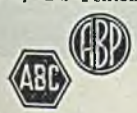

STEEL

The Magazine of Metalworking and Metalproducing

VOL. 117, NO. 27 DEC. 31, 1945

NEWS

TECHNICAL

FEATURES

MARKETS

NEXT WEEK...

What Industry Expects in 1946

What Technical Men Expect in 1946

Steel Export Situation

Transitional Problems Challenge Leadership

Review of European Industry

COLLECTOR RINGS FOR SPECIAL NEEDS

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THE B. A. WESCHE ELECTRIC CO.

Dept. SS, 1628-14 Vine St. **Cincinnati 10, Ohio**

STEEL
December 31, 1945

First Give, Then Take!

No year in history can match 1945 in the variety and number of climactic events. It was a year of almost continuous excitement, of build-ups to glorious triumphs and of let-downs to provoking stalemates. The panorama of the old year's contradictions has left the nation groggy—intoxicated by excessive indulgence in history-making superlatives.

The year started and now is ending on a sober note. As 1945 was ushered in a year ago, the American people were stunned by the serious implications of the battle of the bulge. We were berating ourselves for our over-confidence and tendency to relax before victory was actually won.

Then in quick succession came President Roosevelt's budget message keying the nation's economy to the job situation, the Yalta conference, the futile bid by Green-Johnston-Murray for industrial peace, the sudden death of President Roosevelt and immediate popularity of Mr. Truman as his successor, the United Nations Conference in San Francisco, the execution of Mussolini and the collapse of Germany, the British election and the eclipse of Churchill, the atomic bomb at Hiroshima, the declaration of war by Russia against Japan, the unconditional capitulation by Japan, the prompt removal of many wartime controls, the drastic changes in personnel in the executive department of the government, increasing tension in relations between management and labor, the ill-fated management-labor conference, the CIO-GM strike and the consequent Presidential move to link wages with profits, the wage-price squeeze, the general slowing down of reconversion progress and the unfavorable aspects of international affairs.

In short, 1945 witnessed our rise from the depths of discouragement in January to the heights of victory in May and August and our painful descent into economic confusion as the year ends.

Throughout these ups and downs one can discern one basic situation that must be corrected if we are to rise from our present condition of uncertainty and seeming helplessness. It is the situation whereby the leaders of all of the victorious nations encouraged their people to expect a rainbow of unprecedented blessings at the end of the war.

As a result everybody wants to take and nobody wants to give. It is this attitude that is blocking every constructive move in world affairs and in our own internal national affairs.

To the new year falls the opportunity for statesmen to lead by demonstrating to the public that one must first give in order that he may later take.

MONEY FOR EXPANSION: Producers, manufacturers and distributors who anticipate financial problems in connection with postwar expansion will do well to read carefully the article written for this publication by Charles B. Henderson, chairman of the board of directors of the Reconstruction Finance Corp., in which this agency's services to industry are described authoritatively.

Many businessmen will be surprised at the scope of assistance available through RFC. Mr. Henderson lists seven services: 1. Long term loans to finance reconversion of war plants. 2. Commitments to provide assurance of future loans so that borrowers may proceed with plans for reconversion. 3. Credits or loans to purchase plants, plant facilities or other surplus property. 4. Loans against canceled war contracts or subcontracts. 5. Working capital loans. 6. Veterans' loans. 7. Blanket participation agreements.

Under blanket participation agreements banks are encouraged to make loans with maturities up to ten years with principal payments of not less than 10

(OVER)

per cent each year. The plan provides an automatic guaranty by RFC up to 75 per cent of the loan. Popularity of this type of financing is attested by the fact that loans made under blanket participation agreements already total more than $50 million.

Under RFC's seven-point program, anybody should be able to finance a sound proposition through local bank or RFC. —p. 42

° ° °

EXTRAORDINARY CAREER: Announcement that Eugene G. Grace has been elected chairman of the board of Bethlehem Steel after serving that corporation as president for 32 years invites attention to an extraordinary career.

Mr. Grace assumed the presidency of Bethlehem in 1913. Upon his shoulders soon thereafter fell the heavy responsibility of directing the corporation's extensive wartime activities involving production not only for the United States but also for Great Britain, France, Russia and Italy. Again throughout World War II it was Mr. Grace who directed Bethlehem's great contributions to the war effort of the United States and her allies.

No industrialist in the world has carried as heavy a responsibility for production in the two greatest wars in history as has Mr. Grace, and few if any captains of industry anywhere and at any time can match his record for continuous, successful leadership of an outstanding private enterprise in peace and war for nearly a third of a century. —p. 29

° ° °

EVERY SEVENTH JOB: A booklet just issued by the Automobile Manufacturers Association entitled "U. S. Automobile Industry—Pacemaker for Progress" does a good job of emphasizing the economic blessings conferred upon the public by the automobile.

Although the production of cars and parts directly provides jobs for only 700,000 persons, according to the booklet, the operation, maintenance and servicing of these vehicles affords profitable employment for more than 6 million other persons. Therefore in the aggregate the motor car industry really generates jobs for about 7 million persons, or one out of seven of the gainfully employed in the nation.

The automobile enables the public to spend $5 billion annually on touring. To serve the nation's motorists are more than 360,000 establishments—dealers, repair shops, gasoline stations—which do $8½ billion of business a year.

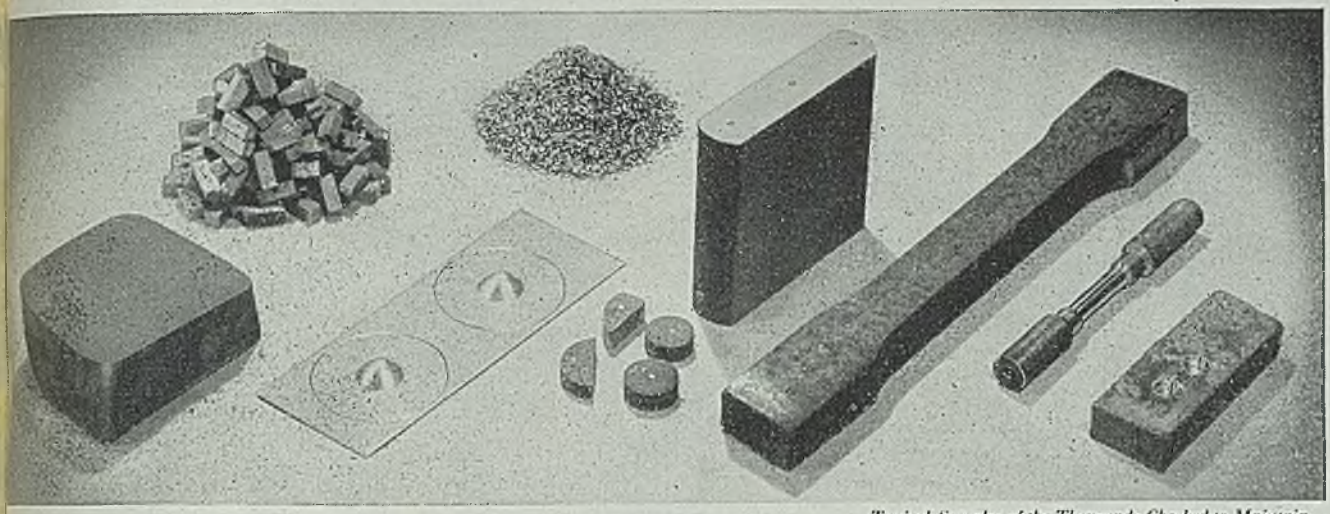
About 20 years from now our children will be reading figures on the economic benefactions of the airplane which may dwarf the currently impressive record of the motor car. —p. 40

POSTWAR POSTSCRIPTS: Automobile assemblies in the week ended Dec. 22, totaled 17,580 compared with 16,240 in the preceding week. "Ward's Automotive Reports" questions the predictions made in some quarters that 6 million cars will be made in 1946 (p. 94) and suggests that 4 million is a more realistic figure, even allowing for a fairly early labor-management reconciliation. . . . A. H. Allen, Detroit editor, opines that the "fact finders" assigned to the CIO-GM case (p. 39) are not looking for figures that can be found in balance sheets, profit and loss statements and expense ledgers but are hoping to see the confidential GM estimates of production levels being projected for 1946 and 1947. . . . Numerous machinery manufacturers and dealers are making application to become "approved dealers" for RFC (p. 32) to assist that agency in selling government-owned machine tools and allied equipment. Approved dealers will receive a 12½ per cent commission on sales. . . . CPA warning that stricter controls will be imposed unless pig iron consumers watch their inventories more carefully has caused some purchasers (p. 35) to modify shipping instructions to their suppliers. . . . The raw material situation is marked by feast and famine. Inventories of iron ore and limestone are adequate for the winter (p. 23) but a high level of operations in the steel industry would precipitate a tight situation in steel scrap and in coal. Tin stocks continue limited; zinc is in fair supply, and most alloying elements are available. . . In his usual informative year-end report on the state of affairs in the iron and steel industry, Walter S. Tower, president of the American Iron & Steel Institute (p. 25) declares that the industry's capacity is more than ample to meet immediate peacetime demands and that the unfavorable relationship between income and costs is disturbing. He points out that the current union demand for a $2 per day wage increase would total $225 million annually—more than the industry earned in 1944. . . . Through technical ingenuity, good metallurgy and use of powerful upsetting machines, Tube Turns, Inc., has cut the weight of rough forged cylinder barrels from about 200 to 83 pounds (p. 52), thus reducing the weight of metal removed by machining from 183 to 66 pounds. . . . Observers scanning developments on the Pacific coast (p. 30) see bright, long-term prospects for expanding industry in that area.

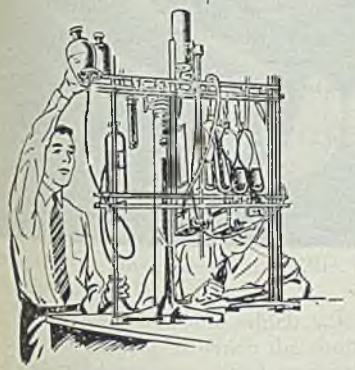
Happy New Year!

E. L. Shaner

EDITOR-IN-CHIEF



Typical Samples of the Thousands Checked to Maintain Quality and Uniformity in Inland Steels



Hundreds of Tons of Samples are Tested Yearly

Making steel, the basic material of our modern world, is no simple process — nor is it one of small responsibility. For in making steel thousands of requirements must be satisfied, many involving consideration for human life as well as the reputation of designers, fabricators and builders of equipment. Operations of such consequence call for constant checks and rigid testing — ruling out all guesswork.

In the course of a single year hundreds of tons of steel samples undergo chemical, tensile, metallographic, etch and other tests at Inland. Chemical analyses alone run well over a thousand tons. These precautions are taken to furnish a uniformity and quality in steel that will fully measure up to every requirement.

For the benefit of steel users, Inland maintains a large specialized staff of engineers and metallurgists who will gladly cooperate with you in the selection and use of steels — without obligation.

Inland Steel Company, 38 S. Dearborn St., Chicago 3, Ill. Sales Offices: Cincinnati, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul. Principal Products: Bars • Structurals • Plates • Sheets • Strip • Tin Plate • Floor Plate • Piling • Reinforcing Bars • Rails • Track Accessories.

INLAND STEEL COMPANY

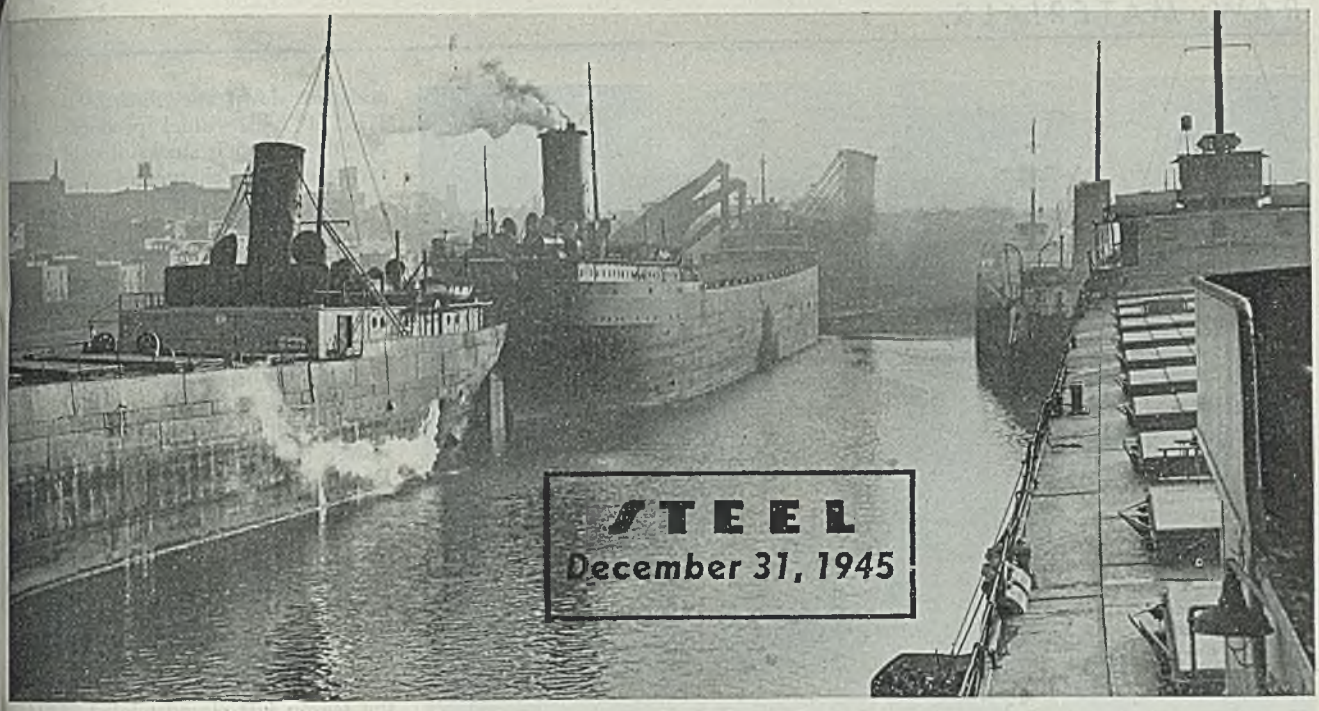
No Mistaking Ryerson Alloys

Certified Quality Demands Positive Identification

All Ryerson alloy steels are doubly identified. Each bar is painted with colors which indicate the AISI analysis type and the condition of the steel. Larger bars are individually stamped, and smaller bars are bundled and tagged with a heat symbol assigned to the specific heat from which the bars are rolled. This double identification is as unmistakable as finger printing.

All this is important to you because: Each heat of alloy steel in Ryerson stocks has been carefully selected, and thoroughly tested. The exact chemical analysis, as well as the hardenability response for that steel are known. This information, together with an interpretation of obtainable physical properties after quenching and drawing, is assembled in the form of an Alloy Steel Report that is cross referenced with Heat identification. A copy of the Report is sent with each shipment of that particular steel. Thus, you receive steel that is Certified as to quality and performance . . . plus a Report that serves as an accurate guide to best heat treatment.

Take advantage of this identified quality and receive prompt, personal service. Joseph T. Ryerson & Son, Inc., Steel-Service Plants: Chicago, Milwaukee, Detroit, St. Louis, Cincinnati, Cleveland, Pittsburgh, Philadelphia, Buffalo, New York, Boston.



With an adequate tonnage of iron ore carried to Lake Erie docks and furnaces to last until the Great Lakes shipping season reopens in the spring, these freighters are tied up in the mouth of the Cuyahoga river at Cleveland. Photo, courtesy, Cleveland Plain Dealer

Steel Scrap, Coal Supplies Scant

Tight situation expected to develop if operations are maintained at high level. Iron ore and limestone inventories adequate for winter. Tin stocks to continue limited. Zinc in fair supply. Most alloying elements available

APPRAISAL of the iron and steel industry's raw materials position at year-end presents a mixed picture. Coal and scrap supplies are short and may interfere with a high level of production during the remaining winter months. Supplies of iron ore and limestone, however, are adequate to cover needs until the lake shipping season is reopened.

Two uncertain factors which will determine the extent to which the shortage of coal and scrap may affect steelmaking operations are the threatened steel strike and weather conditions.

Should the steelworkers walk off the job Jan. 14 as scheduled and remain out for any considerable period, requirements of coal and scrap will drop below present estimates, making present and prospective supplies adequate. If, on the other hand, the labor situation is resolved without interrupting production, an extremely tight situation may develop.

Severe weather conditions would hamper the preparation of scrap in yards and might disrupt transportation of both coal and scrap to the mills. Traffic in the Buffalo and other northern and eastern areas already has been adversely affected by December's storms. Repetition of these could place the mills in a precarious position in regard to raw materials.

Bituminous coal stocks held by the steel industry averaged only 36 days' needs on Nov. 1 compared with 41 days' needs on Oct. 1. This drop was due to a coal mine supervisors' strike in the final week of September and early October. Stocks held by steel and rolling mills on Nov. 1 totaled only 548,000 tons, or 21 days' needs, compared with 746,000 tons, or 33 days' needs, on Oct. 1. By-product coke ovens held 3,677,000 tons on Nov. 1 compared with 4,624,000 tons a month earlier.

Consumption of bituminous coal by steel producers and rolling mills increased 18.6 per cent in October, rising to 798,000 tons from 673,000 tons in the previous month while by-product coke ovens consumed only 5,631,000 tons in October compared with 7,130,000 in September, a decline of approximately 20 per cent.

Partly as a result of directives which channeled large tonnages to the Great Lakes traffic during the 1945 shipping season and to strikes at mines, including numerous "wildcat" strikes, the chief consuming industries were unable to replenish their coal stockpiles. On Nov. 1, the national stockpile was equivalent to only about 45 days' needs compared with a more normal level of 90 days' needs registered at the corresponding time in 1942.

Despite these strikes, however, officials of the Solid Fuels Administration believe production this year will attain the original goal of 575 million tons, compared with 620 million tons in 1944. It is estimated that the amount of soft coal that would have to be mined to meet all needs for the present fuel year, which ends next March 31, is between 570 million and 585 million tons. Steel and coke production account for about 20 per cent of the total soft coal consumption in the United States.

Coke ovens and steel mills will need, during the fuel year ending March 31, based on the top estimate of total needs of 585 million tons, the following tonnages: Beehive ovens, 5,700,000; by-product coke ovens, 86,500,000; steel and rolling mills, 10 million; coal and gas retorts, 1,500,000.

As in coal, the collection and movement of scrap may be hindered by adverse weather during the next few months, as has already occurred in western New York, and to a lesser extent in other northern and eastern areas. In addition, supply is restricted by the continued difficulty in obtaining manpower in dealers' yards. A steady increase in "springboards" has been recorded in recent weeks in offerings for open-hearth scrap. This reflects the dwindling supply and the attempt of dealers to purchase

Snow is hauled out of Bethlehem Steel Co.'s Lackawanna plant in freight cars following December's 68-inch snowfall. Severe storms in late December made transportation of raw materials to steelmaking plants difficult throughout the northern and eastern areas. Photo, courtesy, Buffalo Courier-Express

in a wider than usual territory.

An indication of the tightness in the scrap market is the recent movement of West Coast scrap to Chicago mills. A larger than normal charge of scrap in the open hearths was necessary to offset a drop in pig iron and fuel supplies. Sufficient tonnages were not readily available in the Midwest.

Difficulty in meeting scrap demands, which are small compared with average monthly requirements of over 4 million tons during the war years, is attributed to the shortage of manpower, and the fact that collections during recent years have been so thorough, and the flow of scrap from battlefields and peacetime industrial operations has not reached a high volume.

While no official figures are available, it is believed in the trade that little headway has been made in replenishing reserve stocks of prepared scrap, although those of unprepared scrap may have risen slightly in recent weeks. The report issued by the Bureau of Mines earlier this month showed that stocks of iron and steel scrap at plants of consumers, suppliers and producers at the end of August totaled about 4,848,000 gross tons, a 2 per cent increase over the 4,762,000 tons reported on July 31. Consumers' stocks on Aug. 31 amounted to 3,772,000 tons compared with 3,611,000 tons on July 31, while combined stocks of suppliers and producers were 1,076,000 and 1,151,000 tons on the same dates.

Total consumption of ferrous materials (scrap and pig iron) in August amounted to 7,106,000 gross tons, a 14 per cent loss from the 8,286,000 tons reported used in July. Of the August total, 1,625,000 tons were purchased scrap; 1,937,000 tons, home scrap; and 3,544,000 tons, pig iron.

The steel industry is assured of adequate supplies of iron ore to meet whatever operating levels are attained this winter. The bottleneck, if any, would develop in the smelting of the ore into pig iron. Stocks of Lake Superior iron ore on hand at United States and Canadian furnaces and on Lake Erie docks at the close of the shipping season on Dec. 1 totaled about 46 million tons, compared with only 44,722,000 as of Dec. 1, 1944. This latter stockpile was sufficient to sustain steelmaking operations at an average rate of about 95 per cent last winter compared with the present rate of less than 85 per cent. If steelworkers go out on strike this winter, there will be an oversupply of ore.

Consumption of Lake Superior iron ore in the United States and Canada in December is estimated at 6 million tons compared with 5,611,627 tons in November and 4,491,246 tons in October. This brought the year's total to about 74.650,000 tons compared with 87,246,990 tons in 1944 and 89,027,689 in 1943, the all-time high. Consumption in the United States alone is estimated at 5,800,000 tons for December compared with 5,441,551 tons in November, 4,314,011 in October; 72,280,000 for the full year compared with 84,734,391 in 1944.

The comparatively small consumption in October was due to the fuel shortage. As coal shipments fell off materially when the miners' strike began, many steel companies were forced to bank blast furnaces and shut down open hearths because o lack of fuel. Steel producers dippe heavily into their stocks of cold iron an increased their charges of scrap into th open-hearth furnaces in an effort to of set the reduced flow of hot iron cause by the banking of the blast furnaces. substantial improvement in the pig iro supply has been noted in the final week of the year but consumers have been un able to replenish their stocks of eithe scrap or pig iron.

Resumption of higher operating rat by the pig iron producing industry wa slower than had been expected. As Dec. 1, 37 blast furnaces were still id compared with 59 on Nov. 1 and 43 o Oct. 1. The number of furnaces in bla totaled 148 as of Dec. 1, 126 on Nov. and 142 on Oct. 1. With six furnace continuing in blast and four idle i Canada, the totals for both countries a of Dec. 1 were 154 in blast and 41 idl

Lake Superior iron ore shipments i the season just closed totaled 75,714,75 tons, a decline of 5,455,788 tons, or 6.7 per cent, from the 1944 total of 81,170, 538 tons. This compares with the all time high of 92,076,781 tons in 1942 an the 1941 and 1940 totals of 80,116,36 and 63,712,982 tons, respectively. In ad dition to these shipments by vessel, an a rail movement of 1,230,000 tons of Lak Superior ore and of 13½ million tons o all other ore was recorded in 1945.

Limestone Stocks Remain Adequate

Stocks of limestone at steel mills sup plied by lake shipments are at about th same level as they were a year ago whe steel production was at a much high level and, therefore, are adequate cover needs during the winter month Shipments on the Great Lakes durin the 1945 season amounted to about 15 700,000 net tons compared with 16,852 171 tons in 1944 and 18,570,048 in 194 the all-time high. Mills which are sup plied by rail have normal stocks and wi not encounter any difficulties in obtainin needed supplies unless transportation disrupted.

Supplies of tin will remain limited du ing 1946 with the government maintain ing its distribution controls indefinitel The other principal coating materia zinc, is in good supply. While som metals used in alloying are in limite supply, steel mills will be able to cov their requirements, if the necessity arise through the Office of Metals Reserve the Reconstruction Finance Corp. Upo request or direction of the Civilian Pr duction Administration, the RFC sel quantities from its available reserves assist in meeting civilian deficiencies.

Official figures show that these hol ings by RFC included, in part, the fo lowing as of Nov. 1, many of which ar used by the steel industry: 21,163 ton of pig tin, 86,242 tons of refined lea and 10,312 tons of contained antimony three metals that still continue in suc short supply that distribution contro have been maintained. Materials that re

main in short supply are cadmium, 1,-235,971 pounds and corundum, grain basis, 1443 long tons. Some of the cobalt, nickel, copper and aluminum listed is stored in Canada; otherwise, the amounts listed are held in the United States.

Among other minerals and metals listed are: Chromite, 508,033 tons of metallurgical, 236,855 tons of refractory and 31,590 tons of chemical; cobalt, 3,295,-021 pounds; refined copper, 498,406 short tons; metallurgical fluorspar, 177,-57 short tons; acid fluorspar, 22,007 short tons; secondary magnesium ingot, 2215,562 pounds; metallurgical manganese, 939,543 long dry tons; mercury, 63,638 flasks; molybdenum, 4,746,202 pounds; nickel, 36,620,421 pounds; tungsten, 22,012,743 pounds; vanadium, 1,805,562 pounds; slab zinc, 247,321 short tons; aluminum, 385,140,355 pounds of primary ingot and 6,223,108 pounds of secondary ingot; bismuth, 782,514 pounds; and silver, 7,446,209 troy ounces.

U. S. Tin Mission Reports Dredges in Poor Condition

Preliminary report of the United States Tin Mission recently returned from the Far East indicates that damage by the Japanese to the tin dredges in British Malaya was much less than expected but that the prewar rate of production probably will not be approached until 1948.

The condition of the dredges is the result of operation by the Japanese without normal repairs or replacements.

Steel Capacity Held More Than Ample To Meet Peacetime Demand

President of American Iron & Steel Institute, in yearend statement, says it is unlikely immediate future civilian needs will cause steel production to top wartime record output of close to 90 million tons

THE STATE of affairs in a broad basic industry like iron and steel warrants more than casual public interest at this juncture as the nation strives to get back to a sound peacetime footing, said Walter S. Tower, president, American Iron & Steel Institute, New York, in a yearend statement.

"The industry's ample steel capacity of close to 95 million tons per year provides the nation with one very reassuring actuality. This capacity is more than adequate to meet immediate peacetime demands for steel—demands which are expected to be heavy.

"It seems improbable that in the immediate future civilian demands will cause steel production to exceed the all-time record of close to 90 million tons which was made in 1944. But production may very well exceed the previous peacetime peak of 63,206,000 net tons made in 1929. Steel is still the cheapest, most abundant and most versatile of all metals. Its quality and usefulness are constantly being improved. Its industrial applications are wider than ever.

"The steel industry will be an important factor in helping to put returning ex-servicemen to work. Over 40 per cent of all factory workers in the nation earn their living by making steel into useful products for American life. The products of the steel industry must play a significant part in helping to end the nation's housing shortage and to provide the consumer goods which are so greatly desired.

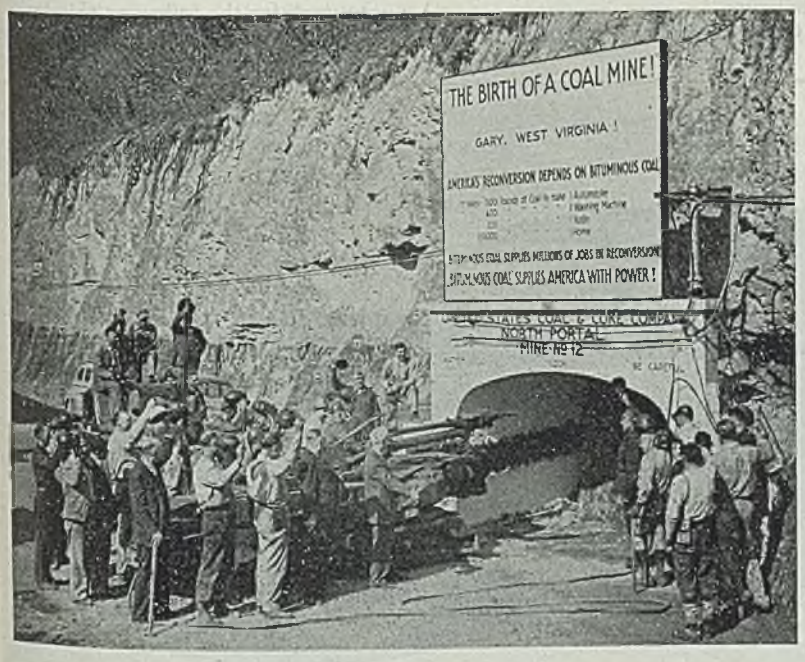
"In 1945 production of ingots and steel for castings was between 79 million and 80 million net tons, a decline of about 10 million tons or 11 per cent from the 89,641,600 tons which constituted a record in 1944. Steel mills operated at an average of about 83.8 per cent of capacity through 1945, compared with 95.5 per cent of capacity in 1944. After the industry had speedily solved its reconversion problems last autumn, output exceeded expectations both before and after the coal strike.

"Production of pig iron and ferroalloys in 1945 is estimated to total about 53 million net tons, against 62,072,683 tons in 1944.

"The steel industry's average employment in 1945 in the production and sale of iron and steel products was 548,000 persons, compared with average employment of 571,200 in 1944. In the autumn of 1945 the industry had many jobs which it was anxious to fill, a total estimated at 55,500 vacancies when one spot survey was made by the American Iron & Steel Institute.

"Total payrolls of the steel industry in 1945 are estimated at $1,631,000,000, to persons directly engaged in the production and sale of iron and steel products. That figure compares with $1,-745,019,700 paid in payrolls in 1944. The shrinkage in payrolls in 1945 as compared to 1944 was relatively less than the shrinkage in steel output.

"The unfavorable relationship of the steel industry's income and earnings as compared to its costs has been disturbing the industry. Wages and costs of materials have risen sharply in recent years. Meanwhile, ceiling prices for steel products are generally less than the schedules of steel prices in 1937. The current demand of the steel union for a $2 per day wage increase would total around 225 million dollars annually, or more than the entire steel industry earned in 1944."



