrap—not to be confused with sash-weight composition—and comprise a surprisingly large tonnage. While the low-grade household scrap is moving into consumption, steelworks encounter difficulty in absorbing the material except as a rather small proportion of the total charge.

A sufficient cushion of scrap to tide steelmakers over the winter appears to be in prospect. By next spring additional new blast furnaces will be in production and will help to take up what slack results from conclusion of special scrap drives, but the supply problem will continue to be aggravated by the fact most of our war production is destined for abroad, including both manufactured items and finished and semi-finished steel products—all of which return no scrap to this country.

Scrap Stocks Gain 13 Per Cent During October

Domestic stocks of steel and iron scrap at the end of October at consumers', suppliers' and producers' plants were approximately 6,260,000 gross tons, an increase of 13 per cent over 5,545,000 tons on Sept. 30, according to the Bureau of Mines. Consumer stocks were up 11 per cent and suppliers and producers reported increases of about 22 per cent. The gain in consumer stocks was lifted by larger deliveries of purchased scrap.

Total consumption of ferrous materials, scrap and pig iron, was 9,364,000 tons in October, an increase of 7 per cent over September.



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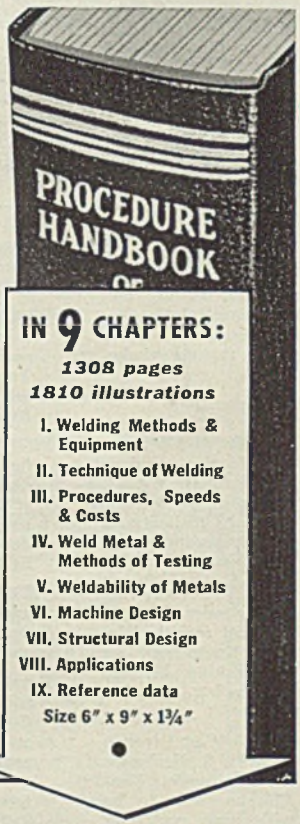

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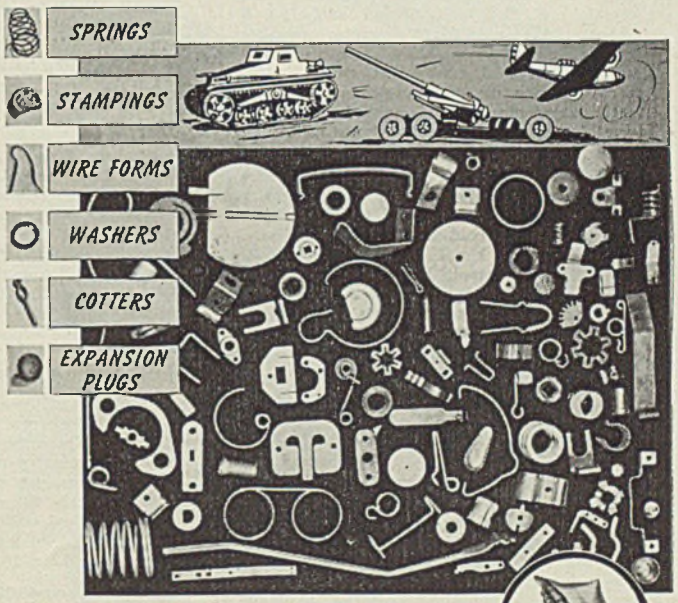

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NEW BUSINESS

Plant Expansion, Construction and Enterprise, Government Inquiries, Sub-Contract Opportunities, Contracts Placed and Pending

SUB-CONTRACT OPPORTUNITIES

Data on subcontract work are issued by regional offices of the War Production Board. Contact either the office issuing the data or your nearest field office. Write, don't telephone, and mention key letters and numbers appearing before each item to assure prompt attention and avoid delay.

Chicago office, Contract Distribution Branch of WPB, 226 West Jackson boulevard, is seeking contractors for the following:

Allis-Chalmers Mfg. Co., Springfield, Ill., attention Owen J. Higgins: Idler arm on priority AA-1, contractor to supply material. Size, 15 x 32 inches. Material, cast steel. Quantity, 8000 at 270 per week. Equipment, 3-inch spindle horizontal boring mill, plain No. 3 horizontal milling machine, 36-inch arm radial drill.

