STEEL

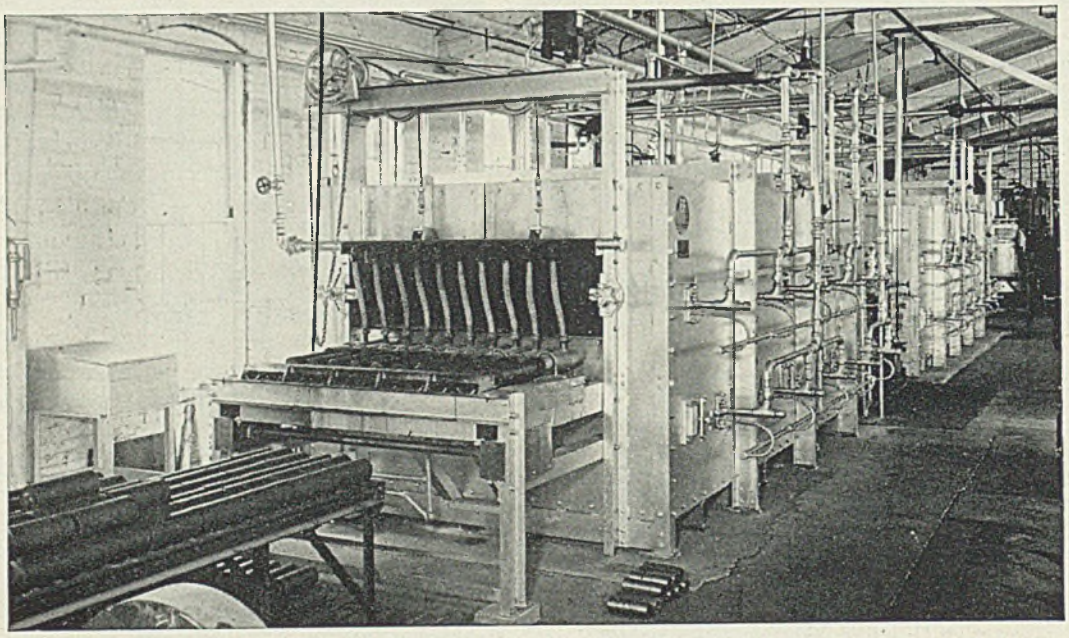
ESTABLISHED 1882

Contents

Volume 109—No. 23 December 8, 1941

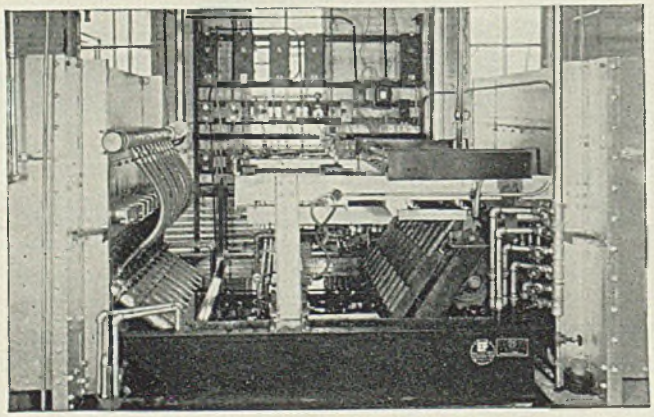
Furnaces For Heat Treating

SHELL



This Completely Automatic EF Furnace Equipment

Heat Treats Shells - - - Scale-Free



Continuous automatic quenching equipment. The shells are quenched without coming in contact with air, automatically reversed and charged into the tempering furnace at right.

Shell forgings are pushed thru the hardening and tempering furnaces in parallel rows in protective atmosphere-filled conveying tubes. An automatic quenching equipment (shown at left) is located between the furnaces. The shells are quenched without coming in contact with air, automatically reversed and charged into the tempering furnace.

This installation is gas-fired and is equipped with ten conveying tubes. Another similar installation with 15 conveying tubes has also just been completed.

This is one of a number of outstanding furnace installations we have made for the production heat treatment of various sizes of shells and for other defense products including machine gun clips, cartridge cases, aircraft and tank parts, gun and ammunition components, etc.

Send for printed matter showing this and other interesting installations.

Submit your furnace problems to EF Engineers

The Electric Furnace Co., Salem, Ohio

Gas Fired, Oil Fired, and Electric Furnaces—For Any Product, Process or Production

HIGHLIGHTING THIS ISSUE OF STEEL

■ AMERICAN "psychology" was in full bloom last week—that inclination to swing from one extreme to another on national issues. With it, there was an interesting demonstration of the American spirit of fair play—democracy. Retaliating, after months of provocative action by radical labor leaders, the House (p. 38) within a few hours, and virtually without debate, cracked down on them—so harshly, in fact, that it immediately caused a reaction—a call for a cooling off period for Congress—common sense (p. 56), and a workable law. Revenge won't do. . . . Congress of Industry in New York (p. 29) again urged centering defense responsibility on one man, proposed a plan to minimize disruption of business.

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Zinc production in 1943, when additional production units now building or projected are completed, will be adequate for requirements (p. 42).

Plates Now Allocated

For 1942, however, the estimated shortage will be 30,000 tons. . . . Steel plates now are under a complete allocation system (p. 41), and none can be produced, delivered or accepted except in accordance with the orders of the priorities director. . . . Machinery production in 1941 is expected (p. 43) to reach an all-time peak of eleven billion dollars. . . . Ratings on materials entering into the construction and repair of certain types freight cars and locomotives (p. 40) have been extended. . . . Railroad representatives will discuss (p. 55) next year's materials needs with OPM authorities this week.

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Production of 37,200 tanks called for under the new "Victory" program (p. 55) will require half of the country's electric steel output next year. . . . All restrictions on the production of heavy truck trailers have been removed (p. 33). . . . Buyers of high speed tool steels will be asked (p. 40) to accept 75 per cent molybdenum type and not more than 25 per cent of the tungsten type. . . . New farm machinery producers have been assigned (p. 40) a rating of A-8. Previously they held the highest civilian rating, B-1. . . . SPAB will make 218,600 tons of tin plate (p. 38) available to Latin America. . . . American Society of Mechanical Engineers (p. 32) discusses what to do now in order to prevent post-war unemployment. . . . Despite the coal strike, daily average pig iron production (p. 53) increased slightly in November.

Tin Plate For S. America

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Internal ballistics, or what happens before the projectile leaves the gun barrel, is the subject of Professor Macconochie's forty-first article (p. 61) on ordnance and its production. . . . L. J. Mahlmeister explains (p. 64) how the multiple automatic gaging of shell bodies permits one operator with a single setup to do the same work formerly handled with 16 or more individual fixed gages, yet maintaining accuracy of gaging within 0.00001-inch. . . . Dr. R. W. Mitchell begins a series on metal cleaning and ordnance production by explaining (p. 90) some of the important factors involved in any metal cleaning work. . . . C. L. Harrel describes (p. 104) use of steel castings in defense.

Automatic Shell Gaging

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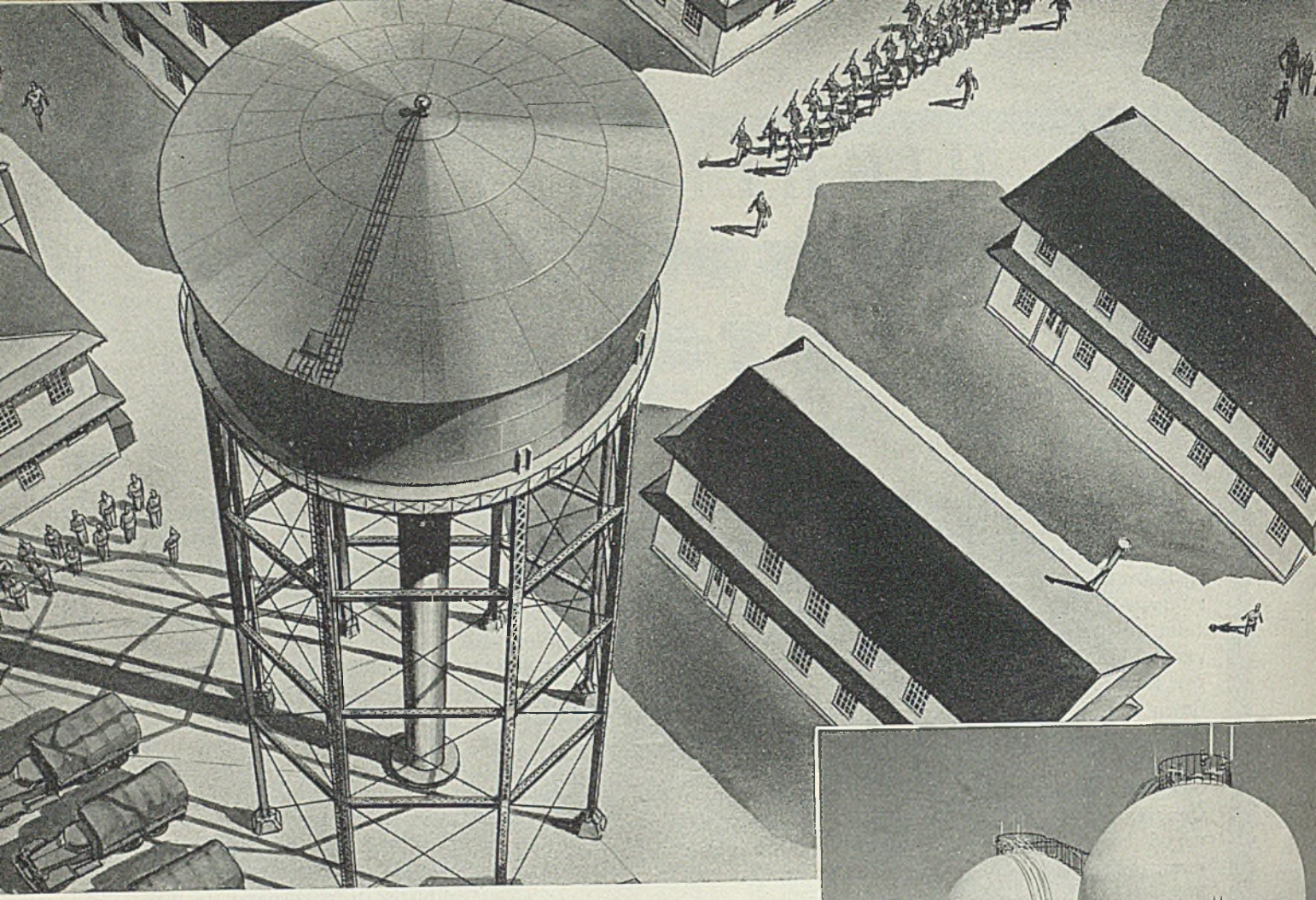
G. P. Astrom details (p. 82) the drastic changes that have been made in design of steel plant cars for handling cinder, molten iron and ingot molds. He also discusses application of various features of different types. . . . The use of shovel-scoop power trucks and pallets moved by fork truck (p. 76) have been instrumental in cutting materials handling costs and eliminating bottlenecks incident to an expanding business. . . . Frank F. Branch describes (p. 72) various operations in fabricating steel trailer wheels. . . . F. T. Van Syckel gives (p. 97) much information on designs for silver-alloy brazing, describes types of joints, production setups.

Joint Designs For Brazing



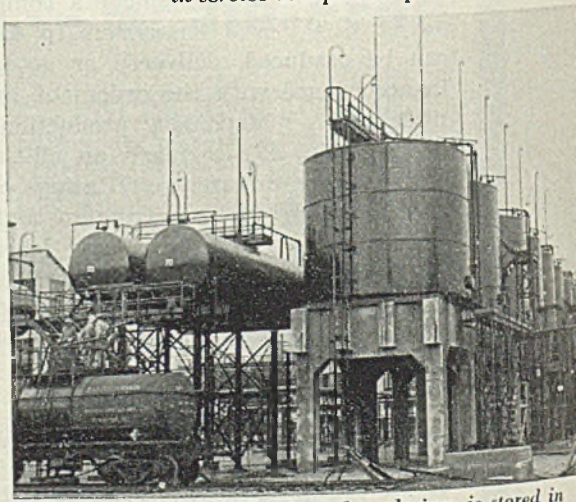
THESE TANKS . . .
of Inland Steel—are also Vital for Defense

Combat tanks are, of course, a vital necessity for modern warfare. But they are not the only tanks. There are others — tanks which will never cross a battlefield, nor be featured in the headlines, or in picture magazines. These tanks are also vital for America's defense.

Filled with gasoline or oil at our off-shore bases, carrying the water supply high above ground at army camps, bearing important chemical solutions at scores of new defense plants — thousands of these tanks are playing their nonspectacular but essential part in our country's great defense program.

For their construction, Inland is regularly producing large tonnages of plates and other steel products. Just as for bomber plants—and ships—and shells—and countless other defense requirements, Inland is bending every effort to deliver steel for these tanks when and where it is needed. For National Defense is Inland's No. 1 Job!

Two 25,000-bbl. pressure tanks built of Inland Steel in service at a powder plant.



Acid for the production of explosives is stored in these tanks at an Army Ordnance Works. Inland Steel was used for their construction.

INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati, New York

More Careful Distribution of Materials

To Save Small Business Urged

✦

Congress of Industry recommends: Single agency to plan defense production; revision of labor laws; cessation of hoarding; guards against inflation; preparations to meet post-war conditions

✦

NEW YORK

■ SINGLE agency with a single head having full power to supervise and guide the defense program was recommended in the platform adopted by the Congress of American Industry, held here last week under auspices of the National Association of Manufacturers. Such an agency, it was suggested, should plan defense production in such a way as to cause as little hardship as possible to nondefense industries.

"Many of our smaller companies are now being forced out of business because they cannot get materials," the document stated. "Much of this is unnecessary. They could be saved by a more careful distribution of available supplies. These companies are vital to our future. The jobs of millions, not only at present, but in the postwar period as well, depend upon their survival. Their destruction would wreck our whole economic system."

The agency should see to it that neither business nor government hoards goods. With an orderly flow of production and sensible buying there is reason to believe that many threatened shortages will not occur.

Platform outlined ways and means of changing the labor laws, of guarding against inflation, of devising a sound system of taxation, and concluded with recommendations as to how to prepare to meet postwar conditions. Individual companies were advised to develop new and improved products and designs, keep in as good financial health as possible, avoid plant expansion where possible, avoid excess inventories, keep costs and prices down, maintain as regular employment as possible, prepare plans for re-training workers released from the Army and from defense industries, employ and train young men directly out of school so as to help build up the long-term productive force of the country.

There is no doubt that apathy as to defense production exists to some extent, said Ernest T. Weir, chairman, National Steel Corp., and he declared the chief reason is this country's administration. Its leadership is not of a sacrificial type, so that it does not inspire a spirit of sacrifice.

Government "Hasn't Been Fair"

"The administration has not been fair and frank with industry or the people," charged Mr. Weir. "So far, its moral leadership has consisted mainly of attempts to scare the country into a super-effort and of exhortations to sacrifice and unite.

"Yet the administration refuses to sacrifice one whit of politics, power, or reform. It tells industry to keep prices down, but, for political reasons, it does nothing to keep wages in line and increases the prices of farm products.

"The administration asks the people to sacrifice a large part of their income in taxes and increased costs of living while it wastes huge sums in both defense and nondefense spending.

"It asks people to save money to prevent inflation, yet creates the main cause of inflation by constantly increasing the federal debt. On the grounds of scarcity, it so restricts the use of certain materials that many manufacturers find it difficult to stay in business; yet the administration helps create scarcity by buying now materials it may not use for several years.

"The administration tells industry to concentrate on the job of making defense material, but it allows industry to be harassed by bureaus, boards and departments, on matters that have no bearing on defense.

"It demands the utmost production but refuses to allow relaxation of the wages and hours law to permit greater efficiency in the use of working forces and also cut down the costs of production to the government and, therefore, to the people. In the interest of the national emergency, the administration demands that industry expand, regardless of any harmful effects such a course may have; but it encourages and assists union bosses in their exploitation of the same national emergency to strengthen and extend their grip on both employers and workers. While calling for a top-notch production job, the administration refuses to delegate the work of co-ordination and administration to men who know their way around industry, but keeps these powers in the hands of the same New Dealers who have flopped on every administrative job . . .

"Industrial management distrusts the administration's eagerness to reach for more and greater control

over economic processes, and its reluctance to see time or other limits imposed on those controls . . .

"Another impediment to unity in the national emergency is lack of public understanding of the national objective. That lack is not the fault of the public, but of its leadership. Certainly, in the American Revolution, the people knew what the shooting was about. In the Civil War, both sides knew what they were fighting against and for. In every American War, there has been a clearly defined American objective. This time, we know we are fighting against Hitlerism. But what are we fighting for? The explanations thus far have produced confusion rather than understanding . . .

"I direct your attention to the captive coal mine strike and the circumstances that preceded it. For many weeks, the administration squirmed and fiddled around trying to find some easy way out of a self-imposed dilemma when John L. Lewis made his brazen demand for a closed shop in the coal mines. The chairman of the mediation board indicated a number of times that he would favor giving this union boss his closed shop were it not for the repercussions of such a gift on the rest of industry. Why give such a labor monopoly? Because, it was said, only 5 per cent of the miners were not already members of the union.

"Even after Lewis had thumbed his nose at the government of the United States by calling his strike, the President still sought a way out by suggesting that he, the President, would write a letter to each of the 5 per cent of nonunion members, asking him to join John Lewis' union as a national service. After two pronouncements from a board that industry had been required to accept as a final authority; after a series of Presidential pleading letters, and after a strike, the President finally won Lewis' agreement to arbitration.

William P. Witherow
President, Blaw-Knox Co., elected president of National Association of Manufacturers

"I would like to call your attention to the personnel of the Arbitration Board. The chairman, who also is the public representative, is an employe of the United States Department of Labor. He was detached from the department to serve on the Arbitration Board and when the board makes its decision, he will go back on his regular job.

"This is the man who will undoubtedly cast the deciding vote. Is the decision of such a man likely to be independent and impartial, or is it more likely to reflect the wishes of the administration?"

Double Defense Output, Urges Nelson

Donald M. Nelson, SPAB's executive director, told the manufacturers: "We are today making military expenditures at a rate of approximately one and three-quarter billion dollars a month.

"Yet it unfortunately remains true that production at that rate won't beat Hitler. It won't even keep Hitler from beating everybody else. I believe that at the very least that production volume must be doubled.

"While much of the job of stimulating production must come out of government action, there is a great deal that industry can do. Individual manufacturers are under the obligation of doing all they can to make sure that their productive facilities remain in operation. Where materials are scarce and the government has tried to do its best for them, individual manufacturers are expected to search out all possible sources of supply; they must examine every possibility of fitting into defense production; they must explore all the possibilities of substitute materials. If they cannot continue their old product, they must look for other products which consumers want and which they can manufacture.

"If you're in a jam, the only sensible thing to do is to go out and wear out a little shoe leather trying to get some of those orders—from the Army and Navy, and prime contractors.

"I believe that in our present emergency it is up to the big fellow to help the little fellow. There are a good many ways in which he can do that. The most obvious is through subcontracting.

"A large corporation holding large prime contracts under the defense program has in its possession a huge amount of this aid-to-small-business which we talk about so much these days. Should that large corporation wait for an act of Congress, a directive from the Secretary of War or an order from someone in OPM before it farms out a substantial portion of that work—or should it act on its own initiative in the matter? . . . I think it ought to—it *must* —make every possible use of the facilities which exist outside its own corporate walls, consistent with meeting of its contractual obligations."

Discussing recent stoppages in defense production due to labor troubles, William S. Knudsen, OPM's director general, declared: "I can't for the life of me understand how in a time of emergency this kind of foolishness can go on. We have all kinds of work to do and then we stop to argue about jurisdictional disputes, organizational disputes and God knows what. Some people who say they are behind the defense program seem to be so far behind it that you can't see them. When the house is on fire we can't have a strike in the fire department and refer the dispute to conciliation and expect the fire to put itself out. If strikes cannot be stopped during the period of unlimited emergency in any other way, then the law ought to stop them."

Ask Labor Legislation

Need for labor legislation was the subject of much discussion at the Congress. In his keynote address, Walter D. Fuller, president, Curtis Publishing Co., and NAM's president, declared:

"It is time for the administration's compromise with labor and its afraid-to-act attitude to cease. If we can't get at the heart of this labor mess and cure the cause let's quit emphasizing any other emergency."

Mr. Fuller said the threat is heard in Washington: "Don't force labor into line or you'll have a workers' revolution." He called it "queer talk and a great libel on the great body of American workingmen who are so much more patriotic and law-abiding than their misleaders."

Existing laws which tie the hands of the Army and Navy in their purchases will be liberalized if proposed new legislation, carefully framed to clear away this legal debris and at the same time safeguard the government's interests, is enacted, according to Floyd B. Odlum, director of OPM's Contract Distribution Division. This new legislation, drawn up by his division, now is before the Budget Bureau for approval before being sent to Congress. It will give the Navy, for example, greater latitude in placing contracts, and it will ease bonding requirements. As a result it will be easier to give defense orders to many manufacturers who hither-

to have been unable to get them.

"We cannot win this defense with a land full of the corpses of little industry," declared Mr. Odlum. "There are 133,300 of these small plants . . . and before we could reach them on a plant-by-plant basis and decide which should be converted to defense and which kept in civilian production, thousands would die of material shortages. While in the midst of the greatest production job in history the nation cannot afford the loss of these small plants.

"I say we should allow these firms employing 20 or less enough scarce materials to keep them alive until we can reach them and find out what they are best fitted to do. We already know that they are fitted for civilian work. We know that some of them can be brought into defense work. Two per cent of the scarce material supply would keep them all alive for six months, 4 per cent for a year.

"I am convinced that a life-giving grant of materials to the very small concerns is essential to the mobilization of our maximum productive power. I am presently presenting my case on this matter to the responsible officials and I anticipate a decision soon."

Without an effective price control law there will be an increase of at least 10 per cent in the cost of living before next June, warned Leon Henderson.

"The house bill," he declared, "is a compromise and you can't compromise with inflation. To control prices you must set up an administrator with authority over all prices —not just some of them—but setting up safeguards to assure business men that they will not be deprived of their legal rights. This administrator must have authority to buy and to sell—so that price premiums can be paid to high-cost or marginal producers; he must have the same authority to buy imports at one price and sell at what seems to be the best price from the country's standpoint; we already are doing that in certain strategic minerals and metals.

"And you cannot have an effective price control law unless you include in it a federal licensing provision whereby the administrator is able to force the chiselers to behave. No country in the world has been able to control prices effectively without such state power."

"Let's stop wasting our time in passing resolutions, instead, let us make the same intelligent approach in dealing with the government that we utilize in handling our private affairs," was the advice given by Thomas Roy Jones, president, American Type Founders. Mr. Jones, after serving a number of years on the association's resolution committee now is chairman of its committee on employment relations.

Howard W. Smith, representative from Virginia who sponsored the Smith labor bill (see page 38) which was passed by the house last week, said that action is not to be regarded

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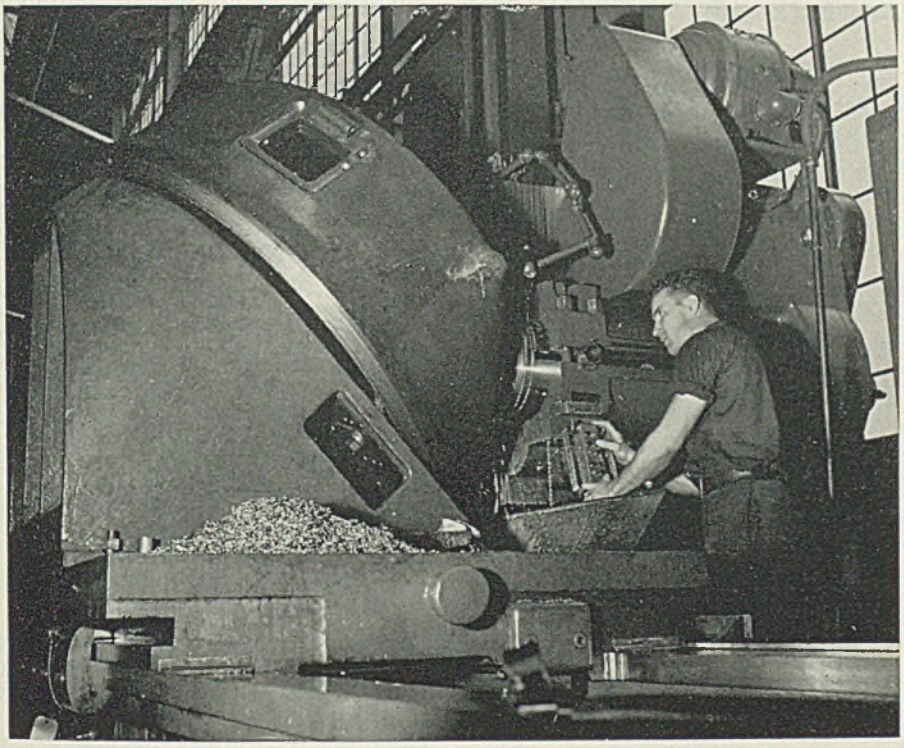
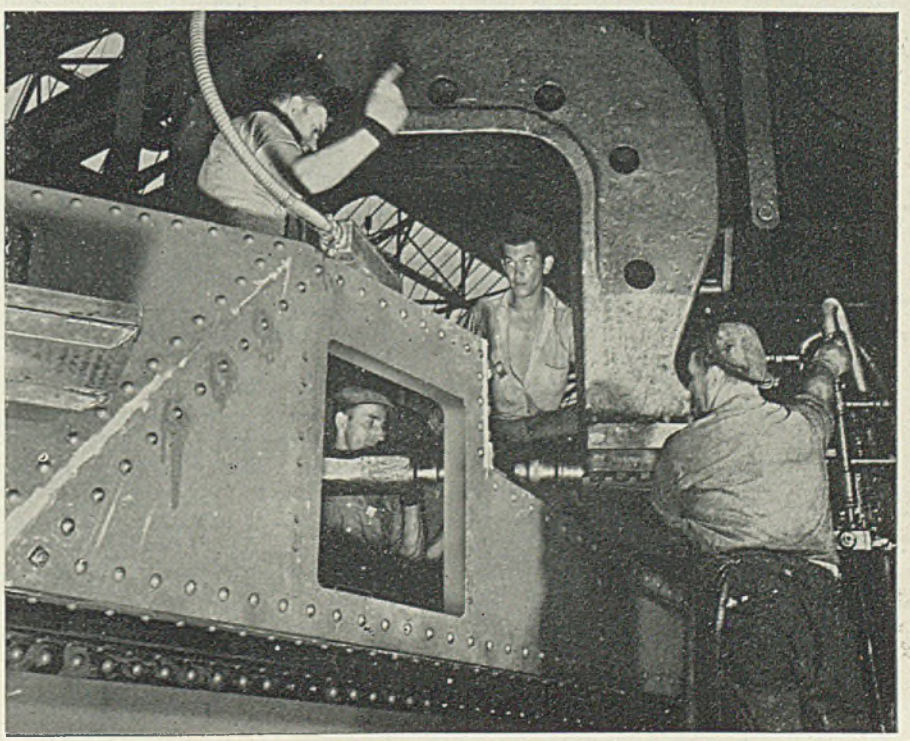


Fabricating Tanks in Chrysler Arsenal

■ Rugged exteriors of 28-ton M-3 tanks give the impression that they are "rough equipment". However, machine work on them is exacting. For example, upon precision milling of this 4000-pound cast steel turret depends quick, easy and precise maneuvering of the 37-millimeter antiaircraft gun to be mounted thereon



■ Riveting plays an important role in assembling the heavy side plates. Speed in this work depends mainly on easy handling of massive tools. OEM Defense photos by Palmer

"Prepare To Create Jobs in Industry After the War," Engineers Advised

NEW YORK

■ NATIONAL defense problems in manufacturing, management, labor, materials, power and transmission received special emphasis at the sixty-second annual meeting of the American Society of Mechanical Engineers, Hotel Astor, New York, Dec. 1-5. Approximately 2500 attended.

About 100 technical papers were presented, together with symposiums on subjects such as machine design, metals engineering, lubrication, mechanical properties and materials, mechanical springs, furnace heat transmission, material handling and cutting materials. Special feature was a clinic on conservation and reclamation of materials used in industry. Sessions were devoted also to such overall subjects as defense production, work standardization, education and training and industrial marketing.

While major emphasis was on defense, attention was also directed to problems likely to arise after the war. Speaking at the annual dinner, William A. Hanley, president, called for "realistic thinking and some definite planning" for the postwar period.

He stated that when the war ends this country will have the tremendous task of putting probably more than 26,000,000 workers engaged in defense industries back into peacetime employment. He said that unless the government is to put 15,000,000 to 20,000,000 on WPA work and in CCC camps, the alternative "is to prepare now to create jobs in private industry and to plan to reduce government employes to a bare necessary minimum."

"Accumulate Needs, Money"

The solution, he declared, lies with individuals to a greater degree than with corporations, municipalities or other groups. "As individuals, as corporations, as cities and states, and as a nation, we should reduce our peacetime expenditures now so that we can accumulate money to spend, and then spend it when the war is over. Accumulate needs and money now. Satisfy those needs and spend the money when the war ceases."

For instance, he said, if there could be 10,000,000 orders for new automobiles the first two years after the war it would be very helpful. He regarded serious attention to these problems as a patriotic duty if this country is to save its present form of life and avoid Fascism after the emergency.

Donald M. Nelson, executive director, SPAB, a featured speaker at the dinner, discussed the difficult task confronting industry and government in conserving and increasing necessary materials. The present emergency, he said, demands a drastic change and a radical reorientation in many production methods, with special emphasis on simplification of commodities and elimination of waste.

William L. Batt, past president, and now active in defense councils in Washington, presided as toastmaster.

James Wentworth Parker

Elected president, American Society of Mechanical Engineers

James Wentworth Parker, vice president and chief engineer, Detroit Edison Co., Detroit, was elected president to suceed Mr. Hanley. Clarke F. Freeman, senior vice president and engineer, Manufacturers Mutual Fire Insurance Co., Providence, R. I.; Clair B. Peck, managing editor, *Railway Mechanical Engineer*, New York; H. W. Winterrowd, vice president, Baldwin Locomotive Works, Eddystone, Pa.; and Willis R. Woolrich, dean, College of Engineering, University of Texas, Austin, Tex., were elected vice presidents for terms of two years.

Board of Managers Elected

Three new members elected to the board of managers: William G. Christy, Hudson county smoke abatement engineer, Jersey City, N. J.; H. L. Eggleston, manager of the gas and refining departments, Gilmore Oil Co., Los Angeles; and Thomas S. McEwan, district head of the Contract Distribution Division of OPM, Chicago.

At the annual dinner Theodor von Karman, director, Guggenheim Laboratory, California Institute of Technology, Pasadena, Calif., was awarded the ASME medal for 1941, for "brilliance as a teacher, his researches in elasticity and many fields in physics and mechanics and his distinguished leadership in the fields of aerodynamics and aircraft design."

John C. Garand, Springfield Armory, Springfield, Mass., received the Holley medal, for "invention and development of the semiautomatic rifle which bears his name." Richard Vynne Southwell, professor of engineering science, Oxford university, Oxford, England, was awarded the 1941 Worcester Reed Warner medal for "distinguished services in engineering and science through papers and publications in many fields, including aeronautics, theory of structures, elasticity and hydrodynamics."

Awarded Melville Medal

The Melville medal was awarded to Roger Vernon Terry, assistant chief engineer, Newport News Shipbuilding & Dry Dock Co., for his paper, "Development of the Automatic Adjustable-Blade-Type Propeller Turbine." The 1941 Pi Tau Sigma award "for outstanding achievement in mechanical engineering, particularly in the heat transfer field," was presented to Rollin Hosmer Norris, engineer in charge of the heat transfer section, General Engineering Laboratory, General Electric Co., Schenectady, N. Y.

Gantt gold medal for distinguished service in industrial management was awarded to Prof. Paul E. Holden, Stanford university.

John T. Rettaliata, Allis-Chalmers Mfg. Co., Milwaukee, received the 1941 Junior Award of the ASME for his paper, "The Combustion Gas Turbine"; John J. Ballun, student engineer, General Electric Co., the 1941 Charles T. Main award, for his paper, "The Need and Possibilities of Participation by Engineers in Public Affairs"; and G. Walker Gilmer III, engineer with Pan American Airways-Africa Ltd., the 1940 undergraduate student award for his paper, "Center of Pressure Characteristics of a Marconix Yacht Sail."

Five honorary memberships were bestowed: Clarence D. Howe, Canada's Minister of Munitions and Supplies; Rear Admiral Samuel M. Robinson, chief, Bureau of Ships, United States Navy; Maj. Gen. Charles S. Wesson, chief of ordnance, United States Army; Leon P. Alford, chairman, department of administrative engineering, New York university; and Aurel Stodola, former professor of mechanical engineering, Swiss Technical university, Zurich, Switzerland. Dr. Victor Nef, consul general for Switzerland, in New York, received the honor in behalf of Dr. Stodola.

Lift Restrictions on Heavy Trucks, Trailers

WASHINGTON

■ All restrictions on production of truck trailers have been removed by the Priorities Division.

Under Limitation Order L-1-a, as extended to Dec. 31, production of truck trailers of five tons or more during the period from Sept. 1 to Dec. 31 was limited to two-thirds of the output in the first half of 1941.

Decision to exempt these heavy trailers from the limitation was reached by the Division of Civilian Supply because it recognized that trailers of this type provide the most economical form of commercial highway transportation, both from the standpoint of cost and amount of metal consumed in manufacture.

Limitation Order L-1-a is accompanied by Preference Rating Order P-54, which assigns an A-3 rating to materials going into the manufacture of truck trailers.

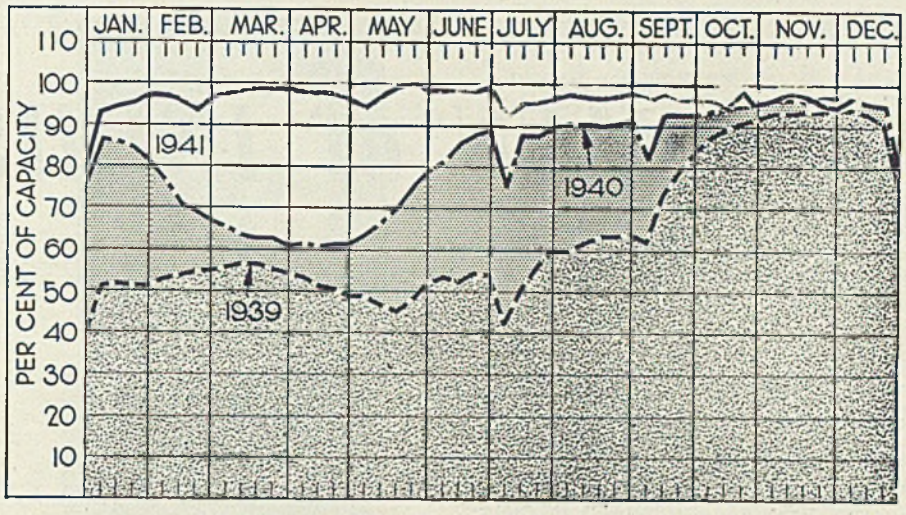
All limitation on the production of bodies and cabs for medium motor trucks, which are covered by Limitation Order L-1-a, also have been removed. This restriction is considered unnecessary because output of bodies and cabs naturally will be governed by volume of production of the medium truck chassis.

Amendments to P-56 To Help Small Foundries, Machine Shops

Small foundries and machine shops in mining areas, as well as mines themselves, will benefit by an amendment to Preference Rating Order P-56. Order P-56 facilitates the acquisition of repair, maintenance, operating supplies by mines.

The clause in the amendment which is particularly helpful to local enterprises is the one which assigns an extendible rating of A-3 to the acquisition of new mining machinery, and of repair parts, by a mine operator. This rating may be used by a mine, to which a serial number under the order has been assigned, to secure the machinery, and repair parts for it, listed in Schedule "A" attached to the order. Thus, a local shop may receive the benefit of the A-3 rating by extending it, if necessary, to acquire the materials necessary to fill orders received from a mine.

Preference Rating Order P-23, which extended a rating of A-3 to the acquisition of materials entering into mining machinery, was issued only to known manufacturers, and hence was not available to the many small businesses which will now be able to fill a portion of the mines' requirements. This order (P-23) is not affected by the amendment.



PRODUCTION . . . . Up

■ PRODUCTION of open-hearth, bessemer and electric furnace ingots last week advanced 1½ points to 96½ per cent. Six districts advanced, four declined and two were unchanged. A year ago the rate was 96½ per cent; two years ago it was 94 per cent.

Central eastern seaboard—Shortage of scrap and pig iron brought a drop of 3 points to 87 per cent.

Detroit—Furnace repairs caused a loss of 10 points to 85 per cent, with a return to 95 per cent expected this week.

Cincinnati—Advanced 3½ points to 91 per cent, with only two open hearths idle, both under repair.

St. Louis—One interest took off two open hearths because of a strike, the rate declining 7½ points to 86 per cent. The idle furnaces will be relighted this week.

Chicago—Up ½-point to 100 per cent. Two companies increased, three decreased and one held unchanged. Inland Steel Co. is reducing operations gradually because of scrap shortage, to cut output 10 per cent for December.

Buffalo—Despite scrap shortage steel mills continue at 79 per cent.

Youngstown, O.—Production advanced 4 points to 92 per cent, with 72 open hearths and three bessemers active. Youngstown Sheet & Tube Co. lighted its relined blast furnace at Brier Hill, relieving its hot metal shortage, and Republic Steel Corp. put on an open hearth at Warren, O., which had been idle for lack of scrap.

Pittsburgh—Gained 2 points to 98 per cent as equipment repairs were completed.

Wheeling—Advanced 3 points to 95 per cent.

New England—Removal of an open hearth for repair caused the rate to drop 8 points to 92 per cent.

Birmingham, Ala.—Held steady at 90 per cent, pending completion of furnace repairs.

Cleveland—Resumption by one open hearth caused an increase of 1 point to 96½ per cent.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Dec. 6	Change	Same week 1940	Same week 1939
Pittsburgh	98	+ 2	97	94
Chicago	100	+ .5	99.5	94
Eastern Pa.	87	— 3	95	88
Youngstown	92	+ 4	92	93
Wheeling	95	+ 3	98.5	93
Cleveland	96.5	+ 1	90.5	89.5
Buffalo	79	None	93	90
Birmingham	90	None	100	94
New England	92	— 8	75	90
Cincinnati	91	+ 3.5	87	80
St. Louis	86	— 7.5	87.5	83
Detroit	85	—10	90	96
Average	96.5	+ 1.5	96.5	94

Light Coke Ovens

■ A battery of coke ovens recently installed at Tennessee Coal, Iron & Railroad Co.'s Fairfield, Ala., steelworks began production last week.

The battery has 73 by-product ovens. Capacity will be approximately 425,000 net tons of coke per year. Company now has six batteries comprising 436 ovens, and its annual coke capacity now is approximately 2,330,000 tons.

Hearings on Copper Situation Scheduled To Start Friday

Hearings by the SPAB on the copper situation are scheduled to begin next Friday in Washington. Chester Davis, a member of the Defense Advisory Commission, will conduct them.

MEN of INDUSTRY

T. I. PHILLIPS has been elected a vice president, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Starting with the company as a tool maker in 1915, Mr. Phillips has been assistant to the president since February of this year.

♦

Joseph A. Sullivan, assistant publicity manager, Chicago Pneumatic Tool Co., New York, has been promoted to advertising manager.

♦

Gordon H. Chambers, vice president, Foote Mineral Co., Philadelphia, recently returned from a three weeks' trip to South America.

♦

W. E. Hines, foreign freight agent since 1933, Atchison, Topeka & Santa Fe Railway Co., Chicago, has been named general foreign freight agent. He will continue to make his headquarters in Chicago.

♦

E. B. Hall, chief mechanical officer, Chicago & North Western Railway Co., Chicago, retired Dec. 1 after 52 years of continuous service. **H. P. Allstrand** has been named Mr. Hall's successor.

♦

W. S. Davis Jr., since 1934 assistant sales manager, Penola Inc., Pittsburgh, affiliate of Standard Oil of New Jersey, has been appointed manager, succeeding **D. V. Stonaker,** retired. Mr. Davis has also been elected a director and vice president.

♦

John H. O'Sullivan has been appointed district sales manager, Peninsular Grinding Wheel Co., Detroit. Mr. O'Sullivan was formerly associated with Crucible Steel Co. of America for 12 years, since 1939 being identified with Crucible's Detroit office.

♦

F. L. Shants, Lukens Steel Co., was recently elected president, Steel Club of Philadelphia. Formerly vice president, Mr. Shants succeeds **B. P. Burtis,** Bethlehem Steel Co. **C. A. Stoeckle,** Crucible Steel Co. of America, was elected vice president, and **R. H. McCracken,** Central Iron & Steel Co., was re-elected secretary-treasurer. **F. Price Norris,** Allegheny Ludlum Steel Corp., and **T. J. Gerwig,** Republic Steel Corp., were

T. I. Phillips

elected directors to succeed **H. E. Richardson,** Youngstown Sheet & Tube Co., and **J. E. Fleming,** National Tube Co.

♦

Walter S. Tower, president, American Iron and Steel Institute, New York, has been notified of his election as an honorary member of the Iron and Steel Institute of Great Britain. The action was taken at a meeting of the council and members of the Institute in London, Nov. 25.

♦

James D. Mooney, vice president and a director, General Motors Corp., has been ordered into active service of the United States Navy Jan. 1. He has been a lieutenant commander in the Naval Reserve since 1937, and he will now head up the production engineering section of the Bureau of Aeronautics.

J. H. O'Sullivan

♦

W. Homer Hartz, since March 4 district co-ordinator, Contract Distribution Division, Office of Production Management, Chicago, has resigned to devote full time to his duties as president, Morden Frog & Crossing Works, Chicago.

♦

Harvey L. Williams Jr. has joined Hawkins-Hamilton Co., Richmond, Va., as a sales engineer. His duties with Hawkins-Hamilton include sales engineering work in the Richmond territory for Cochrane Corp., Hays Corp., Nash Engineering Co., Northern Equipment Co., Detroit Stoker Co., and others.

♦

Dr. Charles E. Lucke has been appointed consultant, Chemical Construction Corp., New York. He formerly was head of the department of mechanical engineering at Columbia University, and also held advisory positions with Worthington Pump & Machinery Corp. and Babcock & Wilcox Co.

♦

Allan Cunningham has joined National Smelting Co., Cleveland, and will handle priority matters for the company. The past four years he has been located in Washington, since 1940 with the Bureau of Labor Statistics, Department of Labor, as industrial economist. He will continue as industrial consultant to the bureau.

♦

Harry D. Bubb, chief engineer, Thompson Products Inc., Cleveland, has been appointed director of engineering of both Thompson Products and its subsidiary, Thompson Aircraft Products Co., Euclid, O. Associated with the company since 1925, Mr. Bubb will be in direct charge of Thompson metallurgical and chemical laboratories and co-ordinating of all engineering activities.

♦

E. L. DeGolyer, consulting petroleum engineer, Dallas, Tex., and deputy for conservation under the federal petroleum co-ordinator for national defense, has been awarded

the John Fritz medal for 1942, in recognition of pioneer work in the application of geophysical exploration to the search for oil fields. Presentation of the award will be made under auspices of the American Institute of Mining and Metallurgical Engineers in New York, Jan. 14.

♦

W. R. Bean, vice president, Whiting Corp., Harvey, Ill., has been appointed chief of the Foundry Supplies Unit, Tools and Equipment Section, Production Division, OPM. He succeeds **Frank G. Steinebach** editor of *The Foundry*, who has been chief of the unit since March 1.

♦

W. Alec Rawls, Alec Rawls Wrecking Co., Rocky Mount, N. C., has been elected president, Southern chapter, Institute of Scrap Iron and Steel Inc. **Guilford H. Glazer,** Glazer Iron & Metal Co., Knoxville, Tenn., has been named first vice president; **Sol Katz,** Katz Bros. & Co. Inc., Columbia, S. C., second vice president; **P. Koplin,** George Paper Stock Co. Inc., Atlanta, Ga., third vice president, and **Morris Brenner,** Brenner Iron & Metal Co., Winston-Salem, N. C., secretary-treasurer.

The North Carolina division of the Southern chapter has elected the following officers for the coming year: Chairman, **Sol Levin,** Levin Bros., Burlington, N. C.; vice chairman, **Morris Brenner,** Brenner Iron & Metal Co., Winston-Salem; secretary-treasurer, **Sam Lyon,** Southern Converting Co., Greensboro, N. C.

Officers of the Capitol district

W. R. Bean

chapter for the coming year are: President, **Milton Symansky,** Symansky Bros., Troy, N. Y.; vice president, **Louis Contey,** Trojan Scrap Iron & Metal Co., Troy, N. Y.; secretary, **Benjamin Apple,** Symansky Bros., Troy; treasurer, **Joseph C. Klein,** Albany, N. Y.

Charles D. Jacobson, David J. Joseph Co., Houston, Tex., has been re-elected president, Gulf Coast chapter. **Jake Feldman,** Commercial Metals Co. Ltd., Dallas, Tex., has again been chosen vice president; and **Joseph Blieden,** Southern Iron & Metal Co., Beaumont, Tex., has been elected secretary-treasurer.

♦

Benjamin Schwartz has been elected president, Springfield & Southwestern Railroad Co., chartered last week under the laws of Illinois, to operate that part of the railroad, from Springfield to Curran, Ill., which formerly was part of the Chicago, Springfield & St. Louis Railway Co. Mr. Schwartz will continue as vice president of Schiavone-Bonomo Corp., Jersey City, N. J.

♦

E. R. Goss has been promoted to manager, El Paso, Tex., branch office of Chicago Pneumatic Tool Co., New York. He succeeds the late E. J. Coughlin.

Metal Congress To Be Held in Detroit in 1942

■ The twenty-fourth National Metal Congress and Exposition will be held in Convention hall, Detroit, in the week of Oct. 12, 1942. The American Society for Metals, American Welding Society, Wire Association and the Institute of Metals division of the American Institute of Mining and Metallurgical Engineers, will hold their annual conventions in conjunction with the show.

Steel Imports Are Doubled in September

■ Steel and iron imports in September totaled 4230 gross tons, valued at $542,510, according to the Department of Commerce. This compares with 1975 tons, valued at $462,232 in August. Details were not available at press time. For nine months total imports were 18,544 tons, $2,954,094, against 46,809 tons, $5,528,578, in the corresponding period in 1940.

Veteran Jessop Steel Employes Honored at Testimonial Dinner

■ Jessop Steel Co., Washington, Pa., recently tendered a testimonial dinner to 17 employes who have been associated with the company 25 years or more. Greetings were extended by F. T. H. Youngman, first vice president; R. J. Murray, secretary and assistant treasurer; and H. Wilson Jr., vice president in charge of operations.

Present at the dinner and years they have been with Jessop, top row, left to right: H. G. Steed, 25; G. Yoders, 25; R. Haas, 26; L. Behner, 25; J. Wilson, 31; R. Mosier, 37; D. Marra, 26; W. Rush, 25; and E. Anderson, 25.

Bottom row, left to right: D. Durbin, 25; E. Maglee, 25; J. McBride, 36; A. R. Anderson, 38; H. Wilson Jr., 36; R. Brown, who was with the parent Jessop Co. in Sheffield, England, 55; E. King, 39; and H. Whiteman, 30.

Activities of Steel Users, Maker

■ LEE WILSON Engineering Co., Cleveland, has expanded its facilities for general furnace business as required in defense industries. Units have been constructed as varied as a car-type annealing furnace, for charges of 500 tons of armor plate at one time, to conveyor belt bright hardening units, with radiant tube heating for aircraft bolts or rifle clips, and continuous complete units for shell hardening, quenching and drawing.

♦

L. R. Kerns Co. Inc., Chicago, has appointed Formax Mfg. Co., 3999 West Eighteenth street, Detroit, exclusive distributor in the Detroit area, for its line of lubricants and compounds for manufacturing processes.

♦

C & G Wheel Puller Co. Inc., formerly located at Wellsville, N. Y., is now located in a new plant at Scio, N. Y.

♦

Purolator Products Inc., maker of oil filters, Newark, N. J., has purchased a four-story manufacturing plant as an addition to its facilities.

♦

Keystone Carbon Co., St. Mary's, Pa., has opened an eastern sales office at 249 High street, Newark, N. J. Robert McKeown and Charles V. Allen are district representatives, succeeding the late E. A. Berger, sales engineer. Keystone has also appointed A. A. Barbera & Co., 417 South Hill street, Los Angeles, representative in southern California.

♦

Borg-Warner Corp., Chicago, has purchased from the Stover Mfg. & Engine Co., Freeport, Ill., all of the latter's machinery, except foundry equipment. It will be moved to one of the corporation's plants for use in defense work.

♦

Pittsburgh-Des Moines Steel Co. will fabricate a $5,000,000 wind tunnel for installation at Moffett Field, California. Scheduled for completion in 1944, the tunnel will be 200 feet high, 900 feet long, 400 feet wide and will cover ten acres of ground.

♦

Denison Engineering Co., Columbus, O., has purchased a 26-acre plot on which will be erected a new plant, with 50,000 square feet of floor space, to be in operation in 60 to 90 days. The company, producing defense equipment in direct government contracts, including shell-loading presses, testing equipment for airplane spark plugs, oil hydraulic systems, crankshafts, brakes, gun recoil and presses for assembling gas shells, will continue to operate its present plants.

♦

Despatch Oven Co., Minneapolis, has appointed Shea-Brownell Co., 3908 Olive street, St. Louis, exclusive representative in the Missouri territory.

♦

Chain Belt Co., Milwaukee, has appointed Dow & Co. Inc., 1820 Elmwood avenue, Buffalo, distributor of Rex construction equipment in the Buffalo and Rochester area.

♦

York Ice Machinery Corp., York, Pa., has been awarded contract for 26 separate air conditioning systems by Douglas Aircraft Co. in connection with expansion of its bomber production facilities at Long Beach, Calif.

♦

Latham Machine Co., Pittsburgh, has moved from 128 Latham street, to larger quarters at 6635 Kelly street.

♦

Jackson Products, manufacturers of electric welding electrode holders and a complete line of eye-shields, have expanded their production facilities, and now occupy a new factory at 3265 Wight street, Detroit.

Federal Tax "Imposes Chronic Unemployment"

NEW YORK

■ Federal tax legislation has imposed "chronic unemployment and depression" on the United States, according to Bradford B. Smith, economist for the United States Steel Corp., speaking at the annual conference of the Society for the Advancement of Management. He warned that the situation will become "acute" in the period following the present war.

J. K. Louden, director of industrial engineering, National Supply Co., Pittsburgh, was elected president of the society.

Makers of Service Tools Name Defense Committee

■ At a recent meeting in Chicago attended by executives representing nearly every important company in the United States manufacturing wrenches, screw drivers, pliers and mechanic's hand tools, a Co-ordinating Committee for National Defense was appointed, to represent the service tools industry in its dealings with OPM and the Steel Allocations Board.

This committee consists of Dillon Stevens, vice president, Plomb Tool Co., as chairman; E. J. Wilcox, J. H. Williams & Co.; Roger Palmer, Snap-On Tools Corp.; W. F. Costello, New Britain Machine Co.; Arthur J. Male, Bonney Forge & Tool Works; W. R. Horsford, Duro Metal Products Co.; and Edward Norris, Utica Drop Forge & Tool Corp.

The service tool industry, it was said, is "on a parity with the machine tool industry as one of the first industries to be allotted steel and raw materials under the new allocations plan."

DIED:

■ **Julian Roe,** for many years western sales manager, Crocker-Wheeler Electric Mfg. Co., at his home in Chicago, Nov. 24. He had been a member, Association of Iron and Steel Engineers since 1912.

♦

Horace F. Hemphill, 72, in Philadelphia, Dec. 4. He moved to Philadelphia several years ago after his retirement as a member of Mackintosh-Hemphill Co., Pittsburgh.

♦

John E. Williams, 81, owner, Springfield Foundry Co., Pittsburgh, Dec. 1, in that city.

♦

Gilbert H. Tompkins, secretary and a director, Sauerman Bros. Inc., Chicago, maker of excavating machinery, in that city, Dec. 2.

♦

James T. Maher, 63, manager, order and distribution department, International Harvester Co., Chicago, at his home in Oak Park, Ill., Dec. 3.

♦

W. E. Sault, assistant to general purchasing agent, American Brake Shoe & Foundry Co., New York, Nov. 29, in that city.

♦

Edmund Brian Keane, 57, vice president in charge of sales, Walworth Mfg. Co., New York, Nov. 29, at his home in Pelham, N. Y.

♦

Louis Larson, 51, traffic manager, Harvey Spring & Forging Co., Milwaukee, Nov. 28, in that city.

♦

James M. Schoonmaker, 53, former president, Standard Steel Spring Co., Coraopolis, Pa., at his home in Sewickley, Pa., Dec. 1. He was a director of Standard Steel Spring and of Union Spring & Mfg. Co.

♦

William D. Cleavenger, 61, mechanical superintendent, Youngstown Sheet & Tube Co., Indiana Harbor, Ind., in Hammond, Ind., recently.

Railroads, with $300,000,000 Added to Payroll, Consider Rate Advances

■ RAILROAD traffic officers at a meeting in Chicago last week indicated that the railroads would petition the Interstate Commerce Commission for freight rate increases of varying amounts on a selected classification of freight.

Expectations are this policy will be adopted, rather than a request for a blanket increase on all commodities which it is feared might develop opposition, particularly from agricultural interests.

At a separate meeting passenger traffic officers discussed the advisability of asking for a flat increase in passenger fares. It was said that an increase of as much as 10 per cent in passenger fares is being considered.

Wages of 1,250,000 Railroad Workers Raised; Strike Averted

Nine hundred thousand non-operating railroad employes were granted basic wage increases of 80 cents a day and 350,000 operating employes raises of 76 cents a day in a compromise agreement reached last week. The agreement averted the threatened rail strike scheduled to start Dec. 7.

The increases are estimated to cost the country's railroads between $300,000,000 and $325,000,000 annually.

In addition to the permanent increases, which are effective Dec. 1, operating employes will receive 7½ per cent and non-operating employes 13½ per cent increases for the period between Sept. 1 and Dec. 1.

The agreement also provides for vacations with pay.

The settlement was recommended by a fact-finding board appointed by the President, after the rail unions had rejected an earlier proposal for raises of 7½ per cent for operating employes and 13½ per cent for non-operating employes to run from Sept. 1 this year to Dec. 31, 1942.

October Steel Payrolls Establish Record

■ Steel industry payrolls rose to a new peak in October, totaling $118,890,000 for the month, according to reports to the American Iron and Steel Institute. Largest previous monthly payroll was in May of this year when a total of $115,267,000 was distributed. In September, steel payrolls amounted to $110,391,000, while in October, 1940, the industry paid out $90,768,000 to employes.

Employment in the industry declined slightly, largely in reflection of the continued rise in demand for "heavy" steel products which require fewer man-hours to produce than do lighter products. During October, employment averaged 646,000, compared with 652,000 in September, and 567,000 employed in October, 1940.

Wage-earning employes received an average of 98.3 cents an hour in October, compared with 98.2 cents in September, and 85.6 cents in October, 1940.

Average work-week was 40 hours, compared with 37.8 hours in September and 39.4 hours in October a year ago.

Delay at Jones & Laughlin Caused by Outlaw Strike

Outlaw strike at Jones & Laughlin Steel Corp.'s by-product coke plant, Pittsburgh, led to a shutdown of a bar mill and curtailed operations in the by-product plant. Thirteen men caused the trouble, pipefitters' helpers who set up a picket line to make known their demands for higher wages, despite a contract between the company and their union which establishes their rate of pay. The bar mill suspended when day-shift workers refused to cross the picket line. Coke oven operations were maintained by the night shift, which stayed on the job at the company's request.

SWOC Petitions for Bargaining Rights at Gary Steelworks

Regional office of the National Labor Relations Board in Chicago is considering a petition by the SWOC for exclusive bargaining rights at the Gary, Ind., works of Carnegie-Illinois Steel Corp.

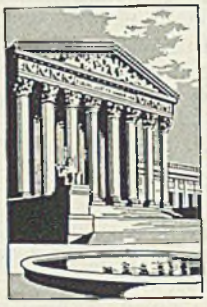
Present contract between the union and the company calls for bargaining rights for members only.

Effort of the union to get its bargaining rights on an exclusive basis apparently is due to recent organizational work by the AFL, which has already signed up many members of a former independent union. Among these are some of the girl workers in the sheet and tin mill who stood their ground against SWOC dues collectors last summer.

■ Officials of the Big Five Railroad operating brotherhoods, left to right: T. C. Cashen, president, Switchmen's Union of North America; D. A. MacKenzie, vice president, Brotherhood of Locomotive Trainmen; Alvanley Johnston, grand chief engineer, Brotherhood of Locomotive Engineers; C. J. Goff, assistant president, Brotherhood of Locomotive Firemen and Enginemen; and H. W. Frazer, president, Order of Railway Conductors. NEA photo

Windows of WASHINGTON

House rebukes labor leaders for work stoppages in defense industries by passing drastic Smith bill, restricting right to strike and requiring unions to register financial and membership data with government. Passage by Senate in present form unlikely . . . United States to ship tin plate to South America . . . Farm implement manufacturers granted higher priority rating . . . Refrigerator output further curtailed



By L. M. LAMM

Washington Editor, STEEL

WASHINGTON

■ THE DRASTIC Smith antistrike bill, passed by the House of Representatives by a two-to-one vote last week, and other legislative proposals to curb work stoppages in defense industries will come before the upper house this week.

Angered by the recent walkouts in the captive coal mines, by John L. Lewis' defiance of the government, and by other strikes in essential industries, the house adopted a bill that would:

Prohibit mass picketing in defense labor disputes.

Prohibit strikes on union organizational issues, such as the closed shop.

Prohibit strikes not sanctioned by a majority of workers at the plant involved, voting secretly under government supervision.

Require labor unions to register with the government, furnishing data on officials, members and dues.

Establish a statutory mediation system under which strikes could be prohibited during a 60-day "cooling-off" period.

Deprive unions of Wagner act benefits for "knowingly or negligently" permitting Communists, Bundists or felons to hold office.

Penalties provided for violations include, in addition to loss of Wagner act protection, liability to court injunctions, loss of collective bargaining rights, and ineligibility for WPA employment or unemployment compensation.

The Smith bill, as passed, is certain to meet strong opposition from labor leaders and from the national administration in the Senate. Vice President Wallace has channeled the bill to the labor and education committee, which is dominated by administration members, rather than to the judiciary committee where chances for formulation of a milder bill were considered slight.

Many neutral observers believe the Smith bill provisions in some cases are so drastic as to be practically inoperative, and favor the passage of a modified bill. The rebuke administered labor leaders by the action of the house in passing the bill, however, was considered salutary.

Highspots of the Week's Washington News

Steel plates placed under complete allocation system (p. 41).
Lead pool placed at 15 per cent of December production (p. 41).
Mining machinery, equipment order, P-23, extended through Dec. 31 (p. 41).
Cutting tool orders, E-2-a and P-18-a, extended to Feb. 28 (p. 41).
Welding equipment order, P-39, extended to March 15 (p. 41).
Scrap iron and steel stocks declined 3 per cent in August (p. 52).
Maryland selected for waste and scrap metals collection campaign inauguration (p. 52).
Tank production to require half of electric steel output in 1942 (p. 55).
Machinery production in 1941 valued at $11,000,000,000 (p. 43).
Calcium-silicon order revised and extended (p. 43).
Textile machinery builders discuss prices with OPA (p. 43).
Zinc producers asked to adhere to maximum prices list (p. 42).
Zinc, tin foil wrappings ban suspended for 30 days (p. 42).
Zinc pool for December to be 29 per cent of August metallic zinc production (p. 42).
Freight car, locomotive materials rating extended (p. 40).
Farm machinery manufacturers rating raised from B-1 to A-8 (p. 40). .
Refrigerator production further curtailed (p 40).
Welding electrode manufacturers granted A-1-c rating (p. 40).
Shoe machinery manufacturers confer with OPA on prices (p. 40).
Tungsten high-speed tool steel order amended to require acceptance of 75 per cent of molybdenum type and not more than 25 per cent tungsten type (p. 40).
Tin plate exports to South America approved (p. 38).
Relaying rail price maximums established (p. 129).

U. S. To Ship Tin Plate to South American Republics

At the request of the Economic Defense Board, the SPAB last week agreed to take all steps consistent with the defense program to make available for export to the other republics of the Western Hemisphere 218,600 metric tons of tin plate in the 12-month period which begins Dec. 15.

Plans are being made to ship up to 35 per cent of this amount during the next three months to relieve serious shortages which have already developed, especially in countries where the canning season is under way.

These 218,600 metric tons are expected to meet the minimum essential requirements for tin plate in the other American republics, in accordance with the established policy of maintaining the economic stability of the Western Hemisphere and of equally recognizing and providing for its essential civilian needs in our allocations of materials.

The countries to which tin plate will be shipped under this plan have been accustomed to filling a large proportion of their tin plate requirements by imports from Germany and England.

The action on tin plate constitutes the first step in a simplified program designed to assure delivery of essen-

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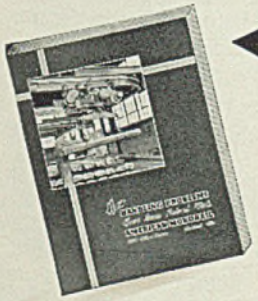
If you are "up in the air" about materials handling, let an American MonoRail Engineer show you how to handle material "in the air". Definite recommendations will be made and a detailed plan submitted without cost or obligation.



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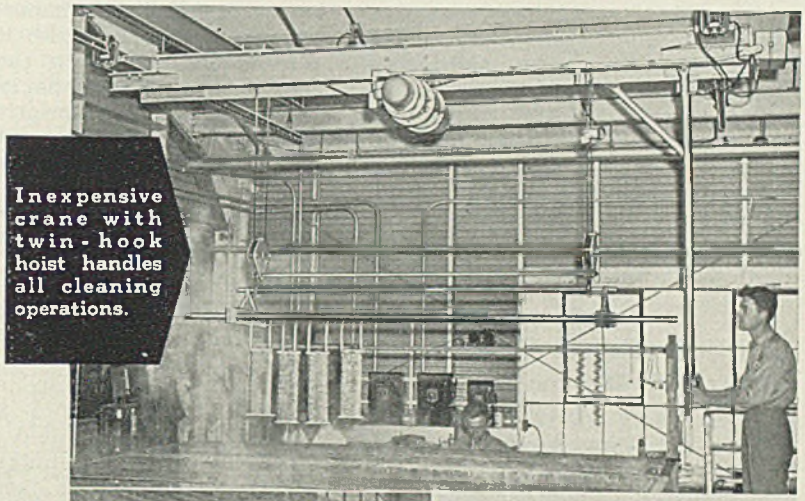

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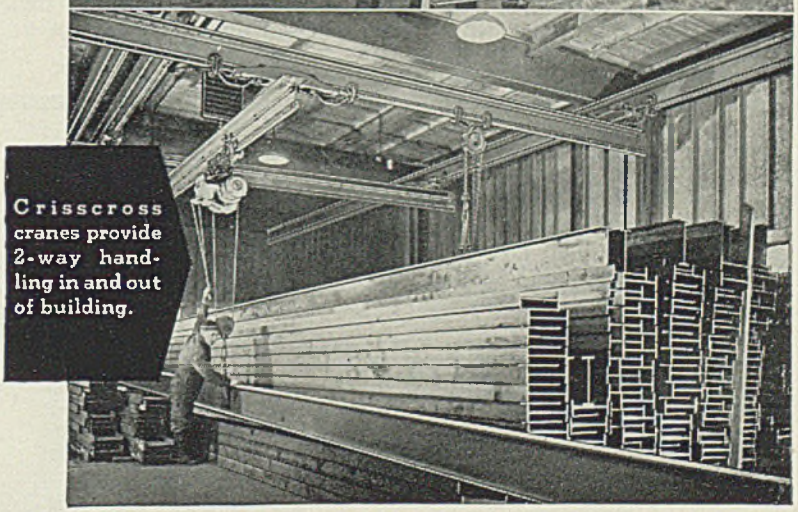

Crisscross cranes provide 2-way handling in and out of building.

THE AMERICAN MONORAIL CO.

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tial commodities to meet the import needs of Latin America.

Truck Sales to Army, Navy Excluded from Output Quotas

Manufacturers of medium motor trucks and passenger carriers may exclude from production quotas established by the OPM any vehicles sold directly or through authorized dealers to the Army or Navy and certain designated government agencies and foreign governments.

The limitation order contains a provision exempting from production quotas any medium trucks (1½ tons or more) and passenger carriers (motor or electric coaches with not less than 15 seats) and replacement parts produced for the Army or Navy and certain government agencies and foreign governments.

Cast Scrap Sellers, Users Confer with OPA on Prices

Buyers and sellers of cast iron scrap and price executives of the Iron and Steel Division, OPA, met last Friday and reviewed operations of scrap price schedule No. 4. The meeting was a continuation of a conference of the same general group the previous week. It was for the purpose of reviewing the schedule and exchanging ideas.

Extend Ratings on Materials for Freight Cars, Locomotives

Preference ratings on materials entering into the construction of freight cars and into the construction, repair and rebuilding of specified types of locomotives have been extended.

General Preference Orders, P-8, P-20 and P-21 were extended to Dec. 31, 1941. Each of the orders extends a preference rating of A-3 to orders for materials to be used in the indicated types of construction or repair.

A-8 Rating Granted to Farm Machinery Manufacturers

Preference Rating Order P-33, which assigned a rating of B-1 to the acquisition of material for the production of new farm machinery, has been amended to provide a rating of A-8 for the same purpose, and extended to Feb. 14, 1942. This date corresponds with the expiration date of its companion order, P-32, which extends priority assistance to the production of repair parts for farm machinery.

Refrigerator Production Curtailed More Sharply

Curtailment between 30 and 52 per cent in the production of domestic mechanical refrigerators during January and February has been ordered by OPM to insure reduction to levels ordered Sept. 30, when output was limited to 2,007,000 units for year beginning Aug. 1.

Due to unforeseen factors, the original curtailment of 29 to 45 per cent failed to attain the desired limitation.

Amount of reduction under the new order will depend on the size of the producer.

A-1-c Rating Assigned to Welding Electrode Materials

A preference rating of A-1-c has been assigned to orders for materials entering into production of resistance welding electrodes by the Priorities Division.

Producers of resistance welding electrodes have experienced difficulties in obtaining the metals and master alloys used in their product. Such electrodes cannot be produced economically except in large furnace runs and the preference rating is therefore applicable to the producer's requirements of specified materials for a three-month period covered by his application for priority assistance under preference Rating Order No. P-85.

Producers of resistance welding electrodes who wish to obtain priority assistance under the order must first file an application with the Priorities Division on Form PD-82 and must receive specific authorization for use of the rating. After a producer has received the authorization he may serve certified copies upon his suppliers and thereafter use the rating by endorsement on his purchase orders. Monthly reports of all applications of the preference rating are required on Form PD-81 or PD-81a.

Resistance welding electrodes as defined in Preference Rating Order P-85 include only spot welding tips, resistance welding dies, seam welding wheels, and water-cooled holders for spot welding tips.

Tungsten High-Speed Tool Steel Order Amended

An amendment to General Preference Order M-14 designed to conserve tungsten was announced today by the Priorities Division.

Order provides that 75 per cent of all high speed steel orders accepted in any one quarter shall be of the molydenum type and not more than 25 per cent of the tungsten type. Previous ratio was 50-50.

Amendment also extends the order until Dec. 31, 1942. It was issued June 11, 1941.

Reasons for the change are increased demands for high speed tungsten steel for export; increased use of molydenum steel generally, and the threat to the Burma Road, over which large supplies of tungsten now come.

While Western Hemisphere production of tungsten has jumped greatly since the defense program started, imports from China continue to be a vital factor in the total United States supply. The bulk of our present molydenum supply is produced domestically.

Shoe Machinery Manufacturers To Confer With OPA on Prices

Manufacturers of shoe machinery have been invited to Washington Dec. 10 to confer with OPA officials on prices, costs and other matters necessary for determination of a level of maximum prices.

Shoe machinery manufacturers are requested in letters announcing the meeting not to increase prices of rentals on contracts for new equipment and repairs while a study of their industry is being made.

Steel Plates Placed Under Complete Allocation System, Effective Dec. 1

■ COMPLETE allocation of steel plates was ordered last week by Donald M. Nelson, priorities director, in General Allocation Order No. 1.

Action is the first step in compliance with the request of the SPAB, made Nov. 1, that a direct allocation system for steel be worked out.

The Army, Navy and Maritime Commission are taking approximately 50 per cent of present production of plates. Other leading users are the railroads, for car construction, and the petroleum industry, for pipe, and in the construction of all types of tanks.