COAL MINE IN THE SKY: A new bituminous coal mine atop a mountain 2200 feet above sea level is being opened at Gary, W. Va. A cutting machine makes first cut in the exposed coal seam 9 feet thick over which a concrete portal has been built. Mine is estimated to produce 250,000 tons a year

America's Advantage in Atomic Energy Research Held "Know-How"

Industrial executives tell Senate Committee on Atomic Energy nation not superior to other countries in basic research but it holds superiority in technical developments, production methods and facilities

IN THE opinion of a number of industrial executives who figured actively in carrying out the Army's atomic bomb program the pre-eminence of the United States is not so much along lines of basic research as in the ability to put into useful form the knowledge gained from such research. Their testimony was given in response to questions put to them at recent hearings of the Senate Special Committee on Atomic Energy.

"I doubt if we have been greatly superior to some other countries in our basic research," said H. A. Winne, vice president and manager of engineering, Apparatus Department, General Electric Co. "Rather, we have been superior in our technical developments, our development of production methods and facilities for manufacturing highly technical and complex equipments."

In its work in connection with the Manhattan Project, General Electric Co. ran into many difficult problems because it had to work from drawings and without any experience gathered from pilot installations. But in every instance the answer was found.

"We called on our Pittsburgh high-voltage laboratory when we ran into trouble at one place. We succeeded in obtaining some very special vacuum tubes from one company. We were able to call on the General Electric X-Ray Corp. for some other very special tubes. We always were able, by making diligent inquiry, to find someone who could help us."

The same opinion was advanced by H. E. Thompson, vice president, Carbide & Carbon Chemicals Corp. He attributed much of our success in production of atomic bombs to our experience in engineering process industries.

"The process industry phase of engineering is something in which we in the United States have perhaps had more experience than other countries. The growth of our chemical industry has been rapid in recent years. The growth of our refining industry has been equally rapid, and the development of those industries has called for a type of engineering which involves hundreds of thousands of individual parts, procured in thousands of different places, all of which must be at the site at the right time and in the right order. They not only have to be there, but they have to be properly warehoused and stored," said Mr. Thompson.

Questioned about Russia, Mr. Thompson admitted that country frequentl finds its name in the chemical literatur in an important way, but that "so far a the carryout of chemical manufacture concerned, it, of course, is not develope to a large extent so far."

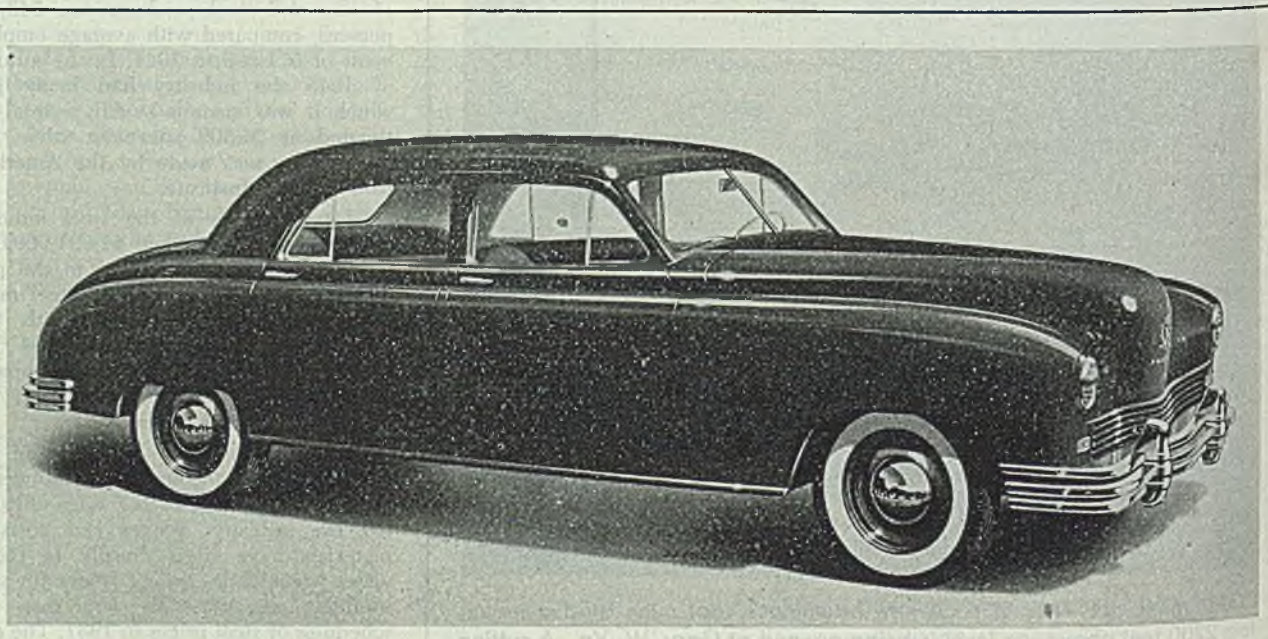
Edwin H. Brown, vice president i charge of the Engineering and Develo ment Division, Allis-Chalmers Mfg. Co stressed the range of resources require in carrying the Manhattan Project to successful conclusion.

"The project," he said, "presente problems which drew on all the re sources of our company, all its personne We required new welding processes. W required surfaces in the machinery th had to be within a tolerance of a mi lionth of an inch, and these had to b produced by ordinary people in relativel large volume. We encountered new an difficult metallurgical problems. Th pumps were different from any ever be fore built. . . . These were just a few o the problems, but they were solved b reason of the resources in experience an facilities and ingenuity which we ha available."

Consensus of opinion among repre sentatives of industry was that som other countries could have produce atomic bombs, but that it would hav taken them one and a half to two time as long to do the job as was required i the United States.

The bill introduced by the Commi tee's chairman, Senator Brien McMaho (Dem., Conn.), on Dec. 20, takes du cognizance of the present dearth of in formation about the full potentiality o atomic energy in the future. It woul establish an Atomic Energy Commissio to work for the following objectives:

1—A program of assisting and foste



NEW FRAZER: This artist's sketch shows the body lines of the new Frazer automobile which will be publicly unveiled in January by Graham-Paige Motors. The car has a wheel base of 123½ inches and a specially designed 100-horsepower motor. Exceptionally wide seating capacity and increased visibility are other features

ing private research and development on a truly independent basis to encourage maximum scientific progress.

2—A program for the free dissemination of basic scientific information and for maximum liberality in dissemination of related technical information.

3—A program of federally-conducted research to assure the government of adequate scientific and technical accomplishment.

4—A program for government control of the production, ownership and use of fissionable materials to protect the national security and to insure the broadest possible exploitation of the field.

5—A program for simultaneous study of the social, political and economic effects of the utilization of atomic energy.

6—A program of administration which will be consistent with international agreements made by the United States, and which will enable the Congress to be currently informed so as to take further legislative action as may hereafter be appropriate.

Seek Strike Settlement Formula

Government hopes to develop pattern for resolving differences. Report steel walkout postponement sought pending completion of price study by OPA

WHILE little change developed in the troubled labor situation over the country last week, a few faint signs were noted encouraging the hope that a pattern for settling some of the major disputes would be evolved in the near future.

At the moment, the threatened strike of steelworkers called for Jan. 14 is in the spotlight. Last week it was reported pressure was being brought on the union to postpone the strike date at least until such time as the Office of Price Administration can complete a new study of steel prices. This, it is said, would be around Feb. 1.

Should the steel strike be delayed it is thought a pattern for wage increases may be worked out which could apply to other industries as well as steel. However, there was no word last week from union spokesmen indicating that a change in plans was contemplated.

In the General Motors strike little progress toward settlement of the dispute was reported. The United Auto Workers (CIO) announced General Motors had agreed to begin negotiations at local levels on grievances affecting more than 70 struck plants. The agreement, it was said, does not affect the overall negotiations for a 30 per cent wage rate increase. Meanwhile picketing of some GM plants was resumed after a suspension over the Christmas holiday.

From still another quarter a serious threat to the reconversion program looms in the threatened strike of some 200,000 workers in the electrical industry. The date for this strike has not been set, but union leaders have announced a walkout early in January is inevitable. As in the case of the steelworkers, the electrical workers are demanding a $2 per day wage boost.

Meanwhile, the debate over fact-finding which includes access to company books continues. President Truman early in the month expressed the belief that management should open its books to fact-finding commissions. Walter P. Reuther, auto workers union vice president conducting the General Motors strike, hailed the President's statement as a "victory for the principle of wages based on the ability to pay."

In management circles, however, it was argued that the linking of wages to profits would have revolutionary effects on free enterprise. It was claimed the government, in effect, would be a party to determining what share of profits went to wage earners and what share went to investors; small business would become prohibitively risky because it would be unable to meet the wage scales imposed on larger competitors and consequently would be unable to recruit labor; investment of venture capital would be discouraged because the return would be limited.

Government spokesmen argued that profits would be only one of many factors considered by the fact-finders and it would not be the determining one.

Ninety-odd day strike of 15,000 at the Ford Motor of Canada Ltd. plant in Windsor, Ont., finally settled on the basis of negotiation and arbitration of differences after a return to work, is estimated to have cost the strikers at the plant, and UAW-CIO workers at other Windsor plants who left their jobs sporadically in sympathy, a total of $14 million in lost wages.

Present, Past and Pending

■ SHARON STEEL EXTENDS LOWELLVILLE OPERATIONS

SHARON, PA.—Sharon Steel Corp. will operate its Lowellville Works for at least another two or three months. Operation beyond the Jan. 1 original deadline for disposal was dictated by pressure for its output, especially sheet bars. Manpower problem at Lowellville is acute because many employees have been transferred to Sharon's Farrell works and others have taken jobs in other Mahoning Valley steel plants.

■ U. S. STEEL TO BUILD NEW CLEVELAND WAREHOUSE

CLEVELAND—United States Steel Supply Co. has purchased nine acres on Bessemer Ave., this city, as a site for a new warehouse which will double the size of its present one. Construction will be completed late in 1946.

■ SURVEY OF JAPANESE STEEL INDUSTRY UNDERWAY

WASHINGTON—Arthur B. Otis of the Steel Division, Civilian Production Administration, has left this city for Japan to assist Richard A. May and Charles Wright in making a six months' survey of the Japanese steel industry.

■ PULLMAN-STANDARD FORECASTS RISE IN OUTPUT

CHICAGO—Pullman-Standard Car Mfg. Co. expects to produce more railway and transit equipment in 1946 than at any time in over 15 years, provided an uninterrupted flow of materials can be maintained, C. A. Liddle, president, said last week. Orders total $146 million and additional freight car orders can be put into production as early as March and additional passenger car orders by third quarter.

■ BENDIX AVIATION PLANS $25 MILLION EXPANSION

DETROIT—Bendix Aviation Corp. will spend about $25 million for purchase and modernization of plants and facilities to carry out its peacetime operations, Ernest R. Breech, president, said last week.

■ CONSOLIDATED VULTEE MAY BUY INTEREST IN ACF-BRILL

NEW YORK—Consolidated Vultee Aircraft Corp., San Diego, Calif., is reported negotiating for purchase of American Car & Foundry's common stock holdings in ACF-Brill Motors Co., this city.

■ RUST FURNACE TO MAKE ORDNANCE PLANT DISPOSAL SURVEY

PITTSBURGH—Rust Furnace Co. has been awarded a contract by RFC for a survey of disposal possibilities of ordnance plants at Meadville, Pa., Titusville, Pa., Williamsport, Pa., and Gadsden, Ala., aggregating about $60 million in value.

Housing Crisis to Continue

Only 400,000 to 500,000 new dwelling units to be constructed during 1946, against need for several million

Workmen erect prefabricated houses on the site of a wartime Army camp on the northern edge of Chicago. These units will be used by returning veterans. Some of the houses were completed just before Christmas. NEA photo

AN ACUTE housing shortage will continue for several years, despite emergency programs now underway and planned to alleviate the crisis, government officials admitted last week.

"Rapid demobilization of service men and women, combined with the evacuation of temporary housing by many thousands of war workers who had migrated to war production centers, has brought the country suddenly face to face with a housing shortage more serious perhaps than any we have known in modern times," says John D. Small, administrator of civilian production.

Most optimistic hopes of housing experts is that only 400,000 to 500,000 new dwelling units can be completed during 1946. These will not go far in filling the country's needs, which the National Housing Administration estimates will be 3,240,000 by the end of next year. At present, it is estimated that 1,500,000 families are doubling up, sharing houses or apartments by necessity.

The housing shortage is not wholly war-born; a substantial deficit was accumulated during the depression which preceded the war. When the depression struck in 1929-30, this country had been building new housing units at an average annual rate of 703,000. Then construction fell almost two-thirds to 273,000 units a year during the next decade. Though building revived to an average of 427,000 units during the period from 1940 to 1945, the need today is greater than ever, for much of the wartime construction consisted of temporary houses that mushroomed up around new war plants.

For the next decade, it is estimated, 1,250,000 new houses a year will have to be built to fill needs.

At present, a shortage of building materials and skilled building tradesmen precludes any such rate of construction activity.

Among the building materials which are most critically short are cast iron soil pipe, cast iron radiation, bathtubs, common and face brick, clay sewer pipe, structural tile, gypsum board, gypsum lath, lumber and millwork.

While the housing shortage rapidly is becoming one of the country's foremost problems, little action has yet been taken toward solving it. A housing conference of government, labor and building industry representatives in Washington recently served only to define the problem and to outline the tentative steps being taken to encourage more home construction and to channel available supplies of building materials into homes for returning veterans.

The Civilian Production Administration has issued Priorities Regulation 33 which will provide an HH rating for materials intended for homes costing less than $10,000 for veterans. In a measure, this action reverses the action of the War Production Board of last October in abolishing L-41, the wartime order governing construction. Half of available building supplies are expected to be channeled into homes for veterans by the measure.

Sen. James Mead (Dem., N. Y.) inspects temporary barracks and war workers' homes made from prefabricated materials. The Federal Housing Administration plans to convert 100,000 of these temporary buildings into comfortable family units, which officials believe can be done at small cost. NEA photo

Grace Elected Chairman of Bethlehem Steel

Continues as chief executive officer of company. Arthur B. Homer named president. Two new vice presidents appointed

EUGENE G. GRACE

ARTHUR B. HOMER

ELECTION of Eugene G. Grace to the chairmanship of Bethlehem Steel Corp., Bethlehem, Pa., has been announced.

Mr. Grace, who has served as president of the company since 1913, continues as chief executive officer but is succeeded as president by Arthur B. Homer who has been vice president in charge of Bethlehem's Shipbuilding Division since May, 1940.

Other executive personnel changes announced by Bethlehem include the election of two new vice presidents. One, William H. Collins, who has been general manager of Bethlehem shipyards in the Boston area, has been appointed vice president in charge of all the corporation's shipbuilding facilities and operations, succeeding Mr. Homer.

At the same time Norborne Berkeley, who has been executive assistant to Mr. Grace, has been elected a vice president and will continue to serve as executive assistant to the chairman.

Both Mr. Collins and Mr. Berkeley have been associated with Bethlehem many years, the former since 1917, and the latter since 1919.

With Company Since 1919

The new president of Bethlehem, Mr. Homer, has been associated with the company since 1919. His entire business career has been with the company. He was for five years at the general headquarters at Bethlehem, and subsequently was at Quincy, Mass., and at New York. After holding various posts in engineering, production, and sales, he became a director of the corporation and a vice president in 1940.

Mr. Homer is 49 years of age and is a native of Belmont, Mass. He was a lieutenant in the submarine service in World War I, and is a graduate of Brown University.

Several sales staff changes were also announced by Bethlehem last week, effective Jan. 1, 1946.

George B. Troxell has been named manager of the Carbon Bar Division, Bethlehem, succeeding L. R. Steuer, retired. Mr. Troxell was formerly manager of ordnance and prior to that was assistant to Mr. Steuer.

N. R. Downie has been named manager of sales, Wire Rope Division, succeeding C. M. Ballard, retired. Mr. Downie has been a member of Mr. Ballard's staff.

S. C. Husted has been appointed manager of sales, Baltimore District, succeeding Jesse A. Davis, retired. He was formerly assistant manager of sales and will be succeeded by B. L. Hagberg.

C. E. Simmons has been named contracting manager at New York, succeeding Andrew M. Conneen Jr., retired. Also G. E. J. Pistor of New York is retiring as contracting engineer. His successor is yet to be named.

J. E. McQueen has been appointed manager of sales, Atlanta, Ga., office, succeeding Charles P. King, retired. Mr. McQueen was formerly resident representative at Savannah, Ga., and will be succeeded in Savannah by D. S. Blankenship. At the same time W. A. Aichel has been appointed contracting manager at Atlanta succeeding J. E. Glenn, retired.

W. R. Stevens has been appointed contracting manager at St. Louis, succeeding J. W. Davis, retired.

E. D. Bickford has been appointed resident representative for Bethlehem at New Haven, Conn.

Unity That Helped Win War Seen as Aid In Meeting Problems of Reconversion

HOPE that the same unity of purpose which made the war effort successful will help solve this country's reconversion problems was expressed by Irving S. Olds, chairman, United States Steel Corp., in a year-end statement last week.

"The year now ending saw the conclusion of a world-wide conflict which for more than three years taxed all the resources of the United States," Mr. Olds said. 'All of us can be devoutly thankful that our arms were so completely successful. American industry contributed in large measure to making possible this military success, and management shares with employees the satisfaction of a job well done.

"During the war no project was held up or abandoned because of lack of steel. As an important unit in the steel industry, United States Steel produced 161,106,303 tons of steel ingots and castings from Jan. 1, 1940, to Aug. 15, 1945.

"Now an era of peace lies ahead. The threat of an industry-wide steel strike presently clouds the horizon. However, it is hoped that the same unity of purpose and the same determination to meet and solve problems in a manner fair to all parties involved, which prevailed during the war, will carry over into the new year and will lead to a sound and constructive solution of this and any other future difficulties of a character affecting the public interest."

White Motor Expands; Will Build Busses in New Plant

Plans for a $2,500,000 plant in Cleveland to enlarge the manufacturing facilities of White Motor Co., Cleveland, have been completed with the acquisition of the plant and general office buildings which were formerly occupied by the Nottingham Works of General Electric Co., Schenectady, N. Y., and were sold through Reconstruction Finance Corp.

The new plant will employ between 1000 and 1200 employees as soon as additions to double its present production area of about 180,000 sq. ft. have been made and machinery and equipment are installed. According to Robert F. Black, president, the company will completely devote this new building to manufacturing of busses.

Long-Term Prospects Bright for Enlarged Pacific Coast Industry

Expanding local market for manufacturers seen in increased population of area, which is still growing. Settlement of labor troubles and improvement in raw material supplies needed to spark advance

SAN FRANCISCO

THE EVENTFUL year 1945 is ending on a note of optimism on the West Coast, despite many uncertainties that remain to be resolved and troubles here and there that may become worse before they improve.

Western business and industry, which has found, along with the rest of the country, that reconversion to peacetime cannot gain speed until more materials and better labor supply are available, is hopeful that 1946 will bring relief from those shortages.

Companies which are undergoing strikes now and those which face possible labor disturbances soon, are hoping for settlement of workers' unrest before the new year is out. They are resigned, in most cases, to the need for higher wage costs and believe that if the Office of Price Administration expires next June 30 they will be able to readjust their operations to a profitable basis despite the higher expenses.

Population Still Rising

For the long-term future, nearly everyone is agreed that the western United States faces a bright prospect. The large war-acquired population is staying on, and in fact still is increasing. California alone has gained nearly 2,500,000 people since 1940. This means that purchasing power has been increased tremendously, providing outlets for home industries that sprang up during the war and now are shifting into peacetime consumer goods.

In particular, prospects are bright for the steel industry and its allied lines on the West Coast. Western metal fabricators are preparing to capture a larger share of the market than they had hoped would be possible a few years ago. The war-born increase in steel-producing capacity, even without the Geneva plant, has made the West Coast self-sufficient.

What is ahead for the steel industry on the West Coast has been foreshadowed in 1945 by plans of U. S. Steel Corp. for a $25 million expansion in the San Francisco area, and possibly a similar increase in its facilities at Los Angeles. Bethlehem Steel Corp. in addition is planning to expand its plants at San Francisco, Seattle and Los Angeles to the extent of more than $15 million. Henry J. Kaiser is converting his Fontana steel mill to peacetime production, and hopes soon to bring his Permanente magnesium plant back into operation.

The one big question in the western steel picture is what will be done with the Geneva plant in Utah. This matter is expected to be decided before the new year is far along.

This $216 million plant, the largest of the war-built steel facilities, soon will be declared surplus by the Reconstruction Finance Corp. and already a call for bids has been announced. Bidding will close March 1.

While Geneva is the largest piece of surplus property, there are many others on the West Coast which will have an important bearing on this area's future economy. Among these are the aluminum plants which have provided the West with a capacity sufficient for huge future expansion.

There are many lines of enterprise which appear destined to grow substantially on the West Coast in the next few years. One of the most important, for example, is assembly of automobiles. The major companies which now operate assembly plants on the Coast have announced expansion plans. In addition, Kaiser-Frazer is expected to announce soon the purchase or lease of a war plant in Southern California for integrated production of automobiles on the West Coast.

Another field which will be extremely active in the next few years will be construction, both commercial and home building. A huge pent-up demand for new structures is leashed now by shortages of materials and labor, but once those become more plentiful activity will reach a sustained high note.

Perhaps the best indication of the West Coast's future prospects is forecast by the trend of eastern industries to establish branch manufacturing plants and selling forces in the west. This movement has been gaining steadily in recent months and up to now there is no let-up. In the San Francisco area alone, scores of new plants have been blueprinted, and surveys show more than 300 other firms are interested in coming west as soon as possible.

Control of Joshua Hendy Iron Works from the hands of Charles E. Moore, its head, passed a few days ago to California Shipbuilding Corp. which purchased the block of stock held by Mr. Moore. Joshua Hendy is now one of the West Coast's largest producers of marine engines, turbines and similar equipment. It was built up during the war from a small plant to one of the leading Coast war enterprises. The company controls Crocker Wheeler Electric Mfg. Corp.

California Shipbuilding Corp. is controlled by the Bechtel-McCone interests.

Although no details were given of the size of the holdings being transferred, it is taken without question that Mr. Moore held the controlling share of Hendy stock. In announcing his decision to sell, Mr. Moore said he had "no other alternative if I am to meet my responsibilities in other enterprises."

Three surplus western war plants have been sold by the RFC under the Surplus Property Act for a total recovery price of $171,000, the RFC office in San Francisco has announced.

They are: The plant of Compak Foods Inc., at Santa Ana, Calif.; Coast Carbons Inc., at Tacoma, Wash.; and the plant of Westvaco Chlorine Products Co., at Newark, Calif.

The sale value represents 28.37 per

Representatives of the press including R. C. Hill, Seattle correspondent of STEEL, *recently were conducted on a tour of Bethlehem Pacific Coast Steel Corp. facilities at Seattle by H. H. Fuller, president*

cent of the original cost of $603,481.

The RFC also has announced satisfactory lease arrangements for five other plants for leases running from one to five years. Original value of plants now under lease amounts to $2,667,440. Other western plants on which lease negotiations are expected to be concluded soon include Basic Magnesium, at Las Vegas, Nev., and Kinner Motors Corp. at Los Angeles.

Food Machinery Corp. is acquiring the Gilbburg Mfg. Co., of Los Angeles, which makes an electrical counting device used extensively in the fresh fruit and vegetable packing industry. Purchase price was not disclosed.

Bethlehem Steel Officials Inspect Seattle Facilities

SEATTLE

Continued expansion and modernization of the Seattle facilities of Bethlehem Pacific Coast Steel Corp. as conditions warrant were promised by H. H. Fuller, president, and Paul W. Cotton, vice president in charge of sales, at a luncheon for a group of newspapermen here recently. The luncheon followed a tour of inspection of the company's Seattle facilities.

Bethlehem Pacific's Seattle plant is the largest steel operation in the Pacific Northwest and is the outgrowth of a rolling mill built in 1895 at Lakeview, Wash. Its steel producing capacity is now 210,000 tons annually. Employees now number between 900 and 1000. Extensive expenditures have been made on expansion and improvement at the Seattle plant since it was taken over by Bethlehem in 1930. New facilities added during the last five years include: One 45-ton open-hearth steelmaking furnace, two new mill heating furnaces, two new rolling mill tilting tables, new rolling mill transfer mechanisms for three mills, new refractory clay mixer, new water cooling pond and tower, new oil storage facilities and new overhead cranes. The revamping of plant transportation system included replacement of steam locomotives with diesel-powered locomotives. Modernization of machine shop facilities is now under way.

On Dec. 1, 1945, the Pacific Coast Forge Co., then a Bethlehem subsidiary, was taken over by Bethlehem Pacific Coast. New structures for manufacturing nuts, bolts and nails are under construction at Seattle, and additional facilities will be furnished this unit in a $400,000 expansion program.

Women Workers Leaving California Aircraft Plants

Of the approximately 55,000 women employees in Southern California aircraft plants on V-J Day, some 35,000 have quit their jobs or been laid off, a survey in the Los Angeles and San Diego areas announced last week indicated.

In the Los Angeles area alone the survey covered the Consolidated Vultee, the three Douglas plants and Lockheed, North American and Northrop. These, on May 1, seven days prior to V-E Day, had 132,935 employees of which about 38 per cent were women. On Aug. 1 they had 111,569, with 37 per cent women and by last week only 64,866 were on all payrolls with the ratio of women down to 27 per cent.

Conversely, the percentage of men in Los Angeles area aircraft plants was 62 on V-E Day, 63 on V-J Day and 73 now.

In the opinion of one management representative the trend will continue, with men tending to remain on the job and women tending to leave the industry as husbands are discharged from military services.

Hearings before the State Railroad Commission on application of the Southern Counties Gas Co. and the Southern California Gas Co. to construct a 1206-mile pipeline for bringing natural gas from Texas fields to the Los Angeles area were in progress last week in that city.

Paul Kayser, president of the El Paso (Tex.) Natural Gas Co., assured the commission that an adequate supply of natural gas for Southern California needs is available. He said his company has voted $36 million for its share of the construction cost.

Previously, A. F. Bridge, general manager of the Southern Counties Gas Co., testified that the 26-inch line would cost the Los Angeles companies about $12 million. He predicted that the line will have an ultimate capacity of 305 million cubic feet a day, with 125 million cubic feet a day during the first year of its operation.

Witnesses agreed on predictions that by 1949 the consumption of gas will be 263 million cubic feet a day more than the amount estimated as available from sources within the state.

J. W. Frazer, Detroit, president, and Henry J. Kaiser, chairman of the board of the Kaiser-Frazer Corp., were in Los Angeles last week for the purpose of surveying this section of California as a market for their new car, expected to be in full production by next March.

Kaiser company representatives in Los Angeles disclosed that production of both the Kaiser and the Frazer automobiles will get underway soon after Jan. 1.

Standard Steel Fabricating Buys Site for Expansion

SEATTLE

William J. Duthie, president, Standard Steel Fabricating Co. Inc., has purchased a 2.2-acre site in the industrial area of Harbor Island and will erect a modern steel fabricating plant.

Mr. Duthie has been active in steel fabrication and construction in the Pacific Northwest for the past 40 years. During World War 1, the Duthie Shipyards constructed many 8800-ton vessels for the U. S. Shipping Board. Later Mr. Duthie developed the Wallace Equipment Co. and the Wallace Bridge Co. For a time he operated the Hofius Steel & Equipment Co. Ten years ago he organized the Standard Steel Fabricating Co., which now is expanding.

TRANSITION TOPICS

RAW MATERIALS— Shortage of coal and scrap peril high level of steel operations. Ore and limestone supplies adequate. See page 23.

HOUSING— Little hope seen for early solution to dwelling shortage. Less than half million units to be completed in 1946, against demand for several million. Scarcity of building materials and skilled labor principal bottlenecks. See page 28.

SURPLUS TOOLS— Machinery manufacturers and dealers will act as agents for government in selling government-owned surplus. See page 32.

RFC— Loan agency ready to offer credit for postwar industrial expansion. Business consultant services available. See page 42.

RAILROADS— Extensive car buying program being undertaken by carriers. Many roads may purchase own sleeping cars. See page 51.

UPSETTING IN FORGING PRACTICE— More than 50 per cent of weight of rough forged cylinder barrels can be eliminated by changing over from conventional forging to upsetting method. See page 52.

TRENDS IN BROACHING— Possibilities for broaching are indicated by its wartime role in limited mass production. See page 58.

DRAWING MAGNESIUM— Crystaline structure of metal imposes problems which will be solved by careful attention to choice of lubricants and forming temperature. See page 64.

Machinery Dealers To Act as RFC Agents in Selling Surplus Tools

Program under which private interests will aid disposal agencies will provide 12½ per cent commission to dealers. Plan expected to speed disposition of large government-owned inventories of surplus machinery and equipment

SUBSTANTIAL number of manufacturers and dealers have made application to become "approved dealers" for the Reconstruction Finance Corp. in selling surplus government-owned machine tools and allied equipment.

Other companies have indicated they will make application to become RFC agents. The plan under which approved dealers have been called upon to liquidate the government's stock of surplus tools has general approval. The plan was evolved after considerable discussion with representatives of the machine tool manufacturers and representatives of dealers in both new and used machine tools. Not only do many interests in this field have a chance to earn some profits by acting as sales agents for the RFC, but by making such sales they will be helping toward an objective which all builders and sellers of machine tools hope will be achieved in minimum time. That is the liquidation of the bulk of the government-owned inventories so that they will not hang like a threat over the machine tool market indefinitely.

RFC spokesmen say they have received no serious complaints on their decision to allow 12½ per cent of the sales price on sales made by approved dealers, despite the fact that many dealers originally thought the commission should be higher. The RFC men point out that dealers do not have to tie up capital in merchandise. All they need is minimum office facilities and cash to pay for traveling and incidental expenses. The RFC pays all other expenses and arranges credit and terms of payment and attends to collections. Even the orders are entered on RFC forms.

The contract form which the approved dealers sign includes a number of stipulations. One of them is that approved dealers shall confine their RFC sales activities to the continental United States. Another is that no commission will be paid to an approved dealer on sales to any individual or corporation in which the dealer is financially interested, or on sales to firms that have any option rights in the equipment involved, or on sales to federal, state or local government agencies. Another is that the approved dealer shall not have exclusive rights to solicit or sell to any firm or corporation, and that RFC is free to solicit and sell without reserve.