Bell & Howell Co., 7100 McCormick boulevard, Lincolnwood, Ill., attention Clinton S. Davis. Aluminum and brass castings to be machined, subcontractors in Chicago metropolitan district preferred. Contractor supplies material, tools, fixtures and gages. Quantity, 3700 to 5700 of five items. Equipment, turret lathes of 1 and 1½ inches bar capacity, 15-ton inclinable press, vertical profiler 14 x 48 inches. Tolerances, .001 and .002.

Budd Wheel Co., 12141 Charlevoix, Detroit, attention W. R. Davis, Wheel hub, 1 x 5 inches, AA-1 priority. Contractor supplies material. Quantity, 90,000 at rate of 15,000 monthly. Material cold-rolled steel. Equipment, 1½-inch capacity single spindle automatic screw machine, 1½-inch bar capacity turret lathe, two-spindle bench drill, ⅝-inch drilling capacity.

Columbian Enameling & Stamping Co., Terre Haute, Ind., attention Kenneth Urau. Four items requiring 800,000 each at 100,000 per month. Material, cold-rolled steel and brass, ½ x 1 inch and 1 x 1 inch. Material, 1020 or WDX 1314 steel. Equipment, four and six-spindle automatic screw machines, bench drill. Prefers subcontractor within 100 miles.

Cameron Can Machinery Co., 240 North Ashland avenue, Chicago, attention W. M. Cameron. Two lots of cast iron blocks, 14 of each, 88 x 172 inches, 5000 and 8000 pounds. Operations, four setups for planing. Equipment, open-side planer, 84-inch. Priority, AA-1.

Cherry-Burrell Corp., 427 West Randolph street, Chicago, attention M. G. Brand. One item is shaft. Blanks furnished by prime require only splining and carburizing. Second item is adjusting screw. Priority AA-1. Equipment, four-inch spline milling machine, carburizing, four-spindle automatic screw machine ⅝-inch capacity, hand milling machine 6 x 14 inches.

Continental Can Co., 7600 South Racine avenue, Chicago, attention John Aschbach. Cylinder housings for oil replenishers. Quantity, 50, size 5 x 22 inches, material bronze. Equipment, No. 3 vertical milling machine, three-spindle horizontal boring mill, plain No. 3 horizontal milling machine, 12 x 30-inch cone head engine lathe. Jig borer preferred to vertical milling machine.

Crosley Corp., Cincinnati, O., attention W. A. Aiken. Valve seat. Material, stainless steel type 303 chrome nickel supplied by contractor. Permanent form tools to be quoted separately, other tools included in price. Priority AA-1 and AA-2. Equipment, single-spindle automatic screw machine ⅝-inch bar capacity, hand milling machine 6 x 14 inches, carburizing, cadmium plating. Quantity, 25,000.

Federal Electric Co., 8700 South State street, Chicago, attention W. F. Moorhouse. Spacer screw for siren. Material, cold-rolled steel. Number, 40,000, on AA-1 priority. Equipment, single-spindle automatic screw machine ⅜-inch capacity, turret lathe ⅜-inch bar capacity.

P. R. Mallory & Co. Inc., 3029 East Washington, Indianapolis, Ind., attention K. R. Roberts. This contractor seeks subcontractors on several items in quantities of 25,000 to 100,000. Material, brass. Equipment, single-spindle automatic screw machines, hand milling machines. Priority, AA-1. Contractor supplies material.

Pettibone Mulliken Co., 4710 West Division street, Chicago, attention R. F. Marsden. Machining of trunnion. Boring mill must have positive feed for cutting 12-inch 8NS-2 internal thread. Prefer subcontractors within 50 miles. Work will continue through 1943. Quantity, 500. Dimensions, 25 x 30 inches. Material, cast steel. Equipment, horizontal boring mill with 4-inch spindle. Tolerance, .002.