As of Nov. 1, reports from steel plate producers showed defense and essential civilian orders, with ratings of A-10 or higher, in excess of production capacity for shipment during the month. Capacity of the industry is about 600,000 tons a month.

The order provides that after Dec. 1 no person shall produce, deliver or accept plates except in accordance with the orders of the director of priorities.

Producers are required to file with the Iron and Steel Branch, OPM, by the 15th of each month a schedule of production and shipments for the following month, together with a statement of unfilled orders for the period. They then will receive an allocation order from the director of priorities, making any changes that are deemed advisable.

Plates produced in excess of schedule cannot be disposed of except at the direction of the director of priorities.

The order also provides that suitable forms for producers and customers will be prescribed.

Immediate purpose of the order is to insure a continuous flow of plates into defense channels and to provide an adequate check against hoarding and excessive inventories.

Studies of steel plate requirements for nondefense industries now are being made by the Division of Civilian Supply in conjunction with the Division of Materials to determine what proportion of the available supply should be allocated to each. No direct allocations of this kind have yet been made, although substantial steps in this direction are being taken.

The order defines plates as flat carbon or alloy steel products (other than slabs) as follows:

Over 6 inches wide and ¼-inch or more thick, or

Over 6 inches wide and weighing 10.2 pounds or more per square foot, or

Over 48 inches wide and 3/16-inch or more thick, or

Over 48 inches wide and weighing 7.65 pounds or more per square foot.

Valley Forge—1941

■ WEED, CALIF.: Striking lumber workers in the hills near Mt. Shasta had to hollow out a place in the snow, and set up wood burners to keep their pickets warm. Twelve hundred employes of Long-Bell Lumber Co. went out in a dispute over union shop and wages. NEA photo

Lead Refiners Must Set Aside 15 Per Cent for Allocation

Every refiner of lead will be required to set aside 15 per cent of his December production for allocation for defense purposes by the Director of Priorities.

The percentage to be set aside in December is the same as that announced for November, and is expected to amount to from 6000 to 6500 tons.

Metal not allocated out of the pool for defense uses during the month will be added to the government stockpile of lead.

Orders Relating to Cutting Tools, Welding Equipment Extended

Orders relating to cutting tools, materials entering into their production, and materials entering into the production of arc welding and resistance welding machines have been extended.

Supplementary Order E-2-a, which directs the distribution of certain cutting tools, was extended to Feb. 28, 1942, as was Preference Rating Order P-18-a, which assigned a preference rating of A-1-a to deliveries of materials entering directly or indirectly into the production of specified cutting tools. Both of these orders were amended to include metal cutting shear knives and metal cutting circular saws in addition to those previously enumerated.

Preference Rating Order P-39, which assigned a preference rating of A-1-c to delivery of materials to be physically incorporated into, or necessary to the production of, arc welding and resistance welding equipment, including electrodes, was extended to March 15, 1942.

Preference Rating Order P-23 Extended Through Dec. 31

Preference Rating Order P-23 has been extended through Dec. 31, 1941. Companies operating under the order have been notified and asked to inform their suppliers of the action.

This order extends a preference rating of A-3 to delivery of material entering, directly or indirectly, into the production of mining machinery and equipment to fill defense orders. The preference rating is applicable only to deliveries of materials included in the government's Priorities Critical List.

Indicated 1942 Zinc Requirements To Exceed Output by 30,000 Tons

■ ZINC consumption in 1942 is estimated at 1,019,000 tons, indicating consumption will be about 30,000 tons greater than production, according to Howard I. Young, president, American Zinc, Lead & Smelting Co., St. Louis. It is his opinion that "it is reasonable to assume that, in view of the possible diversion of steel to other uses and the trend toward substitute coatings, the reduction is consumption in zinc in the galvanizing industry in 1942 will be adequate to account for the difference between available supply and estimated consumption plus exports."

Brass mills are expected to use 50 per cent more in 1942, while die casting consumption will be curtailed by limitations on automobile and appliance production.

When new producing units now planned or under construction are completed in 1943, output will be adequate for all needs unless there is a substantial increase in defense program requirements or large curtailment in production in the British Empire.

These observations were made by Mr. Young in an address before the New York section of the American Institute of Mining and Metallurgical Engineers last week.

Zinc supply for 1942 is estimated at 989,000 tons, including 36,000 tons of Mexican metal. Total metal available outside of Axis dominated countries will be 1,489,000 tons, of which about 1,189,000 tons will be produced in North America.

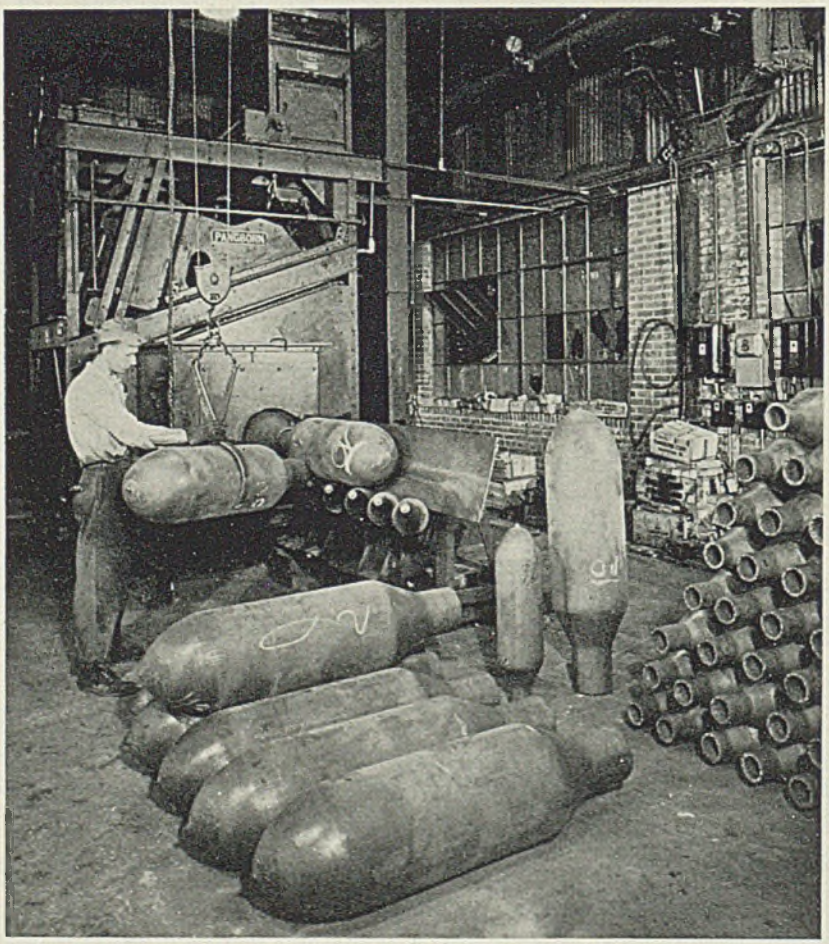
Estimated domestic consumption and exports for 1941 and 1942:

	1941 (Based on Sept. Figures) Per Month	1941 (Based on Sept. Figures) Annually	1942 (Estimated) Annually
Galvanizing	26,000	312,000	312,000
Brass Mills	20,000	240,000	360,000
Die Casting	10,000	120,000	100,000
Rolling Mills	7,000	84,000	67,000
Oxide Plants	1,500	18,000	18,000
Other Uses	1,000	12,000	12,000
	65,500	786,000	669,000
Estimated Exports	12,500	150,000	150,000
Total	78,000	936,000	1,019,000

Mr. Young said he believed production of zinc concentrates would be increased by 5 and possibly 10 per cent in 1942 over 1941.

"Those who are in a position to know feel that an increase in the price of lead would be a greater contributing force to an increase in zinc production at a number of western mines than would be a further increase in the price of zinc."

Cleaning Surfaces of 500-Pound Aerial Bombs



■ Final operation in cleaning 500-pound aerial demolition bombs is the removal of all scale and dirt from exterior surfaces. Illustrated here is an "Automatic Airless Rotoblast Cleaning Machine" which receives the bombs after their inside surfaces have been cleaned, subsequent to annealing and chilling to proper hardness, and completes the cleaning process. The machine uses steel abrasive carried through a nozzle by compressed air. Photo courtesy Pangborn Corp., Hagerstown, Md.

Ask Zinc Producers To Adhere To Maximum Price List

Producers of rolled zinc sheets, strip and plates will be asked to agree individually to adhere to the list of maximum prices recently issued by the OPA.

Notice of the forthcoming requests is contained in letters being sent to manufacturers by the administrator in which he expresses belief that "a formal ceiling order is unnecessary in this case, provided we can obtain the individual co-operation of members of the industry."

Zinc, Tin Foil Order Suspended for 30 Days

Donald M. Nelson, priorities director, has suspended the lead and tin foil order issued Nov. 24 for 30 days.

During the period of its suspension an investigation will be made to get all of the facts upon which the order was based, that a final decision may be reached as to whether the order should be revoked, modified or put into effect unchanged.

Zinc Pool Requirements Established for December

Zinc pool requirements for December were announced last week by the Division of Priorities.

Producers of metallic zinc are required to set aside 29 per cent of the amount they produced in August for the December pool. This is a reduction of 2 per cent from the November requirement and will result in a supply, available for allocation, of 21,700 short tons.

Producers need not set aside any zinc oxide or zinc dust during December.

1941 Machinery Production To Total $11 Billion; To Expand Next Year

WASHINGTON

■ VALUE of machinery produced in the United States during 1941 is expected to reach the all-time high of $11 billion the Department of Commerce estimates. This total is $4 billion over the prior record, established in 1929.

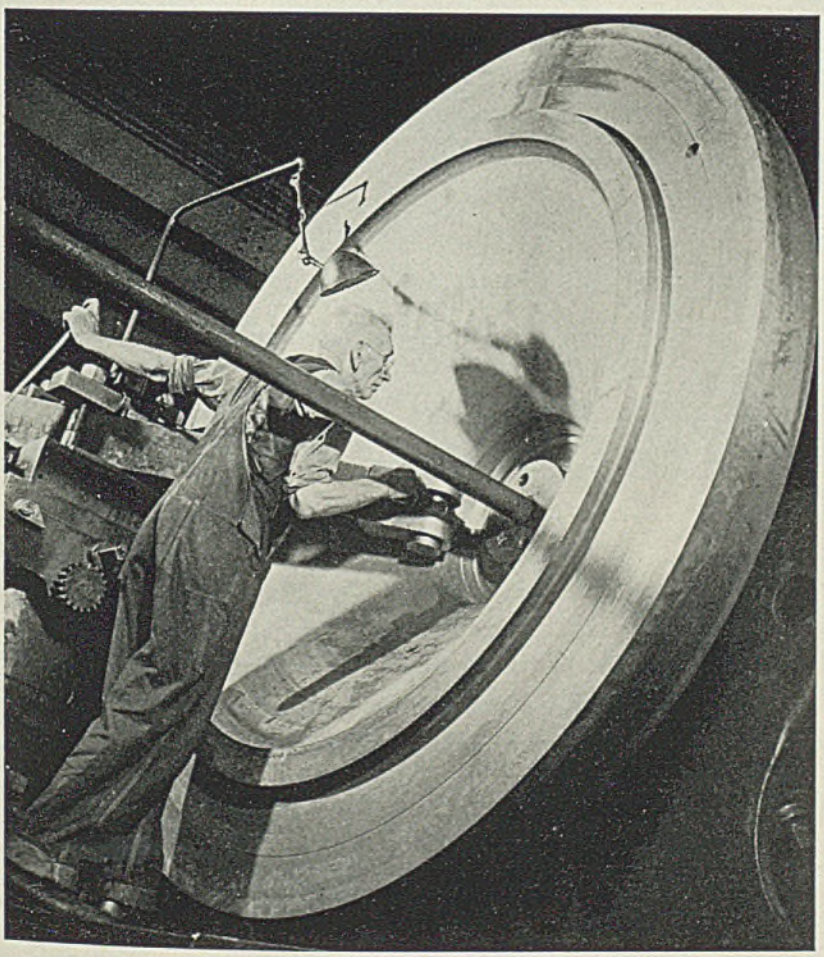
The department points out that this estimate applies to industrial, electrical, farm, printing and office machinery, but does not include automobiles, trucks, airplanes, ships, locomotives, railway or other transportation equipment. Expenditures for producers' machinery during 1941 has been estimated at $9 billion, leaving about $2 billion of output for purposes other than production.

Unprecedented demand for machinery for defense purposes, the department states, means that production during the period of the emergency "could be limited only by availability of raw materials and skilled mechanics and physical capacity of plant equipment." Raw materials of machinery production are primarily iron and steel but a significant share of the available supply of copper, vanadium, nickel, chromium, zinc, mica and other more or less scarce materials is consumed by the machinery industry. Decisions will have to be made as to whether it is desirable to allocate such materials for expansion of productive equipment or to use them directly in making airplane engines, tanks, guns, shells and ships.

Labor supply also is limited, with practically all skilled mechanics now employed. The only source of new recruits is to be found in training programs of industry and trade schools. Much engineering ability is being devoted to development of high-production machinery which can be operated by workmen after relatively short training, but manufacture of equipment of this sort requires a high order of skill. Keenest competition for skilled workers is offered by factories turning out other defense commodities.

Additions to plant facilities drain supplies of both materials and labor. Policy as to whether machinery plants are to be expanded must be based on intelligent study of the merits of each individual case, the department concludes, but despite restrictive elements there can be no doubt the output of machinery will further expand during the coming year. This can be accomplished by working more shifts and longer hours, utilizing materials conserved by curtailed output of non-essentials.

Machining 36,000-Kilowatt Generator Shaft Flange



■ Machining the bore in a 36,000-kilowatt generator shaft flange for the governor which will maintain speed of the 45-ton shaft at 81.8 revolutions per minute. This photograph was made recently at Westinghouse Electric & Mfg. Co.'s East Pittsburgh, Pa., works where the generator is being assembled. It will be installed at Tennessee Valley Authority's Pickwick Dam

Textile Machinery Builders Discuss Prices With OPA

Textile machinery manufacturers have been invited to meet in Washington Dec. 8 and 9 to discuss with officials of the OPA prices, costs and other matters necessary for determination of maximum price schedules.

Letters of invitation were sent to 650 manufacturers stating that OPA is studying the selling prices of machinery to prevent unwarranted price increases.

Calcium-Silicon Order Revised and Extended

General Preference Order controlling production and distribution of calcium-silicon, which was due to expire Nov. 30, has been revised and extended to May 31, 1942. Calcium-silicon is used in making certain types of alloy steel.

All calcium-silicon has been subject to direct allocation by the Director of Priorities since July 29, under the terms of General Preference Order M-20. General Preference Order M-20-a, issued last week, continues the allocation procedure without substantial change, but brings the form of the order into conformity with Priorities Regulation No. 1.

Production of calcium-silicon can be expanded as required, but takes very large quantities of electric power. For that reason, its use is restricted to defense orders and essential civilian requirements.

All users of calcium-silicon must file monthly reports of types and quantities of steel to be melted in the succeeding month, amounts of calcium-silicon to be used, ultimate consumption of the steel, preference ratings of orders to be filled, and inventory on hand.

Problem: Impact plus wear in thin sections.
Answer: Chromium-Molybdenum (X4130) steel.

The aircraft use of Chromium-Molybdenum (X4130) steel has established its effectiveness in parts requiring high strength and toughness in light sections.

The steel is meeting similar requirements in drag-bit blades. They are normalized from 1650 F., oil quenched from 1550 F., and tempered at 900 F.

The allowable high temper, with a retained hardness of 363 B.H.N., provides good wear resistance in addition to the required impact and tensile strength.

Technical details concerning X4130 steel and its applications will be found in "Section 2—Chromium-Molybdenum Steels" in our book, "Molybdenum in Steel". A copy of this informative technical book will gladly be sent you without charge.

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MOLY

Mirrors of MOTORDOM

Motor car production curtailment would take care of itself if award of armament contracts to motor industry were speeded up . . . Deficiencies in ordnance suggest need for engineers to concentrate more intently on military needs, to keep U. S. in front rank of development . . . Locating employe utilities in basements of new defense plants

By A. H. ALLEN
Detroit Editor, STEEL

DETROIT

■ NO BETTER example of "putting the cart before the horse" could be found than situation in Washington today where defense officials are crowding each other to be the next to crack down on the automobile industry. While high-sounding statements about the necessity of curtailing passenger car output because England has done it, or because too much vital material is being consumed, or because consumer spending must be reduced, may appear the essence of patriotism, they represent an entirely reverse approach to the problem.

They infer that the automobile industry is shirking the defense job, which is anything but the truth of the matter. Every armament task assigned to the motor industry is either on or ahead of schedule. Instead of worrying about curtailment of car production, government officials might better concern themselves with furnishing some approximation of the real size of the job to be done in manufacture of war implements, and then speeding up the release of contracts to the automobile and allied industries.

Defense Work Given Preference

All the motor plants are anxious for more of this work. When received, contracts are given rush attention, with planning and tooling pushed through on a seven-day week schedule. Right now they are ready to tackle more jobs. If lease-lend agencies and the services could determine what they wanted and how much, the matter of automobile curtailment would take care of itself. There is no justification whatever for schedules of curtailment worked out in Washington.

The automobile industry would like to make as many cars as the current market required, after giving due consideration to defense jobs on hand. If a new defense award is offered to a motor company and it finds the work can be handled, the job will proceed at once and if passenger car production suffers in the process, the loss is taken as a matter of course. What rankles the industry, however, are proclamations and inferences wafted out of Washington that because England made only 400 cars this year, the industry in this country should only produce 50,000 for the full 1942 model year; or that March assemblies will "have to be cut" to 140,000, instead of the previously decided upon 173,000.

The engineers and executives of the motor capital were given a rude jolt by disclosures in the current issue of *Fortune* in which the deficiencies of U. S. ordnance were given a thorough going over. Failure to keep step with developments in European guns and shell, and refusal to adopt newer types of ordnance are charged to the army ordnance department. Even the supposedly modern combat vehicle, the M-3 medium tank, which Chrysler is now turning out at close to 15 per day is said to be a "failure" and a "dead ringer" for the French "Char B" tank of 1935, except for the unarmored suspension system and the installation of a 37-millimeter gun instead of the French 47-millimeter gun on the turret.

Comparisons are made between U. S. and German anti-aircraft guns, the statement being made that the Swedish 40-millimeter Bofors gun has proved far superior to the 37-millimeter for low-flying planes. The Bofors is being produced now by Chrysler but, according to *Fortune*, is not interchangeable with British-built Bofors. Three-inch anti-aircraft gun for defense against high-flying planes, put into production in 1938, is reported to be too weak for modern air-ground war, and even the 90-millimeter is claimed to stack up poorly with the German mobile 130-millimeter gun. Plans are reported under way to put a 119-millimeter gun into production. Detroit likely will undertake some phase of this work, if the experience of the past two years is any indication.

Detroit's own Alex Taub contributes further illuminating information in *Fortune* on the engineering vs. the military mind. His comments were being digested carefully by industry here last week. He makes a plea for placing armament business with one single group of engineers from a single company, rather than having several engineering groups "pawing" through the same problem. Specifically he urges a realistic appraisal of the merits of air-cooled and liquid-cooled engines, development of new coolants for aircraft engines, airplane engines with lower fuel consumption, more attention to solid fuel injection in aircraft motors, a realistic appraisal of mechanical and exhaust superchargers, development of a "real" tank engine, new transmissions for tanks, and replacement of the riveted tank hull with a welded unit.

Engineers Experimenting

From present information, it appears fair to state that engineers, both automotive and military, are working on all these problems, and some solutions are nearing the production stage. Naturally little is heard about the work, because of the secrecy in which it is shrouded. For example, it is understood Cadillac is experimenting with a light welded tank, in which transmission would involve application of the Hydramatic drive and the engine would be the standard Cadillac type.

If the U. S. is going to keep step with foreign combatants in ordnance development, more automotive engineers are going to have to become ordnance engineers, and the experts with the military and air services are going to have to be willing to place increasing reliance on these converted engineers to "come up" with new ideas in equipment and methods of manufacture.

The policy of copying and improving some European development in combat equipment months after it has appeared on the battle scene will never put the U. S. in front on ordnance development.

Complete Structural Steel Drawings in a Week

Albert Kahn, nationally known industrial architect and engineer, spoke here recently before the Adcraft Club and gave some interesting observations on the speed with which new defense plants are being erected. He declared, "The impossible is being accomplished in spite of many obstacles—unfortunate labor situations, difficulty in obtaining building materials, priority regulations, lack of adequate competent labor, etc."

Mr. Kahn has a force of nearly 500 working day and night in his organization's offices here, rushing through details for new plants, naval bases and other defense projects. He described a specific type of building which has been found best suited to manufacturing operations in defense work. It is a one-story structure of incombustible materials, with enormous uninterrupted floor spaces under roof, with a minimum number of columns. In contrast to the time of the last war, these buildings are of the permanent type and will not be razed when the emergency has passed.

In working out structural steel specifications for these buildings, unusual care must be exercised, according to Mr. Kahn. Certain sections are practically unavailable; and to speed up deliveries, substitutions often must be made to suit a steel company's stocks, or rolling mill schedules. Structural steel drawings often must be completed far enough to obtain prices in less than a week's time after placing contract for the building. With 18 weeks' delivery on steel the architect must absorb part of this extended time.

Mr. Kahn's engineers have worked out some new ideas in locker rooms and toilet rooms for new defense plants. These facilities are now being provided in an excavated basement with a wide general walkway through which employes enter and leave the plant. Locker rooms, cafeterias, lunch rooms and toilets are located off this central passageway, with stairways at numerous points leading to the working floor above. Advantages include the fact that these utilities are located so that they never interfere with future plant expansion, in fact are automatically expanded as the plant grows. Furthermore, much traffic of workmen is avoided on the main floor, since respective departments are reached directly from the basement level.

On the matter of windowless plants, Mr. Kahn observed that while they are built more quickly and easily, they require at all times artificial lighting, mechanical ventilation and air cooling, which is not so bad on a 24-hour day basis, but could prove costly if working time ever was reduced to only 8 hours. Some companies, which expect to operate defense plants after the emergency, are preferring daylighted buildings with provision for blackout when needed.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1939	1940	1941
Jan.	356,962	449,492	524,058
Feb.	317,520	422,225	509,326
March	389,499	440,232	533,849
April	354,266	452,433	489,854
May	313,248	412,492	545,355
June	324,253	362,566	546,278
July	218,600	246,171	468,895
Aug.	103,343	89,866	164,792
Sept.	192,679	284,583	248,751
Oct.	324,689	514,374	401,360
10 mos.	2,895,059	3,674,434	4,432,551
Nov.	368,541	510,973	.....
Dec.	469,118	506,931	.....
Year	3,732,718	4,692,338	.....

Estimated by Wards Reports

Week ended:	1941	1940†
Nov. 8	93,585	120,948
Nov. 15	92,990	121,943
Nov. 22	76,820	102,340
Nov. 29	93,495	128,783
Dec. 6	90,205	125,690

†Comparable week.

Ford Vessels Transferred

Ten vessels of the Ford Motor Co. fleet, five of them ocean-going ships, have been assigned to haul defense cargo (or war material if you prefer the more realistic term). The boats are manned by Ford crews, and some have made trips already to Iceland. In addition to the ocean fleet of five vessels, other boats transferred include two 300-foot motorships or canal boats, a tug and two 250-foot barges which served in the first World war.

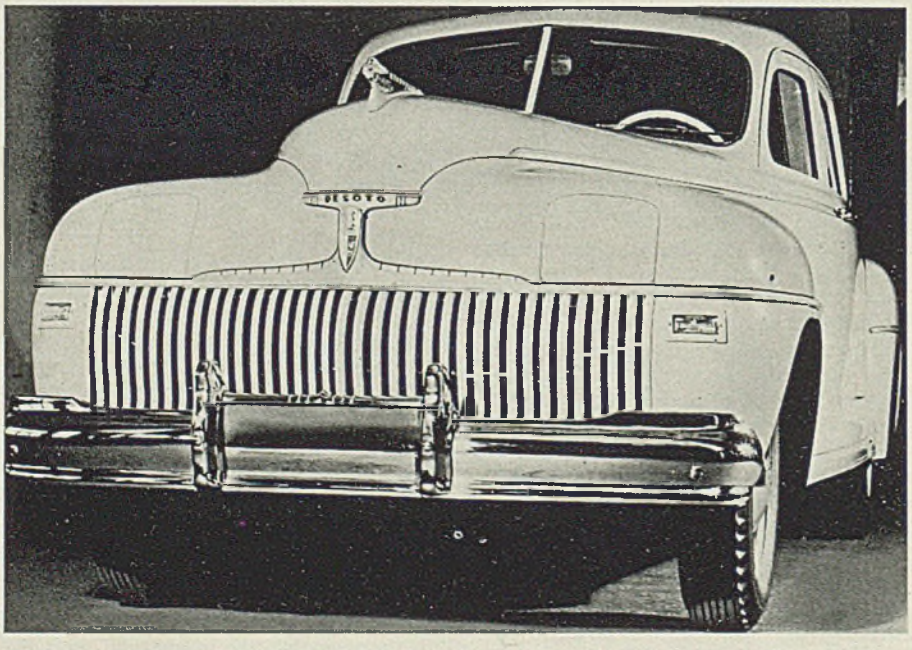
On Sunday, a new recreation center with 1100-seat auditorium, recently completed at the naval training school barracks on the Ford Rouge plant property, was dedicated by Edsel Ford.

Last week Mr. Henry Ford granted one of his infrequent interviews to newsmen, in which the 73-year old auto veteran benignly predicted that out of the present war will come a federation of the world in which "all barriers of nationality will be leveled and the peoples of the world will live in common peace and prosperity." O Happy Day!

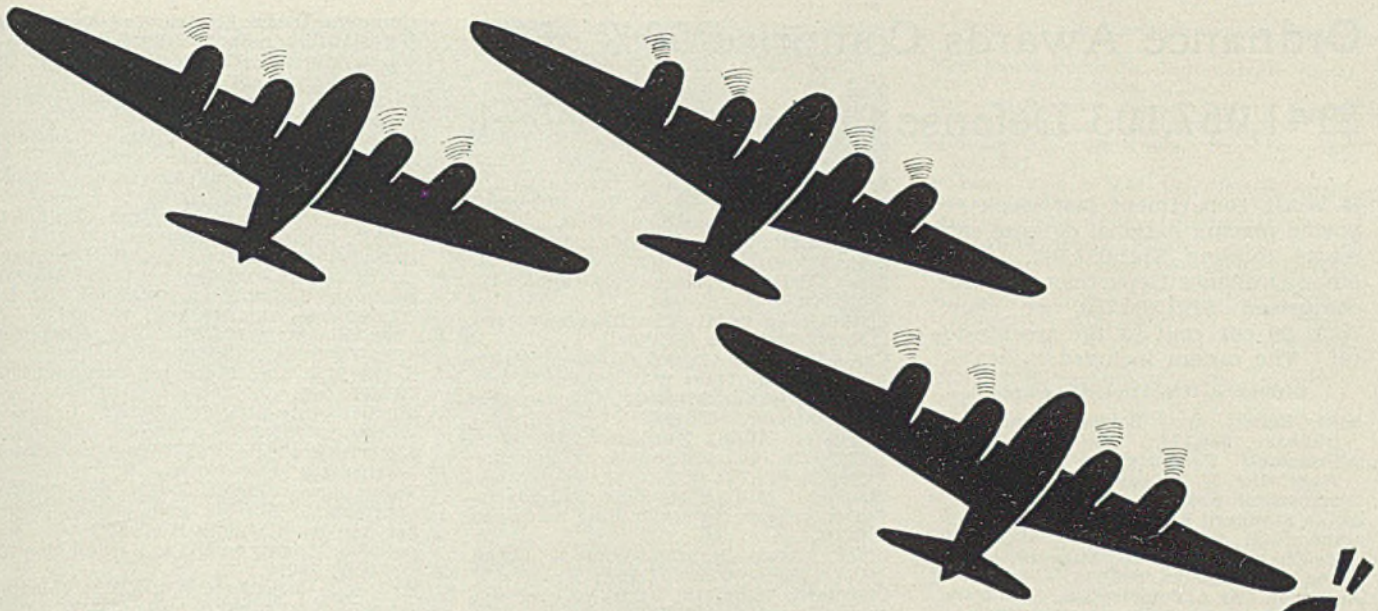
Chrome Plating "Overdone"

Now it comes out! Quoting from David A. Wallace, president of the Chrysler Sales Division, "Chrysler has felt that the use of chrome and stainless steel was being overdone in the ornamentation of cars. For that reason, there was less of these metals on our 1942 models as origi-

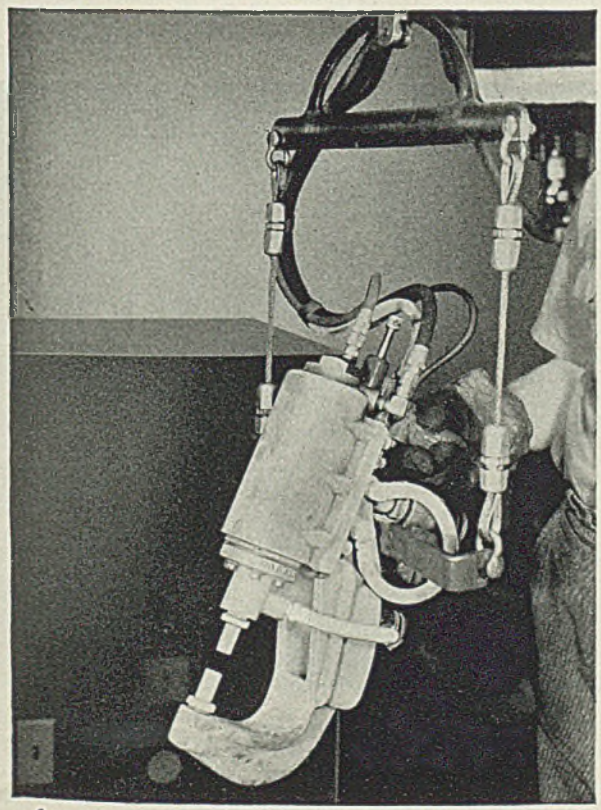
(*Please turn to Page* 140)



■ GOOD-BYE TO GLITTER: Here is the new version of the De Soto to appear in salesrooms after Jan. 1, on which baked enamel and plastic supplant chromium plate for front-end grille and fender moldings and trim, instrument panel trim and other small trim parts. Bright plating is retained on bumpers, outside door handles and one or two other small parts. The car does not appear to have suffered from the deglamorizing



YOU Can't "KEEP 'EM FLYING"



New . . . A welding gun for aluminum. For production and tack-welding. Refrigerated, as shown, if desired, to minimize tip cleaning and mushrooming. Gun hanger permits welding in virtually any position.

. . . ***unless*** you first get them into the air. To speed airplane production, Progressive—largest producer of welding guns—has developed a portable welding gun designed specifically for the welding of aluminum.

Developed at the request of aircraft manufacturers, the gun will permit welding of parts too large to handle in pedestal welders, as well as quick tack-assembling of small parts, etc., in fixtures.

Designed for operation through virtually any control equipment used for aluminum welding, the gun is available on quick delivery in different yoke types to meet individual requirements, as the result of incorporating all operating mechanisms in an interchangeable gun head.

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Ordnance Awards Comprise 90% of $141,057,103 Defense Contracts in Week

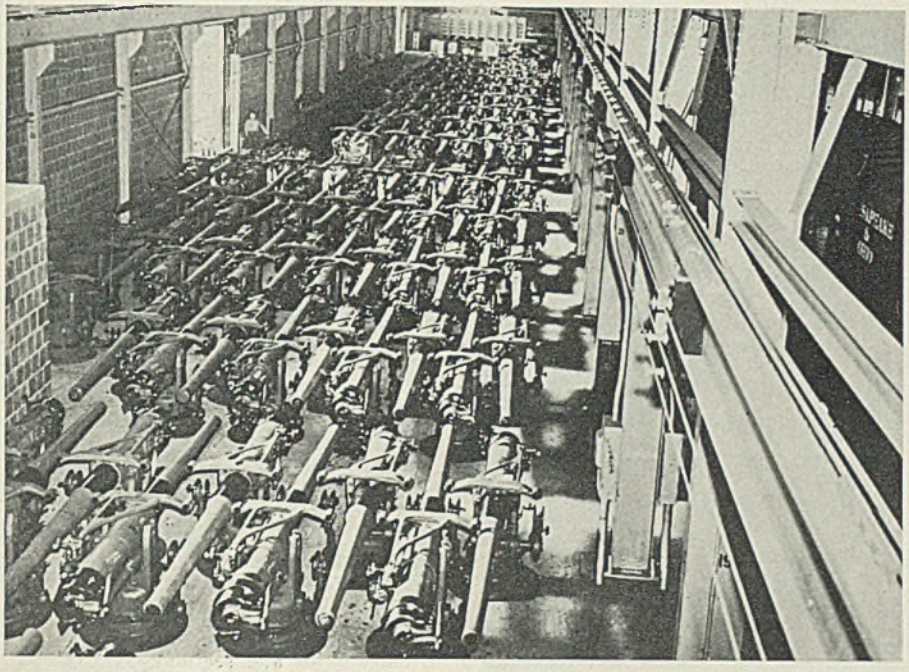
■ WAR Department last week reported placing national defense contracts totaling $141,057,103. Combined Ordnance Department awards comprised $127,960,789, or more than 90 per cent of the week's total. The orders included:

Ordnance Department Awards

Abel, Robert, Inc., Boston, cranes and trackage, $20,174.
Adirondack Foundries & Steel Inc., Watervliet, N. Y., castings and pattern equipment, $24,847.
Aetna Standard Engineering Co., Youngstown, O., spring rammers, $2,523,056.
Allis-Chalmers Mfg. Co., Milwaukee, gun and mount parts, $49,170.
American Car & Foundry Co., New York, levers, steering brake shafts, $1500.
American Cutter & Engineering Co., Detroit, gages, $1516.
American Locomotive Co., Railway Steel-Spring Division, Latrobe, Pa., springs, $10,338.
American Monorail Co., Cleveland, monorail system, $4200.
American Rolling Mill Co., Middletown, O., steel tubing, $2284.
American Smelting & Refining Co., Federated Metals Division, Whiting, Ind., lead, $3975.
American Steel & Wire Co., Cleveland, steel, $5871.
American Tool Works Co., Cincinnati, parts for lathes, $2408.
American Type Founders Inc., Elizabeth, N. J., parts for guns, $715,043.
Armstrong Cork Co., Lancaster, Pa., shells, $782,467.
Autocar Co., Ardmore, Pa., parts for half tracks, $989,400.
Automatic Die & Products Co., Cleveland, coining dies, $3198.
Auto Ordnance Corp., Bridgeport, Conn., magazines, $532,646.
Barbour-Stockwell Co., Cambridge, Mass., castings, $2209.
Bausch & Lomb Optical Co., Rochester, N. Y., instruments, telescopes, $2,110,056.
Belknap Hardware & Mfg. Co. Inc., Louisville, Ky., pliers, $5954.
Bell & Gossett Co., Chicago, oil circulators, $3123.
Belmont Smelting & Refining Works Inc., Brooklyn, N. Y., copper ingots, $2624.
Bendix Aviation Corp., Eclipse Aviation Division, Bendix, N. J., coil assemblies, $3404; Scintilla Magneto Division, Sidney, N. Y., magnetos, $1985.
Bendix-Westinghouse Automotive Air Brake Co., Elyria, O., parts, $2843.
Bethlehem Steel Co., Bethlehem, Pa., projectiles, bombs, $686,348.
Blackhawk Foundry & Machine Co., Davenport, Iowa, castings, $20,608.
Bliss, E. W., Co., Toledo Machine & Tool Division, Toledo, O., presses, $26,156.
Bliss & Laughlin Inc., Harvey, Ill., steel, $5296.
Borg-Warner Corp., Spring Division, Bellwood, Ill., cartridge clips, $352,500.
Boyar-Schultz Corp., Chicago, bolts, washers and nuts, $1184.
Breeze Corps. Inc., Newark, N. J., compression starters, $168,596.
Bridesburg Engineering Co., Philadelphia, wrenches and screwdrivers, $17,705.
Brown & Sharpe Mfg. Co., Providence, R. I., lathes, $35,067.
Builders Structural Steel Co., Cleveland, steel, $3056.
Bullard Co., Bridgeport, Conn., lathes, $593,300.
Bunting Brass & Bronze Co., Cambridge, Mass., bushings, $2484.
Carnegie Illinois Steel Corp., Pittsburgh, Steel, $11,423.
Carpenter & Patterson Inc., Medford, Mass., bronze castings, $2935.
Casco Products Corp., Bridgeport, Conn., metal parts for primers, $100,908.
Chain Belt Co., Milwaukee, guns, $2,396,000.
Chapman Valve Mfg. Co., Indian Orchard, Mass., hydrants, $1060.
Chase Brass & Copper Co. Inc., Waterbury, Conn., brass rods, bands, $36,546.
Chicago Flexible Shaft Co., Chicago, feed mechanisms, $636,988.
Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, milling machines, $24,290.
Cincinnati Milling Machine Co., Cincinnati, grinder cutters, milling machines, $12,964.
Clark, George P., Co., Windsor Locks, Conn., steel boxes, $1700.
Cleveland Automatic Machine Co., Cleveland, machines, $528,440.
Cleveland File Co., Cleveland, files, $2051.
Continental Motors Corp., Muskegon, Mich., pullers, engines, parts for engines, $5,093,167.
Continental Roll & Steel Foundry Co., Hubbard Steel Foundry Division, East Chicago, Ind., castings, $3235.
Continental Screw Co., New Bedford, Mass., screws, $7000.
Cornwall & Patterson Co., Bridgeport, Conn., centrifugal pins, $4410.
Crescent Electric Supply Co., Davenport, Iowa, transformers, $3218.
Crescent Tool Co., Cincinnati, crimping machines, $5000.
Crucible Steel Co. of America, New York, steel bars, ammunition, $3,163,112.
Cummins Diesel Electric Co., New York, generating units, $604,910.
Curtis Mfg. Co., Curtis Saw Division, St. Louis, cross-cut saws, $5150.
C. & W. Tool Co., Cambridge, Mass., reamers, $2025.
Defiance Machine Works Inc., Defiance, O., precision machines, $253,068.
Detroit Testing Machine Co., Detroit, testing machines, $2486.
Disston, Henry, & Sons Inc., Philadelphia, armor plate, $2311.
Duplex Printing Press Co., Battle Creek, Mich., gun carriage parts, $1,443,000.
Eastman Kodak Co., Rochester, N. Y., telescopes, instruments, $3,793,124.
Easy Washing Machine Co., Syracuse, N. Y., fuzes, $750,000.
Eaton Mfg. Co., Cleveland, ammunition, $2,355,000.
Electric Auto-Lite Co., Toledo, O., generators, $11,257.
Electric Products Co., Cleveland, motor generator sets, $5073.
Elliott Lewis Electrical Co. Inc., Philadelphia, reflectors and plates, $1699.
Essex Wire Corp., R-B-M Mfg. Co. Division, Logansport, Ind., firing switch relays, $1092.
Ex-Cell-O Corp., Detroit, grinding spindles and motor driving units, $2565.
Executone System, Philadelphia, intercommunication system, $2197.
Fedders Mfg. Co., Buffalo, metallic belt links, $2,319,974.
Federal Tool Corp., Chicago, gages, $2150.
Firestone Rubber & Latex Products Co., Fall River, Mass., reflectors, $8111.
Firestone Steel Products Co., Akron, O., metallic belt links, $2,002,000.
Ft. Pitt Bedding Co., Pittsburgh, metallic belt links, $396,882.
Fox Munitions Corp., Philadelphia, thread rings, $1690.
Garman Tool & Die Co., Detroit, gages, $30,686.
General Electric Co., Schenectady, N. Y.,

Observe Award of Navy "E" to Bethlehem Plant

■ Guests attending the recent ceremonies at Bethlehem, Pa., commemorating award of the Navy "E" flag and the Bureau of Ordnance pennant to Bethlehem Steel Co., (STEEL, Dec. 1, p. 37), included, front row, left to right: Quincy Bent, vice president in charge of operations, Bethlehem Steel Co.; J. J. Davis, senator from Pennsylvania; Eugene Grace, president, Bethlehem Steel Co.; R. A. Lewis, general manager of the company's Bethlehem plant; Admiral A. E. Watson, United States Navy; J. M. Sylvester, assistant general manager of the Bethlehem plant; Commander A. J. Wellings, United States Navy; Robert Pfeifle, mayor of Bethlehem. The speaker is Francis E. Walter, representative from the twenty-first congressional district



Guns for Arming United States Merchant Ships

■ **Here are some of the guns that will be mounted on United States merchant ships, under the neutrality act revisions. The scene is the Philadelphia Navy yard. United States Navy photo from NEA**

molds, fuze part, transformers, $4113.
General Electric Supply Corp., Schenectady, N. Y., lighting fixtures, $7652.
General Motors Corp., Olds Motor Works Division, Lansing, Mich., ammunition, guns, $8,151,300; Detroit Division, shot, $35,705,287.
General Motors Sales Corp., New Departure Division, Bristol, Conn., ball bearings, $62,122.
Gibbs, Thomas B., & Co., Delavan, Wis., chuck equipment, $4675.
Glebel Machine Tool Co., New York, lathes, $7550.
Goddard & Goddard Co. Inc., Detroit, cutters, $6362.
Grainger-Rush Co., Boston, copper wire, $1054.
Greenfield Tap & Die Corp., Greenfield, Mass., gages, $2545.
Greenlee Bros. & Co., Rockford, Ill., sawing machines, $4772.
Grenby Mfg. Co., Plainville, Conn., grinders, $2680.
Gries Reproducer Corp., New York, gages, $2354.
Guiberson Diesel Engine Co., Chicago, hose clamps, $2041.
Guth, Edwin F., Co., St. Louis, projectiles, $182,750.
Haarmann Steel Co., Holyoke, Mass., frames, $2214.
Hadley Special Tool Co. Inc., Boston, gages, $8792.
Hanssen's, Louis, Sons, Davenport, Iowa, levels, pliers, bobs, hoists, $4430.
Harnischfeger Corp., Milwaukee, cranes and engineering services, $78,075.
Hartford Electric Steel Corp., Hartford, Conn., castings and pattern equipment, $23,450.
Heald Machine Co., Worcester, Mass., grinding machines, $197,165.
Heller Bros. Co., Newark, N. J., files, $2812.
Hendey Machine Co., Torrington, Conn., lathes, $45,702.
Heppenstall Co., Pittsburgh, die blocks, $5900.
Herschede Hall Clock Co., Cincinnati, observation instruments, $976,800.
High Speed Hammer Co. Inc., Rochester, N. Y., head assemblies, spinning machines, $1421.
Hires, Castner & Harris Inc., Philadelphia, toggle presses and charging fixtures, $4400.
Illinois Gage Co., Chicago, gages, $18,365.
International Business Machines Corp., Endicott, N. Y., mechanism feeds, $6921.
International Diesel Electric Co., Long Island City, N. Y., generating units, $546,247.
International Harvester Co., Chicago, cranes, parts for heavy tractors, $76,519.
Iowa Transmission Co., Waterloo, Iowa, transmissions, $9,842,000.
Jahn, B., Mfg. Co., New Britain, Conn., dies, $3268.
Kent Machine Co., Grand Rapids, Mich., pneumatic presses, $74,156.
Kilgore Mfg. Co., Westerville, O., drift signals, $278,969.
Knight, W. B., Machinery Co., St. Louis, equipment for milling machinery, $5950.
LaFrance, Ward, Truck Corp., Elmira Heights, N. Y., parts for trucks, $18,406.
Landis Tool Co., Waynesboro, Pa., grinding machines, $621,054.
LeBlond, R. K., Machine Tool Co., New York, lathes, $31,646.
Lincoln Park Tool & Gage Co., Lincoln Park, Mich., gages, $6099.
Lincoln Tool & Die Co. Inc., Detroit, fixtures and tools, $7051.
Link-Belt Co., Indianapolis, chain assemblies, $4302.
Lloyd & Arms Inc., Philadelphia, lathes, $4872.
Logan Co. Inc., Philadelphia, conveyors, $2725.
Logansport Machine Inc., Logansport, Ind., pneumatic presses, $407,636.
Lucas, J. L., & Son Inc., Bridgeport, Conn., reconditioning screw machines, $3500.
Master Metal Products Inc., Buffalo, accessories for tanks, $2664.
Master Tool & Die Co., Newark, N. J., pins, barricades, and springs, $4660.
Maxson, W. L., Corp., New York, torque amplifiers, $14,100.
McKenna Metals Co., Latrobe, Pa., lathe and turning tools, forming tools, $8215.
Mergenthaler Linotype Co., Brooklyn, N. Y., range quadrants, telescopes, telescope mounts, spotting boards, $5,391,590.
Merz Engineering Co., Indianapolis, gages and fin assemblies, $3220.
Micromatic Hone Corp., Detroit, honing machines and tools, $11,373.
Midvale Co., Nicetown, Pa., forgings, $180,557.
Midwest Tool & Mfg. Co., Detroit, reamers, $6075.
Millers Falls Co., Greenfield, Mass., grinding heads, $7597.
Mills Co., Cleveland, metal partitions, $2940.
Mitchell, John E., Co. Inc., Dallas, Tex., projectiles, $187,500.
Modern Tool & Die Co., Philadelphia, gages, $11,313.
Monarch Aluminum Mfg. Co., Cleveland, funnels, $7855.
Monarch Machine Tool Co., Sidney, O., lathes, $360,343.
Moore Special Tool Co., Bridgeport, Conn., dies, $4305.
Morton Mfg. Co., Chicago, ammunition chests, $114,740.
Motor Wheel Corp., Lansing, Mich., ammunition, $1,505,000.
Munitions Mfg. Corp., Poughkeepsie, N. Y., guns, $4,266,000.
National Acme Co., Cleveland, automatic screw machines, $68,929.
National Stamping Co., Detroit, metallic belt links, $2,264,610.
New York Thread Grinding Corp., New York, gages, $3010.
Nicholson File Co., Providence, R. I., files, $3549.
Niles-Bement-Pond Co., Pratt & Whitney Division, West Hartford, Conn., drilling machines, drill tips, gages, $59,186.
Noblitt-Sparks Industries Inc., Columbus, Ind., ammunition, $791,648.
Norton Co., Worcester, Mass., grinders, $86,250.
Oliver Farm Equipment Co., Chicago, projectiles, $322,905.
Onsrud Machine Works Inc., Chicago, lathes, shapers, borers and millers, $26,890.
Otis Elevator Co., Buffalo, castings, $14,001.
Otis Steel Co., Cleveland, steel, $19,313.
Parish Pressed Steel Co., Reading, Pa., gun carriage parts, $701,935
Pennsylvania Tool Mfg. Co., York, Pa., gages and fin assemblies, $6500.
Peters Engineering Co., Philadelphia, chamfer machines, $2668.
Philadelphia Bronze & Brass Corp., Philadelphia, aluminum bronze rod, manganese, $3676.
Philadelphia Tool Co., Philadelphia, chucking assemblies, $4725.
Phosphor Bronze Smelting Co., Philadelphia, phosphor bronze, $4267.
Pipe Machinery Co., Cleveland, gages and fin assemblies, $4937.
Plumb, Fayette R., Inc., Philadelphia, hammers and sledges, $20,350.
Potter & Johnston Machine Co., Pawtucket, R. I., chucking machines, $536,910.
Revere Copper & Brass Co. Inc., Rome, N. Y., forgings, $39,950.
Rockwell, W. S., Co., New York, forge furnaces, $15,151.
Rodgers Hydraulic Inc., Minneapolis, hydraulic presses, $18,444.
Roessler Machine Co., Philadelphia, punches, $3258.
Rotary Electric Steel Co., Detroit, steel, $47,100.
Safe Guard Corp., Lansdale, Pa., punches for cams, $10,500.
Sampson, Warren D., Co., West Springfield, Mass., snow loaders, $3450.
Silent Hoist Winch & Crane Co., Brooklyn, N. Y., capstans, $5112.
Sipp-Eastwood Corp., thread cleaning machines, pneumatic presses, $485,652.
Snap-On Tools Corp., Kenosha, Wis., wrenches, $12,205.
Somerville Machine & Foundry Co., Somerville, Mass., aluminum bronze castings, $11,759.
Springfield Stamp Die Co., Springfield, Mass., steel stamps, $6486.
Stamford Rolling Mills Co., Springdale,

Conn., brass, $3413.
Standard Gage Co. Inc., Poughkeepsie, N. Y., gages, $8116.
Standard Pressed Steel Co., Jenkintown, Pa., headers, $11,885.
Struthers-Wells Titusville Corp., Titusville Forge Division, Titusville, Pa., forgings, $215,625.
Sutton Tool Co., Detroit, collets and feeders, $13,855.
Tate-Jones & Co. Inc., Leetsdale, Pa., gas fired furnaces, $4906.
Taylor Engineering Co., Elgin, Ill., cylinders, $24,600.
Threadwell Tap & Die Co., Greenfield, Mass., cutters, $100,000.
Timken-Detroit Axle Co., Wisconsin Axle Division, Oshkosh, Wis., differential assemblies, parts for tanks, $111,305.
Timken Roller Bearing Co., Steel & Tube Division, Canton, O., steel, $18,451.
Towmotor Co., Cleveland, trucks, $3539.
Union Fork & Hoe Co., Columbus, O., bayonets, $548,049.
Union Twist Drill Co., Chicago, cutters, $3891.
United Precision Products, Chicago, plug gages, $3388.
U. S. Pipe & Foundry Co., Birmingham, Ala., shells, $90,687.
Vinco Corp., Detroit, gages, $8781.
Vulcan Mold & Iron Co., Latrobe, Pa., molds, $27,184.
Wackman Welded Ware Co., Chester, Pa., drums, $65,520.
Wade Electric Products Co., Sturgis, Mich., cartridge clips, $357,000.
Wahn, George H., Co., Boston, electrical equipment, $5705.
Westclox Co., La Salle, Ill., pins and screws, gears, $26,260.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., switchgears, binoculars, shot, $4,383,038.
Wheland Co., Chattanooga, Tenn., guns, $9,067,270.
White Motor Co., Cleveland, wrenches, shackle assemblies and gaskets, fuel filters, $10,541.
Whitman & Barnes, Detroit, machine tools, $336,632.
Whiton, D. E., Machine Co., New London, Conn., cutting machines, $8800.
Wiedemann Machine Co., Philadelphia, gages and fin assemblies, $2580.
Willamette Hyster Co., Portland, Oreg., trucks, $5980.
Williams, J. H., & Co., Buffalo, wrenches, $3195.
Wisconsin Steel Co., Chicago, steel bar, $4492.
Wollaston Brass & Aluminum Foundry, North Quincy, Mass., castings, $15,729.
Worthington Pump & Machinery Corp., Chicago, air compressors, $25,420.

Corps of Engineers Awards

Cummins Diesel Sales of Oregon Inc., Portland, Oreg., generating units, $6530.
Gardner-Denver Co., Los Angeles, drill rods and rock bits, $20,764.
Harnischfeger Corp., Milwaukee, standard clamshell attachments and extra boom point sheaves, $9089.
Ingersoll-Rand Co., New York, oil engine driven portable equipment, $71,298.
King-Knight Co., San Francisco, generating sets, $42,400.
Mahoney-Clarke Inc., New York, pumps and hardware items, machine shop tools, equipment and supplies, $18,988.
Sterling Motors Corp., Long Island City, N. Y., dump trucks, platform trucks, seats and cushions, $32,481.

Signal Corps Awards

Aeronautical Radio Co., Mineola, Long Island, N. Y., junction boxes, $34,650.
Anaconda Wire & Cable Co., New York, wire, $179,510.
Kellogg Switchboard & Supply Co., Chicago, headsets, microphones, $19,238.
Leich Electric Co., Genoa, Ill., switchboards, $39,587.
North Electric Mfg. Co., Galion, O., head and chest sets, $3521.
RCA Mfg. Co. Inc., Camden, N. J., aircraft transmitters and microphones, $8242.
Scherr, George, Co. Inc., New York, projectors and accessories, $6304.
Teletype Corp., Chicago, teletype sites, $1,594,730.
Widin Metal Goods Co., Garwood, N. J., mast bases and sections, $11,033.
Zenith Radio Corp., Chicago, frequency meter sets, $13,031.

Defense Contract Opportunities . . . .

■ More defense subcontract opportunities, not heretofore published in STEEL, have been issued by local offices of the Contract Distribution Division, OPM. The subcontracts are available to manufacturers possessing facilities required to handle the work offered, and who are not already engaged to capacity on defense work.

Further information concerning specific opportunities may be secured either from the office issuing the item or from the prospective subcontractors' nearest district office. Actual samples or drawings of the desired article are available, in most instances, for examination at the district offices. The opportunities:

Division of Contract Distribution, OPM, Union Commerce building, Cleveland, is seeking subcontractors for the following work.

62—1114: Western manufacturer requires subcontractor with following facilities for fabricating heavy metals: Bending brakes and rolls, flame cutting, welding and hand forging. Also machine shop with milling, turret lathe, and drill press equipment.

63—1114: Subcontractor wanted with machining facilities to fabricate quantity of ball studs—pieces 2.177 inches in length made from ¾-inch hex stock—material SAE 1035 steel. Equipment indicated—multiple spindle automatic screw machines. Material to be furnished by subcontractor. Quantities 10,000 pieces.

64—1126: Cleveland manufacturer requires facilities for machining steel forgings. Eighteen items in quantities of approximately 1800 of each. Equipment indicated consists of, turret and engine lathes to 16 inches; Planers; Milling Machines No. 2, 3; and heavy duty; External grinders; surface grinders 2-inch Horizontal Boring Mills; Slotters; Screw Machines; Heat Treating. Forgings 4340 Steel. Material, tools, dies, fixtures, gages, etc. to be furnished by subcontractor. A-1-a priority. Blueprints on file this office.

65—1127: Subcontractor to machine complete 1600 cases weighing approximately 18 lbs. each. Equipment indicated consists of 2-inch Horizontal Boring Mill; No. 3 Horizontal and vertical Mills; La Pointe Broach; Medium Size drill presses; tapping etc. Material, Bronze-Alum. SAE No. 68, also tools, dies, fixtures, gages to be furnished by subcontractor. A-1-a priority.

Pittsburgh office of Division of Contract Distribution, OPM, 717 Grant street, Pittsburgh, is seeking subcontractors for the following:

BTC-7: Cartridge containers. Quantities, 100,000 to 500,000 each, 2.3925-inches long. 0.935-inch outside diameter. Material is WDX 1335 steel. Requires six-spindle automatic screw machines. Drawings available at Pittsburgh.

WEM-9: Motor frames. Quantities large and work will be continuous. Material varies. Requires horizontal boring mills, 6-inch bar or larger; vertical boring mills 84 inches or up; milling machines; planers and radial drills of 5 to 6 inches.

BK-13: Bofor gun parts. Quantity varies. Material is commercial steel castings furnished by prime contractors. Tolerances are .003 to .005 for rough machine, .001 to .002 for finished machine. Requires boring mill, radial drill, planer.

BL-14: Tank parts. Material is armored steel castings. Requires horizontal and vertical boring mills, planers, drill presses and radial drills.

CSI-19: Steel nose plugs. Quantity, 250,000. Materials are steel forgings and sheet copper. Tolerances .010 to .0025. Requires automatic screw machines and light stamping presses. Drawings available at Pittsburgh.

MSA-24: Gas mask parts. Quantity, 100 to 35,000. Materials are bakelite, hard rubber, nickel silver and aluminum. Requires automatic screw machines up to 2 inches, turret lathes to 2 inches, light stamping presses. Drawings available at Pittsburgh.

SAC-28: Gun mount parts for .30 caliber machine gun. Quantity, lots of 5000 each. Material varies. Tolerances plus or minus .001 to .005. Requires straddle, end and surface mills; profilers; slotters; drills; surface, internal and external grinders. Tools, jigs, dies, fixtures, gages, extra perishable cutters and raw materials will be furnished to subcontractors. Drawings available at Pittsburgh.

WC-32: Valve forgings, ranging from 2 ounces to 150 pounds. Requires drop forging hammers and upsetters.

Division of Contract Distribution, OPM, Civic Opera building, Chicago, is seeking subcontractors for the following work:

BTDC-A-1124: Facilities required to machine forgings made of SAE 4640 steel ranging up to 24 inches in diameter. This work can best be done on 36-inch vertical boring mills, lathes with a 24-inch swing, gear shapers up to 20¾ inches diameter, and gear hobber for 4-inch diameter. Quantities at present from 1000 to 2000 of each part. Material to be furnished by the prime contractor. Blue prints available for inspection at this office.

MAMC-N-1124: Chicago manufacturer requires subcontractors for machine work only on cast iron and cast steel flanges up to 10-inch diameter. Engine lathes up to 8" swing, turret lathes with chucking equipment and 12-inch swing, or a vertical boring mill with 24-inch table best suited for this work. Tolerances fairly liberal. Quantity relatively small.

ABEC-A-1106: A Chicago tool company has work to sublet for internal and external grinders on small dies and punches. The quantities involved are large and the work will continue indefinitely and will be sublet to concerns located within a radius of 200 miles of Chicago. Prime contractor will furnish dies and punches ready for grinding.

AMMC-A-1106: A Midwest manufacturing concern requires subcontractors for machining various steel castings requiring 2, 3½, 4-inch Giddings & Lewis boring mills, or other similar machines. Castings to be furnished by the prime contractor. This work will be sublet to concerns located anywhere in Illinois, Iowa, Indiana, Michigan and Wisconsin.

MC-A-1105: An airplane motor manufacturing company requires additional facilities for centerless grinding of various sizes of cable terminals, having a shoulder on one end. These parts vary from .160 to .563 in diameter and from .910 to 2.419 in length. These parts will be furnished in lots of 2000 to 20,000 pieces for subcontracting and may include several sizes at one time. Blueprint and sample available for examination at this office.

CMC-1010: Urgent requirement for gear cutting equipment capable of turning out from 600 to 1200 Bevel gears per month. These are for use in aircraft motors, tolerances are close. Most of these gears will be integral with shaft and will be between 1½" to 2" P.D. All material to be furnished by prime contractor.

SDP-1107: Foundry capacity required for producing carbon molybdenum steel pressure castings of various shapes and sizes weighing from 32 to 115 pounds each. Approximate requirements 500 pieces per month.

SPG-1003: An eastern manufacturer wishes to sublet contracts for parts for intricate indicating devices requiring machine equipment capable of making parts to within .0003 to .001 limits. This requires automatic and hand screw machines; small lathes with collet attachments for cutting fine threads, small drill presses, small milling machines for cutting Woodruff Keyseats, small bevel and spur gear cutting equipment, with capacity small enough to cut bevel gears of 32

to 48 pitch and 11/16 to 2 1/16 outside diameter. Quantities will be run in lots of 1000 or more. Prime contractor will furnish materials. In some cases the gear blanks only may be required. Prints at this office.

AOG-920: An Eastern manufacturer requires additional facilities for producing small gun parts. A battery of No. 3 or 4 vertical and horizontal milling machines, also deep hole boring equipment required. Lathes suitable for deep hole boring can be used. Workmanship must be accurate as close tolerances are involved.

SKF-924: A manufacturer is in urgent need of subcontractors having available time on multiple spindle Gridley Automatics 2⅝ to 3½ inch capacity. Six spindle preferred as tools are available for these machines. Also Cleveland single spindle automatic from 4 to 7 inch capacity.

GLM-918: A Wisconsin machine tool manufacturer has work to sublet for turret lathes having a capacity for 4½-inch diameter bar stock, which requires spindle and chucking capacity of at least 4⅝-inch in order to handle large bars. The machine will not be used for chucking work. If you have this kind of equipment, contact this office at once.

GEN-816: Several manufacturers have work for various sizes and types of gear hobbing machines. Also Gleason gear shapers as well as worm milling machines for production of spur-mitre and bevel gears, worm wheels and worms.

Canada Orders 17 Corvettes

TORONTO, ONT.

■ CONTRACTS have been placed by the Dominion for 17 additional twin-screw corvettes at a total cost of about $25,000,000, it was reported last week by C. D. Howe, minister of munitions and supply. Awards were placed with Burrard Dry Dock Co. Ltd., Vancouver, B. C., and Yarrows Ltd., Victoria, B. C.

In the week ended Nov. 18, the Department of Munitions and Supply placed 4871 contracts, with total value $34,034,505. Awards to United States companies aggregated $432,433. Shipbuilding contracts totaled about $10,000,000, and were largely placed with Ontario yards. Other orders:

Shipbuilding: Port Arthur Shipbuilding Co. Ltd., Port Arthur, Ont., $648,000; Collingwood Shipyards Ltd., Collingwood, Ont., $3,346,000; Midland Shipyards Ltd., Midland, $2,050,000; Port Carling Boat Works, Port Carling, $19,920; Kingston Shipbuilding Co. Ltd., Kingston, $1,468,000; Superheater Co. Ltd., Montreal, Que., $790,099; George T. Davie & Sons, Lauzon, Que., $1,640,000; Restigouche Co. Ltd., Edmundston, N. B., $10,250; Lunenburg Foundry Co. Ltd., Lunenburg, N. S., $11,581; W. B. Moriarity & Co. Ltd., Halifax, N. S., $12,250.

Land transport: Pierre Thibault, Pierreville, Que., $90,850; Arlington Cycle & Sports Ltd., Montreal, $35,769; Eastern Steel Products Ltd., Montreal, $84,672; Canadian Traction Ltd., Ottawa, Ont., $207,238; International Harvester Co. of Canada Ltd., Ottawa, $115,500; General Motors of Canada Ltd., Oshawa, $20,369; Metallic Roofing Co. Ltd., Toronto, $326,888; Wilson Motor Bodies Ltd., Toronto, $18,144; Chrysler Corp. of Canada Ltd., Windsor, $370,982.

Aircraft: Accessories Manufacturers Ltd., Montreal, $26,624; British Aeroplane Engines Ltd., Montreal, $21,183; Noorduyn Aviation Ltd., Montreal, $31,671; James Pyke & Co. Ltd., Montreal, $54,245; Canadian Westinghouse Co. Ltd., Ottawa, $6204; Coleman Lamp & Stove Co. Ltd., Toronto, $18,148; DeHavilland Aircraft of Canada Ltd., Toronto, $66,232; Safety Supply Co. Ltd., Toronto, $18,545; National Steel Car Corp. Ltd., Malton, $11,969.

Instruments: Overseas Requisition, London, England, $7500; Instruments Ltd., Ottawa, $8640; Ontario Hughes-Owens Co. Ltd., Ottawa, $363,078; Canadian Aircraft Instruments & Accessories Ltd., Leaside (Toronto), Ont., $253,973; Research Enterprises Ltd., Leaside, $89,797; Sutton-Horsley Co. Ltd., Toronto, $113,991.

Electrical equipment: Canadian Pacific Railway Co. Ltd., Montreal, $752,000; Terry Machinery Co., Montreal, $54,671; Jack Watson Co., Montreal, $7756; General Supply Co. Ltd., Ottawa, $7598; R.C.A. Victor Co. Ltd., Ottawa, $60,814; Canadian Telephones & Supplies Ltd., Toronto, $5098; Magnet Electric Co. Ltd., Vancouver, $8450.

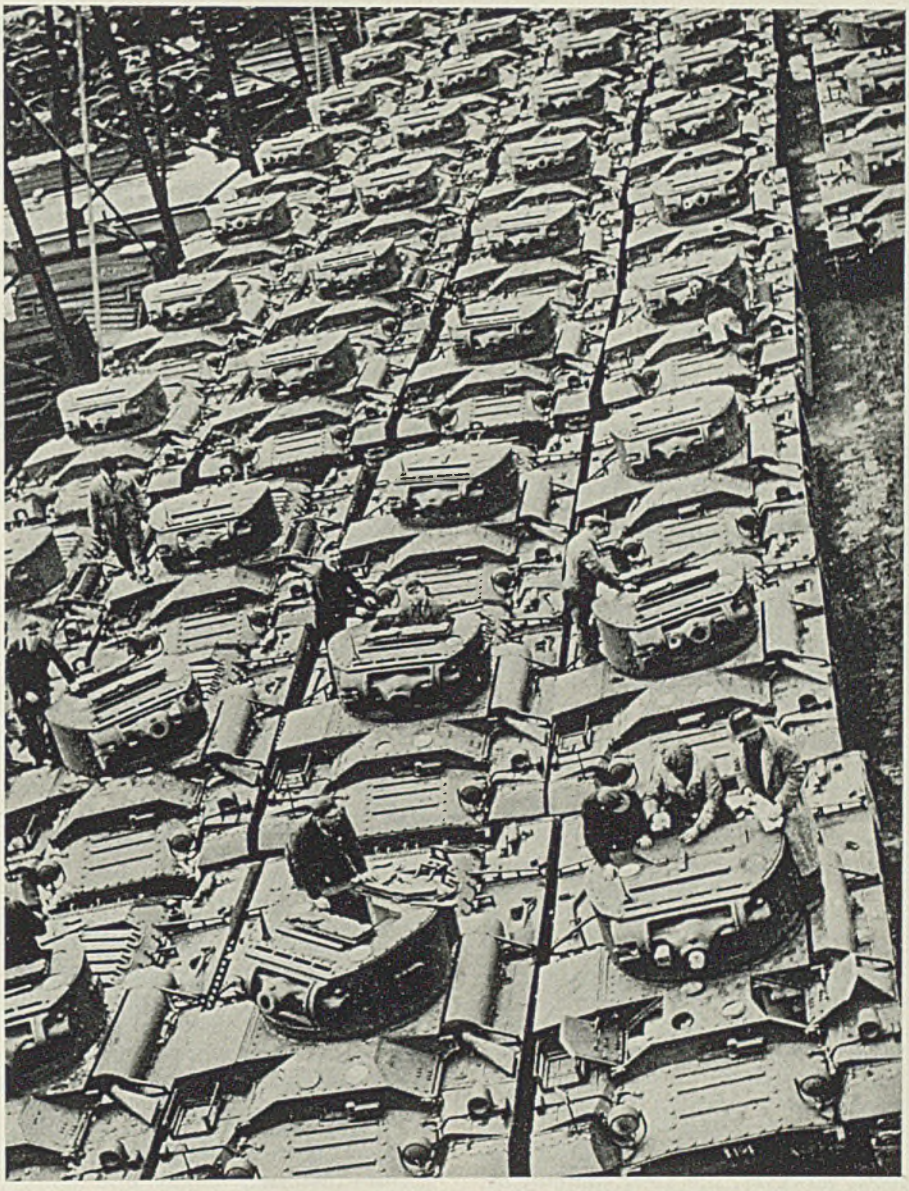
Machinery: Canadian Fairbanks-Morse Co. Ltd., Ottawa, $15,725; A. R. Williams Machinery Co. Ltd., Toronto, $15,725; Canada Machinery Corp. Ltd., Galt, Ont., $10,944.

Tools: Union Twist Drill Co. Ltd., Montreal, $5740; Toronto Lock Mfg. Co., Toronto, $7822.

Fire fighting equipment: Walter Kidde & Co. of Canada Ltd., Montreal, $51,110; Dominion Rubber Co. Ltd., Ottawa, $6372; Gutta Percha & Rubber Ltd., Ottawa, $6372; Goodyear Tire & Rubber Co. of Canada Ltd., New Toronto, $6426; Dunlop Tire & Rubber Co. of Canada Ltd., Toronto, $6372; Bi-Lateral Fire Hose Co. Ltd., Kitchener, $5426.

Ordnance: Sorel Industries Ltd., Sorel, Que., $112,000; Canadian General Electric Co. Ltd., Toronto, $22,428; Hill-Clark-Francis Ltd., New Liskeard, Ont., $13,109; Hamilton Bridge Co. Ltd., Hamilton, $32,000.

Munitions: Overseas Requisition, London, England, $412,954; Dominion Arsenal, Quebec, Que., $288,000; International Flare Signal Co. Ltd., Waterloo, Que., $48,730; E. A. Mahon, Montreal,



Our Neighbors to the North

■ **CANADIAN TANKS IN MASS PRODUCTION: These "Valentines" have trundled off the assembly line in Angus Shops, Montreal, and are being fitted with two-pounder machine guns, flame throwers and other equipment. Built of 40,000 separate parts and costing $90,000, each tank weighs 20 tons, has top speed of 25 miles per hour. More than 3500 men are employed at the plant, which operates 24-hours a day, six days a week. NEA, passed by censor**

$62,397; John Hay & Co., Eastview, Ont., $7020; Government of the United Kingdom, London, England, $233,280; Western Steel Products Corp. Ltd., Ottawa, $112,326; Aluminum Goods Ltd., Toronto, $17,819.

Metals: Consolidated Mining & Smelting Co. of Canada, Ltd., Montreal, $7980.