NEW DRYDOCK: Navy's new drydock and crane installation underway at the Hunters Point, Calif., yard will service ships from overhead track. NEA photo

Under the terms of the agreement, approved dealers are to have full opportunity to examine the records of RFC disposing agencies relating to production equipment and machine tools available for sale. They will have the right to inspect the surplus equipment available for sale and arrange for such inspections by prospective customers. They also may arrange for "freezing" such property in accordance with certain rules so as to give them protection for a reasonable period after they have interested a potential customer. The agreement says that inspection should be made in the company of properly qualified disposing agency personnel —meaning RFC representatives—but the managers of the disposing agencies have authority to waive this requirement.

While the approved dealer will be entitled to deal with and through any disposing agency in the continental United States, his responsibility will be to the disposing agency with which the agreement was executed. When disposing agencies find evidence of misrepresentation on the part of an approved dealer they are to report the facts promptly to the RFC headquarters in Washington whereupon they will receive advice as to the action to be taken. This will involve termination of the agreement where the misrepresentation is malicious.

Dealers' Business Unhampered

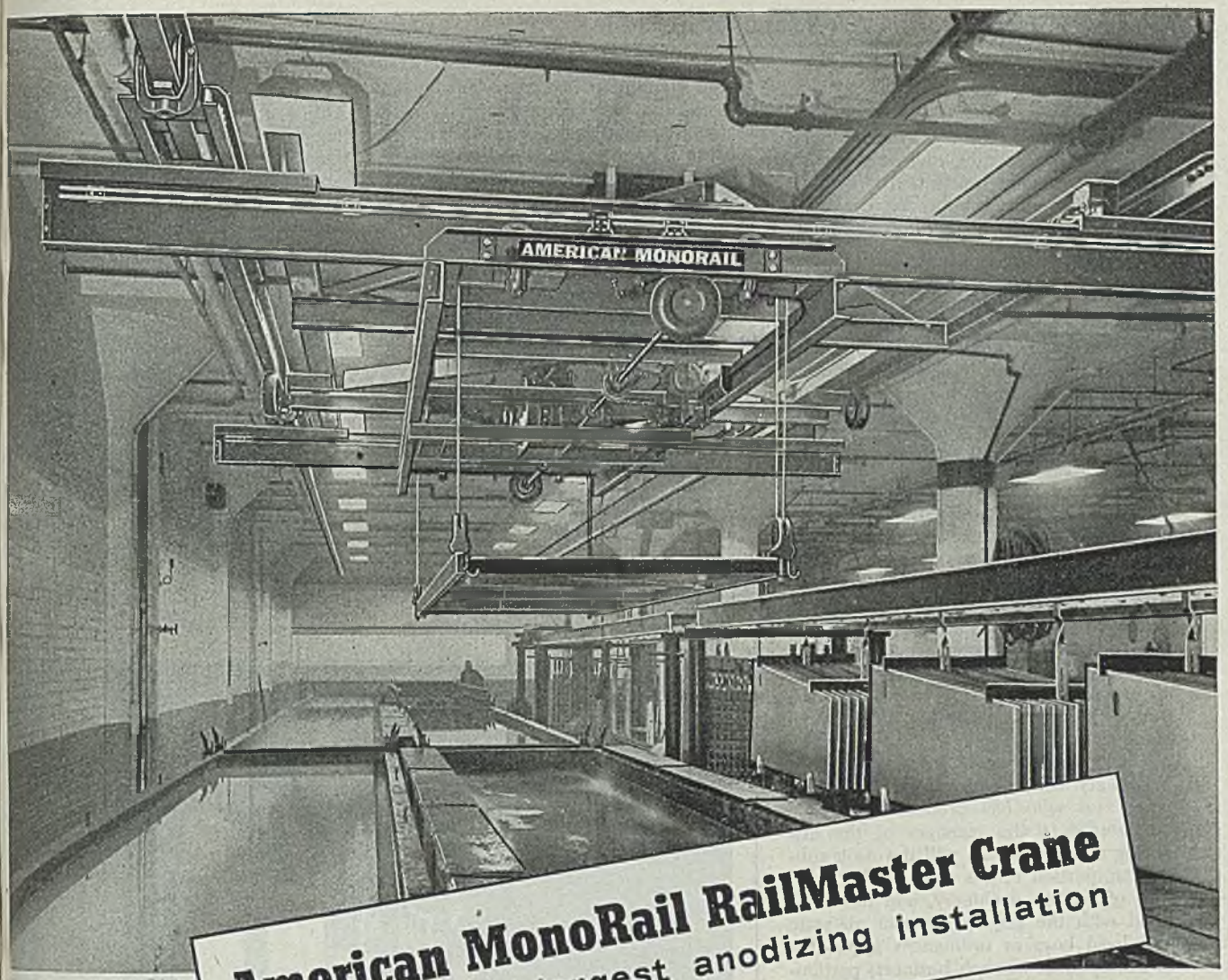
RFC officials, in wording the form of agreement, sought to avoid any restriction on, or interference with, the approved dealer's regular business. One of the stipulations, therefore, reads as follows:

"Approved dealers are not to be precluded from performing services such as transportation, cleaning, repairing, rebuilding or remodeling for purchasers of machine tools or production equipment but any arrangements between such approved dealers and purchasers with respect to such matters shall be solely between the approved dealer, acting in his individual capacity, and not as an agent of the Reconstruction Finance Corp., and the purchaser."

In other words, the RFC is interested only in sales of the equipment in the "as is" condition, and at the price it has set on it. The dealer can go as far as he likes in drumming up business in servicing the equipment on his own responsibility, and the RFC will have no interest in charges he makes for his work.

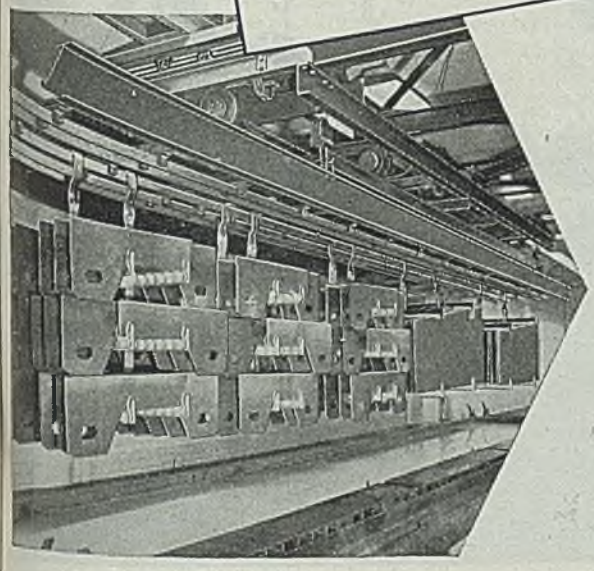
Payment of sales commissions is covered as follows:

"No commissions will be due or payable until Reconstruction Finance Corp. has accepted in writing the sales contract or order submitted by an approved dealer, has received the full sales price thereof, or has completed credit arrangements with the purchaser, and the machine tools and production equipment



Special RailMaster 35' Crane with 2-way tractor drive.

American MonoRail RailMaster Crane feeds nation's largest anodizing installation



Loaded rack on crane ready for anodizing.

AN American MonoRail two-way drive Rail-Master Crane operates over six tanks that make up one of the world's largest anodizing installations. Special racks loaded with parts are lifted from one to another of five cleansing and rinsing tanks and then deposited into a chromic acid tank where the actual anodizing takes place. Some of the loads weigh as much as 3 tons.

American MonoRail Railmaster Cranes of extremely simple design are developed for handling loads up to 5 tons by manual operation or propelled by rubber wheel drive.

With thousands of installations to draw from, American MonoRail Engineers are well qualified to offer solutions involving overhead handling equipment. Consultation with these men will reveal why American MonoRail equipment was selected to serve the nation's largest industrial plants. This service is offered without obligation — we invite your inquiry.

Send for Bulletin C-1, a 56 page book showing successful applications of American MonoRail systems.

THE AMERICAN MONORAIL COMPANY

13102 ATHENS AVE. ● CLEVELAND 7, OHIO

have been delivered to carrier or purchaser.

"Such commissions will be paid quarterly on the preceding quarter's sales of machine tools and production equipment effected through an approved dealer by the disposing agency holding the property in its inventory."

The agreement contains a provision under which "an approved dealer shall not pay to, rebate to, or share with any purchaser of machine tools and production equipment, nor to or with any other person, firm or corporation, except another approved dealer, all or any portion of the commissions paid to the approved dealer under the agreement."

Agreements may be made, upon receipt of a duly executed application, with anyone in the following classifications: (a) Established machinery builder, (b) established new machinery dealer or distributor, (c) established used machinery dealer or distributor, (d) person or firm who wishes to become an approved dealer and who "in the opinion of the manager of the disposing agency in whose territory such person or firm has its principal place of business possesses the necessary qualifications, either by virtue of previous machinery selling experience, or otherwise, and who has produced evidence satisfactory to the manager of the disposing agency that he will devote a substantial portion of his time to the business of selling machinery, and has complied with the requirements of all state and local laws or ordinances applicable to the conduct of such business; particular attention will be given to applications by veterans."

The machine tools and production equipment which may be sold by approved dealers are those tools on which RFC has set fixed prices under the Clayton formula. This includes mostly standard general-purpose machines as identified in Regulation 1-e of the Surplus Property Administration. It also includes such other special and single-purpose machine tools and other equipment as have been placed under the Clayton formula.

Protest Unlimited Imports Of Swiss Watches, Works

First instance of Army-Navy solicitude over the effect of imports in hampering war contractors in their reconversion program is revealed in a report by the House Small Business Committee. From an investigation of many complaints from retail jewelers who would like to restrict importation of watches and watch movements from Switzerland, the committee staff learned that the War and Navy Departments have brought pressure on the State Department with a view to preventing imports from satisfying a major share of the watch demand over the indefinite future as at present. The Commercial Policy Division of the State Department reported to the committee that thus far the only step taken "has been to approach the Swiss Legation for discussions with a view to arriving at a mutual understanding so that there would be both Swiss and American watches available to jewlers in this country without injury to these retailers."

Since 1939 imports of Swiss watches and movements into this country have increased from 2,900,000 in that year to an estimated 9,000,000 to 10,000,000 in 1945 while American production decreased from 1,000,000 to 2,000,000 to no production at all as of V-J Day.

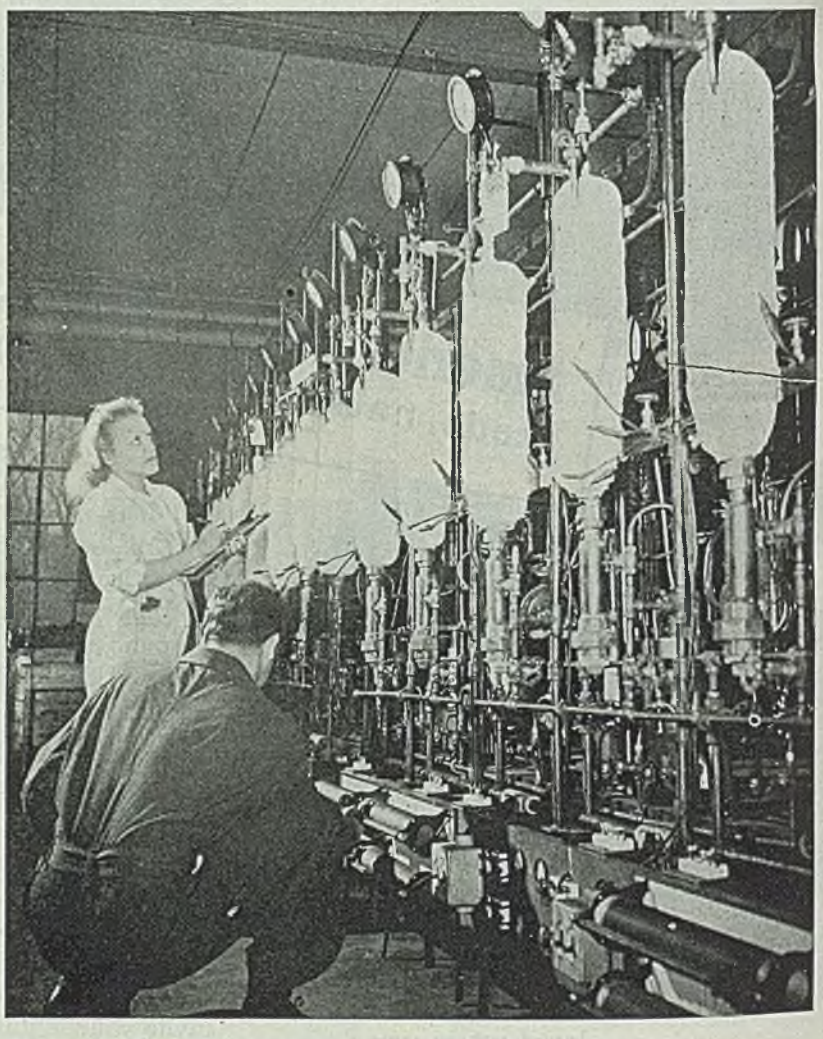
Colombian-Venezuelan Merchant Marine Planned

Plans for the formation of a Colombian-Venezuelan merchant marine are being considered by the Colombian government, according to a report by the Office of Inter-American Affairs. Speaking at a recent luncheon of the Colombian National Association of Merchants at Bogota, President Alberto Lleras Camargo of Colombia reported that negotiations were under way with the Venezuelan government with a view to improving navigation and operating a merchant marine on the Magdalena river.

Argentina Good Potential Customer for Machinery

Potential demand in Argentina for metalworking machinery and parts from the United States is reported to be good, precision equipment being needed especially, according to a report to the Department of Commerce.

Between 1937 and 1941, the produc



GASOLINE FROM COAL: Gasoline is produced from coal on a laboratory scale in the United States Bureau of Mines laboratory in Pittsburgh, using the Fischer-Tropsch type synthesis originally developed in Germany. Three plants are being built by the United States government to utilize this method on a larger scale to produce America's first synthesized gasoline and oil on a commercial basis. This photo shows a battery of catalyst testing units in the Bureau of Mines laboratory

tion of metalworking machinery and parts in Argentina increased 400 per cent. A shortage of the materials that are needed for the manufacture of machinery plus an increasing demand resulted in higher imports in the first six months of 1945. In the third quarter of 1945, application was made for machinery shipments from the United States amounting to $180,000.

Pig Iron Consumers Move To Reduce Inventories

Many consumers of pig iron have requested during the past two weeks a reduction in shipments from their suppliers and a readjustment of their unfilled purchase orders. This followed Civilian Production Administration's recent warning that stricter controls would be imposed unless pig iron consumers abide by the inventory restrictions in Priorities Regulation No. 32. This regulation limits inventories of pig iron to a 30 days' supply.

All pig iron consumers are being advised that if their inventories are in excess of the 30-day limitation, they cannot accept any deliveries if such acceptance would bring their inventories over that limit.

CPA is compiling a list of companies in violation of inventory restrictions and plans to instruct producers to withhold shipments to such pig iron consumers who are in violation.

In New England, where the pig iron market is particularly tight, consumers are now required to report their monthly consumption of pig iron and their inventories at the end of each month.

Britain Permits Exports of Surplus Machine Tools

British government has authorized exports of surplus used and new government machine tools after a standing offer of these goods to home users for the past four months.

Heretofore the British authorities have prohibited foreign sales of surplus machine tools, and the restriction on export of American tools acquired under lend-lease still remains in force.

Belgium Granted $100 Million Credit by U.S.

Two loan agreements have been signed between the Export-Import Bank and Belgium. One provides for a line of credit of $55 million to finance the purchase in the United States of United States products and services for which requisitions had been filed and approved before V-J Day under the lend-lease and the procurement of which was approved but not contracted for prior to V-J Day.

This credit of $55 million is to be available to Belgium until June 30, 1946. Repayment is to be made in 60 semiannual installments, the first of which will fall due on July 1, 1946. Interest will be at the rate of 2⅜ per cent per annum.

The second agreement provides for a line of credit of $45 million to finance the purchase in the United States after Sept. 1, 1945 of a wide variety of United States agricultural and manufactured products. This credit is to be available until June 30, 1948. Advances under the credit are to be made against notes of Belgium bearing interest at the rate of 2½ per cent and maturing on March 31, 1951, at which time Belgium will have the right to tender new notes in exchange for the original notes.

British Guiana Increases Motor Vehicle Imports

British Guiana increased the value of motor vehicle imports for the first half of 1945, compared with the same period last year. Imports for the first half of 1945 totaled $139,783, compared with $4863 in the same months of 1944. Motor vehicle parts imported in the same periods were respectively, $38,667 against $24,-928.

Industrial machinery imports also increased. In the first half of 1945, compared with the same months of the previous year, imports were respectively, sugarmaking machinery, value, $219,202 and $133,349; rice milling machinery, $7057 and $13,281; and agricultural machinery, $81,120 and $40,134.

Lack of Coke Handicaps Belgian Steel Industry

Lack of coke and high production costs are hampering recovery of the Belgian iron and steel industry, American Embassy sources report in a survey of the industry situation abroad.

Only 16 blast furnaces out of a total of 55 were in operation in Belgium at the end of September. Pig iron production rose that month to 80,020 tons, compared to 73,000 tons the preceding month, and the crude steel output rose to 75,680, against 67,980 tons in August. However, this compares with the prewar capacity of both types of plants amounting to more than 300,000 tons.

Before the war, the Belgian metallurgical industry used 250,000 tons of coke per month, whereas in September allocations were only 65,000 tons. Low production meanwhile, has reacted unfavorably on production costs, causing losses at present price levels.

Counsel for OPA Metals Price Branch Resigns

Morris Hershson, well known to the iron and steel metals industries by reason of the fact that for the past three years he has had the legal responsibility of drawing all pricing actions on steel mill products, ferrous castings, iron and steel scrap, reusable steel products, relaying rails, and on iron and steel products sold by the warehouses, has resigned these activities as of Dec. 31 to resume the practice of law at 400 Madison avenue, New York, specializing in administrative law. Mr. Hershson was chief counsel of OPA's Iron and Steel Price Branch and more recently was special counsel for iron and steel in OPA's Metals Price Branch.

Silver-Platers Granted Price Relief by OPA

Service suppliers, such as concerns that do silver-plating under subcontract for manufacturers of silver table service, jewelry materials and allied products, may use the actual dollar-and-cent amount by which their silver costs have been increased since Sept. 21, 1945, in computing the prices for their services, Office of Price Administration has ruled.

French Steel Output Up to 106,000 Tons in August

French steel ingot production is reported to have increased to 106,000 tons in August, from a monthly average of only 38,300 tons in the first quarter of the year, according to information reaching the Department of Commerce.

By September the upward trend was fairly well established, and with the larger allocations of coal in prospect, it was hoped to have between 26 and 28 blast furnaces going, and an output of 160,000 tons per month for the fourth quarter.

Iron ore production, the Ministry of National Economy (French) reported, advanced from 667,000 tons in July to 795,000 tons in August, although the July production was only equal to about 24 per cent of the average monthly output for 1938.

Australia Will Expand Iron, Steel Capacity

Expansion of steel production for Australia is indicated by a survey of new plant projects made by American observers in that country.

One steel company has an expansion program planned to cost $22,400,000, it was stated, including an ore extraction plant, deep sea port, and a town, at a cost of about $4,000,000; four 12,500-ton ore steamers, about $5,000,000; a new battery of modern by-product coke ovens, about $4,000,000; and a new 10-inch merchant bar and strip rolling mill, approximately $3,200,000; this latter will be at Port Kembla, Australia. Mechanization of collieries to increase the coal supply for this steel capacity is expected to cost $3,200,000.

Globe Forge Inc. Bought by Barium Steel

Canton, O., firm announces also that negotiations are about to be closed for taking over other companies

BARIUM Steel Corp., Canton, O., has acquired control of Globe Forge Inc., Syracuse, N. Y., steel forging and manufacturing firm, and is about to close negotiations to take over a group of companies in associated lines of the steel and manufacturing industries.

Acquisition of Globe Forge marks the third time in the past year that Barium Steel has expanded its organization and activities. Late in 1944, it purchased Clyde Iron Works Inc., Duluth, and in June, 1945, took over Erie Bolt & Nut Co., Erie, Pa.

Globe Forge was founded in 1910. In 1926, it was purchased by E. R. Bishop, who had started with the company in 1910 as foreman of the die department. Mr. Bishop will continue to act in a consulting capacity.

Globe Forge has steadily broadened the scope of its business since its organization and today it furnishes drop and upset forgings for the automotive, aircraft, agricultural, railroad and other types of industries.

Engine To Be Produced by Jack & Heintz To Be Diecast

The new Jahco engine which Jack & Heintz Inc., Cleveland, will produce will be the first completely diecast engine ever made, William S. Jack, president, announced last week.

The engine, he said, will develop one horsepower for every cubic inch of piston displacement. He added that laboratory tests had proved that the engine could carry an automobile full of passengers around the world at 75 mph.

A number of firms which might be possible users of the engine have looked at it but no orders have been closed for it. The engine could be produced at the rate of 1500 units daily.

By the end of 1946 between 15,000 and 20,000 people will be employed in the Jack & Heintz plants in Cleveland, Mr. Jack said. The company, he announced, has orders for 2½ million electric motors and 1½ million refrigerator compressors. He added that the company's policy would be to distribute 50 per cent of the profits to associates (employees) according to their take-home pay.

50 YEARS' SERVICE: Curtis S. Garner, left, long identified with the erection of large bridges and skyscrapers in all parts of the world, receives a gold medal from L. A. Paddock, president, American Bridge Co., for 50 years of continuous service with this United States Steel Corp. subsidiary

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Colorado Fuel & Iron Corp., New York, has announced that its subsidiary, California Wire Cloth Corp., Oakland, Calif., will handle sales and service for C. F. & I. on the West Coast.

—o—

Hewitt Rubber Corp., Buffalo, has appointed LaFrance Industries, Philadelphia, as sales agents for its latex foam products.

—o—

Walter Kidde & Co. Inc., Belleville, N. J., has moved its sales and executive offices from 140 Cedar St., New York, to 1020 Main St., Belleville, N. J.

—o—

Barwood & Co., Philadelphia, has been appointed sales representative for Size Control Co. and Walsh Press & Die Co., divisions of American Machine & Gage Co., Chicago.

—o—

National Mineral Co., Chicago, has changed its name to National Industries Inc.

—o—

Rockwell Mfg. Co., Pittsburgh, has announced that its subsidiaries—Merco Nordstrom Valve Co., Pittsburgh, and H. A. Smith Machine Co., Hopewell, N. J.—have changed their names and are now Nordstrom Valve Co. and Rockwe Machine Co., respectively.

—o—

Power Piping Division, Pittsburg Blaw-Knox Co., has appointed Flag Brackett & Durgin, Boston, as sales representatives in Massachusetts, Main New Hampshire, Vermont and Rhod Island.

—o—

Monsanto Chemical Co., Springfiel Mass., has developed a phosphorescen molding compound which can be use for clock faces, dash boards, house num bers, light switches, and similar applica tions.

—o—

Chrysler Corp., Detroit, has inco porated a safety-rim wheel on all its 194 cars. The rim grasps the tire firmly i the event of a blowout and prevents th tire from leaving the wheel.

—o—

Sponge-Aire Seat Co. Inc., Buffal has changed its name to Chandler Indu tries Inc.

—o—

International Detrola Corp., Detroi has sold its machine tool manufacturin interests with the exception of its Elk hart, Ind., plant which will continue ma

chining operations under subcontracts, to Gisholt Machine Co., Madison, Wis., and will specialize in appliance manufacture.

—o—

Lincoln Electric Co., Cleveland, is continuing its welding courses under the supervision of W. J. Conley, welding consultant, and has announced that its class rosters contain members from many South American countries and China.

—o—

Lodge & Shipley Machine Tool Co., Cincinnati, has appointed Rudel Machinery Co. Inc., Boston, as exclusive dealer in Maine, Vermont, New Hampshire, Massachusetts and Rhode Island.

—o—

Koppers Co. Inc., Tar & Chemical Division, Pittsburgh, has announced plans to acquire the capital stock of Wailes Dove-Hermiston Corp., Westfield, N. J.

—o—

Forker Corp., Cleveland, has appointed the following sales representatives: Samuel G. Boyd, Atlanta, Ga.; Ohio Mechanical Handling Co., Akron; Robert Abel Inc., Boston; and A. C. Towne & Son, Buffalo.

—o—

Westinghouse Electric Corp., Pittsburgh, has transferred its aviation section activities from the industrial sales department to the marine sales department which will now be known as the Marine & Aviation Sales department.

—o—

Kropp Forge Co., Chicago, has announced that Foley & Co., New York, will be its representatives in the New York area.

—o—

Industrial Rubber Process Co. and Plastoweld Co., Detroit, have combined operations and will begin manufacture at 30856 Five Mile Rd., Plymouth, Mich., under the name of J. I. Spanich Welding Co.

—o—

American Central Mfg. Co., Connersville, Ind., has named Bruce & Co. as distributors for its line of all-steel kitchen sinks and cabinets in the territory of Hawaii.

—o—

Amcoin Corp., Buffalo, N.Y., producers of food dispensing equipment, has leased two additional floors in the building it now occupies for expansion of its manufacturing facilities.

—o—

Electrochemicals Department, Du Pont Co., Wilmington, Del., has announced plans for a laboratory in Columbus, O., to service the ceramics industry. O. T. Fraser, field service representative, will be in charge.

—o—

F. J. Stokes Machine Co., Philadelphia, has appointed Williams & Wilson Ltd., with offices in Montreal, Toronto and Windsor, as exclusive sales agents throughout Canada, east of Manitoba.

Harold G. Roman, Portland, Conn., has been appointed New England representative for the company.

—o—

International Nickel Co. Inc., New York, has opened the Cincinnati Technical Section of its development and research division at 1715 Carew Tower, Cincinnati 2. Richard B. Kropf is in charge of the new section.

—o—

M. A. Hanna Co., Cleveland, has completed plans for merging Bessemer Coal & Coke Corp., Pittsburgh, parent company of the recently-formed Pittsburgh Consolidation Coal Co., Pittsburgh, with the Cleveland corporation.

—o—

Sylvania Electric Products Inc., Ipswich, Mass., has acquired Wabash Appliance Corp., Wabash Photolamp Corp., and Birdseye Electric Corp., all of Brooklyn, N. Y., and will operate them as subsidiaries beginning the first of the year.

—o—

Hydro-Power Inc., Mt. Gilead, O., designer and builder of hydraulic pumps, valves and controls, has announced plans for construction of a factory in Springfield, O.

—o—

Western Thermal Equipment Co., Los Angeles, has moved to 1701 W. Slauson Ave., Los Angeles 44.

—o—

Electric Welding Division, General Electric Co., Schenectady, N. Y., has developed two compounds for use in welding operations to prevent weld-spatter.

—o—

Truscon Steel Co., Youngstown, has been awarded the National Safety Council's citation for its reduction of industrial accidents.

—o—

Drayer-Hanson Co., Los Angeles, manufacturer of heat exchange equipment, has acquired a new factory and offices at 3301 Medford St., Los Angeles.

—o—

Derry Plan, Louisville, has opened its general offices in the Kentucky Home Life Bldg., that city, and will continue its engineering and counseling service.

—o—

Lindsay & Lindsay, Chicago, have been incorporated under the name of Lindsay Corp. and will continue manufacture of truck bodies, cold storage lockers, and similar items.

—o—

Flynn & Emerich Co., Baltimore, is increasing its capacity. Its foundry will soon have a daily capacity of 50 tons, and its machine plant will increase production of automatic stokers.

—o—

Kalamazoo Stove & Furnace Co., Kalamazoo, Mich., plans to add a newly designed refrigerator to its line of ranges, furnaces, heaters and washing machines.

American Steel & Wire Co. Will Improve Plant

Production of stainless steel wire to be increased through $1 million project at firm's Waukegan, Ill., Works

PRODUCTION of stainless steel wire at the Waukegan, Ill., Works of American Steel & Wire Co., U. S. Steel Corp., subsidiary, will be increased through expenditure of $1 million for improvement and rearrangement of facilities.

Construction of a new modern-type, single-story building to house the facilities will begin immediately. The structure in which operations are expected to start early in 1947, will have approximately 100,000 square feet of floor space and will be a completely integrated unit, drawing and processing from hot-rolled rod to the finished production. Wire ranging from 0.5 in. to 0.004 in. in diameter in rounds and shapes will be produced in the new unit.

Provision will be made for rod storage, heat treating, cleaning, wire drawing and finishing operations, such as grinding, polishing, straightening and cutting, spooling, and packaging.

Director Appointed for Demonstration Plant

Dr. Lester L. Hirst, Pittsburgh, has been appointed acting chief of a new hydrogenation demonstration plant which the U. S. Bureau of Mines will establish at the Missouri Ordnance Works, near Louisiana, Mo. Dr. Hirst has been assistant chief of the Bureau's synthetic liquid fuels Research and Development Division at Pittsburgh.

The plant was a wartime synthetic ammonia producer which cost $17,500,000. It was operated during the war by the Hercules Powder Co. The plant, following a period of conversion, will produce gasoline and oil, on a demonstration basis, from coal and lignite.

New Company Organized To Build Appliances Plant

Formation of a new company to build a new plant at Buenos Aires in Argentina for the fabrication of Kelvinator refrigeration products, ranges and other household appliances for distribution there is announced by Nash-Kelvinator Corp. The company is capitalized for two million pesos by a group of leading Argentinian business men and will be known as Darkel, S. A.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

ARMY E NAVY

MOLYBDIC OXIDE, BRIQUETTED OR CANNED
FERROMOLYBDENUM • "CALCIUM MOLYBDATE

Climax Molybdenum Company

MOLY

500 Fifth Avenue · New York City

By A. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

Automotive outlook inauspicious as old year ends. Production in many plants stalled by strikes, parts shortages, inventory taking and general apathy. AMA brochure shows auto industry generates employment for seven million

DETROIT

IF, as the UAW-CIO so strenuously contends and as President Truman apparently has re-echoed, profits and prices have a "relevancy" to determination of wage increases on the basis of a company's ability to pay, then why is not the public interest better served by a passing along such a margin of ability to pay in the form of lower prices? By reducing prices, more people can buy automobiles, production can move up, more people can be hired by manufacturers at wages which are currently about the highest of any industrial group. Why should "ability to pay" react to the sole benefit of a small monopolistic group like the UAW-CIO?