Studebaker Corp., aviation division, South Bend, Ind., attention J. M. Wilder. Screw. Quantity, 1,000,000, size 1 x 1½ inches. Subcontractor should have thread grinder. Thread is .438-20 USF x .62-inch long. Contractor supplies material. Equipment, 1-inch capacity single-spindle automatic screw machine, plain No. 0 horizontal milling machine, 7 x 16 x ¾-inch bench lathe, ¼-inch drilling capacity two-spindle bench drill, 5 x 18-inch external thread grinder, hardening equipment.

Trane Co., LaCrosse, Wis., attention A. W. Schroder. Pressure plate, 12 x 25 x ⅜-inch cast iron. Quantity, 112 in lots of 25. Faces must be ground parallel within plus or minus .0005. Contractor supplies material. Weight, approximately 90 pounds each. Equipment, No. 3 vertical milling machine, 36-inch arm radial drill, No. 2 Morse single-spindle sensitive drill, 12 x 36-inch surface grinder.

Tropic-Aire Inc., 4501 Augusta boulevard, Chicago, attention F. G. Schminder. Booster holder 1 x 2 inches, alloy steel furnished by contractor. Priority, AA-1. Equipment, six spindle automatic screw machine 1¼-inch capacity, turret lathe 1-inch bar capacity. Tolerance, .003.

Wallace Supplies Mfg. Co., 1300 West Diversey Parkway, Chicago, attention H. S. Nachman. Job covers making of die for flanges. Contractor also wishes 8000 stampings to be made and will place with same contractor if possible. Contractor supplies material for flanges only. Size, 6 x 4 inches. Material, tool steel. Equipment, heavy duty engine lathe, tool post grinder, No. 2 vertical milling machine, 1 x 8¼-inch die filing machine, No. 2 Morse single-spindle sensitive drill. Priority, .001.

Display No. 307: Link forgings. Material, AN-QQ-S-756 steel, furnished by sub. Tool cost to be quoted separately; five pieces of various sizes. Equipment, 5000-pound drop board hammer, 10,000 and 12,000-pound drop hammers, normalizing and annealing furnaces. Tolerances, 1/16, 1/8 and 3/32-inch. Prime contractor, Chrysler Corp., Detroit, attention W. N. Brown.

Display No. 316: Material cold-rolled steel tubing, cast iron, brass and aluminum castings, furnished by prime. Total of 27 items varying in size, some rather small and up to 20 x 20 inches and 72 inches long. Quantities 400 to 1600 per item. Tolerance .005. Equipment, ⅞-inch bar capacity turret lathe; ¼-inch capacity bench drill press; 3-inch cutoff machine; ½-inch capacity vertical tapping machine or tapping attachment; hand miller; ⅜-inch capacity single-spindle drill press; ⅜-inch capacity vertical tapping machine or tapping attachment. Prime contractor, Standard X-Ray Co., 1932 North Burling street, Chicago, attention P. P. Preston.

Display No. 320: Grommets. Material, SAE 1010 dead soft steel, furnished by sub. Total of eight items, sizes ½-inch O.D. x ¼-inch, to 1-inch O.D. x ⅜-inch. Priority, AA-1. Prime will consider eyelet machine. Quantity, 100,000 and 2,000,000 pieces. Tolerance, .010. Prime contractor, Shakeproof Inc., 2501 North Keeler avenue, Chicago, attention George Jensen.

Boston office, Contract Distribution Branch of WPB, 17 Court street, is seeking contractors for the following:

SC-35: Automatic screw machine work for machines having ⅜-inch diameter bar capacity. Secondary operations on hand screw machine and bench drilling. Three items ranging in length from 2⅝ to 3 7/16-inch. Material, hex steel SAE 1020 supplied by prime contractor. Tolerance, .005. AA-1 priority. Quantities 2,000,000 each size. Reference, 1-A-414.

SC-36: Steel foundry facilities for various sizes marine castings ranging from 50 to 500 pounds. Quantities range from 40 to 1600. Total requirements about 100 tons. Deliveries spread over 1943, starting in January. High priority. Reference, 1-A-413.