War construction projects: Dexter Construction Co. Ltd., Fairville, N. B., $55,547; Stewart Construction Co. Ltd., Sherbrooke, Que., $495,082; E. G. M. Cape & Co. Ltd., Montreal, $1,418,647; Collet Freres Ltd., Montreal, $414,000; Douglas Bremner Construction Co., Montreal, $87,784; A. Janin & Co. Ltd., Montreal, $1,420,000; L. G. Ogilvie & Co. Ltd., Montreal, $623,217; M. Sullivan & Son Ltd., Arnprior, Ont., $126,567; Canadian Dredge & Dock Co. Ltd., Toronto, Ont., $259,300; Redfern Construction Co. Ltd., Toronto, $137,500; Tomlinson Construction Co. Ltd., Toronto, $613,900; Hill-Clark-Francis Ltd., New Liskeard, Ont., $142,900; Frid Construction Co. Ltd., Hamilton, $76,966; Sterling Construction Co. Ltd., Windsor, Ont., $64,386; Assiniboia Engineering Co. Ltd., and Dutton Bros. & Co., Winnipeg, Man., $97,703; Carter-Halls-Aldinger Co. Ltd., Winnipeg, $350,000; Waterman-Waterbury Mfg. Co. Ltd., Regina, Sask., $544,863; A. W. Heise Co. Ltd., Saskatoon, Sask., $370,000; W. C. Wells Co., Wilkie, Sask., $96,840; Claydon Co. Ltd., Winnipeg, Man., $84,000.

Miscellaneous: Horton Steel Works Ltd., Toronto, $9603; Iron Fireman Mfg. Co., of Canada Ltd., Toronto, $32,266; Devilbiss Mfg. Co., Windsor, Ont., $7639; Dominion Bridge Co. Ltd., Winnipeg, $17,700; Clare Bros. Western Ltd., Winnipeg, $5000; General Construction Co. Ltd., Claresholm, Alta., $18,000; Anthes Foundry Ltd., Winnipeg, $12,678; Enamel & Heating Products Ltd., Sackville, N. B., $25,960; Pacific Veneer Co. Ltd., New Westminster, B. C., $6173; Page Equipment & Construction Ltd., Three Rivers, Que., $7950; Dominion Bridge Co. Ltd., Montreal, $50,300; Corbin Lock Co. of Canada Ltd., Belleville, Ont., $5880; Miner Rubber Co. Ltd., Granby, Que., $231,256; Gutta Percha & Rubber Ltd., Toronto, $125,000; Viceroy Mfg. Co. Ltd., Toronto, $59,018; Canadian General Rubber Co. Ltd., Galt, Ont., $18,765; Kaufman Rubber Co. Ltd., Winnipeg, Man., $30,242; Drummond McCall & Co. Ltd., Ottawa, $5739.

New Blast Furnace Gives Dominion Record Output

Production of pig iron and steel in Canada in October topped all prior months, and totals for ten months are well above all other comparable periods. Pig iron output in the month was 137,114 gross tons, 20.6 per cent above the previous record, 113,624 tons, in May, 1941. Ingots and castings in October amounted to 222,853 tons, an increase of 8.1 per cent over the May record of 206,110 tons.

Ingots and castings for ten months total 1,971,909 tons, an increase of 19.5 per cent over the corresponding period last year, and 81.4 per cent over the 1939 period. Pig iron output for ten months this year was 1,082,222 tons, 14 per cent above the similar period in 1940 and 88.8 per cent over the comparable 1939 period.

Ferroalloys at 155,451 tons, gained 47.5 per cent over ten months of 1941 and 170.5 per cent over ten months in 1939.

October increase in pig iron resulted mainly from blowing in the new blast furnace of the Steel Co. of Canada at Hamilton, Ont., which is producing about 850 tons per day.

Scrap Metal "Mined" from Slag Dumps at Pittsburgh

PITTSBURGH

■ Scrap "mining" is becoming more extensive in the slag dumps that have been increasing in size in this district for many years. A result of the growing scrap shortage, these "mining" operations have been carried on in the past, on a much smaller scale, by companies interested in selling slag as an aggregate or for other applications. Now, however, the steel content, instead of being an undesirable by-product, has become the object of search.

Both hand picking and magnetic separation methods are being used to recover the metal. Older dumps are preferable, as weathering tends to make the slag crumble into a sandy substance and allow the metal to come free. Estimates cannot be made to indicate the resources of scrap available as a result of this process. Metal content runs between 1 and 2 per cent on the average slag, and there are millions of tons in the dumps here. Some are so solidified externally that blasting is required to reach the softer material, while others require merely a power shovel to scoop out the slag.

In addition to the open-hearth slag, there also is a large quantity of blast furnace slag productive of scrap metal. In some places the two are mixed.

Scrap Stocks Reduced 3% in August

■ Domestic stocks of steel and iron scrap at consumers' and suppliers' yards and in transit at the close of August amounted to 6,002,000 net tons, 3 per cent less than 6,208,000 tons July 31, according to the Bureau of Mines.

Known stocks held by consumers and suppliers Aug. 31 were equivalent to a five-weeks supply at the rate of consumption in that month, a position unchanged from the end of July. Although total stocks decreased 3 per cent, those on hand at and in transit to consumers' plants declined only 2 per cent, from 4,911,000 tons to 4,814,000 tons. Suppliers' stocks decreased 8 per cent, from 1,297,000 tons July 31 to 1,188,000 tons Aug. 31. Most of this loss was due to shrinkage in dealers' stocks, which were 10 per cent less Aug. 31, with automobile wreckers' and railroads' stocks down 5 and 10 per cent, respectively, while manufacturers' stocks were 20 per cent larger.

In western Pennsylvania reported stocks of purchased and home scrap were equivalent to four weeks' supply at August rate of consumption. In eastern Ohio and West Virginia supply was sufficient for about four week; in other principal consuming areas, four to six weeks. New England had sufficient for 11 weeks and western states for 10 weeks, while southwestern states had stocks for 24 weeks.

Total consumption of scrap and pig iron in August was 9,961,000 tons, an increase of 3 per cent over 9,696,000 tons in July. Despite an increase of 2 per cent in use of home scrap stocks of this grade increased 2 per cent in August. Use of pig iron increased 3 per cent in August but stocks declined only 1 per cent compared with July 31.

Maryland Selected as Site for Waste Collection Campaign

Maryland has been selected by the OPM Bureau of Industrial Conservation for the launching of its program to increase the salvaging of scrap metals, rubber and other waste materials.

The Maryland waste collection program will be based on plans laid out by the bureau, Lessing J. Rosenwald, chief of the bureau, said, but will be executed by a State Salvage Committee, a new division of the State Defense Council. The bureau will offer full co-operation and support, and will provide informational and promotional material for widespread distribution to homes, shops, farms and factories in every section of the state.

The bureau plans similar efforts in other states on the east coast and, finally, in every section of the country.

Pig Iron Rate 99% in November; Daily Average Increased Slightly

■ DAILY average production of coke pig iron and ferroalloys in United States increased 131 tons, or 0.08 per cent, from the preceding month to 156,906 tons in November, despite interruptions in operations occasioned by coke shortages caused by the coal mine tie-ups.

Total production for the month, one day shorter than October, was down 3.2 per cent, according to complete reports from operators of the nation's 231 potential coke blast furnaces. Operating rate was 99.0 per cent.

Second highest on record, daily output in November was exceeded only in September this year, with 157,378 tons. Last month's daily average compared with 146,589 tons in November, 1940; it was up nearly 13 per cent over the month in 1939, and was more than double the 74,929 tons produced daily in November, 1937. In the month in 1929, daily average was 118,811 tons.

Total output in November was 4,707,194 net tons, down 152,839 tons from 4,860,033 tons in October. Production in the month was 7 per cent greater than 4,397,656 tons in the month in 1940, and almost 13 per cent above 4,166,512 tons in November, 1939. It was more than double 2,247,875 tons produced in November, 1937, and compared with 3,564,310 tons in the month in 1929.

Aggregate production in the first 11 months this year was 50,903,091 tons, 20.2 per cent greater than in the corresponding period in 1940, and was up 64.3 per cent from 30,986,482 tons in the 11 months in 1939. It compared with combined output of 39,430,345 tons in the period in 1937 and was 15.3 per cent greater than 44,165,258 tons produced in the first 11 months of 1929.

Production 20.2% Above 1940

Average daily production for the 11 months' period was 152,404 tons, 20.2 per cent above 126,802 tons in the 11 months last year. This compared with 92,774 tons in the period in 1939, with 118,055 in the first 11 months in 1937, and 132,231 tons in the 1929 period.

Merchant iron produced in the month, 713,174 tons, was 15.2 per cent of total output. This compared with 15 per cent in October, 15.5 per cent in September, 15.4 per cent in August, 15 per cent in July, and 14.7 per cent in November, 1940.

Stacks in blast Nov. 30 totaled 217, a net gain of one from October's 216. In September, 219 were blowing, 215 in August, 212 in July and 191 in April, the year's low. Total in November last year was 202, compared with 191 in the month in 1939, and 114 in November, 1937. In the month in 1929, stacks active numbered 176.

Two merchant stacks were taken out of blast in the month and two added. In the steelworks or nonmerchant classification, three stacks were lighted and two removed from blast. Stacks blown out in November:

In Alabama: Woodward Nos. 2 and 3, Woodward Iron Co. In Ohio: One Central, American Steel & Wire Co. In Pennsylvania: National Works No. 4 of National Tube Co., at Monongahela.

Lackawanna H, Bethlehem Steel Co., was blown in at Lackawanna, N. Y., for the first time Nov. 23. A new blast furnace, it is rated at more than 1000 tons daily and increases the number of stacks at this works to seven. Other stacks blown in included, in Alabama: Pioneer No. 2, Republic Steel Corp. In Ohio: Toledo B, Interlake Iron Corp.; and Brier Hill No. 2, Youngstown Sheet & Tube Co. In Pennsylvania, Palmerton No. 1, New Jersey Zinc Co.

Fourteen furnaces were out of blast Nov. 30. Several are in process of rebuilding or relining and are scheduled to be relighted soon. They include: Isabella No. 1, Carnegie-Illinois Steel Corp.; One Detroit, National Steel Corp.; One Granite City, Koppers United Co.; Carrie No. 4, Carnegie-Illinois Steel Corp.; those blown out last month.

Following furnaces have not yet been reported in active process of rehabilitation: Two Joliet stacks, Carnegie-Illinois Steel Corp.; Delaware, Philadelphia Electric Co.; and Cumberland, Warner Iron Co.

Two blast furnaces at Edgar Thomson works of Carnegie-Illinois Steel Corp. have been slated for dismantlement, although no action has yet been reported. K furnace is to be moved to the Mingo Junction, O., works, to replace No. 3 stack there. J furnace will be dismantled piecemeal and used to repair other stacks.

■ First half of 1941 has seen a sharp upturn in Swiss imports of German iron and steel, a trade report to Washington reveals, with the prospect that at present figures, 1939 quantity levels may be attained, and due to higher prices, such imports will have a greater value than for that year.

PIG IRON STATISTICS

RATE OF FURNACE OPERATION
(Relation of Production to Capacity)

	1941[1]	1940[2]	1939[3]	1938[4]
Jan.	95.5	85.4	51.0	33.6
Feb.	95.3	75.0	53.5	33.6
March	96.3	69.5	56.1	34.2
April	91.8	68.9	49.8	33.4
May	94.1	74.2	40.2	29.4
June	95.7	83.6	51.4	25.5
July	97.0	86.1	55.0	28.2
Aug.	97.4	89.9	62.4	34.8
Sept.	99.3	91.5	69.7	40.5
Oct.	98.9	94.2	85.2	48.0
Nov.	99.0	96.4	90.3	55.0
Dec.	....	96.4	88.5	51.4

[1] First six months are based on capacity of 57,503,030 net tons, Dec. 31, 1940—last six months on capacity of 57,830,610 net tons, June 30, 1940; [2] capacity of 55,628,060 net tons, Dec. 31, 1939; [3] capacity of 56,222,790 net tons, Dec. 31, 1938; [4] capacity of 56,679,168 net tons, Dec. 31, 1937. Capacities by American Iron and Steel Institute.

MONTHLY IRON PRODUCTION
Net Tons

	1941	1940	1939
Jan.	4,666,233	4,024,556	2,436,474
Feb.	4,206,826	3,304,368	2,307,405
March	4,702,905	3,270,575	2,680,446
April	4,340,555	3,139,043	2,301,965
May	4,596,113	3,497,157	1,923,625
June	4,551,040	3,813,092	2,373,753
July	4,766,216	4,060,513	2,638,760
Aug.	4,784,639	4,234,576	2,979,774
Sept.	4,721,337	4,172,551	3,218,940
Oct.	4,860,033	4,437,725	4,062,670
Nov.	4,707,194	4,397,656	4,166,512
Tot. 11 mo.	50,903,091	42,351,812	30,986,482
Dec.	.....	4,542,864	4,219,718
Total	.....	46,894,676	35,310,042

NOVEMBER IRON PRODUCTION
Net Tons

	No. in blast last day of Nov.	No. in blast last day of Oct.	—Total Tonnages— Merchant	—Total Tonnages— Non-merchant
Alabama	17	18	117,485	192,654
Illinois	20	20	132,085	330,572
Indiana	19	19	21,484	515,270
New York	16	15	120,565	194,427
Ohio	47	46	123,329	935,970
Penna.	71	71	164,178*	1,303,154*
Colorado	3	3		
Michigan	4	4		
Minnesota	2	2	13,683*	188,983*
Tennessee	3	3		
Utah	1	1		
Kentucky	2	2		
Maryland	7	7		
Mass.	1	1	20,365*	332,990
Virginia	1	1		
West Va.	3	3		
Total	217	216	713,174*	3,994,020*

*Includes ferromanganese and spiegeleisen.

AVERAGE DAILY PRODUCTION
Net Tons

	1941	1940	1939	1938
Jan.	150,524	129,825	78,596	52,201
Feb.	150,244	113,943	82,407	52,254
March	151,707	105,502	86,465	53,117
April	144,685	104,635	76,732	51,819
May	148,262	112,811	62,052	45,556
June	151,701	127,103	79,125	39,601
July	153,749	130,984	85,121	43,827
Aug.	154,343	136,599	96,122	54,031
Sept.	157,378	139,085	107,298	62,835
Oct.	156,775	143,152	131,053	74,697
Nov.	156,906	146,589	138,883	85,369
Dec.	.....	146,544	136,119	79,943
Ave.	152,404	128,128	96,740	57,962

Finds Armament Effort Only Half Amount Required "To Close Gap"

■ ANNUAL rate of United States' defense production at the end of July approximated 5,000,000,000 man-hours of factory effort, according to a study by Farrel-Birmingham Co. Inc., Ansonia, Conn. This was "6,000,000,000 to 12,000,000,000 man-hours short of the 11,000,000,000 to 17,000,000,000 man-hours estimated as needed to close the gap between Axis and Britain's war production rates."

Three major factors, according to the study, have retarded American war output: Strikes, which directly resulted in a loss of 147,000,000 man-hours of effort in 12 months ended July, 1941; limitation of the work week to 40 hours; and artificial rise in wage rates.

Estimated factory effort of the Axis powers combined is 24,000,000,000 to 32,000,000,000 man-hours yearly, against an estimated 13,000,000,000 to 15,000,000,000 man-hours for the British empire. Deficiency of the British empire in this respect "is the gap to be closed by American production."

"The present rate of armament production in the United States is estimated at only one-half the minimum and one-third the probable optimum required."

Entitled "The Basic Factors Retarding American War Production," the study has been published in booklet form by Farrel-Birmingham.

Defense Strikers Lose $10,200,000 in Five Weeks

Major defense strikes in five weeks ended Nov. 29 cost workers $10,200,000 in wages, according to a study by the National Association of Manufacturers. Imposed on the rearmament program by the same strikes was an irretrievable loss of 10,313,864 man-hours of production.

Compilation of work stoppages under the "Strikes as Usual" policy, the association pointed out, does not purport to cover every strike now in progress. It includes only strikes at plants making defense materials and that are reported in metropolitan newspapers.

Fourteen strikes were in progress in the week ended Nov. 28, the association reported last week. Several were settled, but the total man-hours lost was 496,520. A number of the strikes are regarded as "critical," as the defense material being produced in the strike-bound plants is of vital importance either to a prime contractor or a defense project.

Although the number of men on strike and total man-hours lost in the week was less than in the prior 7-day period, the NAM declared, spread of "sympathy" walkouts continued.

1941 Military Plane Output Nearly 20,000

■ Col. John H. Jouett, president, Aeronautical Chamber of Commerce of America, told members at their annual meeting in New York last week that the industry has performed "an industrial miracle" in producing nearly 20,000 military planes this year. He said it will be called upon to put out nearly 100,000 warplanes during the next two years and that these American aircraft "will prove to be the deciding factor in this war."

Government Pressure in Aircraft Merger Denied

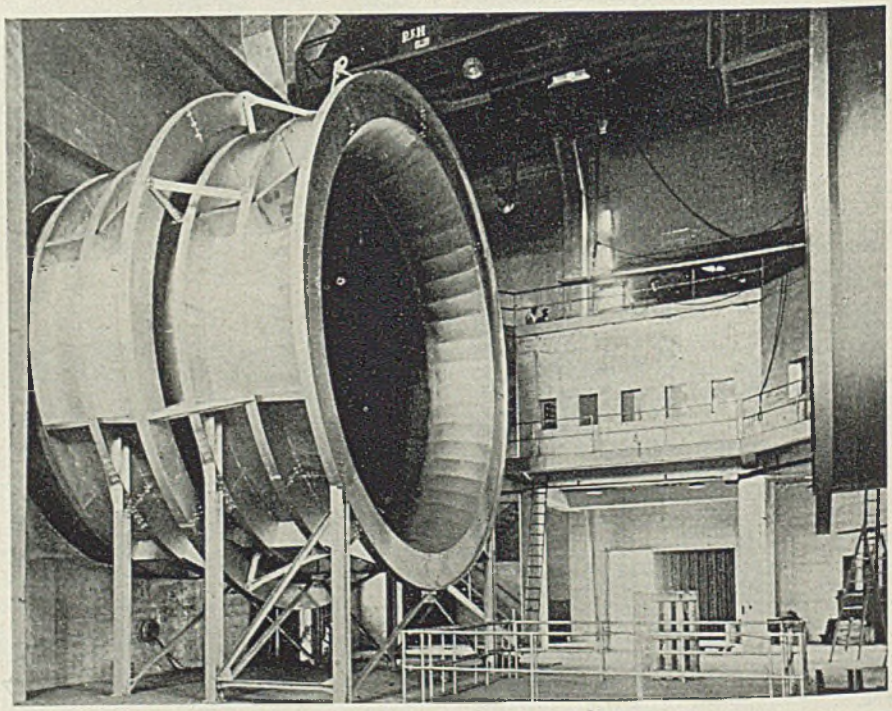
■ Negotiations leading to a merger of Consolidated Aircraft Corp., San Diego, Calif., with Vultee Aircraft Inc., Downey, Calif., have been interpreted in some quarters as indicating government dictation to Maj. Reuben H. Fleet, head of Consolidated, to relinquish his controlling interest because of differences with the administration.

These inferences have drawn a denial from Major Fleet, who states, "By no means am I withdrawing. The job before me is even bigger. Turning over management details of Consolidated to younger men and becoming an adviser to both Consolidated and Vultee, will enable me better to serve my country in this period of need than has been possible previously.

"There have been reports that severe criticism of the administration, attributed to me, has brought about the present negotiations between Vultee and Consolidated. Nothing could be further from the truth. I subscribe entirely and wholeheartedly to the all-important foreign policy of our President and am with him 100 per cent."

Consolidated has a backlog estimated at $725,000,000 for 4-motor bombers and other military aircraft. Vultee is reportedly owned by a group of eastern capitalists representing the Aviation Mfg. Corp., and controls also two plants of Stinson Aircraft, at Wayne, Mich., and Nashville, Tenn. T. M. Girdler, chairman, Republic Steel Corp., Cleveland, is said to have large holdings in the parent organization.

Tests Plane Models at 400 Miles an Hour



■ Two thousand tons of sheet, plate and structural steel was required to build the 20-foot wind tunnel for Wright Field, Dayton, O. The tunnel, which cost $2,500,000, will permit testing by Air Corps engineers of plane models with as much as 15-foot wing span in a wind stream that will simulate flying conditions at speeds in the neighborhood of 400 miles an hour. Shown is the mouth of the tunnel in which the model planes will be suspended. NEA photo

Tank Production Scheduled To Take Half of Electric Steel Production

■ PRODUCTION of the 37,200 light, medium and heavy tanks called for each year under the new "Victory" program will require half of the country's electric steel output next year.

According to official estimates, the tank program will call for 870,000 tons of special armor plate annually. Program contemplates production of 2000 medium, 1000 light and 100 heavy tanks each month.

Blaw-Knox To Operate Tank Factory at Pittsburgh

Defense Plant Corp. has authorized a $1,740,000 contract for a tank equipment factory at Pittsburgh to be operated by Blaw-Knox Co. The company will extend the foundry at its Union Steel Castings Division and add equipment which will increase considerably its output of armor castings.

Scullin Steel Co. Plans Armor Plate Expansion

Scullin Steel Co., St. Louis, which recently completed deliveries on its armor plate contract with Great Britain, has been notified of a contract for welded armor plate for tanks for the United States government. It will necessitate expansion of plant and facilities costing about $2,000,000.

Production is expected to begin about mid-May at the rate of about $1,000,000 per month. An additional open-hearth furnace will be installed as well as special heat-treating facilities.

Brassert To Build Open Hearths For Brazilian Steel Co.

Brazilian steel capacity soon will be augmented by a $2½ million job just awarded H. A. Brassert Co. by Brazilian National Steel Co.

A complete open hearth shop will be built by Brassert for the South American interests, including one tilting open hearth and two stationary ones. Capacity of each will be 150 metric tons, equalling 163 net tons.

High priorities will be assigned to materials for this job in order to speed construction as rapidly as possible.

The Brazilian steel scene is quite active, not only from the new national steel company's offices but also from independent producers. Inquiry has recently been received here from another company for a complete bar mill, principally for reinforcing rods.

American construction firms with South American interests report difficulties in obtaining all types of building materials in almost all South American countries.

Railroad Representatives To Discuss Material Requirements

Representatives of the railroad industry have been asked to meet Dec. 12 with officials of the Automotive, Transportation and Farm Equipment Branch of the Division of Civilian Supply to discuss material requirements for 1942.

Andrew Stevenson, acting chief of the branch, sent invitations to the conference to 88 railway executives, passenger and freight car builders, locomotive builders, and railroad supply manufacturers.

Meeting will be held at 10 a.m. Dec. 12, in Room 5055 of the Social Security building, Washington, and admittance will be by invitation only. Mr. Stevenson will preside.

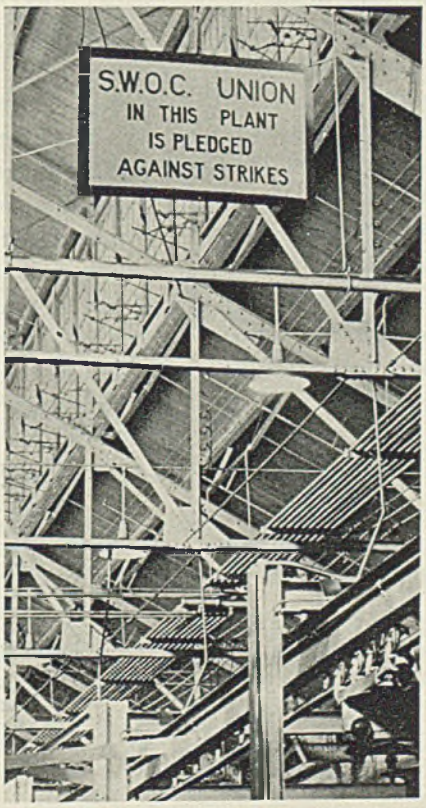
ACF Union Employes "Pledged Against Strikes"

■ Workmen in American Car & Foundry Co.'s Berwick, Pa., plant recently placed on record with their local SWOC union, CIO, a pledge against strikes.

Placards, as illustrated, have been posted at strategic points throughout the plant, bearing the inscription, "SWOC Union in this Plant Is Pledged Against Strikes." "Credit goes to the union, which initiated this step in labor's co-operation in the national defense program," the company states.

The Berwick plant, it says further, was the first civilian builder to engage in production of light combat tanks. Through uninterrupted work on the part of employes, the company has attained a production figure of more than 400 units monthly. ACF's 2000th tank was delivered to the United States government in October.

According to current news reports, more than 500 of these light tanks which have been furnished to Great Britain are participating in the battle in North Africa.



Nine New Blast Furnaces Financed by Government

■ Defense Plant Corp. has loaned money for the construction of nine new blast furnaces since last June when the steel expansion program was launched, according to an OPM survey. Letters of intent have been filed for four more and five other propositions are being studied.

The survey covered only the government financed stacks and does not include blast furnaces privately financed.

World Tin Production Exceeds 1940 Rate

■ World production of tin in October is estimated at 19,300 gross tons, compared with 22,200 tons in October, 1940. Production for ten months was 205,000 tons, against 187,600 tons in the corresponding period last year, according to the Tin Research Institute, Greenford, England.

United States deliveries totaled 8000 tons in October; 12,715 tons in September. For ten months they were 127,287 tons, compared with 93,634 tons in the period in 1940. Consumption of tin in the United Kingdom in the first eight months this year amounted to 18,933 tons; 20,818 tons in the period in 1940.

World tin stocks, including smelters' stocks and carryover, increased by 4736 tons during October, to 51,465 tons at the end of the month. Stocks at the end of October, 1940, were 53,890 tons.

STEEL

Sharp Rebuke; Now for Effective Law

■ DURING the past 10 days the leaders of A. F. of L. and CIO put on an almost perfect reproduction of the fable of the dog with a bone.

According to the legend, the dog, with bone in mouth, was crossing a stream. Looking down into the water, it mistook its reflection for another dog. In its greed to get a second bone, the dog leaped at its imagined rival and lost the bone it had.

♦ ♦ ♦

A. F. of L. and CIO, not satisfied with the tremendous power and privilege they had acquired in recent years, thought they saw a chance to get still more.

Instead of accepting the mild legislation to curb defense strikes which the administration leaders in Congress offered, they took the position that no legislation of any kind should be enacted.

To impose their minority will upon legislators, they doubled and trebled the pressure exerted by their lobbyists upon members of the House, who were debating the question. They imported union men from all over the country to "work" on congressmen in the corridors of the House office building. They went "all out" for no anti-strike legislation at all.

Angered by these tactics and by the utter disregard of public opinion by the union leaders, the House surprised everybody by passing the drastic Smith bill by the decisive vote of 252 to 136. As matters stand at the moment, A. F. of L. and CIO have lost their bone.

However, if they can learn the lesson which this experience should teach them, they may be able to retrieve their bone, or at least part of it.

The Smith bill, as passed by the House, has everything in it but the kitchen sink. It bans strikes for organization purposes, prohibits strikes unless a majority of workers approve by secret vote, prohibits mass picketing, bans jurisdictional and sympathy strikes under certain conditions, bars pickets who are not employes in the struck plant, denies unions having "subversive" officers the privileges of the Wagner act, requires unions to register the names of officers and members and to report dues and finances, etc., etc.

Many of these provisions are desirable, but it must be apparent to every reasonable person that the bill, in its entirety, is too sweeping and too drastic to be practical under existing conditions. A few of the features should be eliminated. Those which are desirable should be rewritten and toned down so that they can be made operative.

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However, no one—not even the most rabid union leader—should regret that the House acted as it did. The jolt which it administered to union officials, to the administration and to subversive interests here and abroad should have a most salutary effect. The 252 representatives who defied administration and minority bloc pressure deserve commendation for their demonstration of independence.

The culprits have been spanked. The next order of business is to refine the bill so that it will curb abuse of power in a fair and workable manner.

E. L. Shaner

EDITOR-IN-CHIEF

Dec. 8, 1941

The BUSINESS TREND

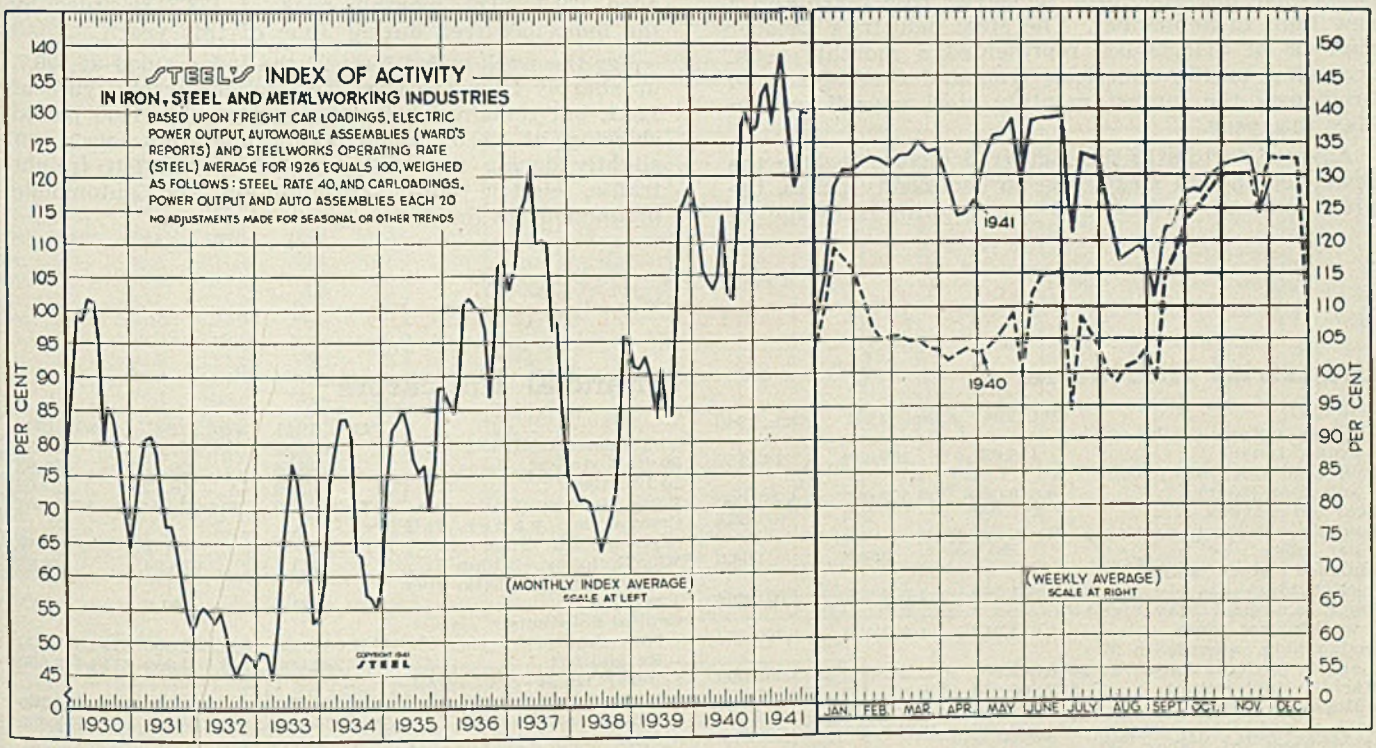
New Production Records Continue To Be Set

■ UNDERLYING trend of industrial activity continues to move upward. Output of defense industries is increasing steadily, as new plants are brought into service. Expanding production of defense goods has at least offset curtailed operations in civilian lines.

The pace at which industrial plants have been operating in recent months is indicated by the all-time production records which are being established.

November machine tool output is estimated to have reached a new peak, topping the previous high of $77,200,000 reported in October. The industry's goal of $750,000,000 for the full year should easily be exceeded. Earlier this year that goal seemed unattainable. The largest shipbuilding program in the nation's history is moving ahead rapidly. Aircraft production recently registered a new peak on a monthly basis, while output in 1941 will exceed any previous year.

Lake Superior iron ore shipments during November totaled 7,660,987 gross tons, highest recorded for that month. Shipments for the full year are expected to top 80,500,000 tons, also a new high. Oc-



STEEL'S index of activity advanced 5.8 points to 129.7 in the week ended Nov. 29:

Week Ended	1941	1940
Sept. 13	122.3	114.9
Sept. 20	122.9	124.4
Sept. 27	127.5	122.8
Oct. 4	128.0	124.4
Oct. 11	127.9	126.0
Oct. 18	130.2	128.3
Oct. 25	131.4	129.9
Nov. 1	131.9	130.2
Nov. 8	132.3	130.3
Nov. 15	131.8	130.3
Nov. 22	124.1	124.7
Nov. 29	129.7	132.6

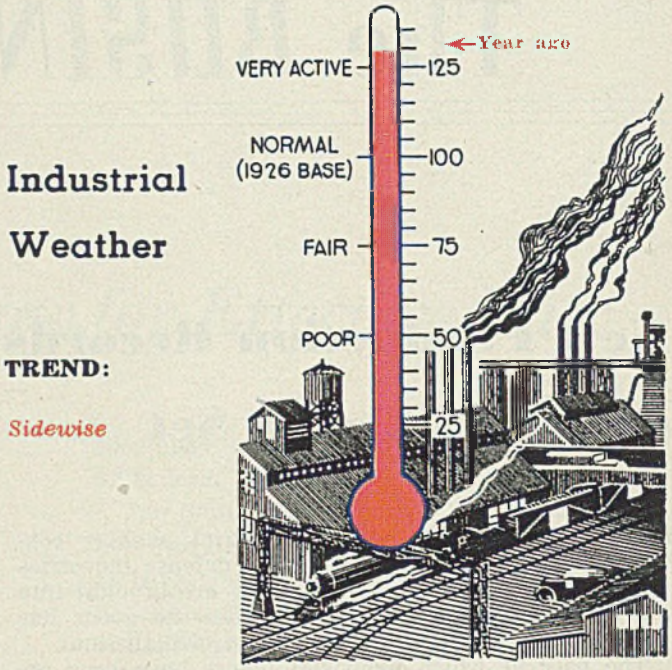
Mo. Data	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930
Jan.	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6
Feb.	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2
March	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4	98.6
April	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7
May	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2
June	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8
July	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9
Aug.	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4
Sept.	121.1	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	93.7
Oct.	129.9	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8
Nov.	129.7	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0
Dec.	...	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.8

tober ore consumption reached a new monthly record, reflecting increased capacities of many blast furnaces which have been relined during the past year.

October shipments of fabricated structural steel were the largest for any month since October, 1930, while in this same period sales of foundry equipment reached an all-time high.

Value of manufacturers' inventories and shipments advanced to a new peak during October, according to the National Industrial Conference Board. New orders increased, following declines in the preceding two months. Unfilled orders were virtually unchanged. The same board states that average hourly earnings in twenty-five manufacturing industries rose sharply to a new high in September. The steel industry's October payrolls of $118,890,000 represented a monthly peak, according to the American Iron and Steel Institute. Previously the largest monthly steel payroll was in May this year.

Adverse factors in the industrial picture include the restricted though steady rise in commodity prices, the prevalence of strikes, and the growing shortage of raw materials which has resulted in disemployment in some civilian lines.



STEEL's weekly index average of 129.7 for November was substantially unchanged from the October level, while in comparable month a year ago the index averaged 129.5. The monthly peak of 138.7 recorded by the index occurred during June of this year.

For the week ended Nov. 29 the index stood at 129.7, up sharply from the preceding holiday week figure of 124.1, but remained below the comparable 1940 period showing of 132.6. Steelmaking operations were off slightly during the week ended Nov. 29, but freight traffic, electric power consumption and automobile production advanced.

Where Business Stands

Monthly Averages, 1940 = 100

	Oct., 1941	Sept., 1941	Oct., 1940
Steel Ingot Output	127.6	124.3	117.1
Pig Iron Output	122.3	122.9	111.7
Building Construction	181.7	186.8	114.8
Auto Output	100.3	63.6	131.6
Freight Movement	130.8	126.6	116.3
Wholesale Prices	117.7	116.9	100.3

The Barometer of Business

Industrial Indicators

	Oct., 1941	Sept., 1941	Oct., 1940
Pig iron output (daily average, tons)	156,637	157,510	143,152
Iron and steel scrap consumption (tons)	4,649,000	4,392,000	4,233,000
Gear Sales Index	261	243	216
Foundry equipment new order index	403.8	363.8	264.0
Finished steel shipments (Net tons)	1,851,279	1,664,227	1,572,408
Ingot output (average weekly; net tons)	1,634,917	1,593,389	1,499,897
Dodge bldg. awards in 37 states ($ Valuation)	$606,349,000	$623,292,000	$383,069,000
Machine tool output	$77,200,000	$68,700,000	$49,000,000
Automobile output	401,360	248,751	514,374
Coal output, tons	49,800,000	46,880,000	38,700,000
U. S. Dept. of Labor (90 industries):			
Av. wkly. hrs. per worker†	40.9	41.0	38.8
Av. weekly earnings†	$32.01	$31.63	$26.54
Cement production, bbls.	16,688,000	16,115,000	13,935,000
Cotton consumption, bales	953,600	875,682	770,832
Car loadings (1,000 cars) weekly av.	914	885	813

Foreign Trade

	Sept., 1941	Aug., 1941	Sept., 1940
Exports	417,139	455,257	295,245
Imports	262,680	282,513	194,928
Gold exports	$5,000	$6,000	$13,000
Gold imports	$65,707,000	$36,979,000	$325,981,000

Financial Indicators

	Oct., 1941	Sept., 1941	Oct., 1940
30 Industrial Stocks‡	121.18	127.35	132.39
20 Rail stocks‡	28.54	29.28	28.83
15 Utilities‡	17.65	18.62	22.07
Bank clear'gs (Daily ave.)	$1,241,652	$1,092,324	$972,664
Commercial paper rate (N. Y., per cent)	½–⅝	½–⅝	½–⅝
*Com'l. loans (Billion $)	$11.1	$10.94	$8.85
Federal Reserve ratio (per cent)	91.0	91.2	90.1
Capital flotations:			
New Capital†	$132,066,000	$64,856,000	$110,687,000
Refunding†	$167,236,000	$208,544,000	$114,752,000
Federal Gross debt (millions of dollars)	$53,584	$51,346	$44,140
Railroad earnings†	$104,070,310	$111,317,825	$74,715,435
Stock sales, New York stock exchange	13,151,616	13,546,161	14,489,085
Bond sales, par value ($1,000,000)	$178.9	$141.0	$151.0

†September, August and September respectively.
*Leading member banks Federal Reserve System.
‡Dow-Jones Series.

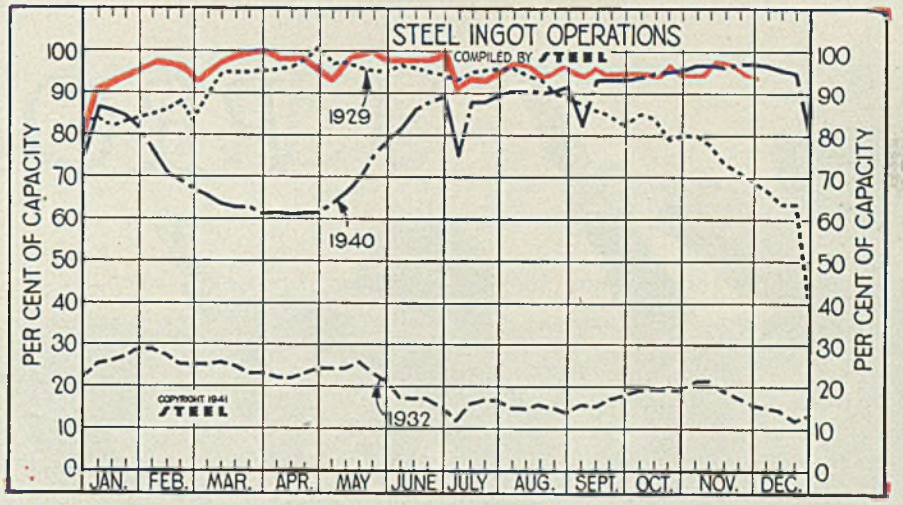
Commodity Prices

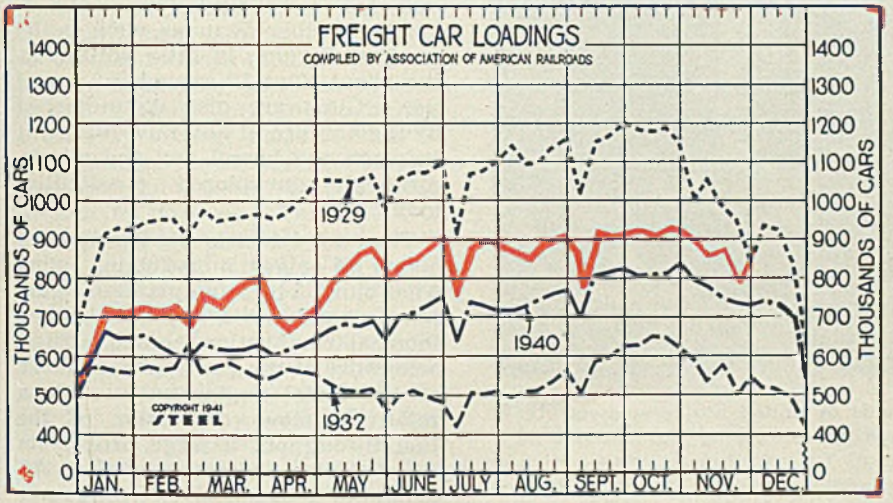
	Oct., 1941	Sept., 1941	Oct., 1940
STEEL's composite finished steel price average	$56.73	$56.73	$56.60
U. S. Bureau of Labor's index	92.4	91.8	78.7
Wheat, cash (bushel)	$1.105	$1.17	$0.85
Corn, cash (bushel)	$0.75	$0.815	$0.685

Steel Ingot Operations

(Per Cent)

Week ended	1941	1940	1939	1938
Nov. 29....	95.0	97.0	93.5	61.0
Nov. 22....	95.5	97.0	93.5	62.0
Nov. 15....	97.0	96.0	93.5	63.0
Nov. 8....	97.5	96.5	93.0	61.5
Nov. 1....	95.5	96.5	93.0	57.5
Oct. 25....	95.5	95.5	92.0	54.5
Oct. 18....	96.5	95.0	91.0	51.5
Oct. 11....	94.5	94.5	89.5	51.5
Oct. 4....	96.0	93.5	87.5	48.5
Sept. 27....	96.0	93.0	84.0	47.0
Sept. 20....	96.0	93.0	79.5	48.0
Sept. 13....	96.5	93.0	74.0	46.0
Sept. 6....	95.5	82.0	62.0	41.5
Aug. 30....	96.5	91.5	64.0	44.5
Aug. 23....	96.0	90.5	63.5	43.5
Aug. 16....	95.5	90.0	63.5	41.5
Aug. 9....	96.0	90.5	62.0	40.0





Freight Car Loadings

(1000 Cars)

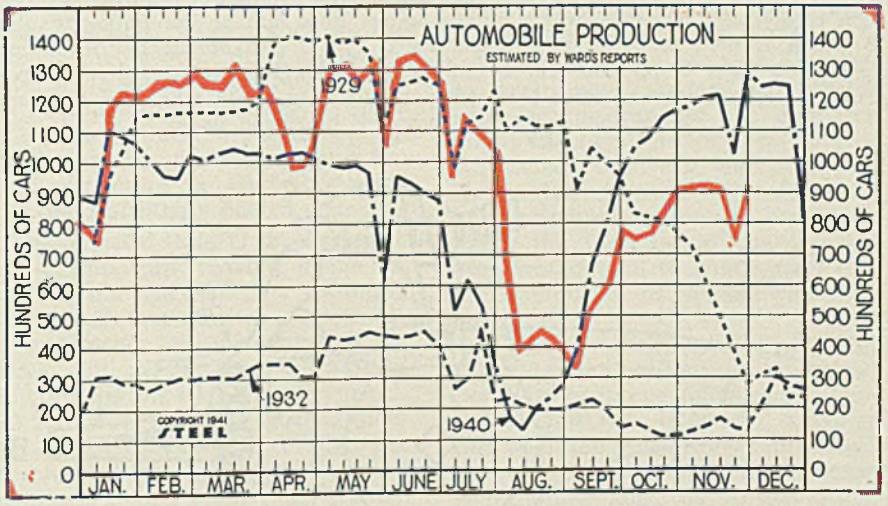
Week ended	1941	1940	1939	1938
Nov. 29.....	866	729	677	649
Nov. 22.....	799	733	677	562
Nov. 15.....	884†	745	771	657
Nov. 8.....	874	778	786	637
Nov. 1.....	895	795	806	673
Oct. 25.....	914	838	834	709
Oct. 18.....	923	814	861	706
Oct. 11.....	904	812	845	727
Oct. 4.....	918	806	835	703
Sept. 27.....	920	822	835	698
Sept. 20.....	908	813	815	676
Sept. 13.....	914	804	806	660
Sept. 6.....	798	695	667	569
Aug. 30.....	912	769	722	648
Aug. 23.....	900	761	689	621

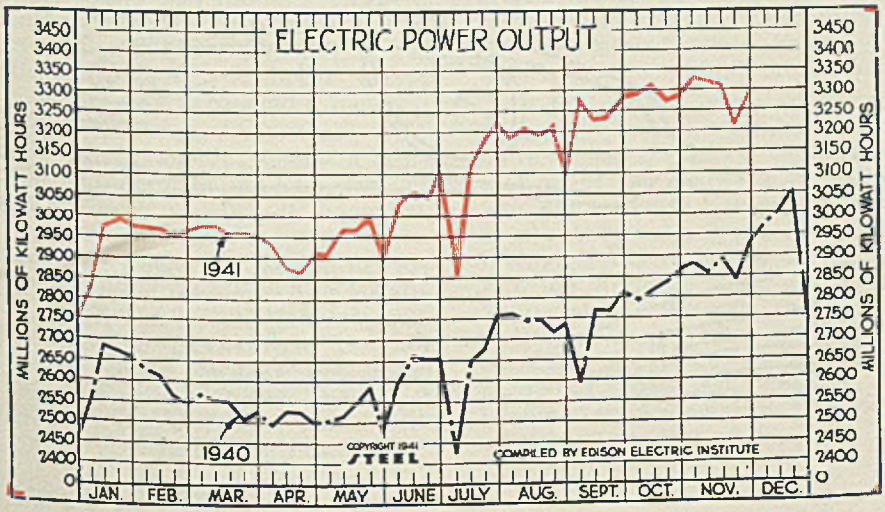
†Revised.

Auto Production

(1000 Units)

Week ended	1941	1940	1939	1938
Nov. 29....	93.5	128.8	72.5	97.8
Nov. 22....	76.8	102.3	72.5	84.9
Nov. 15....	93.0	121.9	86.7	96.7
Nov. 8....	93.6	120.9	86.2	86.3
Nov. 1....	92.9	118.1	82.7	80.0
Oct. 25....	91.9	117.1	78.2	73.3
Oct. 18....	85.6	114.7	70.1	68.4
Oct. 11....	79.1	108.0	75.9	50 5
Oct. 4....	76.8	105.2	76.1	37.7
Sept. 27....	78.5	96.0	62.8	25.4
Sept. 20....	60.6	78.8	54.0	20.4
Sept. 13....	53.2	66.6	41.2	16.1
Sept. 6....	32.9	39.7	26.9	17.5
Aug. 30....	40.0	27.6	25.2	22.2
Aug. 23....	45.5	23.7	17.5	18.7
Aug. 16....	45.6	20.5	13.0	23.9
Aug. 9....	41.8	12.6	24.9	13.8





Electric Power Output

†

(Million KWH)

Week ended	1941	1940	1939	1938
Nov. 29.....	3,295	2,932	2,605	2,335
Nov. 22.....	3,205	2,839	2,561	2,248
Nov. 15.....	3,304	2,890	2,587	2,325
Nov. 8.....	3,339	2,858	2,589	2,277
Nov. 1.....	3,339	2,882	2,609	2,271
Oct. 25.....	3,299	2,867	2,622	2,284
Oct. 18.....	3,273	2,838	2,576	2,281
Oct. 11.....	3,315	2,817	2,584	2,251
Oct. 4.....	3,290	2,792	2,554	2,229
Sept. 27.....	3,233	2,816	2,559	2,208
Sept. 20.....	3,232	2,769	2,538	2,211
Sept. 13.....	3,281	2,773	2,532	2,279
Sept. 6.....	3,096	2,592	2,376	2,110

†New series: Includes additional governmental and power generation not previously reported.

PROPELLING

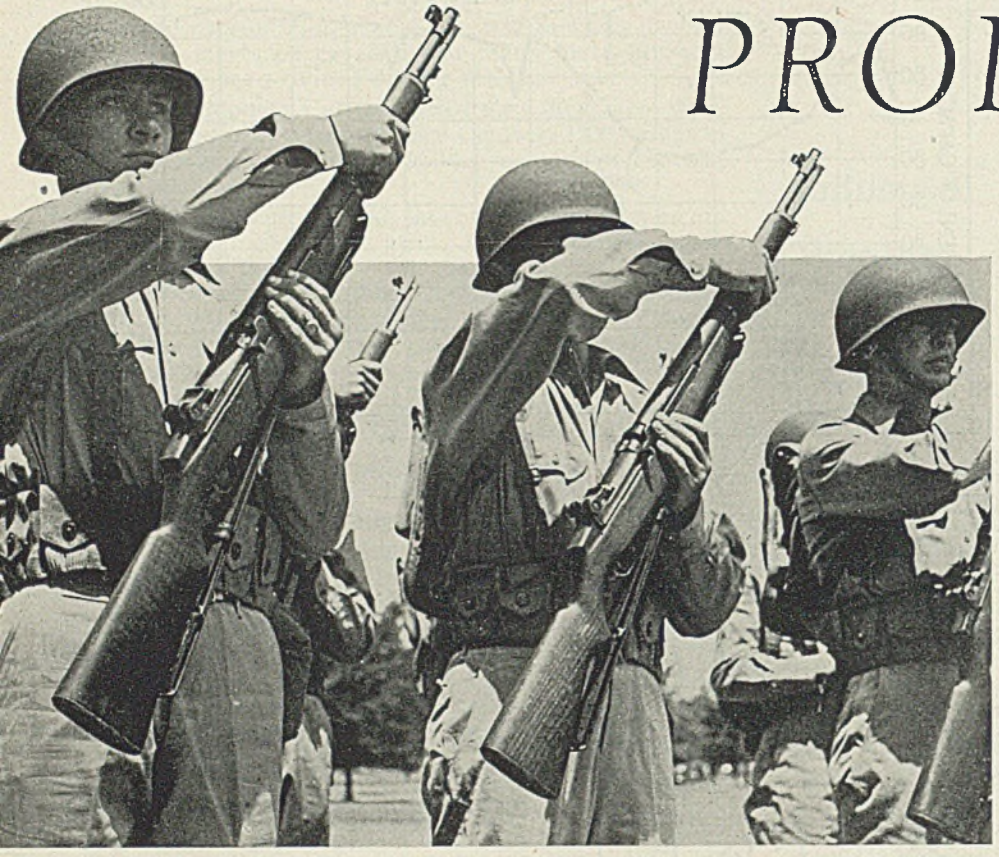


Fig. 1. (Above)—The new Garand in the hands of United States soldiers. U. S. Army Signal Corps photo

■ A GUN might be described as an internal combustion engine requiring a new piston for each stroke and distinguished from the ordinary gas or oil engine principally by its extremely short life—a few seconds' operation of a big naval rifle may call for a relining job. Life of smaller caliber weapons, such as the modern Garand, is little better, being about 10 or 12 seconds of actual use. Guns are also distinguished by the absence of any fluid lubricant between the barrel and the missle, although unexplored possibilities may exist.

Then solid fuel is used instead of a fuel oil or gas, a distinction somewhat blurred by attempts to use gunpowder and powdered coal in the internal combustion engine. Characteristics of the gun approach those of the diesel engine as there is a relatively slow combustion of the fuel throughout a large proportion if not during the entire stroke. Attempts to use explosives which functioned with such rapidity as to complete combustion before appreciable movement of the projectile have resulted in disaster, the pressures developed in the barrel being beyond the ability of the latter to resist them. Thus a principal problem of successful action, long since successfully solved, was the discovery of a fuel that would burn at the desired

Fig. 2. (Below)—A typical old-fashioned wheel lock. Ignition is furnished by rotation of serrated wheel A which strikes sparks from flint or iron-antimony alloy B which is held firmly against wheel by clamp C and spring E. When lock is cocked, cam G presses arm F and holds cover D away from powder pan. Pulling trigger releases catch J allowing spring K to rotate wheel as K returns to its normal position indicated by dotted lines

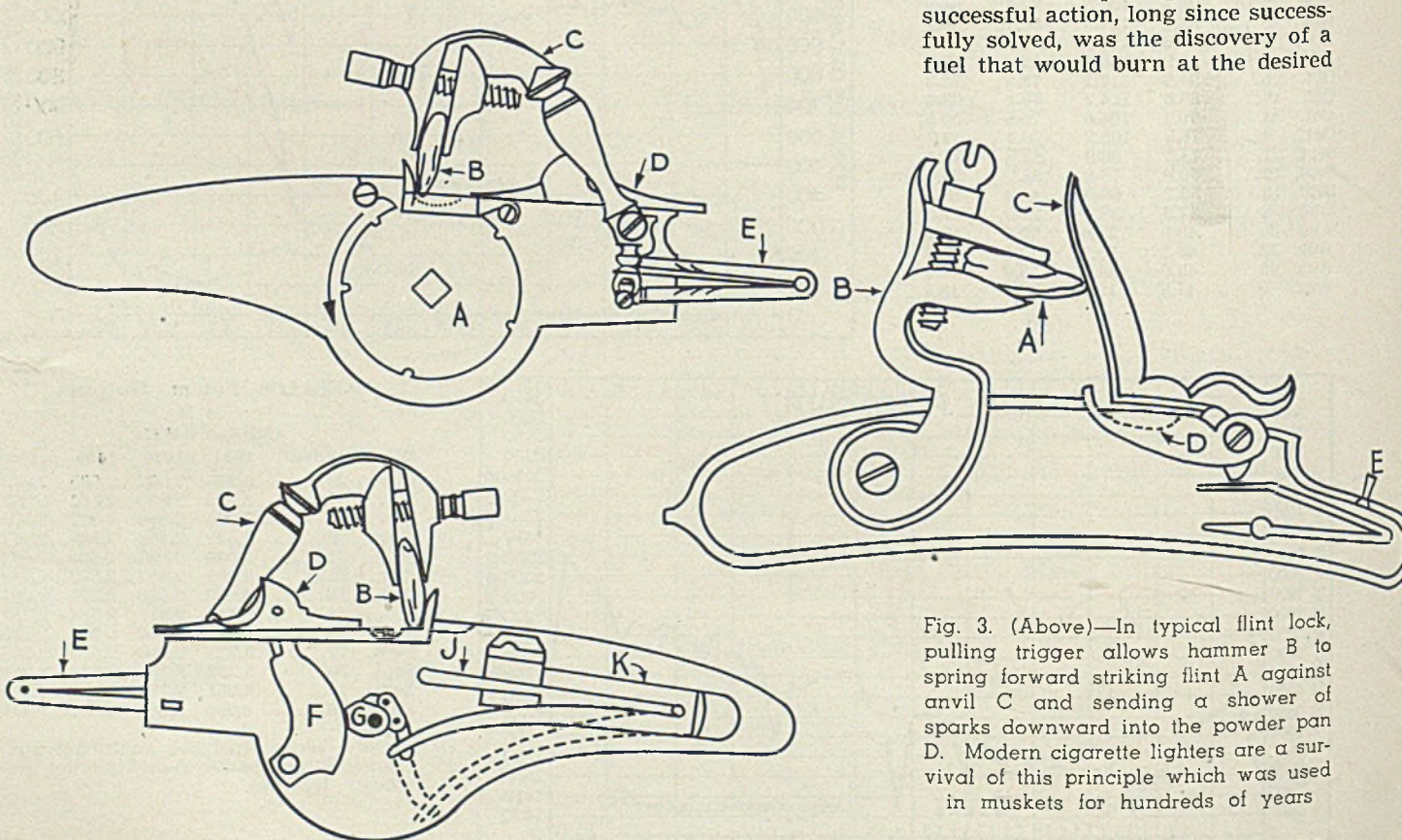


Fig. 3. (Above)—In typical flint lock, pulling trigger allows hammer B to spring forward striking flint A against anvil C and sending a shower of sparks downward into the powder pan D. Modern cigarette lighters are a survival of this principle which was used in muskets for hundreds of years

the PROJECTILE

. . . . likened to operation of an internal combustion engine; gun powder as fuel; methods of igniting the charge; maximum pressures and rate of combustion of the powder; shape of the pressure-stroke curve; best form and size of powder grain for propellants

This Is Number 41 in a Series on Ordnance and Its Production, Prepared for STEEL *by Professor Macconochie*

By ARTHUR F. MACCONOCHIE

Head, Department of Mechanical Engineering
University of Virginia
University Station, Va.
And
Contributing Editor, STEEL

rate and acceleration without requiring atmospheric oxygen to support combustion.

The mixture of charcoal, sulphur and saltpeter known as *gun powder* has changed little since its properties were first put to use. Its appearance and methods of manufacture have been altered rather than its chemical constitution. Originally it had a fine mealy consistency; later it was formed into rough brains, graded by sifting; more recently it was compacted under considerable pressure into cakes before being broken up for use. The object of compacting is to control combustion speed so as to distribute the resulting pressure more evenly as the projectile travels the length of the barrel. Used for many years solely as a propellant for rifle bullets and cannon balls, it was later applied to blowing up enemy fortifications and for blasting in mining and quarrying operations. In early firearms, it also was used to form an ignition train to the touch hole.

The wheellock, Fig. 2—see account of the development of the rifle, STEEL, Oct. 6, 1941, p. 60—had a serrated wheel and spring wound up with a key like a clock. When released by the trigger, a shower of sparks was sent into the priming pan as the flint (or iron-antimony alloy) rasped against the serrations on the revolving wheel. Note that as the wheel spindle revolves, the cam G resting on the arm F also rotates and permits the cover D to close the powder pan.

Figs. 3 and 5 exhibit respectively the familiar flintlock and a typical percussion lock. The flintlock survived through three and a half centuries, reaching the apex of its career in the famous "Kentucky rifle." The percussion system resulting from the discoveries of Forsythe, the Scottish clergyman caused the flintlock to disappear except those few now in collectors' hands.

Low and High Explosives: Modern *low explosives* include a wide range of mixtures and homogeneous chemical compounds with oxygen always present in such form as to permit combustion to take place without the presence of the atmosphere. In those explosives classed as propellants in contradistinction to *high explosives*, the chemical reaction is a true burning process which proceeds from layer to layer and which is accelerated by the heat and pressure developed during the action. It is with these *progressive* or *low* explosives that the field of interior ballestics (action occurring before projectile leaves muzzle of gun) is concerned.

In detonating-type explosives, oxygen is nearly always present in association with combustible elements such as carbon and hydrogen and is commonly held in the system in weak bonding radicals such as the NO_2 or nitro group. Such explosives exist in a state of unstable chemical equilibrium which may be upset by a powerful shock, initiating a detonating wave which transforms the solid compound almost instantly into a mass of highly heated gas.

The physical state of the explosive has an important bearing on the nature of this reaction. For example, certain cellulose nitrates in the form of guncotton can be detonated by shock, but in the form of a solid colloid solution they are the principal components of the various modern smokeless powders (propellants or slow-burning powders). Many detonating explosives will burn at moderate rates if ignited merely under atmospheric pressure, whereas they may be detonated in a shell by a booster charge (at high pressures).

As the powder burns within the gun, the projectile commences to move, unless the action be so rapid that all of the charge is converted into gas instantly. In that case, a mass of very hot gas under extremely high pressure would result before the projectile started to move. Temperature would fall as expansion took place, an adiabatic reaction since the short time interval would permit no loss of heat. But such attempts to employ adiabatic processes impose severe and ofttimes disruptive loads on the breech. Thus to keep down maximum pressures, it is necessary to control the rate of combustion. This also makes it possible to lower the maximum temperature and so prolong barrel life.

Obviously, if an appreciable proportion of the available energy is extracted in the form of mechanical work in accelerating the projectile, the peak temperature will not be as high as though the energy released on explosion were allowed to pass wholly into the products of combustion before any external work was done. For any given explosive, it is possible to control the rate of combustion by varying the size and shape of the grain since this is a linear function of the area over which combustion takes place.

It may be concluded that a spherical grain whose surface area diminishes as the cube of the diameter might still result in undesirable pressure distribution as the projectile moves through the barrel. In a hollow cylindrical form, on the other hand, the increase in the interior area would tend to compensate for the diminution of the exterior surface.

In the limiting case where inner and outer radii are nearly equal, evolution of the products of combustion would take place at constant rate over the indefinitely diminished interval of explosion. Clearly some compromise such as a cylindrical grain with one or more perforations is most desirable; and this, in fact, is the form commonly adopted. American cannon powders consist of cylindrical grains having a central perforation and six others symmetrically disposed around it in such fashion that as combustion approaches completion, all seven perforations merge with each other and with the periphery of the grain, leaving 12 slivers aggregating about 15 per cent of the total weight. These slivers usually burn before the projectile leaves the muzzle, but with short weapons they are sometimes expelled unburned.

As compared with the solid grains

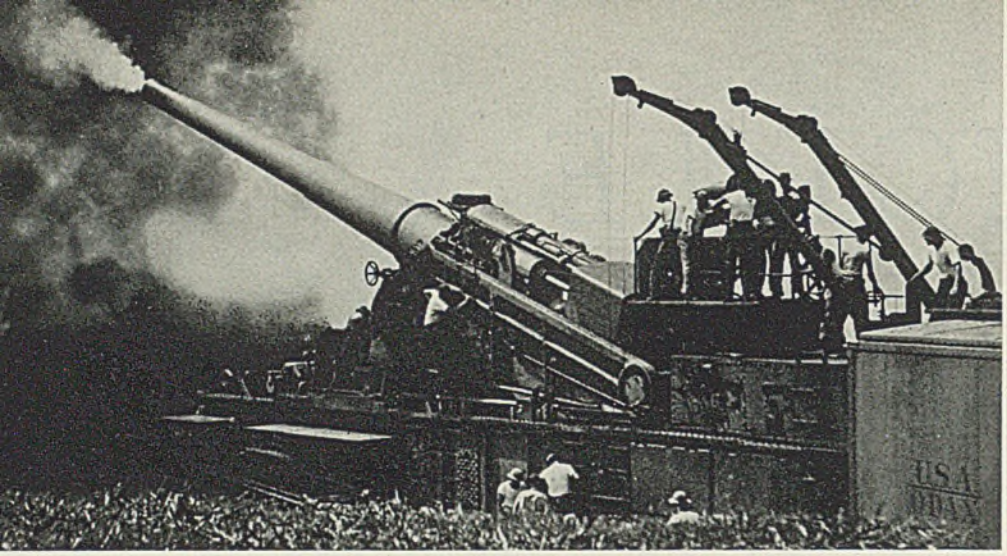


Fig. 4—Blast from a monster 14-inch railway gun rocks the countryside. U. S. Army Signal Corps photo

or "degressive" types, the burning surface of the multiperforated grains actually increases during combustion, giving rise to the condition known as "progressive" granulation. Thus, as the space occupied by the propellant gases is enlarged by the movement of the projectile, the pressure sinks less rapidly than if the evolution of gas proceeded at a constant rate or actually declined as in the degressive type of grain. Thus to secure a given muzzle velocity, the maximum pressure can and must be higher with a degressive form of powder since the same work is done in either case.

Credit for the development of the perforated grain belongs to General Rodman of the United States Army. Realizing the advantages to be derived from an increase in the time of burning, he first proposed that large grains of extremely dense powder be employed. Thus, while the charge was still of the degressive type, a reduction of area exposed to combustion together with a lower rate of gas evolution was secured. As a result of subsequent researches he later proposed the use of the perforated grain. These grains took various forms including the spherohexagonal and prismatic, more especially the hexagonal with single perforation. But the discovery by Pelouze in 1838, or 22 years before Rodman's contributions to the art, that an explosive could be produced by nitrating cotton, sealed the fate of black powder as a propellant. However, these principles were applied to the grain form of the newer explosives. Thus black powder is now employed in saluting charges because it produces a louder report; as a base charge for expelling shrapnel; as a time element in powder train fuzes, and the like.

A satisfactory propellant (with proper granulation) must also secure the desired muzzle velocity within the limit of permissible maximum pressure; must lack smoke and flash as well as any tendency to absorb moisture or to evaporate; and must show the least possible erosive and corrosive effects. Further, it must burn uniformly and possess resistance to mechanical fracture. Storage over long periods should not affect its characteristics, and the raw materials of which it is composed must be readily available in large quantities.

Modern powders which meet these specifications, especially for guns other than small arms, fall naturally into two classes—the single-base and the double-base powders. In the former, cellulose nitrates or nitrocellulose is the only explosive ingredient. In double-base powders, nitroglycerin is present partly to assist in dissolving the nitrocellulose during manufacture and also to add to the explosive characteristics of the powder. The lesser proportion of oxygen present in single-base powders results in a certain incompleteness of combustion and gives rise to a higher percentage of carbon monoxide in the resultant gases. On the other hand, the volume of gas produced is greater and the maximum temperatures attained on combustion are lower. Hence our preference for this type. However, double-base powders are used in Britain under the name of Cordite and elsewhere in Europe.

To ignite the charge, black powder still holds first place. Theoretically it would be desirable to secure simultaneous ignition of all grain surfaces throughout the charge but practically we have to be satisfied with an arrangement which will function with sufficient efficiency and whose action follows a uniform pattern from one round to another. In the center of the charge, therefore, and contained within the primer tube, the black powder burns and distributes its hot gases very rapidly to all the component grains of the propellant. Gas pressure within the chamber rises to that point necessary to push the copper band of the shell into the rifling and the stroke begins.

In considering the relationships which enter into a discussion of projectile movement through the barrel, note that total thermal energy of the powder is converted into translational and rotational energy of the projectile; heating of both gun and shell; kinetic energy of the spent gases; translational energy of recoil; the balance being muzzle loss by heat in the waste gases, incomplete combustion and the like. Of these various elements, the energy of projectile translation may account for about 32 per cent; heat to the gun, (including friction loss) 22 per cent; rotation of the shell, 0.14 per cent; gun recoil, 0.12 per cent; and the balance as above described, some 45 per cent.

Just as the indicator card of an internal combustion engine gives a measure of the total work spent upon the piston, so also the curve relating pressure and stroke in the gun reveals the extent of useful

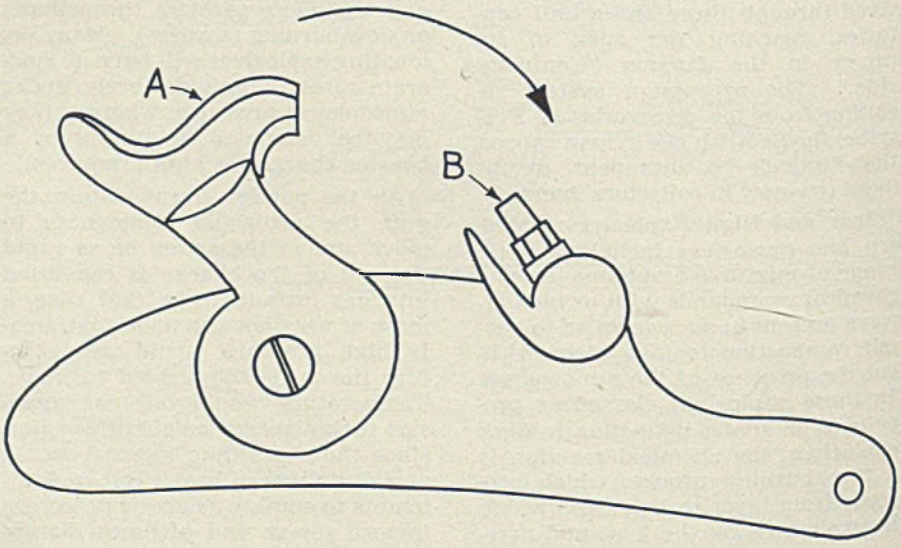


Fig. 5—A typical percussion lock employed a hammer A which struck the anvil B with sufficient force to set off the percussion cap containing the primer charge

New Handbook Available

Copies of "Modern Gun Production", the third of a series of reprint handbooks on defense production compiled by STEEL, are now available.

"Modern Gun Production" deals with the principles of gun construction, gun carriages and recoil mechanisms, instruments for fire control, and rangefinders. It is attractively bound and fully-illustrated.

Orders should be addressed to Readers Service Department, STEEL, Penton building, Cleveland. Price, $1.00 per copy.

work done on the projectile. Just as the output of the engine is less than the indicated work by an amount which represents friction loss, so also the muzzle energy of the projectile is less than the total work spent upon it by the heat equivalent of the friction work, expressed in appropriate units.