These are fair questions which any impartial fact-finding commission should consider seriously. They were posed to the General Motors fact-finding commission by Walter G. Merritt, special counsel for GM, but by a prearranged plan which union representatives and a number of newspaper men knew all about, the President immediately released his prepared statement which seemed to puncture Mr. Merritt's case.

GM Restates Position

Nevertheless, the attorney's statement rests on solid ground and can hardly be voided by any presidential statement, considering laws now in force. His words are worthy of consideration by anyone caught up in the current wage-price wrangle: "If, as claimed by the union, there is ample margin as profit here, such as would permit wages to be paid out of line with other wages in this or other industries, the correction, if any, is to be furnished by the OPA in fixing prices which would permit the benefit to the entire public instead of a small group.

"That certainly is the logic of a controlled economy under which we have adopted a national wage-price policy. There may be those who feel we should venture into these unchartered seas with labor having a voice in price or profits, there may be those who feel this is the primrose way, but this corporation believes such a course is beset with traps and pitfalls and would constitute an impairment of those management functions which made it possible for this country to outproduce its enemies in the war now happily ended.

"When the people, through Congress, declare a policy, this company will comply, but it will not voluntarily lead American industry down a trail which it believes should not be followed.

"And in this connection, we say that in the light of national wage-price policy, in the light of our antitrust policies, which forbid alliances between capital and labor in respect to prices or market controls, we should not be pressed to acquiesce in any other position than we have taken. What this country needs is an understanding of our position, and not a distortion of it."

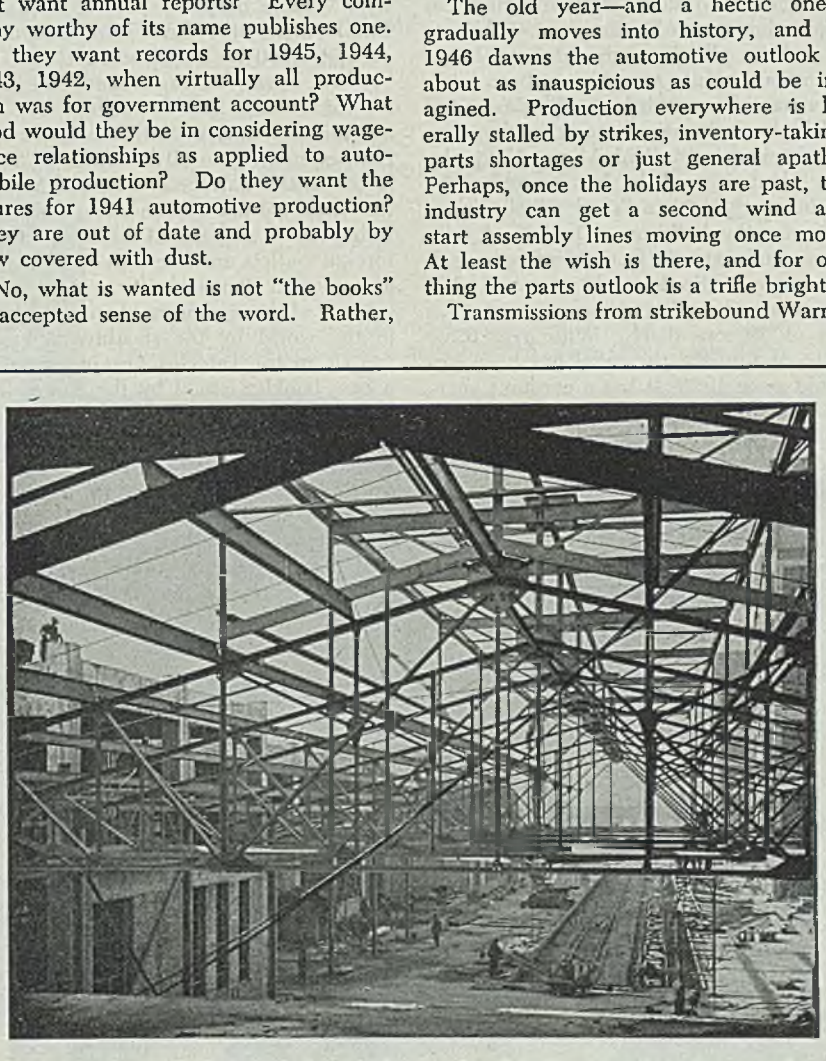
There is so much loose talk about corporations "showing their books" to fact-finding groups it is becoming wearying. Just what do these booklookers hope to find? Do they want balance sheets? The SEC can supply them. Do that want annual reports? Every company worthy of its name publishes one. Do they want records for 1945, 1944, 1943, 1942, when virtually all production was for government account? What good would they be in considering wage-price relationships as applied to automobile production? Do they want the figures for 1941 automotive production? They are out of date and probably by now covered with dust.

No, what is wanted is not "the books" in accepted sense of the word. Rather, the unions and probably government too, want to take a look at confidential estimates of production levels being projected for 1946 and 1947. At the prices which manufacturers expect to pay for steel, nuts and bolts, gears, wheels and a thousand other things. And at the profits charted as possible for various production levels. The fact-finders do not want facts at all, they want forecasts. The union's entire thesis of the 30 per cent boosts rests precariously on forecasts of production volume yet to be achieved.

Unfortunately, forecasts do not build automobiles. Nor do forecasts on probable materials and costs provide any guarantee of ultimate invoices. About all they do is provide union officials (and fact-finding commissions) data which in the first place they do not understand but over which they can wrangle and haggle to little avail.

The old year—and a hectic one—gradually moves into history, and as 1946 dawns the automotive outlook is about as inauspicious as could be imagined. Production everywhere is literally stalled by strikes, inventory-taking, parts shortages or just general apathy. Perhaps, once the holidays are past, the industry can get a second wind and start assembly lines moving once more. At least the wish is there, and for one thing the parts outlook is a trifle brighter.

Transmissions from strikebound Warner



STUDEBAKER EXPANSION: With the Studebaker truck cab manufacturing building, left, virtually complete, work has been started on a covered loading and receiving dock which will serve the passenger car body plant, right, as well as the new truck cab unit. Steel scaffolding now is being erected over a 80 x 500-foot area. Spur rail lines lead to the docks immediately beneath

Gear Co. will be moving shortly after an interim settlement of a wage dispute which had tied up operations at the Muncie, Ind., plant since Oct. 22. It took UAW President R. J. Thomas himself to get the disgruntled unionists back to work, with an agreement calling for 13 cents an hour increase to nonincentive workers, which will bring their average rate to $1.50 per hour. The tie-up has affected Willys, Studebaker, Packard, Hudson and Nash on passenger cars, and Ford and Dodge on trucks.

Momentary settlement of interruptions to glass shipments from Pittsburgh Plate Glass and Libbey-Owens-Ford, strike-bound for months, is expected, but Briggs and Nash already have depleted glass stocks, and General Motors divisions weeks ago stated their supplies would have run out Nov. 30 even if their own plants had not been struck.

Ford has been placing rush orders for equipment and supplies to resume glass production at the Rouge plant, a department long idle but scheduled to be in operation within a week or two. Approximately one-third of all glass used on Ford cars is manufactured at the company's plant in St. Paul, Minn. Uniquely, this plant is said to be the only one in the world with a "sand mine" directly under the building. Deposit of pure silica sand extends from Minnesota well into Iowa. Ford sand is mined 106 feet underground and is removed at a rate of 40 tons daily. With over three miles of tunnels, the mine has been operated since 1926. It has a constant year-round temperature of 51 degrees and is said to encompass a 100-year supply. The glass plant itself operates 7 hours daily, seven days a week, and produces 60,000 square feet of glass every 24 hours.

Kaiser-Frazer Corp. announces it will eventually manufacture its own bodies for the two new passenger cars being put into production in the Willow Run plant. Norman A. Schassberger, former chief body engineer at Willys-Overland, has been appointed to a similar post with K-F, and Fred R. Watson, at one time with Chrysler and Fisher Body, is manager of the body division.

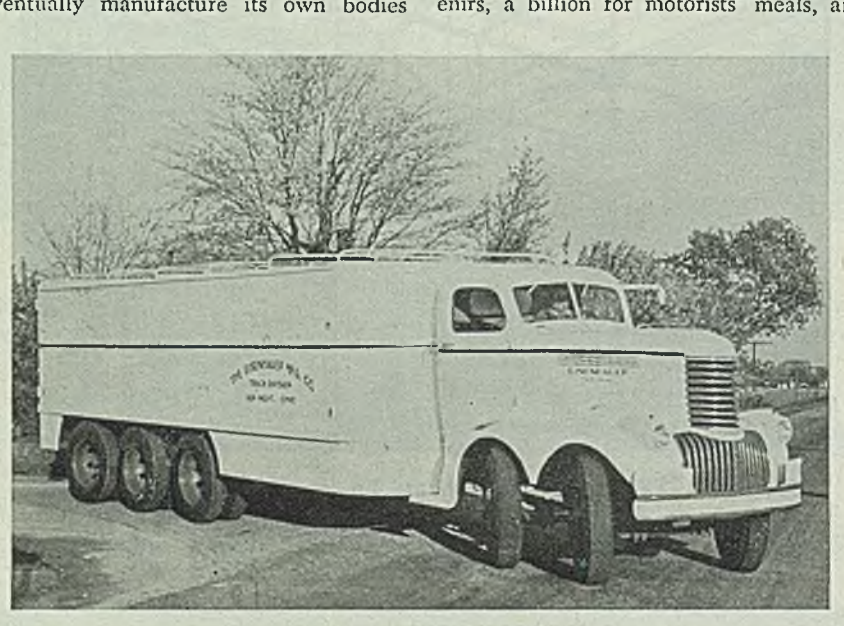
Three advantages are seen to concentrating production of bodies for Kaiser and Frazer models at Willow Run—better control over quality, savings in costs, and better opportunity to place in effect any necessary changes. While the first of a battery of 900-ton presses are scheduled for installation within the next 60 days, it will undoubtedly be several months before complete body operations are possible. Meanwhile, body stampings are in process at a number of suppliers' plants, including Mullins Mfg., Budd and elsewhere. First display of the Frazer has been set for Jan. 20, with volume output expected in March. Employment at Willow Run is seen exceeding 8000 by midsummer.

J. W. Frazer has announced the closing of foreign distributorships for the automobiles and a forthcoming line of farm equipment in all countries of South America, the Caribbean area and Mexico, the India-Burma-Ceylon area, and Australia, Africa and the Middle East. Other foreign outlets include Sweden, Hawaii, Iceland and Portugal.

Many of the significant changes wrought in the world by the steadily increasing use of motor vehicles are portrayed in a new booklet issued by the Automobile Manufacturers Association titled, "U. S. Automobile Industry — Pacemaker for Progress." Each year, the text discloses, the American people spend $5 billion on touring, $1 billion on gas, oil and garaging, another billion for lodging, $1¼ billion for camping supplies and souvenirs, a billion for motorists' meals, and $700,000 for golf, soda pop and hot dogs. To serve the nation's motorists there are more than 360,000 establishments—dealers, repair shops, gasoline stations—which do $8½ billion worth of business annually.

Although the automobile generates profitable employment for 7 million people, or one out of every seven jobs in the nation, the making of cars and parts and accessories requires the work of only 700,000. Sales and service require another 1.5 million, operation and maintenance of trucks and busses an other 4 million, construction and maintenance of highways 250,000.

To facilitate early judicial revival of the status of the Foremen's Association of America as bargaining agent for its foremen, Packard Motor Car Co. has gone through the formality of refusing an NLRB order to so bargain. Likelihood now is that the labor agency will file its petition with the U. S. Circuit Court of Appeals in Cincinnati, and if the decision of this court is against Packard's contention that foremen are a part of management, then proceedings will be carried to the U. S. Supreme Court.



Four front steering wheels are outstanding features of the new twin engine truck developed by the Eisenhauer Mfg. Co., Van Wert, O., which says this is the first successful application of this type of steering for commercial use

Twin-Engine Truck Made; Has Four-Wheel Steering

A new type truck, especially designed for fast, long distance hauling, has been developed by the truck division of Eisenhauer Mfg. Co., Van Wert, O. Known as the Eisenhauer twin engine truck, the vehicle has a payload capacity of approximately 20 tons.

Several new features in truck design are incorporated, according to L. E. Eisenhauer, head of the truck division. These include what is believed to be the first successful commercial application of four front steering wheels, making possible greater load capacity through better distribution.

Easier steering is accomplished through use of the four front wheels in tandem relation rather than dual relation, thus eliminating the need for power steering. The truck has three rear axles, including two driving or "live" axles, with a "dead" axle between. Dual wheels are on all three rear axles and single wheels on the two front axles. Greater traction is achieved because of the remote spacing of the live axles, it is pointed out.

The truck is powered by two standard 93 horsepower engines mounted in line, one under the hood and the other beneath the cab. The front engine is connected directly to the front rear axle and the rear engine to the rearmost axle. The engines can be used together or independently. The power selection can be made at will at any road speed.

Overall length of the truck is 35 feet with a truck bed of 25 feet, meeting length regulations for highways in practically all states.

Loan Agency Offers Credit for Postwar Industrial Expansion

Blanket participation agreement program, recently established, automatically guarantees portion of loans extended by private bank; latter handles all details of transaction, including application, security and maturity. Agency also offers various business consultant services

By CHARLES B. HENDERSON
Chairman, Board of Directors, Reconstruction Finance Corp.

CHARLES B. HENDERSON

MONTHS before V-E Day and V-J Day, at about the time of the Normandy landing, the Reconstruction Finance Corp., through its 31 regional loan agencies, conducted a nationwide survey to determine well in advance of the need what steps the RFC should take to assist industry in reconverting plants and activities to a peacetime basis.

Then as now, the nation was laying plans for an expanding postwar economy in which some 50 million workers would find employment in industry, and national income would remain at the $140 billion mark or higher. To reach these objectives, a commonly accepted blueprint of things to come indicated the necessity of a substantial increase in the productive capacity of existing business enterprises and the addition to our present industrial world of thousands of new business enterprises. The task ahead, it was apparent, would be not only to justify the placing of more workers on existing payrolls, but also to enlarge the total of wage-payers as well as of pay-takers. This development in turn would be possible only through the close, understanding co-operation of industry, finance and government.

In this national effort to raise living standards, the manufacturing industry would have a vital role. Statistics reveal, if anyone seriously doubts the point that manufacturing activity is bread and butter to the wage and salary segment of our economy.

The United States Treasury in its preliminary report of "Statistics of Income for 1942, Part 2," compiled by the Bureau of Internal Revenue, revealed that 269,942 corporation returns reporting net income showed combined receipts of $175 billions by eight general classes of industrial corporations. Of this total, 59,723 returns were filed by corporations in the manufacturing group, and this one group reported receipts of over $115 billions, or nearly two-thirds of the combined receipts of all eight groups.

During the five years 1935-1939, inclusive, as reported by the Department of Commerce, national income ranged from about $71 billions to over $77 billions. In 1940 it leaped to $97 billions; in 1941 to $122 billions; in 1942 to $149 billions; and in 1943 to $160 billions. Over the same period, the wages and salaries paid by private industry also moved upward. The 1935-1939 base ranged from $30 billions to just over $38 billions. In 1940 the industrial pay figure was approximately $41 billions; in 1941, over $51 billions; in 1942, over $65 billions; and in 1943, just short of $79 billions. In relation to the total industry payroll the manufacturing wage bill held during 1935-1939 a ratio of 1 to 3, but starting with 1940 the relative importance of the manufacturing payroll increased at an accelerating pace until, in 1943, at nearly $41 billions, it was more than one-half of the total payroll of all private industry.

There is no reason to expect that manufacturing will be less important to our economy in the future than in the past. It may become even more important.

As its part in the government effort to encourage industry to increase its productivity—through expansion of existing enterprises, entrance into new business fields and the establishment of thousands of new enterprises—the Reconstruction Finance Corp. serves a primary function. Its job has been for a number of years to employ its resources to the end of assuring industry and finance of a credit reservoir adequate at all times to meet the requirements of sound business development. In large degree, RFC's task of helping to keep the reservoir full has been done indirectly through the nation's banks and other lending institutions. They make loans; and RFC participates, if the bank desires.

In cases where local credit is not available, RFC considers applications for direct loans to business, and it does so with the idea of helping every applicant work out a practical approach to his business problem.

Borrowers frequently describe RFC's business consultant service as being fully as important as the corporation's money lending operation. Very often applicants who are skilled operating men have neither had time nor inclination to learn the technical aspects of sound lending practice. RFC helps such applicants to set up their balance sheets, financial statements and loan applications in a way to present the true picture of the business enterprise. For example, a road contractor recently applied for a loan of about $50,000. His loan application said that the proceeds would be divided between two operating companies, one of which had ample security, the other

not so satisfactory. Study of the applicant's business resulted in suggestions for improving its financial organization. A single loan was authorized to the operating company which in turn advanced funds to its affiliated company. Set up in this form, the loan application was entirely satisfactory from a money-borrowing standpoint, and, incidentally, the re-arrangement resulted in improvement of the company's credit rating with local banks.

In a number of instances, applicants apply for loans in greater amounts than the security justifies. In many such cases RFC consultants have been able to show the enterprise how they can negotiate favorable credit terms in purchasing equipment, enabling them to lower fixed charges and to insure adequate working capital while the business is being developed.

RFC's direct loans to business are particularly important in the case of companies needing longer maturities than banks ordinarily extend. Small business enterprises are frequently in this category. The same is true of many new enterprises which, because they cannot display a background of operating experience, are not always able to obtain bank loans that their earnings prospects might appear to justify.

Blanket Participation Agreement

The reluctance of some banks to support such enterprises has been alleviated to a considerable extent because of a new program established by the corporation. In this program—known as the blanket participation agreement program—RFC automatically guarantees a portion of the loan extended by the approved bank. The bank handles every detail of the business loan transaction; receives and considers the application, discusses security, and decides on maturity, and when the loan is extended, its liquidity is automatically insured up to 75 per cent under the RFC agreement.

Many have described the program as one of the most far-reaching and constructive actions yet taken by RFC. It embodies the experience obtained by the corporation in helping to meet credit problems during the early 1930s, and is a direct result of the nationwide survey undertaken more than a year ago in preparation for postwar industrial expansion. The development is one of several, discussed in more detail later, which the RFC board of directors believes will provide full assurance of all the credit needed for industry to reconvert and to expand postwar activities. It should enable the manufacturer and his banker to plan ahead with full confidence.

The business enterprise seeking assurance of credit to meet future needs should contact its bank first; if the bank cannot help—because of the specialized type of business the applicant is engaged in, or because a longer maturity is needed to assure continuity of operation, or for statutory reasons—the applicant is advised to call the nearest RFC loan agency.

The corporation is authorized under the RFC Act as amended to make loans to business enterprises "when capital or credit, at prevailing rates for the character of loan applied for, is not otherwise available" and provided such loans are so secured "as reasonably to assure retirement or repayment."

The seven points in RFC's program of assuring an adequate credit reservoir for the postwar expansion of industry are listed with examples of specific loans extended under the program.

1. Long-term loans to finance reconversion of war plants.

A nationally known manufacturer of transportation equipment utilized its facilities during the war to manufacture ordnance and other equipment for the military services. In advance of V-J Day it opened negotiations with RFC to acquire the government-owned war plant it had leased as a war contractor. The company agreed to take over space as it became available upon the termination of various war contracts. Thus, as war work diminished, the space released was occupied by the company for the production of equipment needed in the civilian economy. In addition, it arranged with RFC for a loan of several million dollars, part of which was to pay the cost of reconversion and the balance was for expansion.

Provides Financing Program

A supplier who contracted to install electrical apparatus in equipment used by one of the military services faced a dilemma during early December. Successful as an operator and a skilled engineer, this man was not particularly interested in the financial side of his work, and was content to operate on funds loaned by RFC and the military service holding the contract. Upon the cancellation of war contracts, the government asked him to pay off his loans. The maturity date was Dec. 10. Less than four days before maturity, the RFC learned that repayment of the loans would force the supplier to lose his business and to lay off several hundred men. RFC got busy by telephone negotiating with bankers and others in the Pacific Northwest and with government officials in Washington. A financing program was set up which met the approval of all interested parties including the contractor and the board of directors of the corporation authorized a loan which made it possible for the contractor to put his staff to work on civilian orders. This extension of credit kept several hundred men on the payroll, saved the contractor from at least a temporary shut-down of his business, repaid outstanding loans and provided adequate working capital to cover the period while the business of the supplier was being converted to the basis of peacetime operations.

2. Commitments to provide assurance of future loans needed in order that borrowers may proceed with plans for reconversion.

As yet the corporation has received only a limited number of calls for such assurances from business enterprises. One of the more dramatic related to the activities of a shipbuilding concern. Two top executives of this concern arrived in Washington on a Tuesday for the purpose of submitting a bid the next day to the disposal agency which was selling the government-owned shipyard. The concern had leased the property during wartime and was prepared to offer more than $1 million to buy the property for peacetime operation. Much to their dismay, the company's representatives learned that the sale was on a cash basis, and they had not arranged in advance for cash payment.

Prompt Action in Emergency

Referred to RFC as a possible source of aid, the two men arrived at the RFC office at 4 o'clock in the afternoon of the day before bids were to be opened.

"How long would it take RFC to process a loan to be used for reconversion purposes?" the executive asked.

"It is difficult to say because that depends on how soon we can obtain all the information we need to consider this case. However, we realize the urgency in this instance and we will do our best to assist you as we do in all emergency cases."

The shipbuilders were advised to remain in their hotel room the following morning of the sale, while RFC would see what could be accomplished. During the rest of the day, telephone discussions were held by RFC and the concern's commercial banker. Satisfied that the shipbuilders could repay, a recommendation was placed before the board of directors of RFC the following morning. By 11 o'clock a loan commitment was authorized; the anxiously waiting executives were notified and the way was cleared for the company to enter a bid for the shipbuilding plant.

The only alternative bid for the property, they said, was one from a salvage operator who, if successful, planned to close down the yard and scrap the facilities. In contrast, a continuing operation meant keeping 2000 men on the payroll, income to the community, reasonable opportunity of profit to the business enterprise and the city where it was located. It also meant an opportunity to dispose of property the government is attempting to sell.

The entire negotiation for the commitment, involving the shipyard operators, the disposal agency, the RFC and the company's local bank, required less than 20 hours.

Another RFC commitment to supply credit when needed relates to a New England enterprise. The company asked

for a five-year loan commitment of over $2 millions, the proceeds to be used solely for operating expenses. Given this assurance, the company said it would spend money for reconversion, and for new machinery and other equipment. A commitment was authorized, and this assurance that the money would be available upon application at the regional RFC office was all that the company needed to push ahead with its reconversion program and to retain its wartime working staff. As yet, the company has not found it necessary to take down any of the loan which RFC committed itself to keep available for that purpose.

3. Credits or loans to finance the purchase of (a) plants, (b) plant facilities and (c) other types of surplus property.

The corporation recently financed the purchase of a $30,000 plant by a small western company which advanced $7500 from its own funds and obtained a loan, payable over ten years, from the corporation for payment of the $22,500 balance. Another small war contractor applied at a southern office of RFC for a loan of $50,000 to be used in purchasing automotive and marine equipment from government-owned surplus materials. The board of directors of RFC authorized an RFC advance of $31,250, and the borrower was enabled to make the desired purchase. Ordinary commercial credit terms are offered by RFC to buyers of machine tools and aircraft stocks of surplus government-owned property. The terms provide generally for a down payment of 15 per cent and payment of the balance within 36 months.

Canceled War Contract Loans

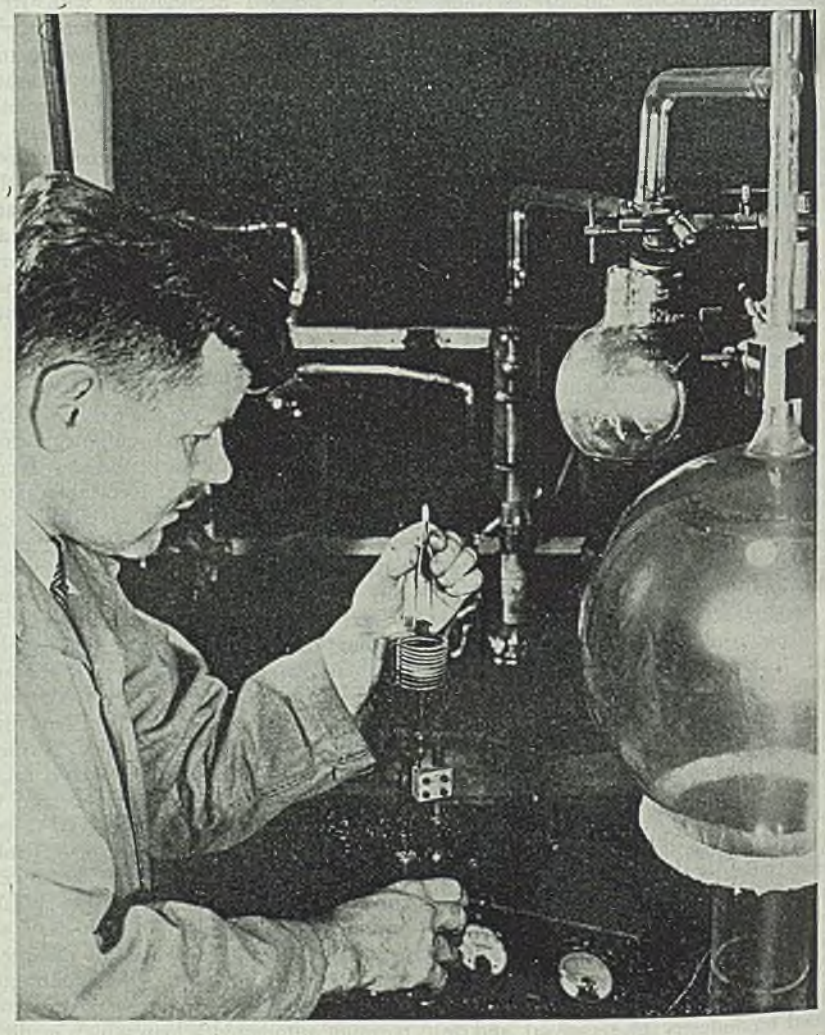
4. Loans against canceled war contracts or subcontracts.

While the corporation is prepared to make loans of this type, either directly or in participation with banks, the call upon RFC for funds has thus far been of small proportions. War contractors in many cases are able to await payment after settlement of canceled contracts; those that need payment quickly can obtain advance payments up to about 90 per cent of the amount due from the military services canceling the order, and in the remainder of cases, banks, whether in participation with RFC or on their own, have been able to accommodate the contractors without difficulty. Nevertheless, RFC is prepared to meet any unusual demands of this nature, either through banks or independent of them, and this assurance is an important factor in the seven-point program of helping to assure industry of adequate credit to meet future needs.

5. Working capital loans for the completion of civilian production orders.

There are many of these. Let's take two opposites, one of a small enterprise and one of a large enterprise. A bookbinding concern that manufactured its own book covers applied to its bank for a $2500 loan to pay off short-term indebtedness and otherwise improve its capital position. The bank was willing to make a short-term loan, but did not see its way clear to make a loan of the maturity requested; two years. Accordingly it referred the bookbinder to RFC. The company's unfilled orders amounted to $14,000, its operating profit ratio was fair, and its management was described as good by the bank. The applicant offered machinery and equipment appraised at $11,000, and said that it would increase its working force from 20 employees to 25 if it obtained the loan which would provide sufficient working capital to assure continuity of operations. The loan was granted.

A manufacturer of precision tubular steel products early in the war converted its operations to all-out war production. Then, as in the prewar years, the company was the economic mainstay of a city of 1500 persons. At the peak of war production the company had 1500 employees on its payroll. With the sudden surrender of Japan and prompt cancellation of war orders, the company faced the prospect of plant closing, unless it could convert quickly to peacetime production. Impressed with the company's record of accomplishment and by its importance as a means of livelihood to an industrious small city, the RFC was able to work out a reconversion loan for the company. The latter is now in production of tubular steel products for the civilian economy, and while production is not as great as it was at the peak of war work, it still employs some 700 persons or nearly one-half of the population of the city in which it operates. Furthermore, the loan has made it possible for the com-



CURIOSITY PAID DIVIDENDS: Research into uranium as a source of electric lamp filaments at the Westinghouse Lamp Division, Bloomfield, N. J., made possible all the pure uranium that was available to scientists at the outset of the atomic bomb project. Shown at work in that division is W. C. Lilliendahl, research engineer, placing a small cube of pressed uranium into a crucible at the bottom of the coil for induction heating in the big bottle at the right

pany to serve its new markets and to expand its activities beyond their pre-war scope.

6. Veterans' loans, either under RFC's business loan program or under the so-called G. I. Bill of Rights.

An Army captain who, at the age of 27, had completed his military service in the Pacific and had returned to civilian life wanted to go into business for himself. He had invested a part of his savings in a $5000 business lot and a $15,000 residential lot. He had obtained promise of an important dealer agency in that region, for which he wanted a substantial loan to finance the acquisition of a business property for the use of his agency. The amount sought was more than the security would justify despite RFC's belief that the veteran would do well in business for himself. Accordingly it suggested a lease arrangement instead with the young business man taking a smaller loan for working capital purposes. The result was entirely satisfactory to the veteran. He has sufficient capital to assure continuity of his operations some time ahead, and his fixed interest charges are only one-quarter of what he had originally contemplated.