SC-37: Horizontal boring mill facilities suitable for boring valve chambers 6½ to 11¾ inches diameters. Tolerance, .001. Twenty-two each of three items weighing 2000 to 3500 pounds. Iron castings and cutter heads supplied by prime contractor. Priority, AA-1. Early delivery required. Reference, 1-F-380.

Philadelphia Office, Contract Distribution Branch, Production Division, WPB, Broad Street Station building, reports the following subcontract opportunities:

Roystuart 64-4: Eastern shipyard requires 24 rudder quadrants and emergency tillers. Equipment required, 70-inch chucking lathe or vertical boring mill, slotter, No. 4 horizontal milling machine, cutting torch, electric arc welder, 8-inch bench lathe, drill press. Overall dimensions, quadrant hub 12 inches deep x 10 inches long and eight feet wide; tiller, seven feet long x 19 inches wide and 7½ inches deep. Material, medium steel and cast steel, to be furnished by subcontractor. Prints and specifications at Philadelphia office.

Roystuart 61-1: An Ohio corporation requires 25,000 discharge valve seats. Material, stain-

less steel. Equipment, automatic screw machine one-inch spindle, drill press, flat lapping machine ½-inch diameter and $\frac{1}{32}$-inch seat. Dimensions, one-inch O.D. x .328 width. Tolerance, .002, threads NEF No. 3. Material to be furnished by contractor. Drawings and specifications at Philadelphia office.

Roystuart 59-5: Government agency requires additional facilities for machining aviation engine crankshafts. Production requirements start at 31 and 57 units per month, increasing progressively. Equipment, heavy duty lathe 24-inch swing 10 feet center to center, crankshaft grinder, thread grinder, heavy duty drill press, drilling machine, balancing equipment, heat treating. Dimensions O.D., length 37 and 48 inches, main bearing 2½ and 2¾ inches, crank throw same. All forgings furnished.

Detroit office, Contract Distribution Branch, Production Division, WPB, Boulevard building, is seeking contractors for the following:

Job No. 3437: Gun mount shaft sleeve. SAE No. 4140, 1⅝-inch O.D. Material is furnished. Equipment, hand screw machine, heat treat, cadmium plate, internal and external grinder. Order is for 6500.

Job No. 3440: Eccentric flex. Gun bushing. SAE No. 4140 2 x .687. Material is furnished. Equipment, hand screw machine, 2-inch O.D., hand screw machine, $1\frac{9}{16}$-inch collet, hand drill, mill. Order is for 6500.

Job No. 3472: Right-hand driven clutch gear. SAE 4145 or hyten B4 or B3X steel, 3¼-inch O.D. Equipment, hand screw machine, gear shaper, hobber, sensitive drill, tapper, lathe, heat treat, internal grinder. Order is for 3000.

Job No. 3473: Left-hand driven clutch gear. Same material and equipment as in No. 3472.

Job No. 3442: Turret sight actuating shaft, No. 2512 steel, .56 diameter x 2.32. Equipment, hand screw machine $\frac{9}{16}$-inch O.D., hobber two operations, heat treat, cadmium plate, centerless grinder. Order is for 6400.

Job No. 3512: Turret gun camera bolt. SAE No. 2330 steel, ½ x 1.219-inch. Equipment, hand screw machine, mill, cadmium plate. Order is for 6400.

Jobs No. 3756 to 3771: Prime contractor seeks casting facilities on magnesium alloy on several jobs. Sizes run from 2½ x 2½ x 2-inch to 9¾ x 5 x 3⅛-inch. Orders are for 900 on each job. Prime will consider subcontracting as many jobs as facilities can handle.

Job No. 3557: Bevel gear blank only. Zinc die casting or brass. Prime will furnish brass rod, $1\frac{5}{16}$-inch. Equipment, automatic screw machine, sensitive drill. Order is for 12,300 on AA-1 priority.

Minneapolis office, Contract Distribution Branch of WPB, 334 Midland Bank building, is seeking contractors for the following:

S.O. No. 204: Complete machining of diesel cylinder heads. Approximate dimensions, 34 x10 x 5 inches. Iron castings furnished. Quantities 600 to 1000. Drawings at Minneapolis office.