In studying powder characteristics as these relate to form of the pressure-stroke curve, consider the simplest case—that in which combustion is complete before the shell begins to move. As already indicated, such a situation is never allowed to develop, explaining why a violent explosive like T.N.T. or even nitroglycerine cannot be used in a rifle. The indicator diagram in this case follows a law of the form $P.V^a$ equals a constant, in which "a" is the ratio of the specific heats of the gas. By integrating between any assigned limits of volume (areas of the bore multiplied by the stroke) the work done upon the shell may be determined. If such a curve be plotted, using a value of 1.2, say, for "a", the curve will be found to descend at first more rapidly than it does in the later states of shell movement, resulting in curve concave upward with the peak pressure at the point where the shell enters the rifling.

Combustion of progressive-powders, on the other hand, is characterized by a family of curves having certain features in common. Pressure during the earlier stages rises steeply, reaches a maximum and then declines to a minimum which generally is higher than the end pressure in the case first cited. Further, the maximum pressure attained will be far below the peak for constant volume combustion. In this way, although a higher proportion of the total available energy convertible into work may be sacrified, the shattering effect upon the breech end of the gun is avoided and the shell itself is subjected to acceleration pressures which more nearly approach the mean.

As the rate of combustion declines with charges of the same calorific value, the pressure peak moves toward the muzzle and also falls, thus increasing the muzzle loss and necessitating an increase in the charge for the same muzzle velocity. But note that with the same peak pressure, the slower powder will maintain barrel pressure at a higher level and so produce a higher muzzle velocity than a faster powder.

The potential of a powder is defined as the total work obtained if gases of combustion could be infinitely expanded. For United States Navy powders, this quantity has been computed at around 600 foot-tons per pound. The kinetic energy of the moving projectile as it leaves the muzzle is about one-fourth of this total. Barrel length is a compromise since with a longer barrel, a larger proportion of the energy imparted to the shell is lost by friction.

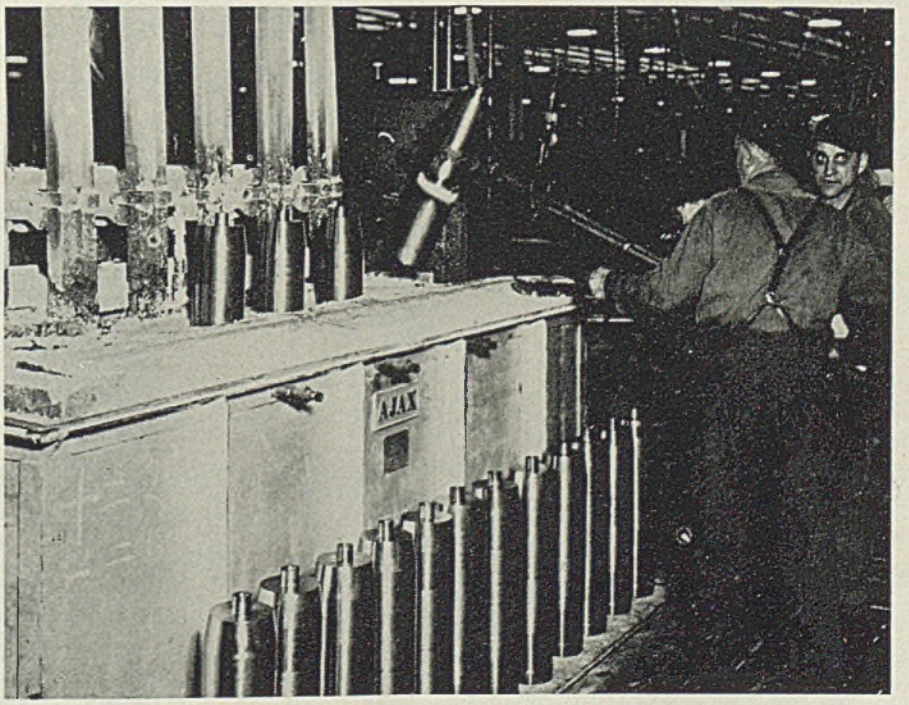
Instead of approaching the problem of determining the relation among the several quantities pertaining to the flight of the projectile through the barrel by an attempt to evaluate the various forms of the pressure-stroke curve, it is simpler and more convenient to assume that the relation between the velocity of the shell and the distance traveled along the bore has hyperbolic form.

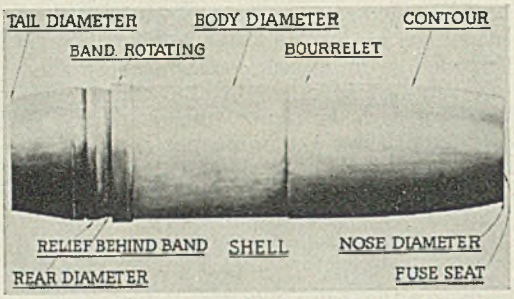
For American powder, the total energy available for the performance of work upon the shell if the gases were infinitely expanded from unit density to infinity is given as 653 foot-tons per pound of powder. Not all of this energy, however, could actually be applied on account of friction losses, energy used up in

(*Please turn to Page* 116)

Giving 155-Millimeter Army Shell a Salt Bath

■ Big shell forgings at the rate of 40 per hour are being heated for nosing in each one of a large battery of Ajax-Hultgren electric salt bath furnaces at the Willys-Overland Toledo plant. Illustration shows one of the salt baths in production. The shell (high-explosive 155's) are heated at temperatures 500 degrees lower than those usually considered necessary for this work. The low forging temperature is said to eliminate most rejects hitherto caused by eccentricity, wrinkling, linear distortion and scale. Made by Ajax Electric Co. Inc., Franklin and Delaware avenues, Philadelphia, the furnaces heat the shell for a length of but 9 inches with sharp, visible demarcation between the hot and relatively cold portions. They are then inserted in the forging press, which squeezes the hot nose shut.





All the dimensions shown here can be checked simultaneously by the system described in the accompanying text

Multiple Automatic GAGING OF SHELL

. . . . . permits one operator with one setup to do same work formerly handled with 16 or more individual fixed gages. Increase in speed is important feature, also. Accuracy of gaging is within 0.00001-inch

By L. J. MAHLMEISTER
The Sheffield Corp.
Dayton, O.

■ ARTILLERY ammunition is either a precision product or a dangerous, untrustworthy counterfeit. There seems to be no middle ground. Consequently, final inspection of both shell body and cartridge case is an extremely precise and critical operation.

Good inspectors are scarce at any time, but whenever industry approaches its present output level, the final inspection of a precision product like artillery ammunition becomes a major problem. The skill and experience of the inspector are exceptionally important factors in the use of fixed size gages, especially where tolerances are small. The inspector must develop a sense of feel peculiar to gaging work and a special dexterity in handling gages in order to keep them from jamming. If it were not for the multiple simultaneous automatic gages such as the Sheffield Multichek described here, the problem of getting enough reliable inspectors would be far more serious today than it is.

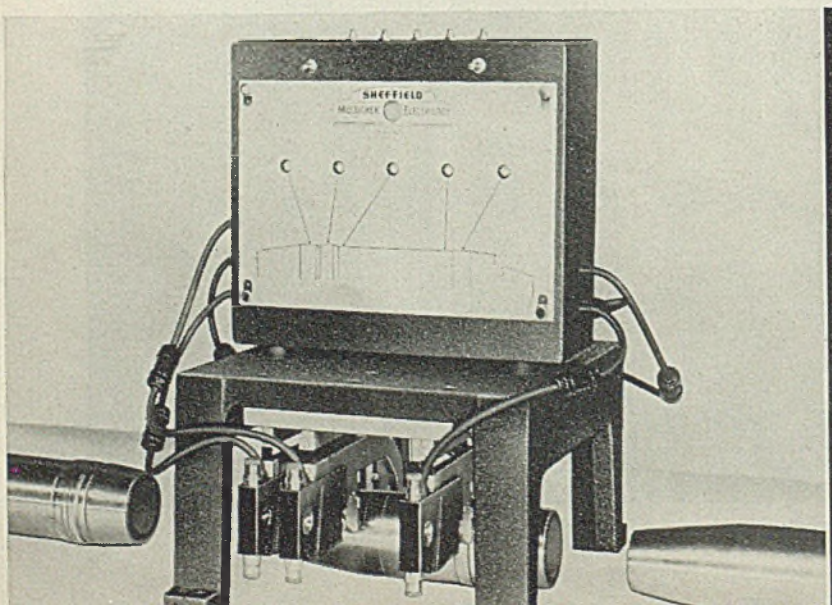
Multiple simultaneous automatic gaging offers relief in five ways—by reducing the number of inspectors required, by minimizing the individual skill needed, by greatly increasing inspection speed, by obtaining much greater accuracy and by reducing the floor area occupied by the inspection department.

Before the advent of multiple automatic gaging, practically all dimensions of both shell body and cartridge case were checked with fixed size gages—plugs, rings, snaps, length and contour gages—and each dimension of necessity was checked as a separate operation. For instance, seven diameters and one length on the average shell body require checking. Each of these has a specified upper and lower limit within which the actual dimension should fall. Consequently, to be precise, every one of these dimensions should be checked with both a "Go" and a "No Go" gage. This involves 16 individual operations when fixed-size gages are used.

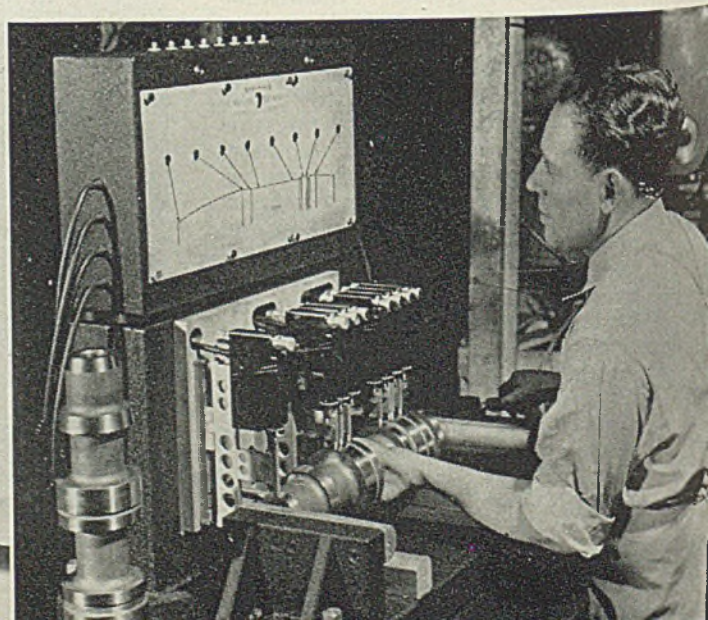
In practice, when using fixed size gages, not all of these dimensions are checked on both their upper and lower limits. Some are checked only partially—a percentage check, as it is called. Such dimensions include rear diameter, body diameter, relief behind rotating band, nose diameter, distance from bottom to rear of band, and overall length. At best, percentage checking is only an approximation. It is not complete protection against the acceptance of a part the dimensions of which fall outside of the tolerance zone.

The same applies to the failure to use both "Go" and "Not Go" gages. When "Go" gages alone are used, every part passed will assemble. In the case of a shell body, "Go" gage inspection will prevent accepting a shell which will not pass through the bore of the gun. But it will not assure uniformity.

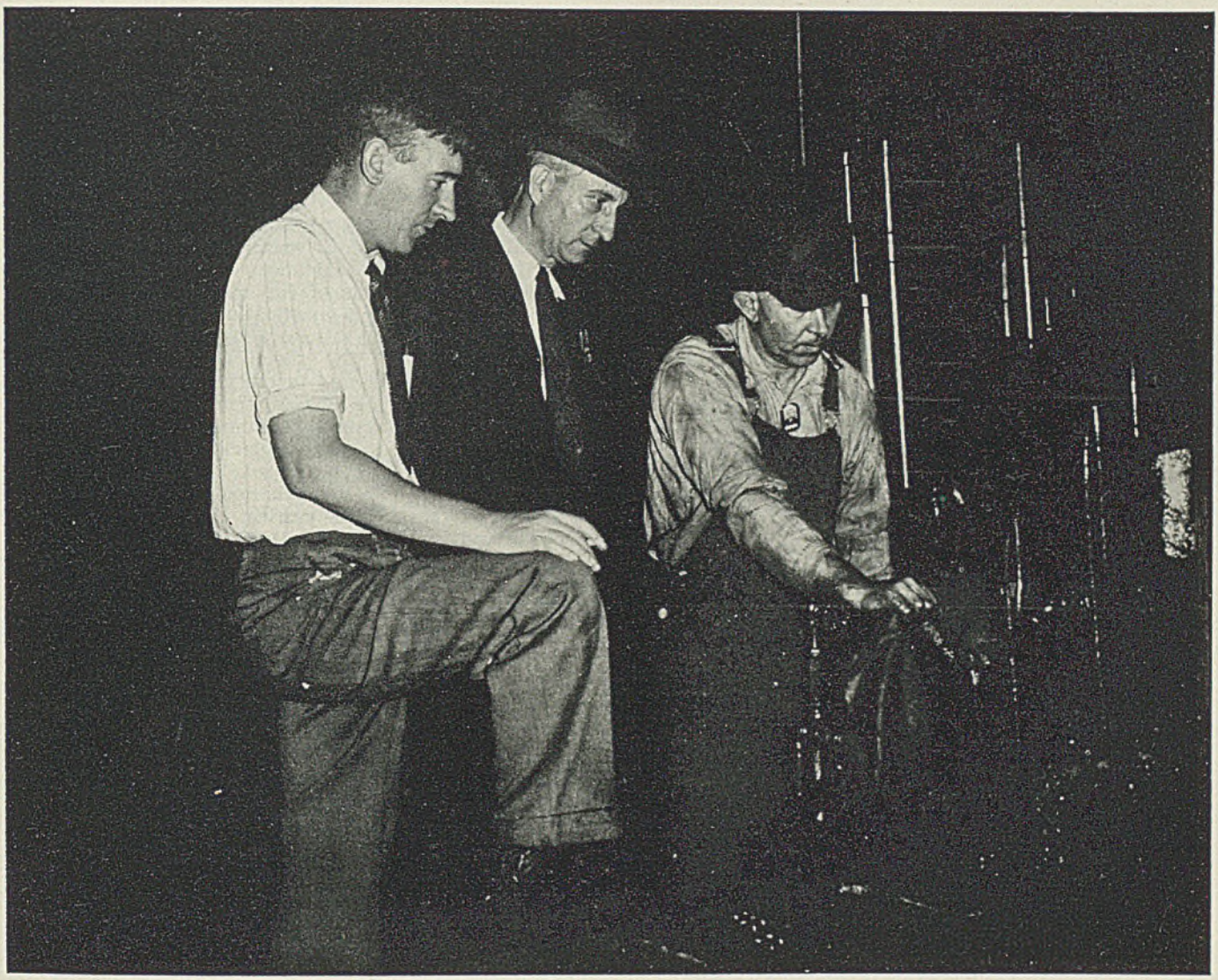
Uniformity in artillery ammunition is by no means an impractical requirement because the physical characteristics of the projectile are an important factor in artillery ballistics. If these characteristics



Left, multiple gage set for heavy shell bodies which are brought to the gaging station on a roller conveyor. Gage can be hinged to raise and lower over the work, or work can be fed to gage on hinged section of conveyor to eliminate gage points sliding on shell as it moves on conveyor. In any case, means is provided for accurately locating shell in gaging position



Right, setting gage with a master. Special master gages are provided for minimum as well as maximum settings of gage points



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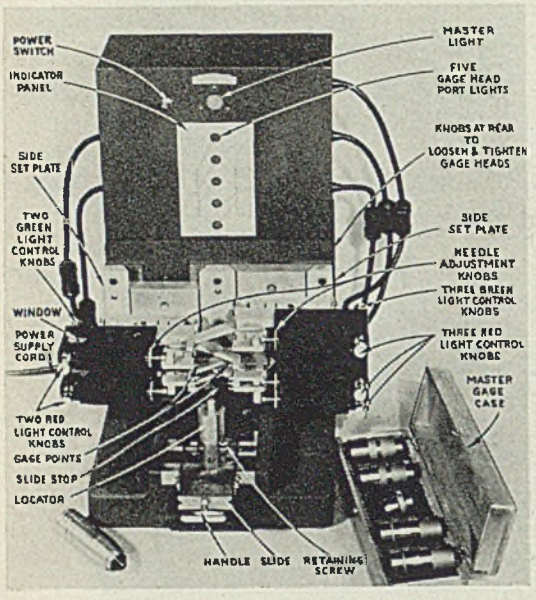


Details of Sheffield Multichek Electrigage, Model 1500-B. Note work is fed to gaging position by means of a special locator and slide

vary, the trajectory of the projectile in the air cannot be predicted, and accuracy of fire is jeopardized. For instance, if all shell in a gun caisson are not uniform, it becomes impossible intelligently to correct the angle of fire to get on the target after the burst of a previous salvo has been observed to fall either short of or beyond the target. The smaller the variation in ammunition, the more rapidly an experienced artilleryman can register on his target.

Multiple automatic gaging has done a great deal to prevent nonuniformity because it checks all dimensions for both upper and lower limits, and checks them all simultaneously—and does it so fast that no difficulty is had in checking every single shell. In other words, it does the same work at one pass that is accomplished in 16 separate operations with fixed size gages, and with greater accuracy because the human equation is nonexistent.

There is no size limitation on work units, the dimensions of which can be checked with the Multichek gage. It is now being used to check pinions less than ⅛-inch long and 0.010-inch in diameter. Likewise, this gage is being used to check all the critical dimensions of shell of large caliber as well as cartridge cases.

In the matter of tolerances, the Multichek may be set for any tolerance range from 0.00005-inch (50 millionths of an inch) to 0.012-inch (12 thousandths of an inch). These, it must be remembered, are tolerance settings, or the range between upper and lower limits of a dimension and have no relation to gage accuracy. Accuracy on either upper or lower tolerance limit is within 0.00001-inch (10 millionths of on inch), and this accuracy is always constant.

There is practically no limitation on the number of dimensions or the type of dimension—that is, external or internal or depth—except the space required on the gage for mounting the individual gaging heads. Each gage head is 1 1/16 inches thick, and one head is needed for each dimension. All heads must be so mounted that the gaging points are properly located when the work part is in the gaging position. These heads, mounted on a modified snap frame, may be staggered or offset where space is limited. They may be provided with many types of gaging points or fingers, depending on the type of dimension to be checked and its accessibility.

Each head is suspended by two steel reeds. By thus permitting the head to float in one plane, accuracy is not jeopardized by slight variations in the position of the part being checked as the reading is taken.

Gaging fingers, arranged caliper fashion, are used to measure external diameters, lengths and internal diameters. Depth measurements are taken usually by projecting a tapered plug into the hole and determining its position when seated. The position of grooves is checked by the use of gaging fingers mounted with reference to a locating point or surface. This same arrangement is also used to measure overall length in certain cases.

For highly complicated work parts, the principles outlined above are combined with those of the Precisionaire—a flow type air gage now used extensively for internal diameters, bell mouth and taper.

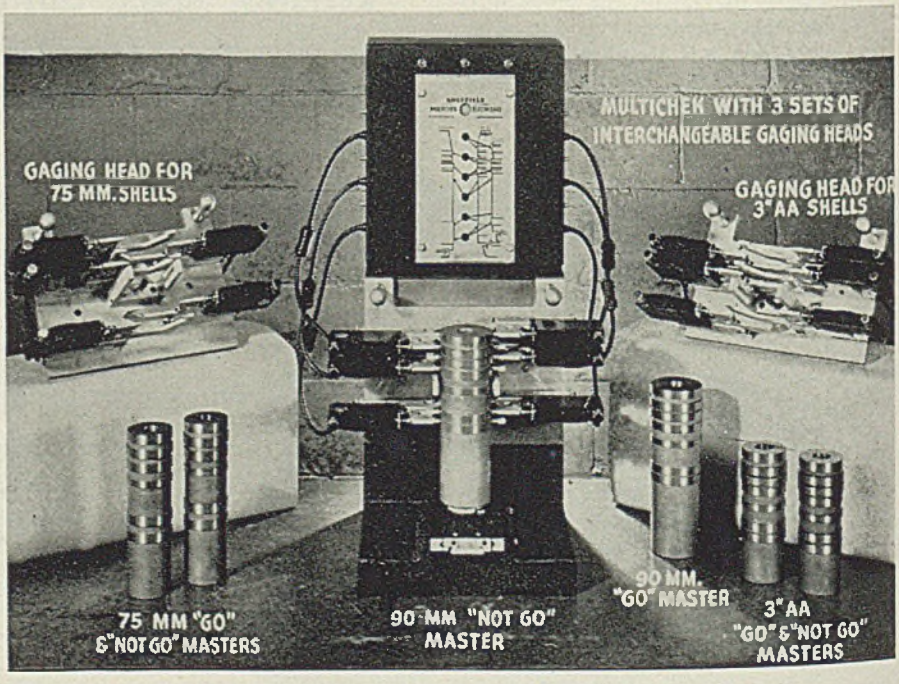
The well-known reed mechanism is the means of magnifying the movement of the gaging point or gaging fingers. This reed mechanism is the simplest mechanical device yet evolved for the magnification of extremely small movements or distance. Essentially it consists of two metal blocks, one fixed and one floating. These are joined by special alloy steel reeds.

The fixed block is rigidly anchored to the gage head. The floating block, carrying the gaging spindle, is connected horizontally to the fixed block by two reeds. A vertical reed is also attached to each block and the upper ends of these vertical reeds are joined together. Beyond this joint extends a contact arm or needle.

The gaging spindle with its diamond pointed gaging member, or gaging finger, is an integral part of a floating block. When spindle and block are moved upward in the gaging operation, the horizontal reeds deflect slightly, but the vertical reed on the floating block tends to slip past its companion. As these vertical reeds are joined at their upper end instead of slipping, the movement causes both reeds to swing through an arc and as the contact arm or needle is merely an extension of the vertical reeds, its outer end swings through a much wider arc. The amount of needle swing is proportional to the distance the floating block is moved with reference to the fixed block, but, of course, much greater.

At both extreme ends of the needle swing, it breaks an electrical contact which completed a circuit on one side with a terminal

Single gage with three heads handles three shell sizes



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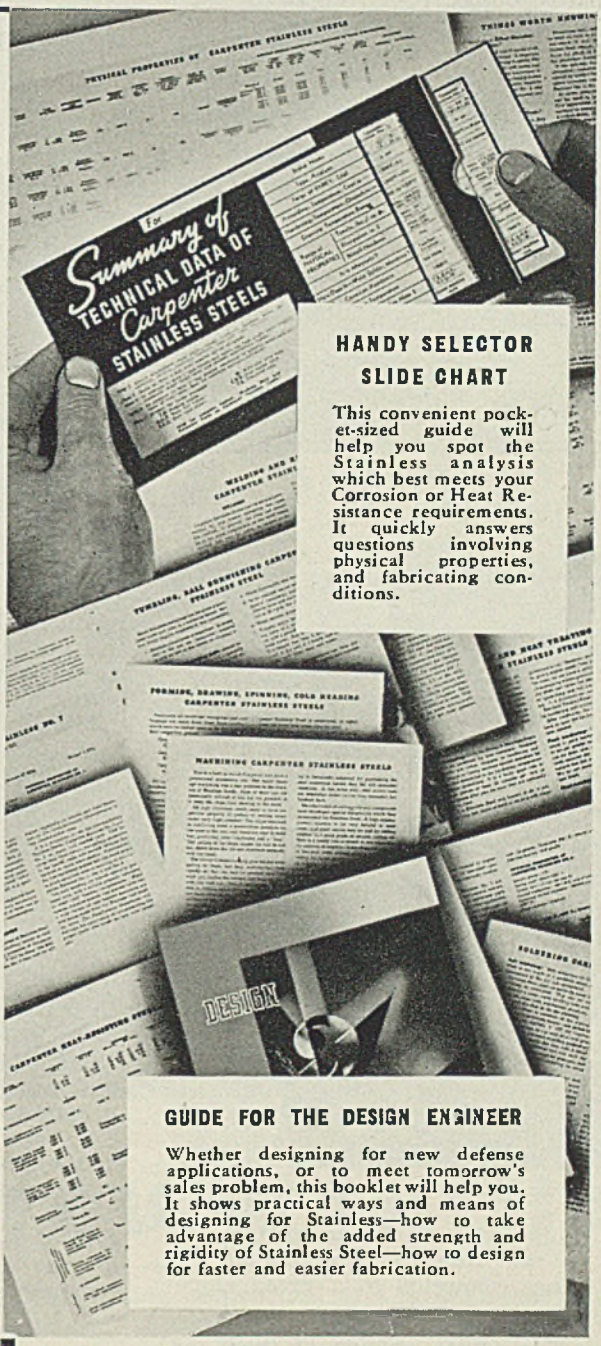

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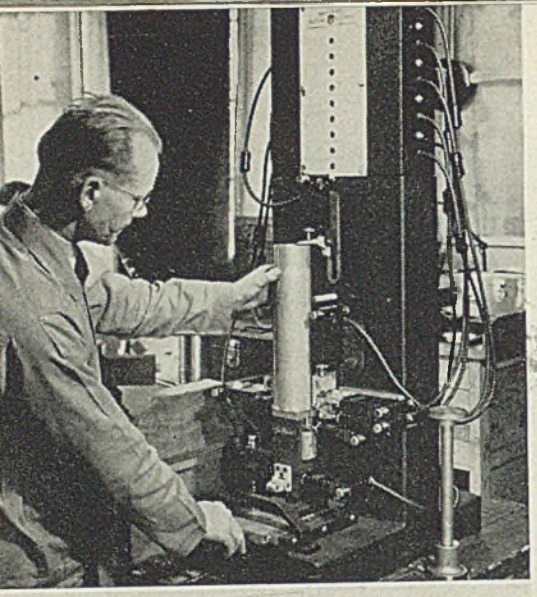
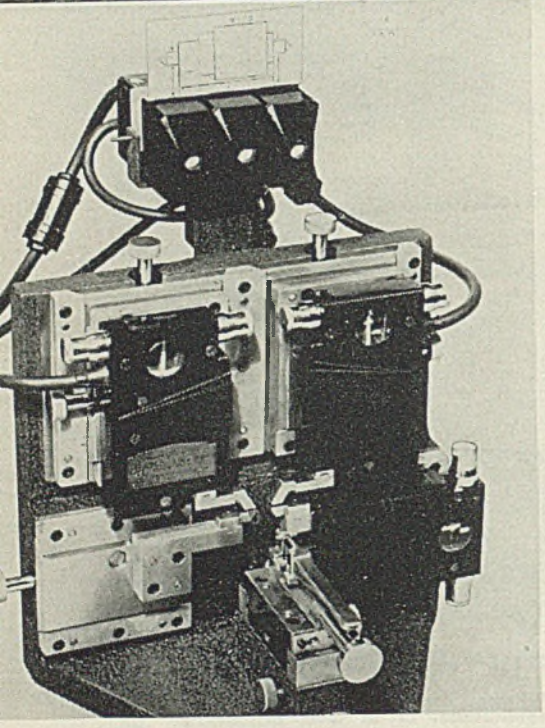


Upper view, simpler setups work well on cartridge cases



Setup below, checks pinions less than 1/8-inch long, 0.01-inch diameter

connected to a red signal light and on the other with a similar terminal connected to a green signal light.

The actual position of these terminals which fixes the sweep of the needle is controlled by two micrometer adjusting screws, one for each terminal. The sweep of the needle between contacts is proportional to the dimensional tolerance for which the gage is set, the two terminals being the upper and lower limits of the tolerance zone.

In setting a gage head for any given dimension, a master fixed size gage, or precision gage blocks equivalent to the minimum tolerance limit, is placed in gaging position. By means of the adjustment knob on the spindle, the needle is moved toward the terminal which controls the red signal light. Its movement may be viewed through the window in the gage head case. By manipulating the micrometer adjustment screw on that side of the head, the terminal is moved so that the signal light just breaks from red to amber, with the minimum master gage in gaging position. Thus, any work part smaller than the minimum master gage will allow the needle to swing far enough to break the green light circuit and by leaving the red light circuit on, show that the part is undersize.

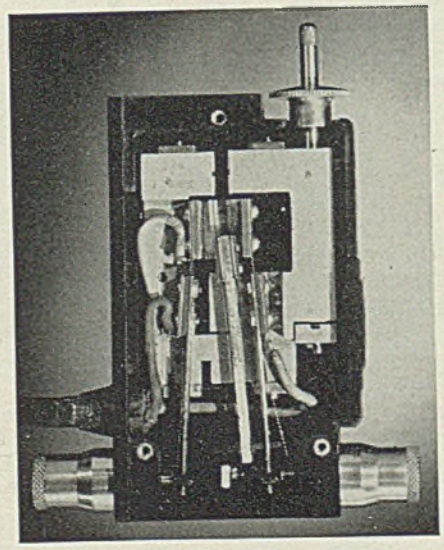
In the same way the opposite terminal is set with a master maximum limit gage. When a work part is larger than that, the needle makes contact and breaks the circuit which lights the red signal, allowing the green light to remain on. The needle, swinging anywhere between these points, fails to break either terminal and keeps the signal light amber to indicate that the part being checked falls within its prescribed tolerance range.

Where a number of gage heads are used, it is more convenient for the inspector to watch one light rather than a number. In such cases the individual signal lights are integrated with a single master light. This signals "all clear" if all dimensions are within tolerance. If one or more dimensions are not within tolerance, the master light so indicates, and the inspector then glances down to see which dimension, or dimensions, are at fault and whether they are oversize or undersize.

A locator, mounted on a slide at the base of the gage, carries the work part into gaging position.

The extreme flexibility of this type of gage makes it readily adaptable to almost any type of work-handling system. Work parts that are easy to handle come to the gage either by conveyor or factory truck and are presented to gage manually. Large or heavy work parts usually come on a conveyor. In one instance 105-millimeter and 155-millimeter shell bodies come to the Multichek gage on a gravity conveyor and are lifted into gaging position by means of a pneumatic hoist, thus relieving the inspector of all lifting. Five experienced inspectors with fixed size gages and following the conventional procedure usually check 2500 such shell bodies in an 8-hour day. With the Multichek gage, this same inspection team can check both limits of every tolerance 100 per cent on 5000 shell bodies in the same length of time and with much less fatigue.

Conventional procedure with fixed size gages requires 18 inspectors to check 700 artillery cartridge cases per hour. The same output is now handled by one Multichek operator, three chamber gage operators and three inspectors check surface flaws, or a total of seven inspectors instead of eighteen.



Internal mechanism of the reed head showing means for setting the tolerances

Manual Gives Data on Magnaflux Inspection

■ *Magnaflux Aircraft Inspection Manual*, by F. B. Doane and W. E. Thomas; cloth, 193 pages, 6 x 9 inches; published by Magnaflux Corp., Chicago, for $1.75.

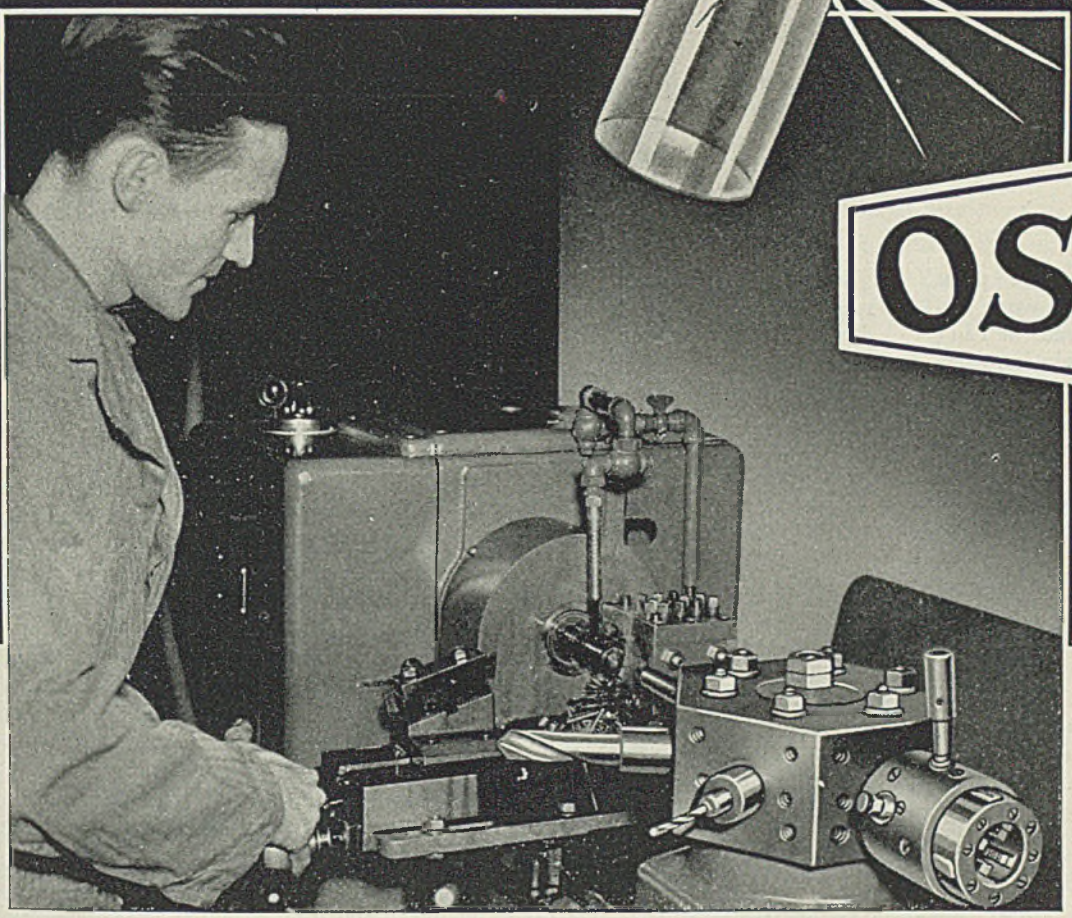
Both authors are officers of Magnaflux Corp., and are well qualified to explain the uses of this method of testing steel materials. The manual has been prepared to follow *Principles of Magnaflux Inspection*, published in 1940, to supply detailed directions as to the exact procedure to be employed in its use, such as points at which current should be applied, current density to be used, use of wet or dry method, whether to rely on continuous or residual magnetism and interpretations to be placed on patterns produced.

The manual is an attempt to supply definite information along these lines as far as possible to do so in the light of present day knowledge. Many difficulties are met in this endeavor but it has seemed desirable that a start be made in putting down some definite recommendations, which, if not exact, would at least serve as a guide. With this end in view the information in the manual is released to industry.

Lubricant for Welders

■ A lubricant which defies water contact in welding equipment is announced by Stevens Grease & Oil Co., 7299 Bessemer, Cleveland. Called Crystal Solid, it is water-repellent, does not wash away and maintains a continuous film of protection.

Bottleneck Breaker!



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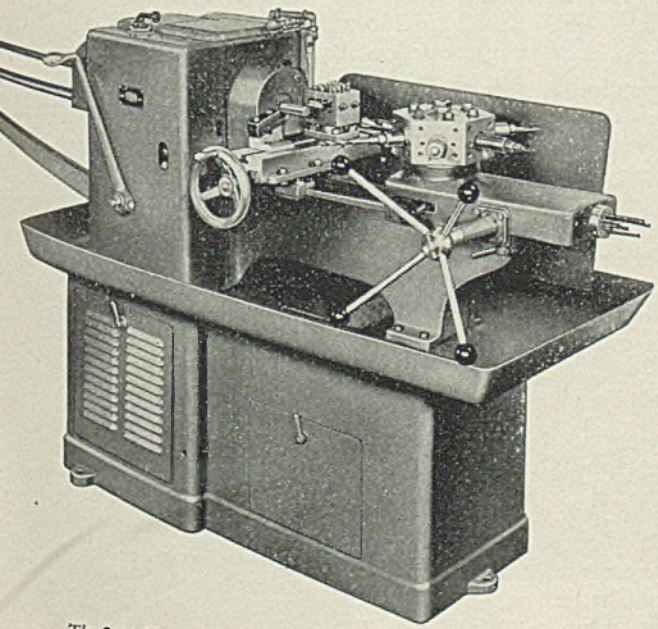

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BETWEEN HEATS

WITH Shorty

■ Say Fellers:

We gotta rule 'round the plant that if any guy comes out to work carryin' too much under 'is belt, he can't start the turn 'til 'is boss looks 'im over. It 's been a long time since anything like this has come up but the other night Doc Barren, foreman over at the blast furnaces, sent one of 'is men home cuz he couldn't stay on the sidewalk. Course the guy sez he could, y' understand, but 'is demonstration proved that sidewalks are too narrow fer guys as the likes of 'im to hew to a straight line 'n still keep traffic goin' in both directions.

Doc was tellin' Tony Longo, the water tender on No. 2 furnace, 'bout this feller that he had to take out through the clock house and head up the hill toward 'is home so as to sleep 'er off. 'N they both got to talkin' 'n Doc sez, "Y' know, Tony, I was sorta scared fer a minute cuz y' never know what 's liable to happen when a guy thinks everybody 's crazy 'cept 'imself."

"Yeh, Doc, when a guy gets liquored up, y' know it ain't always hops that's a brewin'," sez Tony. "Sometimes hellsapoppin 'fore y' know it."

"Sure is, Tony. Suppose you've heard 'bout the rumpus we had with Big Pete, the keeper on this furnace, haven't y'?" Dock asked.

"Naw, don't know as I have," Tony responded.

Tony Pops a Question

"Big Pete was a Russian who worked 'is way up to keepin'. He was as strong as an ox. He always had a couple or so under 'is belt when he started 'is turn. But this night when he came on duty he wasn't steady 'nough to start 'is trick. 'N so, Charlie Kurtz, the foreman, sez to 'im, 'Pete, you'd better knock off fer the rest of the night. Go on down to the locker room 'n change your clothes 'n beat 'er home 'n get a good night's rest, 'n tomorrow you'll feel more like workin'.' Then Charlie called the labor boss and had 'im send up a man to work in the runners; 'n Charlie put the monkey bed man in Big Pete's place."

"How'd Pete take it?" inquired Tony.

"Not so well. He started talkin' in 'is native tongue 'n swingin' 'is arms in the air 'n sayin' 'Hey you, where's a big boss Charlie him go? I killa 'im, sun of a gun, bigga stiff.' One of the fellers workin' on the furnace gotta hold of Charlie 'n he sez to 'im, 'Charlie, better keep your peepers open for Big Pete. He's gunnin' fer y'. Looks like he's on the war path.' 'N Charlie cockin' 'is hat on one side of 'is head starts toward the cast house."

"Hot dickety dog, son. Go ahead," sez Tony.

Talks 'er Over Ag'in

"Well Charlie walks up to Big Pete 'n he sez to 'im, 'Pete, thought I told y' to get down in the locker room 'n change your clothes 'n head up the hill toward home. Remember?' 'N Charlie looks 'im straight in the eye. 'Yes, boss,' he sez 'n he sulked away toward the locker shanty, mutterin' to 'imself."

"Close shave, huh, Doc?"

"Not yet, Tony. It didn't end there. 'Bout a half hour later Charlie went down to 'is shanty to get some pipe tobacco out of 'is street clothes. He shut the door of 'is locker 'n turned the handle. He pulls out 'is pen knife to cut some of the cake outta 'is pipe, loads 'er up and lights 'er 'n starts up the walkway between the locker house 'n the back end of the hot blast stoves —cleanin' 'is finger nails with 'is pen knife as he walked along. 'N jus' as he gets opposite the door at the far end of the locker shanty where Big Pete 'n the rest of the furnace crew kept their clothes the fun started."

"Yea, go ahead," sez Tony. "I'm all ears."

"Big Pete was waitin' fer Charlie. He gave a 'whoopee,' caught Charlie 'round the neck 'n down they went to the brick pavement. I'm tellin' y' son, Big Pete was as strong as they make 'em 'n that 's plenty. He rolled Charlie over on his back 'n then he sat on 'im, mutterin' somethin' in Russian."

Tony scratched 'is head 'n sez, "Why didn't ol' Charlie sock 'im one under the belt when he had a chance?"

"He tried to but he couldn't do much with a couple hundred pounds holdin' 'im down. Finally Pete spies somethin' over 'is head. It was a small cast-iron wheel hooked onto a short piece of half-inch round which the stoveman used as a weight to keep the cold blast valve open. Pete reaches for this, 'n once he gets 'er in 'is big paw he decided he'd biff Charlie over the head with it. Charlie started to yell and squirm when he sensed 'is predicament but try as he did, he couldn't free 'imself from the load on top of 'im."

"Here She Is," Sez Doc

"Wasn't there anybody 'round that could put a stop to the thing?" Tony inquired.

"Naw, Tony, not right then. Well finally Big Pete raised the cast-iron wheel over 'is shoulder intendin' to bring 'er down on Charlie's head but the blow never fell."

"Hot dickety dog, son. Why not?" Tony asked.

"Cuz Charlie happened to remember the pen knife he had in 'is right hand. Sizin' up the situation he sticks the blade into Pete's side 'n pushes 'er in clear to the hilt 'n that did the trick. Pete lets out a yell 'n starts rollin' on the brick pavement. Meanwhile Charlie gets on the telephone 'n tells the story to the general foreman 'n 'fore long they had big Pete on 'is way to the hospital."

"How'd he come out of it?" inquired Tony.

"Alright. He was 'round the furnace ag'in in 'bout a month or so. But one of our cops had to accompany Charlie to and from 'is home fer a long time cuz Pete kept tellin' some of the fellers that he'd get Charlie one of these days."

"Did he ever git 'im?"

"Naw. Big Pete quit after a while and started workin' at some blast furnaces further down the valley. 'N the last I heard of 'im was that he got in a drunken brawl 'n they carried 'im out of the place for keeps that time. So that 's the story of Big Pete," sez Doc Barren.

"I suppose the moral is that it pays to give some attention to your finger nails when you're workin' 'round one of these furnaces, huh Doc?"

"Guess y' got somethin' there, my boy," sez Doc.

* * *

So long, fellers. I'll be seein' ya.

"Shorty" Long

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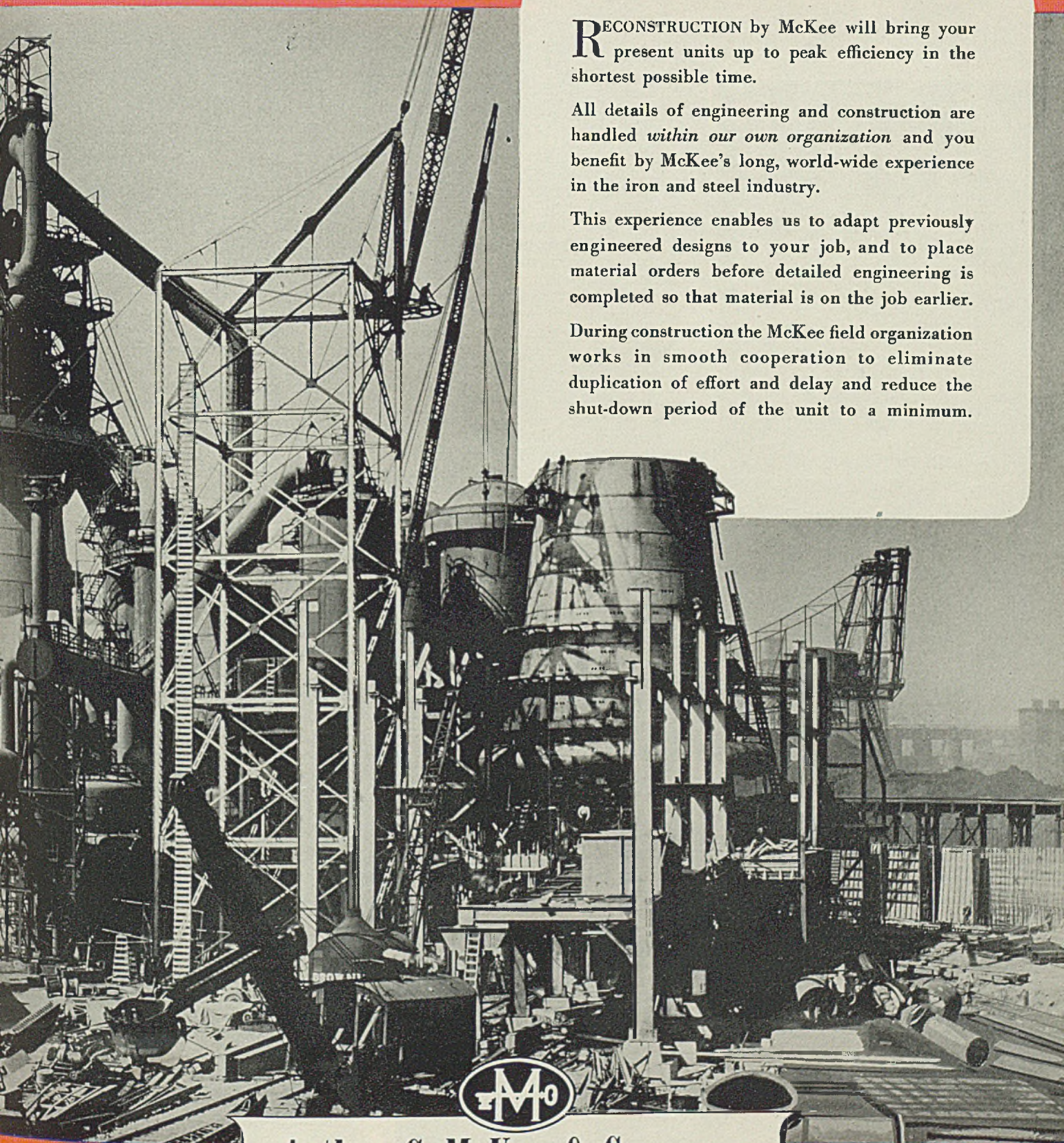

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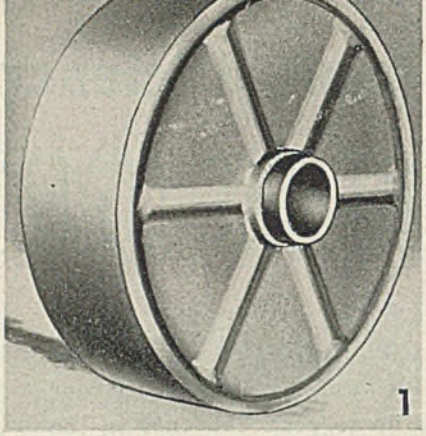
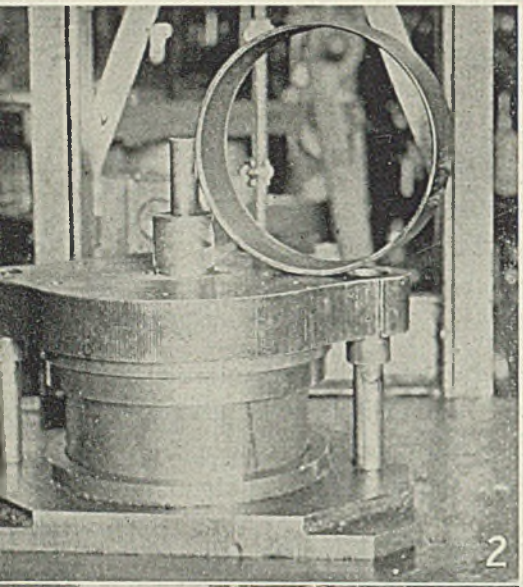
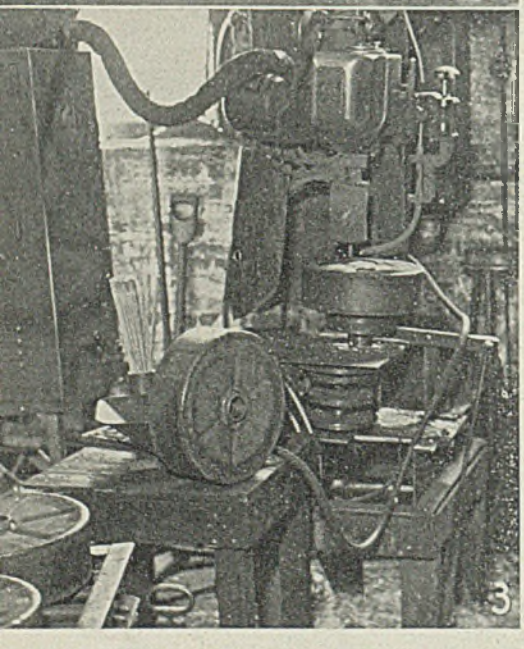


Fabricating

STEEL TRAILER WHEELS

By FRANK F. BRANCH
Chief Engineer
Geneva Metal Wheel Co.
Geneva, O.





■ TRUCK trailer jack wheels as manufactured by the Geneva Metal Wheel Co., Geneva, O., involve a number of interesting operations which are performed by means of special equipment, a few of which are illustrated and described here. A typical trailer wheel is shown in **Fig. 1.** These wheels are 10 and 12 inches in diameter and from 2½ to 5 inches across the face. As the illustration shows, the side members are pressed steel welded to the rim and the hub. The center hole accommodates axles 1¼ to 2 inches in diameter. The rims are made of ¼-inch high-carbon steel to withstand impact shocks and to assure long wear.

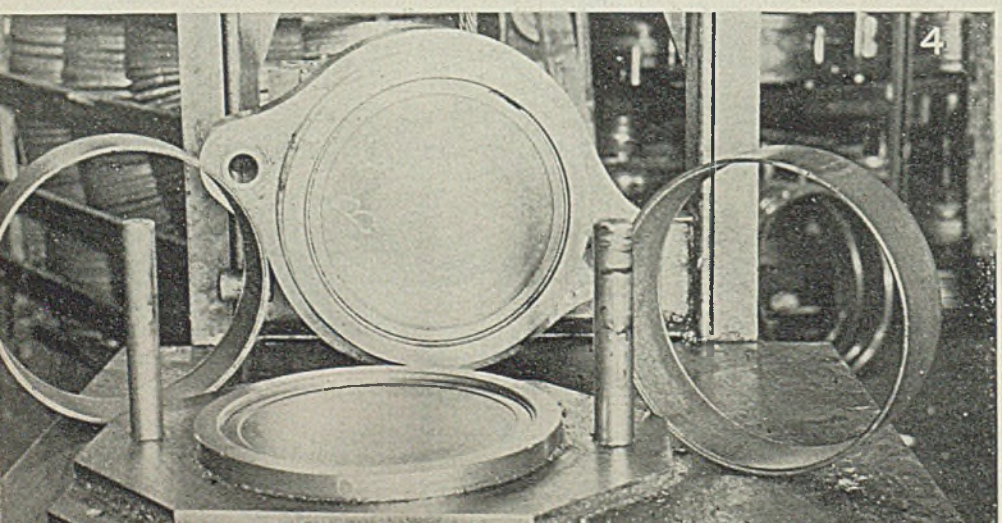
The first step in making the rims is to coil them from flat stock which is cut to the correct length. This is an ordinary bending operation performed in the usual manner between rollers. Next the ends are butt welded together, closing the rim.

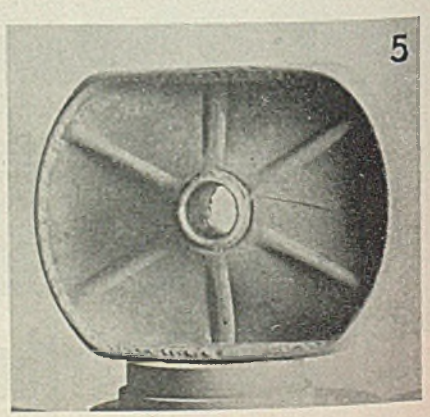
Next operation on the rims consists of expanding them to the correct size. This is done in a special fixture equipped with six tapered shoes. The flat parts of the shoes bear against the rim while a tapered member is driven through the setup by a heavy press to produce the expansion desired.

Now depressions are made in the rim to receive the side members. **Fig. 2** shows the special pillar die in which this operation is performed, while **Fig. 4** is another view of the dies taken apart. With a heavy press, this is a comparatively simple operation. The die is provided with two knock-outs for ejecting the stock.

The side members are formed from 10-gage material in special dies. Referring again to **Fig. 1** it is shown that six ribs are provided which strengthen the part materially. An interesting operation is the welding of the rims to the side members. This is done on the equipment shown in **Fig. 3**—a Lincoln Electronic Tornado welder. The work is mounted on a revolving fixture which turns at a rate of about 5 feet a minute under the welding head. The carbon arc fuses the rim and side member together. The arc is struck at 250 amperes and then increased to 400 amperes, at which value the work makes a complete circuit. It overlaps slightly at each end to assure complete fusion. The hubs are simply pieces of tubing cut to the right length and welded in place.

An interesting test is carried out to make sure that the wheels will stand up satisfactorily under severe use. In **Fig. 5** is a wheel that has been subjected to a pressure of 50 tons. While it is flattened, the joints between the side members and the rim are still perfect. Every 250th wheel is tested in this manner, thus giving reasonable assurance against breakage while in use.





MANUAL MOTOR STARTERS

with Quick-Make and Quick-Break Silver Alloy, Double Break Contacts

Max. Ratings

Polyphase
5 hp, 220 v
7½ hp, 600 v

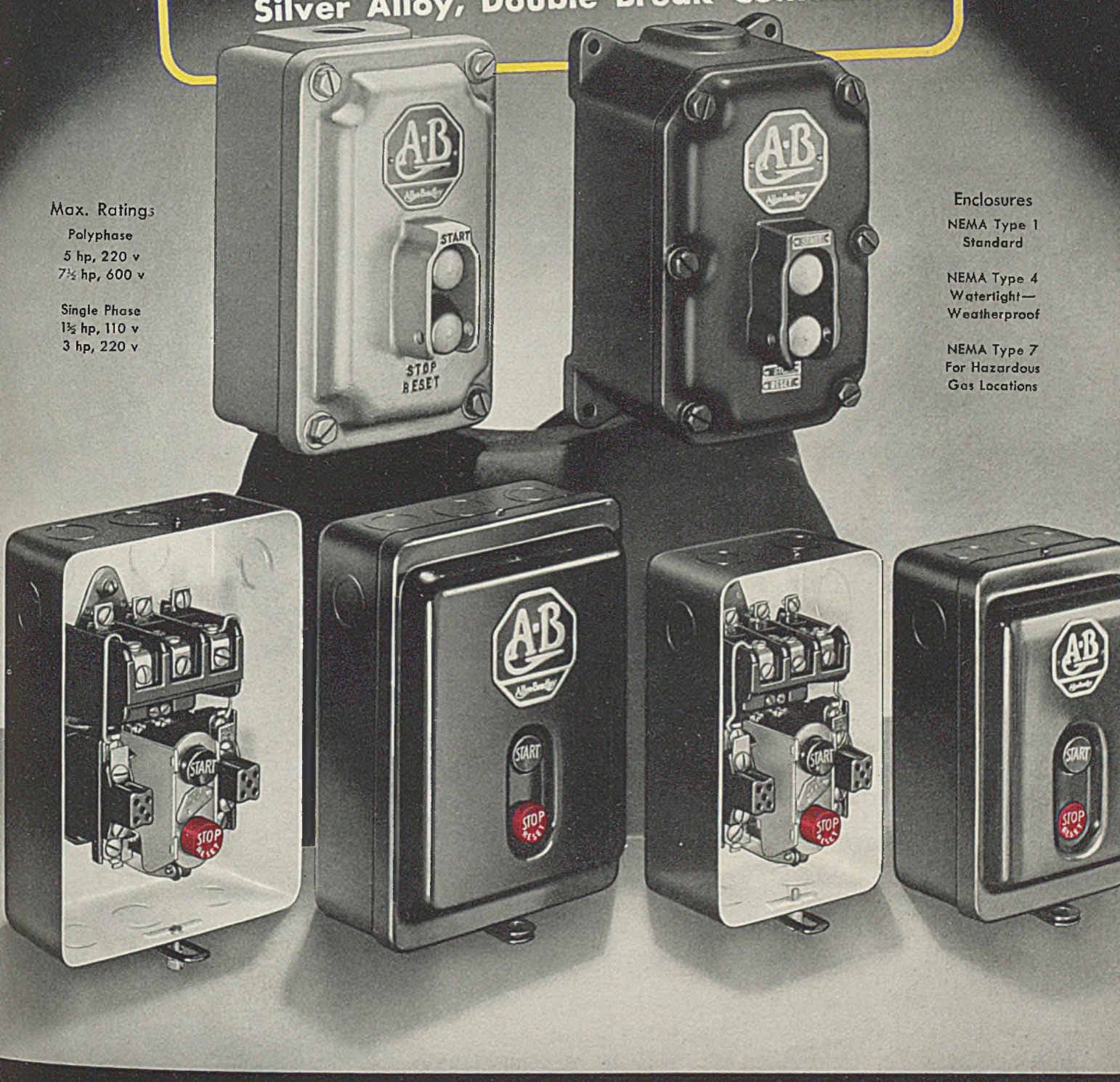
Single Phase
1½ hp, 110 v
3 hp, 220 v

Enclosures

NEMA Type 1
Standard

NEMA Type 4
Watertight—
Weatherproof

NEMA Type 7
For Hazardous
Gas Locations



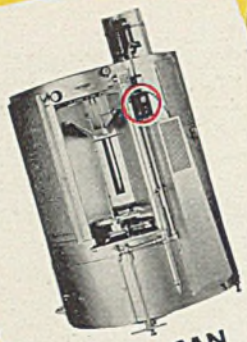
ALSO AVAILABLE IN FLUSH MOUNTINGS FOR WALLS AND MACHINE BASES

ALLEN-BRADLEY

BULLETIN 609 ACROSS-THE-LINE STARTERS

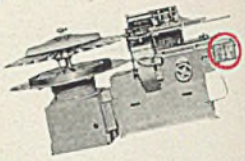
QUALITY

THE MANUAL STARTER for 1,001 JOBS



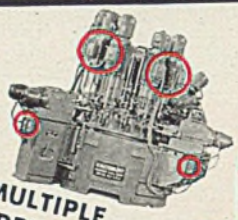
MILK CAN WASHERS

DRILL PRESSES



BAG SEALING MACHINES

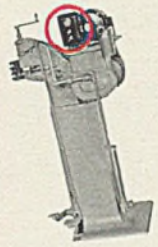
BOTTLE FILLERS



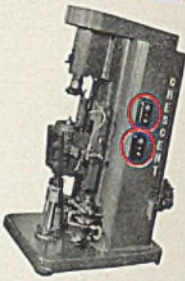
MULTIPLE DRILLS

BULLETIN 609
MOTOR STARTERS

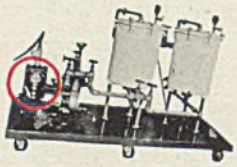
This open view of the Bulletin 609 hand-operated motor starter shows the compact switch mechanism mounted in the standard general-purpose enclosure.



ROTARY SHEARS



BURRING MACHINES



FILTERS

METAL CLEANERS

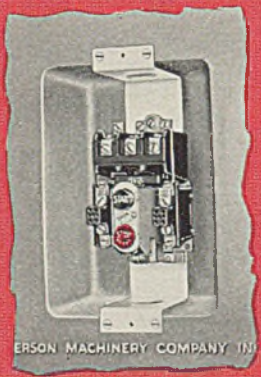
GRINDERS

WRAPPING MACHINES

MULTIPLE SPINDLE MACHINES

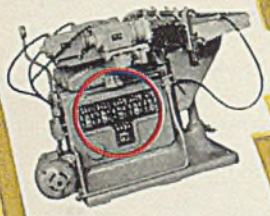
TOOL GRINDERS

CUTTER SHARPENERS

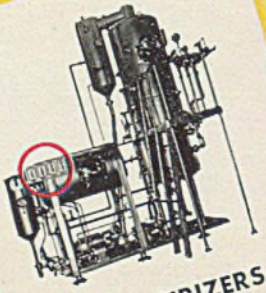


The above illustration shows the Bulletin 609 starter arranged for flush mounting in a machine base or wall recess.

Allen-Bradley Co.
1320 S. Second St., Milwaukee, Wis.



WOOD BORING MACHINES



PASTEURIZERS

WASHERS AND DRYERS

THREADING MACHINES

ALLEN-BRADLEY

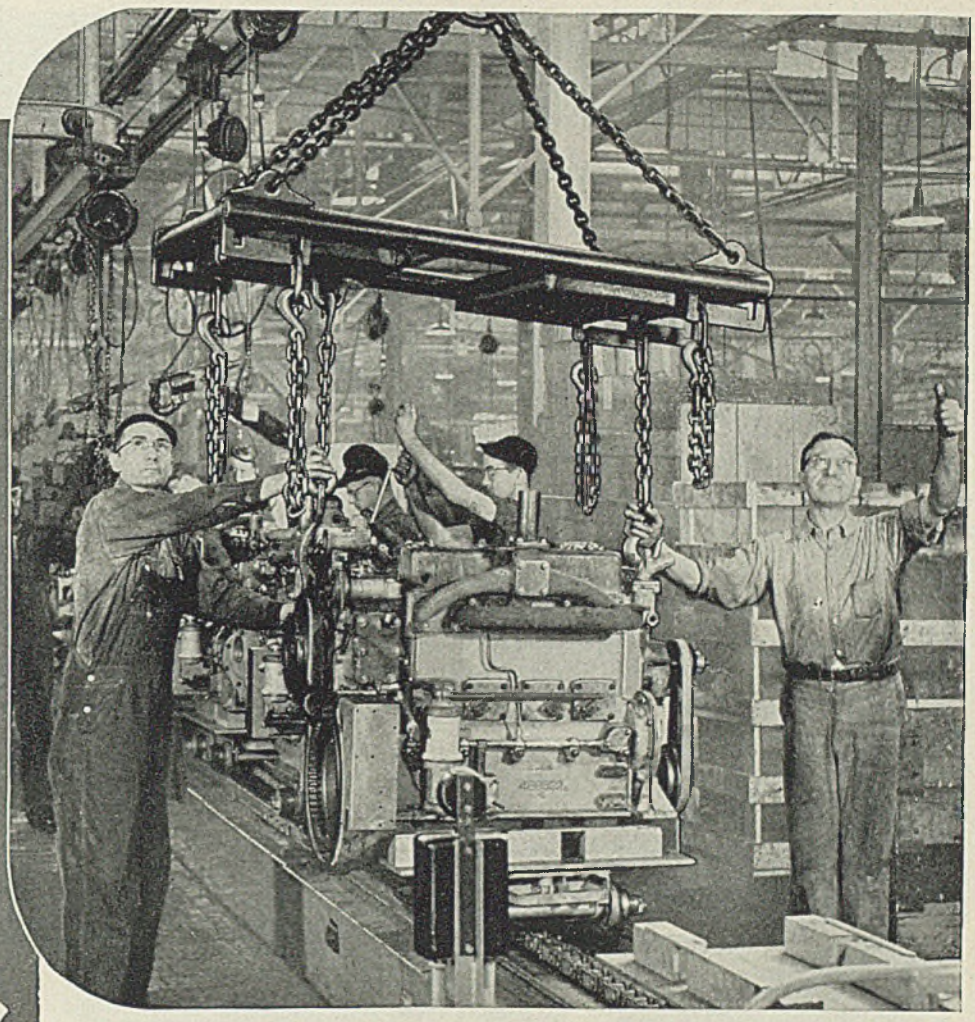
BULLETIN 609 HAND-OPERATED MOTOR STARTERS

QUICK-MAKE QUALITY QUICK-BREAK

★ ★ ★ ★ ★

Use ACCO CHAIN

Because workmen work better with SAFE CHAIN



⬅ ⬅ ⬅ that statement goes DOUBLE today!

It appeared first in an AMERICAN CHAIN advertisement two years ago. It deserves thought now.

Men are working "under the gun." Many are inexperienced. Chains get undue overloads and stresses.

Workmen appreciate American chain's extra margin of resistance to emergency loads and strains.

American chain protects life and load, job and owner, industry and government.

In these times there can be no compromise with safety. *Specify AMERICAN.*

AMERICAN CHAIN DIVISION • BRIDGEPORT • CONNECTICUT

AMERICAN CHAIN & CABLE COMPANY, Inc.

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

HANDLING SYSTEM

. . . . uses shovel-scoop trucks and pallets moved by fork truck to cut costs and to eliminate bottlenecks

■ AT THE Chester, Pa., plant of the Harbison-Walker Refractories Co., expanding business created two materials handling problems, both of which have been solved by the application of the battery industrial truck handling system. The two problems were (1) the handling of bulk raw materials from the storage yards to the crushing plant and (2) the handling of fire brick through finishing operations and stock sheds to railroad cars.

The raw materials used in the manufacture of the refractory brick made at this plant consist principally of burned magnesite clinker, the largest pieces of which measure about 4 inches across, and chromite ore, which contains lumps as heavy as 150 pounds.

Growth in the volume of business increased the quantity to be moved and also necessitated an increase in inventories and, therefore, in the average distances to the crushers. Approximately 2 acres of yard space are given over to the storage of these materials, and the distance to the crushers may be as much as 750 feet. At least 15 different kinds of raw materials are stored in this space.

Originally the materials were handled from storage to crushers by means of standard railroad cars. A car was spotted in the storage yards by a switching locomotive. It was loaded as nearly to capacity as possible by a crew of laborers working with shovels and wheelbarrows. The car was then moved along yard trackage to within approximately 25 feet of the crushers and unloaded in the same manner as it was loaded.

The tracks were depressed below the yard level to eliminate the need for ramps both for this operation and for the loading of outgoing cars with the finished brick. Nevertheless, even without the difficulty of moving the materials over appreciable grades, a large crew of men was needed.

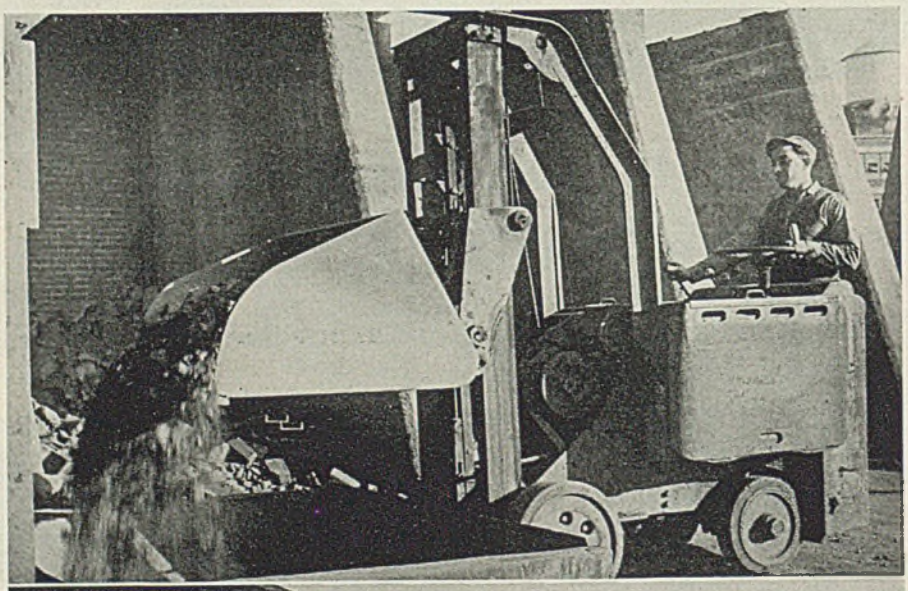
A further disadvantage lay in the fact that the quantity of the various types of brick produced in one day had to be regulated by the quantity of materials that could be moved from storage at one time in one carload instead of by the production requirements. Obviously a simpler and more flexible method was needed, a method that would keep the crushers constantly supplied during working shifts with any one of the required materials regardless of the distance it had to be transported from storage. The battery shovel-scoop truck appeared to meet these specifications. A test immediately proved so successful that sufficient additional units to handle the entire tonnage have now been put into service.

Trucks Travel Anywhere

The trucks travel anywhere throughout the yards. At the storage piles, they bite out loads ranging from 1 to 2 tons, then carry them to the crushers. The crushers, however, are not large enough to handle a charge of ore of this size without flooding or choking, so a means for controlling the feed had to be devised. The only change that had to be made was the installation at each crusher of a belt feeder with a hopper above it into which the load on the truck could be discharged. With this arrangement, several tons of ore can be maintained in the hopper, and can be fed to the crusher at any desired rate.