Strengthens Credit Structure

7. Blanket participation agreements. The RFC blanket participation agreement, entered into with banks approved by RFC, is perhaps the most outstanding RFC contribution toward strengthening the postwar industrial credit structure. Under the plan banks are encouraged to make loans with maturities up to ten years with principal payments of not less than 10 per cent each year, payable monthly or quarterly, although it is interesting to note that many loans have been made under the plan with maturities running not more than six months. The plan provides in effect for an automatic guaranty by RFC up to 75 per cent of loans made by approved banks to business enterprises meeting the requirements of the blanket participation agreement. When inaugurated, the program set a limit of $250,000 for any individual loan which banks might make with the automatic guaranty of RFC. Success of the plan was so promising that RFC in the past few weeks has raised the limit to $350,000 per loan. Thus, the agreement currently relates to any new loan not in excess of $350,000 made by the bank under the agreement in which the bank takes at least 25 per cent participation.

An interesting development in the past several months has been the extension of BPA loans in connection with enterprises of direct benefit to communities such as the establishment of food lockers. Some 30 loans of this type have been made in recent months, advances ranging from $8000 to $65,000. The public interest in these cases extends beyond the local payroll; food lockers help to conserve food needed to feed other nations as well as ourselves.

In serving the purpose for which Congress set up RFC as a lending agency, the corporation seeks to serve the public interest by co-operating closely with borrowers as well as with local banks. The consultant service mentioned before is a case in point.

Reflecting this co-operation is a letter received from a middle western company which has just paid off the balance of a loan exceeding $600,000.

The letter said, "I would like to take this opportunity of thanking all the personnel of the RFC . . . for the helpful suggestions that they have made to us, and for their co-operation and consideration of the various problems which have arisen throughout the period of our loan."

RFC invites businessmen—manufacturers, distributors, and others—to seek funds for expansion at their local banks first. If a satisfactory arrangement cannot be worked out there, then consult the nearest regional loan agency of RFC. Somewhere along the line a helpful operating plan can be developed—provided of course that the applicant has a sound proposition.

RFC Reconversion Loans Pass $50 Million Mark

Aggregate amount of loans authorized by banks under the Reconstruction Finance Corp.'s blanket participation agreement program has crossed the $50 million mark. This program was set up recently for the purpose of assuring credit adequate to meet the needs of industry in reconversion and postwar expansion.

Canadian Machine Exports Decline From 1944 Total

Machinery exports, with the exception of agricultural implements, from Canada in September were valued at $1,297,000 bringing the total for the first nine months of the year to $15,584,000, according to a report to the Department of Commerce. The comparable figures for 1944 were $1,769,000 for September and $17,431,000 for the first nine months.

French Port Under Repair; Equipment Damaged Most

Considerable progress toward restoration of the port of Rouen, France, is reported since the liberation, an official report to the government discloses.

Equipment was hardest hit, and the port could be serviced by rail only with great difficulty. By March, the report states, 10 hoists were functioning; the 14,000-ton floating dock was back in use, and an 8000-ton dock was being repaired after it had been refloated. By the end of August, there were 15 hoists, 15 pontoon hoists and 15 bins, a relay bridge and a pontoon bridge in serviceable condition.

Far Eastern Trade Seen Delayed by War Damage

Many dislocations incident to war must be corrected before any appreciable volume of commerce in the Far East can be attained, according to Department of Commerce officials.

In a circular reply to answer inquiries now being received, the department says reopening of the Far East to normal trade is proceeding as rapidly as can be expected in view of the magnitude of the problems involved.

Ports and shipping lanes must be cleared of mines, docking and other necessary facilities and public utilities must be re-established after being destroyed in bombing raids, and Japanese troops still being held in the areas must be cleared out, it is said.

Principal Philippine cities are in ruins, leading industries largely destroyed or disorganized, transportation crippled, and there is inflation. Conditions are fairly well known as to China, Korea, Japan, British Malaya, and as to general considerations entering into Far Eastern trade. No information on Siam, French Indo-China, and the Netherlands East Indies is available, it is said.

Farm Implements Needed By Dominican Republic

Tractors, plows and machinery for sugar cane cultivation is badly needed in the Dominican Republic, according to a report from the American Consulate in Santo Domingo.

Even though use of oxen might be more economical, it was said, the demand may continue. The need was especially felt during the war when sugar cane production was affected by the labor shortage and a lack of sufficient grass for stock feeding.

Applications for Exports To Yugoslavia Accepted

Effective immediately, applications to export to Yugoslavia will be accepted, according to an announcement by the Office of International Trade Operations, Department of Commerce. Although trade with that country will be restricted for a time because of difficulties in obtaining clearance from Yugoslav authorities and because of transportation difficulties, the action has been taken to aid in re-establishing commercial channels with a view to facilitating full restoration of private trade with that country as promptly as circumstances permit.

MEN of INDUSTRY

COL. FRANK J. ATWOOD

ROBERT B. WARREN

ROBERT H. HOGE

Col. Frank J. Atwood, for the past three and one half years chief, Rochester, N. Y., Ordnance District, Army Service Forces, has been named director of purchases, Remington Rand Inc., Buffalo, and its subsidiary companies. Colonel Atwood will have headquarters at the company's New York offices.

—o—

George D. Creelman, administrative assistant at the Institute of Gas Technology, has been appointed by the M. A. Hanna Co., Cleveland, to direct its recently organized research department. **Frank A. Howard,** formerly president of the Standard Oil Co. of New Jersey Development Corp., has been engaged to serve in a consulting capacity.

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Leroy D. Greene, assistant purchasing agent, Bethlehem Steel Co., Bethlehem, Pa., is retiring Jan. 1. For some time past his chief duty has been the purchase of scrap, and during the war he served on the Scrap Advisory Committee, WPB, and at present is a member of the Scrap Advisory Committee, OPA.

—o—

John H. Sipchen, Chicago, has been appointed representative in the Chicago area for the Erie Foundry Co., Erie, Pa., manufacturers of forge shop machinery. He succeeds the late **L. F. Carlton,** who represented the company for the past 20 years.

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L. S. Marsh, formerly manager, department of inspection and metallurgy, Chicago, and **J. de N. Macomb,** manager, sales engineering, Railroad Sales Division, Inland Steel Co., Chicago, are retiring Jan. 1.

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George C. Brainard has been elected to succeed **Joseph E. Rogers** as president and general manager of the Addressograph-Multigraph Corp., Cleveland. Mr. Rogers continues as chairman of the executive committee and a member of the board of directors. Mr. Brainard has resigned as president of the General Fireproofing Co., Youngstown, a position which he has held from 1928. Other officers of the company include: **Charles R. Battin,** vice president and treasurer; **David E. White,** vice president; **Henry C. Osborn,** vice president and consulting engineer; **J. B. Ward,** vice president in charge of domestic distribution; **Albert R. Porter,** vice president and managing director, Addressograph - Multigraph Ltd., London, England; **W. H. Casson,** works manager; **L. F. Mitchell,** manager of engineering.

—o—

Robert B. Warren has been appointed eastern railroad sales manager, Mechanical Goods Division, Goodyear Tire & Rubber Co., after serving three years as a lieutenant commander in the office of the Navy rubber director. Mr. Warren has been with Goodyear 15 years. His offices will be at 600 West 58th St., New York.

—o—

Paul M. Grezelle recently resigned as personnel director, Bell Aircraft Corp., Buffalo, to become personnel director of the Buffalo plant, American Machine & Foundry Co.

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Frank O. Leitzell has been elected executive vice president, Arms-Franklin Corp., Youngstown. Mr. Leitzell formerly was with the Lewis Foundry & Machine Division, Blaw-Knox Co., Pittsburgh, serving as vice president in charge of engineering and sales for ten years.

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George Lowe, since 1942 serving in the president's office as supervisor, new business research, Carnegie-Illinois Steel Corp., Pittsburgh, has been appointed general staff manager, sales.

—o—

Fred Reiser Jr., Cincinnati, since 1944 district manager for the Industrial Division, Timken Roller Bearing Co., Canton, O., has been named division manager for the company's divisions in that city which are: Industrial, steel, automotive and service-sales. **Harry McCool,** who joined the Timken company in 1928 as a hot mill operator, has been appointed sales engineer for the Steel & Tube Division, Cincinnati district.

—o—

Robert H. Hoge has been appointed general manager of the Clark Controller Co., Cleveland. Mr. Hoge has served as district manager in Gary, Ind., and New York; as assistant sales manager, and finally sales manager. **R. L. Puette** becomes general sales manager. **D. L. Orton** succeeds Mr. Puette as manager of engineered and industrial sales.

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N. W. Hopkins, director of public relations for Continental Motors Corp., Detroit and Muskegon, Mich., since 1942, has been appointed advertising director succeeding the late **John L. Wierengo.**

—o—

Carl W. Moyer has been named general director of industrial relations for Fisher Body Division, General Motors Corp., Detroit. **Robt. R. Nordyke** becomes assistant general director of industrial relations. Mr. Moyer succeeds **John J. Cronin,** now general manufacturing manager.

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L. R. Knapp has been appointed Washington sales manager for special accounts, Carnegie-Illinois Steel Corp., Pittsburgh, succeeding **Harry F. Knapp,** who has retired after 44 years' service with the United States Steel Corp. and its subsidiaries.

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Ray H. Walker, who has been manager of the Detroit sales office, Inland Mfg. Division, General Motors Corp., effective Jan. 1, will be associated with **James H. Burgess,** manufacturers' representative, Fisher Building, Detroit.

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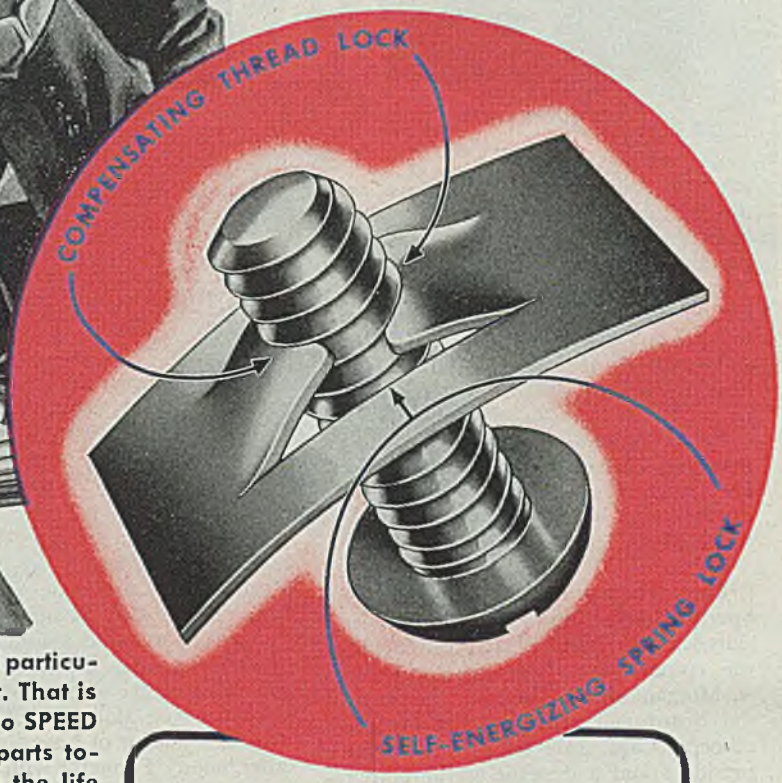
Bernard Schaenen, American Iron & Metals Inc., Dallas, Tex., was elected president, Gulf Coast chapter, Institute of Scrap Iron & Steel Inc. Mr. Schaenen succeeds Max Clairfield, Sampson Machinery & Supply Co. Inc., Hous-

WHY SPEED NUTS ARE FIRST *with management*



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F. A. WRIGHT

H. D. MALONE

ton, Tex., and he also will serve as a director of the national institute. Other officers of the chapter are: First vice president, **Jacob Gachman**, St. Louis Waste Material Corp., Fort Worth, Tex.; second vice president, **Sidney Byer**, Houston Compressed Steel Corp., Houston; and secretary-treasurer, **Cyril Coguenhem**, Luria Bros. & Co. Inc., Houston.

—o—

F. A. Wright, assistant general sales manager, Cutler-Hammer Inc., Milwaukee, recently was elected chairman, industrial control section, National Electrical Manufacturers Association.

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Capt. Thomas B. Doe, vice president, Sperry Corp., New York, and its subsidiaries, has been elected president of the corporation. He succeeds **Thomas A. Morgan** who has become chairman of the board and remains chief executive officer. Capt. Doe has served as vice president and a director of the corporation and its subsidiaries since 1934.

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Otto M. Jensen, an executive for many years with Peerless Machine Co., Racine, Wis., has been appointed works manager and vice president in charge of engineering.

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Ralph A. Powers, formerly with the Bundy Tubing Co., Detroit, has been named engineer-in-charge of electronic engineering, Allis-Chalmers Mfg. Co., Milwaukee. He succeeds **J. M. Cage**, who has resigned.

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Henry E. Guerin, airplane manufacturing executive, is retiring Jan. 1 after 25 years' service with Douglas Aircraft Co., Santa Monica, Calif.

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Horace A. Deane, works manager, Brake Shoe & Castings Division, American Brake Shoe Co., New York, has been appointed a vice president of the division.

—o—

William E. Mikolasy has been appointed eastern sales representative, Stacey Bros. Gas Construction Co., Cincinnati, and will have headquarters in the New York offices of Dresser Industries. **Walter E. Flagg**, Flagg, Brackett & Durgin, has been named sales representative in the New England states with headquarters in Boston.

—o—

H. D. Malone recently was appointed assistant sales manager, American Welding & Mfg. Co., Warren, O. Mr. Malone has served as manager of sales of the midwest district since 1943.

—o—

J. W. McIntire, vice president in charge of sales since February, 1945, was named executive vice president, Southern States Iron Roofing Co., Savannah, Ga. **J. R. Anderson**, serving as assistant to the vice president of sales, has been promoted to general manager of sales. **E. C. Boyce**, sales manager, Mail Order Division, takes over as manager of advertising and mail order sales. Formerly with the accounting department, **Kenneth A. Helmly** has been named assistant manager, Mail Order Sales Division.

—o—

Dr. John G. Dean is with the Development & Research Division, International Nickel Co. Inc., New York, as senior fellow-in-absentia, Mellon Institute of Industrial Research, Pittsburgh.

—o—

A. J. Pick has been named to the newly created post of buyer and merchandiser of auto and home supplies for the Pacific Division, B. F. Goodrich Co., Akron, O. His headquarters are in Los Angeles.

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Paul W. Eberhardt has been elected vice president, Walter Kidde & Co., New York.

—o—

William O. Philbrook has been appointed assistant professor of metallurgical engineering and a member of the staff of the Metals Research Laboratory, Carnegie Institute of Technology, Pittsburgh. Prior to his recent appointment, he was affiliated with Wisconsin Steel Works, International Harvester Co., Chicago.

Harrison D. Comins, Davenport, Iowa, has been named assistant to the secretary, American Society of Civil Engineers, New York, to specialize in affairs pertaining to student chapters, local sections and technical divisions.

—o—

H. Norman Miller, a member of the industrial sales staff at Portland, Oreg., for the past 19 years, Westinghouse Electric Corp., Pittsburgh, has been named manager for the company in the Portland area. Appointments in the Electric Appliance Division include: **R. E. Brown** as Pacific coast supervisor of domestic refrigerators and home freezers; **Gordon W. Moxley**, product supervisor at Mansfield, O.; **Edward L. Smith**, purchasing agent at Mansfield; and **Walter T. Baker Jr.**, eastern sales promotion manager.

—o—

Joseph S. Marx, superintendent of the Carthage, Mo., explosives plant, Hercules Powder Co., Wilmington, Del., will retire Jan. 1 after 45 years in the explosives industry. He will be succeeded by **John C. Foster**, who, for the past three years has been superintendent at the Badger Ordnance Works in Wisconsin.

—o—

John S. Lawrence has been appointed district sales manager, Denver branch, Mechanical Goods Division, United States Rubber Co., New York.

—o—

J. O. Cornette, who has been assistant controller for the entire corporation, Consolidated Vultee Aircraft Corp., San Diego, Calif., has been named controller of the San Diego Division, succeeding **C. C. Bishop**, resigned.

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George D. Yeazel recently was appointed factory sales representative at Kansas City, Mo., for the Surface Combustion Corp., Toledo, O.

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G. J. Newl'n, 12825 Franklin Blvd. Cleveland, will act as sales representative in the Cleveland territory for the Barber-Colman Co. in the sale of its door and door operating equipment.

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Shelton R. Houx has been appointed assistant director of advertising of Nash Motors Division, Nash-Kelvinator Corp. Detroit.

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Edwin J. Putzell Jr. has joined Monsanto Chemical Co., St. Louis, as assistant to **F. A. Ulmer**, treasurer. **Frederick B. Langreck** has been transferred to the general development department.

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Bret C. Neece, vice president, Landers Frary & Clark, New Britain, Conn., has been elected president, Vacuum Cleaner Manufacturers Association, to serve a two-year term. Other officers elected by the association for a two-year period are: **Alfred E. Norris**, president, Regina Corp., Rahway, N. J., as vice president; **C. G. Frantz**, president, Apex Electrical Mfg. Co., Cleveland, secretary and

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WILLIAM B. PIERCE

Recently was named manager, sales development department, Allegheny Ludlum Steel Corp., Brackenridge, Pa., noted in STEEL, Dec. 10 issue, p. 110.

J. F. SMITH JR.

Who has been promoted to assistant manager of sales, Sheet & Strip Division, Inland Steel Co., Chicago, noted in STEEL, Dec. 17 issue, p. 90.

EDWARD C. HOENICKE

Who has been appointed general manager Foundry Division, Eaton Mfg. Co., Detroit, noted in STEEL, Nov. 19 issue, page 106.

treasurer. Members of the executive committee in addition to the officers include: E. V. Ekman, chairman, Electrolux Corp., New York; R. J. Simmons, vice president, Birtman Electric Co., Chicago; J. H. Nuffer, president, Air-Way Electric Appliance Corp., Toledo, O.; and H. W. Burritt, president, Eureka Vacuum Cleaner Co., Detroit.

—o—

E. A. Goddard, general manager, Goddard & Goddard Co., Detroit, was recently elected president of the Cutting Tool Manufacturers Association. He succeeds W. G. Robbins, president, Carboloy Co. Inc., Detroit. R. G. Michell, president, Eclipse Counterbore Co., Detroit, was elected vice president, succeeding O. L. Bard, president, Michigan Tool Co., Detroit. R. H. Wolfe, president, Arrow Tool & Reamer Co., Detroit, and Harry J. Merrick, were re-elected as treasurer and executive secretary, respectively. New directors elected were: L. C. Gorham, president, Gorham Tool Co., Detroit; E. C. Putnam, president, Putnam Tool Co., Detroit; E. F. Reinhart, president, Republic Drill & Tool Co., Chicago; and Mr. Wolfe.

—o—

John R. Hurley has resumed his position as president, Hurley Machine Division, Electric Household Utilities Corp., Chicago, after serving for three years as a major with Headquarters, Army Service Forces.

—o—

Sidney G. Down, first vice president and director, Westinghouse Air Brake Co., Wilmerding, Pa., will retire this week climaxing 44 years of service with the company. He will retain his directorship. In 1902 he began work as an air brake instructor for the company and in 1905 became a mechanical expert in the company's Chicago headquarters. He later became chief engineer of the Pacific Coast Division and in 1923 was elected vice president. He became a director in 1925, and was advanced to first vice president in 1937. In addition to his position with Westinghouse, he has held eight other directorships. He was president of the Railway Supply Manufacturer's Association for seven years, and during the war, served on the War Production Board's Railway Advisory Committee.

—o—

Charles J. Hardy has resigned as president of Carter Carburetor Corp., Detroit, to accept the position of chairman of the board of the company. Hugh H. C. Weed, formerly vice president and general manager, has been elected president and general manager; M. F. Peterson, formerly assistant to the general manager, was elected vice president. George R. Ericson and Charles J. Hard Jr. were elected as directors.

—o—

J. H. Walsh, vice president in charg of steel works, Inland Steel Co., Chicago will retire this week but will remain director of the company. He will b succeeded by Fred M. Gillies, genera superintendent of the Indiana Harbo Ind., plant. A. P. Miller, assistant to th general superintendent, will take over M Gillies' post, with A. J. Cochrane and W A. Perry as assistants. Dr. E. H. Carle ton, medical director for the Indiana Har bor works, has been named medical di rector for the company, and H. W. John son is now staff assistant to the presi dent.

—o—

T. J. Ess has been appointed managing director of the Association of Iron & Steel Engineers, succeeding Brent Wile who will act as an advisory consultan for the organization. Mr. Ess has bee a member of the association's staff sinc 1938, prior to which he was with Re public Steel Corp., Cleveland.

OBITUARIES...

Ernest C. Fox, 75, founder and chairman of the board, Independent Register Co., Cleveland, died Dec. 20 at his home in that city.

—o—

W. C. Anderson, at one time European manager for the Ford Motor Co., and founder of the Ford agency in St. Louis in 1905, died Dec. 19 in Des Moines, Iowa.

—o—

Edward H. Clark, 81, formerly president of the Cerro de Pasco Copper Corp., New York, died Dec. 16 in San Francisco following a long illness. Mr. Clark served as vice president of the copper corporation from 1901 to 1929 and was president from 1929 to 1942.

—o—

Philip Roseboom, 65, executive vice president, Carey Machine Co., Cleveland, died in that city Dec. 16. Mr. Roseboom had been associated with the Carey company since 1941, formerly being purchasing agent for the American Locomotive Co. at Auburn, N. Y.

—o—

Rowland Hazard, 64, executive vice president, Bristol Co., Waterbury, Conn died Dec. 20 at his home in that city.

—o—

Irus H. Wells, 84, chairman, Chicag Foundry Co., Chicago, a company whic he founded in 1905, died Dec. 19 in th city. One of the older foundrymen i the Chicago district, he had been a mem ber of the Chicago Foundrymen's Clu predecessor of the Chicago chapte American Foundrymen's Association.

—o—

James J. Donnelly, 60, vice presiden Sheffield Bronze Powder Corp., Cleve land, died in that city, Dec. 19.

C. & O. Seeking Bids for 1000 Modern Light-weight Sleeping Cars

If placed, order would constitute largest single purchase of passenger car equipment in history, surpassing previous high of 420 cars placed recently by New York Central. Industry's program will require largest steel tonnage since 1926-1929

AN EXTENSIVE passenger car buying program is being undertaken by the railroads. Within the past two weeks, a total of 600 cars for passenger trains have been ordered and 1000 are in the inquiry stage.

This activity is particularly significant in view of the recent efforts of four groups to acquire the Pullman Co. sleeping car facilities. A special United States Expediting Court finally approved the offer of Pullman Inc. to sell Pullman Co. to a group of 43 railroads. Present indications now are that as a result of this court decision many of the country's railroads will purchase their own sleeping cars rather than rely on the previous "pool" arrangement.

Large tonnages of steel will be required to carry out the railroad industry's improvement and expansion program in its effort to retain or increase its share of the transportation business. Railroads will require more steel during the next few years than at any time since the 1926-1929 period when their annual requirements averaged about 6,720,000 tons.

Competition with airline and trucking interests as well as competition among the various railroads is forcing the carriers to modernize their facilities, especially their rolling stock.

Record Inquiry Made

The latest passenger car inquiry was made by Chesapeake & Ohio Railway for 1000 modern light-weight sleeping cars. If placed, this will constitute the largest single purchase of passenger equipment in the history of American railroading. C. & O.'s invitation for bids has been extended to some firms that have not heretofore built sleeping car equipment, as well as to the established car builders. This is the first indication that other firms are preparing to enter the car building industry.

While no specifications are available, testimony at the recent Pullman hearing revealed that sleeping cars cost about $70,000 but might be built on a mass production basis for as low as $35,000.

Strides which railroads have made in car design are indicated in the New York Central Railroad's specifications for the 420 cars of 22 streamlined sleeping car trains recently ordered. Each car of this $34 million order will be of the all-room type and will include single rooms, double bedrooms, and de luxe bedroom suites.

Of the New York Central's order, 200 sleeping cars will be built by Pullman-Standard Car Mfg. Co. of high-tensile, low-alloy steel, with welded girder construction. Edward G. Budd Mfg. Co. will build 112 cars of stainless steel construction, and the American Car & Foundry Co. will build 108 streamlined baggage, baggage-mail and railway post-office cars. The first of the new sleeping cars are expected to be delivered next September and the balance in subsequent months through March, 1947.

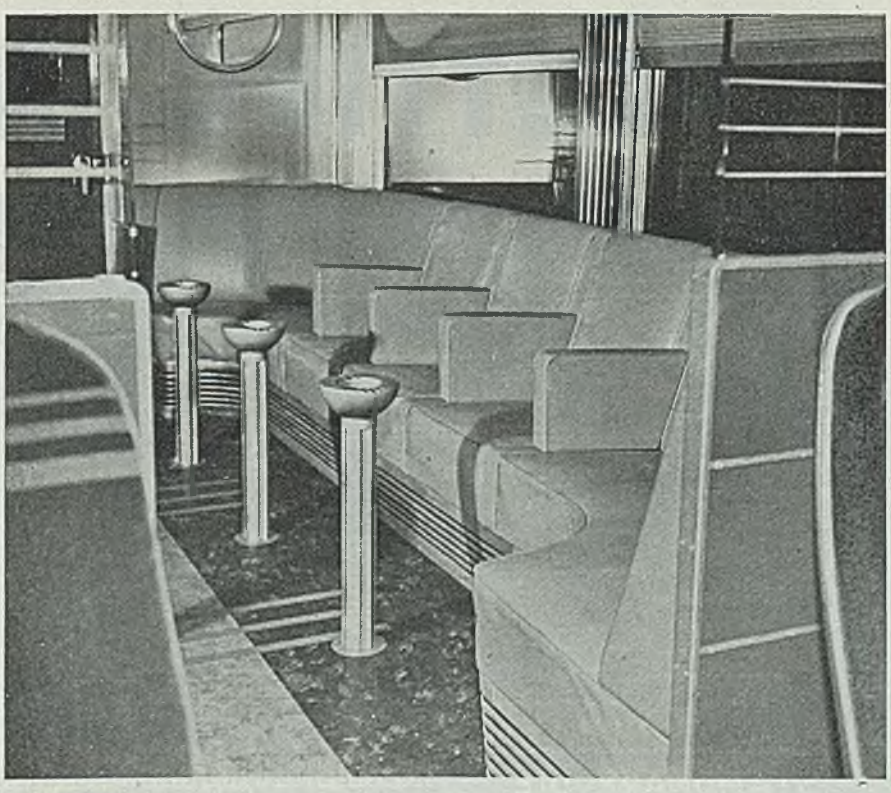
New York, New Haven & Hartford has ordered 180 streamlined passenger cars from Pullman-Standard, subject to approval of the federal court at New Haven, Conn., at a cost of $13.5 million. This equipment will consist of 100 coaches and 10 dining, 15 grill, and 55 lounge, parlor and observation cars.

Howard S. Palmer, trustee and president of the New Haven, said three years of intensive research and experimentation have gone into the design of the new cars. Exteriors will be finished in shining corrugated metal, accented by a New Haven hunter-green band running lengthwise at window height. High on the list of special features in the interior design of all the equipment is a new type of lighting. All orthodox methods of lighting have been discarded in this new system which fills the cars with a completely diffused, glareless and shadowless light. Wide, clear-view windows and improved toilet facilities are provided.

The seating arrangement is another radical departure from the usual. In addition to 64 roomier individual reclining seats with foot rests, the design calls for a smoking lounge with 14 seats separated from the main body of the car by a glass partition. This will accomplish the purpose of solving the smoking problem, one of the most vexing to be dealt with.

Colombia To Send Mission To Buy Railroad Equipment

The administrative council of national railroads of Colombia is sending a mission to the United States to purchase modern railroad equipment, with particular interest in diesel engines for passenger trains, according to the Department of Commerce. The council is stated to contemplate electrification of the country's most important railroads.