S.O. No. 260: Aircraft engine parts, tappets, studs, piston pins, bushings, etc. Grinding operations on most. Close tolerances. Drawings and samples at Minneapolis office.

S.O. No. 273: Source urgently required to manufacture various ring and plug gages to 2¼ inches.

S.O. No. 277: Several very small screw machine parts. Quantities, 2000 to 50,000. Material, brass. Tolerance, .001. Sizes vary from .09 to .75-inch diameter. Samples and drawings at Minneapolis office.

S.O. No. 300: Part, plug pin, five sizes. Facilities required, automatic screw machine, ¼-inch. Quantities, 100,000 of each size. Order will be repeated. Deliveries as soon as possible. Tolerance, .004. Material, half-hard brass, to be furnished by subcontractor. Price set by prime contractor. Drawings at Minneapolis office.

CONSTRUCTION AND ENTERPRISE

OHIO

CANTON, O.—Diebold Safe & Lock Co., 818 Mulberry road Southeast, plans power house. L. W. Kilgore, 1311 Cherry street Northeast, is general contractor.

CANTON, O.—Union Metal Mfg. Co., reported Dec. 14 as planning an addition for more production space, is in addition to this project remodeling the 20,400-foot factory building at rear of 1432 Maple street Northeast. Estimated cost of alterations $36,000.

CLEVELAND—Sackman Mfg. Co. is being incorporated to deal in steel and metal stampings and other metal products. Dorothy I. Hyde, 1175 Union Commerce building, attorney, is statutory agent for the firm.

CLEVELAND—Westinghouse Electric & Mfg. Co., W. F. White, manager, plans improvements to foundry building at 1216 West Fifty-eighth street.

CLEVELAND—International Metal Hose Co., A. H. Miller, president, 10709 Quincy avenue, has awarded contract for one-story factory, office and storage building to Sam W. Emerson Co., 1836 Euclid avenue. Estimated cost $40,000. Bonfield & Cummings, 1900 Euclid avenue, architects.

CLEVELAND — Vanderhorst Corp., Olean, N. Y., is erecting a boiler house at its new plant here at 12500 Berea road. The firm is remodeling a part of the old Lakewood Engineering Co. plant. D. A. Murdock is the local representative and has his office at the Berea road location.

CLEVELAND—Linderme Tube Co., Emil J. Linderme, vice president and treasurer, is spending $14,000 for factory addition and $10,000 for degreasing building at its plant at 1500 East 219th street, Euclid, O.

CLEVELAND — Lempco Products Co. plans building at present plant on Dunham road in Maple Heights. James F. Strnad is president.

CLEVELAND—Eaton Mfg. Co., Clifford I. Ochs, president, 739 East 140th street; is erecting a $35,000 building for storage purposes.

CUYAHOGA FALLS, O.—Atlas Mold & Machine Co., 2812 Vincent street, will spend $20,000 for machine shop.

CUYAHOGA FALLS, O. — Akron Machine Mold, Tool & Die Co. is expanding production facilities. Latest improvement is a 9000-square foot machine shop costing approximately $25,000.

WARREN, O.—Copperweld Steel Co., S. E. Braemer, president, Glassport, Pa., is expanding plant here on Mahoning avenue. Present plant will be increased from four furnaces to seven. William B. Klee is local manager.

CONNECTICUT

STAMFORD, CONN. — Reflectone Inc., 67 Greenwich avenue, is altering factory at 114 Manhattan street.

RHODE ISLAND

PROVIDENCE, R. I.—United States Rubber Co., 355 Valley street, Providence, plans plant.

NEW YORK

FARMINGDALE, N. Y.—Republic Aviation Corp., Farmingdale, plans additional aviation plant facilities in Indiana. Defense Plant Corp., Washington, will own the plant and Republic will operate it.

NEW JERSEY

NEWARK, N. J.—E. I. Du Pont de Nemours & Co., Jersey avenue, New Brunswick, N. J., has let contract for three-story chemical

manufacturing building addition to Rogers & Sons Construction Co., 71 John street, New Brunswick. Estimated cost $40,000.