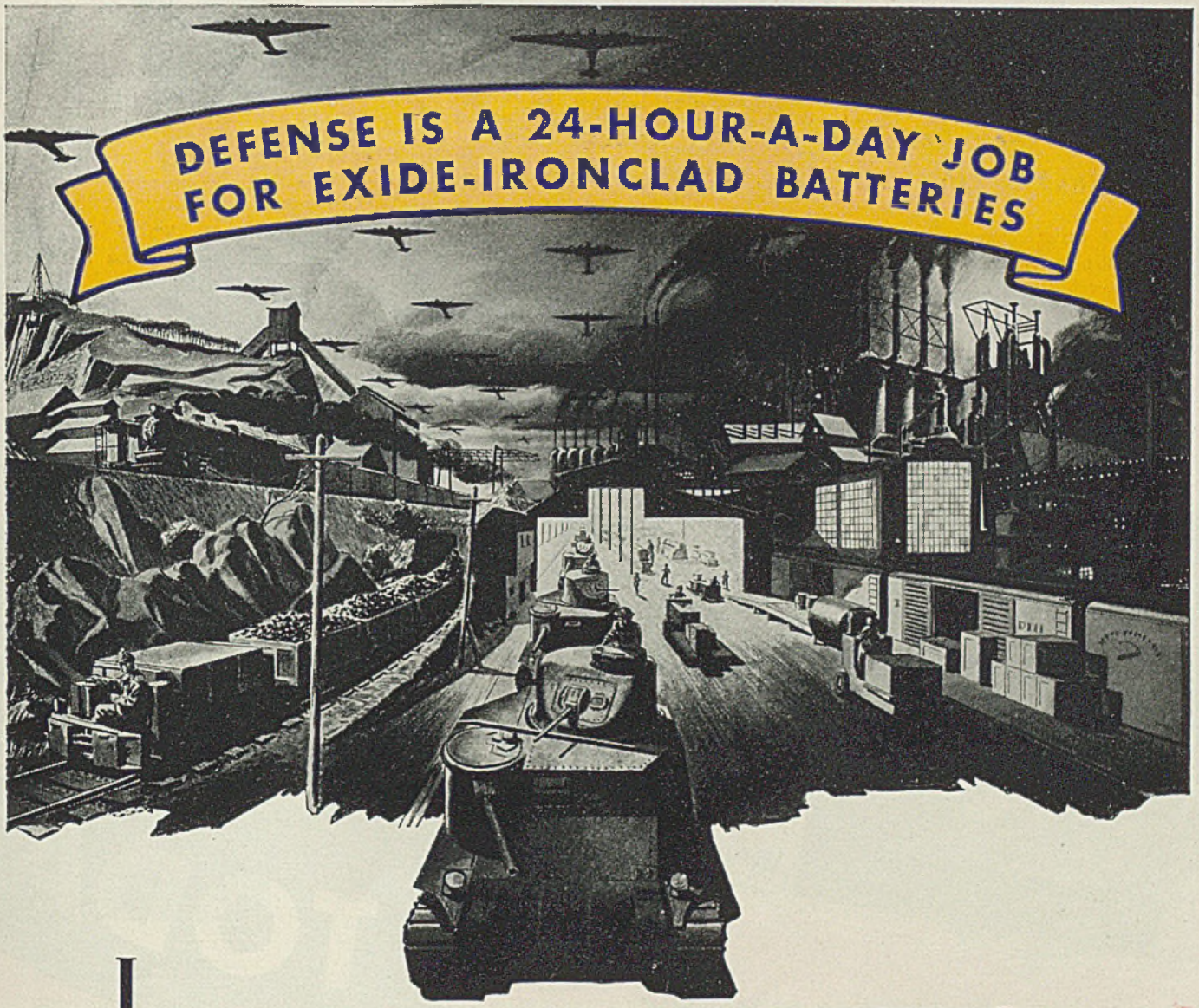
Change from one material to another is now made according to production convenience, but the simplicity of the operation represents the greatest gain. Shoveling and dumping are done in units of 1 to 2 tons instead of a few pounds. It is already evident that the direct reduction in costs will pay for the truck equipment well within the first year.

The ore is so heavy and contains so many large lumps that it is necessary to utilize the momentum of the truck to drive the scoop into the pile and pick up a full load at one bite. In fact, the truck is driven right up to the stalling point every



Above, battery-powered shovel-scoop trucks deliver raw materials to crusher, 1 or 2 tons at a time

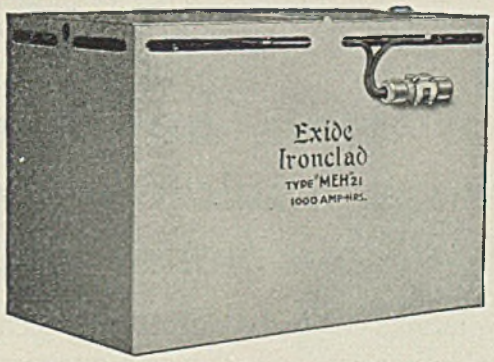
Below, shipments wire-strapped on skids are loaded into freight cars by fork truck. This method of shipping also facilitates unloading and storage at receiving end



IN busy defense plants, steel mills and shipyards where electric industrial trucks run tirelessly night and day, Exide-Ironclad Batteries are on the job . . . speeding up *production* by speeding the flow of materials, freight and cargo.

Production lines slow up and stall if materials aren't fed to them on time. Dependable Exide-Ironclads in battery electric trucks help to assure the prompt delivery of essential materials within each factory and steel mill, and at terminal, dock and warehouse.

Exide-Ironclad Batteries have been specified for this important 24-hour-a-day defense job because they supply the surging power



needed to handle today's heavier loads . . . and they deliver this power at a consistently high voltage for faster running speeds.

Best of all, Exide-Ironclads are so easy to maintain and so dependable that they are helping to prevent breakdowns and delays . . . they're doing their part to keep America rolling!

Exide IRONCLAD BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

BEST ANSWER

TO MOTOR INSULATION PROBLEMS

IN 1933

AND TODAY

Motor users approved Tuffernell Insulation then ...and like it better NOW

"Are windings adequately protected mechanically as well as electrically?" was a question we invited motor buyers to ask in 1933.

It's still a good question—and in Westinghouse CS Motors Tuffernell insulation gives the right answer.

For mechanical protection, each individual end turn is strongly taped. Combination slot cells of treated cloth cemented to fish paper hold slot portions of windings firmly in place without flexing.

For electrical protection, accurately controlled impregnation treatments penetrate every part of the winding. Coils are protected against damage from moisture, oil, grit, mild chemicals, and metallic dust.

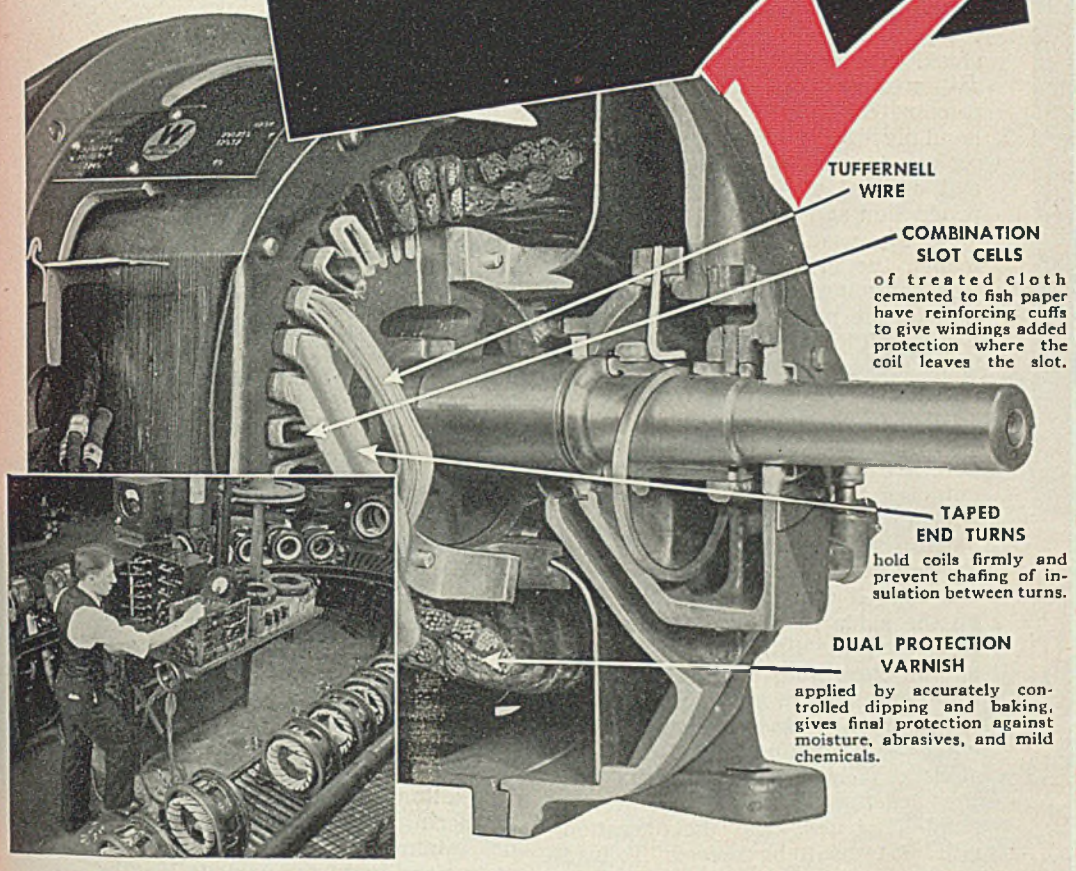
What motor users think of dual-protected insulation is shown by the rapidly growing number of CS Motors which have gone into service in the years since we first announced it. Today it is more widely accepted than ever before.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, EAST PITTSBURGH, PA.

Westinghouse

WESTINGHOUSE W

TUFFERNELL INSULATION



From the first coating applied on the Tuffernell wire to the final dipping and baking processes for protection against moisture, abrasives, and mild chemicals, Westinghouse Tuffernell insulation meets every requirement of complete dual protection against mechanical and electrical hazards.

The Westinghouse high-frequency test is the final step which reveals minute flaws in insulation between turns which might cause failure in service, but which ordinary coil tests do not detect.

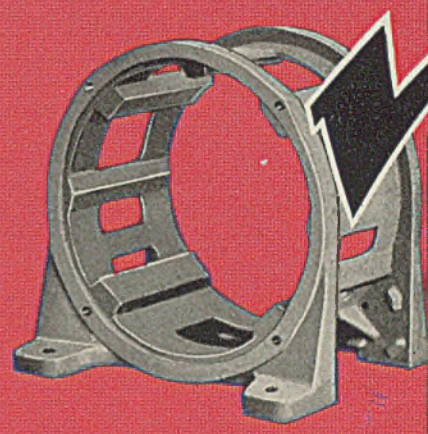
RENEWAL PARTS AND SERVICE

Not only for current models, but for any Westinghouse Motor or control device ever built, Westinghouse assumes the responsibility of providing renewal parts. They are made with the same tools as the original equipment and to the same rigid standards. Parts are therefore interchangeable and maintain the original performance.

The 34 district manufacturing and repair plants are so located throughout the United States that parts or service are available overnight wherever your plant may be.

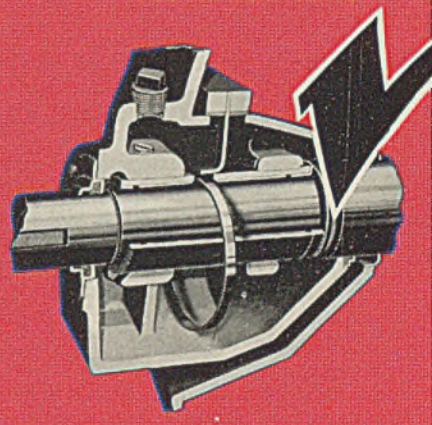
J-21176

ONE-PIECE FRAME

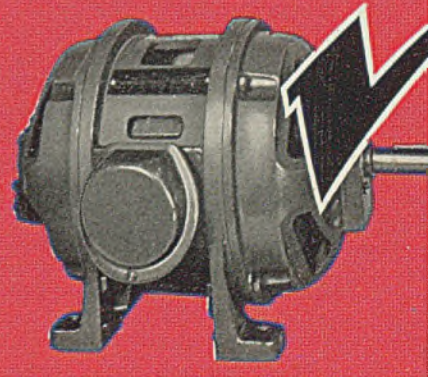


The integrally cast frame of the Westinghouse CS Motor, developed and introduced by Westinghouse, protects the electrical elements fully against twisting strain and vibration.

SEALED-SLEEVE BEARING WITH FELT GASKET AND VESTIBULE SEAL

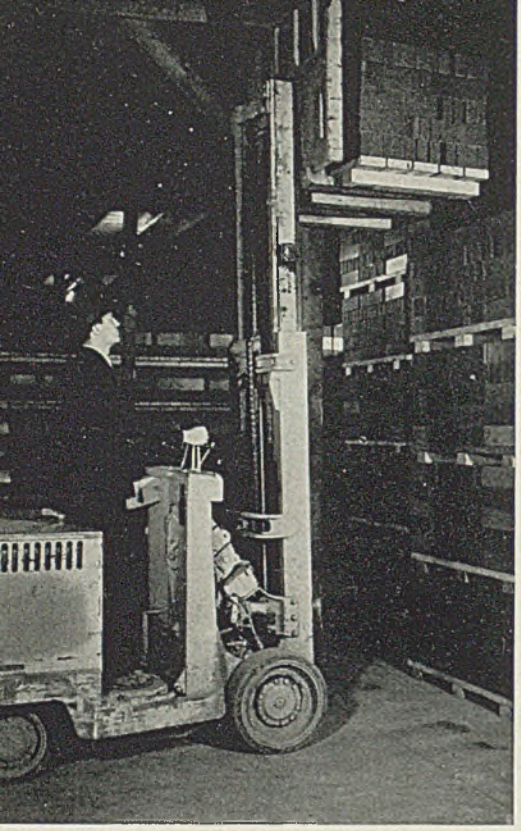


Oil is sealed in—dirt and dust are sealed out. Only in Westinghouse CS Motors do you get this dual protection.



Type CS Motor with sealed-sleeve bearings, one-piece frame, and Tuffernell insulation.

Type CS Motors



Pallet loads of 9 x 4½ x 2½ "straights" are tiered five high in storage by means of this fork lift truck. All photos courtesy Storage Battery Division, Thomas A. Edison Inc., Orange, N. J.

time it picks up a load of the heaviest ore. Only the sturdiest kind of construction could stand this treatment.

Without knowing that trucks of this type have actually been doing such work regularly for a number of years, one might be inclined to doubt that they could withstand either the mechanical shock or the high surges of power incident to the stalling operation. The fact that they do is due to high-strength construction in both the truck and the storage battery, combined with ability of the battery to supply the power surges as required, yet limiting them to a safe value.

The principle of handling larger unit loads is also being applied to the movement of finished brick. Either at the driers or at the kilns, depending upon the type of ware which is being made, the brick are piled on wooden pallets. Each pallet load consists of approximately two hundred fifty-five 9 x 4½ x 2½-inch "straights" or their equivalent and weighs approximatey 3000 pounds. Once the brick are placed on these pallets, they remain in this unit until they are loaded into railroad cars. If it is necessary to place the brick in the stock sheds before shipping, they are left on the pallets and any rehandling by hand is thereby eliminated.

The pallets adopted for handling all types of brick are single-faced. Decking is made of 2 x 6s and the battens (three per pallet) of 3 x 4s. The platforms measure 30 x 43 inches. The use of this relatively heavy lumber for the pallets is necessary because of the concentrated weight of the loads. Tests have shown that lighter material sags too much, thus preventing the necessary under-clearance for the fork lifting truck.

The loads are tiered five-high in stock. This has increased the utilization of the available space by approximately 50 per cent while the handling of 255 brick at a time on pallets has vastly reduced the time and cost of all handlings between production and outgoing carriers.

In the past, for domestic shipments, the brick have been loaded into out-going cars by hand. Adoption of the pallet-fork-truck system has simplified this work in that the loads are now brought into the railroad cars in the most convenient position for packing.

Shipments packed on skids for export are already being loaded into outgoing freight cars by fork truck with a gain in efficiency that cannot be fully appreciated except by comparison with earlier methods. At one time it was necessary to make up the skids inside the cars which, aside from the difficulties introduced by the close quarters, was so slow that demurrage was incurred.

The method was improved somewhat by assembling the brick on the skids next to the loading dock and then loading them into the cars by hand lift truck. But the operation still left much to be desired. To load one car required some 30 man-hours.

Now, with the use of a fork truck, a car can be loaded in less than 2 hours. This is especially advantageous because of present erratic sailing schedules. Shipping companies are not able to guarantee sailing dates far in advance so that to avoid risk of excessive storage charges at tidewater, it is necessary to load a car quickly on short notice.

To provide ample capacity to operate full shifts, the trucks have been provided with two 8-cell CIO Edison batteries per truck. One battery is removed from the truck for charging while the other is in use. Normally the batteries are exchanged at 8-hour intervals. While they usually show sufficient remaining capacity for further operation, the 8-hour exchange periods have been adopted partly because the shifts are changed at these intervals and partly to insure ample capacity for hauls from the more remote parts of the yard.

Synthetic Sponge Rubber Is Grease Resistant

■ Ameripol, a new sponge rubber made from its synthetic rubber, is announced by B. F. Goodrich Co., Akron, O. Developed to resist the action of oil, grease or other solvents which deteriorate natural rubber, the new product also is capable of withstanding higher temperatures.

Booklet Clarifies Use Of Welding Symbols

■ American Welding Society, 33 West Thirty-ninth street, New York, announces a 25-page booklet containing welding symbols and instructions for their use. Prepared by the symbols committee and approved by the executive committee in October, 1940, the booklet was prepared in line with the society's policy to make it easier to carry the designer's information to the workmen.

The symbols incorporated are a development of the welding symbols in use here and abroad, and supersede the society's former symbols.

Enlarged Handbook on Steel Construction

■ *Manual of Steel Construction*, fourth edition, published by American Institute of Steel Construction, 101 Park avenue, New York, for $2.

A handbook for engineers and architects, the new edition contains new data useful to designers and detailers of steel structure.

Additional data include tables for cambering of rolled beams, giving the minimum camber likely to remain permanent for various lengths of 21 to 36-inch wide flange sections and the 24-inch standard section; additional values in the section modulus tables that are affected by changes in the 6 x 6 wide flange section and adding the modulus values for the smallest I-beams and structural sections; five tables of properties for struts; the standard beam connections for wide flange and American standard beams have been completely revised so as to include ¾-inch rivets as well as ⅞-inch rivets; a table of maximum reactions and minimum spans for allowable uniformly distributed loads on seated connections; tables for additional standard beam connections for ¾-inch rivets to be known as "K" and "KK" series; a table giving allowable loads for beam seats without stiffeners.

Tables have been added for allowable loads for angles and structural T connections and net section moduli of plates for gusset connections carrying either ¾-inch, ⅞-inch or 1-inch rivets. The welding data have been entirely revised, bringing them up to date and in line with revisions for the arc and gas welding symbols now being published by American Welding Society.

TODAY every essential productive enterprise is engaged in a common task . . . to provide the materials necessary to national defense in ever-increasing volume. No need can take precedence over defense requirements. No time or effort can be spared from this, the major obligation of every American.

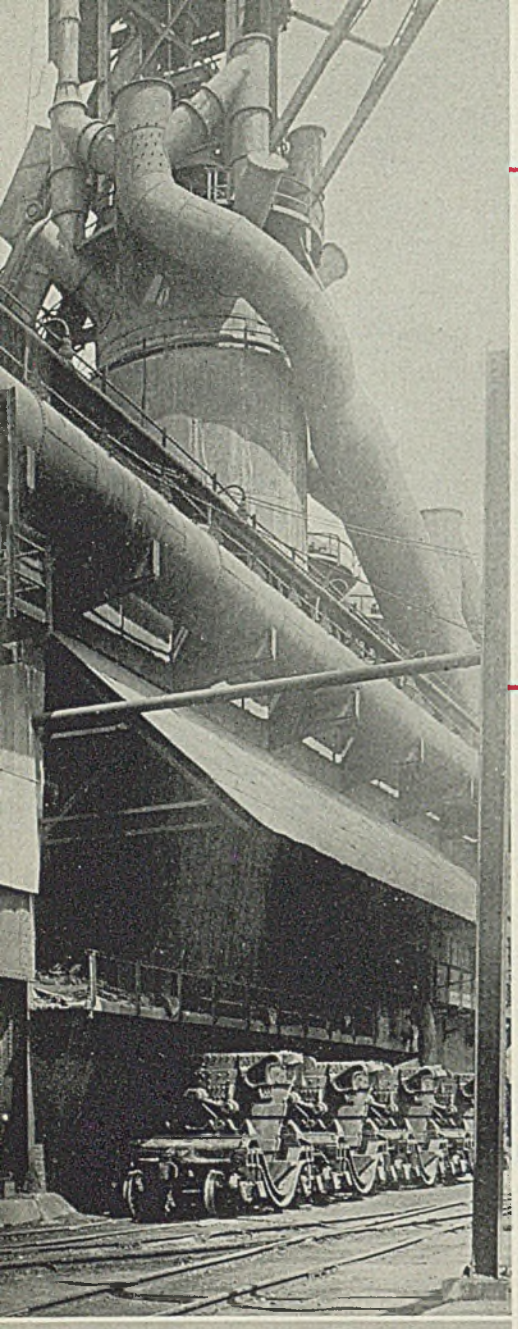
Andrews wishes to care for the needs of customers to the fullest possible extent, but "First Things First" must be the wise governing policy of the day.

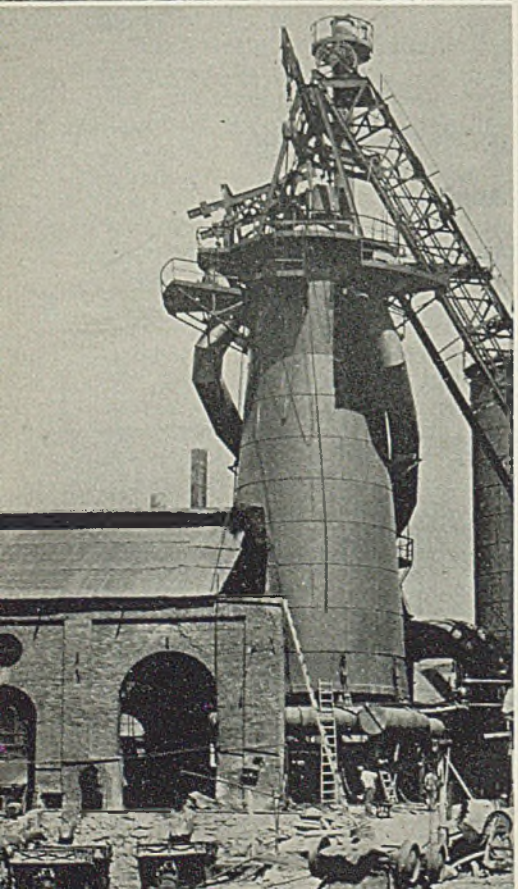
THE ANDREWS STEEL CO.
NEWPORT, KENTUCKY

DIVISIONS
THE NEWPORT ROLLING MILL COMPANY
THE GLOBE IRON ROOFING & CORRUGATING CO.

ANDREWS STEEL

BASIC OPEN-HEARTH ALLOY STEEL BILLETS AND SLABS





STEEL PLANT CARS

Their Design, Application And Features

Cars for handling cinder, molten iron and ingot molds have undergone drastic changes in design in recent years. Twin-pot cinder cars and mixer type iron ladles are recommended for efficient transportation and upkeep costs. Author traces development of three types of cars for steel plant service

By G. P. ASTROM
Chief Engineer
M. H. Treadwell Co. Inc.
New York

■ IN MAKING iron in a blast furnace or steel in an open hearth slag is produced as a by product. This comes from the furnaces in liquid form and at a temperature approximately the same as the molten iron or steel. In olden times, when the furnaces were small, the slag usually was run into shallow boxes or into pits, and disposed of when sufficiently cool. But in the early eighties several types of mechanically dumped cinder pots were designed, and for the next 40 years many more types appeared as the art developed.

I. CINDER CARS

Early cinder pots were practically steel plate tanks with brick linings, but at the turn of the century the brick lining was abandoned and a cast-iron lining for the tank was substituted. Ten years later the steel plate tank disappeared and the cinder pot of cast iron without a jacket was introduced.

The steel plate cinder pot with brick or cast-iron lining was more or less cylindrical and the skull had to be pried out. This was laborious and dangerous work, and demand soon was made for self-cleaning pots which often were made of cast-iron sections the idea being that if one section cracked, a new one could be substituted instead of discarding the whole pot. Later, when cast steel began to be used for pots this practice was abandoned. Today cast steel pots are used for blast furnace slag but for open-hearth slag many shops still use cast iron because molten steel, which often is carried over the sides, adheres to the wall of a cast-steel pot, but not to cast iron.

The latest problem in cinder pot design is how to reinforce the walls to prevent distortion from the heat. Three differing opinions prevail. One is to build the ladle heavier at certain points, another to reinforce the walls with ribs both vertical and horizontal making a net work on the upper part of the ladle, and still another favors a newer type of pot with corrugated sidewalls and which has been found satisfactory in many ways.

Life of a cinder pot seems to depend upon how many times it is filled and also upon how long the hot slag stays in the pot before it is dumped. In many plants 3000 fillings are expected from a cast-steel pot. As the different types of reinforcing are more or less expensive it becomes an individual problem for each plant as to which type is the most economical in the long run.

Usual size of new designs is 400 cubic feet capacity although some 450 cubic foot pots are in use.

Cinder cars developed slowly as the size of the pots increased. Originally hand dump mechanisms consisting of worm-wheel and worm or screw, were most common. Later designs employing the power of the locomotive either to push or pull the ladle over appeared. But it was the use of steam from the locomotive that eliminated the hand dumping operation.

Numerous inventions were made with the object of getting the sim-

Top left, early type of open-top hot metal ladles are shown spotted beneath the iron runner at blast furnace cast house

Bottom, left, a Virginia stack in the early eighties which flushed its slag into shallow boxes, three of which are shown in position beneath the spouts

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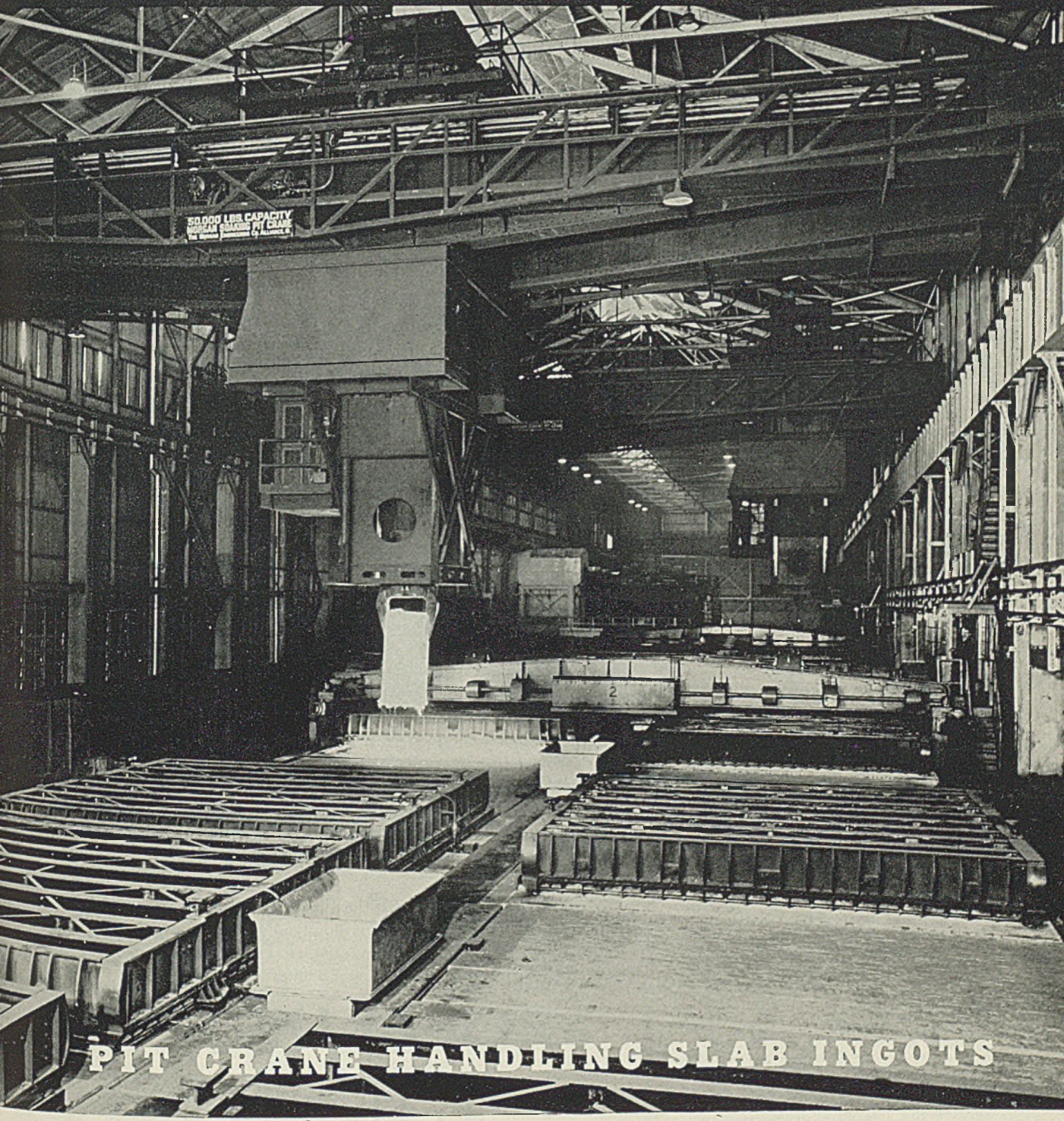

PIT CRANE HANDLING SLAB INGOTS

● Illustrated are three Morgan 25-ton, 95′-2″ span modern soaking pit cranes handling slab ingots for one of the world's largest strip mills. Equipped with worm-operated trolleys and anti-friction bearings, coupled with Morgan stamina of design and construction, these cranes will render many years of profitable

is, of course, based upon sound engineering, the best materials and correct fabrication methods. Morgan soaking pit cranes forty years old, and over, are in successful operation today—slower, less efficient than a modern Morgan crane of latest type as illustrated, but still operating with their orig-

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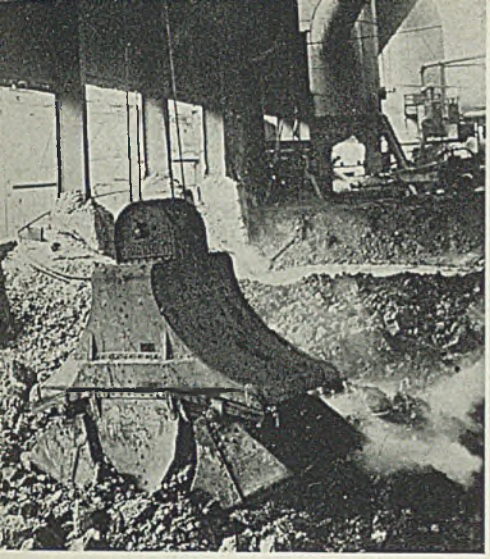
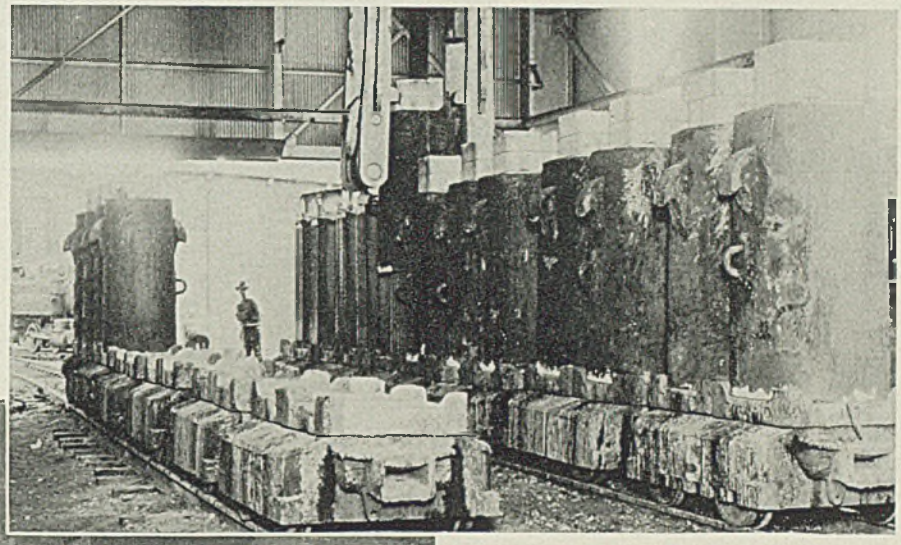
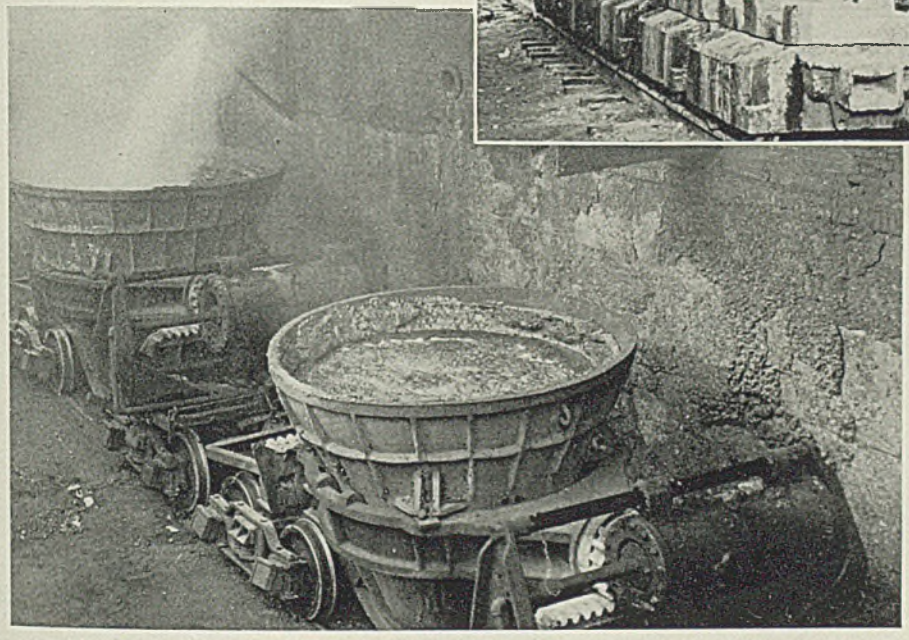


Extreme left, top, at some of the early stacks the cinder was flushed into a pit at one side of the cast house. When solidified it was removed by a clam-shell bucket

Below, four-wheel ingot mold cars. Cast-steel car body protects wheel and axle assemblies from splash of molten steel during pouring operation





Left, cinder ladles cast with vertical and horizontal ribs to prevent warpage. Note steam cylinder and rack and pinion arrangement for tilting the ladle

plest, sturdiest and most reliable construction. As cinder pots are conical they are by nature top heavy when full of slag. This means, that while a certain amount of power is required to start the pots dumping, the moment they start tilting, they often slam over on the side frames or the track and the momentum may even overturn the car.

Therefore, it is necessary to control the speed of dumping. For many years the usual way was to provide an oil cylinder with the oil by-passed through a small orifice. This made a simple and safe way of controlling the speed. Later, more or less complicated control valves were designed to shift the steam pressure from one side in the steam cylinder to the other and thereby create a cushion. Today many operators use both systems.

The latest development, occasioned by the electric locomotive, is the use of air instead of steam. A different kind of piston packing in the cylinders is necessary but otherwise the dumping mechanism is the same.

Use of the electric locomotive also brought about the development of electric dump cinder cars. The electric dumping devices are built more or less on the same principle as the hand-dump cars. The objectional feature is that they cannot bump the pot on the side or underframe to loosen the skull.

A relatively new type of cinder car carries two 400 cubic foot pots. The dumping means are either steam cylinders operating each pot independently or an electric device operating both simultaneously.

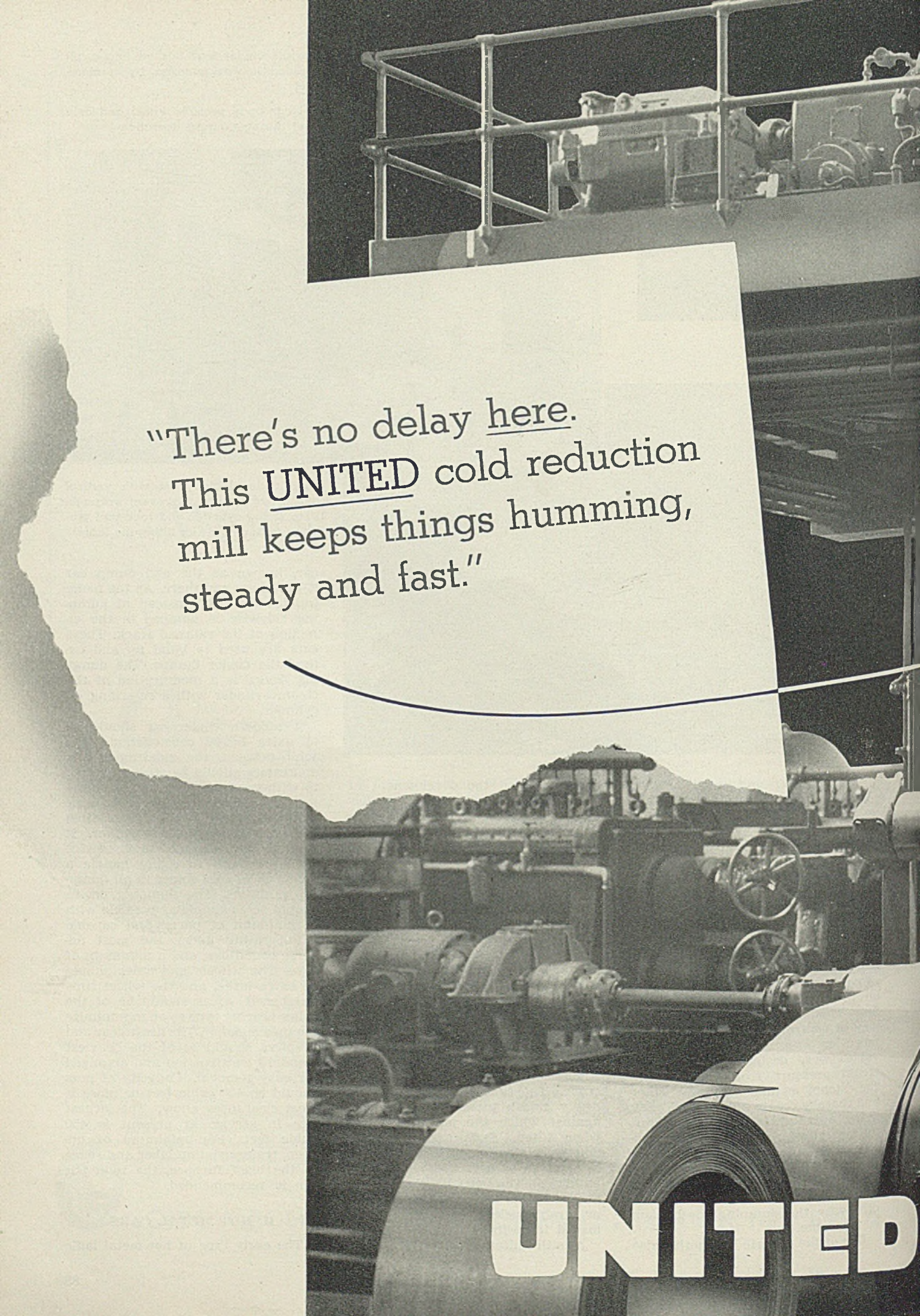
Still another type of cinder car is in use having no dumping device. These cars carrying from one to three pots each, are used by the open-hearth department. The ladle is tipped by means of an overhead crane. The cars are equipped with heavy splash plates on each side, against which the pot can dump, when tilted. Such cars are used where the slag is poured or dumped in a pit, in or near the open-hearth building. The pit is cleaned as needed by the use of a steam shovel or grab buckets, the slag being loaded in railroad cars.

A still different type of cinder car, known as the end dump car is used here and there. As the name implies the ladle instead of dumping sidewise is dumped in the direction of the railroad track. These cars are used to build up and extend the cinder dumps. The dumping device is a modification of the steam cylinder with a retarding oil cylinder.

A modern cinder car should be of extra heavy construction. The joint between the sideframes and endframes should be strong enough to withstand the blows from bumping the ladles on the sideframe bumpers as well as the shocks when the cars are coupled together. It should have a dumping device strong enough to easily handle a ladle full of cold cinder in all dumping positions. The dumping device should be as simple as possible with a minimum of parts, and capable of operating under the most adverse conditions, and a minimum of care. The wheels and axles should be extra large, and the wheel rims toughened. Axles should be of the roller bearing type so as to minimize the upkeep labor. The draft gear and couplers should be of the heaviest standard construction and arranged for easy removal. Capacity of pots should be 400 cubic feet or more if local clearances allow. The largest size in service at present is 450 cubic feet. For minimum of upkeep, transportation labor and space at the blast furnace, the twin pot car is recommended.

II. HOT METAL CARS

The early type of hot metal ladle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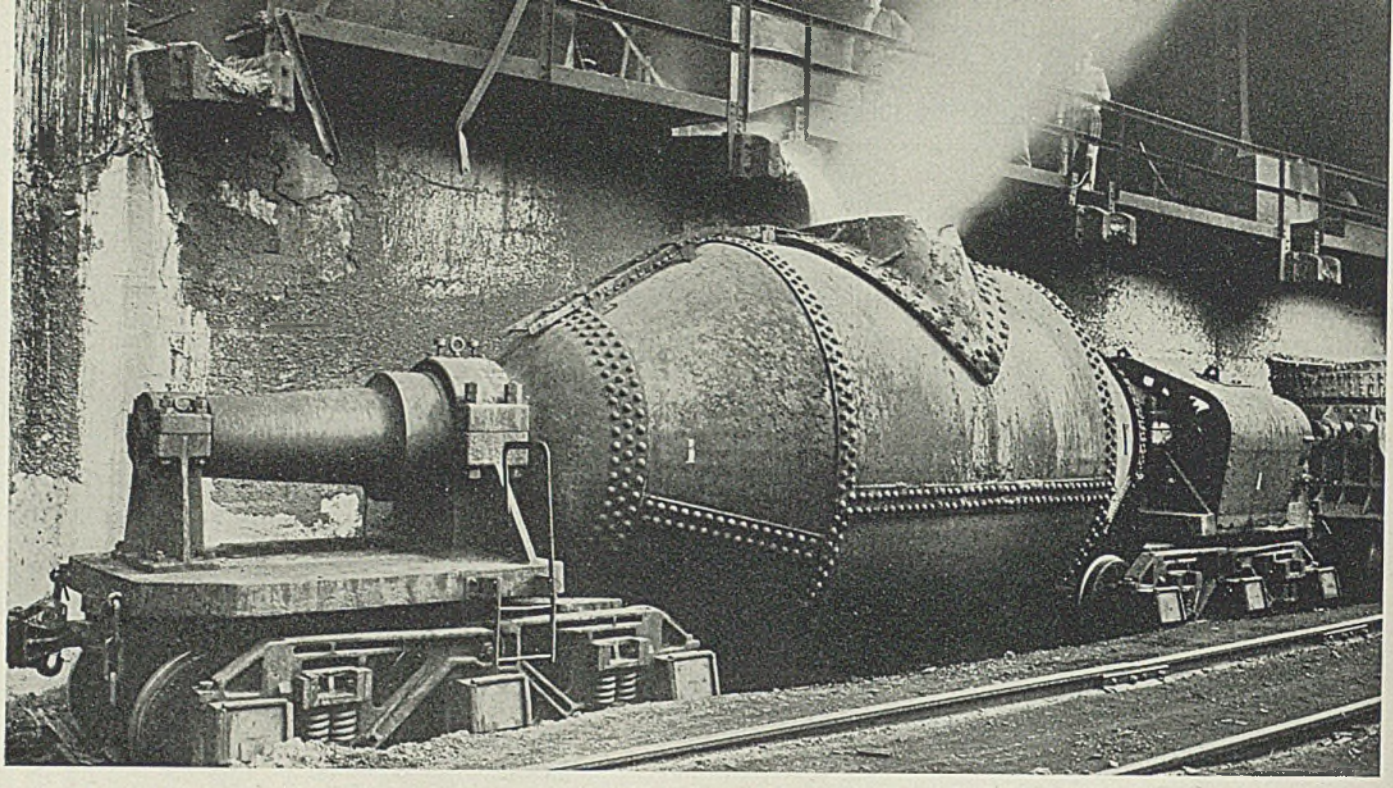


Mixer type ladle of 125-ton capacity receiving a cast of molten iron from a blast furnace

persisted in general use until the advent of the mixer-type or closed ladle. Previous to that, experiments had been made with covers for open-top ladles but not with much success. The real advantage of the mixer type is that its construction permits building ladles of large capacity.

Standard railroad clearances limit upright ladles with covers or semi-open top (conical) to capacities of about 75 tons; while mixer-type cars have been built for 160-tons capacity and designs perfected for cars carrying 300 tons. Of the different types (there are about four) the cylindrical ladle with conical ends lends itself admirably for designs of large units.

Construction of this type vessel is simple and inherently strong against both bending and twisting and the lining problem is the simplest. The different parts of the ladle preferably are riveted together inasmuch as the ladle cannot be stress relieved as a whole because of the machined trunnions and the saving in weight against a welded ladle would only amount to the weight of the butt straps.

Mixer ladles are lined with either firebrick or stone. Which of these two lining materials afford the lowest cost per ton of metal handled, depends upon service, slag composition, local conditions, and on how long the metal is held in the ladle. If used between blast furnace and mixer an average of 100,000 tons per lining can be expected; but if the ladle is used as a mixer at the open hearth, about half of that or 50,000 tons is a fair average. These figures are averages since there are many instances where a lining has given a campaign of over 200,000 tons.

Linings seem to have certain maximum carrying capacity per day, if the ladle is made to carry more or less per day, the life of the lining will decrease.

Because of heat retaining properties of the ladle, metal has been held in a molten state for 48 hours. At the end of this period it is still fluid enough to be poured without forming more skull than can be melted by the following cast. Consequently, this type ladle is adopted for transporting molten metal long distances. Several plants use them for transporting their metal from 10 to 15 miles.

Mixer cars also are used to handle hot metal for the manufacture of ingot molds from direct blast furnace iron and with the improvement in the blast furnace technique so as to get purer iron, this practice will extend to other fields.

Mixer cars do not make any appreciable amount of scrap. They permit a minimum of runner length, of attending labor and of reduced lining cost. Often the whole cast can be taken in one ladle. Moreover, the car upkeep is extremely low. The economies of their use has made this type ladle the most important contribution of our times in the art of handling fluid hot metal.

III. INGOT MOLD CARS

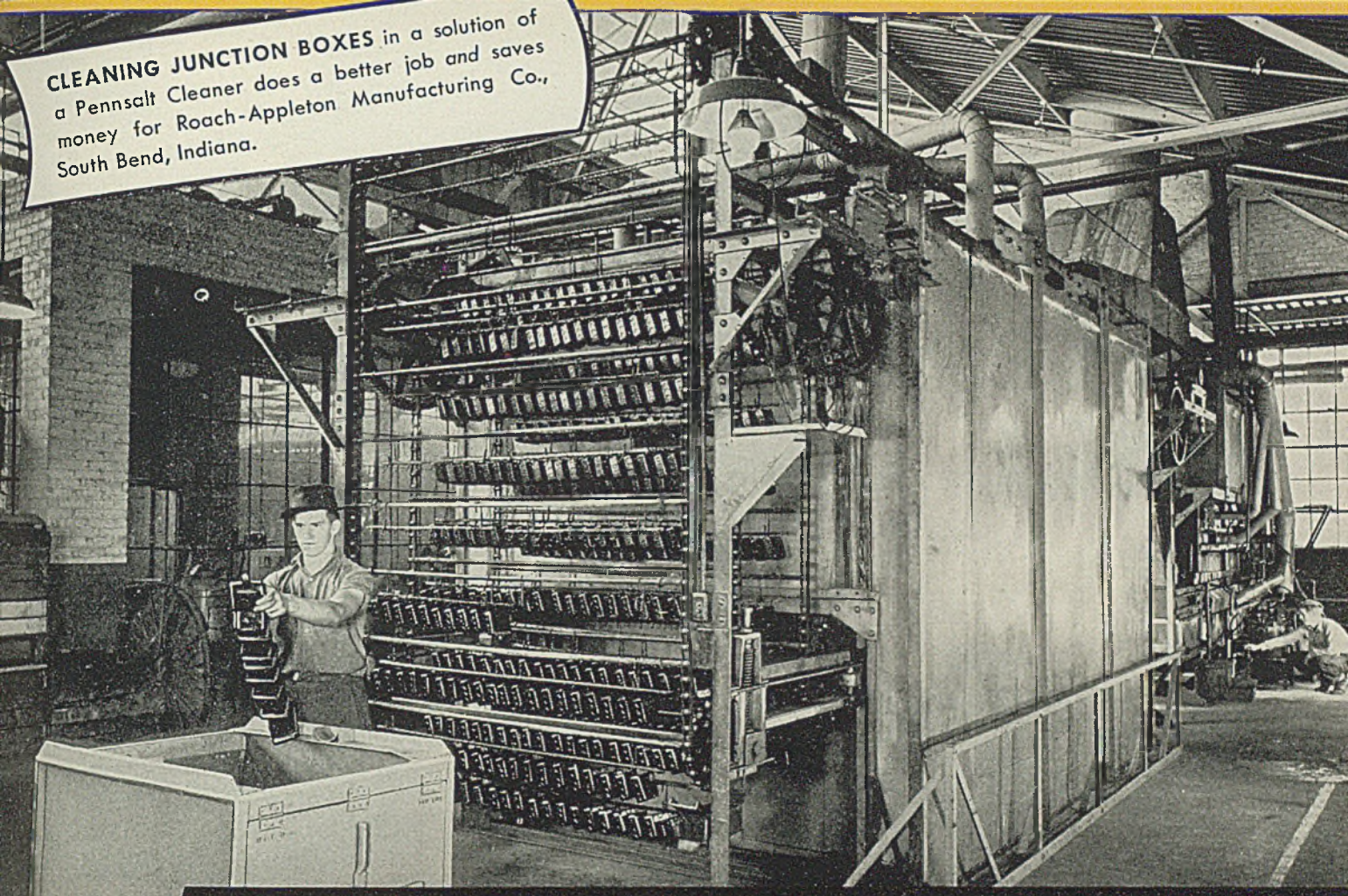
The customary ingot mold car formerly had four wheels, two axles with simple journal boxes and brass bearings, four springs and a cast-steel car body covering the wheel and axle assemblies.

As the ingots increased in size and weight, it became necessary to use eight wheels and the design changed to look like a flat car with two small four-wheel trucks. The top was a steel casting extending well over the wheels and axles and arranged to take couplers of standard design.

As the ingot car tracks in most plants have many short curves and often are of narrow gage and without proper roadbed it happens that derailment is a common occurrence. Another source of trouble is the dropping of ingots on the car, or extra loading from the stripper itself. When this happens the car-frame often is damaged since the springs compress to solid and break.

Therefore, the new type of ingot mold car is made with a rolled steel top, welded construction, especially heavy and with limiting features in the spring assembly preventing excessive strains. The truck is arranged to give the car a low center of gravity and to prevent derailment it is of the compensating type that allows the wheels the necessary free vertical movement without distorting the truck frames.

Bolsters as well as truck side frames are of rolled steel arranged to give equal load distribution on the wheels. Journal bearings are of antifriction type with cast-steel journal boxes having large grease reservoirs. The car body extends over the trucks and has protection plates to prevent damage by molten metal. The couplers are standard size but draft gears have not been found necessary. The wheels should be of forged steel with extra wide treads. Such ingot mold cars have stood up well and practically eliminated the trouble of derailing.



CLEANING JUNCTION BOXES in a solution of a Pennsalt Cleaner does a better job and saves money for Roach-Appleton Manufacturing Co., South Bend, Indiana.

ROACH-APPLETON REPORTS:

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• a 28% saving in cleaner costs with a Pennsalt Cleaner

In the last few years, Roach-Appleton Manufacturing Co., South Bend, Indiana, maker of electrical products, has tried a good many different metal cleaners.

According to Mr. S. J. Zawadzki, General Superintendent:

"Our Pennsalt Cleaner is the only product that really does a thorough job for us in cleaning electrical junction boxes, made of low carbon steel, prior to plating or enameling. Also, we formerly used two different metal cleaners, one for cleaning the junction boxes to be enameled, the other to clean those to be plated. Now we do both jobs better with this one Pennsalt Cleaner . . . and on top of that, it has saved us 28% in cleaner costs."

No wonder that Roach-Appleton, ever since trying a Pennsalt Cleaner over a year ago, has used it exclusively! Thorough metal cleaning despite extremely hard water . . . one cleaner to handle instead of two . . . and a saving of 28% . . . those are real benefits from this efficient Pennsalt Cleaner.

Leading manufacturers who make or fabricate metals report similar advantages since they've started using one or more of the series of Pennsalt Cleaners. Some save time . . . others use fewer men . . . some clean several metals in one cleaner solution . . . many have cut cleaning costs . . . *all* report thorough and efficient metal cleaning with Pennsalt Cleaners.

THE RIGHT METAL CLEANER FOR YOU is the Pennsalt Cleaner with the properties best suited to your specific conditions. Let one of our experienced technical men help you choose the most efficient metal cleaner for your needs. Write us about your problems today . . . to our Pennsalt Cleaner Division, Dept. S.

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METAL CLEANING

And Ordnance Production

By DR. R. W. MITCHELL
Technical Director
Magnus Chemical Co.
Garwood, N. J.

This first of a series of three articles explains many of the important characteristics of metal cleaning solutions

■ SINCE the defense program is largely a matter of production and processing of metals, often it becomes necessary to process metal surfaces so they are physically clean or physically and chemically clean. Thus many production departments now called upon to produce unfamiliar items in huge quantities may encounter some apparently tough cleaning problems. To explain just what constitutes cleaning, the mechanization of cleaning and its application to various cleaning operations is the purpose of this series. Also included will be a discussion of specific cleaning problems having to do with production of projectiles, shell cases and small arms cartridge cases as well as other items.

Metal cleaning is important because it bulks large as a time-manpower-material consuming operation and because it can and often does constitute a bottleneck. Ineffective cleaning prior to any finishing operation tends to increase rejections, particularly in view of the rigid standards of inspection which prevail today.

An imperfectly cleaned shell may be rejected prior to lacquering and have to be returned for a second cleaning. Or it may be rejected after lacquering, when poorly bonded lacquer shows up as a result of poor cleaning. This means stripping off the lacquer, recleaning and relacquering—a waste of time and labor that cannot be tolerated at today's required rate of production.

Ineffective cleaning may hold up production merely because it is too slow in action, or requires too much manual labor. Often cleaning itself may be quite satisfactory, but subsequent rinsing may be slow or difficult. Although cleaning costs themselves may be quite low, ineffective cleaning can run up excess costs in many ways that are hard to trace back to the cleaning operation. It is this factor that possibly accounts for the apparent lack of consideration given to cleaning procedures in many plants.

Metal cleaning is not a simple operation. Many factors involved are not ordinarily considered. Therefore it is believed well worth while to outline the common factors in metal cleaning usually overlooked when selecting materials and procedures.

First of all, what does a metal cleaner have to do? The "dirt" that has to be removed from metals prior to painting, enameling, plating, galvanizing, etc., is fairly easily classified as to abrasive, metallic or oxide particles. And they may either be embedded in the metal surface, or bonded in a matrix of oils and greases covering the metal.

Drawing and stamping, polishing and buffing, lubricating and cooling compounds often contain ingredients which improve their functioning but which materially complicate the cleaning operation because commonly used cleaners may not work well when they are present.

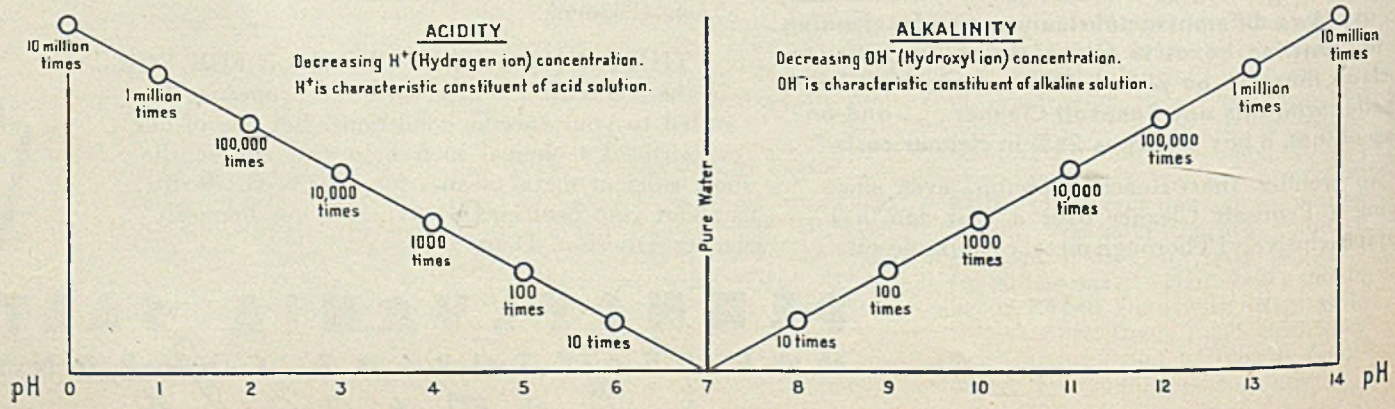
Thus while the job of the metal cleaner is the removal of solid par-

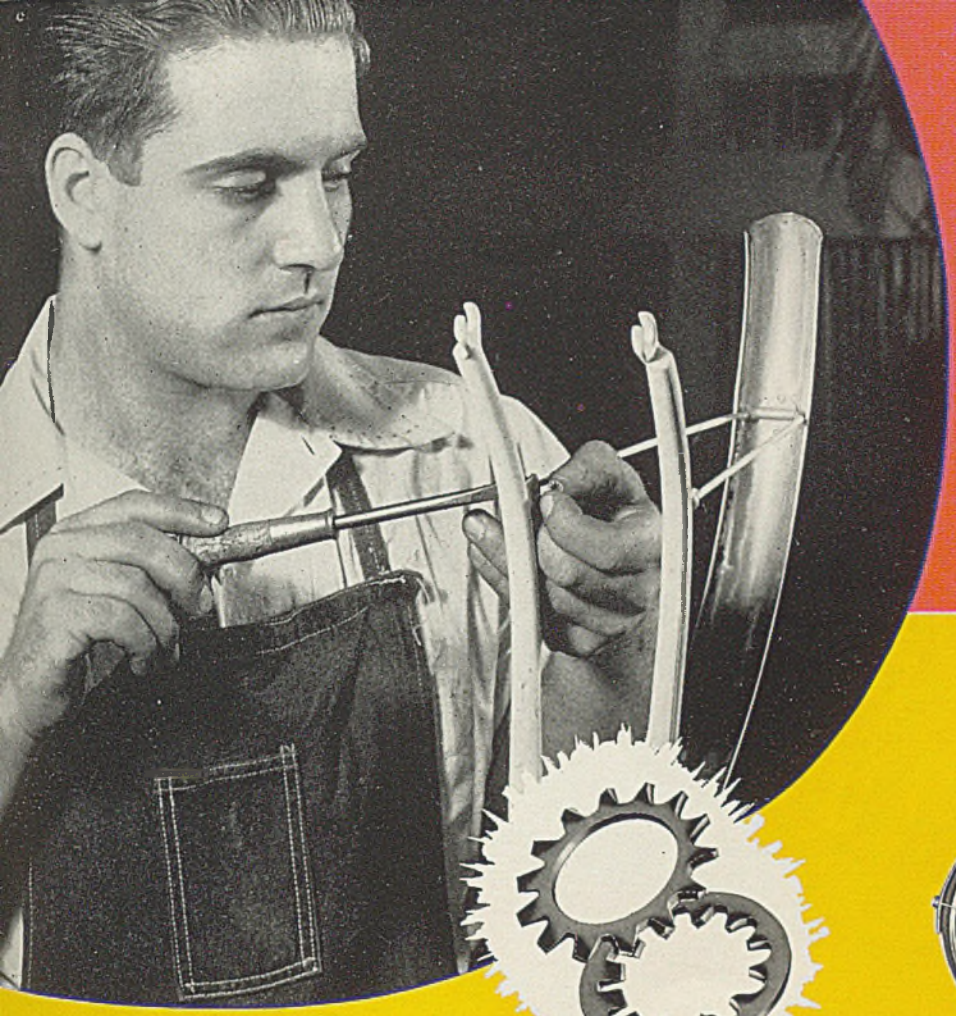
A solid dirt particle held on a metal surface by grease or oil.

Solid dirt particles bonded and held agether by grease or oil.

Fig. 1. (Left)—Preferential wetting by soap of both metal and dirt, where a solid dirt particle is held on a metal surface by grease or oil, quickly breaks the bond. Dirt particles bonded together as at right are broken up (deflocculated) by the soap into particles small enough to be dispersed and carried off by a rinse

Fig. 2. (Below)—Diagram showing variation of pH values from 0 to 14. Note pH 9 is 10 times as alkaline as pH 8; pH 13 is 100,000 times pH 8





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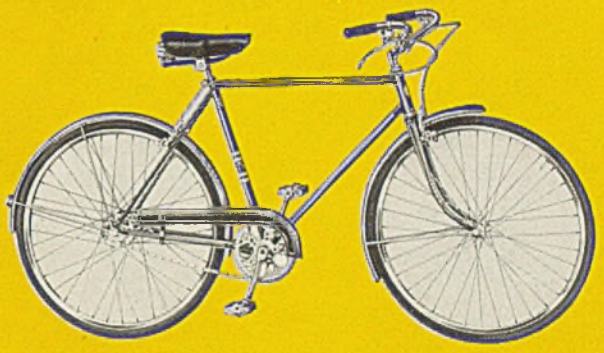
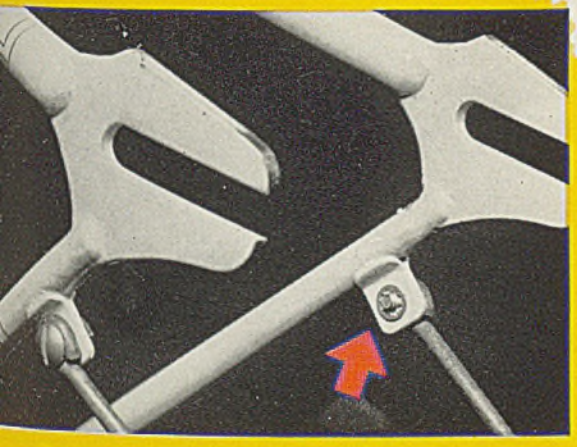
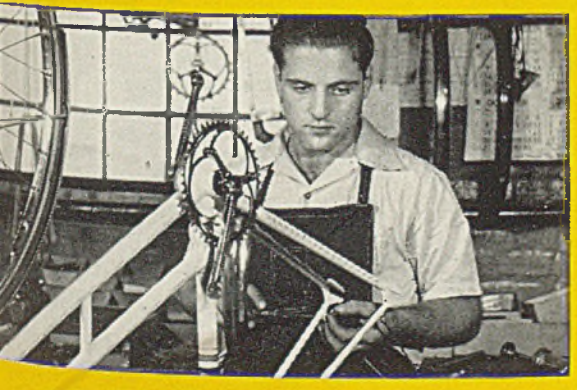


SCHWINN-BUILT BICYCLES are protected against vibration with SHAKEPROOF LOCK WASHERS



Showing Shakeproof Lock Washer (internal type) being used to lock connection of mudguard support to frame.



A Schwinn-Built Bicycle being carefully assembled to assure trouble-free performance.

The ability to take the "bumps" is a prime requirement for quality bicycles. All connections must stay tight regardless of the degree of vibration experienced. That is why Shakeproof Lock Washers are preferred for such applications by Arnold, Schwinn & Co., Chicago, makers of the famous Schwinn-Built Bicycles. The tapered-twisted teeth form a powerful, strut-action lock which actually locks tighter as vibration increases. Every metal product should have this extra protection which only Shakeproof Lock Washers can provide!

New SHAKEPROOF Catalog

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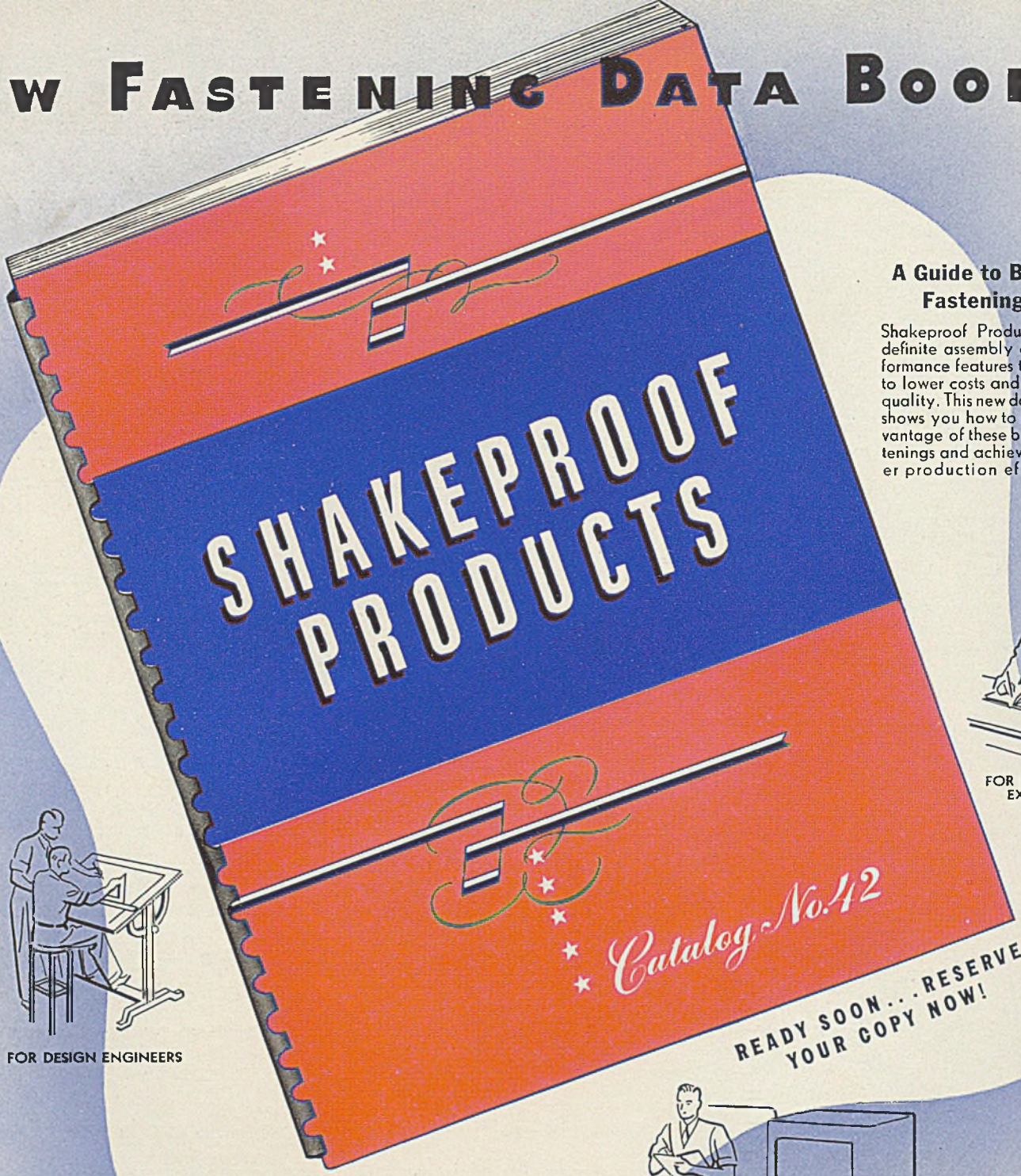

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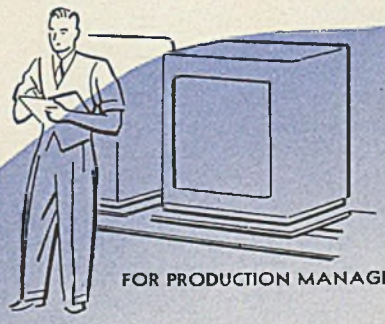

FOR PRODUCTION MANAGERS

THE new Shakeproof Catalog No. 42 provides a complete and detailed presentation of all Shakeproof Products. Its one hundred and forty pages are filled with information and illustrations of special interest for design engineers, production managers and purchasing executives. Each Shakeproof product is described in detail and full engineering data is given. In addition, application suggestions and other technical material helpful in securing greater fastening efficiency has been included. Reserve your copy of this outstanding fastening data book by mailing a request on your company's stationery—copies will be distributed as soon as available.