New Haven railroad is seeking permission to purchase 180 *modern air-conditioned passenger cars costing approximately* $13,500,000. *Above is shown the smoking compartment of one of the new coaches. This compartment seats* 14, *while space for* 64 *others is provided in the reclining seat sections of the cars*

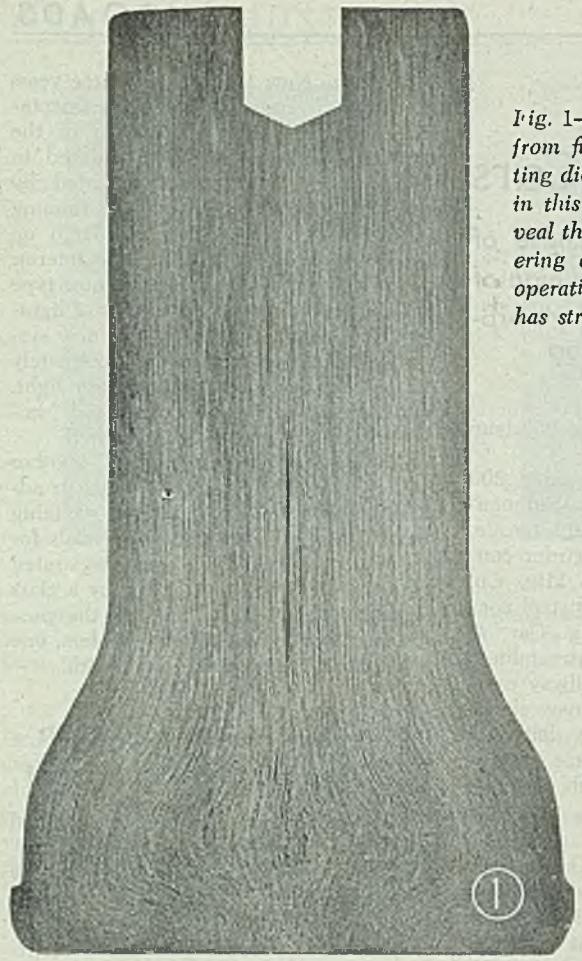


Fig. 1—Work as it comes from first stage of upsetting dies. Grain flow lines in this etched section reveal this is largely a gathering or true upsetting operation where punch has struck bottom end of forging

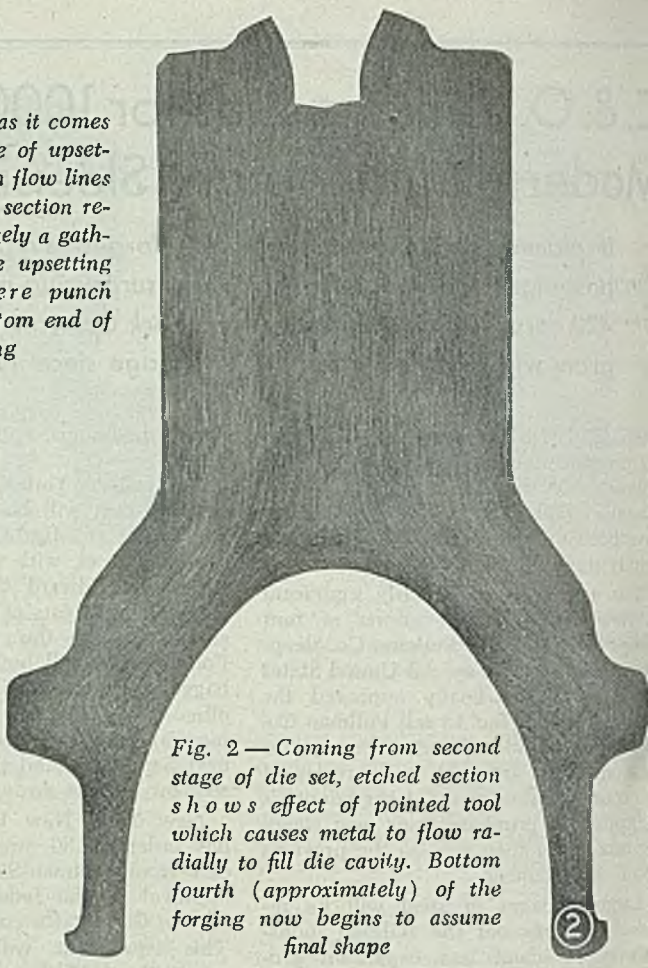


Fig. 2 — Coming from second stage of die set, etched section shows effect of pointed tool which causes metal to flow radially to fill die cavity. Bottom fourth (approximately) of the forging now begins to assume final shape

UPSETTING CYLINDER

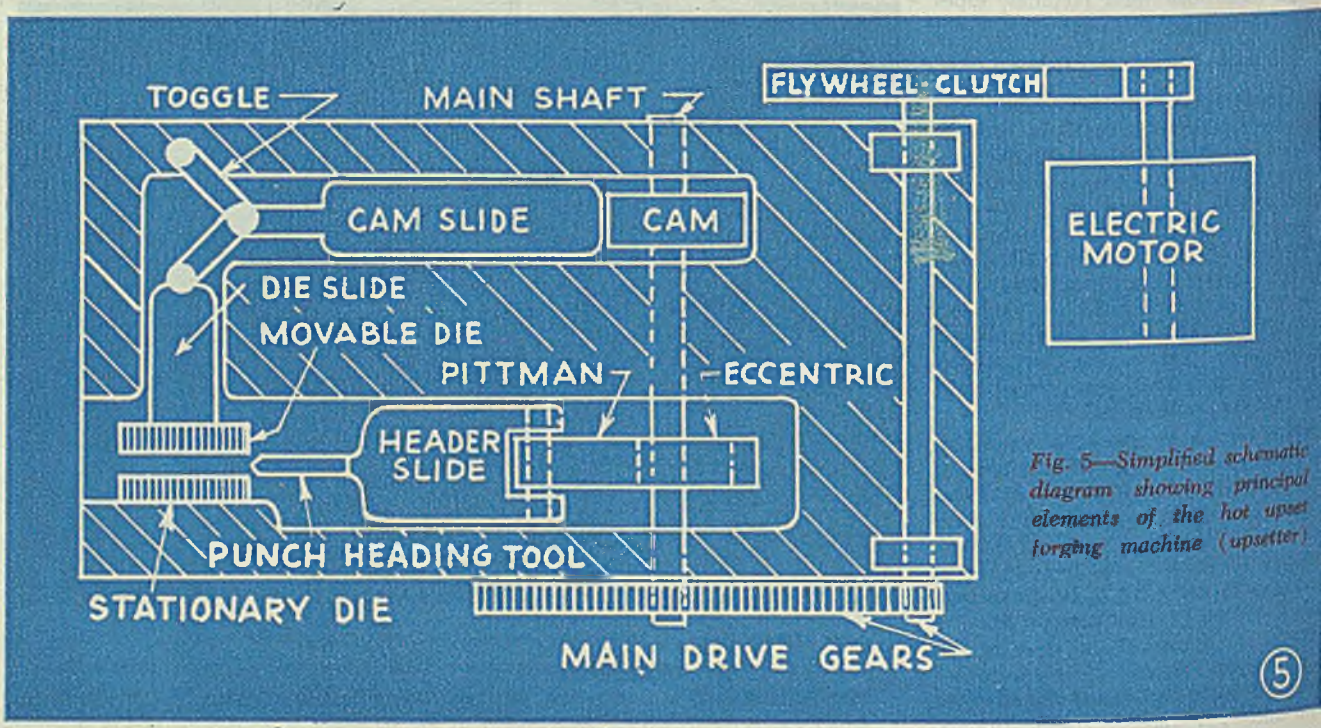


Fig. 5—Simplified schematic diagram showing principal elements of the hot upset forging machine (upsetter)

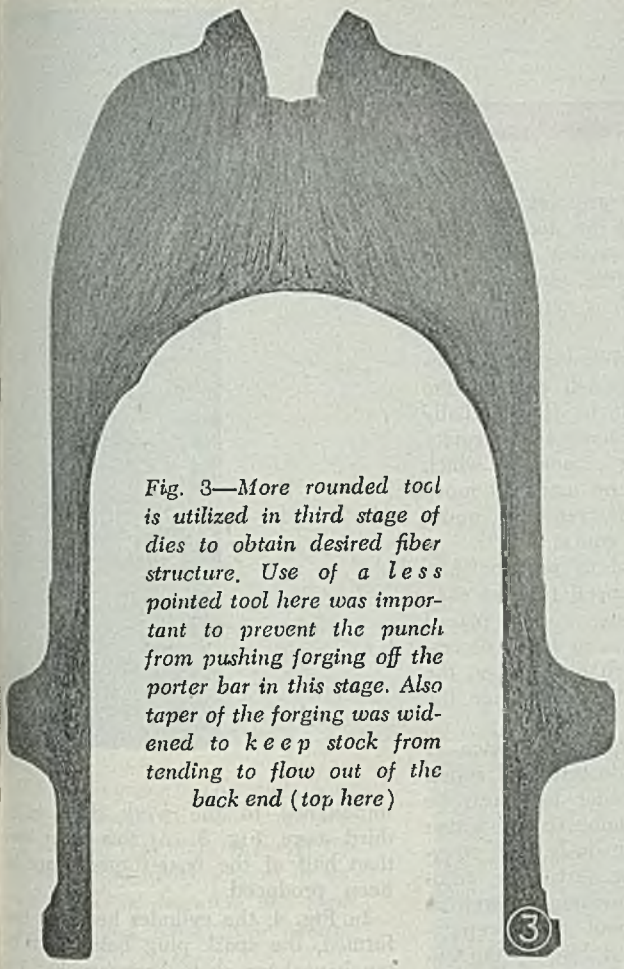


Fig. 3—More rounded tool is utilized in third stage of dies to obtain desired fiber structure. Use of a less pointed tool here was important to prevent the punch from pushing forging off the porter bar in this stage. Also taper of the forging was widened to keep stock from tending to flow out of the back end (top here)

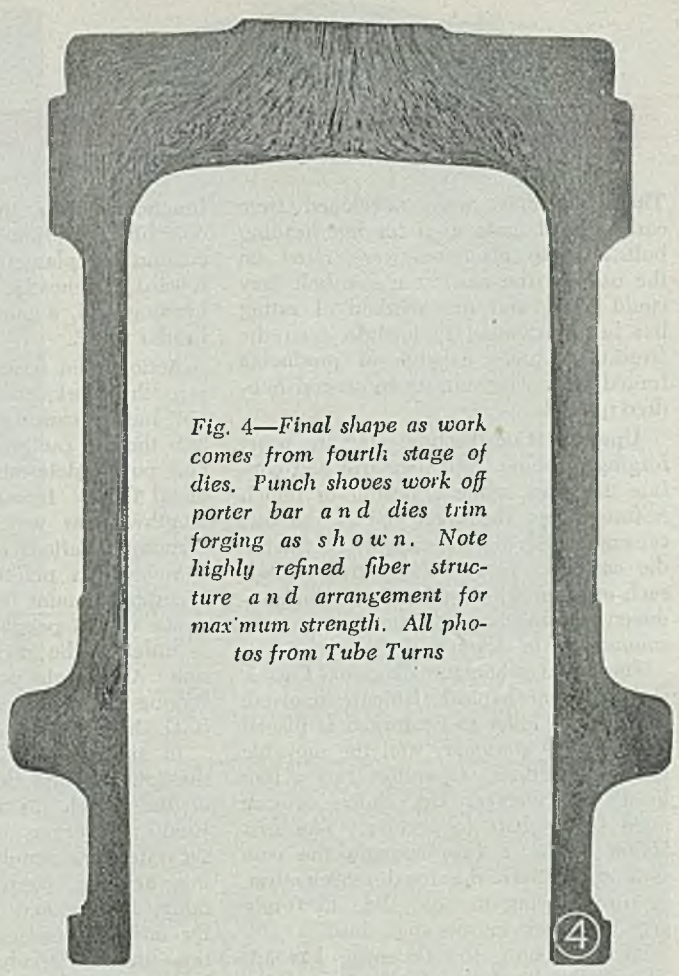


Fig. 4—Final shape as work comes from fourth stage of dies. Punch shoves work off porter bar and dies trim forging as shown. Note highly refined fiber structure and arrangement for maximum strength. All photos from Tube Turns

BARRELS

Experience with "world's largest" battery of 8 and 9-in. upsetters enables Tube Turns' engineers to cut more than 50 per cent from weight of rough forging by changing over from conventional forging to the upsetting method

By G. W. BIRDSALL
Associate Editor, STEEL

AN IMPRESSIVE example of how broad experience and technical ingenuity can be combined to bring about remarkable improvement in production procedures is found at Plant No. 1 of Tube Turns Inc., 718 South 28th street, Louisville. Here members of the forging and metallurgical departments combined their talents to cut the weight of a rough forged cylinder barrel down to only 83 lb.

This steel cylinder barrel, closed at the top to form the cylinder head, was required in tremendous quantities for powerful 12-cylinder V-type gasoline marine engines. Originally it was forged as a virtual solid piece that weighed 190-210 lb. When this job was brought to Tube Turns, it was desired to forge to closer tolerances to reduce the enormous amount of machining required to cut the rough forging (averaging 200 lb) down to the finished section weighing only 17 lb. Thus more than 90 per cent of the metal in the rough forging had to be machined away before the forging could be used.

When Tube Turns' development engineers took hold, they designed new dies and devised a new forging technique based on use of the huge 8 and 9-in. upsetters.

Now the barrel is produced in four consecutive forging passes in a single machine on one heat. It is relatively close to its finished size and the bore is forged to approximate rough machine dimensions. In addition, spark plug bosses are now forged integral instead of having to be machined out of excess stock on the rough forging. What has been accomplished is the production of an intricate forging that approaches the standard tolerances of simpler pieces, the end result being an impressive saving in both material and production time.

Instead of 190-210 lb, rough forging now weighs only 83 lb, which means that 1380 lb of chrome-moly steel per engine does not have to be laboriously "whittled off" in machining operations. Machining operations now require removing only $\frac{1}{16}$ to $\frac{3}{32}$-in. of metal. The many associated advantages include lower plant-to-plant freight costs, conserved manpower, greater output, and much lower cost of finished unit as well as the release of important forging and machining facilities at a time when such facilities were vital.

Battery of Huge Upsetters: Successful application of hot upset machine forging to this particular job is largely the result of Tube Turns' experience with what is said to be the world's biggest battery of large upsetters including 9, 8, 6, 5, 4 and 3-in. units.

Some of these huge machines weigh more than 200 tons, are capable of exerting pressures of 2000 tons and more.

These machines were developed from earlier small units used for hot heading bolts. These machines were rated on the basis of the maximum size bolt they could head, and this method of rating has been extended to include even the largest machines capable of producing forged parts weighing up to several hundred pounds.

Upsetter Construction: In an upset forging machine, split dies grip and confine the work while a header or punch is forced into the open end of the die, causing metal to flow radially to fill the die cavities. These two motions follow each other in rapid succession, being produced by mechanical connection to a common main drive shaft.

Simplified schematic diagram, Fig. 5, shows the mechanical elements involved. The heated billet to be forged is placed between the stationary and the movable split die sections. Operator trips a foot lever that engages the clutch causing main drive shaft to revolve. The first action is that a cam engages the cam slide to operate the toggle mechanism, in turn moving the die slide to firmly grip the work in the split dies.

At this point, the eccentric has advanced the header slide through a pitman to a point where the header tool or punch engages the work, forcing metal to flow into the die cavities. See STEEL, July 13, 1942, p. 78, for additional details on upsetters and dies used with them; also "Metals Handbook", p. 852.

How Upsetter Works Metal: The upsetter can forge a great variety of shapes because the cavity formed by the two die halves of the split dies and the cavity produced by the punch are in two planes at right angles to each other. During forging, the hot metal is placed under great hydrostatic-like pressure causing it to flow radially to fill the die impressions. By using a number of die impressions and punches to work the forging in rapid succession, it is possible to produce deeply recessed parts with great accuracy. That is the feature of the process that is so important in producing the cylinder barrels for it permits the part to be forged much closer to final dimensions.

Original upsetters simply gripped a portion of the stock, allowing a certain amount to overhang in front of the gripping dies. This "overhang" then was struck by the heading tool to cause the stock to be "gathered" or increased in diameter. With a header die to confine the gather, it was possible to produce a head on a bolt quite accurately.

Recessed Parts: For producing parts incorporating recesses, such as the cylinder barrel described here, a different method of flowing the metal is employed and dies and tools perform different functions. Here the gripping dies not only hold a portion of the stock but also contain an enlarged opening on the end toward the header slide. Instead of a heading tool, a punch is carried on the header slide.

Action then is as follows: After dies grip the work, the punch engages the hot metal, causing it to flow radially into the die cavity. Shape of die cavity and punch determine manner in which metal flows. It can be made to move lengthwise as well as radially, under certain limitations of course.

Since it is practical to produce only a certain amount of metal flow at each stroke of the punch, the work is placed in different die cavities in rapid succession. A separate punch operates on the forging in each cavity to produce the final shape wanted.

In addition, the transverse action of the split die and the longitudinal action of the punch (or header tool) can be used in various combinations, either separately or simultaneously, for swaging, bending, shearing, extrusion, trimming, slotting and punching as well as for internal displacement — the operation utilized largely in forging the cylinder barrel.

Sequence For Cylinder Barrel: The four steps in forging the cylinder barrel are revealed by Figs. 1, 2, 3 and 4 which show etched sections through the center of the forging as they come from each of the four die cavities of the upsetter. In these views, the bottom is the end engaged by the punch.

In first stage, Fig. 1, the action is mainly one of gathering or true upsetting. In this stage, the metal is compressed longitudinally to increase the diameter. Note that the bottom end of the forging is flat, the "punch" employed here is flat, resulting in no punching but purely an upsetting action.

In second stage, Fig. 2, the tool is pointed to produce a piercing action that causes the metal to flow radially to fill the die cavity. The bottom fourth (approximate) of the forging now begins to assume its final shape.

Considerable care in designing die cavity and shape of punch is necessary here because the flow of metal at this point largely determines the fiber arrangement of this portion of the final forging. And since one of the important advantages of forging a part lies in the chance to rearrange the fibers for maximum strength, this phase of the tooling is given most careful study. Desired tooling is usually arrived at after considerable development work as it is exceedingly difficult to determine how a certain set of tools will flow the metal except by actually trying them out.

These comments also apply with equal

importance to the work done in th third stage, Fig. 3. At this point, mo than half of the final forged shape h been produced.

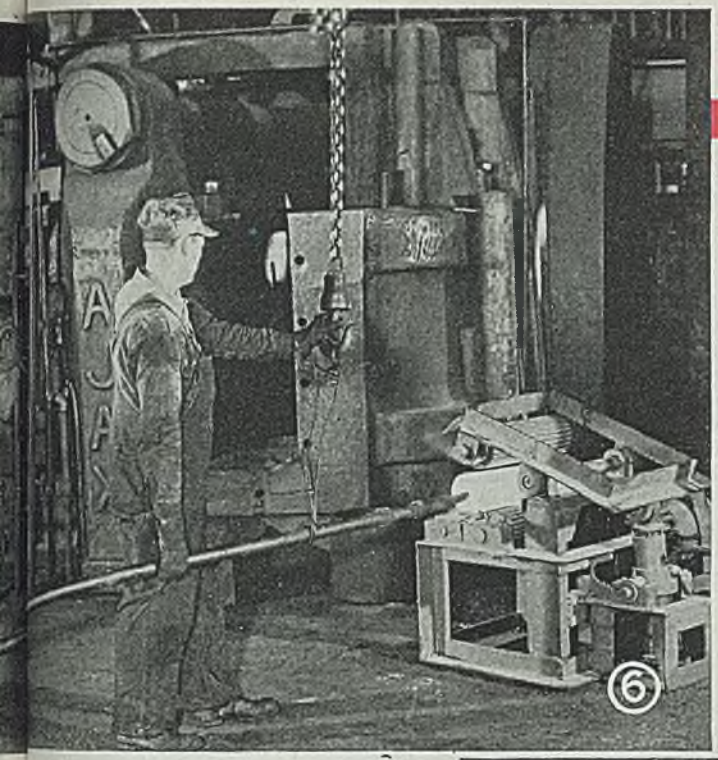
In Fig. 4, the cylinder head has be formed, the spark plug bosses near t top have been shaped up (see Fig. 7 well), and the excess metal has be sheared off of the forging. Note th as the work progresses from one sta to another, successively more and mo of the forging assumes final shape whi practically no work is done on the wa sections previously formed.

Production At Tube Turns: Havi seen what is done to the billet to pr duce the finished forging, let's take look at the associated equipment an layout of the production setup at Tub Turns to get a picture of the complet operation.

Stock for forging is cut from 4¾-i diameter rounds of SAE-4135 stee When the forging dies are new, stock i cut into 17¼-in. lengths. But when die are worn, more stock is supplied fo forging by cutting to 17½-in. length Each billet has a hole drilled in on end for insertion of the porter bar use in handling the billet during descalin and forging.

Stock comes to the heating furnaces o steel skid racks, these in turn bein handled by gas engine or battery pow ered fork trucks.

Heating Furnaces: Each upsetter fed with heated billets from two fu naces, one on each side of the upsette These furnaces are the well known slo type design, and are oil fired. Slot i approximately 15 ft long, suitable fo heating 18-20 billets simultaneously. descaler is located at each side of th upsetter near the entrance to the die as shown in Fig. 6. Thus at all time



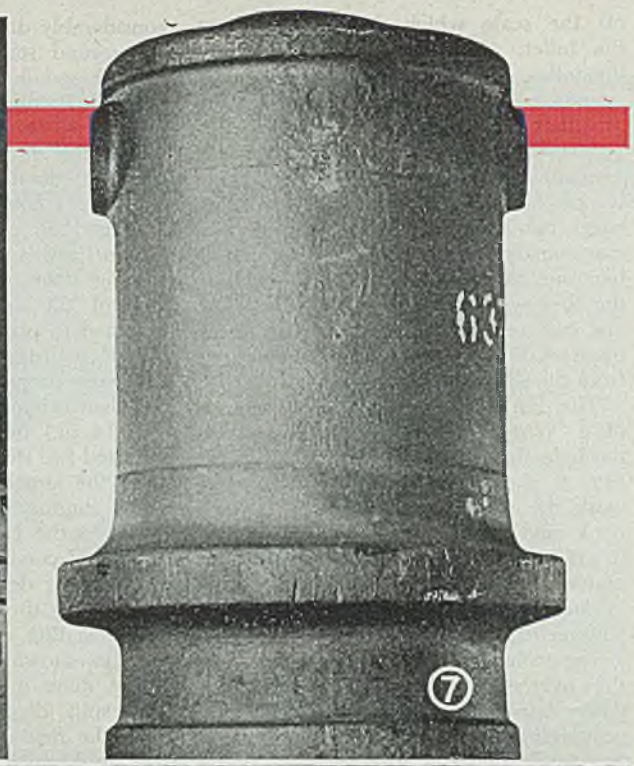


Fig. 6—Descaler in operation. Note use of porter bar. Crane operator works with two men on porter bar in positioning work in dies in upsetter, also in descaling and loading-unloading work from heating furnace

Fig. 7 — Closed-end cylinder barrel for famed 12-cylinder V-type gasoline marine engines powering PT boats and other craft, as forged at Tube Turns

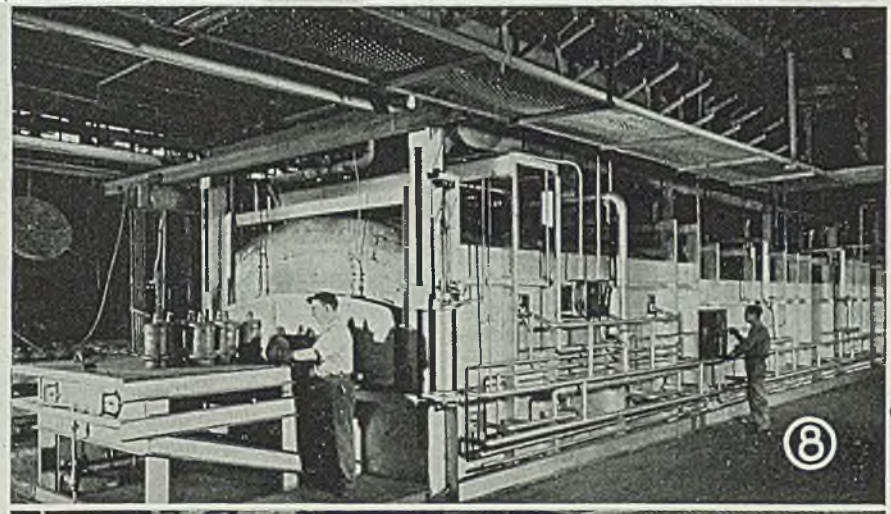


Fig. 8 — One of four pusher-type cycle annealing furnaces that reduce maximum hardness of forging to 217 brinell for easy machining

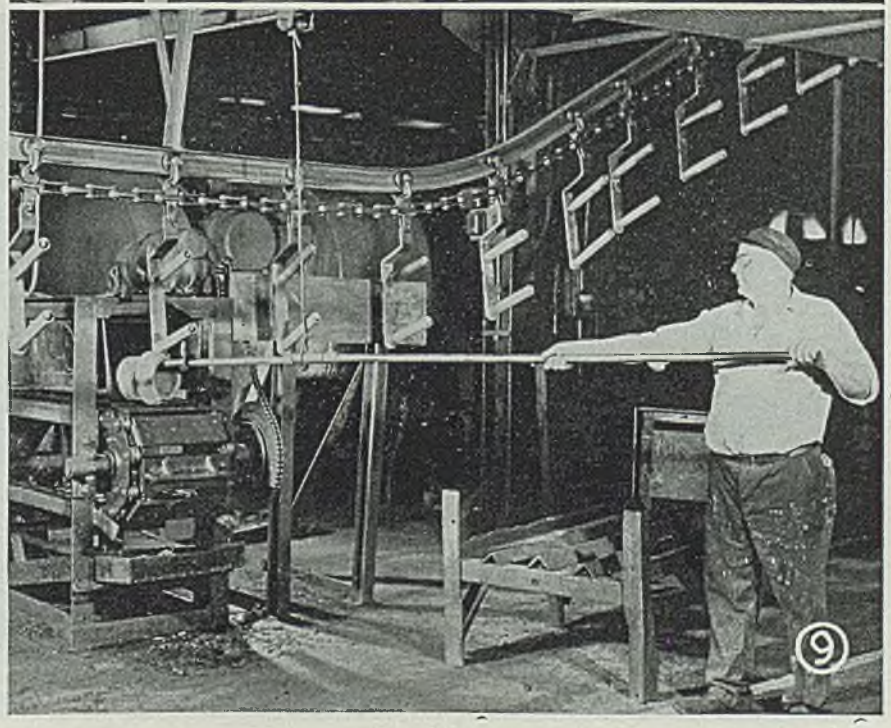


Fig. 9—Forging drops out of upsetter dies onto slat conveyor that discharges here

there are 36-40 billets being heated for each upsetter. When a heated billet is removed from one of the furnaces, a cold billet is immediately put in its place. This assures ample supply of hot billets for forging. Billet temperature at this point is 2150-2200° F, sufficient to permit forging in the 4-station upsetter die without re-heating.

Descaling of heated billets is done in special units designed and built by Tube Turns. In these descalers, Fig. 6, the billet is placed on the two lower rolls which revolve continuously under power supplied by a 7½ hp motor. A third roll located immediately above the billet is forced down against the work under a pressure of about 400 lb, developed by an air cylinder as shown in Fig. 6. Since all three rolls have coarse corrugation in them, they effectively break

off the scale which drops away from the billet. And since the rollers spin the billet, they eliminate a conventional operation which calls for manual rotation of billets during descaling.

Mechanical Handling Aids: Seven men constitute the crew employed. There is one heater at each of the two furnaces, two men on the porter bar (Fig. 6), one man on the crane lifting the porter bar, one man on the upsetter swabbing the dies with lubricant after each pass, and one man at the discharge end of the upsetter removing the finished forgings from the discharge conveyor.

The hot billet is handled by means of a "porter bar" which is inserted in the hole drilled in one end of the stock. Fig. 6 shows this clearly. Two men work the porter bar—one at the crane hook and the other at the rear end where a crossbar handle enables the operator there to turn the work as required in moving from one die impression to another in forging.

The weight of the billet is carried by the overhead crane, the man at the porter bar handle merely balancing and positioning the billet. The crane operator and the two men on the porter bar really "team up" in handling the forging for they all work together in moving the billet from the descaler into the first die impression, then on through the other three impressions in succession as the piece is forged.

In the last stage, the punch shoves the porter bar off and also trims the forging as shown in Fig. 4. In putting this job into production, one of the problems was to keep the porter bar from being pushed off in the third stage. The difficulty was overcome by making the punch less pointed (see Fig. 3) and by widening the taper of the forging to keep stock from tending to flow out of the back end (top end in Fig. 3). Punch for third stage is shaped considerably different than the punch for the second stage as can be seen from Figs. 2 and 3.

High Production Rate: One of the significant things about this upsetting job is the great output obtained. Average production is 38 forged cylinder barrels per hour. And some crews have averaged 50 per hour for 8 hr. One reason for this high output is that proper forging action does not depend upon the skill of the operators, the work being confined to placing the stock in the dies which in turn do the actual forging. Of course proper placement is essential.

When originally set up, smaller diameter (4 in.) bar stock was used. This required five stages in the upsetter to produce the largest outside diameter in finished forging which is 9½ in. But by going to the larger stock (4¾ in. diameter) it is possible to obtain the increase in diameter desired in only four stages, work going through all four stages without reheating.

Work shown here in Figs. 6 and 10 is being done on an 8-in. Ajax upsetter. The split dies are arranged vertically with the first stage on the top; second, third and fourth below in sequence. Finished forging and crop end fall out of dies at the fourth stage. Upsetting is powered by a 250-hp squirrel-cage induction motor running at 1750 rpm. It is connected to the machine through a V-belt drive. Punches travel through a 26-in. stroke in forging, while the dies travel 12 in. in opening and closing.

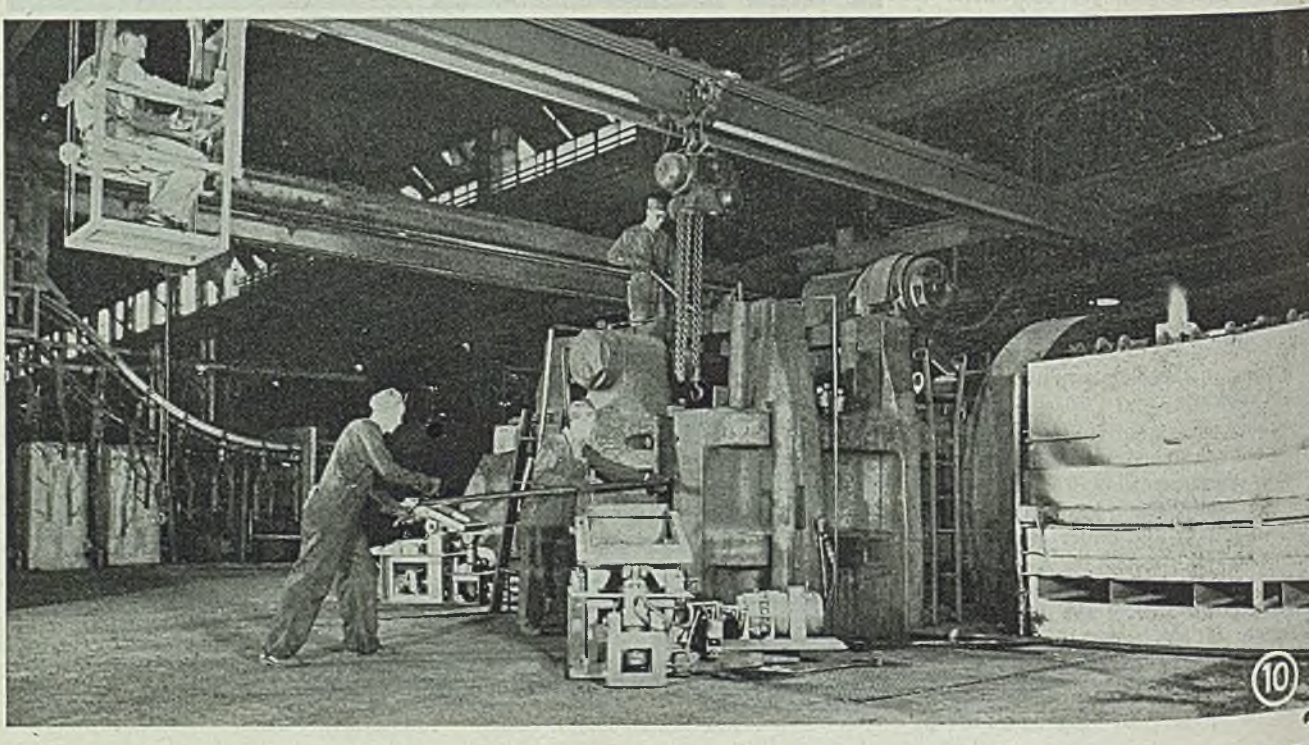
Fig. 10 — Overall view of crew working 8-in. upsetter. Heating furnaces are at extreme right and to left side of upsetter. Crane operator controls lifting and positioning of porter bar while two men on bar position the forging in the upsetter dies

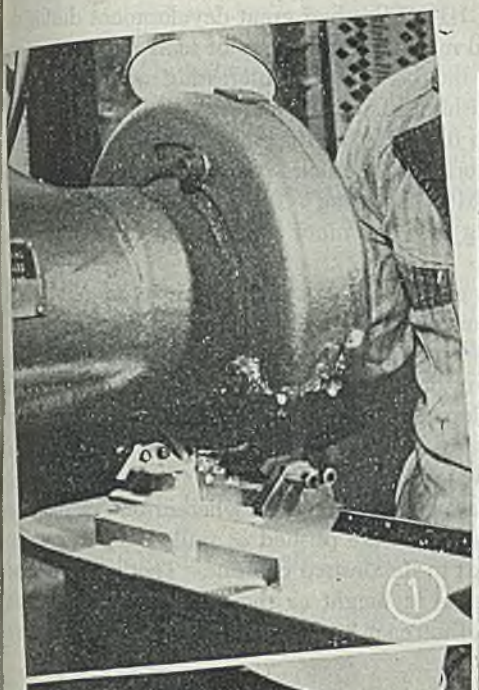
Upsetting Dies: Two die sets a available for forging. Dies are mac from heat-treated die steels. Some 600 8000 forgings are obtained from a s of dies before they need reworkin Then they have ½ to ¾-in. remov from their face and the die cavities r sunk, after which they are good f producing another 6000-8000 forgings.