PENNSYLVANIA

NEW BRIGHTON, PA.—Brighton Clay Products Co., W. H. Schwartz, president, Pinney street, will build three-story factory and one-story machine shop and other buildings here. Estimated cost $75,000.

PHILADELPHIA—F. C. Castelli & Co., F street and Erie avenue, has given contract for manufacturing building, office and garage to Henry E. Baton Inc., 1717 Sansom street. Estimated cost $40,000.

MICHIGAN

DETROIT—O. W. Burke Co. has been awarded contract for engine building for Chrysler Corp. in Highland Park.

DETROIT—Albert A. Albrecht Co., Detroit, has contract for addition to factory at 2860 Clark for Cadillac Motor Car Co.

PORT HURON, MICH.—Gibraltar Products Co., 1605 Elmwood, Port Huron, has been organized to manufacture tools, dies and jigs. Correspondent: Stewart P. Blasier, 66 Sunningdale, Grosse Pointe Shores, Mich.

ROYAL OAK, MICH.—Adept Tool & Mfg. Co. Inc., 903 Woodcrest, Royal Oak, has been formed to manufacture cutting tools, dies and jigs. Correspondent: Warren Raddatz, 19189 Havana, Detroit.

ILLINOIS

CHICAGO—Industrial company has let contract for buildings to Consolidated Construction Co., 9 South Clinton street, Chicago. Albert Kahn Associated Architects & Engineers Inc., 345 New Center building, Detroit, engineer.

WISCONSIN

BELOIT, WIS.—Fairbanks, Morse & Co. has given contract to Cunningham Bros. for one-story addition to storage building. W. Fred Dolke, 189 West Madison street, Chicago, architect.

DELAVAN, WIS.—Sta-Rite Products Inc. has begun construction of one-story factory addition.

MILWAUKEE—Supreme Metal Treating Co. has let contract to Ray Stadler Construction Co., Wauwatosa, for one-story addition to factory at 4400 West Mitchell street.

MILWAUKEE—Stolper Steel Products Corp. plans one-story addition to factory. F. F. Drolshagen, 647 West Virginia street, architect.

MILWAUKEE—J. P. Schwada, city engineer, plans to spend approximately $893,000 for sewage system.

WEST ALLIS, WIS.—Allis-Chalmers Mfg. Co., 1126 South Seventieth street, has awarded contract for three-story addition to Meredith Bros. Inc., 121 East Washington street, Milwaukee. C. E. Meyer, care of owner, architect.

WEST ALLIS, WIS.—Wisconsin Motor Corp., 1910 South Fifty-third street, has let contract for design and construction of one-story assembly plant and stockroom to Klug & Smith Co., 111 East Wisconsin avenue, Milwaukee.

MINNESOTA

MINNEAPOLIS—Minneapolis-Honeywell Regulator Co. has given general contract to Northwestern Construction Co. for one-story factory addition.

MINNEAPOLIS—American Bridge Co. has given contract to August Cederstrand Co. for one-story addition to angle shear shop.

MINNEAPOLIS—University of Minnesota, W. C. Coffey, president, will ask forthcoming state legislature for an appropriation for a four-story mechanical aeronautical engineering building to cost about $1,250,000. C. H. Johnston, 715 Empire Bank building, St. Paul, architect.

SOUTH ST. PAUL, MINN.—Farmers Union Exchange Inc., 1200 North Concord street, plans oil refinery to cost about $1,000,000. Emil A. Syfestad is general manager.

WINONA, MINN.—Vulcan Mfg. Co., H. R. Lange, president, 218 South Wabasha street, St. Paul, will lease and operate the old O'Donnell Shoe Co. plant as soon as extensive remodeling and alterations have been made.

LOUISIANA

SHREVEPORT, LA.—Atlas Oil & Refining Corp., Atlas building, has contracted with Hudson Engineering Corp., 2711 Danville street, Houston, Tex., for construction work incidental to conversion of refinery for production of a butylene-butadiene fraction.

TEXAS

CORSICANA, TEX.—Texas Power & Light Co. will spend approximately $40,000 for steam electric station.