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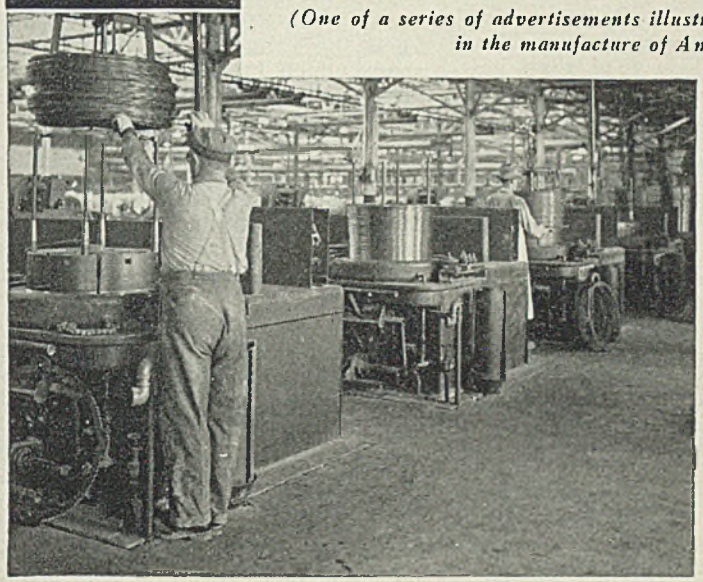
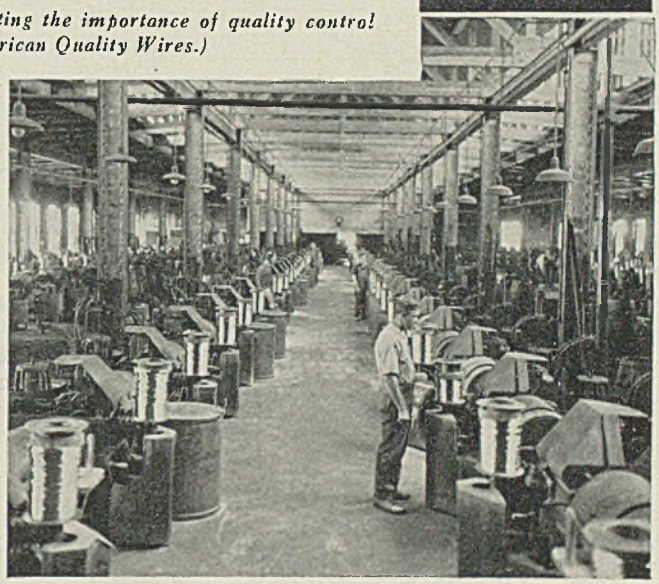
IT TAKES "*knowing how*" TO MAKE GOOD WIRE

(One of a series of advertisements illustrating the importance of quality control in the manufacture of American Quality Wires.)





1 **RUGGED MACHINES AND THE MEN** who run them have much to do with the quality of American Quality Wire. The smooth operation of our modern continuous wire drawing machines is the result of years of engineering skill and ingenuity. And the men who run them know their jobs well.

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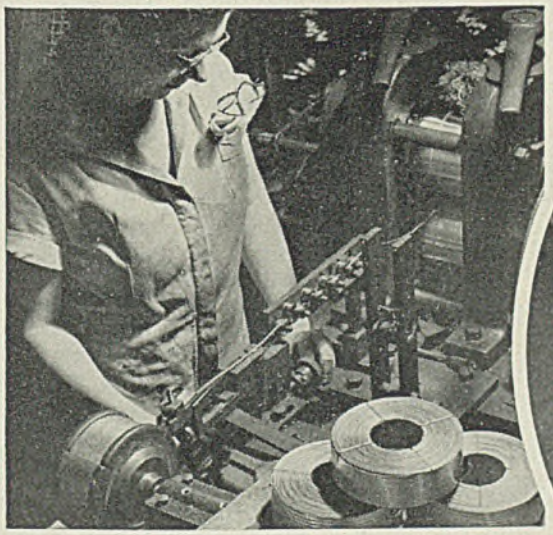

3 **NOT ALL WIRE IS CYLINDRICAL.** In fact, there is a wide variety of shapes and sizes to meet every manufacturing need. One of the most common types of non-cylindrical wire is flat stitching wire. High standards of quality and uniformity are maintained in this product, for when used in stitching machines, every inch of the wire is actually subjected to a severe test.

4 **EVERY STEP OF PRODUCTION IS CHECKED** to assure unvarying uniformity in American Quality Wires. By controlling all processes from the ore to the finished wire — by employing the most modern equipment and well-trained men — we know that every coil of wire leaving our mill will measure up to required high standards.

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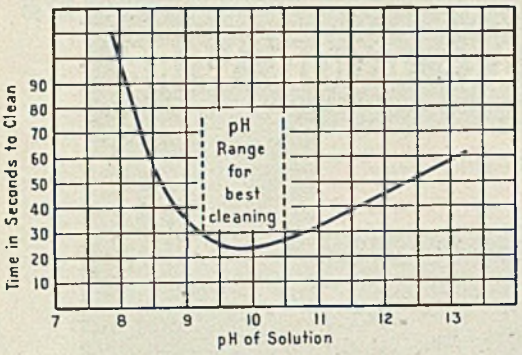

Fig. 3. (Top)—Typical cleaning curve showing best pH value for a particular job

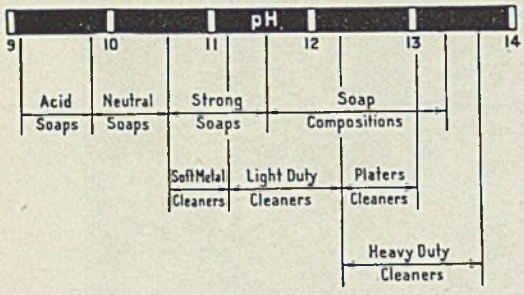

Fig. 4. (Center view)—The pH range of industrial cleaners

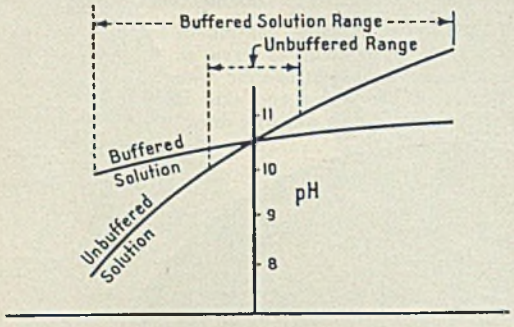

Fig. 5. (Bottom view)—Buffered solutions offer a much wider concentration range as shown here. For a pH between 10 and 11, note how much wide concentration is available

ticles together with grease, dirt and the ingredients of lubricating and cooling compounds left on the metal surface, it must be recognized from the start that not all cleaners can be counted on to be successful until the nature of the ingredients to be removed is known, or at least until various cleaners have been tried to determine which one or ones will do a job.

Wetting: Let's get a bit closer to the actual technique of these cleaning operations. If any cleaning solution is to work at all, it must first promptly wet the surface to be cleaned. To do this, the cleaning solution must act at and upon the boundary between the dirt and the solution. Until this boundary is broken down, cleaning cannot proceed. Where it is broken down slowly or incompletely, cleaning will be slow and ineffective. Hence, the need for wetting agents, ingredients which decrease surface tension in the cleaning solution to such an extent that it has the power to spread upon and wet other surfaces. Wetting agents thus help break down the boundary between the dirt and solution. The better the wetting agent, the faster the action.

Wetting action is important, not only for rapid cleaning but because the final rinsing operation also depends on it.

Penetration: But wetting is not enough. The cleaner must penetrate into oil or grease-bonded masses of solid dirt particles, must penetrate the capillary interstices of the mass; otherwise it would not be possible to reach the metal surfaces. Proper penetration quickly breaks up the bond of dirt to grease as well as the bond of dirt and grease to the metal surface.

But equally important is chemical attack, emulsification or dispersion to insure thorough cleaning action and pave the way for complete rinsing. Here the alkalinity of the solution enters the picture. Most soaps are good penetrants with good wetting powers and effectively emulsify many greases and oils. But where an alkaline action is added, the emulsifying, penetrating and loosening effect is greatly increased. Hence alkalinity is provided in most metal cleaners.

Alkalinity: A common fallacy is that the stronger the alkaline content, the better its cleaning action. This is not so. Excessively alkaline solutions cause more poor cleaning than any other factor. Stains and tarnish as well as slow, ineffective cleaning and poor rinsing may result.

There is a range of alkalinity best suited to every type of cleaning operation. Effective alkalinity in a cleaning solution is measured by the concentration of hydroxyl ions, just as acidity is measured by concentration of hydrogen ions. The "pH" value denotes acidity or alkalinity and how much. The pH scale runs from 0 to 14. Values from 0 to 7 indicate acid solutions, the strength of the acid decreasing from 0 to 7. At pH 7, the solution is neutral and from 7 to 14 it is alkaline, increasing in alkalinity from 7 to 14.

As shown in Fig. 2, this scale is logarithmic and not arithmetic. It proceeds by powers of 10. Thus the change in alkalinity from pH 8 to pH 9 is ten times as great as from pH 7 to pH 8. The change from pH 10 to pH 11 is one thousand times as great as the change from pH 7 to pH 8 and one hundred times as great as from pH 8 to pH 9.

Generally you can use the pH value as a rough measure of the suitability of the solution to do a cleaning job.

For example, pH 10.5 is in the range of neutral soaps, capable of little cleaning action beyond that of pure soap and without much alkaline effect. From pH 10.5 to about 11 is the range of strong or built soaps which have material alkaline action. Such solutions are suitable for light-duty cleaning and particularly for cleaning soft metals where greater alkaline action would lead to attack on the metal. The emulsifying value (ability to hold dirt in suspension) of such solutions is much more limited than those of a bit higher alkalinity in spite of their soap content.

From pH 11 to about 13 are the compositions of relatively high alkalinity, usually made up of soaps and chemicals which provide the added alkaline effect. At the lower range of this bracket are solutions adapted to lighter types of cleaning. The desirability of greater alkalinity increases with the need for the more effective emulsification and detergent (cleansing) action which a combination of soap and alkaline effect gives.

At the upper end of this bracket are found platers, cleaners and heavy-duty cleaners, where the cleaning job, as regards penetration, emulsification and detergent action is heavier. Above 13 are the extremely strong and highly alkaline cleaners. These must be used with care, not only from the viewpoint of the metals to be cleaned, but from that of safety to personnel.

Chemicals used to provide alkalinity beyond that available by hydrolysis of the soap content of the solution include trisodium phosphate, sodium carbonate, sodium metasilicate, sodium orthosilicate and caustic soda or potash. Each has an entirely different effect on the degree of alkalinity produced. Moreover, some chemicals produce strongly alkaline solutions which lose strength rather quickly. Others give solutions less active from the alkaline standpoint but capable of maintaining their strength by progressive freeing of alkaline effect by hydrolysis as the solution is used.

This ability to maintain alkalinity throughout prolonged usage is known as buffer action. By proper combination of soaps and alkalinity-producing chemicals which yield reserve alkalinity as required, it is possible to obtain a compound which will give any desired pH in solution and maintain this desired pH closely under working conditions for a long time. Hence it is well to look for this buffer action in any cleaning material you buy.

A properly buffered cleaner will not only produce solutions which hold closely the pH best suited to

(*Please turn to Page* 117)

GOOD NEWS ★ ★ ★ ★ ★ ★ ★

Fortunately we did not wait until present peak demands forced us to increase production. In '39 we completed a four-year plan of improvement, expansion and modernization. Since then these new facilities have been still further expanded to give you the best source for Cap Screws, Set Screws, and special upset parts.

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Address the Factory or our Nearest Warehouse: Chicago, 726 W. Washington Blvd. • Philadelphia, 12th & Olive Streets
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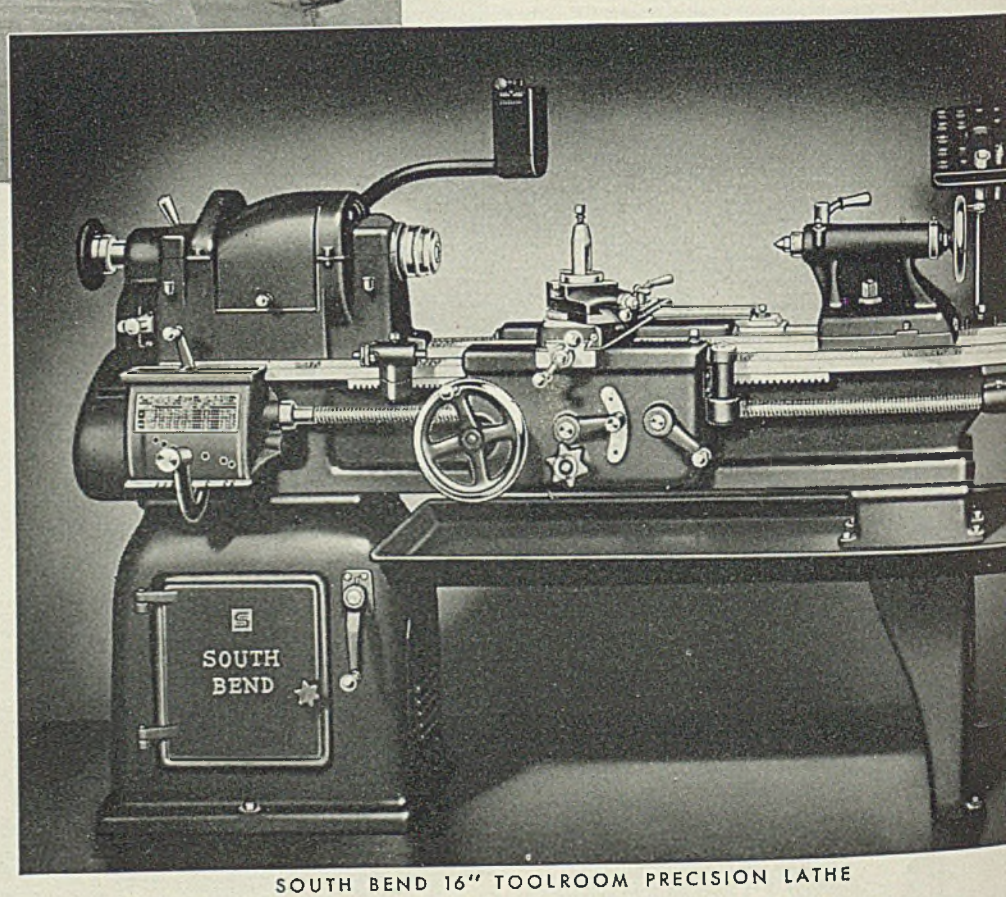
They Work Together *for* YOU

Yes, these two men are working together for you, a prospective user of South Bend Lathes. Together a shop foreman and a designer are finding the answer to one of the problems that must be solved to maintain South Bend standards of quality. Their friendly cooperation is typical of the shoulder to shoulder teamwork of our employees. This coordination of effort contributes much to the service and satisfaction you will receive from a South Bend Lathe.

All of us, here at South Bend, are working together for you—and for National Defense. Production schedules have been doubled and redoubled. But no sacrifice in quality has been made—nor will there be any lowering of our standards.

South Bend Lathes are made in five sizes: 9″, 10″, 13″, 14½″ and 16″ swing, Toolroom and Manufacturing types. Each size is available in several bed lengths. Complete line of practical attachments, chucks and tools.



SOUTH BEND 16″ TOOLROOM PRECISION LATHE

SOUTH BEND LATHE DEALERS

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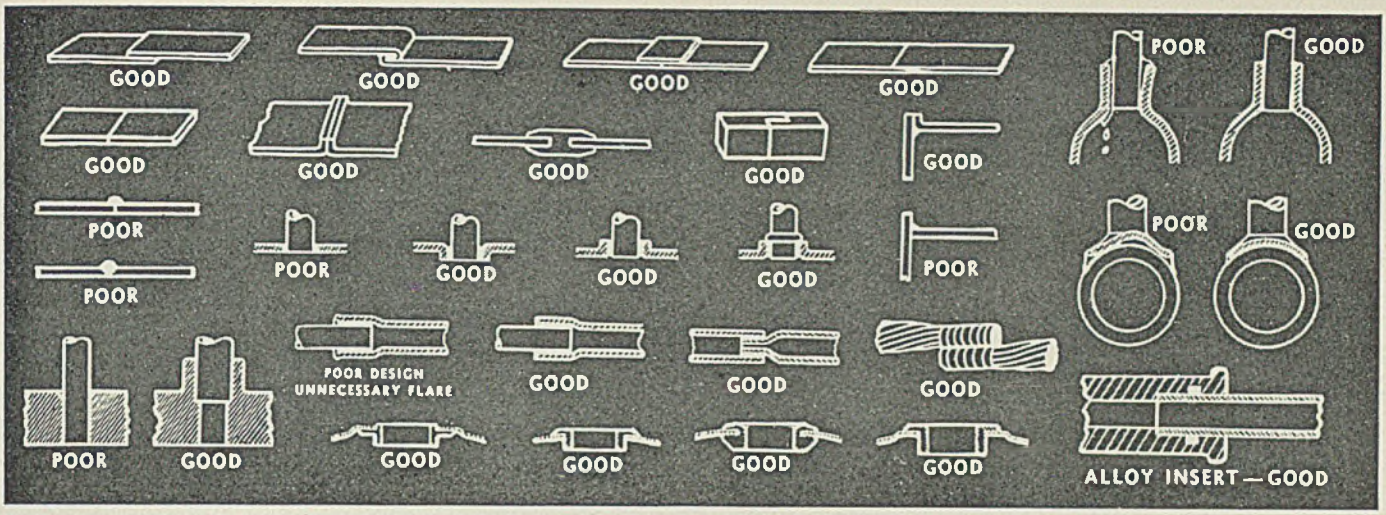


Fig. 1—These are typical examples of good and bad joint designs. The reasons why will be found in the accompanying text

BEST JOINT DESIGNS

For Silver-Alloy Brazing

By F. T. VAN SYCKEL
Handy & Harman
82 Fulton Street
New York

■ LOW TEMPERATURE brazing has expanded tremendously as an effective means of joining ferrous, nonferrous and dissimilar metals because it fills three primary manufacturing needs: The joints produced are strong and reliable. Fast brazing action speeds production. Cost is surprisingly low.

The subject of joint design is of increasing importance because upon it depends largely whether or not the full benefits of the process will be obtained. Brazing alloys—such as Sil-Fos which joins nonferrous metals only at 1300 degrees Fahr. and Easy-Flo which flows at 1175 degrees Fahr. and joins nonferrous, ferrous or dissimilar metals equally well—are extremely liquid and penetrate quickly into narrow openings. Thus if the metal surfaces are clean and are properly protected by flux from oxidizing during preheating, capillary action spreads the alloy throughout the entire joint rapidly and completely.

To get the full benefits from silver alloy brazing, the amount of clearance in the joint is of utmost importance. A drive fit will stop brazing action and leave room for but little more than a small fillet to give strength. On the other hand, fits that have excessive clearance result in joints with strength below the maximum. Best results are obtained when clearances between surfaces to be joined are held around 0.001 to 0.003-inch. Fig. 2 showing the relation of joint thickness to tensile strength in butt joints practically demonstrates the effect of clearance upon joint strength. It also shows that silver alloys, which have tensile strengths from 40,000 to 60,000 pounds per square inch in cast form have the unique ability to make joints of still higher strength when proper clearances

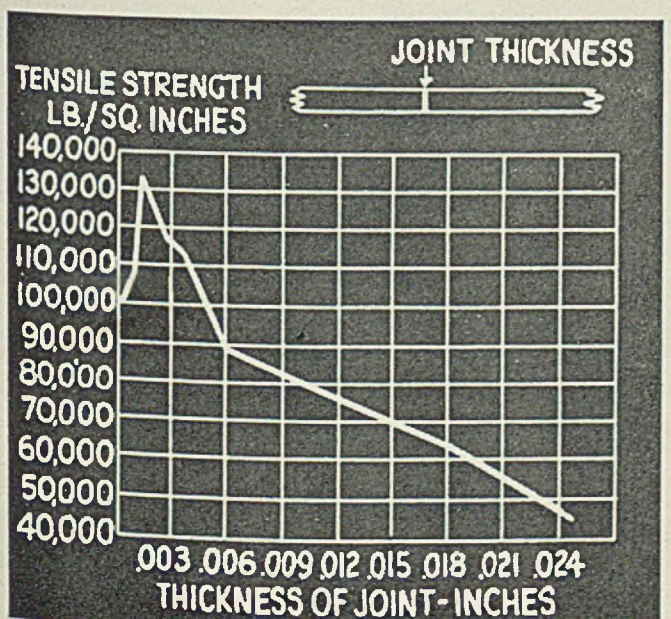


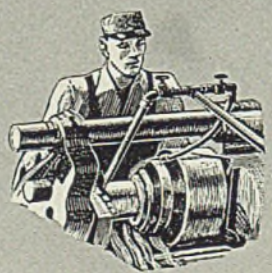
Fig. 2. (Left)—The relation of joint thickness to tensile strength, based upon butt joints of stainless steel to stainless steel—silver alloy used to braze these joints has a tensile strength of only 40,000 to 60,000 pounds per square inch in cast form

Fig. 3. (Right)—Many brass valve seat housings have been brazed to steel bottom plates to form high side floats used in refrigeration, on the setup shown at right here. After fluxing parts with Handy flux, they are assembled, placed on jigs on the revolving table, heated by the oxyacetylene torch. One operator loads, unloads; a second heating and applying the brazing alloy. Fast output is obtained

parts used to tarnish

FASTER CUTTING

The better cooling and lubricating job performed by Tycol Transparent Sulphurized Cutting Oil is effecting material savings in time and enables greater output even on the toughest of steels.



LONGER TOOL LIFE

Tools that work under Tycol Cutting Oil have a long useful life. Regrindings are cut materially and the problem of chips welding to the tool is minimized.

like a CARNIVAL WATCH

...until they discovered TYCOL CUTTING OIL

Disappointment mounted in the plating and machining departments of one of the world's largest manufacturers of precision instruments like that in the carnival watch winner whose prize quickly tarnished. Little wonder, for after machining, bronze and copper parts tarnished—became discolored.

Then the change to Tide Water Transparent Sulphurized Cutting Oil—and what a change. Gone are the headaches, for operations now go smoothly. Steel, copper, bronze—all are machined without discoloration. No longer must the oil be changed for each different material, yet results are uniformly good throughout. Add to this the fact that since going on the job Tide Water Cutting Oil has promoted greater tool life and more pieces per grind.

Possibly you are dissatisfied with some phase of your plant lubrication. If so call in a Tide Water engineer to survey your operations. He will recommend from Tide Water's complete line of industrial lubricants the one designed to do your job best. For full details write to the Tide Water Associated Oil Company, 17 Battery Place, New York, N.Y.

Regional Offices: Boston, Philadelphia, Pittsburgh, Charlotte, N. C.

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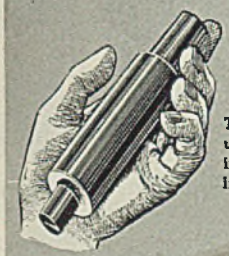

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TIDE WATER
TRANSPARENT SULPHURIZED
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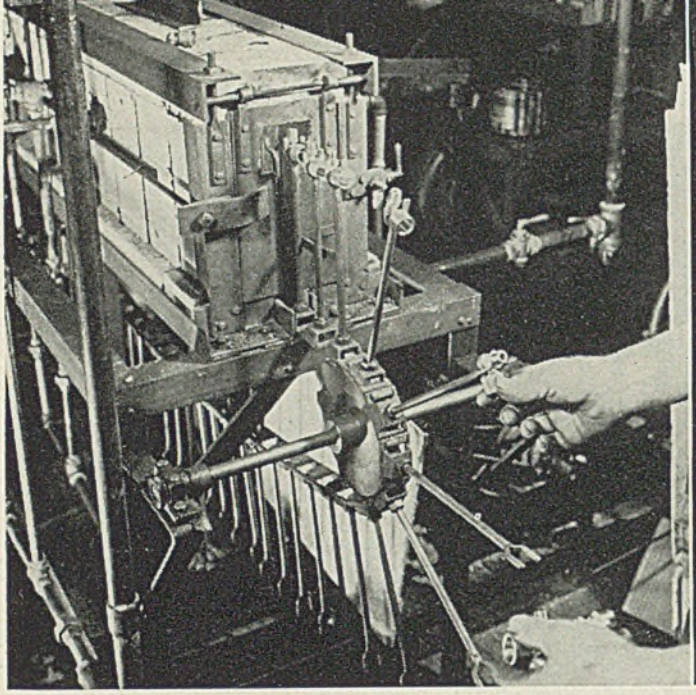


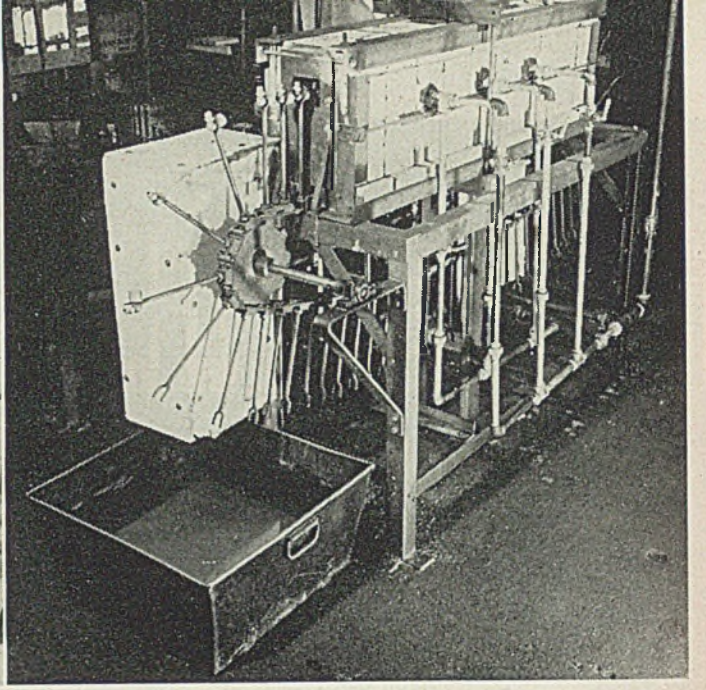


Fig. 4. (Left)—Front view of special furnace setup designed for high production brazing of a threaded fitting to the body or cup of a brass priming cup used on tractor engines. After fluxing and preplacing a ring of Easy-Flo brazing alloy between the parts, the assembly is mounted at the end of rods joined to a moving chain or belt that runs continuously to carry them through the furnace, whose temperature is 1400 degrees Fahr. Output is 800 joints per hour. When done by hand, production was only 60 per hour. Furnace is fired by four gas torches

Fig. 5. (Right)—Rear view of the same brazing setup shown in Fig. 4: Here can be seen the priming cups as they pass from the heating zone. Work cools gradually as it passes from furnace to point where pieces drop off into pan of water where the sudden cooling and washing removes excess flux. Of course the brazing alloy solidifies before the work drops off the conveyor rods. Note simple construction of furnace

are maintained. Note the maximum tensile strength of 134,000 pounds per square inch exhibited in Fig. 2. The clearances mentioned can be maintained readily and inexpensively in manufacture.

While the butt, scarf and lap or shear joints are the three types generally employed, the lap or shear joint is most commonly used and is recommended.

Butt Joints: There are applications where the double thickness of a lap or shear type joint is undesirable and well made butt joints can be used with good results if a few precautions are watched closely. The surfaces to be joined should be cut or machined square and even so that when pressed together they will provide the close clearances required for high strength. Made under proper production conditions, joints of this kind are strong and reliable.

Scarf Joints: This is another form of butt joint which may be used. The joint surfaces are beveled to an angle of less than 90 degrees. This design provides larger joining surfaces than butt construction and gives higher strength without making joint thickness greater than that of the metals joined. Parts can readily be held in place with clamps while brazing. Joints of this type are used on such work as the joining of band saws, pipe fabrication, tank construction and the like.

Shear Type Joints: These are the most satisfactory because they permit incorporating any desired factor of safety by varying the amount of lap. Due to the small area of alloy exposed, lap joints also offer better resistance to corrosion. Joints are easily held in place for brazing and tolerances are readily controlled.

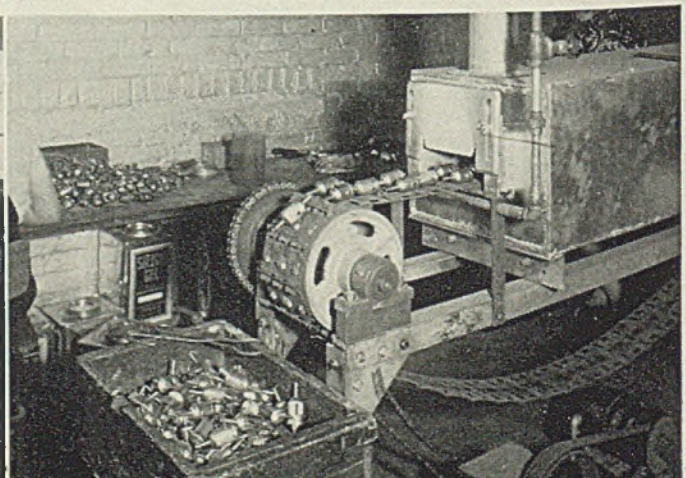
In joining flat parts, a little pressure assures complete bonding. Where tubular members are to be joined, pressure cannot be exerted and clearances and capillary action become the controlling factors.

Shear Depths: The depth of shear required will vary according to the strength of the metals to be joined and the factor of safety desired. The formula commonly used in figuring shear depth is: Depth of shear

(*Please turn to Page* 117)

Fig. 6. (Left)—In making dehydrators of monel metal at Industrial Wire Cloth Products Corp., Wayne, Mich., a top head and a bracket are brazed to the body. A ring of Easy-Flo 1/16-inch wire, 1/8-inch in diameter slides upon the body and rests next to the head. A straight piece of the same alloy wire, 1 1/4-inch long is laid between the body and bracket. Parts go through electrically heated furnace (at 1400 degrees Fahr.) at rate of 400 per hour

Fig. 7. (Right)—Operator is shown loading parts upon link conveyor in Fig. 6. As conveyor carries brazed parts from furnace, they cool in air and alloy sets before parts fall off conveyor into box shown in this view of the discharge end of furnace at the Wayne plant



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Sales Offices in All Principal Cities

MOLTRUP
COLD DRAWN STEELS

This, or Silence

★ ★ *A suggested method of speeding up the processes of Business and Government through the intelligent use of a basic tool of Management*

NOBODY knows what is going to happen, but all of us are beginning to realize that we are in for a rather grim and difficult time. Just how grim and how difficult, remains to be seen. Some people think that our resources . . . as individuals and as a nation . . . will be taxed to the utmost.

We are a Democracy and Democracies are traditionally slow to act. A great many opinions must be aired and a great many arguments expounded, pro and con, before we can arrive at a decision to do anything. That is the price of liberty.

Meanwhile, we are confronted with many serious and urgent problems. We are not getting ahead with them as fast as we should. The question is: What can we do to speed things up?

The answer herewith suggested is this: *By an intelligent use of one of the most potent and misunderstood tools of Management the joint objectives of Business and Government can be more swiftly and effectively achieved.*

That tool is advertising . . . but not advertising as it is too often defined by its critics (and many of its defenders). It is advertising operating under *an entirely different conception as to its basic nature and function.*

Ask a hundred men for a definition of advertising, and you will get a hundred different replies. Nearly all of them, however, will contain the word "sales" or the word "selling."

Everybody thinks of advertising in terms of selling. That is unfortunate. Because advertising is not selling. *It is something far bigger and more comprehensive.*

Let's stop a minute and see why.

At the present time, most advertising has to do with Business. When advertising is used by Business it becomes a function of Business, like accounting or manufacturing, or maintenance, or the laboratory.

Each of these functions has a specific purpose. Take accounting, for example. The accounting department is there to tell Management how much merchandise has been made and sold, to whom, how much it cost to make it, to sell it, and a host of other questions.

Management has to know these things in order to be able to offer useful merchandise in the market-place at prices acceptable to the consumer. In other words, in order eventually to produce salable goods.

Thus in a business the specific purpose of accounting is to provide information for Management . . . but its ultimate purpose has to do with sales.

Or take the laboratory. Why is the laboratory needed? The laboratory is there to check the quality of raw materials, to exert some control over the quality of the finished product, to find ways of making products of equal quality at less cost, to find ways of making new and better products.

The Old Definition Won't Work

Why is it desirable to do all this? In order to provide product information for Management. That is its specific purpose. But its ultimate purpose is the same as the ultimate purpose of the accounting department—*i. e.*, sales.

And so it goes, all down the line, until we come to advertising. Advertising also is a function of Business, but when we ask "What is the purpose of advertising?" we find that its specific purpose is completely skipped over, and the definition of advertising is given at once in terms of its ultimate purpose—sales.

This is like saying that the purpose of the accounting department is sales, or that the purpose of the manufacturing department is sales, or that the purpose of the laboratory is sales.

Advertising should receive neither blame nor credit for sales. As a matter of fact, total sales volume is influenced at all times by the manufacturing department, the accounting department, the sales department, the laboratory, and all the other departments of a business. It is no less influenced by the quality of the product, the price of the product, the intensity and effectiveness of the competition, the attitude of the trade, the economic condition of the country, and other factors too numerous to mention.

How, then, can we accept a definition of advertising which identifies advertising solely with sales, when it is obvious that the net sales result is the sum total of many forces and factors so inextricably tangled that nobody yet has succeeded in devising a method for separating and measuring their relative influence?

Let us try now to define advertising in terms of its *specific purpose* . . . its immediate rather than its ultimate objective . . . as all other functions of a business are defined and judged.

Specifically, what do we expect our advertising to do?

Advertising has one specific thing to do; and that is to inform, and often . . . although not necessarily always . . . to persuade.

If some one still insists that when you say "sell" you are saying the same thing as "inform and persuade," let us take a look at some recent advertising in the oil industry, where considerable space and time were used in an effort to induce people to use *less* gasoline. If that is "selling," it will be very difficult to measure the results in the sales figures at the end of the year.

The truth is, the term "selling" has come to be used very loosely . . . especially with reference to advertising. Advertising cannot make change, wrap up packages, or perform any of the many services or functions of the retailer. Most of the time, it does not even operate in the presence of an opportunity to buy.

What advertising actually does is to convey a message . . . *to say something which Management wants to say to a large number of people.*

Which leads us immediately to a definition and concept of advertising which has far-reaching implications:

Advertising is a specialized technique for mass com-

munication. It exists for two reasons . . . because it is fast, and because it costs less than any other method.

These are not the only characteristics of advertising, but they are the most essential ones. Without them there would be no advertising at all. These two characteristics explain why Management uses advertising. It uses it for exactly the same reason that it uses accounting—because it is the most efficient way to accomplish a desired end.

The Responsibility of Management

In the light of this definition it becomes apparent that *advertising is nothing in the world but a tool of Management.*

This is an exceedingly sharp and powerful tool; and it can be misused, just as accounting can be misused, or the franking privilege. But it cannot be dispensed with. And it cannot be dispensed with because there is no substitute.

Because it has occasionally been misused, the tool of advertising has been attacked, But this is manifestly absurd. It would be just as sensible to critcize a hammer because somebody had used it to commit a murder.

Because advertising is a difficult tool to handle, Management usually prefers to enlist the aid of organizations . . . advertising agencies . . . which are specially trained and skilful in its use. *But the tool does not belong to the agency; it belongs to the advertiser who pays for it.*

The final responsibility for advertising rests with the advertiser. As a basic technique, it is as much a part of his operating equipment as manufacturing or accounting. Yet it is a curious fact that many business men of the highest type, who would not think of turning out a shoddy product or falsifying their books or retaining a shyster lawyer or going to a quack physician, will nevertheless use advertising methods which are both irresponsible and ridiculous.

The whole standing and reputation of a company may be fundamentally affected by the advertising through which the company tells its story to the public. It is as important to safeguard the integrity of that advertising as it is to be represented in court by reputable counsel, or to keep the funds of the company in a sound bank.

Nor can the importance of telling the story be too strongly emphasized. Any business Management which has nothing to say to the public at a time like this is either blind or inexcusably timid.

To tell its story consistently and well, to keep itself always in the forefront of public knowledge and confidence . . . that is one of the first duties of Management. No company can afford the luxury of silence. And it is not only a duty, but a right. Under our law and theory of government, the right of every citizen to free speech, to say his say, to have his day in court, is basic and inalienable. It is one of the four freedoms cited recently by the President of the United States. And like all freedoms, if it is not to be lost, it must be valued and fully exercised and defended.

Thus it becomes clear that advertising is not a magic sales lamp, nor a species of sorcery, nor (as some of its critics would have us believe) a sinister device for the enrichment of entrenched privilege. It is simply a tool . . . a technique for mass communication . . . and one which is among the most useful and important of all the tools which Management has at its disposal.

Now, the usefulness of this tool of Management is not fully appreciated until it is remembered that *Management is not confined to Business.*

Management means any responsible group or individual vested with authority to direct an operation or enterprise of any sort.

New Horizons and Opportunities

Government is Management. Organized Charity is Management. Education is Management. Public Health is Management. The Nutrition Movement is Management. Every league, grange, society, federation or association in the land is Management. And most of them have something which they believe in and very much want to say.

Some of these other forms of Management already are using advertising in an experimental but successful way. The U. S. Government, for example, is using advertising to recruit likely young men for our armed services, and to obtain technicians of various kinds. In Philadelphia the federated charities went to the public last year with a carefully planned program of advertising to tell their story of human suffering and service. Many other instances could be cited.

But this is only a beginning. Advertising can be used in many ways yet untried and undreamed of . . . to stabilize markets . . . to control inflation . . . to promote healthy competition . . . to thrash out controversies . . . to crystallize public sentiment in matters of public policy . . . to strengthen our minds and hearts as one people working toward a common goal.

Here in America our whole existence is built around the Democratic process. That is what we will be fighting for, if we are going to fight. We feel, and will always feel, that Freedom is the greatest thing in life. And of all freedoms, freedom of speech is the most precious. If we doubt it, we need only look about us in the world. It is a significant fact that wherever the darkness of despotism lies over the earth, there is no voice but the voice of the dictator.

In a Democracy, the supreme tragedy is silence.

Yet the voice of Democracy is not always a clear voice. Often it falters, stutters, digresses. Sometimes it even forgets what it is talking about, there is so much to say. And particularly in an emergency, this can be dangerous.

Here, especially, advertising can serve. As a technique of mass communication, advertising can sharpen and shape ideas, present them clearly and fairly in the public forum, bring them infinitely more swiftly to the point of action.

Advertising, more than any other tool, can be used to speed up and make more effective the Democratic process.

Advertising, if properly defined and understood, has before it a magnificent opportunity. By those whose task it is to build a better world, it will be used in constantly increasing measure. Advertising can be used to help in making our nation secure in time of war. It will be of even greater use in cultivating and making available to every one the fruits of peace. And it may be that some day our country may call upon it to carry to other, less-favored nations our vision of universal brotherhood and abundance, of human freedom and cooperation and good-will.

[A digest of an article by H. A. Batten, President of N. W. Ayer & Son, Inc., in the November 14 issue of *Printers' Ink*]

STEEL CASTINGS

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ in defense

By C. L. HARREL
Vice President
Sterling Steel Casting Co.
East St. Louis, Ill.

■ UPWARD of 75 per cent of the present output of the steel casting industry is going directly or indirectly into the defense program. Steel castings are being ordered in ever increasing quantities by the army, the navy, the Maritime Commission and other branches of the federal government.

In the case of tanks, there has been a steady evolution toward integral construction of the hulls or bodies of the tanks. Such units are now being produced in quantity for the Canadian government. These one-piece hulls are for the medium-sized tanks used by the British. Integral construction is also being employed in the heavy tanks for our government. This latter construction is just now emerging from the experimental stage.

Because the casting process lends itself to mass production and relatively short-term deliveries, the government has turned more and more to the products of this industry in connection with its defense requirements. I am told that a growing number of ship parts of all sorts is being produced as steel castings. These parts now include practically all of the deck fittings, a large percentage of the propulsion equipment, auxiliary machinery and other applications where the strength and rigidity of cast steel are valuable.

Even in the production of aircraft, we find a large variety of steel castings being utilized, principally in the landing gear mechanisms of the heavy bombers. Dozens of small cast steel parts for airplanes are being produced, principally by the foundries located along the west coast.

Large tonnages of steel castings are being used in the production of gun mounts for anti-aircraft and machine guns. Techniques also have been developed for the casting of bomb bodies. In addition, there are many other applications where steel castings are employed as parts of such defense items as tractors, motor trucks and other mechanized equipment.

The reason steel castings are so widely used in defense work is due to the fact that cast steel can be made with almost any desired set of mechanical properties. This wide range of properties is possible because a large variety of chemical analyses can be employed as well as a considerable number of different types of heat treatment.

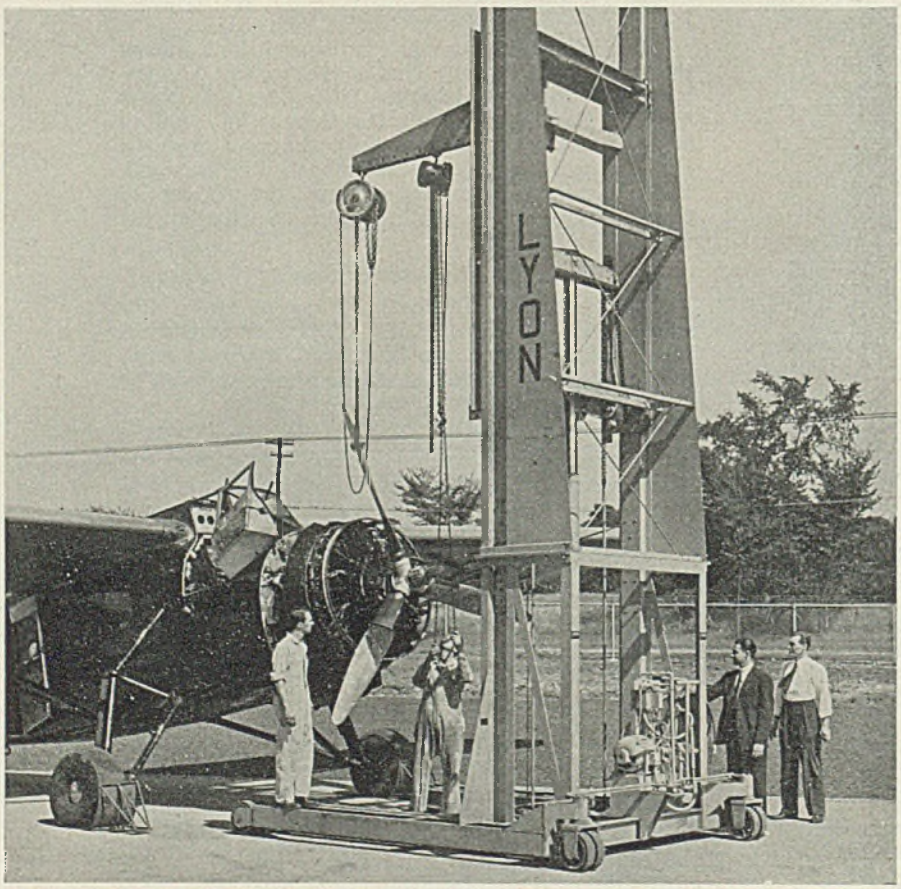
Alloy steels have become commonplace in the steel foundry. The addition of alloys in steel castings and their proper heat treatments used to obtain higher physical properties of strength, ductility, shock resistance and endurance values so aptly fulfill the requirements of the Ordnance Department in their designs from the small .50-caliber machine gun mountings to the heaviest of the fixed implacement gun carriages.

Due to the heavy demand for steel castings for defense purposes, the industry is not operating well above 100 per cent of its normal rated capacity. Forward bookings will require the full resources of the industry for many months ahead.

The new casting techniques now being developed will have peacetime application and should open up new and important fields.

From a paper presented at the American Society of Mechanical Engineers' national defense meeting, St. Louis, Sept. 10, 1941.

Portable Elevator for Aircraft



■ Engines may be removed or installed in large bomber planes quite easily by use of the illustrated hydraulic portable elevator developed by Lyon Raymond Corp., 875 Madison street, Greene, N. Y. It has a capacity of 5000 pounds and is equipped with both elevating platform and boom. Measuring 9 feet wide, 12 feet 6 inches long and 26 feet high, the elevator is moved on rubber tired wheels. Both platform and boom are elevated by hydraulic hoist and 3-horsepower motor-driven hydraulic pump. Unit's speed of elevation is approximately 12 feet per minute

Announces "Defense Line" of Paints

■ A line of five new paints—Valdura tank white, metal lead paint, two defense grays, enamelized yellow metal primer—for use in applications formerly requiring aluminum paints, is announced by American-Marietta Co., 43 East Ohio street, Chicago. Introduced as the company's "Defense Line", they may be applied on new construc-

tion, etc., by brushing or spraying.

The first paint, tank white, is for cutting evaporation losses and reducing inside temperatures. It is resistant to oil and water. The second provides a protective, lead-colored metal coating for all metal surfaces, including new or old galvanized metal. It is highly resistant to acids and alkalies, and to fumes, rust and moisture. It will set in 2 to 3 hours, dry in 10 hours, and resists temperatures up to 225 degrees Fahr.

The two defense grays, available in light and neutral shades, provide low-cost effective protection and long durability on exposed metal surfaces. Both colors have high gloss finishes and are highly resistant to rain, sun, grime, smoke and rust. Enamelized yellow metal primer is for all types of metal surfaces, particularly where metal is subjected to extremely damp, wet and foggy conditions. It may be used under water when covered with one or two coats of defense grays.

Announces New Series of Tools

■ A new standard series of Kennametal tools in large turning and facing styles for heavy machining is reported by McKenna Metals Co., 200 Lloyd avenue, Latrobe, Pa.

Position of the tip in the shank of each tool permits a greater thickness of steel under the cutting point of the tip. According to the company, it also permits the top surface or chip breaker to be ground without the necessity of grinding away steel, and during the life of the tool the height of the cutting point is retained rather than being lowered each time the tool is ground.

Metal Spinning Designs

■ *Metal Spinning Designs*, by Harold V. Johnson; cloth, 102 pages, 6 x 9 inches; published by Bruce Publishing Co., Milwaukee, for $2.

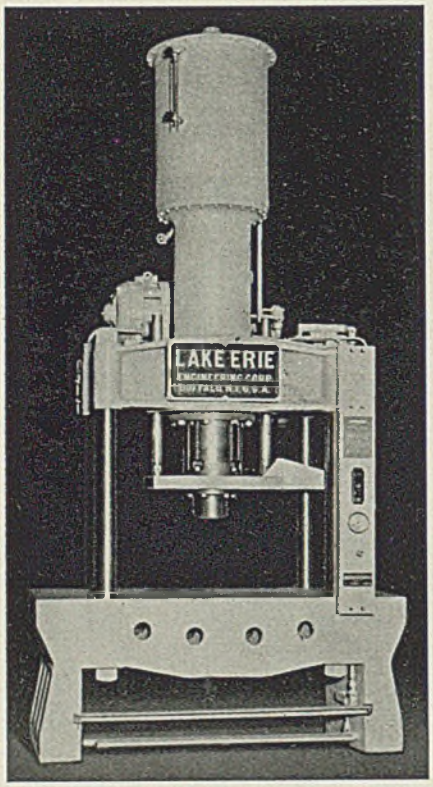
Purpose of this volume is to assist the teacher of industrial arts and the home craftsman in acquiring the art of spinning metal. Instructions are simple and anyone familiar with the use of woodworking tools can acquire this skill. Each of the 32 designs has a step-by-step description, enabling the student to produce them with little aid. A few projects are a combination of metal, plastics and wood, furnishing an opportunity to work in a variety of materials.

Zenith Radio Corp. has purchased for $97,500 a part of the old Grigsby-Grunow radio plant, Dickens and Menard avenues, Chicago, where it will manufacture radio instruments for the signal corps of the Army.

Industrial Equipment

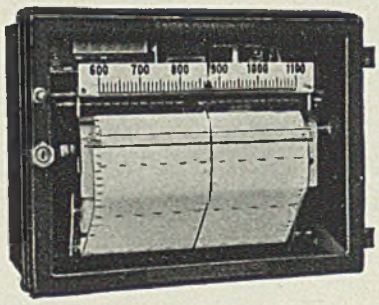
Hydraulic Press

■ Lake Erie Engineering Corp., Buffalo, has introduced a 100-ton hydraulic press for straightening light armor plate and bars which have become distorted or warped due to heat treatment. Self-contained with pumping unit mounted on top, its working space is accessible from all four sides for speed and convenience in handling material.



System for Sheet Tinning Pots

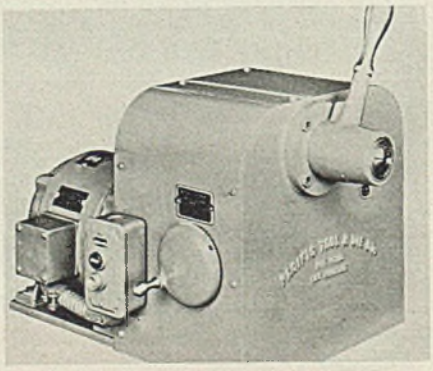
■ Brown Instrument Co., Wayne and Roberts avenues, Philadelphia, announces a system for sheet tinning pots. It is organized to provide close control and ease of operation, with both the tin bath and palm oil temperatures being closely controlled. The system consists of a thermocouple in a seamless steel protecting tube, immersed in the tin bath, a single record proportioning control potentiometer, a control relay and a motor and valve. The temperature of the tin bath is measured by the thermocouple and is recorded by the potentiometer. The



proportioning relay and motor serve to position the fuel valve under all conditions of load. The palm oil bath control system consists of a sensitive thermocouple in a stainless steel protecting tube, immersed in the palm oil, and a single-record control potentiometer. When the tin machine is equipped with a unit pump for delivery of palm oil, 2-position control is used.

Polishing Lathe

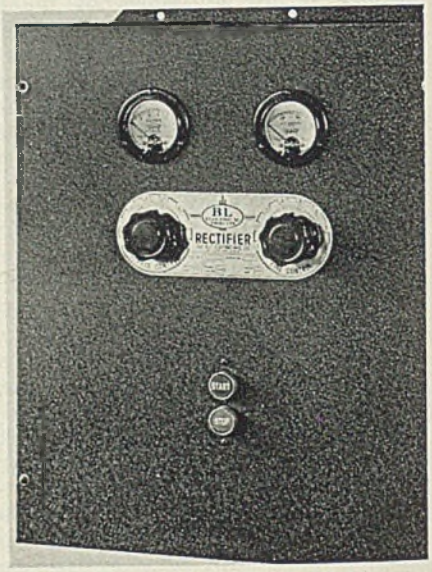
■ Pacific Tool & Die Co., 1225 East Sixty-third street, Los Angeles, has introduced a Pacific Vera-Lathe or second operation machine for polishing, buffing, burring, filing, sizing, finishing and lapping round parts. It provides an infinite number of variable spindle speeds from 5000 revolutions per minute down to 1250 revolutions per minute. One outstanding feature of the machine is the collet operating mechanism on the front end of the spindle, known as the Vera-Handi collet mechanism. It saves much time by permitting the spindle to rotate while work is inserted into the collet, and eliminates attendant wear and tear caused on machines that must be stopped to chuck the work. This collet also can be foot-operated if so desired. Interchangeable spindles can be furnished to accommodate a chuck. The machine's spindle is ball-bearing mounted, and has a hole through its entire length through which passes



a hollow draw tube with a 13/16-inch bore for holding the ¾-inch maximum capacity collet. Collet tension can be adjusted easily by a turn of a handwheel found on the back end of the spindle. A handwheel on the side of the lathe controls the various spindle speeds, a 3-horsepower motor providing the power for the unit.

Voltage Regulator

■ Benwood Linze Co., 1811 Locust street, St. Louis, has developed a voltage regulator for use in conjunction with metallic rectifier electroplating units. Manually operated, it provides a convenient means for adjusting voltage output of each individual or bank of rectifiers. It may be installed adjacent to the plating tank, in a wall mounting cabinet, within convenient reach. The regulator has 64 steps of adjustment, giving a voltage range from maximum

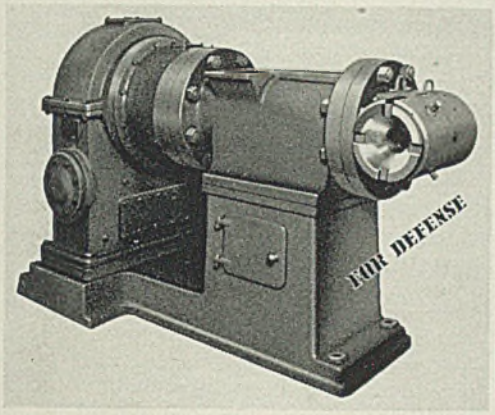


down to 1 volt. The coarse control covers the full range in eight steps while the fine control provides eight steps for each step of the coarse control. A start-stop station permits remote control for starting and stopping the rectifier. Two meters are incorporated in front of the unit. A voltmeter and an ammeter record current and voltage of each individual rectifier.

Extruding Machines

■ National Erie Corp., Erie, Pa., announces new large capacity continuous extruding machines for thermoplastic compounds. They are being offered with plasticizing cylinders 3½ to 12 inches in diameter and equipped with corrosion resisting linings. Cylinders are jacketed for high temperature operation, and are baffled to provde "progressive heating" of the material passing through the processing chamber. Periphery of stock screws, specially developed for plastics, are protected against wear by the application of a new hard surfacing alloy. Improved axial extruding heads suit-

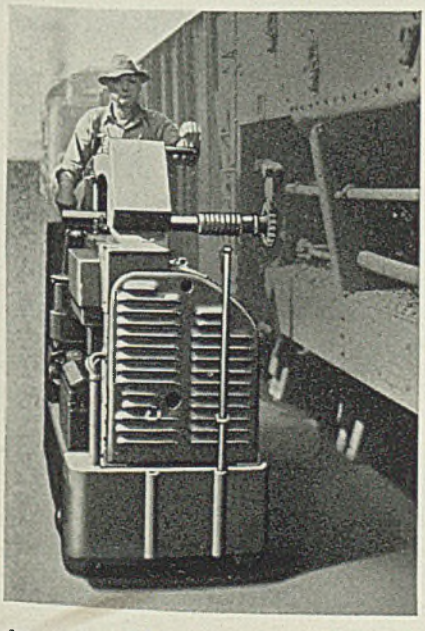
able for tubes or straight extruding of miscellaneous commercial shapes are standard equipment on all extruders. Machines are driven



through enclosed transmissions with all gearing straddle mounted between heavy duty roller bearings and lubricated automatically.

Wrench Truck

■ Elwell-Parker Electric Co., 4205 St. Clair avenue, Cleveland, has introduced a new type IE wrench truck for emptying loaded hopper cars. As illustrated, it is a gas-electric unit, but also can be furnished with battery power. It develops speeds up to 6 miles per hour. When emptying cars of loose materials, the operator lines up the truck with the squared shaft projecting from side of car; raises or lowers the wrench to correct height through a motor-operated mechanism. This shortens the process of opening the bottom gates and of winding them up again after the load has been

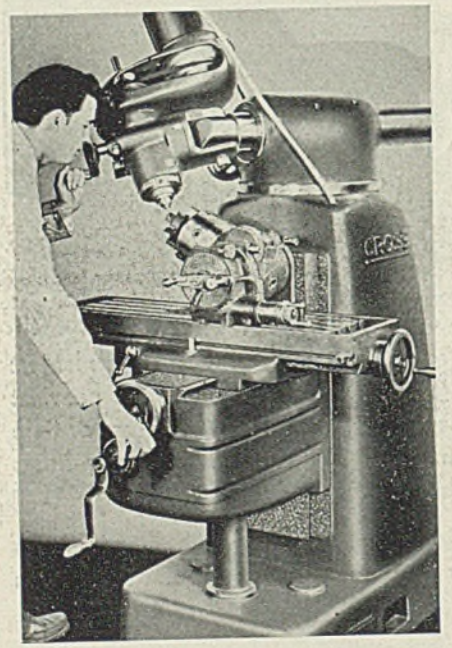


dumped. A single truck can open and close 515 cars in one day according to the company. It also insures safety by eliminating injuries to men who formerly did the same work by hand. The truck is

powerful enough to open the car-bottom gates even though the loose materials have become set or frozen.

Milling Machine

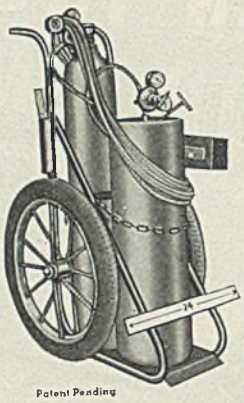
■ Cross Gear & Machine Co., 3250 Bellevue avenue, Detroit, has placed on the market a new No. 20 universal milling machine which features a cutter spindle that can be adjusted to any angle in any plane. Thus the spindle makes it practical to mill vertically, drill at an angle, jig bore at another compound angle, spot face a third angle and finally sink a horizontal keyway without moving or resetting the work. The unit incorporates a direct reading spindle dial and a 10½ x 36-inch table. Power feed for the table and back gear drive for the spindle increase the scope of the machine. Maximum throat depth of the machine is 19⅞ inches. Its spindle speeds with 1200 revolutions per



minute motor range from 350 to 3880 revolutions per minute and higher with an 1800 revolutions per minute motor.

Acetylene-Tank Cart

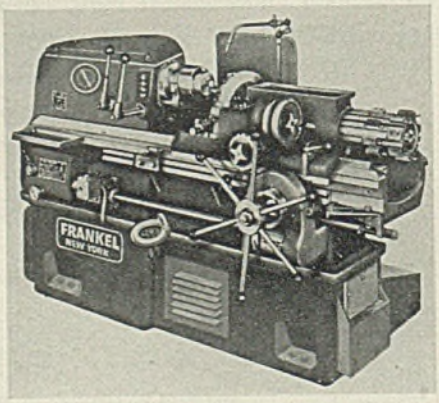
■ Garlinghouse Bros., 2416 East Sixteenth street, Los Angeles, have introduced a new narrow-width Gar-Bro acetylene cart which can be pushed through any door or passageway. Instead of carrying the two tanks side by side, this cart has one set behind the other, making possible the narrow 24-inch width ideal for shops or crowded aisles. The chassis of the cart is mounted on two large pneumatic-tired wheels with fully depressed hubs. Either tank may be removed independently of the other, as the acetylene cylinder is inserted at the front while the oxygen tank is placed in the rear of the cart. The cart frame is of all-welded steel tubing. A broad, heavy bottom plate



rests flush on the floor when the tank is standing, assuring steady support. In addition, a big steel tool box and two rod holders, for long and short rods, are attached to the cart.

Semiautomatic Machine

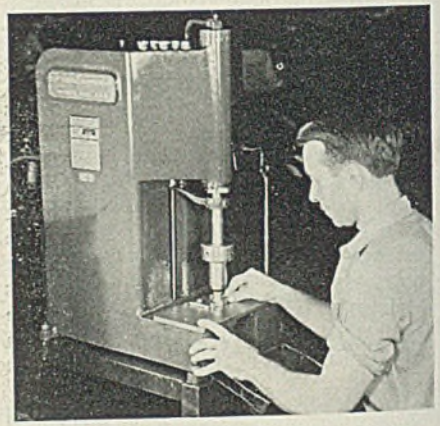
■ Frankel Machinery Corp., 118 East Twenty-eighth street, New York, announces a new single spindle semiautomatic machine designed to take all standard turret lathe tools. Its outstanding feature is its large face-plate like turret which revolves around a horizontal axis instead of the usual vertical mounting, eliminating the customary cross slide. An auxiliary cross slide, however, may be attached if necessary. The large 15-inch diameter turret provides for 16 tool positions near its circumference. Sixteen feeds are available on the machine without changing back gears. A spring-operated overload safety device prevents breakage. The feed shaft drives a falling worm through a pair of gears. The falling worm in turn drives a wormgear which through pinion and rack feeds the



tool-head unit longitudinally. The automatic feed is effected by auxiliary shafts and bevel gears to the geared face of the tool-head. It is engaged and disengaged by a bevel friction clutch. The hand feed is effected by a handwheel. Drive is provided by a vari-drive unit permitting an infinite number of speeds from 37 to 1270 revolutions per minute. The pulley in the spindle is mounted on separate roller bearings and is driven by a V-belt. Bed of the machine is mounted on a full length box-shaped base.

Revised Presses

■ Colonial Broach Co., 147 Jos. Campau, Detroit, reports a number of changes in the design of its Junior presses to increase work handling capacity and the condensation of the line to two models. Smoother and faster the line of Junior presses now includes hydraulically operated units rated at ½ and 1-ton capacities, both with 12-inch stroke and designated as models VJI-1000-12 and VJI-1-12 respectively. The two models are similar in design and construction with principal dimensions the same for both. Both are suitable for mounting in virtually any location. Revisions in previously specified dimensions of these "standardized" presses include an increase in platen



depth from 8 to 9½ inches, with increase of ½ to 5½ inches in the throat and an increase in the base dimension from 14 x 22 to 17 x 24½ inches. While designed primarily for work on small parts, the large amount of throat clearance permits operations on quite large and bulky parts. Platen width is 14 inches with a slot 2½ inches. Overall height also has been increased 2 inches to 37 inches for both sizes. Control of the ram stroke is through a 2-way valve, operated manually by a single-lever control. The hydraulic system includes an adjustable pressure relief valve so that the maximum ram pressure may be adjusted to any desired limit within the capacity of the machine. Provision is made for installation of a pressure gage on the column. The self-contained operating system in both models includes constant delivery pumps of 1000-pound capacity submerged in an oil reservoir. Pumps are direct-driven through flexible couplings from standard electric motors vertically

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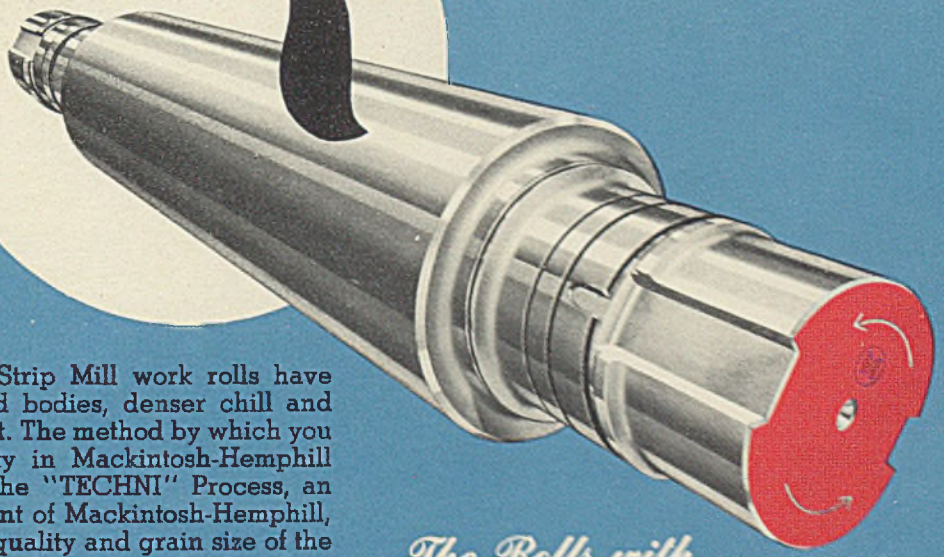

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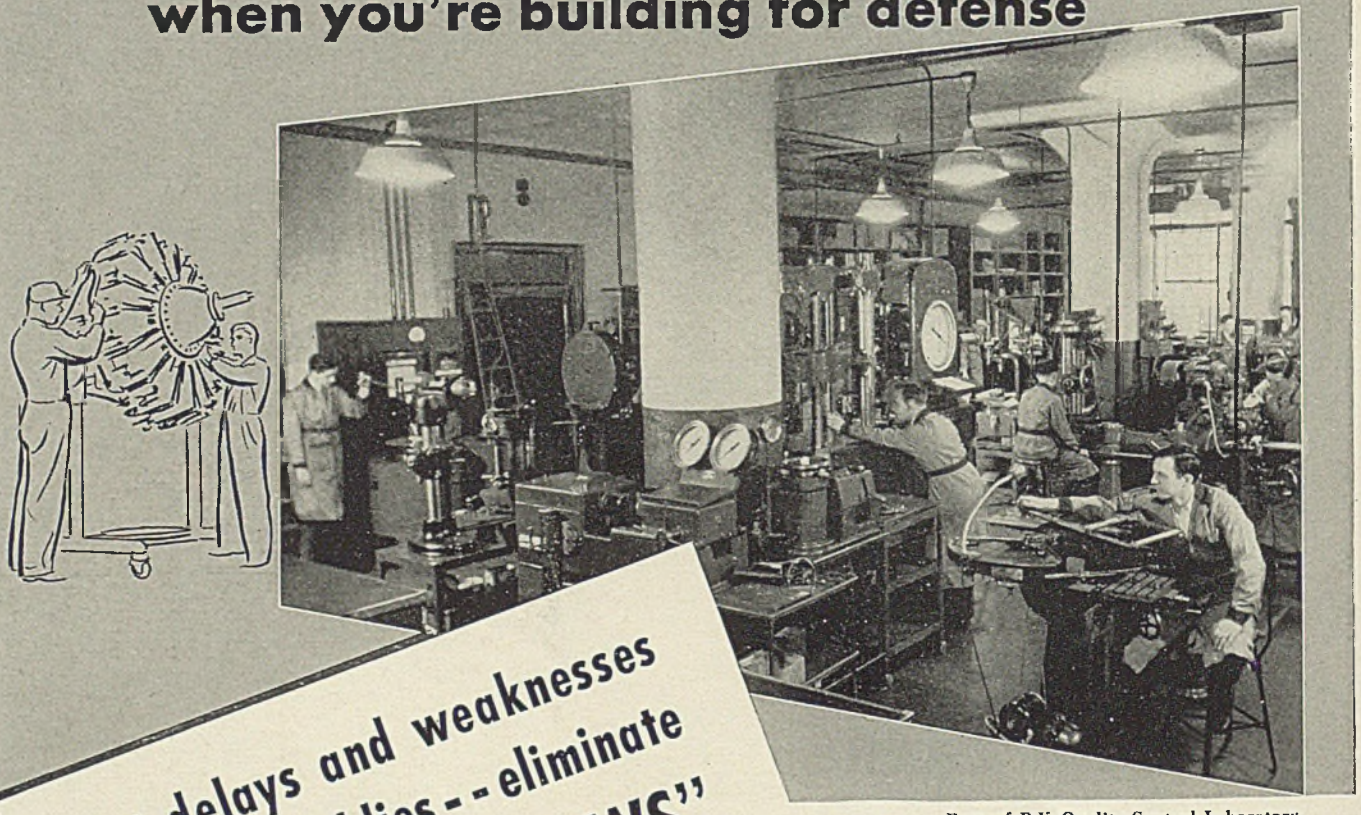

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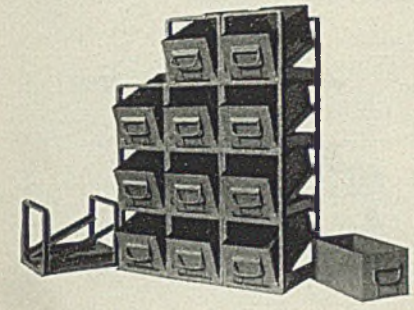
mounted within the frame of the column. A 1-horsepower motor is used on the smaller presses, and a 1½-horsepower motor on the larger units.

Storage Rack

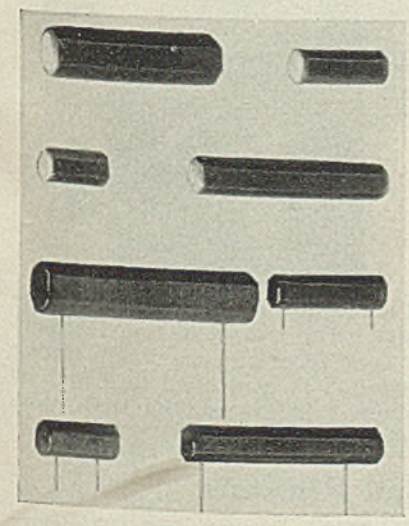
■ Stackbin Corp., 68 Troy street, Providence, R. I., has placed on the market a new type steel slant-box storage rack which converts ordinary boxes into hopper-fronted bins and speeds handling of parts and



materials. The racks are individual types which interlock to form storage units of any desired shape or capacity. Tilted runners hold boxes at the proper angle; a wide lip holds them securely in position. The use of standard Stackrack construction permits high stacking in interlocking units which form a storage of any desired height, shape or capacity.

Resistors

■ Keystone Carbon Co., 1935 State street, Saint Marys, Pa., announces a line of negative temperature coefficient resistors with metal coated ends for making electric connections. Chief characteristic of these resistors is their decrease in electrical resistance with an increase in tempera-



ture. This property makes the material useful where it is desired to reduce or eliminate initial current surges. At present, resistors are offered in four standard sizes, as shown in the illustration. These are as follows: 5/32 x ⅜-inch, 5/32 x ½-inch, 5/32 x 1-inch, and ¼ x 1-inch.