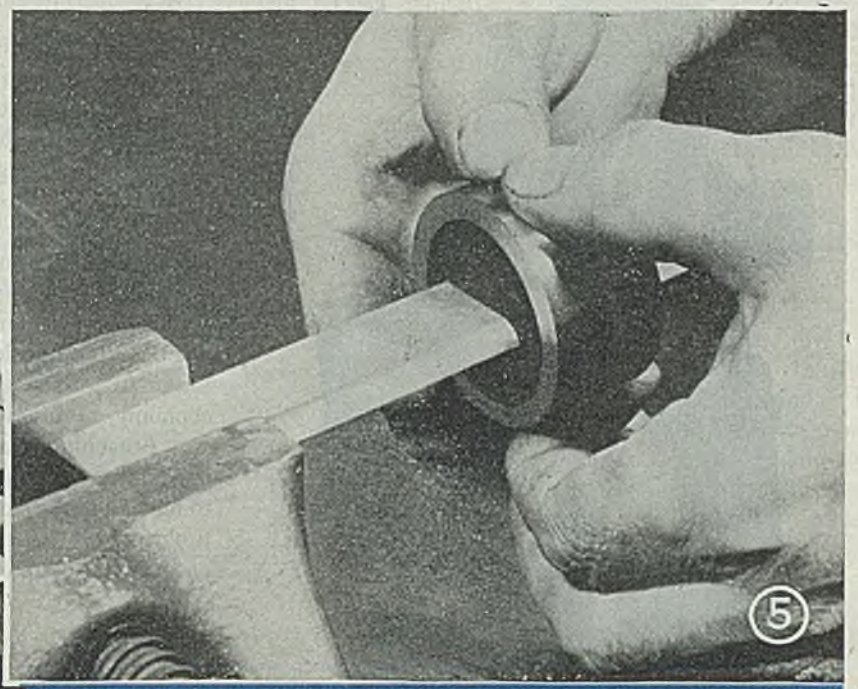
Cycle Annealing: From the last sta in the dies, the completed forging fa onto a slat type conveyor which carri it up to a point where it can be load onto steel skids as shown in Fig. A chain conveyor also travels past th station, being used for carrying oth forged parts on through processing. Cy inder barrels are moved to loading si of heat-treating furnaces by power l trucks which handle the steel skids.

Fig. 8 shows one of four pusher-ty furnaces designed and built by Tu Turns for giving the work a cycle sol tion anneal to produce maximum m chinability. The furnace receives eig cylinder barrels every 15 min. In th next 8 hr and 45 min, they move throug four zones at the following temperature First zone, 1700-1725°F; second zon 1700-1725°F; third zone, 1300-1315°F fourth zone, 1275-1300°F. The result proper movement through these zones that the work is held at 1675°F f about one hour, then cooled in the fu nace at a rate of about 100° per ho to a temperature around 1000°F. Fro this point they are allowed to cool t remainder of way to room temperatu in air.

All zones are held at desired tempe ture by means of automatic controlle Result of this careful annealing is a har ness that does not exceed 217 brinell a value that assures easy machining cutting the heat-radiating fins and fi ishing up the forging.







Sectional Nib Molds

Body of sintered carbide may be recut without impairing productive life of tool

EXPERIENCE of Firth-Sterling Steel Co., McKeesport, Pa., indicates that sectional carbide nib molds will duplicate production records achieved with sintered carbide tools and dies. Summing up results of 6 years of experimentation in this branch of powder metallurgy, William J. Loach, superintendent

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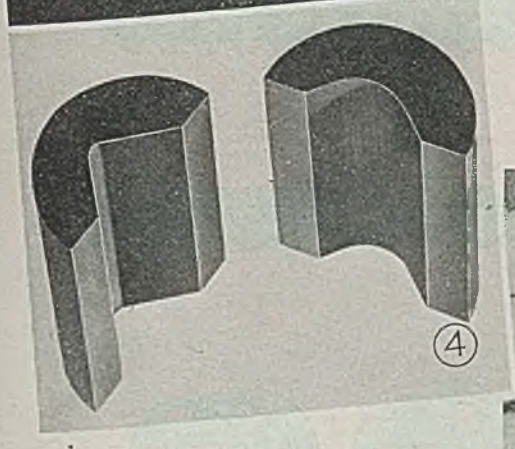


Fig. 4—*Preformed sectional sintered carbide nibs*

Fig. 5—*Hand lapping the mold with diamond powder*

Fig. 6—*Fitting plunger to mold. Tolerance is* 0.0003-*in.*

Fig. 1—*Grinding of sectional nib to exact size is done with diamond wheel on a surface grinder*

Fig. 2—*Gaging mold for size*

Fig. 3—*Spotted nib ready for the grinding jig*

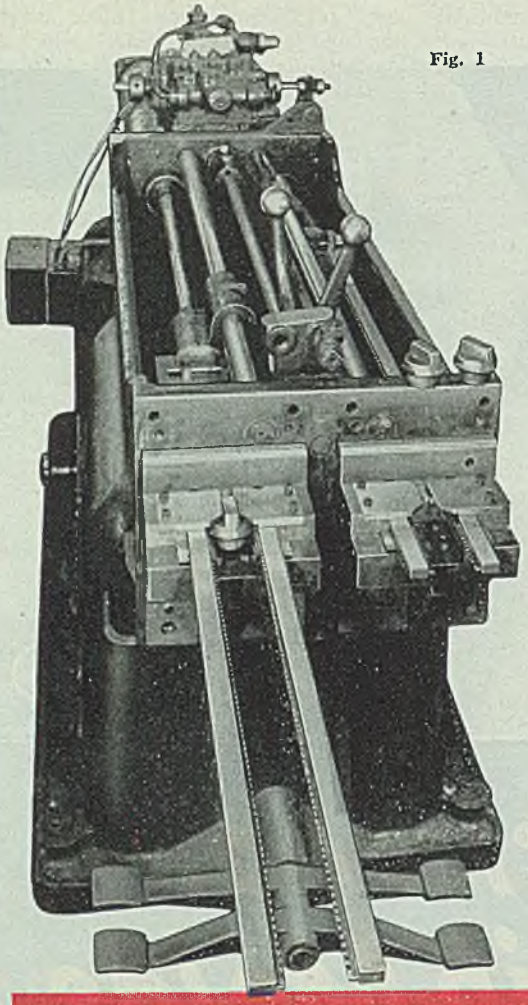


Fig. 1

". . . BROACHING has had great development during the last decade, special machines and forms of tools having been designed to further the use of this interesting and labor-saving process for the finishing of work which it was formerly thought to be impossible to finish by such means." Thus in 1904, wrote Joseph V. Woodworth in his book "American Tool Making and Inter-Changeable Manufacturing". Today these words can again be used—providing that the minor substitution of four years for a decade be made.

Although the earliest applications of broaching have been traced back to some 90 years ago, an immense amount of advancement in this machining process has taken place in four hectic years of war production. Results of the war's impetus has been the development of machines capable of lending themselves to a variety of production needs with increased overall economy, accuracy, and productivity.

Broaching is a machining method wherein one or more cutters with a series of teeth are pushed or pulled across a surface to machine that part to the desired contour. Teeth of the broach progressively increase in height as they approach the finishing end of the tool so that each tooth removes an equal amount of

TRENDS IN

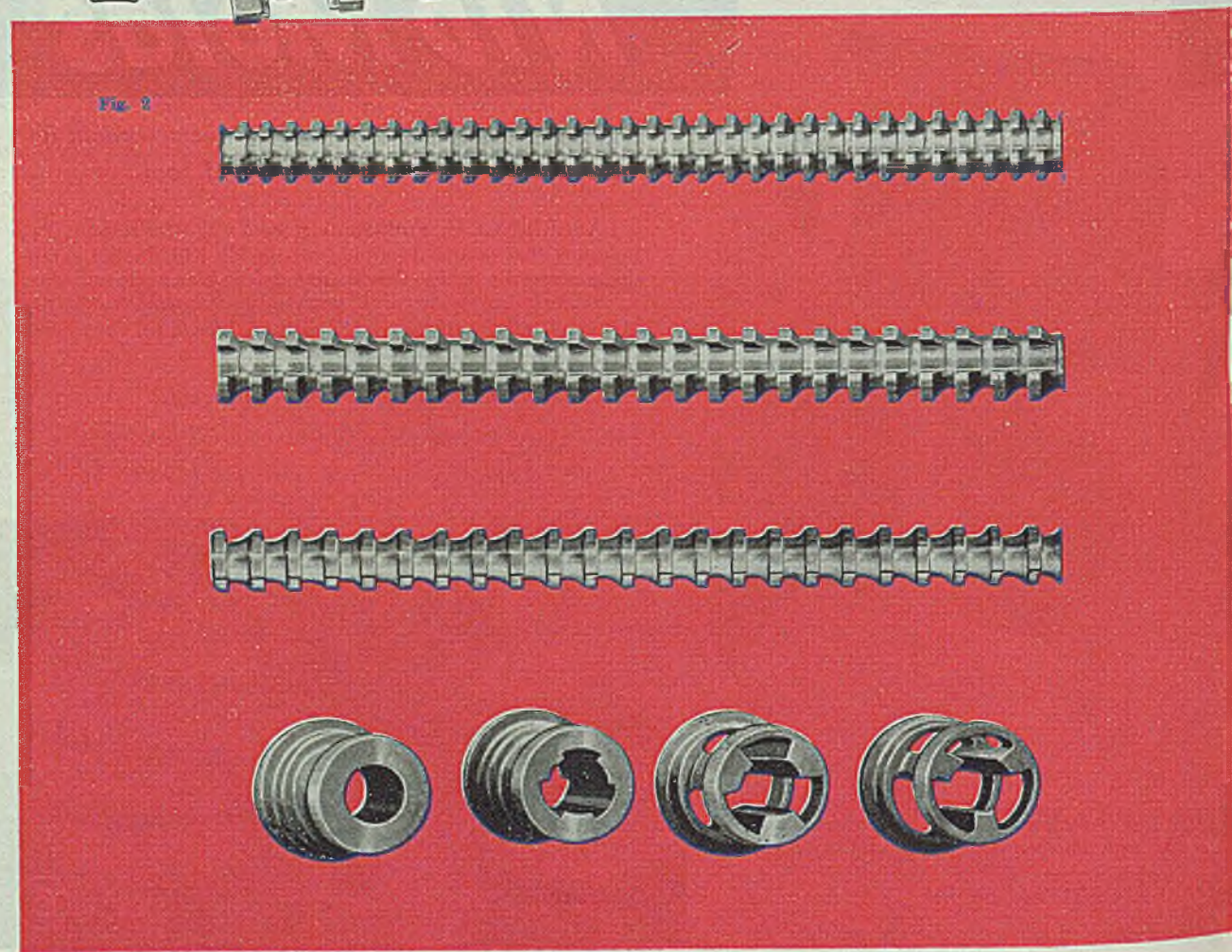


Fig. 2

metal. The last few teeth in the broach are used to bring the work to the desired size and finish.

Originally, broaching was done on manually operated presses. These were replaced by screw actuated broaching machines which in turn, in the early 1920's, began to give way to hydraulic machines. Advantages gained with the screw actuated type are self-evident; those with the hydraulic machine—among other gains—involve smooth power delivery to the tool and a quick return speed. About this time, too, form grinding was introduced. Surface broaching, adopted so extensively by the automotive industry in the late 20's when its possibilities were realized, had been in limited commercial use for almost 40 years.

Broaches are usually classified according to the general types of jobs done. These jobs are as follows:

The Keyway Broach—forerunner of present-day practices.

The Flat Broach—usually a blade section for shaping external contours.

The Cylindrical Broach—usually employed in internal contours for special shaped holes including splines, etc.

Probably the earliest broach form to be used is the keyway broach which is even today one of the most widely used. Type of work done by this broach is a keyway cutting operation completed in a single pass.

The automotive applications of surface broaching had attained the status of a mass production process before the advent of the late war, consequently they provided the pattern for the development of new techniques for production of war materiel. This form of machining is used for such parts as wrenches, pliers, small mounting brackets, rocker arms and valve guides of aircraft engines, parts of camera shutters, slides for optical devices, etc.

Perhaps the best known type of job performed by this general method of finishing is internal broaching. It started initially as a method for producing accurate plain bores, but over the years the process has extended to the development of openings of a great variety of forms and intricacy. This type of work has been used in the production of splined and serrated holes, involute splines; and

BROACHING

Stimulated pace of production in the past four years has done much to engender new conceptions in mass volume production. Impetus given to broaching in this short period is perhaps indicative of its yet unrealized possibilities

Fig. 1—A mass production method utilizing a horizontal dual ram machine for the cutting of slots on each side of fuse body proved to be fast and accurate

Fig. 2—Parts formerly made by drilling and slotting were subsequently made by broaching when the initial method proved slow, expensive and did not give high repetitive accuracy

Fig. 3—Broaching of internal gears. Broaches can be made to produce any number of teeth and gears with as small as 48 diametral pitch teeth can be made

Fig. 3

more recently as a practical means of producing helical lead splines.

An example of the mass production capabilities realized with this last mentioned technique during the war, is the change that took place in the method of rifling of gun barrels. Formerly, and strictly in accordance with long established ordnance practice, a single-point tool was used to produce one helical groove at a time. In this practice the axial advance of the tool broach is accompanied by rotary motion in the ratio of one rotation for every axial movement equal to the lead of the helix. During the war when the same parts had to be made by the millions, the same process was used except that a broach with several series of teeth was used. This modification of the tool permitted rifling all grooves in a single operation.

Advantages: There are some limitations to the use of broaching but, in general, it can be used economically wherever there is call for repetitive accuracy and mass production of continuous contours—whether the surfaces be flat, curved or irregular. The outstanding advantages gained with this method of metal removal are: (1) Productivity, (2) accuracy, (3) simplicity of operation, and (4) multiple operations at a single setup.

(1) Roughing and finishing cuts in many instances can be made in one operation. Other factors which have influence on productivity are the high return speed of the tool, ease of setting up work in fixtures resulting in overall reduction of idle time. Ordinarily, production speed of the broach is 15 to 25 times faster than that obtained by other machining methods.

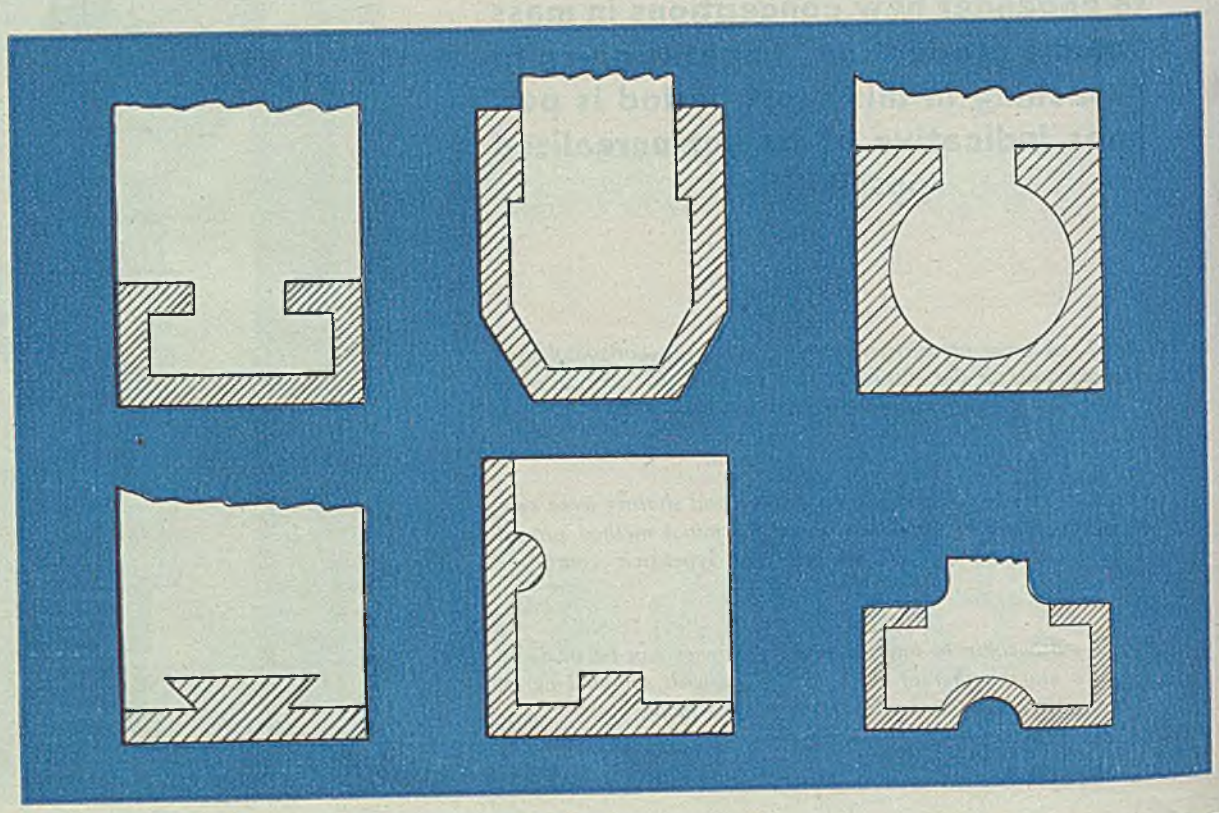
(2) The absence of accumulated chips in clamps and fixtures permits accurate positioning of the workpiece. Another asset is that the final sizing of the hole is done by the last few teeth which remove very little metal, consequently the broach will hold its size for a long time. The insignificant deflection of the machine slide and the rigidity of the heavy fixtures contribute immensely to the machines' ability to produce parts of high dimensional accuracy from setup to setup.

(3) Once a job is properly designed and tooled, machine operation can be entrusted to relatively unskilled labor whose principal function is to load and unload the work. Functional cycle is simple to follow and easily can be made fully automatic.

(4) A series of operations can be performed with a single stroke of the broach. In the case of a cylindrical broach, the first few teeth are used to make a roughing cut, the next series sizes the cut, and finally, 3 or 4 semispherical teeth are used for burnishing the job thereby removing small surface irregularities. Multiple operations and multiple cuts can be made by the use of indexing and turret machines. As an example of this type of function, such elements as a connecting rod and connecting rod bolt holes are assembled, held in a vertical position, and a number of pull broaches (depending upon the number of holes required) are drawn through simultaneously.

Automatic Operation: Developments in automatic operation undoubtedly began back in the days of the screw-actuated type of machines. In this type of machine the broach was pulled through the work by a nonrotating screw which received its axial motion from a pulley-driven rotating nut. Machines designed specifically for broaching operations became available in a matter of relatively few years prior to the time Mr. Woodworth made his commentary regarding this "very interesting work." Broaching, as other manufacturing methods, went through various evolutionary stages before it became a common method of manufacturing on a mass production scale. Indexing devices were introduced to reduce the manual handling of parts to a minimum. With this device in place, the ram returns to the top of its stroke, the table indexes

Fig. 4



automatically to the next position, and the broaching operation is repeated on the next piece of work.

Rotary continuous surface machines were developed for broaching small parts in large quantities. These usually are horizontal machines equipped with an endless chain on which work-holding fixtures are mounted to carry the work between and underneath horizontal surfacing broaches. Thus, large scale production is easily attained. Fixtures used on these machines usually are made self-clamping, and unclamp automatically to drop the work out of the fixture after it has passed the broach position.

The duplex vertical broaching machine is another development which is in keeping with the trend toward mass production methods. This type is fitted with two alternately timed broaches and two sets of fixtures so that while one broach is cutting, the operator unloads and loads the other fixture. These machines also are applicable to the finishing of many kinds of parts.

Some of the most recent developments and improvements include redesigned pumps and valves to give greater and smoother hydraulic power; automatic electronic operating controls; electronic controls along with solenoids for power and pressure regulation; and some machines use counting devices based on electronic detection.

Great improvements have been made in the broaches themselves. Such factors as new tool steels, broach design, heat treatment (of the broaches), etc., have added materially to the life of the tool and the resultant economy of the entire practice. Present-day speeds of cutting on the hydraulically driven broaching machines range between 10 and 40 fpm, with a noncutting return stroke 3 to 5 times as fast.

Perhaps one of the best ways to visualize the role of broaching as a fundamental process is to look at a few examples of present-day techniques which in themselves may set the pattern for further development. Fig. 2 shows the production of a part formerly made in small quantities by drilling and slotting. When larger production was demanded, cost of production by the former method was found to be prohibitive, and the repetitive accuracy to be low. This problem was overcome by the de-

(*Please turn to Page* 91)

Fig. 4—Typical examples of internal and external broached surfaces

Fig. 5—Another application of broaching showing a turbine wheel in which the entire groove contour is produced in one setting

Fig. 6—Straddle broaching of tank track links. Straddle broaching was used on the two edges, then ¼-in. deep keyway was cut across one of the edges. A vertical duplex machine equipped with two fixtures was used; one to handle the straddle broaching, the other to cut the keyway

Fig. 5

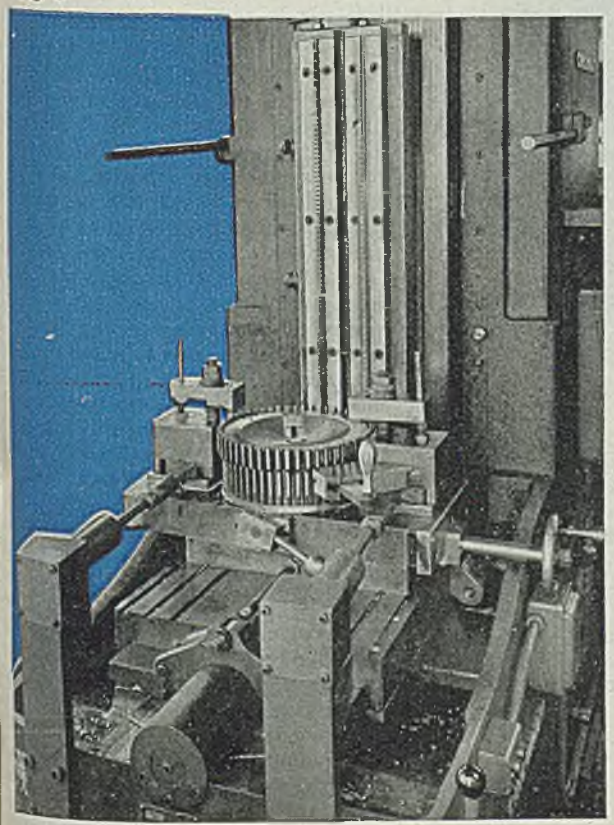
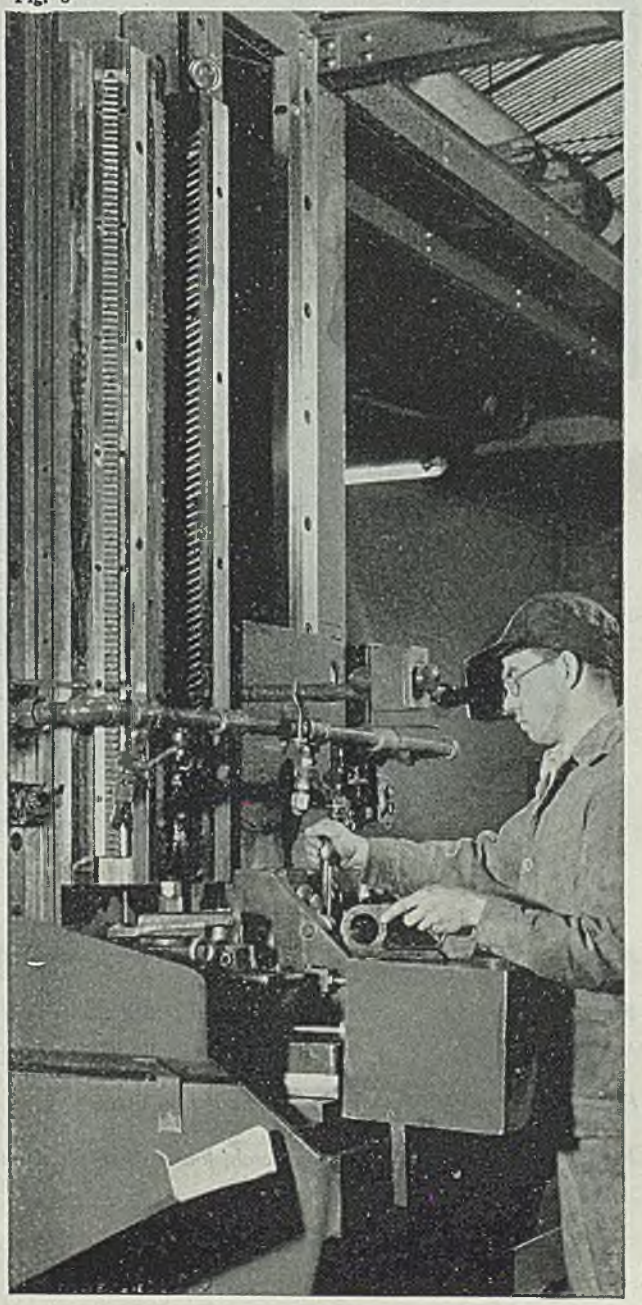


Fig. 6



CARBON LINING for Blast Furnace

ITS HISTORY, INSTALLATION a

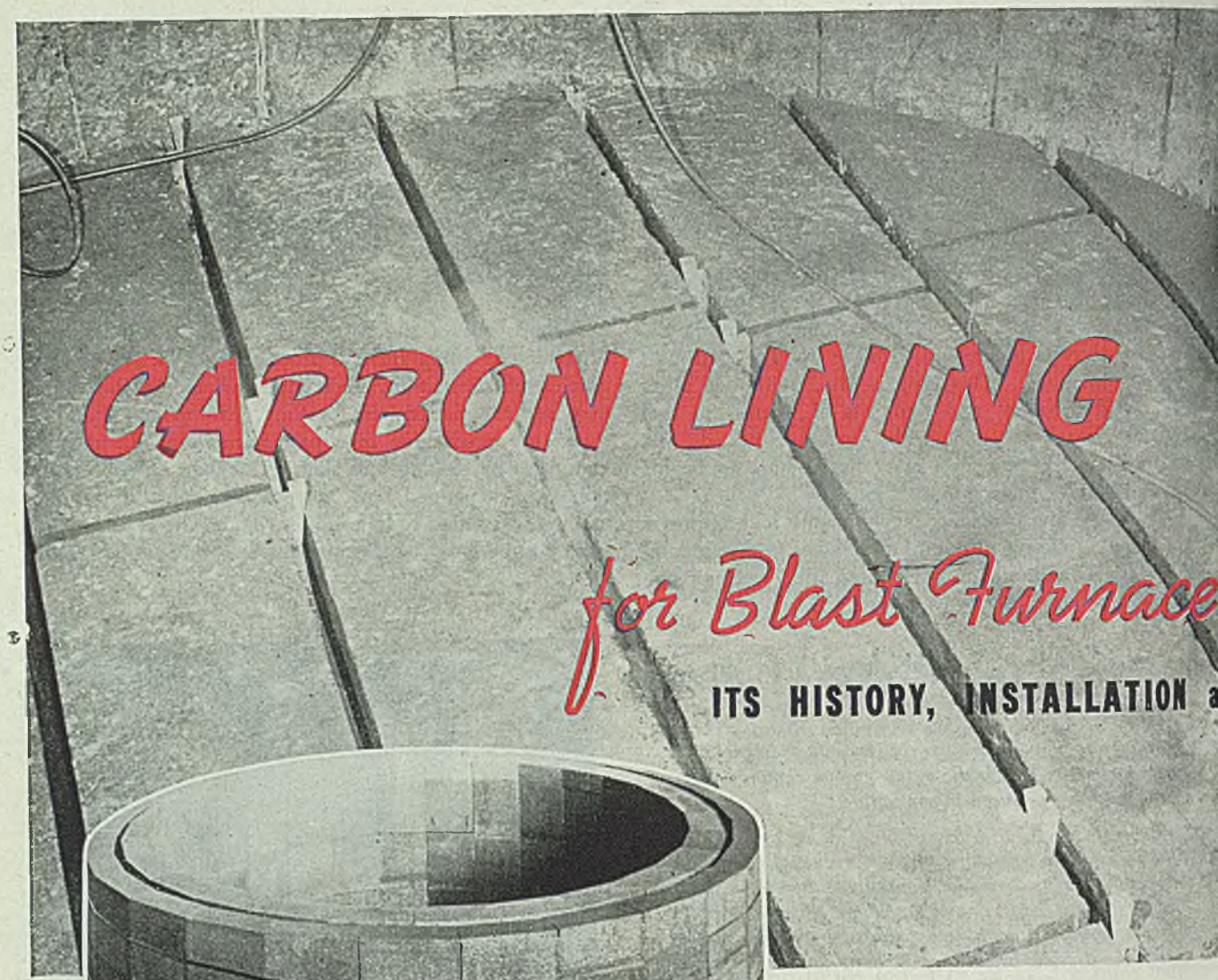


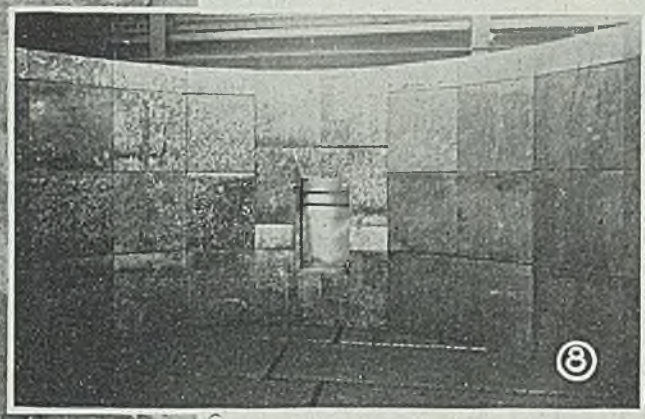
Fig. 6—Carbon block lining assembled on test floor for inspection