HAYS COUNTY, TEX.—Williams & Whittle and Williams & Broughton, Dallas, Tex., has contract for electrical distribution system, to cost under $50,000. United States engineer office, San Antonio district, Fort Sam Houston, Tex., in charge.

HOUSTON, TEX.—American Pipe & Construction Co., 4635 Firestone boulevard, Southgate, Los Angeles, and Lockjoint Pipe Co., Ampere, N. J., and Houston, Tex., have let contract for steel storage and plant facilities here to P. Pertelsen, 2803 University boulevard. Cost estimated at $76,500.

HOUSTON, TEX.—Nyotex Chemical Co., care of C. F. Dunasky, M. Esperson building, Houston, will build lime and chemical manufacturing plant. Total cost estimated at $6,000,000.

ORANGE, TEX.—Federal Works Agency, 1309 Electric building, Fort Worth, Tex., plans sewers, including lift station, pumping unit and sewage disposal plant. C. F. Smith, Orange, engineer. Estimated cost $75,000.

VAL VERDE, TEX.—Paul Wright Electric Co., 1018 South Presa street, San Antonio, Tex., has contract for electrical distribution system. United States engineer office, Fort Sam Houston, in charge.

WYOMING

CASPER, WYO.—Western Equipment Co. has been incorporated with capital stock of $50,000 to deal in highway, industrial and agricultural machinery and equipment. Bert E. Lindsey, is secretary of the company.

CALIFORNIA

ALHAMBRA, CALIF. — Contract has been awarded for factory building at 230 Date avenue for American Pipe & Steel Co. to cost approximately $35,000.

BURBANK, CALIF.—Building permit has been issued for storage building at 3201 Empire avenue, for Vega Aircraft Corp., to cost $594,000.

LOS ANGELES—Aero & Automotive Accessories Co. has been incorporated with capital of $250,000. Directors are: Dean S. Conklin, Beverly Hills, Calif.; E. A. Howard, Altadena, Calif., and Kent Allen, Los Angeles. The new firm is represented by Kent Allen, 458 South Spring street, Los Angeles.

LOS ANGELES—Contract has been let for addition to factory of Acme Machine & Stamping Co., 6611 South San Pedro street, Los Angeles.

SUNNYVALE, CALIF.—Joshua Hendy Iron Works, Henry avenue, has let contract for additions to three buildings to MacDonald & Kahn Inc., 200 Financial Center building, San Francisco. L. H. Nishkian, 155 Sansome street, San Francisco, engineer.

CANADA

GALT, ONT.—Galt Art Metal Co. Ltd., 386 Dundas street, is taking bids through Ray M. Hall, architect, 9 Cathy street, for plant addition to cost with equipment about $25,000.

HAMILTON, ONT.—Otis-Fensom Elevator Co. Ltd., Victoria street, has given general contract to W. H. Yates Construction Co. Ltd., 400 Wellington street North, for plant addition and installation of equipment on a cost-plus basis. Estimated cost about $25,000. Hutton & Souter, Pigott building, architects.

KINGSTON, ONT.—Silica Mines Ltd., R. R. No. 1, has plans for one-story plant building. Estimated cost with equipment $42,000.

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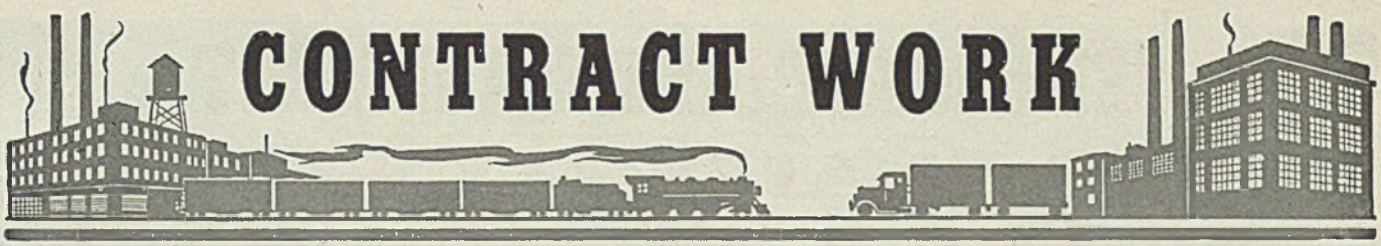