Starter Device for Fluorescent Lamps

■ Westinghouse Electric & Mfg. Co., Bloomfield, N. J., has placed on the market a new "no-blink" starter switch which will end a fluorescent lamp's life when it has reached the stage where it blinks on and off. Designed specifically for 40-watt Mazda fluorescent lamps, it will conserve starter switches as they will not be impaired by repeated attempts to start lamps. The switch is interchangeable with present FS-4 2-contact switches. It is available in limited quantities. Orders from defense industries, however, will be given preference.

Lock Washer

■ George K. Garret Co., 1421 Chestnut street, Philadelphia, announces a new Diamond G lock washer which as one unit serves as the flat washer and the ordinary lock washer in all bolted assemblies. Its broad surface affords adequate bearing surface for all requirements and its design assures uniform tension at

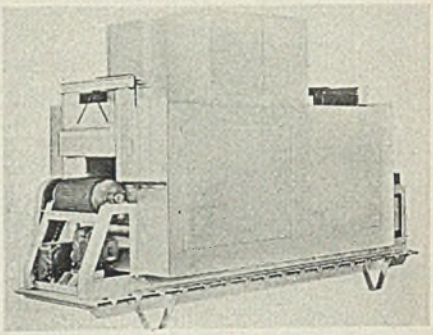
all times. Its chief feature, according to the company, is that it cuts time of assembling these units on defense products nearly in half.

Starter Device

■ General Electric Co., Nela Park, Cleveland, announces an improved starter device for 40-watt Mazda fluorescent lamps which now includes a "stopper" element that promptly shuts off the starter element if the lamp has reached the end of its normal life. Included in the same small cylindrical container of the starter, it will be interchangeable with the present units, and is designed to permit more efficient and economical group replacement without bothersome flickering of inoperative tubes. The device will be available in limited quantities, first production, however, will be reserved for defense plants.

Heat Treating Furnace

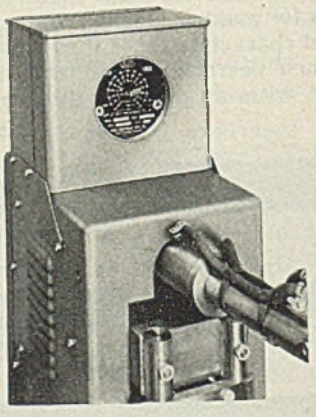
■ Gehnrich Corp., Long Island City, N. Y., has introduced a new conveyor type, convection heated, low temperature heat treating furnace for preheating, drawing, normalizing, holding, annealing, stress relieving and other heating operations up to 1250 degrees Fahr. on relatively small metal castings, slugs, stampings and forgings. It provides continuous, fast heat treatment within close temperature limits. The furnace is easily applicable also for drying or baking of bulk chemicals and other process materials. Its interior is alloy steel. The furnace walls are of patented, insulated dual panels packed with mineral wool blankets. The heat source consists of electric heating elements. A fan placed above the oven draws the heat from the heaters and discharges it over



the full length and width of the oven. The conveyor consists of a wire mesh belt which runs over steel drums at both ends of the oven, and is driven by a motorized variable speed drive.

Automatic Timer

■ Pier Equipment Mfg. Co., Benton Harbor, Mich., is now marketing its spot welders equipped with a new type of precision timer for automatically controlling the welding period. The timer is simple to adjust, adjustment range being between 3 to 47 cycles (3/60 to 47/60

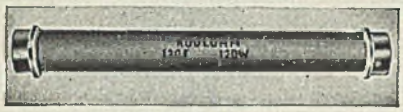


of a second), calibrated in one cycle steps. The unit is of the electronic or tube type, and maximum timing variation is controlled to a plus or minus 1/120 second on short time welding.

End Resistors

■ Sprague Specialties Co., Resistors Division, North Adams, Mass., has placed on the market a new line of Koolohm resistors with ferrule-end type construction for "fuse clip" mounting. Designed to meet Navy's

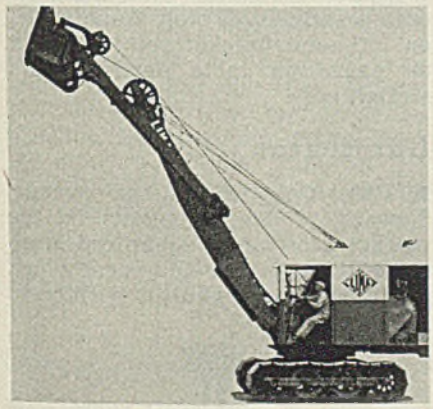
specification No. RE13A372J units are available in 10, 20, 35, 50, 90 and 120-watt sizes, in high resistance values. They are supplied in either inductive or non-inductive types, the latter having a residual inductance at all values of essentially zero. Known as Type F, the new units have standard layer windings, the wire being insulated before winding with a 1000-degree Cent. heat-proof,



moisture-proof inorganic material. An outer shell, ⅛-inch thick, of heat-treated, Pyrex glass, provides insulation as well as additional protection against humidity.

Combination Shovel, Dragline and Crane

■ Lima Locomotive Works Inc., Lima, O., has introduced a new type 603 combination shovel, dragline and crane for versatile materials handling services. The unit, when used as a shovel is equipped with a 21-inch boom, 17-inch dipper handle and a 1½-yard dipper. As a crane, it has a maximum lifting capacity of 25 tons and its dragline capacity is variable, depending on the work. Available with either gas, diesel, oil or electric power, machine is equipped with inside expanding



clutches with housings cooled through radiation fins. Roller bearings are applied to the hoist brake and clutch housings. Vacuum power assistors on the hoist clutches make possible the raising or lowering of loads with accuracy and ease without the operator losing the "feel" of the work. This feature is especially adapted to crane work. Each major operation of the machine is independent of the other. The crawler truck is composed of a one-piece base casting with four through axles on the ends of which revolve eight open type self-cleaning rollers. It is of the end drive principle with drive chain located back under the crawler treads. Steering is accomplished with the upper frame at any position. The crawlers are so designed that they can be extended in length to increase the ground bearing area. The change from short crawlers to long crawlers can be made without dismantling the machine. The cab features a built-in winter front.

Endless Belt Sander

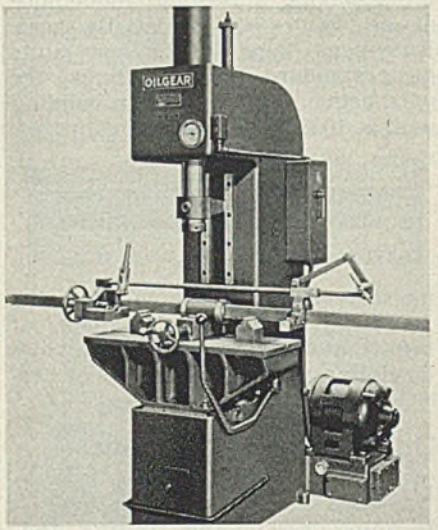
■ Jefferson Machine Tool Co., Fourth, Cutter and Sweeney streets, Cincinnati, has placed on the market an improved model of the endless belt sander described in STEEL Aug. 26, 1940, p. 64, which eliminates costly hand sanding and finishing. Its table frame is of heavy structural steel, electrically welded to form a rigid and substantial foundation. The work table has a vertical adjustment by hand-wheel of 10 inches. The table stands 32 inches from the floor and is adjustable up to 42 inches.

A conveniently located locking device makes it possible to lock the table in any desired position. Main sand belt pulleys are 12 inches in diameter by 8¾ inches face, and the two overhead idler pulleys are 6 inches in diameter and 8¾ inches face. The unit's drive is derived

from a 2-horsepower fully enclosed 220 or 440-volt motor. For metal finishing the belt travels approximately 1800 surface feet per minute.

Gooseneck Presses

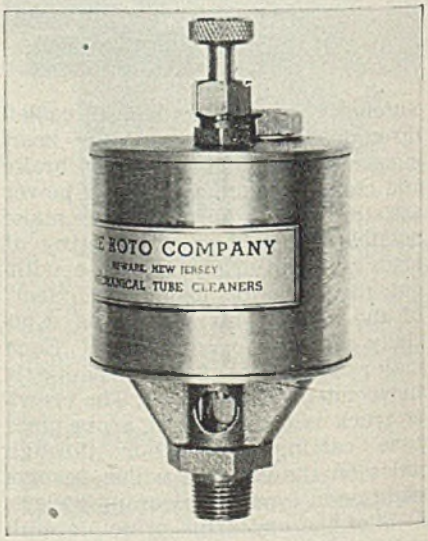
■ Oilgear Co., 1327A West Bruce street, Milwaukee, is offering several new gooseneck presses in capacities from 6 to 25 tons with controlled ram pressure, speed and travel for fast stamping, broaching, assembling and straightening operations. All have plain platens. Lower platens are arranged to receive detachable tables or fixtures. Each press consists of a rigid, allsteel welded frame with integral pump and motor reservoir base, a ring type piston closely fitted to a honed steel cylinder, large ram guided in a long bronze liner, built-in direct reading pressure gage, enclosed control mechanism, built-in coolant reservoir, mounting for vertical motor-driven coolant pump, direct pump and motor drive and a small or large type "DH" 2-way variable displacement pump. Presses are offered with two styles of standard controls. One, a Servo-motor hand lever and foot pedal mechanism provides sensitive, almost "human" control of the variable ram speed in either direction. Another, a Servo-motor follow-up hand lever mechanism provides high-speed approach for a preset ram travel. Three styles of special controls, to



meet specific production requirements, are also available. Rifle barrels of varying lengths and diameters are straightened on the press shown in photograph. The spring balanced bar carries the two overhanging brackets which support the barrel slightly above the resistance blocks. Both brackets are connected through a rod for convenient movement of barrel to right or left. Rifle barrel is deflected against two resistance blocks and the amount of deflection is limited by a hand operated wedge type stop. Hand wheel on left-hand bracket rotates barrel as gages on table determine its straightness.

Lubricator

■ Roto Co., 145 Sussex avenue, Newark, N. J., has placed on the market a new type sight-feed lubricator for air-driven equipment which operates regardless of its position in

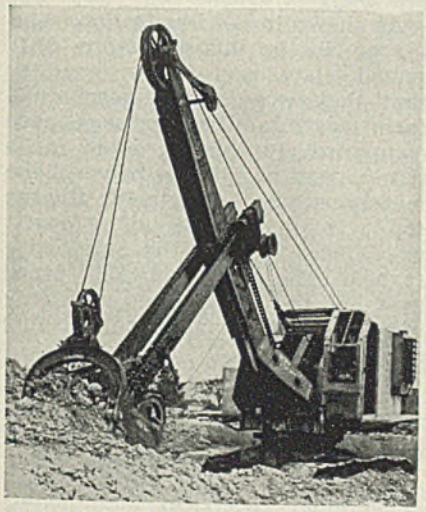


the line. Because it has no baffle, the lubricator can be turned to any

position convenient for visibility. The unit only requires one regulating valve. Oil is added by removing a screw plug at the top of the lubricator. Units are offered in 4/5 pint and quart sizes, and can be regulated to drop as few as 5 drops of oil per minute.

Multiduty Shovel

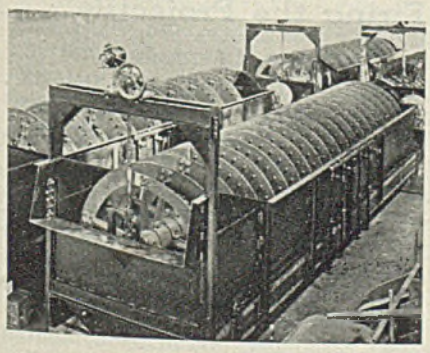
■ The Osgood Co., Marion, O., announces a new type Seventy 1¼ cubic yard shovel or 15-ton crane which can perform the duties of a shovel, dragline, clamshell, crane, pile driver. It features unit cast steel construction of deck, air control and twin-disk clutches. With the air control, the type 70 lowers heavy loads against the friction of the operating machinery and the



compression of the engine. It may be steered in any direction, without stopping the forward motion of the machine. Air operation of the steering clutches sets the brake at the same time it disengages the clutch. All controls are banked in front of, and around the operator. In addition the streamlined cab gives the operator ample protection and full vision.

Screw Type Classifier

■ Western Machinery Co., 760 Folsom street, San Francisco, has introduced an improved Wemco screw



classifier for separating solid particles from liquids and for the classification according to size of solid particles contained in liquids. It consists of a sloping longitudinal round bottom tank with a continuous screw attached to the main shaft running the entire length of the tank. The shaft is of heavy pipe and the arms supporting the spiral are cast steel, clamped securely to the shaft. The spiral flights are of steel plate sections preformed to the indicated pitch and bolted to the cast steel supporting arms. Both ends of the main shaft are supported by large bearings. The motor-driven lifting device is a cut-tooth worm gear assembly running in oil, operating a vertical screw rod which is attached to the submerged bearing casing. It permits lifting the spiral out of the pulp during a shut down and eliminates necessity of draining the tank. The spirals can be lowered into the settled material while rotating and will dig into the pulp and reestablish the circulation. To provide greater ease in field adjustments, the lower end of the pool is arranged with a variable height overflow weir and can be built with flared sides to create a greater pool area when necessary. The tank can be set at a very steep slope, which eliminates the need of auxiliary pumping or elevating equipment to return the sands to the mill when operating in closed circuit.

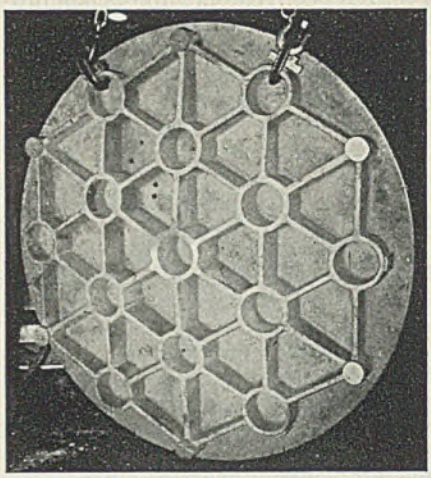
University Offers Use Of Its Film Library

■ To do its part in the national emergency, the State University of Iowa, Iowa City, is offering the service of its films to industries and educational institutions conducting defense courses. Used in its courses in industrial engineering and management, these films provide one of the most effective means of presenting the results of motion economy principles applied to various types of manual work.

Contrasting old methods with improved methods, they show applications of motion study principles in offices and factories which result in easier and better methods and lower costs. Organizations interested in borrowing these films should address the Department of Visual Instruction. Folders containing a description of the school's film library are also available.

Rib Design Provides Permanent Trueness

■ A new and unusual design for providing permanent surface trueness in large surface plates to be used in the as-cast condition is reported by Fulton Foundry & Machine Co., East Seventy-Fifth street and Morgan, Cleveland.



As shown in the illustration, spacing of ribs on this Meehanite 6700-pound plate was proportioned so that they were all of nearly uniform length, and the top was made comparatively thin so as to maintain a good proportion between the metal sections of the ribbing and the top. In machining, all supports were faced off and the outer edge turned. The plate was then turned over and the top finished with only one roughing cut and one finishing cut.

Issues Handbook on Turbine Generators

■ National Electrical Manufacturers Association, 155 East Forty-fourth street, New York, reports publication of a new handbook, "Turbine Generator Recommended Practices", compiled to cover direct connected sets and 25-cycle and direct-current geared sets in types and sizes in current use.

The material is divided into three separate classifications — turbine units, synchronous generators for steam turbine drives, and direct current generators for steam turbine drives. Copies of the handbook may be obtained from association headquarters for 50 cents each.

Firing the Projectile

(*Continued from Page* 63)

expanding the gun, and the like. Thus a figure of 459 foot-tons more nearly represents the work which would be done on a shell in an infinitely long barrel.

It may be of interest to note that the energy content of explosives, or calorific value, is much lower than that of a good coal. Cellulose nitrate smokeless powder gives out about 3600 B.t.u. per pound as compared with over 15,000 for a West Virginia semi-bituminous fuel. Expressed in work units, this former quantity is about 1400 foot-tons.

Hence what might be termed the cycle efficiency with complete expansion is around 47 per cent. Taking account of friction losses but still assuming complete expansion, the figure drops to about 33 per cent. The actual efficiency of the gun, *with very incomplete expansion* is, of course, much less than this.

As already indicated, the curve of pressure follows the acceleration curve of the shell in its flight through the bore. Hence at the point where the acceleration is a maximum, so also is the pressure a maximum. Thus when the rate of change of the acceleration is zero, we have reached the point of maximum pressure.

This point of maximum pressure in turn is dependent on the "quickness" of the powder. Since the measure of this quantity is a function of the size of the grain, the thickness of the "web", etc., these characteristics in turn determine the position of the pressure peak in the bore. Other factors involved are the initial air space, the chamber volume and the weight of the shell.

The practical problems of gunnery fall naturally into two categories—those which relate to the distribution of pressure along the length of the barrel and those concerned with the relation between muzzle velocity and weight of powder. It is clear, for example, that the equation for the acceleration of the shell will give us a measure of the net pressure required for propulsion. Then for any particular point in the stroke, multiplying this quantity by a suitable coefficient (1.12) gives the bore pressure. This particular calculation can be checked by gages.

Then again it may be necessary to find the muzzle velocity of a gun when the powder charge is reduced. Or perhaps the influence of a change in the length of the barrel, or in the density of the loading, or in the weight of the projectile may be under consideration. All these are subject to mathematical analysis.

Metal Cleaning

(*Concluded from Page* 94)

your particular metals and cleaning operations, but your cleaning solutions will work at top effectiveness for much longer periods without needing more cleaning compound or requiring a new solution.

The second section of this series discusses rinsing qualities, precleaning methods and materials, electrocleaning and the like. It is scheduled to appear in STEEL of December 15, 1941. A third section will follow devoted to particular problems encountered in cleaning shell bodies, shell cases and small arms cartridge cases as well as other ordnance items.

Joint Designs

(*Continued from Page* 100)

equals W (D—W) YT over LD. Here D is shear diameter; T is tensile strength of weakest member; W is wall thickness of weakest member; Y is factor of safety; L is shear strength of silver brazing alloy.

After a type of joint has been selected there are many ways of adapting it to the particular work at hand. In Fig. 1 a number of basic designs are shown. Note particularly the high hub flange shown in the lower left hand corner. To make the joint marked "poor" it would be necessary to heat all the way through the heavy mass to which the tube is joined. By using the construction marked "good" the relatively thin high hub can be heated rapidly and joined to the tube without bringing the heavy section up to brazing heat.

Just above these flange designs, extreme left at center, are two illustrations marked "poor". The top one shows a bead of alloy along the joint. This requires far more alloy than is necessary and the bead, which in reality is a casting, does not give as high strength as would be secured if a thin film of alloy

were flowed between the surfaces to be joined. Likewise the V-shaped groove below gives the strength of a casting rather than the higher strength of a thin film alloyed with the metals joined.

In the upper right hand corner are two examples of poorly fitted joints. While poor fits can be brazed, it pays to fit joints properly and usually speeds up the brazing operation. Some of the joints illustrated in Fig. 1 are simple joints—others are particularly suited to a definite way of applying the brazing alloy. In designing a brazed joint, therefore, it is important to give some thought to how the alloy is to be applied to the joint.

Since the silver brazing alloy is obtainable rolled into sheets and drawn into wire of practically any size, it is possible to choose a form of alloy suitable to the particular job, keeping in mind that there are three general methods of applying the alloy to the work. These are by hand feeding, by preplacing the brazing alloy in or around the joint, by providing a groove or reservoir in which the alloy can be preplaced.

Wire Best: In much production, the brazing alloy is applied by hand, even where large quantities are involved. Size of wire or strip most practical to use should be in such proportion to the size of the joint that the alloy will melt quickly and give sufficient material to make the joint without requiring too great a length of rod, wire or strip. Of course too large a size results in melting an excess amount of material.

This is not only wasteful but it often spoils the appearance of the finished joint.

The silver brazing alloy may be preplaced in either flat or tubular joints and can be used in the form of the inserts of sheet or flat washers, as rings of round or other shaped wire, or as a powder sprayed on the surface. Also filed or powdered brazing alloys can be sprinkled on or mixed with flux and painted on the joint. Too it it possible to "tin" with brazing alloy by dipping or other methods.

Typical use of a sheet insert is in making joints in flat bus bars. A sheet of alloy 0.010-inch thick inserted between the two bars to be joined is clamped into place while the joint is heated with an oxy-acetylene torch until the brazing alloy flows.

Washers have proved effective in joining parts to flat and curved surfaces. Usually washers are used where pressure can be applied. While washers do an excellent job, less costly rings of brazing alloy wire will do equally well on small parts which can be heated uniformly. Where heat cannot be evenly distributed washers are better suited.

Where pipe or tubing is to be joined to tube sheets or headers, the reservoir type of preplacing can be used. Designs of this kind are provided with a groove into which the brazing alloy is inserted. The location, size and shape of the groove will depend upon the size of the joint members and the design of the completed assembly.

It is good practice to extend the alloy insert above the groove so the joint is made and the groove is filled at the same time.

Capillary action may often be employed to pull the alloy in all directions and spread it throughout the entire joint area. In either case, the depth of shear area, exclusive of the depth of the groove, should be sufficient to provide the necessary factor of safety to meet any requirement for strength.

Preplacing is used to advantage on many production setups since it permits accurate control of alloy cost per joint, assures a complete flow of alloy throughout the joint area, acts as a temperature guide and aids in making better locking joints. Because preplacing relieves operators from feeding the alloy, they have a better opportunity to control heating when it is done by torch or other manually controlled methods.

Helpful Literature

1. Steel Specifications

Joseph T. Ryerson & Son, Inc.—22-page booklet compares S.A.E. and A.I.S.I. systems of steel identification. Both systems are explained and direct comparisons made in tabular form. Complete analyses ranges for straight carbon and alloy steels of both systems are listed and average physical properties given in their proper relationship.

2. Rivet Setter

Tomkins-Johnson Co.—4-page illustrated bulletin No. RP-1 describes air powered "Rivitor" rivet setter for flush riveting of aircraft sections. Complete specifications are tabulated together with list of design features.

3. Diesel Engines

Worthington Pump & Machinery Corp.—8-page illustrated bulletin No. S-500 describes "DD" diesel engine which is of four-cycle type, fitted with trunk pistons and utilizing direct fuel-injection system. Various operating parts are explained in detail with regard to construction and design.

4. Heat Treating Furnaces

R-S Products Corp.—4-page illustrated bulletin presents pictorially various furnaces for taper and mouth, intermediate and final annealing of cartridge cases; automatic heat treatment of shell and shell forgings; and stress relieving of guns and gun mounts. Advantages of these types of furnaces are briefly enumerated.

5. Hand Lift Truck

Yale & Towne Manufacturing Co.—4-page illustrated bulletin No. P-567 presents information on "Load King" hydraulic hand lift truck which features multiple stroke, controlled stroke and heavy duty construction. Several models in varying capacities are shown and described. Tables list complete specifications.

6. Cut-Off Machines

A. P. de Sanno & Son, Inc.—Two 2-page bulletins announce "Radiac" type J and M cut-off machines. Tables list specifications and text explains operation and construction features of both models.

7. Bronze Welding Rod

Ampco Metal, Inc.—16-page illustrated bulletin is devoted to "Ampco-Trode" coated aluminum bronze welding rod. Six grades of rod are described and illustrated with photomicrographs. General welding instructions are given for welding on ferrous and non-ferrous metals.

8. Dies and Tools

S. B. Whistler & Sons, Inc.—36-page illustrated bulletin describes dies, tools and special machinery. Explained in detail, with engineering drawings, are automatic step control equipment, dies sets for universal perforator, drawn and embossed stamping dies, grouped hole dies, hardened forming die steels, universal standard notching dies and square punches and die bushings.

9. Electric Cranes

Shaw-Box Crane & Hoist division, Manning, Maxwell & Moore, Inc.—8-page illustrated catalog No. 211-A reports on features and construction advantages of type C overhead electric traveling crane designed especially for foundries, machine shops, railway shops, paper mills, stoneyards and similar industries. Tables give dimensions for sizes in capacities from 5 to 25 tons.

10. Hydraulic Machinery

Watson-Stillman Co.—40-page illustrated general catalog No. 110-A presents extensive pictorial review of uses of company's hydraulic machinery and accessory equipment. Illustrations show applications of hydraulic power for bending, straightening and forming operations. Section contains engineering tables and data relative to current practices in design of hydraulic equipment.

11. Photo-copying Machine

Haloid Co.—Illustrated spiral-bound booklet No. 300 outlines salient features of "Rectigraph" machines for photographic copying. Described in detail are commercial model and daylight duplex model. In addition information is offered on automatic washing and drying units, photocopying accessories and chemical supplies.

12. Charging Systems

Whiting Corp.—24-page illustrated bulletin FY-101 reports on features and advantages of individually engineered mechanical charging systems. General description and operating features are listed in detail. Six case studies covering problem, solution and result are enumerated together with explanatory line drawings.

13. Compressors

Spencer Turbine Co.—8-page illustrated bulletin No. 105-C describes standard overhung, single-stage and multi-stage "Turbo-Compressors" for oil and gas-fired furnaces, ovens and foundry cupolas. Ratings, capacities and construction details are enumerated.

14. Inclinable Presses

E. W. Bliss Co.—16-pages of loose-leaf catalog sections list specifications and features of line of inclinable power presses. Line included 20 presses with strokes ranging from 1½ to 6 inches.

15. Portable Drills

Independent Pneumatic Tool Co.—6-page illustrated bulletin No. JE-112 explains features and advantages of type U14 "Thor" ¼-inch portable electric drills. Specifications and prices are tabulated and action photographs show several typical uses for these lightweight one-hand drills.

16. Tool Steel

Bethlehem Steel Co.—2-page descriptive sheet No. 77 gives information on "66" high speed tool steel of low tungsten content. Typical analysis, recommended usage, and instructions for working are given.

17. Electrical Equipment

Westinghouse Electric & Manufacturing Co.—60-page illustrated "Quick Selector" catalog aids in selecting correct electrical equipment for any motor, lighting, or feeder circuit. Scope of catalog is safety switches, "Nofuse" breakers, "Nofuse" multibreakers, panelboards, motors and motor controls.

18. Saw Blades for Metal

Capewell Manufacturing Co.—16-page illustrated bulletin No. M239D gives sizes, usages and prices for hacksaw blades, metal cutting bandsaw blades and contour saw blades. Several pages are devoted to hints on how to achieve greater cutting efficiency. Table gives recommended cutting speeds for various materials.

19. Furnace Atmospheres

Brown Instrument Co.—14-page technical bulletin No. 92-4 describes "A.C. Analy-Graph" which is industrial instrument developed to continuously measure and record quality of furnace atmospheres. Explained in detail are features of operation, models available and application data.

20. Electric Contact Gages

Pratt & Whitney division, Niles-Bement-Pond Co.—4-page illustrated circular No. 461 is devoted to multiple electric contact gages which provide rapid means of checking several dimensions simultaneously. Each gage is engineered for particular job and this bulletin describes construction and operation of gage made for inspecting shell.

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21. Lubrication System

Farval Corp.—8-page illustrated bulletin No. 167, entitled "Why Farval" describes in detail system of centralized lubrication. Correct lubrication as factor in maintaining production schedules is discussed. Charts show savings which are claimed to be effected with this system.

22. Automatic Controls

Mercoid Corp.—60-page illustrated catalog No. 500 gives complete details and specifications on "Mercoid" automatic controls for heating, air conditioning, refrigeration and various types of industrial applications.

23. Power Shovels

Bucyrus Erie Co.—16-page illustrated pocket-size bulletin No. MP-W-102 enumerates various features of dippers used on company's line of shovels. Each feature is described and accompanied with action photograph showing advantages of that feature.

24. Waterproofing

Koppers Co.—4-page illustrated bulletin No. TB-3 describes membrane waterproofing. Subjects covered include difference between waterproofing and dampproofing, methods of waterproofing, preparation of surface, and functions of waterproofing. Table lists recommended locations for this treatment.

25. Miniature Bearings

Miniature Precision Bearings—8-page illustrated catalog No. 41 contains engineering data on radial, pivot and special bearings in miniature precision sizes. Available sizes, tolerances, materials and load ratings are given for each of three types mentioned above.

26. High Strength Castings

Meehanite Research Institute of America, Inc.—12-page illustrated bulletin is comprised mainly of photographs showing "Mechanite" castings used in aircraft manufacture, gun and shell manufacture, machine tool castings, and radio, marine, truck and steel mill equipment. Short descriptions accompany each illustration.

27. Motor Starters

General Electric Co.—12-page illustrated bulletin No. GEA-3660 explains in detail design, construction and application of 2300-volt contactor motor starter which can be safely applied to high capacity power circuits. Operation of EJ-2 current-limiting fuses, overload relays and cabinet enclosure housing for entire starter are also discussed.

28. Surface Analyzer

Brush Development Co.—10-page technical bulletin No. 552 describes SA-2 surface analyzer which is designed for making instantaneous and permanent chart records of irregularities in finished surfaces such as metals, glass, plastics, plated and painted surfaces, paper and other materials.

29. Nonferrous Metals

Williams & Co.—6-page illustrated bulletin is entitled "Aesop's Fables For Metal Users—No. 1." It relates in informal style the experiences of character named Mr. Abernathy with non-ferrous metals. Statement is included on company's efforts to maintain full warehouse stocks of metal.

30. Metal Descaling

Bullard-Dunn Process division, Bullard Co.—8-page illustrated bulletin BD-35 explains principal characteristics of company's electro-chemical method of removing scale and oxides from surface of metals, particularly ferrous metals. General description of operation of process is included.

31. Self-locking Nuts

Elastic Stop Nut Corp.—60-page illustrated bulletin contains prices and specifications on over 2500 combinations of type, size, thread system and material of self-locking nuts. General description, explanation of principle of design, and recommended applications are also included.

32. Foundry Riddles

Buffalo Wire Works, Inc.—2-page illustrated bulletin No. 591 deals with three grades, three sizes and seven different meshes of foundry riddles. Seven advantages of these riddles for efficient screening of foundry sand are listed.

33. Cutting Tools

Tungsten Carbide Tool Co.—4-page illustrated bulletin lists complete specifications for 92 different types and sizes of carbide tools. Both steel-cutting and cast iron and non-ferrous cutting tool grades are given, with tips available in any of following materials: "Vascoloy," "Kennametal," or "Firthite."

34. Graphite

United States Graphite Co.—12-page illustrated booklet entitled "Graphite" discusses mining, processing and applications of graphite for lubrication, boiler treatment, electrotyping, pencil making and special uses. Available types for steel mill applications are listed.

35. Power Sander

Sundstrand Machine Tool Co.—6-page illustrated bulletin, "Finishing Suggestions," lists recommendations for using mechanical sanders on metal, wood, plywood, wallboard and automobile parts. Illustrations show equipment being used on steel sheets, small castings, wooden cabinets, airplane wings and automobile bodies.

36. Quick-acting Vises

Fenn Manufacturing Co.—4-page illustrated bulletin explains features and advantages of "Quick-Action" vises for production milling, drilling, tapping and assembling operations on small parts. Tables list specifications and dimensions for three sizes.

37. Electric Motors

Allis-Chalmers Manufacturing Co.—8-page illustrated bulletin No. B6052-B describes complete line of "Lo-Maintenance" electric motors in rating from ¾ to 75 horsepower, in open, enclosed and splash-proof, alternating and direct current types.

38. Instrument Charts

C. J. Tagliabue Manufacturing Co.—32-page illustrated bulletin No. 1230 reproduces actual size portions of company's line of charts for recording temperature, pressure and flow instruments. Prices, temperature and time ranges, and other information are given for each type.

39. Synthetic Rubber

Miller Rubber Co.—12-page illustrated bulletin explains properties of "Ameripol" synthetic rubber which suit it for use as oil seals, V-type packings, accumulator diaphragms and hydraulic equipment parts. Charts and tables supplement engineering data.

40. Pneumatic Controls

Prosperity Co.—30-page illustrated bulletin No. V1 outlines features and advantages of "Lok-Air" packless valves, cylinders and control systems for operating and controlling equipment by air or hydraulic power. Several pages of sketches show suggested applications for this equipment.

41. Pumps

Pomona Pump Co.—24-page illustrated bulletin No. 29 endeavors to present practical information concerning pump adaptations for wide range of duties under varying conditions. Numerous case histories are quoted and illustrated. Line drawings amplify text.

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Defense, Lease-Lend Needs Cover Market

Shell program may take million tons. Plate allocation plan in effect. Scrap situation grows worse. Pig iron output near record

MARKET IN TABLOID ★

Demand
Civilian pressure lessens.

Prices
Ceiling on relaying rails.

Production
Up 1½ points to 96½ per cent.

■ STEEL requirements for defense and lease-lend purposes are absorbing an increasing proportion of production. New munitions plants coming into production require further supplies of raw material and established war plants continue to take tonnages as rapidly as mills can provide it.

Expected allocation of steel for an extensive shell program, estimated to require about 1,000,000 tons, puts a further load on producers. This is to be allocated among a number of mills and will carry a high priority. Delivery will be scheduled to meet speed of shell production. Increased shipments of plates to shipbuilders have been ordered, causing corresponding delay for other users. Agricultural implement manufacturers have been given a slightly higher priority rating for December and January as an aid to meeting the food situation. A new price schedule on relaying rails has established maximums.

Plate allocations under the new OPM plan will follow the pattern that has proven of value in pig iron distribution. Producers will file reports each month for the succeeding month, showing production, shipments and unfilled orders. On this basis a schedule of shipments will be formulated for each supplier. Production in excess of schedule will be disposed of only on order of the priorities division. This action on plates followed reports by platemakers that orders with A-10 ratings or higher exceeded November production.

Conditions grow worse in regard to scrap and steel production is being curtailed at some points as a result. No general allocation has been put into effect but cases of distress are being met by orders for shipment to consumers in greatest need. An instance last week was an order covering 10,000 tons to Inland Steel Co. at Chicago, to minimize its cut in production. Previous diversion of scrap from Chicago to Ohio river points had contributed to the shortage. The industry considers these diversion orders as futile since they had no effect in increasing supply. Continued reduction of steel production is expected to result during the winter.

Steelworks operations last week advanced 1½ points to 96½ per cent, although lack of scrap and necessity for furnace repair holds several producers at low rates. Pittsburgh recovered 2 points to 98 per cent and Chicago ½-point to 100 per cent. Cincinnati gained 3½ points to 91 per cent, Wheeling 3 points to 95 per cent, Cleveland 1 point to 96½ per cent and Youngstown 4 points to 92 per cent. Eastern Pennsylvania lost 3 points to 87 per cent, Detroit 10 points to 85 per cent, St. Louis 7½ points to 86 per cent and New England 8 points to 92 per cent. Buffalo at 79 per cent and Birmingham at 90 per cent showed no change.

Except for the fact that November had only 30 days a new all-time record in pig iron production probably would have been made. As it was, production of 4,707,194 net tons was only 152,839 tons, 3.2 per cent, below the all-time monthly production of 4,860,033 tons in September. This difference was less than the November average daily rate of 156,906 tons, which was .08 per cent above the October daily rate of 156,775 tons. The November rate was second only to the record reached in September, 157,378 tons. One more blast furnace was in production than in October.

Automotive assemblies continue to decline in accordance with the OPM program of limitation for December. Last week production was 90,205 units, compared with 93,495 the previous week. Last year the corresponding figure was 125,690 cars.

Placing of 2222 freight cars during November brings the total for 11 months to 113,093 units, compared with 59,708 for the corresponding period last year. The total for the entire year is expected to be about 117,000 cars, the largest in several years.

Lake Superior iron ore movement in November was 7,660,987 gross tons, 41.76 per cent greater than the same month last year and exceeding the former November record of 7,333,826 tons, made in 1917. Shipments to Dec. 1 aggregated 79,281,279 tons, 24.46 per cent over the same period last year and exceeding the largest full-season movement, 65,204.600 tons, in 1929. Continued favorable weather, with a large part of the fleet still in service, indicates an unusual movement in December. This gives foundation for expectation of a season total of more than 80,000,000 tons.

Composite prices continue unchanged, under control by Office of Price Administration: Finished steel, $56.73; semifinished steel, $36.00; steelmaking pig iron, $23.05; steelmaking scrap, $19.17.

COMPOSITE MARKET AVERAGES

	Dec. 6	Nov. 29	Nov. 22	One Month Ago Nov., 1941	Three Months Ago Sept., 1941	One Year Ago Dec., 1940	Five Years Ago Dec., 1936
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$54.66
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	35.45
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	22.32	19.48
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	21.40	17.05

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 Mouth, Three Months and One Year Ago

Finished Material

	Dec. 6, 1941	Nov. 1941	Sept. 1941	Dec. 1940
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv. Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	Dec. 6, 1941	Nov. 1941	Sept. 1941	Dec. 1940
Bessemer, del. Pittsburgh	$25.34	$25.34	$25.34	$24.95
Basic, Valley	23.50	23.50	23.50	23.10
Basic, eastern, del. Philadelphia	25.34	25.34	25.34	24.84
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	24.29
No. 2 foundry, Chicago	24.00	24.00	24.00	23.75
Southern No. 2, Birmingham	20.38	20.38	20.38	19.38
Southern No. 2, del. Cincinnati	24.06	24.06	24.06	23.06
No. 2X, del. Phila. (differ. av.)	26.215	26.215	26.215	25.715
Malleable, Valley	24.00	24.00	24.00	23.60
Malleable, Chicago	24.00	24.00	24.00	23.75
Lake Sup., charcoal, del. Chicago	31.34	31.34	31.34	30.34
Gray forge, del. Pittsburgh	24.19	24.19	24.19	23.35
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	125.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.00	$22.75
Heavy melt. steel, No. 2, E. Pa.	17.75	17.75	17.75	19.75
Heavy melting steel, Chicago	18.75	18.75	18.75	20.70
Rails for rolling, Chicago	22.25	22.25	22.25	25.00
No. 1 cast, Chicago	20.00	21.50	21.50	19.00

Coke

Connellsville, furnace, ovens	$6.25	$6.25	$6.25	$5.50
Connellsville, foundry, ovens	7.25	7.25	7.25	6.00
Chicago, by-product fdry., del.	12.25	12.25	12.25	11.75

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. mill, carloads.

Sheets, Strip

Hot-Rolled Sheets

Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 2.10c
Granite City base 2.20c
Detroit, del. 2.20c
Pacific ports 2.65c

Cold-Rolled Sheets

Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, B'ham., base .. 3.05c
Granite City, base 3.15c
Detroit, del. 3.15c
Other Mich. pts., del. ... 2.25c
Pacific ports 3.70c

Galvanized Sheets, No. 24

Pittsburgh, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c
Granite City, base 3.60c
Pacific ports 4.05c

Corrugated Galv. Sheets

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, 29 gage, per square 3.31c
Granite City 3.38c
Pacific Ports 3.73c

Culvert Sheets

Pittsburgh, Gary, Birmingham, 16-gage, not corrugated, copper steel 3.60c, copper iron 3.90c, pure iron 3.95c.

Pittsburgh, 24-gage, zinc-coated, hot-dipped, heat-treated 4.25c.

Granite City, copper steel 3.70c, copper iron 4.00c, pure iron 4.05c.

Pacific ports, copper steel 4.25c, copper iron 4.55c, pure iron 4.60c.

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 gr.	3.20c	3.95c	3.30c
Armat.	3.55c	4.30c	3.65c
Elect.	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. 2.20c
Other Mich. pts. del. ... 2.25c
Pacific ports 2.75c

Cold-Rolled Strip

Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c
Chicago, base 2.90c
Worcester, base 3.00c
Detroit, del. 2.90c
Other Mich. pts. del. ... 2.95c

Commodity C.R. Strip

Pittsburgh, Cleveland, Youngstown, base 3 tons and over 2.95c
Worcester, base 3.35c
Detroit, del. 3.05c
Other Mich. pts. del. ... 3.10c

Cold-Finished Spring Steel

Pittsburgh, Cleveland, base; add 20 cents for Worcester.

.26-.50 Carbon	2.80c
.51-.75 Carbon	4.30c
.76-1.00 Carbon	6.15c
Over 1.00 Carbon	8.35c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

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
304-20% clad	.....	*18.00	19.00	.....	.....
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
347	33.00	38.00	45.00	33.00	42.00
403	21.50	24.50	29.50	21.25	27.00
410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
430F	19.50	22.50	29.50	18.75	24.50
431	19.00	22.00	29.00	17.50	22.50
442	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00

*Includes annealing and pickling.

Tin, Terne Plate

Tin Plate

Pittsburgh, Chicago, Gary, 100-lb. base box $5.00
Granite City $5.10
Pacific ports, f.o.b. $5.75½

Tin Mill Black Plate

Pittsburgh, Chicago, Gary, base 29 gage and lighter 3.05c
Granite City 3.15c
Pacific ports, boxed 4.27½c

Long Ternes

Pittsburgh, Gary No. 24 unassorted 3.80c
Pacific Ports 4.55c

Special Coated Mfg. Ternes

Pittsburgh, Chicago, Gary, 100-base box $4.30
Granite City $4.40

Roofing Ternes

Pittsburgh base per package 112 sheets 20 x 28 in., coating I.C.

8-lb.	$12.00	25-lb.	$16.00
15-lb.	14.00	30-lb.	17.25
20-lb.	15.00	40-lb.	19.50

Steel Plate

Pittsburgh, Chicago, Gary, Cleveland, Birmingham,

Youngstown 2.10c
Coatesville, Sparrows Point, Claymont 2.10c
Gulf ports 2.45c
Pacific Coast ports 2.65c

Steel Floor Plates

Pittsburgh 3.35c
Chicago 3.35c
Gulf ports 3.70c
Pacific Coast ports 4.00c

Structural Shapes

Pittsburgh, Bethlehem, Chicago, Buffalo, Birmingham 2.10c
St. Louis, del. 2.34c
Pacific Coast ports 2.75c

Bars

Hot-Rolled Carbon Bars

Pittsburgh, Chicago, Gary, Cleve., Birm., base 20 tons one size 2.15c
Detroit, del. 2.25c
New York, del. 2.49c
Duluth, base 2.25c
Philadelphia, del. 2.47c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pac. ports, dock 2.80c
All-rail from Chicago.. 3.25c

Rail Steel Bars

Pitts., Chicago, Gary, Cleveland, Birm., base 5 tons 2.15c
Detroit, del. 2.25c
New York, del. 2.49c
Philadelphia, del. 2.47c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pac. ports, dock 2.80c
All-rail from Chicago.. 3.25c

Hot-Rolled Alloy Bars

Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size 2.70c
Detroit 2.80c

Alloy	Diff.	Alloy	Diff.
S.A.E.		S.A.E.	
2000.....	0.35	3100.....	0.70
2100.....	0.75	3200.....	1.35
2300.....	1.70	3300.....	3.80
2500.....	2.55	3400.....	3.20

4100 .15-25 Mo. 0.55
4600 0.20-0.30 Mo.; 1.50-2.00 Ni. 1.20
5100 80-1.10 Cr. 0.45
5100 Spr. flats 0.15
6100 Bars 1.20
6100 Spr. flats 0.85
Carb., Van. 0.85
9200 Spr. flats 0.15
9200 Spr. rounds, squares 0.40
T 1300, Mn, mean 1.51-2.00 0.10
Do., carbon under 0.20 max. 0.35

Cold-Finished Carbon Bars

Pitts., Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs. 2.65c
Detroit 2.70c

Cold-Finished Alloy Bars

Pitts., Chicago, Gary, Cleveland, Buffalo, base 3.35c
Detroit 3.45c
Galveston, add $0.25; Pacific Coast, $0.50.

Turned, Ground Shafting

Pitts., Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c
Detroit 2.70c

Reinforcing Bars *(New Billet)*

Pitts., Chicago, Gary, Cleveland, Birm., Sparrows Point, Buffalo, Youngstown, base 2.15c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pacific ports, dock 2.80c
Detroit, del. 2.25c

Reinforcing Bars *(Rail Steel)*

Pitts., Chicago, Gary, Cleveland, Birm., base. 2.15c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pacific ports, dock 2.80c
Detroit, del. 2.25c

Iron Bars

Philadelphia, com. del. 3.06-3.50c
Pittsburgh, muck bar ... 5.00c
Pittsburgh, staybolt 8.00c
Terre Haute com., f.o.b. mill 2.15c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails $2.55

(Per Pound)

Polished fence staples .. 2.55c
Annealed fence wire 3.05c
Galv. fence wire 3.40c
Woven wire fencing (base C. L. column) 67
Single loop bale ties, (base C. L. column) .. 59
Galv. barbed wire, 80-rod spools, base column .. 70
Twisted barbless wire, column 70

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago Birmingham (except spring wire at Birmingham)

Bright bess., basic wire 2.60c
Galvanized wire 2.60c
Spring wire 3.20c
Worcester, Mass., 10c higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh, keg. $3.85

Alloy Plates (Hot)

Pitts., Chicago, Coatesville, Pa. 3.50c

Rails, Fastenings

(Gross Tons)

Standard rails, mill $40.00
Relay rails, base, 35 lbs. and over.....28.00-30.00
Light rails, billet qual., Pitts., Chicago, Bham. $40.00
Do., rerolling quality.. 39.00

Cents per pound

Angle bars, billet, mills. 2.70c
Do., axle steel 2.35c
Spikes, R. R. base 3.00c
Track bolts, base 4.75c
Do., heat treated 5.00c
Car axles forged, Pitts., Chicago, Birmingham.. 3.15c
Tie plates, base 2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and 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., ⅞ and ⅝ x 6-in. and shorter .....63½ off
Do., ¾ to 1 x 6-in. and shorter .....61 off
1⅛ and larger, all lengths 59 off
All diameters, over 6-in. long .....59 off
Tire bolts .....50 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts .....56 off
Plow bolts .....65 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less.	62	64
⅝-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger..	56	

Hexagon Cap Screws

Upset 1-in., smaller .....60 off

Square Head Set Screws

Upset, 1-in., smaller ... 68 off
Headless, ¼-in., larger ..55 off
No. 10, smaller .....60 off

Piling

Pitts., Chgo., Buffalo .. 2.40c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural 3.75c
⅞-inch and under .....65-5 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l .....$3.50 off

Tool Steels

Pittsburgh, Bethlehem, Syracuse, base, cents per lb.

Carb. Reg. 14.00 Oil-hardening .. 24.00
Carb. Ext. 18.00
Carb. Spec. 22.00 High car.-chr. 43.00

High Speed Tool Steels

Tung.	Chr.	Van.	Moly.	
18.00	4	1	...	67.00
18.00	4	2	1	77.00
18.00	4	3	1	87.00
1.50	4	1	8.50	54.00
....	4	2	8	54.00
5.50	4	1.50	4	57.50
5.50	4.50	4	4.50	70.00

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut-lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½"O.D.	13	$ 9.72	$23.71
1¾"O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼"O.D.	13	13.79	21.68
2¼"O.D.	12	15.16	....
2½"O.D.	12	16.58	26.57
2¾"O.D	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½"O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O.D.	13	$ 7.82	$ 9.01
1¼"O.D.	13	9.26	10.67
1½"O.D.	13	10.23	11.79
1¾"O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼"O.D.	13	14.54	16.76
2¼"O.D.	12	16.01	18.45
2½"O.D.	12	17.54	20.21
2¾"O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½"O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½"O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Welded Iron, Steel, Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
⅛	63½	51
¼	66½	55
⅜—3	68½	57½
Iron		
⅜	30	10
½—1¼	34	16
1½	38	18½
2	37½	18

Lap Weld

Steel

2	61	49½
2½—3	64	52½
3½—6	66	54½
7 and 8	65	52½

Iron

2	30½	12
2½—3½	31½	14½
4	33½	18
4½—8	32½	17
9—12	28½	12

Line Pipe, Plain Ends

Steel

1 to 3, butt weld..... 68½
2, lap weld 63
2½ to 3, lap weld 66
3½ to 6, lap weld 65
7 and 8, lap weld 64
Seamless, 3 pts. lower discount.

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm..$45.00-46.00
4-in., Birmingham .. 48.00-49.00
4-in., Chicago 56.80-57.80
6-in. & over, Chicago 53.80-54.80
6-in. & over, east fdy. 49.00
Do., 4-in 52.00
Class A Pipe $3 over Class B
Sind. flgs., Birm., base $100.00.

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Youngs., Birm., Sparrows Point..$34.00
Duluth (billets) 36.00
Detroit, delivered 36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm.. 40.00
Duluth 42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago. 34.00
Detroit, delivered 36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅜-inch incl. (per 100 lbs.) $2.00
Do., over ⅜ to 41/64-in. incl. 2.15
Worcester up $0.10, Galveston up $0.25 and Pacific Coast up $0.50 on water shipments.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt. 1.90c

Shell Steel

Pittsburgh, Chicago, base, 1000 tons of one size, open hearth

3-12-inch $52.00
12-18-inch 54.00
18-inch and over 56.00

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur... $6.00- 6.25
Connellsville, fdry.. 7.00- 7.50
Connell. prem. fdry. 7.25- 7.60
New River fdry. .. 8.00- 8.25
Wise county fdry. .. 7.50
Wise county fur. .. 6.50

By-Product Foundry

Newark, N. J., del... 12.60-13.05
Chicago, outside del. 11.50
Chicago, delivered .. 12.25
Terre Haute, del. .. 12.00
Milwaukee, ovens... 12.25
New England, del.... 13.75
St. Louis, del. 12.02
Birmingham, ovens. 8.50
Indianapolis, del. .. 12.00
Cincinnati, del. 11.75
Cleveland, del. 12.30
Buffalo, del. 12.50
Detroit, del. 12.25
Philadelphia, del. .. 12.38

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol.... 14.00c
Toluol, two degree 27.00c
Solvent naphtha 26.00c
Industrial xylol 26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.) 14.75
Do. (1000 lbs. or over) 13.00

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers 7.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia $29.00

Pig Iron

No. 2 foundry is 1.75-2.25 sil.; 50c diff. for each 0.25 sil. above 2.25 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$25.00	$25.50	$24.50	$26.00
Birmingham, Ala.§	20.38	....	19.38	25.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.00	25.50	24.50	26.00
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	.....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	....	....	....
Sharpsville, Pa.	24.00–24.50	24.00–24.50	23.50–24.50	24.50–25.00
Sparrow's Point, Md.	25.00	.....	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00–24.50	24.00–24.50	23.50–24.50	24.50–25.00

§Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham†	25.61	.....	25.11	.....
Boston from Birmingham†	25.12	.....	....	.....
Boston from Everett, Mass.	25.50	26.00	25.00	26.50
Boston from Buffalo	25.50	26.00	25.00	26.50
Brooklyn, N. Y., from Bethlehem	27.50	28.00	.....	.....
Canton, O. from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†24.22	....	....	....
Cincinnati from Hamilton, O.	24.44	25.11	24.61	.....
Cincinnati from Birmingham†	24.06	.....	23.06	.....
Cleveland from Birmingham†	24.12	.....	23.12	.....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	.....
Milwaukee from Chicago	25.10	25.10	24.60	25.60
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	.....	.....
Newark, N. J., from Birmingham†	26.15	.....	.....	.....
Newark, N. J., from Bethlehem	26.53	27.03	.....	.....
Philadelphia from Birmingham†	25.46	.....	24.96	.....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....

Pittsburgh dist.: Add to Neville Island base, North and South Sides, 69c; McKees Rocks, 55c; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, 84c; Monessen, Monongahela City, $1.07; Oakmont, Verona, $1.11; Brackenridge, $1.24.

	No. 2 Fdry.	Malleable	Basic	Bessemer
Saginaw, Mich., from Detroit	26.31	26.31	25.81	26.81
St. Louis, northern	24.50	24.50	24.00	.....
St. Louis from Birmingham	†24.50	.....	23.62	.....
St. Paul from Duluth	26.63	26.63	.....	27.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50, base; $30.74 delivered Philadelphia.

Gray Forge

Valley furnace $23.50
Pitts. dist. fur. 23.50

Charcoal

Lake Superior fur. $28.00
do., del. Chicago 31.34
Lyles, Tenn., high phos. ... 28.50

Silvery

Jackson county, O., base, 6.00 to 6.50 per cent $29.50. Add 50 cents for each additional 0.25 per cent of silicon. Buffalo base $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

Manganese differentials in silvery iron and ferrosilicon not to exceed 50 cents per 0.50 per cent manganese in excess of 1 per cent.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky. $64.60

First Quality

Pa., Ill., Md., Mo., Ky. 51.30
Alabama, Georgia 51.30
New Jersey 56.00

Second Quality

Pa., Ill., Ky., Md., Mo. .. 46.55
Georgia, Alabama 38.00
New Jersey 49.00

Ohio

First quality 43.00
Intermediate 36.10
Second quality 36.00

Malleable Bung Brick

All bases $59.85

Silica Brick

Pennsylvania $51.30
Joliet, E. Chicago 58.90
Birmingham, Ala. 51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press $31.00
Wire cut 29.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk 22.00
net ton, bags 26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick $54.00
Chem. bonded chrome ... 54.00
Magnesite brick 76.00
Chem. bonded magnesite 65.00

Fluorspar

Washed gravel, duty pd., tide. net ton .... nominal
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $23.00
Do., barge 23.00
No. 2 lump 23.00

Ferroalloy Prices

Ferromanganese, 78-82%,
Carlots, duty pd., seab'd .. $120.00
Carlots, del. Pittsburgh 125.33
Carlots, f.o.b. So. f'ces. .. 145.00
Add $10 for ton, $13.50 for less ton, $18 for less than 200-lb. lots.

Spiegeleisen, 19-21%, gross ton, Palmerton $36.00

Manganese Briquets, Contract carloads, bulk freight allowed, per lb. 5.50c
Packed 5.75c
Ton lots 6.00c
Less-ton lots 6.25c
Less 200-lb. lots 6.50c
Spot ¼c higher.

Manganese Electro, 99.9+%, less car lots 42.00c

Chromium Metal, per lb. contained chromium

	Contract	Spot
98% Cr. ton lots	80.00c	85.00c
88% Cr. ton lots	79.00c	84.00c

Ferrocolumbium, 50-60% f.o.b. Niagara Falls, per lb. contained Cb on contract $2.25
Less-ton lots 2.30
(Spot 10c higher)

Chromium Briquets, per lb., freight allowed

	Contract	Spot
Carlots	8.25c	8.50c
Packed	8.50c	8.75c
Ton lots	8.75c	9.00c
Less-ton lots	9.00c	9.25c
Less 200 lbs.	9.25c	9.50c

Ferrochrome, 66-70%, freight allowed, 4-6% carbon, per pound contained (chrome)
Carloads 13.00c
Ton lots 13.75c
Less-ton lots 14.00c
Less than 200-lb. lots 14.25c

67-72%, low carbon, cts. per pound:

	Car loads	Ton lots	Less ton	Less 200 lbs.
2% C.	19.50	20.25	20.75	21.00
1% C.	20.50	21.25	21.75	22.00
0.20% C.	21.50	22.25	22.75	23.00
0.10% C.	22.50	23.25	23.75	24.00

Spot is ¼c higher.

Ferromolybdenum, 55-75%, per lb. contained molybdenum, f.o.b. furnace 95.00c

Calcium Molybdate (Molyte), 40-45% Mo., per lb. contracts, f.o.b. producers plant 80.00c

Molybdic Oxide Briquets, 48-52% Mo. per lb. contained, f.o.b. producers plant ... 30.00c

Molybdenum Oxide, (In 5 and 20 lb. mo. contained cans) 53-63 mo. per lb. contained f.o.b. producers' plants .. 80.00c

Molybdenum Powder, 99%, f.o.b. York, Pa., per lb. in 200-lb. kegs $2.60
Do., 100-200 lb. lots 2.75
Do., under 100-lb. lots ... 3.00

Ferrophosphorus, 17-19%, gross ton carloads, f.o.b. sellers' works, $3 unitage, freight equalized with Rockdale, Tenn. for 18% phos.
Contract $58.50
Spot 62.25
23-26%, $3 unitage, freight equalized with Mt. Pleasant, Tenn., for 24% phos.
Contract 75.00
Spot 80.00

Ferrosilicon, Gross tons, freight allowed, bulk

	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

(Above for contracts; spot ¼c higher)

Silicon Metal, Spot ¼-cent higher (Per Lb., Contracts):

	1% Iron	2% Iron
Carlots	14.50c	13.00c
Ton lots	15.00c	13.50c
Less-ton lots	15.25c	13.75c
Less 200 lbs.	15.50c	14.00c

Silicon Briquets, Contract 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 4.25c
Spot ¼c higher on less ton lots; $5 higher on ton lots and over.

Siliconanganese,

	1½%	2½%
Carbon		
Carloads (contract)	$128.00	$118.00
Ton Lots (contract)	140.50	130.50

Freight allowed spot $5 above contract

Ferrotungsten, (All prices nominal) Carlots, per lb. contained tungsten $1.90

Tungsten Metal Powder, (Prices Nominal) 98-99 per cent, per pound, depending upon quantity .....$2.60-$2.65

Ferrotitanium, 40-45%, f.o.b. Niagara Falls, per lb. contained in ton lots $1.23
Less ton lots 1.25
20-25%, C. 0.10 max., in ton lots per lb. contained Ti 1.35
Less-ton lots 1.40
(Spot 5c higher)

Ferro-Carbon-Titanium, 15-20% Titanium,

	6-8% C	3-5% C
Carlots, contract, f.o.b. Niagara Falls, freight allowed to destinations east of Mississippi and north of Baltimore and St. Louis	$142.50	$157.50

Ferrovanadium, 35-40%, contract per pound contained vanadium .....$2.70-$2.80-$2.90
(Spot 10c higher)

Vanadium Pentoxide, Per lb. contained, contracts $1.10
Do., spot 1.15

Zirconium Alloy, 12-15%, carloads, contract, bulk $102.50
Packed 107.50
Ton lots 108.00
Less ton lots 112.50
Spot $5 a ton higher
35-40%, contract, carloads, bulk or package, per lb. alloy 14.00c
Do., ton lots 15.00c
Do., less-ton lots 16.00c
Spot is ¼-cent higher

Alsifer, Per lb., f.o.b. Niagara Falls.

	Contract	Spot
Carlots	7.50c	8.00c
Ton lots	8.00c	8.50c

Simanal, Per lb. of alloy, contracts, freight allowed (approx. 20% Si, 20% Mn, 20% Al)

Carlots	Ton Lots	Ton Lots
10.50c	11.00c	11.50c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	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	4.48	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	5.26	3.31	4.06	8.56	7.10
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.05	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.52	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.00	4.92	3.47	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	3.30	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.85	5.25	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.18	4.23	4.73	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
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	6.00	....	4.42	....	....
Memphis	4.15	4.35	4.35	4.20	4.20	5.96	4.35	....	6.00	....	4.56	....	....
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.80	3.75	....	4.50	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.49	4.49	6.09	4.19	....	5.79	....	4.69	....	....
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	....	4.80	5.00	4.60	....	....
Houston, Tex.	3.75	5.95	5.95	4.10	4.10	5.50	4.20	....	5.25	....	7.15	....	....
Seattle	4.00	4.00	5.20	4.75	4.75	6.50	4.75	7.25	6.00	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	5.00	....	5.75	....	....
Los Angeles	4.15	5.45	7.25	4.95	4.95	7.20	5.10	7.30	6.30	....	6.60	11.35	10.35
San Francisco	4.00	5.20	6.80	4.70	4.70	6.40	4.70	7.20	6.45	....	7.05	11.60	10.60

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	6.45	....	8.75	8.60	9.40
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	9.05
San Francisco	6.05	10.60	9.60	9.45	10.10

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 pounds and over, Portland, Seattle; 400-14,999 Twin Cities; 400-3999 Birmingham; 400 pounds and over in Memphis; Los Angeles, bars over 4-in. wide, 1-in. thick, 4.95c.

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; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 1 to 10 bun. in Los Angeles; 300 and over 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; any quantity in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle, 1 to 99 pounds in Los Angeles; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

EUROPEAN IRON, STEEL PRICES

Dollars at $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	Gross Tons f.o.b. U.K. Ports	BRITISH £ s d
Merchant bars, 3-inch and over	$66.50	16 10 0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20 0 0
Structural shapes	2.95c	15 10 0
Ship plates	2.90c	16 2 6
Boiler plates	3.17c	17 12 6
Sheets, black, 24 gage	4.00c	22 5 0
Sheets, galvanized, corrugated, 24 gage	4.61c	25 12 6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.20	1 10 9

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

		£ s d
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$25.79	6 8 0(a)
Basic pig iron	24.28	6 0 6(a)
Furnace coke, f.o.t. ovens	7.40	1 16 9
Billets, basic soft, 100-ton lots and over	49.37	12 5 0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14 10 6
Merchant bars, rounds and squares, under 3-inch	3.17c	17 12 0††
Shapes	2.77c	15 8 0††
Ship plates	2.91c	16 3 0††
Boiler plates	3.06c	17 0 6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22 15 0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26 2 6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	23 15 0
Bands and strips, hot-rolled	3.30c	18 7 0

(a) del. Middlesbrough 5s rebate to approved customers. ††Rebate 15s on certain conditions.

Ores

Lake Superior Iron Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract.	12.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Chinese wolframite, net ton, duty pd.	$24.00
Brazil iron ore, 68-69%, ord.	7.50c
Low phos. (.02 max.)	8.00c

F.O.B. Rio Janeiro.

Scheelite, imp.	23.50-24.00
Chrome ore, Indian, 48% gross ton	.....

Manganese Ore

Including war risk but not duty, cents per unit cargo lots

Caucasian, 50-52%	.....
So. African, 50%	68.00-70.00
Indian, 50%	68.00-70.00
Brazilian, 46%	68.00-70.00
Chilean, 47%	68.00-70.00
Cuban, 50-51%, duty free	.....

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

OTHER THAN RAILROAD GRADES (a) (b)	Pittsburgh, *Wheeling, *Johnstown, Weirton, Steubenville	Youngstown, *Warren, Canton, Sharon	Chicago	Kokomo, Ind.	Bethlehem	*East. Pa.	Sparrows Pt.	Cleveland	Buffalo	Cincinnati, Ashland, Ky., Portsmouth, O. Middletown, O.	St. Louis	Detroit	Duluth	Alabama City, Atlanta, Birmingham	Los Angeles, San Francisco	Minnequa, Colo., Portland, Oreg.	Seattle, Wash.
No. 1 heavy melting	$20.00	$20.00	$18.75	$18.25	$18.25	$18.75	$18.75	$19.50	$19.25	$19.50	$17.50	$17.85	$18.00	$17.00	$17.00	$16.50(f)	$14.50
No. 1 hyd. comp. black sheets	20.00	20.00	18.75	18.25	18.25	18.75	18.75	19.50	19.25	19.50	17.50	17.85	18.00	17.00	17.00	16.50(f)	14.50
No. 2 heavy melting	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.50	18.25	18.50	16.50	16.85	17.00	16.00	16.00	15.50(f)	13.50
Dealer No. 1 bundles	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.50	18.25	18.50	16.50	16.85	17.00	16.00	16.00	15.50(f)	13.50
Dealer No. 2 bundles	18.00	18.00	16.75	16.25	16.25	16.75	16.75	17.50	17.25	17.50	15.50	15.85	16.00	15.00	15.00	14.50(f)	12.50
Mixed borings and turnings	15.25	15.25	14.00	14.25	13.50	14.00	14.00	14.75	14.50	14.75	12.75	13.10	. . .	12.25(d)	12.25	11.75(f)	9.75
Machine shop turnings	15.50	15.50	14.25	14.50	13.75	14.25	14.25	15.00	14.75	15.00	13.00	13.35	15.50	15.00(d)	12.50	12.00(f)	10.00
Shovel turnings	16.50	16.50	15.25	15.50	14.75	15.25	15.25	16.00	15.75	16.00	14.00	14.35	16.50	16.00(d)	13.50	13.00(f)	11.00
No. 1 busheling	19.50	19.50	18.25	17.75	17.75	18.25	18.25	19.00	18.75	19.00	17.00	17.35	17.50	16.50(d)	16.50	16.00(f)	14.00
No. 2 busheling	15.50	15.50	14.25	13.75	13.75	14.25	14.25	15.00	14.75	15.00	13.00	13.35	13.50	12.50(d)	12.50	12.00(f)	10.00
Cast iron borings	15.75	15.75	14.50	14.00	14.00	14.50	14.50	15.25	15.00	†15.25	13.25	13.60	13.75	12.75(d)	12.75	12.25(f)	10.25
Uncut structurals and plate	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.50	18.25	18.50	18.50	16.85	17.00	16.00(d)	16.00	15.50(f)	13.50
No. 1 cupola	21.00	21.00	20.00	20.00	22.50	23.00	22.00	22.00	20.00	21.00	20.00	20.35	19.00	20.00(e)	19.50	18.00(g)	18.00
Heavy breakable cast	19.50	19.50	18.50	18.50	21.00	21.50	21.00	20.50	18.50	19.50	18.50	18.85	17.50	18.50(e)	18.00	16.50(g)	17.00
Stove plate	19.00	. . .	17.00	16.00	18.00	18.50	18.00	18.00	19.00	17.50	17.00	14.10	16.00	17.00(e)	16.50	15.00(g)	14.00
Low phos. billet, bloom crops	25.00	25.00	23.75	23.75	23.25	23.75	23.75	24.50	24.25	24.50	22.50	22.85	23.00	22.00(e)	22.00	20.50(g)	19.50
Low phos. bar crops and smaller	23.00	23.00	21.75	21.75	21.25	21.75	21.75	22.50	22.25	22.50	20.50	20.85	21.00	20.00(e)	20.00	18.50(g)	19.50
Low phos. punch., plate scrap**	23.00(c)	23.00	21.75	21.75	21.25	21.75	21.75	22.50	22.25	22.50	20.50	20.85	21.00	20.00(e)	20.00	18.50(g)	17.50
Machinery cast cupola size***	22.00	22.00	21.00	21.00	23.50	24.00	23.50	23.00	21.00	22.00	21.00	21.35	20.00	21.00(e)	20.50	19.00(g)	19.00
No. 1 machine cast, drop broken, 150 pounds and under	22.50	22.50	21.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50	21.50	21.85	20.50	21.50(e)	21.00	19.50(g)	19.50
Clean auto cast	22.50	22.50	21.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50	21.50	21.85	20.50	21.50(e)	21.00	19.50(g)	19.50
Punchings and plate scrap‡‡	22.00(c)	22.00	20.75	20.75	20.25	20.75	20.75	21.50	21.25	20.50	19.50	19.85	20.00	19.00(e)	19.00	17.50(g)	16.50
Punchings and plate scrap§§	21.00(c)	21.00	19.75	19.75	19.25	19.75	19.75	20.50	20.25	19.50	18.50	18.85	19.00	18.00(e)	18.00	16.50(g)	15.50
Heavy axle and forge turnings	19.50(c)	19.50	18.25	18.25	17.75	18.25	18.25	19.00	18.75	18.00	17.00	17.35	17.50	16.50(e)	16.50	15.00(g)	14.00
Medium heavy elec. furnace turnings	18.00(c)	18.00	16.75	16.75	16.25	16.75	16.75	17.50	17.25	16.50	15.50	15.85	16.00	15.00(e)	15.00	13.50(g)	12.50
GRADES ORIGINATING FROM RAILROADS																Kansas City	
No. 1 R.R. heavy melting steel	21.00	21.00	19.75	19.25	. . . .	19.75	19.75	20.50	20.25	20.50	18.50	18.85	19.00	18.00(e)	18.00	17.00	15.50
Scrap rails	22.00	22.00	20.75	20.25	. . . .	20.75	20.75	21.50	21.25	21.50	19.50	19.85	20.00	19.00(e)	19.00	18.00	16.50
Rerolling quality rails	23.50	23.50	22.25	21.75	. . . .	22.25	22.25	23.00	22.75	23.00	21.00	21.35	21.50	20.50(e)	20.50	19.50	18.00
Scrap rails 3 feet and under	24.00	24.00	22.75	22.25	. . . .	22.75	22.75	23.50	23.25	23.50	21.50	21.85	22.00	21.00(e)	21.00	20.00	18.50
Scrap rails 2 feet and under	24.25	24.25	23.00	22.50	. . . .	23.00	23.00	23.75	23.50	23.75	21.75	22.10	22.25	21.25(e)	21.25	20.25	18.75
Scrap rails 18 inches and under	24.50	24.50	23.25	22.75	. . . .	23.25	23.25	24.00	23.75	24.00	22.00	22.35	22.50	21.50(e)	21.50	20.50	19.00

*Johnstown, Pa., and Warren, O., not bases for railroad grades; Wheeling railroad only. Eastern Pa. includes Coatesville, Claymont, Conshohocken, Phoenixville and Harrisburg as bases only for "other than railroad grades"; Philadelphia and Wilmington are Eastern Pa. bases only for railroad grades. †Base price at Portsmouth and Ashland; Cincinnati, Middletown 25 cents less. **¾-inch and heavier, cut 12 inches and under; ***may include clean agricultural cast; ‡‡under ¾-inch to ¼-inch, cut 12 inches and under; §§under ¼-inch to No. 12 gage, cut 12 inches and under. (c) add $1.75 at Pittsburgh. (d) Bases at Alabama City and Birmingham only. (e) Bases at Birmingham only. (f) Minnequa only. (g) Portland only.