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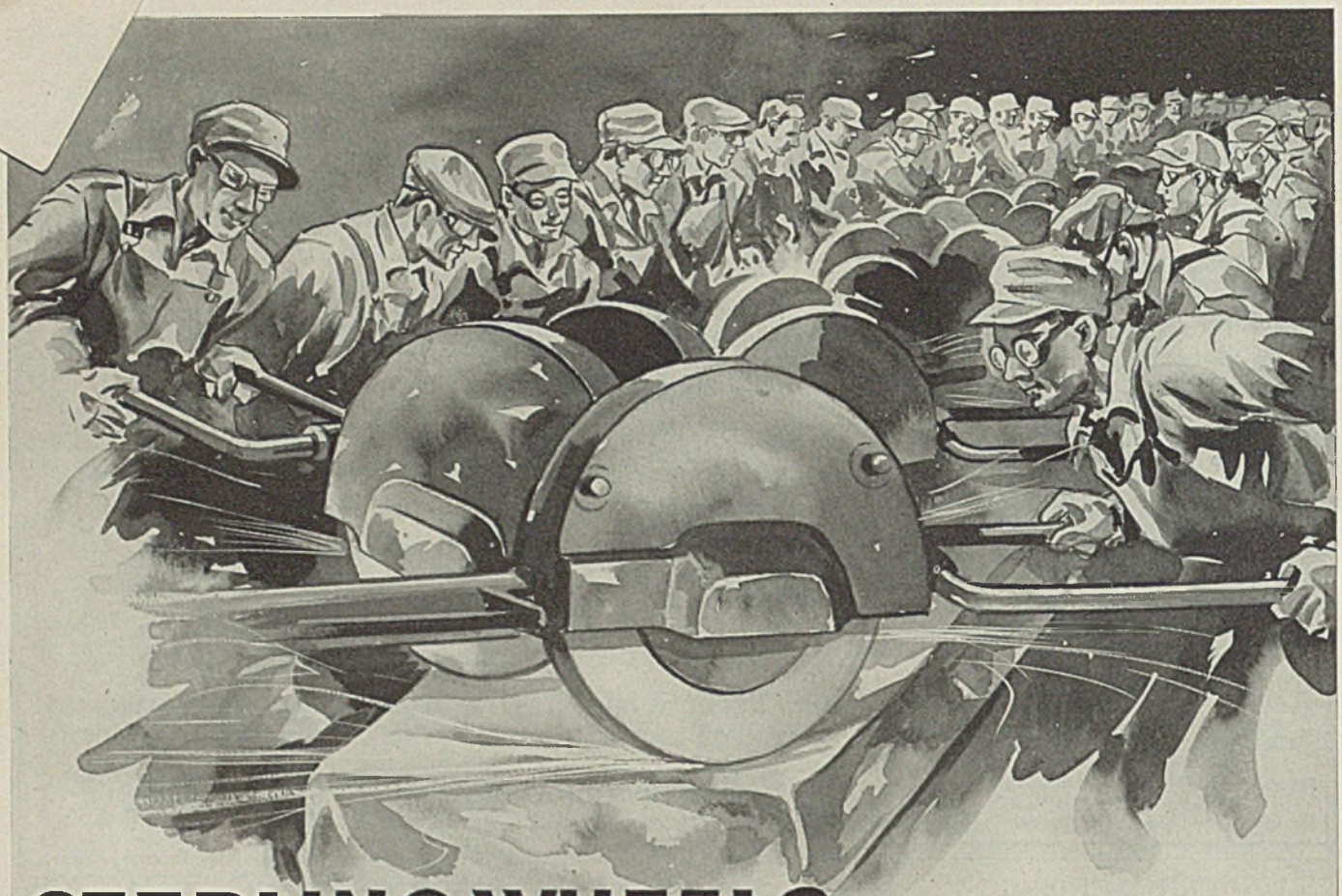

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