OTHER BASE PRICES: Machine shop turnings $17.60, Alloy, W. Va., $13.35 Toledo, O.; **Shoveling turnings,** $14.35 Toledo; **cast iron borings,** $13.60 Toledo; **No. 1 cupola cast,** $19 Minneapolis and St. Paul, $20.50 Chattanooga, $21 Radford, Va. and $22 Phillipsdale; Bridgeport and Worcester; **Heavy breakable cast,** $20.50 Phillipsdale, Bridgeport and Worcester, $17.50 Minneapolis and St. Paul; **Stove plate** $16 Minneapolis and St. Paul, $17.50 Chattanooga, $18 Radford, Va., $15.60 Toledo and $17.50 Phillipsdale, Bridgeport and Worcester; Machinery cast cupola size $21.50 Chattanooga, $22 Radford, Va. and $23 Phillipsdale, Bridgeport and Worcester; **No. 1 machinery cast, drop broken** $22 Chattanooga, $22.50 Radford, Va. and $23.50 Phillipsdale, Bridgeport and Worcester; **Clean auto cast** $22 Chattanooga, $22.50 Radford, Va. and $23.50 Phillipsdale, Bridgeport and Worcester.

(a) The grades specified are, except dealers' No. 1 and No. 2 bundles and uncut structural and plate scrap, as named and defined in the simplified recommendations R-58-36 of the Department of Commerce which shall be the governing specifications for iron and steel scrap hereunder (other than railroad grades). Dealers' No. 1 bundles shall consist of new, clean black sheet scrap, hydraulically compressed in the dealer's yard. Dealers' No. 2 bundles shall consist of old fender and body scrap, and shall in no case command a premium. (b) These grades (other than railroad grades) represent the major classifications of iron and steel scrap. The maximum prices of superior or inferior grades shall continue to bear the same comparable relationship to those major grade classifications as heretofore existed between the prices of such superior or inferior grades and the prices of the major grades.

Maximum price at shipping point: A shipping point is the point from which the scrap is to be shipped to a consumer. Maximum price at which a grade of scrap may be sold f.o.b. its point of shipment is the shipping point of such scrap. **For shipping points located within a basing point,** the shipping point price is determined by taking the basing point price and deducting actual transportation costs to the consumer's plant within the basing point. Exception: Shipping point price within the Cincinnati basing point, for all grades other than No. 1 cupola, heavy breakable, stove plate, machinery cast (cupola size), No. 1 machinery cast (drop-broken 150 lbs. and under) and clean auto cast, shall in no case exceed basing point prices minus 80 cents. **For shipping points outside a basing point,** the shipping point price is determined by taking the nearest basing point and subtracting the lowest transportation charge. (Example: No. 1 steel shipped from Toledo takes the Detroit base of $17.85 minus transportation of $1.52 or $16.33. This shipping point price is the same to all consumers wherever located.) **Exceptions:** Shipping point of any grade not listed as having a basing point in New England is the Johnstown base minus the all-rail freight from the shipping point to Johnstown. Shipping point prices for New York City, Brooklyn, New York and New Jersey must be computed on the basis of the Bethlehem base although nearer to Buffalo in terms of barge transportation.

Maximum prices to consumers: Maximum price at which any grade (other than railroad) may be delivered to a consumer wherever located is the shipping point price plus actual transportation charges. Where shipment is by water, not more than 75 cents per gross ton may be included for handling charges at dock. Maximum delivered price in no case shall exceed by $1 a ton the nearest maximum base price in terms of transportation charges. (Example: The $1 excess is the so-called "springboard" arrangement. Youngstown consumers can draw on the Cleveland area for No. 1 steel scrap by taking the Cleveland base of $19.50, subtracting the Cleveland switching charge of 65 cents and adding freight to Youngstown of $2.08. The resulting delivered figure of $20.93 is within the "springboard" limit of $1 over the Youngstown base of $20.)

Billet and bloom crops originating in the Pittsburgh district may be sold within or without the district at the Pittsburgh base price plus up to, but not more than $2.50 in transportation charges. Maximum prices for **unprepared scrap** shall be $2.50 a ton less than the maximums for corresponding grade or grades of prepared scrap. **Remote scrap** takes a maximum delivered price $5 above the nearest basing point price.

Railroad grades: Where a railroad operates in two or more basing points, the highest base applies to consumers anywhere on the line. (Example: New York Central Railroad uses the $21 Pittsburgh base on No. 1 steel since the P. & L. E. operates there). Exception: Switching charges of 84 cents a ton must be subtracted from prices on scrap originating from railroads operating in Chicago and sold for consumption outside Chicago. Where railroad scrap is shipped to an off-the-line consumer, the highest maximum on-the-line price or the nearest basing point price, whichever is higher, applies. For scrap rails and rerolling rails originating from mines, logging roads, etc., take the nearest basing point and subtract the lowest established transportation charge to determine shipping point price, which need not be less than $13.50 for scrap rails, $15 for rerollers.

Commissions: Brokers are allowed a commission up to 50 cents a ton above maximum prices to consumers, including export.

Export prices: Maximum on No. 1 heavy melting steel (other than railroad) is the domestic shipping point price plus lowest transportation charge to point of export. Maximum price to a domestic consumer on line of the originating railroad plus transportation to point of export applies on No. 1 railroad steel. Customary differentials apply on other railroad and non-railroad grades.

Sheets, Strip

Sheet & Strip Prices, Page 122

Sheet demand shows continued trend toward a larger percentage of defense tonnage. Although consumers without defense work continue to press for deliveries, a slight lessening in pressure for booking of further tonnage is noted. Manufacturers of automobile parts and accessories are curtailing output in proportion with automotive production. In other lines, where production has been curtailed by government order, demand for sheets has not been materially reduced currently.

Deliveries to nondefense consumers are uncertain and subject to deferment as additional defense orders come in. Uncertainty exists as to the effect of the new OPM production requirements plan and sheetmakers are entering nondefense orders for delivery next year with caution, contingent on results of the new plan. Clarification of this situation is expected to come shortly.

OPM limitation to 72 inches wide for plates seems likely to release tonnage from some wide strip-sheet mills and divert it to regular plate mills, owing to the ⅝-inch thickness limitation on the wide mills. The latter have been rolling ¾-inch hot-rolled material for ship and car building and may continue that course.

Some difficulty continues in the case of nonintegrated sheet mills in obtaining sufficient sheet bars.

Galvanized sheet costs have increased to such an extent that representations are likely to be made soon for permission to increase prices. At present producers claim they are operating at a loss in view of zinc prices and other factors.

Incoming orders for narrow cold-rolled strip steel are slightly below shipments with the ratio of defense-rated specifications increasing. The difference between new tonnage and shipments, however, is narrowing and purchases are at about the November rate. Strong demand prevails for stainless and alloy strip, distribution of the former being strictly under priority control. Requirements of the aircraft industry for alloy strip are heavy and additional inquiry is out for larger caliber cartridge links. Against high ratings, deliveries of hot strip are fairly satisfactory, but any tonnage outside that category is uncertain as to shipment.

Plates

Plate Prices, Page 122

First step under General Allocation Order No. 1, effective Dec. 1, was complete allocation of steel plates. After Dec. 1 all production, delivery or acceptance of plates will be under orders by the director of priorities.

The plan follows the pattern which has been used with much success in pig iron distribution. Producers are required to file with the iron and steel branch of OPM, on the fifteenth of each month, a schedule of production and shipments for the coming months and a statement of unfilled orders upon which allocations will be made.

Production in excess of schedule will be disposed of only under direction of the priorities division. The immediate purpose of the order is to insure continuous flow of plates into defense production and provide a check against hoarding and excessive inventories.

One effect of the allocation plan is shipment of much heavier tonnages to shipyards in December. Some mills find practically their entire sheared plate capacity will be absorbed in this way. Shops supplying equipment for ships, ventilators, blowers, propulsion and miscellaneous machinery are being covered by allocations but current supplies are being consumed without increase in inventory.

As a result of increased shipments to shipyards some platemakers have been forced to advise many customers, some with high priorities, that anticipated requirements for December cannot be met.

New York Central is figuring on about 30,000 tons of steel, principally plates, for its 1942 car repair program. This road originally

planned for use of 50,000 tons for this purpose.

PLATE CONTRACTS PLACED

200 tons, large diameter pipe, Missouri ordnance plant, Louisiana, Mo., through Bechtel-McCone-Parsons Corp., Wilmington, Del., to Bethlehem Steel Co., Bethlehem, Pa.

PLATE CONTRACTS PENDING

Unstated, three water tanks, 150,000 to 250,000 gallons capacity each, for Defense Public Works, near Fort Lewis; bids in to Parker & Hill, Seattle, engineers, Dec. 2; alternates for reinforced concrete.

Bars

Bar Prices, Page 123

A huge shell program in process of formulation for some weeks is expected to be announced within the next few weeks and is likely to require at least 1,000,000 tons of shell rounds. This probably will be allocated among several producers and will add to the already large backlogs on mill books.

Meanwhile, barmakers hope they will be able to make some shipments on contracts long on their books, to users with lower priority numbers or no preference rating.

Makers of agricultural implements are advising suppliers of an A-8 priority rating. This has been made effective to Feb. 1 and supplants previous rating of B-1 for new equipment manufacture and A-10 for emergency repairs.

Imposition of the shell program probably will result in disrupting planned deliveries and only top ratings are likely to be carried through.

Cold drawers have been invited to Washington Dec. 9 to discuss their share in the impending shell program and to be advised in greater detail concerning the new requirements plan. Incidentally, the first of the new forms to be used in connection with the plan have been received, with instructions that they be made out with all possible haste so that they can be returned to OPM for analysis in time to get the plan under way for first quarter.

New England shops have received additional contracts for small arms and have filed covering orders to supplement the heavy tonnage against which monthly specifications are being issued. Some contracts extend well through last half of 1942. Deliveries for this purpose are steady and well maintained.

Pipe

Pipe Prices, Page 123

Pipe demands is heavy, both for steel and cast iron. Distributors have difficulty in meeting specifications from broken assortments. Cast pipe foundries are operating to the limit of their pig iron supply.

STEEL PIPE PLACED

Unstated tonnage, 100 16-foot lengths electric lap welded steel pipe, United States engineer, Charleston, S. C., to Naylor Pipe Co., Chicago, inv. 13.

CAST PIPE PENDING

1550 tons, 30 to 8 inch centrifugal, Airport Way improvement, Seattle; bids in Dec. 4; alternates for 30-inch electric welded steel pipe.

900 tons, mostly 16-inch, Fort Lewis, Wash., water system extension; L. Colucclo, Seattle, low at $80,540, for general contract.

800 tons, 6 to 16-inch, Kelso, Wash.; bids in but award postponed.

290 tons, 6-inch, water line, Ft. Leonard Wood, Mo.; bids Dec. 9, constructing quartermaster.

Unstated tonnage, 17,000 lineal feet 6-inch cast iron pipe for water lines at Fort Leonard Wood, Mo.; bids Dec. 9 to construction quartermaster at fort.

Wire

Wire Prices, Page 123

Insufficient supplies of wire rods are handicapping finishing operations to a greater extent in most mills. An integrated mill in the East has appealed to OPM for relief as the proportion of defense orders has been mounting to an extent that shipments could not be met. Specialty departments are sold ahead heavily and processing equipment is taxed to the utmost. Rope mills continue to press for heavy deliveries to meet demand for rope and cable for shipbuilding supply.

Nail shortage continues as demand for building and other defense purposes holds at a high point.

Rails, Cars

Track Material Prices, Page 123

Domestic freight car awards for November totaled 2222 units, a slight decline from October. Aggregate for 11 months is 113,093, compared with 59,708 in the corresponding period last year. Further comparisons follow:

	1941	1940	1939	1938
Jan.	15,169	360	3	25
Feb.	5.508	1,147	2,259	109
March . . .	8,074	3,104	800	680
April	14,645	2,077	3,095	15
May	18,630	2,010	2,051	6,014
June	32,749	7,475	1,324	1,178
July	6,459	5,846	110	0
Aug.	2,668	7,525	2,814	182
Sept.	4,470	9,735	23,000	1,750
Oct.	2,499	12,195	19,634	2,537
Nov.	2,222	8,234	2,650	1,232
11 mos. . .	113,093	59,708	57,740	13,822
Dec.	. . . . . .	7,181	35	2,581
Total . .	. . . . . .	66,889	57,775	16,303

A few moderate sized lists are pending, with action likely this month. These include a number of cars still to be placed for several United States Steel Corp. subsidiaries. It seems probable total for the year will be close to 117,000 cars.

Export demand has increased in recent weeks, practically all under lease-lend and considerable of this may be placed before the end of the year. Some substantial locomotive buying for lease-lend has been done recently.

Office of Price Administration has fixed maximum price for relaying rails. Two classes are set up, rails from Class I railroads, switching and terminal companies and those from other sources, short lines, interurban lines and abandoned roads. Price on rails of the first class are set at $25 per gross ton f.o.b. any station on the road. Such rails may be resold by jobbers at $30 per ton. For all other types the ceiling is $30 per ton at shipping point, minus freight charges between shipping point and basing point nearest in terms of transportation charge. Some 19 basing points are named for rails other than from Class I roads. Relaying rails from warehouses equipped with reconditioning machinery may be sold, f.o.b. warehouse, at $2.25 per 100 pounds for less than five tons, $2 for five tons to less than 25 tons, and $1.60 for 25 tons or over.

Buying under lease-lend provisions for export may increase within the next few months. Illustrative of what locomotive builders expect is the statement of William C. Dickerman, chairman, American Locomotive Co., before the American Society of Mechanical Engineers, that American locomotive builders will be asked to deliver 1000 units next year for domestic use and more than 250 for export.

CAR ORDERS PLACED

Aliquippa & Southern, fifty 100-ton all steel gondolas, to own shops.

Monongahela Connecting, thirty-five 120-ton gondolas, to own shops.

Niagara Alkali Co., ten 40-ton tank cars, to American Car & Foundry Co., New York.

Norfolk & Western, twenty-five 70-ton hoppers, to own shops.

Warren Petroleum Corp., twenty 50-ton tank cars, to American Car & Foundry Co., New York.

Weirton Steel Co., eighteen 50-ton flat cars, to own shops.

LOCOMOTIVES PLACED

Brecon Loading Corp., one 65-ton diesel-electric locomotive, to General Electric Co., Schenectady, N. Y.

War Department, one 65-ton diesel-electric locomotive, for delivery to Raritan Arsenal, Metuchen, N. J., to the H. K. Porter Co. Inc., Pittsburgh.

War Department, one locomotive, to Vulcan Iron Works, Wilkesbarre, Pa.

LOCOMOTIVES PENDING

Navy department, one 50-ton diesel-electric locomotive; bids opened Dec. 2.

Wabash, three 1000-horsepower diesel-electric switchers, two for Detroit, one for Chicago; court permission given.

RAIL CONTRACTS PENDING

Wabash, 5000 tons [illegible]-pound rails, plus accessories; Court permission given.

Tin Plate

Tin Plate Prices, Page 122

Tin plate market shows no indication of change, mill backlogs continue heavy and production is esti-

mated at 92 per cent, virtual capacity of active mills. Some plants find difficulty in obtaining sufficient semifinished steel.

Nonintegrated tin plate producers are watching closely development of general allocations order No. 1 covering allocations of carbon and alloy steel plate and a similar order, expected soon, covering cold-drawn bar mill products. These may have considerable effect as both affect raw material supply, including coiled strip and tin bars. The cold-drawn steel order is expected to establish a definite rating for nonintegrated users on rolling schedules of integrated mills.

Structural Shapes

Structural Shape Prices, Page 123

Allocation of structural steel is not expected to be applied until total defense business rises above monthly production. Until it is indicated the present priority plan will continue in effect.

Analysis of recent awards showed 88 per cent were for direct or indirect defense, the remaining 12 per cent for nondefense projects, though some of the latter may have obtained ratings. About 25 per cent were for federal work, such as Bonneville dam, which has been under construction for some time. A similar analysis of recent inquiries showed about 50 per cent were for direct defense and 30 per cent for indirect defense. Some of the remaining 20 per cent may carry ratings. This drop in nondefense inquiry is due in part to refusal of fabricators to bid on unrated tonnage.

Inquiry for large tonnages continues to decline though there is some increase in small lots which can be filled from warehouse. Several large defense projects have been approved but have not been advanced to the bidding stage. Fabricators have sufficient business to carry well through January and the new projects will furnish much additional work.

SHAPE CONTRACTS PLACED

2400 tons, addition, building 199, navy yard, Boston, to American Bridge Co., Pittsburgh, direct; Thomas O. Connor Co., Boston, contractor.

2700 tons, turbine shop No. 13, General Electric Co., Erie, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

2300 tons, five hangars, Bermuda base, to unstated fabricator.

2200 tons, additions, buildings GL and GF, also new manufacturing structure, Watervliet, N. Y., arsenal, to Bethlehem Steel Co., Bethlehem, Pa.; direct bids, awarded on basis of delivery.

914 tons, camouflage building and hangar, Boeing Aircraft Co., Wichita Falls, Kans., to Kansas City Structural Steel Co., Kansas City, Kans.; bids Oct. 30.

860 tons, plant, Lycoming division, Aviation Mfg. Co., Williamsport, Pa., to Anthracite Bridge Co., Scranton, Pa.

600 tons, one-section seaplane hangar, naval air station, Quonset Point, R. I., to Bethlehem Steel Co., Bethlehem, Pa.

570 tons, Frances Cabrini Homes, Chicago, for Chicago Housing Authority, to New City Iron Works, Chicago; S. N. Nielson Co., Chicago, contractor; bids Oct. 15.

500 tons, mill building, Vanadium Corp. of America, Niagara Falls, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

500 tons, hangar, Panama, to U. S. Steel Export Co.

320 tons, various bridges, Kansas and Louisiana, for Missouri Pacific railroad, to American Bridge Co., Pittsburgh.

300 tons, powerhouse, Westinghouse Electric & Mfg. Co., Lester, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

299 tons, bridge RC-41-47, Post Creek, N. Y., to American Bridge Co., Pittsburgh.

250 tons, estimated, two demountable hangars, Basie Flying Field, Waco, Tex., to J. B. Klein Iron & Foundry Co., Oklahoma City, Okla.; Cage Bros. & F. M. Reeves & Sons Inc., Midland, Tex., contractors.

215 tons, four outriggers, Tietjen & Lang shipyard, Kearny, N. J., to American Bridge Co., Pittsburgh.

170 tons, building 42M, General Electric

SHAPE AWARDS COMPARED

	Tons
Week ended Dec. 6	16,661
Week ended Nov. 29	37,818
Week ended Nov. 22	11,718
This week, 1940	14,966
Weekly average, 1941	27,815
Weekly average, 1940	28,414
Weekly average, Nov., 1941	20,935
Total to date, 1940	1,366,442
Total to date, 1941	1,362,966

Includes awards of 100 tons or more.

Co., Lynn, Mass., to Lehigh Structural Steel Co., Allentown, Pa.

163 tons, state bridge and underpass, De Beque, Colo., to Minneapolis-Moline Power Implement Co., Minneapolis.

100 tons, shapes and bars, additional unit, International Harvester Co., Dallas, Tex., to Austin Bros., Dallas, and Southern States Steel Co., Dallas; George P. O'Rourke Construction Co., Dallas, contractor.

SHAPE CONTRACTS PENDING

4090 tons, shafts and tunnels, contract 7, Governor's Island, N. Y., for New York Tunnel Authority.

1800 tons, additional building, Chapman Valve Mfg. Co., Indian Orchard, Mass.; Stone & Webster Engineering Co., Boston, contractor; bids Dec. 15.

1500 tons or more, forge plant, Isaacson Iron Works, Seattle; bids to army quartermaster, Seattle, Dec. 5.

1000 tons, approach section, Hartford-East Hartford bridge, Connecticut; Alexander Jarvis Co., low.

1000 tons, powerhouse, Virginia Electric & Power Co., Norfolk, Va.; Stone & Webster Engineering Corp., Boston, contractor.

890 tons, power house, Central Illinois Public Service Co., Meredosia, Ill.; Sargent & Lundy, Chicago, engineers; bids Dec. 1.

735 tons, through truss bridge, Tioga county, Pennsylvania; bids to state highway department, Harrisburg, Pa., Dec. 12.

705 tons, girder spans, Yancopin, Ark., for Missouri Pacific railroad.

700 tons, crane girders and rails for storehouse, Bellevue, D. C.

640 tons, aviation gasoline plant, Atlantic Refining Co., Philadelphia.

530 tons, building extension, Railway Steel Spring division, American Locomotive Co., Latrobe, Pa.

215 tons, kettle and pan house buildings, ordnance plant, Marion, Ill., for government.

200 tons, addition, St. Joseph's hospital, Lowell, Mass.

135 tons, infirmary and class room building, Coast Guard, New London, Conn.; Tremeglio Bros., Waterbury, low.

130 tons, bridge repairs, various locations, for St. Louis-San Francisco railway.

130 tons, plate girder overpass bridge, Montgomery county, Pennsylvania; bids to state highway department, Harrisburg, Pa., Dec. 12.

120 tons, airplane hangar, Elmira, N. Y., for Chemung county, New York.

105 tons, overpass, route 54, section 1, Folsom, N. J.; bids Dec. 19, E. Donald Sterner, State Highway Commissioner, Trenton; also 56 tons reinforcing bars, A-4, rating.

100 tons or more, 150 90-foot radio towers, steel, lattice or tubular; bids Dec. 8, Signal Corps Procurement district, Philadelphia, cir. 51.

Unstated, six overhead cranes, Puget Sound navy yard; Cleveland Crane & Engine Co., Cleveland, low, $20,167 sch. A, $18,795 sch. B.

Reinforcing Bars

Reinforcing Bar Prices, Page 123

Civilian projects requiring reinforcing bars have almost disappeared and suppliers have sufficient defense demand that they are slow to bid on others. Currently sales are light although much tonnage is pending and awaiting formal award. Prospects are that numerous defense projects will reach the bidding stage soon after Jan. 1, involving heavy tonnage. Steel supply is short and as most suppliers are almost completely booked for some time to come only highly rated tonnage has any likelihood of receiving attention.

REINFORCING STEEL AWARDS

545 tons, Panama Canal, sch. inv. No. 950-42-Neg.-46, to Youngstown Sheet & Tube Co., Youngstown, O.

500 tons, Worthington Pump & Machinery Corp., Holyoke, Mass., to Truscon Steel Co., Youngstown, O.; United Engineers & Constructors Inc., Contractor.

425 tons, Panama Canal sch. inv. No. 950-420-Neg.-43, to Youngstown Sheet & Tube Co., Youngstown, O.

350 tons, gun plant, Pontiac, Mich., for Pontiac Motor Car Co., to Republic Steel Corp., Cleveland, through Truscon Steel Co., Youngstown, O.; O. W. Burke, contractor.

207 tons, Third avenue viaduct, Highland Park, Mich., to Republic Steel Corp., Cleveland, through Truscon Steel Co., Youngstown, O.

200 tons, municipal filtration plant, Newport News, Va., to Bethlehem Steel Co., Bethlehem, Pa.; Bass Engineering Co., contractor.

125 tons, inv. No. 6845-88, city of Cincinnati, to Pollak Steel Co., Cincinnati.

100 tons, defense plant building, U. S. Rubber Co., Naugatuck, Conn., to Ceco Steel Products Corp., New York.

100 tons, Tidal Basin bridge, Washington, D. C., to Bethlehem Steel Co., Bethlehem, Pa.; Charles H. Tompkins Co., Washington, contractor; 152 tons

structural steel to American Bridge Co., Pittsburgh, previously reported.

REINFORCING STEEL PENDING

1400 tons, concrete graving dock, part 4, navy yard, South Boston, Mass.; United Constructors Inc., Winona, Minn., low, bids Dec. 3.

1250 tons, highway and bridge projects, State of Connecticut; bids in.

838 tons, Panama, sch. 5772; bids Dec. 9, Washington.

500 tons, hospital, Springfield Memorial Hospital Association, Springfield, Ill.

400 tons, pier and wharf, Maryland Dry Dock Co., Baltimore; bids Dec. 8.

400 tons, administration engineers buildings, Wright field, Dayton, Ohio.

334 tons, state highway bridge, New York, New Haven & Hartford railroad, Hartford, Conn.; bids Dec. 2.

CONCRETE BARS COMPARED

	Tons
Week ended Dec. 6	2,562
Week ended Nov. 29	10,069
Week ended Nov. 22	5,851
This week, 1940	9,286
Weekly average, 1941	13,945
Weekly average, 1940	9,661
Weekly average, Nov., 1941	11,379
Total to date, 1940	482,825
Total to date, 1941	683,312

Includes awards of 100 tons or more.

310 tons, highway reinforcement, route 28, section 25B and 26A, Somerset county, New Jersey; bids Dec. 19, E. Donald Sterner, State Highway Commissioner, Trenton, A-4 ratings.

300 tons, addition, Chapman Valve Mfg. Co., Indian Orchard, Mass.; Stone & Webster Engineering Corp., Boston, contractor.

276 tons, building 87, packing plant, Morrell & Co., Ottumwa, Iowa; bids originally asked Oct. 21 now scheduled for Dec. 9.

250 tons, Northern States Power Co., St. Paul, Minn.; bids Nov. 26.

250 tons or more, forge plant, Isaacson Iron Works, Seattle; bids in to quartermaster, Seattle, Dec. 5.

240 tons, superstructure, Potomac river bridge, Sandy Hook, Md.; bids Dec. 16.

226 tons, state highway overpass, Groton, Conn.; bids Dec. 2.

209 tons, state bridges in King county, Washington; Peter Kiewit and Northwest Construction Co., Seattle, contractors.

200 tons, bridge, Franconia, N. H.

200 tons, concrete silos, Great Lakes Carbon Corp., Chicago; bids Dec. 2.

180 tons, state hospital for insane, Manitowoc, Wis., Maurice Schumacher, Minneapolis, low on general contract; bids Dec. 2; project originally bid Sept. 6 and subsequently rejected.

150 tons, viaduct, Lincoln-Cumberland, R. I.; bids Dec. 10, A-3 rating.

125 tons, coast guard buildings, New London, Conn.; Tremeglio Bros., Waterbury, low.

106 tons, three pumping stations, U. S. Engineer, Huntington, W. Va.; bids Dec. 2.

Unstated, Idaho state highway bridge, Potlatch river; J. F. Konen, Lewiston, Idaho, contractor.

Unstated, Montana state highway bridge, Yellowstone Trail highway; Roy L. Bair, Spokane, Wash., contractor, low at $203,000.

Scrap

Scrap Prices, Page 126

No relief in the scrap situation has appeared and high steel production continues to reduce available tonnages, with further reduction of steelmaking as supply dwindles. Current collection rate is far below consumption and consumers have slight margin.

A drop of 3 points in the production rate in eastern Pennsylvania is attributed to lack of scrap and Inland Steel Co. at Chicago plans reduction of steel output 10 per cent for December, a preliminary cut being put into effect last week. At Buffalo some curtailment already has been made and further reductions have been averted only by arrival of scrap from the head of the lakes. Close of navigation

Tool Steel Scrap

Cents per pound, to consumers fo.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%	1.40
Turnings, millings, solids under 5%	1.25

Molybdenum Types

Solid scrap, not less than 7% molybdenum, 0.50 vanadium	12.50
Turnings, millings, same basis	10.50
Solid scrap, not less than 3% molybdenum, 4% tungsten, 0.50 vanadium	13.50
Turnings, millings, same basis	11.50

within a few days will cut off this source of supply.

While no general system of allocations has been put in effect numerous instances have occurred in which scrap has been ordered shipped to consumers in most need. Five eastern mills recently shared in direct allocation of material from Brooklyn navy yard, including both prepared and unprepared scrap. One of the mills has facilities for handling unprepared scrap. Most definite orders for shipment have covered special scrap grades. This has interfered with normal flow through dealers, who normally provide such material to regular clients.

OPM has ordered shipment of 10,000 tons of steelmaking scrap to Inland Steel Co., Chicago, seven dealers participating in the movement. This will not be available in time to prevent reduction of steel output by this company. The material involved will be that originating in the district and will not increase available supply as a whole. In the past month or two considerable scrap has been diverted from the Chicago district to Ohio river points, causing greater shortage at Chicago.

Cast grades continue far below requirements and consumers seek larger supply of pig iron as an offset, though with little success. Establishment of cast scrap prices on an f.o.b. shipping point basis is said to be under consideration at Washington, presumably an effort to localize movement of this material.

In general movement of scrap through yards is about half normal tonnage. In spite of large accumulations of scrapped automobiles little tonnage is being received from this source. Railroad lists are much smaller than usual. More scrap is being shipped direct from producer to consumer.

Some remote scrap continues to appear but the total is relatively small and shipments are irregular. Yards of dealers contain little material as shipment is made as fast as it is prepared. Supply is expected to decrease as winter weather arrives, a normal result of the effect of cold on collections.

Pig Iron

Pig Iron Prices, Page 124

Pig iron allocations continue to be fairly satisfactory, most melters being given sufficient to continue production. December allotments are about the same as in preceding months, with slight changes here and there. Practically entire furnace production has been covered, leaving little iron for further assignment. An effort has been made to avoid cross hauls in delivery and this has met with considerable success.

New pig iron forms, PD 71-C, are expected to be available soon, to provide for adjustments in allocations where excess iron is available. They will be used to cover instructions by Washington to producers in such cases, it is announced.

Numerous melters have applied to their pig iron suppliers for prompt shipment of December quotas. The latter are unable to meet this request and must follow their usual method of spreading production as widely as possible, sending out tonnage as fast as it is produced.

While banking of blast furnaces during the captive mine coal strike cut into pig iron output, the total was not sufficient to affect the general situation materially and supply will not be reduced sufficiently to hamper defense production.

Warehouse

Warehouse Prices, Page 125

Steel warehouse shipments are at about 50 per cent of the rate a year ago. Inability of consumers to obtain their requirements from distributors is evidenced by increasing demand on mills for small lots, normally too small for mill consideration. Distributors are hopeful that the new allocations program now being developed may afford better distribution and provide tonnage closer to warehouse quotas.

Shapes are most difficult to obtain from warehouses, with sheets and bars also in short supply. As-

sortments of all forms are badly broken and consumers are forced to substitute other sizes and analyses in many cases. Pipe sales are high and stocks are becoming depleted by heavy movement for defense construction.

Variations in supply to warehouses causes much shopping around, one supplier often receiving shipment of some items of which others have been given none.

Pacific Coast

Seattle—Addition of Oregon state as a source of remote scrap, with privilege of absorbing excess freight charge, is favorable to scrap consumers here as they can compete with California melters in that state. Prices have not been altered in the Seattle market, though San Francisco and Los Angeles rates have been raised $2.50 per ton. Receipts are increasing, with fixed prices and conditions, and melters here anticipate no shortage of steel scrap, although foundries could absorb larger quantities of cast iron. Washington State Toll Bridge Authority will soon sell 3500 tons of salvage from the Narrows bridge.

For furnishing three 150,000-horsepower hydraulic turbines for Coulee power plant, Newport News Shipbuilding & Dry Dock Co. is low to Denver at $1,900,000; Woodward Governor Co., Rockford, Ill., low at $87,550, $93,100 and $93,600 for three governors, and Baldwin Locomotive Co., Eddystone, Pa., submitted a low combined bid of $2,496,600.

In the Puget Sound area navy yard shipbuilding contracts total $162,000,000, private shipbuilding $362,217,043 and airplane construction in Seattle $508,959,669.

Bids for about 1500 tons of shapes and 250 tons of reinforcing bars for the Isaacson Iron Works forging plant at Seattle, were opened by army quartermaster at Seattle Dec. 5. Henrik Vallee Co., Seattle, will be awarded the basic construction contract, low at $183,000, and Hellenthal Co., Seattle, was awarded the plumbing and heating contract at $92,929.

Need of additional machine tool equipment is indicated by the announcement that Willamette Hyster Co., Portland, is seeking subcontractors for boring mills and turret lathe work for fabrication jobs.

Work is reported begun at Fairview, Oregon, by United Engineering & Foundry Co., Pittsburgh, on the government aluminum fabricating plant, the proposed Tacoma aluminum reduction plans will cost $6,000,000 instead of the original $4,500,000 and plans are in the making for a $3,500,000 magnesium reduction plant at Spokane, Wash., using a new process developed at Washington State College, Pullman, by Bureau of Mines engineers.

Iron Ore

Iron Ore Prices, Page 125

November movement of Lake Superior iron ore to lower lake ports totaled 7,660,987 gross tons, exceeding the former November record of 7,333,828 tons in 1917. This compares with 5,404,113 tons in November, 1940, according to the Lake Superior Iron Ore Association.

Movement to Dec. 1 was 79,281,279 tons, compared with 63,700,467 tons to Dec. 1, 1940, and exceeds the record full season movement of 65,204,600 tons in 1929. November shipments were 41.76 per cent larger than in November, 1940, and the season total to Dec. 1 was 24.46 per cent over the same period last year.

With a large portion of the ore fleet still in service and weather conditions favorable the December movement may be between 1,000,000 and 1,500,000 tons, which would give the season total considerably more than 80,000,000 tons. Vessels remaining in service for the most part are the larger carriers which will continue to operate as long as weather permits.

Canadian vessels, permitted to carry ore between American ports under an amendment passed last summer, carried 72 cargoes, approximating 695,000 tons of ore. The provision will apply also to the 1942 season.

Shipments in gross tons for November were:

	November, 1941	November, 1940
Escanaba	385,314	386,524
Marquette	699,300	560,811
Ashland	536,633	573,146
Superior	2,119,654	1,236,880
Duluth	2,230,155	1,658,499
Two Harbors	1,636,151	925,526
U. S. Ports	7,607,207	5,341,386
Michipicoten	53,780	62,727
Grand Total	7,660,987	5,404,113
Increase from year ago	2,256,874	.....

Cumulative shipments for the season to Dec. 1 were:

	To Dec. 1, 1941	To Dec. 1, 1940
Escanaba	4,513,079	3,423,334
Marquette	5,606,527	5,477,604
Ashland	6,219,156	5,968,214
Superior	27,566,213	21,502,083
Duluth	20,115,431	16,267,848
Two Harbors	14,811,381	10,705,000
U. S. Ports	78,831,787	63,344,083
Michipicoten	449,492	356,384
Grand total	79,281,279	63,700,467
Increased from year ago	15,580,812	.....

Canada

Toronto, Ont.—In extending its program for production of war materials the Canadian government has increased steel requirements in this country far beyond the capacity of domestic mills. It is estimated that within the next twelve months Canada will require about 2,000,000 tons of steel in excess of capacity and efforts are being made to obtain this surplus from the

United States. Despite capacity mill production and record breaking imports, sufficient steel is not available to supply war industries and manufacturers of civilian goods. Thus, while the government has placed restrictions on civilian production of non-essentials and even some so-called essentials, scarcity of steel is the prime factor and a number of manufacturers interviewed recently state they are unable to get any delivery and even without curtailment regulations they would be unable to maintain production. All prices in Canada have been pegged and no changes are in prospect for iron and steel materials.

Further expansion in plate demand is indicated by announcement from Ottawa that 17 large twin-screw corvettes have been contracted with British Columbia shipbuilders, in addition to contracts previously placed. Canadian plate producers are accepting no orders, except from government sources and are assured of maximum production for plate mills for two years. Arrangements are under negotiation for substantial increase in plate imports from the United States.

Structural steel awards on wartime construction projects continue in good volume, with lettings for the past week about 9000 tons, and contracts pending for approximately 8000 tons. Fabricators are maintaining capacity operations and are several months behind in deliveries.

While regulation of deliveries of merchant pig iron to non-war plants, shipments to foundries have gained about 20 per cent in the past two or three weeks and now are holding around 6000 tons weekly. Basic iron sales are gaining, now averaging close to 1000 tons weekly. Inquiries for iron, however, are far in excess of supply and war industries are absorbing all available supplies. Pig iron production is at the highest rate in Canadian history and there is little prospect of further betterment in this direction unless additional blast furnaces are built.

No improvement is indicated in the iron and steel scrap markets. Despite persistent efforts to bring out tonnage there has been only minor betterment in offerings. Steel mills and electric furnace operators are pressing for steel grades and if they are to maintain current steel production schedules larger quantities of scrap must be found. Cast scrap and stove plate are in small supply and further curtailment in consumer operation are inevitable.

Steel in Europe

Foreign Steel Prices, Page 125

London — (*By Cable*) — Little change has occurred in the general iron and steel situation in Great Britain. Imports of American material are now practically stopped but supply control and war material priority render the country practically self supporting. No serious shortage is reported except in hematite iron, now increasingly replaced by refined iron. War demand continues intense for plates and special steel. Some resumption in tin plate exports appears possible as American mills are reported fully booked.

Ferroalloys

Ferroalloy Prices, Page 124

Some word with respect to ferroalloy prices is expected soon, certainly not later than Dec. 15. Many in the trade look for an advance, particularly on ferromanganese, which price has been unchanged since a year ago last July, at $120, duty paid, except in the instance of one seller, the Tennessee Products Corp., which early in the year advanced its price to $145, f.o.b. southern furnace, with the approval of Washington.

The reason that many expect an increase for next quarter is that producers generally have long since had to begin processing ore bought at substantially higher levels than that used at the time present prices were put into effect 18 months ago. Increased coke prices and other production costs also are a factor.

Demands for ferroalloys continue to expand, although production is still handicapped by dry weather in the South.

Save Small Business, N.A.M. Platform Urges

(*Concluded from Page* 31)

as a victory for business or for the employer.

"I do not want anybody to be under a misapprehension that business is out of the dog-house," said Mr. Smith. "Some years ago Congress passed a law which enabled racketeering labor leaders to place a yoke on the neck of the worker. The act which was passed by the house restores the right to work and it will protect him from violence and intimidation.

"We want you as employers to help remove that yoke. We want you to stand up for your rights and for the best interests of the country. Many of you aggravated the situation by surrendering voluntarily to outrageous demands . . .

"There is not enough fight in industry. We who are fighting for the people hope that you too will stand up and fight in the days ahead."

William H. Davis, chairman, National Defense Mediation Board, declared he is opposed to forcing cooling periods by statute since such compulsion actually prevents cooling.

Modernization To Be No. 1 Job

Alfred P. Sloan Jr., General Motors Corp. chairman, declared industry's No. 1 postwar job is modernization of the obsolete American production plant. General Motors, he said, already has put such a long-range plan into effect.

"Such an approach contemplates accelerating the development of new products, re-engineering existing products, making use of new materials and new methods, and in other ways—improving quality and value, having in mind the necessity of lower postwar prices," he said. "It contemplates the substitution of new instrumentalities in all functional activities wherever gains are possible. Again, lower prices. It contemplates studies to develop the possibilities of further horizontal expansion.

"In total, on the liquidation of the defense program we hope to have available concrete programs for each production unit, engineered and approved and founded on the most modern technology—all ready for action."

Murray Shields, economist, Irving Trust Co., New York, drew the conclusion that the postwar slump will not be long. The principal reason, he said, is that there will be a return to governmental policies which proved sound in the past. Many thinkers who fathered the New Deal

policies of devaluing the dollar, withdrawing gold, spending large sums on government projects, enacting social security laws found that these policies did not bring about the desired objective — prosperity, and these men definitely have changed their old beliefs.

Charles R. Hook, president, American Rolling Mill Co., Middletown, O., characterized the seizure of defense plants by the government as a dangerous solution of strike difficulties. "Bayonets at men's backs cannot make men work."

Calls on Public To Awaken

H. W. Prentis Jr., president, Armstrong Cork Co., Lancaster, Pa., called on American citizens to awake to the increasing violations of the American Bill of Rights, dwelling particularly on encroachments on the right to work.

Severest test for the free enterprise system lies ahead, warned Dr. Edwin G. Nourse, Brookings Institution, Washington. He counseled planning now for postwar production and employment.

Private industry gets out defense production more efficiently than government-managed plants, according to J. Howard Pew, president, Sun Oil Co. Mr. Pew compared the government's efforts to build ships during the first World war with the accomplishment of private yards now delivering ships ahead of schedule.

Majority of Americans now disapprove of the checkoff and closed shop, Dr. Claude Robinson, president, Opinion Research Corp., reported. He added that public opinion of industry has improved vastly.

Colby Chester, chairman, General Foods Corp., declared industrial management must be humanized. "The people want strong, colorful leaders."

Metallurgical Coke

Coke Prices, Page 123

Little change in demand for coke is expected over the next few months and prices and supply are expected to maintain the present status. Though by-product coke for foundry use is below requirements there is ample supply of beehive foundry fuel. The latter is less desirable for cupola use and producers prefer to turn out furnace grades. This is because foundry coke must be low in sulphur and 72 hours is required instead of 48 for furnace fuel. Low-sulphur coal is not easily available in all locations and supply is comparatively short.

When additional blast furnaces come into production next year foundries may be given larger pig iron supply and demand for by-product foundry coke then may become more of a factor.

Nonferrous Metals

New York—Thorough investigations of the copper supply and production situations will be made immediately. A Senate committee will open its investigation on Dec. 8 while OPM holds public hearings soon, possibly Dec. 12, at the request of SPAB on possibilities of increasing copper output.

Copper—The OPM hearings will seek facts concerning reports that copper mines are operating on a one-shift basis and not making full use of their equipment, reports that copper companies are mining low-grade ores which are more expensive to mine than high grade deposits, and data given out by companies as to their maximum possible production rates.

Lead—Consumers will meet with OPM officials Dec. 8 to consider ways to conserve lead supplies and to increase production. Information has been collected to substantiate producers' claim that a higher price is needed to obtain necessary production. OPA had held the position previously that the present price level was sufficient to allow a higher rate of operations.

Zinc—Supply situation has improved with consumers getting more zinc directly from producers. The quota for OPM's December pool was reduced to 29 per cent, while at the same time production by smelters will be higher than it was in November. Consumers' stocks increased 6 per cent during September, according to the latest report issued by the Bureau of Mines.

Tin—Cargo war-risk insurance rates on shipments across the Pacific were increased while those across the south Atlantic were reduced. Rates on shipments from the Far East via Pacific ocean were raised by a maximum of ¾ per cent, while those via the Cape of Good Hope were reduced as much as 1 per cent. Offerings again were light, however, as the cost of importing Straits tin remained generally above the OPA maximum selling price of 52.00c, New York.

Waste, Scrap Metal Prices Higher Than in August, 1939

Based on an index of 100 for August, 1939, price indexes for waste and scrap of all metals stood at 133 on Nov. 22, as compared with 133.7 on Nov. 23, a year ago, according to the Bureau of Labor Statistics.

Iron and steel scrap stood at 134 for the same date this year, and 139 for Nov. 23, 1940, while nonferrous metals were at 132.8 for Nov. 22 this year, and 132.7, Nov. 23, last year.

Compared with Oct. 25, 1941, the Nov. 22 indexes showed changes from 133.6 for scrap of all metals, no change for iron and steel scrap, 133.5 for nonferrous metals.

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
1-5	12.00	12.12½	11.75	52.00	52.00	5.85	5.70	8.25	15.00	14.00	35.00

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.10
Zinc, 100 lb. base	13.15

Tubes

High yellow brass	22.23
Seamless copper	21.37

Rods

High yellow brass	15.01
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.73

OLD METALS

Dealers' Buying Prices

No. 1 Composition Red Brass

New York	10.12½-10.25
Cleveland	10.25-10.50
Chicago	10.25-10.50
St. Louis	10.50

Heavy Copper and Wire

New York, No. 1	10.00
Cleveland, No. 1	10.00
Chicago, No. 1	10.00
St. Louis	10.00

Composition Brass Turnings

New York	9.37½-9.75

Light Copper

New York	8.00
Cleveland	8.00
Chicago	8.00
St. Louis	8.00

Light Brass

Cleveland	6.00-6.25
Chicago	6.00-6.25
St. Louis	6.25

Lead

New York	5.25-5.50
Cleveland	5.00-5.25
Chicago	4.75-5.00
St. Louis	4.75-5.00

Old Zinc

New York	5.00-5.25
Cleveland	4.00-4.12½
St. Louis	4.50-5.00

Aluminum

Mis., cast	11.00
Borings, No. 12	9.50
Other than No. 12	10.00
Clips, pure	13.00

SECONDARY METALS

Brass ingot, 85-5-5-5, l. c. l.	13.25
Standard No. 12 aluminum	14.50

OPA To Establish 15 Regional Offices

WASHINGTON

■ Office of Price Administration soon will establish 15 regional offices, each with several branch offices, it was announced last week.

The agency is preparing to reissue its price schedules under the new price-fixing bill now pending in Congress. They will be in the same form as now, but will be accompanied by certificates of consideration permitting appeals.

Armored Half Truck Vehicles Assigned A-1-f Rating

Preference rating has been assigned to manufacturers of armored half truck vehicles for the Army and Great Britain under Order P-35.

New York Warehouse Operators To Meet with Stuart Dec. 19

Steel warehouse operators in New York and vicinity have been invited to attend a meeting Dec. 19 in New York to discuss distributors' problems with J. R. Stuart, chief of the OPM Iron and Steel Branch warehouse section.

Small Users of Cobalt Need Not File Monthly Reports

Cobalt users requiring less than 54 pounds monthly—principally in the chemical industries—have been relieved of the necessity for filing monthly request forms by an amendment to M-39. Other provisions of the order remain in effect.

Mirrors of Motordom

(*Concluded from Page* 46)

nally planned than on most other new cars. The competitive situation had reached point where it seemed likely to develop into a race to see who could put on the most bright metal. We welcome the opportunity to prove that an effective job can be done without chrome or stainless steel, except on bumpers and bumper guards. The reaction so far has been entirely favorable and we feel confident that the general public will feel the same way. In any event, everyone will agree that the 1942 Chrysler cars are beautiful, with the reserved elegance that is sought by persons of the best tastes."

Oldsmobile Division of General Motors will produce only three parts —barrel, breech ring and breech block—of the 75-millimeter tank gun for which it recently received contracts. Other parts totaling 67 will be subcontracted. About 200,000 square feet in six of the present motor car buildings at the plant will be transferred to gun work. Machines and machine tools totaling about $8,000,000 have been ordered in part, with some still to be placed.

Ford Sells Indianapolis Branch To P. R. Mallory & Co. Inc.

Ford Motor Co. has sold its Indianapolis branch to P. R. Mallory & Co. Inc., manufacturer of special alloys, electrical and precision instruments, bearings and other materials necessary to the armament program. Ford, however, is retaining enough space to carry on operations as usual.

Of the 186,000 square feet of floor space, Mallory will occupy about 110,000 square feet; the remainder will be used by Ford.

Equipment

Seattle—Dealers generally are out of stock and unable to care for normal needs of customers. Priorities loom large in this field. Used machinery and equipment stocks are low. Replacements are slow and uncertain. Electrical items continue in strong demand. Denver

opened bids Nov. 27 for nine earth-moving units for the Saco, Mont., project. Bids are called Dec. 15 for oil purifier and Dec. 18 for capacitators and coupling devices for 230-kv Coulee power line. King county, Washington, has purchased two oil tanker trucks, road scraper and two highway mowers. Tacoma has called bids Dec. 15 for three turbines, three generators. Bonneville project opened bids for switchgear for Longview station and has called bids Dec. 8 for 25 tons of copper cable and Dec. 11 for 69-kv circuit breaker for Yakima station.

Construction and Enterprise

Michigan

ANN ARBOR, MICH. — American Broach & Machine Co. has started construction of a $20,000 addition to its plant.

DETROIT—Bradley Machinery Co. plant at 211 Joseph Campau avenue has sustained damages by fire.

DETROIT—American Asbestos Products Co., 5701 Davison avenue, has plans by Lyndon & Smith, 13700 Woodward avenue, Highland Park, for one-story factory, costing $45,000.

DETROIT—American Metal Products Co., 5959 Linsdal avenue, has let contract to Bryant & Detwiler Co., 2304 Penobscot

Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 131 and Reinforcing Bars Pending on page 132 in this issue.

building, for one-story factory addition. Giffels & Vallet, 1000 Marquette building, engineers.

DETROIT—Impression Die Co., 4672 Bellevue, has let contract to F. H. Martin Construction Co., 955 East Jefferson, for an addition to its shop. Pollmar, Ropes & Lundy, Detroit, architects.

DETROIT—Detroit Gauge Co. has been incorporated to manufacture gauges, dies and tools. Paul E. Duckworth, 20510 West Warren avenue, correspondent.

DETROIT — Echweitzer Engineering Inc., 6000 Beniteau avenue, has been organized to design and manufacture special machinery and equipment. John von Rosen, 667 Edison avenue, correspondent.

GRAND RAPIDS, MICH.—Roger Allen, architect, is completing plans for a power house addition at Central State Teachers College, Mt. Pleasant, Mich.

SAGINAW, MICH.—Wilcox-Rich division of Eaton Mfg. Co. plans construction of plant addition. Estimated cost, including equipment, $465,235. George S. Rider Co., Terminal tower, Cleveland, architect.

WYANDOTTE, MICH.—DuPont Co. Inc. has asked bids for one and two-story warehouse, factory and administration building. Cost about $100,000.

Massachusetts

SPRINGFIELD, MASS.—Westinghouse Electric & Mfg. Co., construction department, Union Bank building, Pittsburgh, will build two-story, 82 x 284-foot factory L replacement here. Estimated cost $75,000.

New York

BUFFALO — Farrel-Birmingham Co. Inc., 344 Vulcan street, has awarded contract to H. F. Stimm Co., Ellicott Square building, for 50 x 200-foot plant addition, Estimated cost $40,000.

FORT EDWARD, N. Y.—General Electric Co., Schenectady, N. Y., will build factory here.

NEW YORK—Inventool Mfg. Co. Inc. has been incorporated to manufacture tools and metal products of all kinds. Joseph A. Michel, 38 Park Row, New York, representative.

NEW YORK—Tracy Tool Machine Co. Inc. has been incorporated with 200 shares of no par value. Wilfred A. Waltemade, 521 Fifth avenue, representative.

New Jersey

GARFIELD, N. J.—Heyden Chemical Corp., 290 River road, has let contract to J. H. Steele & Sons, 48 Second street, Paterson, N. J., for one-story, 40 x 60-

foot steel boiler house. Cost $40,000.

HOBOKEN, N. J.—Autographic Register Co., 1000 Clinton avenue, has plans by C. F. Dieffenbach, 84 Washington street, for one-story, 75 x 100-foot steel factory alterations and addition. Cost $50,000.

NEWARK, N. J.—American Platinum Co., 231 New Jersey Railroad avenue, will build manufacturing building. Epple & Kahrs, 17 Washington street, architects.

NEWARK, N. J.—American Steel Castings Co. has let contract for a pattern shop, machine shop and foundry additions, to cost $200,000.

PARLIN, N. J.—Hercules Powder Co., Wilmington, Del., plans enlargement of facilities at plant here.

UNIONVILLE, N. J.—Elastic Stop Nut Corp. has let contract for erection of manufacturing plant additions, 140 x 250 feet and 40 x 260 feet, to cost about $150,000.

WOODBRIDGE, N. J.—Colville Bros., Linden, N. J., have purchased the plant of the Anness Hollow Tile Co. here, containing 10,000 square feet of floor space.

Ohio

ASHTABULA, O.—American Fork & Hoe Co. has awarded contract to Ashtabula Industrial Corp. for one-story steel manufacturing unit, to cost $50,000.

CLEVELAND — Cleveland Graphite Bronze Co. has authorization from Defense Plant Corp. to purchase $1,393,647 worth of machinery and equipment, to be installed in the company's $3,000,000 plant nearing completion at 16800 St. Clair avenue.

CLEVELAND—Black Boring Machine, 4909 Luther avenue, will manufacture new jig-type boring machine in plant now under construction at 1400 East 222nd street, Euclid, O.

CLEVELAND — Cleveland Automatic Machine Co., 2269 Ashland road, is asking bids for 47 x 160-foot, 21 x 120-foot and 47 x 60-foot steel factory additions, all one-story. Estimated cost $75,000. C. B. Rowley & Associates, Keith building, architects, and F. Eroskey, 7829 Euclid avenue, engineer. (Noted Oct. 27).

COLUMBIANA, O.—National Rubber Machinery Co., Railroad street, will expand facilities by remodeling and altering the building it recently purchased.

HAMILTON, O.—General Machinery Corp. plans erection of factory building for manufacture of diesel engines.

MASSILLON, O.—Tyson Roller Bearing Corp. is having plans prepared for a 10,500-square foot addition to its factory building.

WILLOUGHBY, O.—Ohio Rubber Co., Robert Keach, purchasing agent, is starting $90,000 factory building.

Illinois

CHICAGO HEIGHTS, ILL.—American Locomotive Co. plant here, idle for a number of years, will be remodeled at cost of about $500,000, and put in operation in 1942 for manufacture of defense goods. Defense Plant Corp. is financing the work.

CHICAGO—John Wood Mfg. Co. Inc., maker of steel tanks, 4435 South Western avenue, has preliminary plans for a plant 40 x 400 feet, to cost about $100,000.

CHICAGO—Frisch Steel Products Co., 231 South LaSalle street, has been incorporated with 2000 shares of common stock by P. Frisch, D. Frisch and S. Morgan. Correspondent: Charles T. Adams, 231 South LaSalle street.

DECATUR, ILL.—A. E. Steley Mfg. Co., E. K. Scheiter, vice president, plans to build corn and soybean oil refinery, costing $150,000.

ROCKFORD, ILL.—Alloy Castings Inc., Beacon street, has been incorporated with 300 shares of common stock by A. F. Ahlstrand, P. V. Hogland, and A. O. Ahlstrand, to operate a foundry and machine shop. Correspondent: Alf O. Ahlstrand, Rockford.

Indiana

EAST CHICAGO, IND.—Defense Plant Corp. has authorized expenditure of $5,493,487 to build and equip an ordnance equipment plant here to be operated by Continental Roll & Steel Foundry Co.

FORT WAYNE, IND.—Tokheim Oil Tank & Pump Co., 1602 Wabash avenue, plans one-story plant addition, costing $175,000, including equipment.

Alabama

ALEXANDER CITY, ALA.—Coosa Cassiterite Corp., Charles A. Dean, president, P. O. box 445, Alexander City, plans erection of flake graphite mill, near present tin operations in Coosa county.

Maryland

WHITEFORD, MD.—Staso Milling Co., C. McCann, superintendent, will rebuild plant recently destroyed by fire.

District of Columbia

WASHINGTON—Bureau of Supplies and Accounts, Navy Department, will open bids Dec. 12, schedule 9533, diesel electric propelling plant, machinery and control equipment, spare parts and tools, delivery Annapolis, Md.; schedule 9591, diesel generator sets, spare parts, tools and wrenches, delivery Brooklyn, N. Y.; schedule 9566, four gasoline engine driven truck cranes, delivery Key West, Fla.; Dec. 16, schedule 9534, 4500 steel barrels, delivery San Diego, Calif., and Pearl Harbor, T. H.

Kentucky

HAZARD, KY.—Public Service Commission has granted permit to Kentucky-West Virginia Power Co. for $4,000,000 enlargement of plant. (Noted Oct. 13).

LAWRENCEBURG, KY. — Fox Creek Rural Electric Co-operative, Roy Yard, superintendent, will construct approximately 368 miles of rural lines, costing $360,000.

OWENTON, KY.—Owen County Rural Electric Co-operative, Chester Roland, superintendent, plans to construct approximately 650 miles of rural lines, costing $732,000.

TYRONE, KY.—Public Service Commission has issued permit to Kentucky Utilities Co., Lexington, Ky., Washington Reed, vice president, for construction of a $4,000,000 plant. (Noted Sept. 1).

Florida

SEBRING, FLA.—City council has approved project to double capacity of municipal light and power plant. Approximate cost $131,000, including purchase of machinery and generating equipment. WPA has allotted $65,000.

TAMPA, FLA.—RFC has authorized loan of $30,000 to Southern Erecting & Engineering Co. for expansion.

Mississippi

MERRIMAC, MISS.—War Department plans construction of explosive plant here to be known as the Badger Ordnance Works.

North Carolina

DURHAM, N. C.—Defense Plant Corp. has authorized an increase in its contract with Wright's Automatic Tobacco Packing Machine Co. for additional facilities for plant, from $500,000 to $600,000, to manufacture ordnance equipment.

Tennessee

FAYETTEVILLE, TENN.—REA has allotted $164,000 to Lincoln County Electric Corp. to finance construction of 166 miles of rural transmission lines to serve 717 customers.

Oklahoma

PRYOR, OKLA.—DPW has approved application of city for funds to finance construction of sanitary sewers and sew-

age disposal plant estimated to cost $250,000. Rex Collins, McAlester, Okla., consulting engineer.

Minnesota

FERGUS FALLS, MINN.—City, Miles S. Cooper, director of purchases, is taking bids to Dec. 16, on piping work, auxiliary boiler and engine room equipment and miscellaneous work for power plant at state hospital. Toltz, King & Day, 1509 Pioneer building, St. Paul, engineers.

GREENWALD, MINN.—WPA has allotted $28,793 to the village, M. C. Mader, clerk, to aid financing construction of sewer system and sewage disposal plant. Ealy G. Briggs, 1955 University avenue, St. Paul, consulting engineer.

WASECA, MINN.—City, L. E. Peterson, clerk, has submitted plans to WPA for approval of construction of sewage disposal plant and extensions to cost $65,000. Toltz, King & Day, 1509 Pioneer building, St. Paul, engineers.

Texas

FORT WORTH, TEX.—REA has allotted $1,000,000 to Brazos River Transmission Electric Co-operative to finance construction of generating and transmission facilities.

HOUSTON, TEX.—Texas Pipe & Supply Co., 1720 Maury street, will soon start work on $15,000 addition to plant. Leonard Gabert, 1315 Bell, architect.

Kansas

LINDSBORG, KANS.—City, E. W. Jernberg, mayor, will hold an election to vote on issuing $51,000 bonds to finance installation of a new engine-generator unit. Plan for issuing $105,000 for new engines was defeated Oct. 7.

North Dakota

MILNOR, N. DAK.—R. S. R. Electric Co-operative, R. G. Harens, co-ordinator, is preparing plans and will take bids soon on construction of 240 miles of rural transmission lines. Banister Engineering Co., 1586 University avenue, St. Paul, consulting engineer. Estimated cost $167,000.

Nebraska

BATTLE CREEK, NEBR.—Madison County Rural Public Power district, Alfred H. Lewis, superintendent, will take bids Dec. 15 on constructing 363 miles of transmission lines. H. S. Nixon, Grain Exchange building, Omaha, Nebr., consulting engineer.

Iowa

SIOUX CITY, IOWA — Wincharger Corp., Robert F. Weinig, vice president and general manager, plans to spend approximately $250,000 for plant expansion to provide facilities for manufacture of airplane dynamotors.

Utah

HATCH, UTAH—REA has allotted $213,000 to Garkane Power Association, Robert A. Middleton, superintendent, to finance construction of 205 miles of rural transmission lines to serve 727 customers, and $140,000 for construction of generating plant.

California

ALAMEDA, CALIF.—General Engineering & Drydock Co., 1807 Clement avenue, plans erection of welding shop, to cost approximately $40,000.

BAYSHORE CITY, CALIF.—H. M. Pitt Jr., 884 Chestnut street, San Francisco, is completing plans for chemical plant. Estimated cost $40,000.

INGLEWOOD, CALIF.—Madill Co. will build machine shop 110 x 178 feet at 729 South Redondo boulevard, at cost of $20,000.

SANTA MONICA, CALIF.—Douglas Aircraft Co. Inc. will build two machine shops, each 75 x 100 feet, and a third one, 60 x 100 feet. Total cost estimated at $128,000.

VAN NUYS, CALIF.—Plans are being prepared for construction of a factory building on a 54-acre site here for Timm Aircraft Corp., 8055 Woodley avenue, Van Nuys. Estimated cost $100,000.

Washington

SEATTLE—Washington Iron Works, 1500 Sixth avenue South, plans to make alterations to its plant.

SEATTLE—National Steel Co., 425 Frontenac street, will build an addition to its plant, 24 x 40 feet. William J. Jones is architect.

Canada

NEW WESTMINSTER, B. C.—Pacific Veneer Co. will build addition and install new equipment to cost about $60,000.

OCEAN FALLS, B. C.—Pacific Mills Ltd. will erect addition to bleached sulphite mill here and install new equipment, at cost of about $585,000.

WINNIPEG, MAN.—Carl Guss, 164 Isobel street, has purchased site on Elgin street here and plans erection of machine shop to cost, with equipment, about $40,000.

HAMILTON, ONT.—Canadian Westinghouse Co. Ltd., 288 Sanford avenue, will build an addition to the West End lamp plant, 4 stories, 70 x 200 feet, to cost about $150,000, with equipment. Hutton & Souter, architects, Pigott building, are receiving bids for construction work.

HAMILTON, ONT.—National Steel Car Corp. Ltd., Kenilworth avenue, has purchased property in the Saltfleet township area, and a plant addition will be erected to cost $500,000, with equipment.

KITCHENER, ONT.—Sehl Engineering Co., 71 Mill street, will erect machine shop, 80 x 80 feet, to cost, with equipment, about $25,000. General contract awarded to Ball Bros. Ltd., 49 King street East.

TORONTO, ONT.—Canadian General Electric Co. Ltd., 212 King street West, will build addition to foundry at Royce and Lansdowne avenue, to cost $35,000, equipment extra, and has given general contract to A. W. Robertson Co., 57 Bloor street West.

TORONTO, ONT.—United Steel Corp., 58 Pelham avenue, will build foundry to cost $25,000, equipment extra, and has given general contract to William Edwards, 337 Rusholme road.

HALIFAX, N. S.—Department of Munitions and Supply, H. H. Turnbull, secretary, Ottawa, Ont., has let general contract to Foundation Maritime Ltd., 1538 Sherbrooke street West, Montreal, Que., for construction of workshop and other additions to H. M. C. drydock here, to cost about $300,000.

JOLIET, QUE.—Joliette Steel Co. Ltd., Laval street, is completing arrangements for installation of new electric furnace and transformers, to cost about $30,000.

MONTREAL, QUE.—Farand & Delorme Ltd., subsidiary of United Steel Corp., 385 St. Martin street, has started work in connection with plant addition to cost about $100,000. Foundation Co. of Canada Ltd., 1538 Sherbrooke street West, has general contract.

MONTREAL, QUE.—Canadian Car & Foundry Co. Ltd., 621 Craig street West, will start work immediately in erection of plant addition to cost $65,000. Foundation Co. of Canada Ltd., 1538 Sherbrooke street West, has general contract.

MONTREAL, QUE.—Canadian Vickers Ltd., Maisonneuve, has called bids through T. Pringle & Son Ltd., 485 McGill street, for construction of boiler plant to cost about $1,000,000, with equipment.

ROCK ISLAND, QUE.—Union Twist Drill Co. Ltd., will build two-story, 41 x 52-foot addition to Butterfield division plant, to cost about $25,000, equipment extra. J. J. Shea & Co., 660 St. Catharine street West, Montreal, has general contract.

SASKATOON, SASK.—J. East Iron Works, Avenue "C", is having plans prepared for addition to foundry to cost about $35,000, including equipment.

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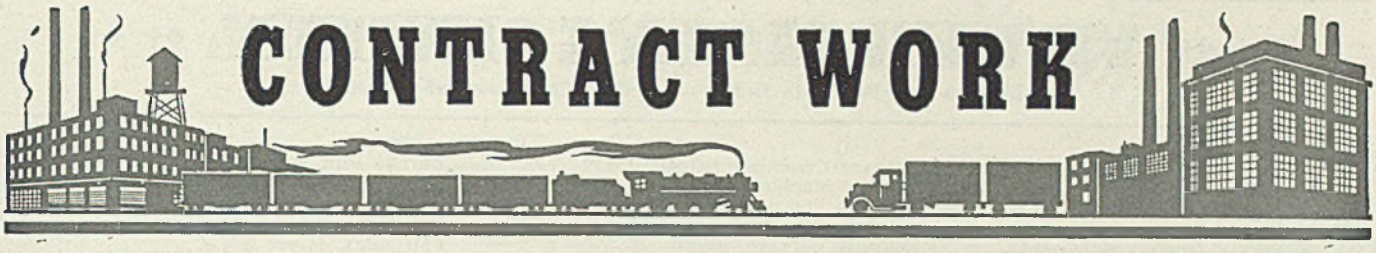

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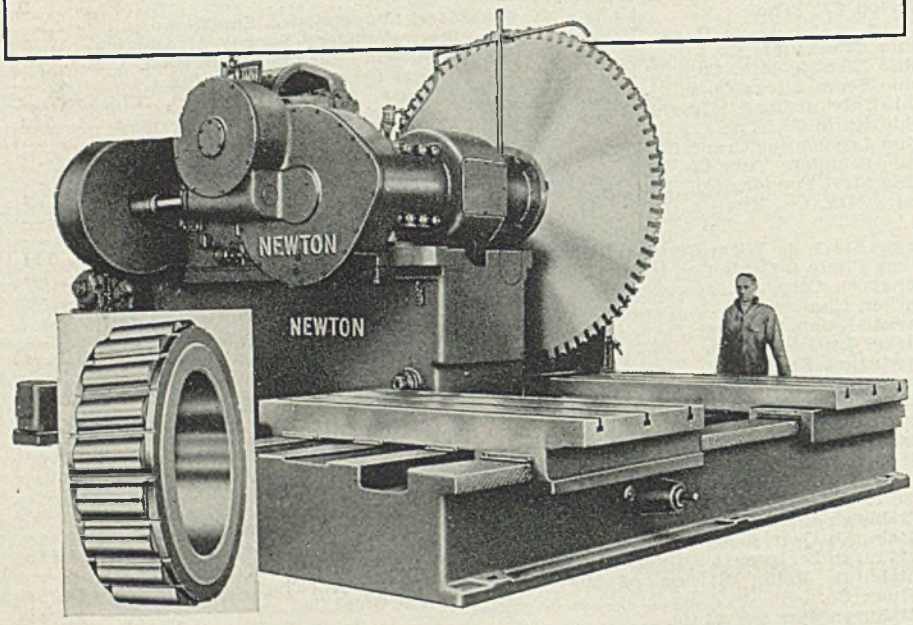
Where-to-Buy Products Index carried in first issue of month.

IN THE NEWS

WITH BANTAM BEARINGS



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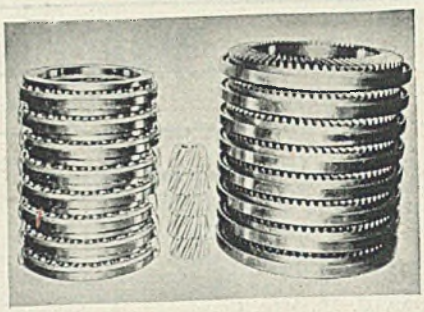

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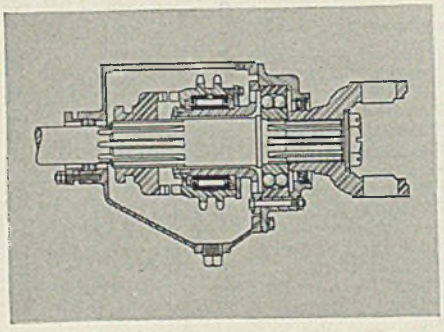

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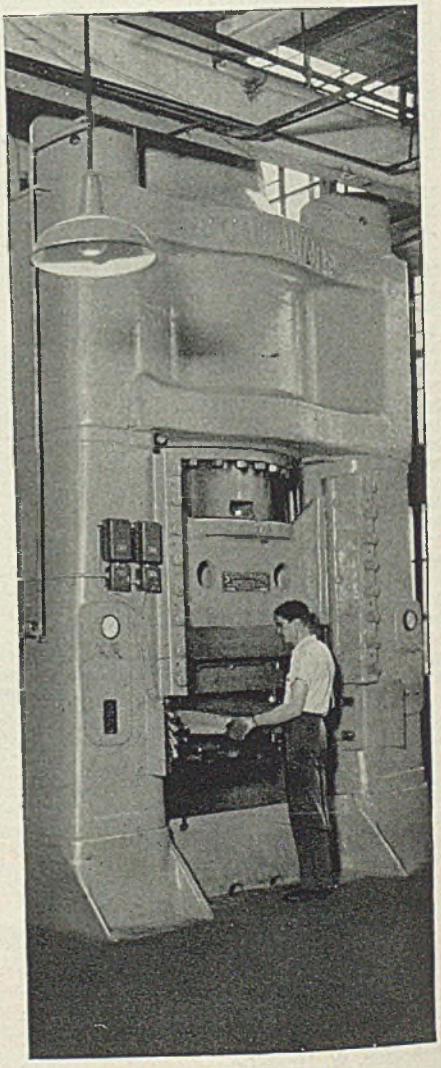

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