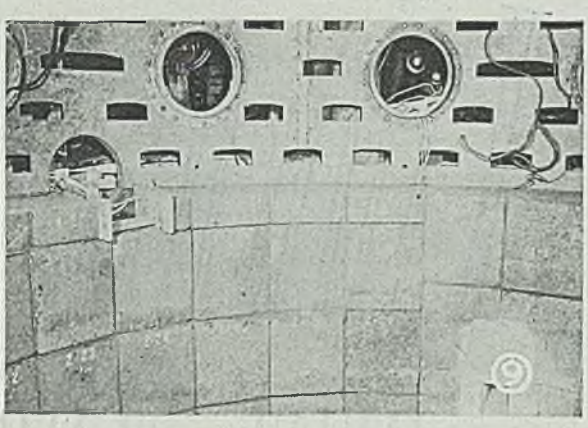
Fig. 7—Wedges are used to hold blocks in position while carbon ramming mix is being tamped between joints

Fig. 8—Interior of hearth looking toward iron notch

Fig. 9—Wall lining showing iron notch, lower right, fitted with ceramic blocks

FOLLOWING the installation of a partial carbon lining of one of the Carrie stacks of the Carnegie-Illinois Steel Corp., Rankin, Pa., the company in the fall of 1944 ordered a carbon block lining for one of its other furnaces. The design of the lining includes a hearth made of a double layer of blocks 22½ in. thick, 30 in. wide and in lengths up to 11 ft, the largest block weighing over 5000 lb. The wall from the hearth to the top of the hearth jacket is made of a double ring of blocks, the inner ring blocks 15 in. from inner to outer face and the outer ring blocks 11¾ in. face to face. A space about 2 in. wide separates the two rings which is filled with carbon ramming mix tamped in hot as the wall was installed. The abutting edges of the wall blocks are finished, top and bottom and side (not inner and outer faces) and carbonaceous cement was used in those joints. The hearth blocks were finished top, bottom and ends but not vertical sides. Carbonaceous cement was used between the two layers of blocks but between the separate blocks where joints approximately 2 in. wide were maintained, carbon ramming mix was tamped in hot. Surrounding the hearth and the wall sections is 3 to 4 in. of tamped coke braize which not only takes care of the out-of





Shapes and sizes of carbon blocks for lining hearths and hearth walls of various stacks in this country and details of their installation are presented. Operating reports of some European stacks with hearths lined with this material emphasize the use of large blocks and careful laying up

By FRANK J. VOSBURGH
Product Development Manager
National Carbon Co., Inc.
New York

roundness and inequalities of the shell, but the expansion of the blocks in the hearth and walls as well, and serves to a degree as insulation of the shell. When the furnace is blown in the top of the hearth and the inner face of the wall blocks will be protected by a minimum thickness of brick.

It will be seen in the drawing that all hearth joints are staggered and wall joints are broken so that there is no possible straight through path of molten metal. The tap hole blocks will be the standard clay material normally used tightly fitted into the carbon blocks.

Since in laying ceramic blocks extreme care is taken to obtain joints as thin as possible, comment on the use of joints as wide as 2 in. in the hearth may be welcomed.

Either the joints should be very thin and made up with cement or wide enough to permit thorough tamping in of the hot carbon ramming mix. The latter type of joint is preferred in the hearth because after it has been baked in, the carbon ramming mix is, for all practical purposes, the same as the blocks in every particular. The best carbonaceous ce-

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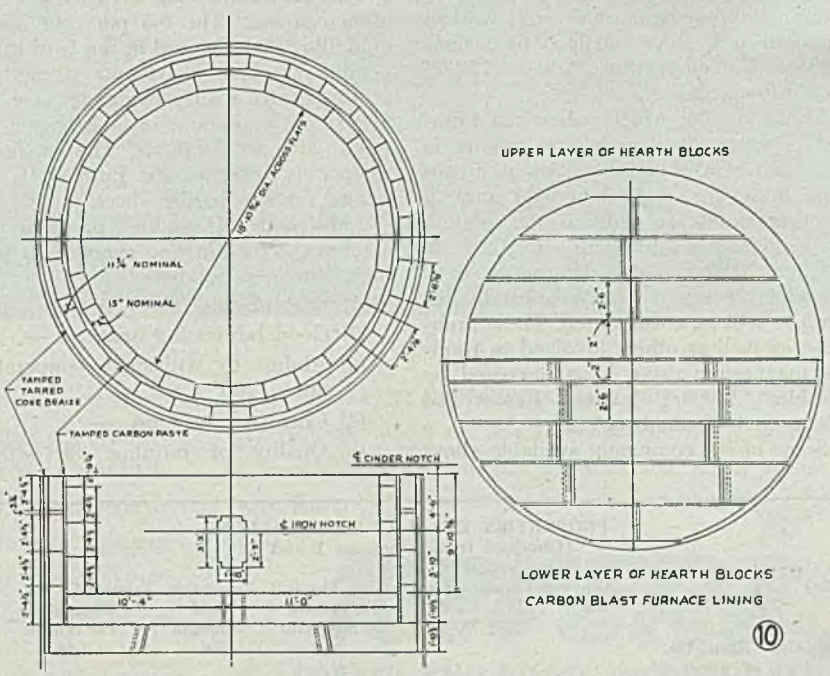

Fig. 10—Details of hearth lining showing arrangement of staggering all joints in hearth and walls

Lubrication in Drawing Magnesium

By SAMUEL SPRING
Chemist
Frankford Arsenal
Philadelphia

Metallurgical and engineering factors governing choice and use of lubricants to facilitate press-forming of magnesium are discussed in this brief but instructive resume by the author of "Lubrication in Drawing Aluminum" which appeared in STEEL Dec. 24

MANY of the difficulties in drawing magnesium are tied up with the brittleness of the close-packed hexagonal crystalline form. As the temperature of the metal is raised, however, the deformation properties of the metal are greatly improved and at temperatures of 450-700° F the metal may be more severely worked than can most other metals at room temperature[1]. Temperatures above 750° F should be avoided[3].

This situation, which makes hot forming of magnesium necessary, results in basic differences in lubrication problems from those encountered in cold forming of other metals. In addition, the solution of engineering problems involved in forming heated metal determines to a considerable extent what lubrication difficulties will be encountered. These problems, as well as others involved in forming magnesium, have been discussed by Winkler[1], Meyer[2], Jevons[3], Resos[4] and Weber and Vandenberg[5].

Some of the commonly available alloys and properties are listed in accompanying table. The 3 per cent aluminum sheet has good formality coupled with higher strength. It has slightly inferior drawability qualities to the manganese alloy. The most easily formable magnesium alloy is that containing 1½ to 2 per cent of manganese. The 6.5 per cent aluminum alloy sheet is used in the hard rolled condition where maximum strength is required. Its main advantage over the 3 per cent aluminum sheet is that it has good arc weldability. The annealed temper is used where forming is too severe for the harder sheet.

Lubricants: Desirable properties of a lubricant for drawing magnesium have been listed[6] as follows:

(1) Ease of application —
(2) Good lubricating qualities —
(3) Ability to withstand temperature up to 700° F —
(4) Chemical inertness —
(5) Quality of burning off without leaving a residue that is difficult to remove —
(6) Lack of toxicity.

Because of the required high temperature, it is not possible to use circulated lubricants nor lubricants of such nature and quality as to cause excessive cooling action. In this connection, the practice of keeping the punch relatively cool by a blast of air has been suggested by Jevons for some applications. This chills the metal and increases its strength so that it is better able to draw the hot, weaker portions of the metal through the die.

High temperature used in drawing magnesium increases the tendency for build-up on tools, particularly when genuine deep drawing operations are involved. Moreover, it is desirable to have unhindered flow of metal for successful forming, so that friction should be at a minimum.

Most widely used component of lubricants for drawing magnesium is graphite, because of the resistance of this material to high temperatures and its innate lubricating qualities. Dow Chemical Co. engineers have found colloidal graphite suspended in a volatile solvent to be very good[1]. This is sprayed on the sheet with a conventional spray gun. Resos[4] suggests Acheson colloidal graphite Type 2404 for sheet, used 1 part to 50 parts of carbon tetrachloride. This is sprayed on the sheet before it is placed in the oven to be brought to temperature. He also reports the use of Acheson dispersion PD-41 as being better than other products when placed on the die just before the draw.

Graphite Used in Tallow

Another way that graphite is commonly used is by suspension of 20 per cent flake graphite in tallow[6] or in tallow and mineral oil mixture[5]. In this case it is suggested[6] that this be applied by buffing on die surfaces rather than to the work. Flake graphite in a volatile solvent has also been suggested by engineers of the Aluminum Co. of America[5].

In using graphite it is desirable to clean the die occasionally and to run some graphitized grease on the working surfaces by means of an asbestos pad[1].

It is very important to clean the work as soon as possible after using graphite lubricants. This is sometimes difficult because of the tendency for the graphite to embed into the surface. Where oil or fatty materials are involved, an alkaline or solvent degreasing operation should be used first. After this, there is suggested a bath of 15-20 per cent chromic acid. Suggestions on the use of this bath include a rapid dip of from 0.5 to 2.0 min. One author suggests that room temperature be used[1], while others suggest 150° F[3, 5]. Winkler considers that 3 per cent of sodium, potassium, calcium or magnesium nitrate improves the cleaning action of the bath. This addition is essential when pickled sheet is used. In general, Dow Co. st

PROPERTIES OF MAGNESIUM ALLOYS
(Obtained from references 1 and 5)

Alloy		Alloying Constituents Per cent Mn	Al	Zn	Physical Properties (approx.) Tensile Strength Psi	Yield Strength Psi	Elongation, Per cent in 2-in.
Dow Co.	Alum. Co.				#		
Ma°°	Am-3S-O	1.5	.....	.....	32-33,000	17-15,000	16-17
Mn°°°	Am-3S-H	1.5	.....	.....	36-37,000	27-29,000	9-8
FS-la	Am-C52S-O	0.3	2.7°-3.0	1.0	38-37,000	25-22,000	18-21
FS-lh	Am-C52S-H	0.3	2.7 -3.0	1.0	46-43,000	34-33,000	10-10
J-la	Am-C57S-O	0.2	6.5	0.7°-1.0	42-43.000	26,000	10-16
J-lh	Am-C57S-H	0.2	6.5	0.7 -1.0	50-47,000	35-34,000	6-9

° Lower concentration for Alum. Co. of America Product
°° A and O stand for annealed and h and H for hard temper
First value in each case is for the product of the Alum. Co. of America

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gests use of oiled rather than chromium-pickled surfaces if graphite is to be used as the lubricant since cleaning is facilitated.

If the chrome-pickled sheet is used, they suggest 1-15 min soaking in 1.5 lb of chromic acid in water to make 1 gal. Winkler suggests that the action of chromic acid is to attack the magnesium hydroxide coating and thus break the bond between graphite and metal. It is advised that time in the chromic acid bath be kept short, to prevent pitting at the graphite-magnesium junction due to galvanic action.

Weber[5] has found that a mixture of high flash point oil, consisting of asphaltic still residue and black oil, with 0.75-lb of mica per gallon, gave a satisfactory lubricant for drawing tank heads. The vehicle oil of the mixture was very viscous (20,000 sec. at 100°F S.U.V.). The mica used was very finely devised. It was observed that this lubricant did not leave an objectionable residue on the tool surface and the lubricant could be completely removed by washing in mineral spirits or benzene.

In addition, Meyer[2] has suggested the use of Lennox soap solution and a good brand of heavy machine oil for use on the dies.

In rubber pad forming by the Guerin process, it has been suggested that cornstarch[2] or powdered mica[4] be used to prevent sticking to the rubber pad. Meyer[2] reports that the Dow Co. prevents sticking by placing a thin piece of wrapping paper between the rubber and the work.

Tools: Many workers in this field suggest the use of mild steel for tools rather than hardened steel. Jevons[3] is of the belief that this is due to the situation in which drawing of magnesium has been confined to the aircraft industry where the number of pressings made from a tool is small. All investigators, however, agree on the importance of maintaining a high polish on the tools.

Weber suggests the use of mild steel for drawing magnesium and occasionally employs heat resisting cast irons. Meyer considers Meehanite iron to yield the best drawing dies and has found ordinary gray cast iron to be unsatisfactory.

Jevons states that when large numbers of articles are to be made, ordinary carbon tool steel, hardened and tempered at rather higher temperatures than usual —will give excellent service. He also mentions that the tendency to "foul" during genuine deep-drawing operations can be lessened by the use of nitrided steel dies, which lose little of their original hardness when used at temperatures up to 660°F. On the other hand, Meyer reports that while tool steel is satisfactory for many drawing dies, there is a tendency to warp when operated on long runs of heated sheet magnesium, particularly for steel blank holders and pressure rings.

Punches for drawing magnesium are made of steel, aluminum, cast iron, zinc and even of magnesium alloys; in the latter case they should not be heated over 500°F. Of course, in the Guerin process, punches are made of rubber. This sometimes seriously limits the temperature at which the shaping operation can be carried out because of the effect of high temperature on the rubber.

DRILLING DIAMONDS: A microscope is necessary to check progress in drilling a diamond die, a slow process which takes from 3 to 9 days. Proper shape of those dies made by North American Phillips Co. Inc., New York, is essential for drawing high-quality fine-wire products to be used in electronic devices

ACKNOWLEDGEMENTS

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Deep Fillet Welding Technique Described

A bulletin entitled "Deep Fillet Welding With Murex Type FHP Electrodes," illustrated with diagrams and photographs, is available from Metal and Thermit Corp., New York 5. It explains the technique of deep fillet welding. This process is especially suited to the production of parts and subassemblies involving long continuous stretches of flat or horizontal fillet welds. Deep fillet welding is recommended only where rigid control can be imposed and absolute assurance can be maintained, so that correct burn-off rate, electrode position, electrode angle, etc., will be used.

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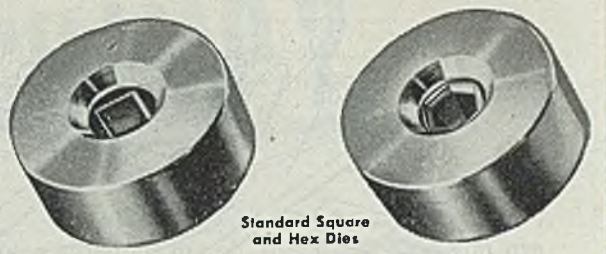

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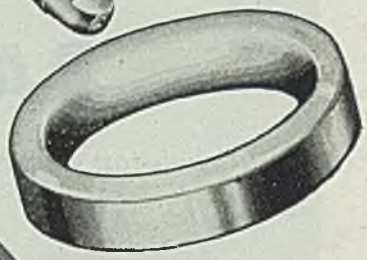
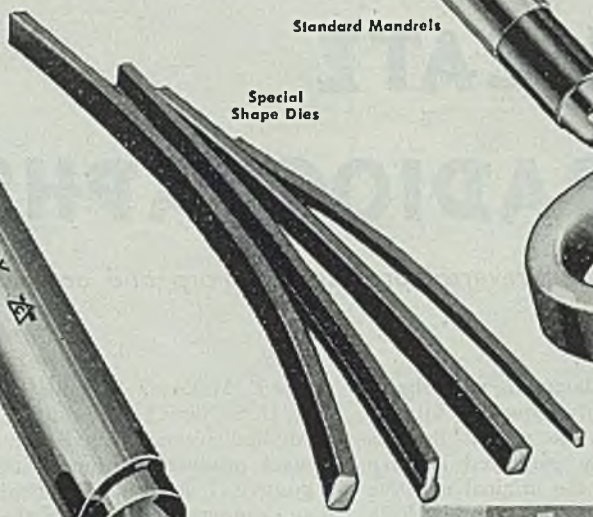


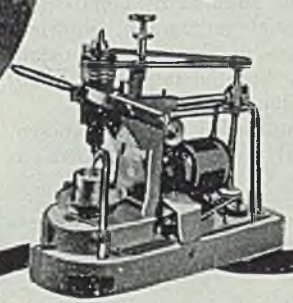
Special Shape Dies



Special Wire Forming Tools

Special Round Hole Dies

Special Sheet Metal Forming, Forming Lapping Dies



Die Finishing and Servicing Equipment

Complete equipment for finishing and servicing all carbide dies (Roas Heavy Duty Lapping Machine shown.)

Prompt Service and Complete Technical Assistance

Detroit Die Training Course

Field Service by Die Specialist

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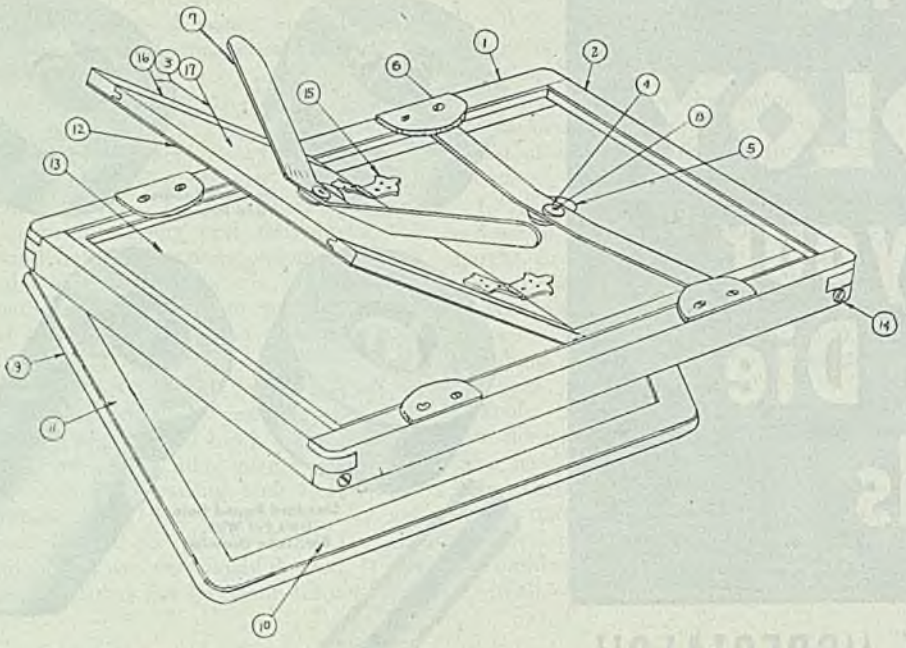
Foreign Sales: International General Electric Co., Schenectady 5, N. Y.



DUPLICATE RADIOGRAPHS

with fast light-reversal process are sharp and accurate

DUPLICATE radiographs with sharpness and sensitivity equaling original negatives now can be made. By this method, successfully employed at the Boston Navy Yard, the original negative is reproduced on a special type film by a single contact printing exposure. It has been valuable for making copies of standards governing acceptance, repairability, or rejection of castings and weldments, according to *Industrial Radiography*, which recently presented the views on this subject of Stuart D. Herbein, associate materials engineer, and James F. McKenna Jr., chief engineering aide, U. S. Navy Yard, Boston.

Method formerly used required two contact printing exposures, first making a positive of the original radiograph, and then printing negatives from the positive. Reproductions made by the two-step process not only suffered by comparison with the original radiograph, showing considerable loss in sharpness of detail and sensitivity, but the operations were lengthy and tedious.

The direct duplicating process is known as light reversal process and is based on massive over-exposure of a special type film. In explanation, consider the characteristic curves for various types of x-ray films. These curves are derived by plotting H & D density along the ordinate against logarithm of relative exposure time along the abscissa. For most types of x-ray film, for example, Eastman types A, M and K, the H & D density appears to increase indefinitely with increasing exposure time and the type of film is unadaptable to the light reversal process. However, there are films known as the "Autho-positive" type which show a different characteristic curve and are suited to the process.

For example, the curves for Eastman type F or Bluebrand films show a reversal point up to which H & D density increases with exposure time as ordinarily. Beyond this point the curve assumes a downward course, and further increases in exposure time result in decreasing densities. Reversal therefore causes the film to become light and transparent instead of dark and opaque as is ordinarily expected with overexposure. In the case of type F film reversal occurs at an H & D density slightly above 3.5 and additional exposure after this density has been reached can be adjusted to produce the exact density of the film being copied.

The direct duplicating process is most effectively carried out in sunlight, artificial illumination requiring considerably longer periods of exposure. The radiograph to be copied is placed in a contact printing frame (shown in accompanying illustration) against an unexposed Eastman type F or Bluebrand film, the latter being backed by a sheet of black paper. The printing frame is closed, thereby clamping the unexposed film tightly against the radiograph. Exposure is then made either in sunlight or artificial light after which the duplicate film is developed for 2½ min at 68° F using standard x-ray developing solution.

A normal exposure time in bright sunlight has been found to be about 25 sec. Although the process has considerable latitude, some adjustment in exposure time for time of day and clearness of atmosphere is necessary if resulting film is too dark, the exposure time is increased; if too light the time is decreased. This is just the opposite of ordinary photographic procedure because of the reversal feature previously explained.

PRINTING FRAME SPECIFICATIONS

No.	Pieces Required	Material	Description	Size (inches)
1	2	wood	frame	1¼ x 1⅝ x 19¼
2	2	wood	frame	1¼ x 1⅝ x 16¼
3	1	wood	hinged cover	½ x 14⅛ x 17⅛
4	2	steel	washer	⅛ x ⅝ diameter
5	2	steel	washer	⅛ x 1¼ diameter
6	4	steel	spring clip lock	⅛ x 1 diameter
7	2	steel	spring clip	⅛ x 1 x 14⅝
8	2	steel	rd hd mach screw and nut	No. 5-40 x ⅞
9	1	plywood	cover	⅛ x 19¼ x 16¼
10	2	felt		1 x 19¼
11	2	felt		1 x 14¼
12	2	felt		8⅛ x 14⅛
13	1	glass		⅛ x 14⅛ x 17⅛
14	4	steel	fl hd wood screw	No. 14 x 1¼
15	2	steel	hinges	.....
16	4	wood	hinged cover detail	⅛ x 1⅛ x 8⅛
17	2	wood	hinged cover detail	⅛ x 8⅛ x 11⅛

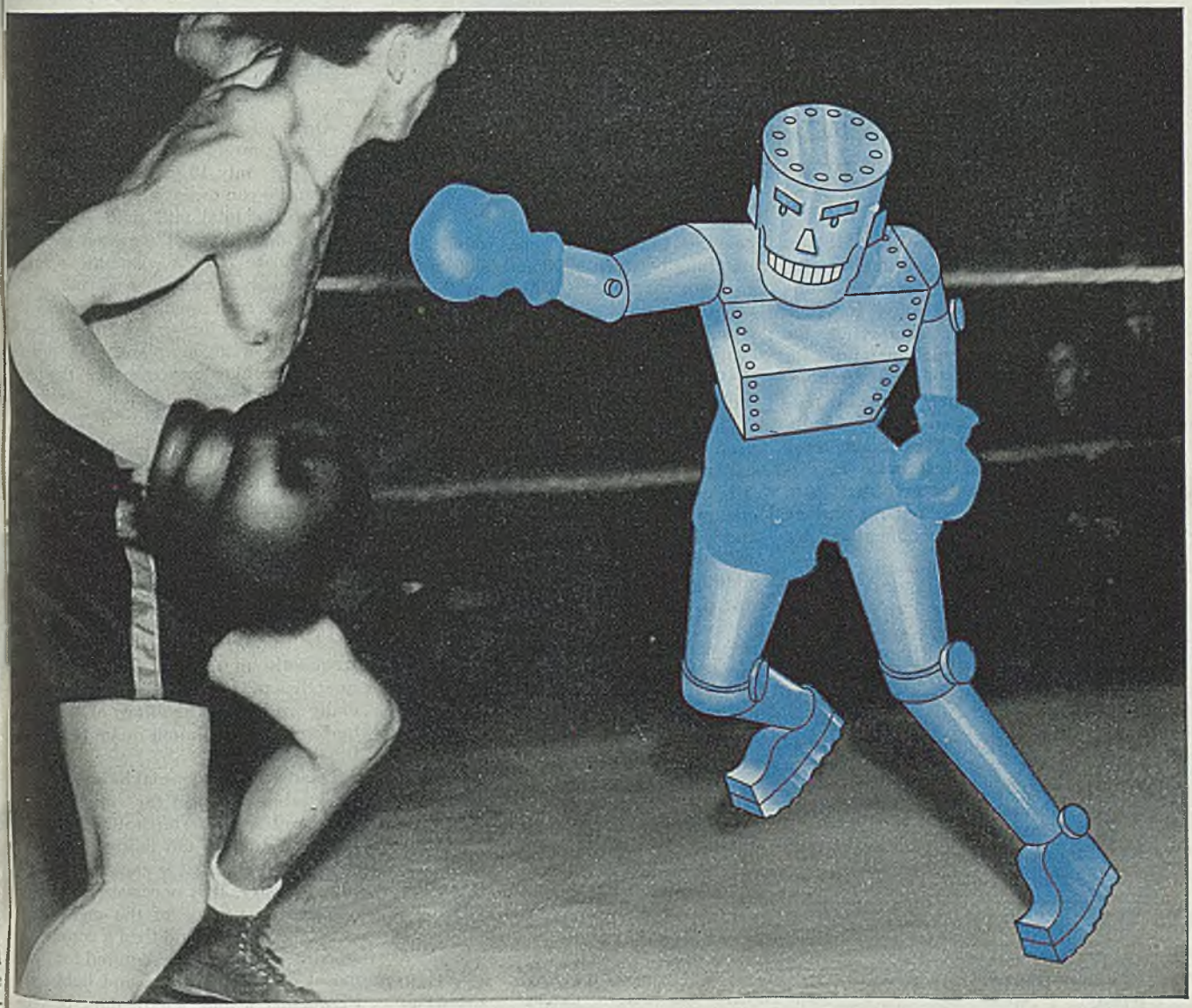
Production Planning Cards

Production planning cards and da sheets for executives and engineers a available from Plan-O-Mill Corp., 18 East Eight Mile road, Hazel Park, Mic They can be used in planning expande facilities or other building, and a designed to simplify layout of produ tion flow by providing scale machi models which can be placed on facto floor plan and arranged to meet pr duction or space requirements. Set three cards is offered, covering thr different models. Each card reproduc eight to twelve plan views of the mod scaled ¼ in. to the foot, together wi specificati ns of the machine.

WANTA MANAGE A CHAMP?

With postwar competition getting set for a slugging match, every machine you use will have to compete in the battle of costs on the basis of maximum production per man hour.

Now is the time to get rid of your "punch drunk" machines. Replace them with machines that can transmit the *horsepower and have the rigidity to take full advantage of carbide cutting tools—increase cutting speeds from* 200 *to* 500 *per cent.* Jones & Lamson has pioneered in machines designed specifically for the use of carbide cutting tools. Whether you buy War Surplus machines or new machines, send for our book, "Welcome to You and Your Problem". Or, better yet, phone now for one of our engineers to assist you in making the most profitable investment.



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MACHINE COMPANY
Springfield, Vermont, U.S.A.

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HEAVY WALL PIPE

By E. C. WRIGHT
Assistant to President
National Tube Co.

Problems encountered in manufacturing heavy wall pipe for high-pressure steam service may be solved by standardizing wall thicknesses, rolling only one length in any given diameter and wall thickness, and by buying billets of only one diameter and weight for rolling each pipe size

FEW steel mills in the United States can roll rounds over 7 in. in diameter, such as are required by seamless tube mills rolling heavy-wall pipe for high pressure steam service. As a result, the purchase of rounds in small quantities for small orders of pipe becomes troublesome. Unless a whole heat of steel is purchased, large rounds can usually be obtained only in forged sizes. Since these are quite rough and inaccurate in diameter, the tube manufacturer must turn or peel such rounds to remove surface defects and get accurate dimensions for piercing.

The steel melter also is troubled with the problem of selecting the proper ingot size and weight to cut such billets as 12 in. OD by 5000 lb or 10½ in. by 3500 lb. Often the available ingot mold size and weight of ingot is such that only 50 to 60 per cent of the ingot can be cut to the proper weight billet. This is particularly true in the case of alloy steel melting shops with electric furnaces where ingot weights rarely exceed 15,000 lb and where 8000 to 10,000 lb ingots are usually standard equipment. Thus, it is possible to cut only one round billet weighing between 4000 and 6000 lb from an ingot weighing 10,000 lb, as the normal crop loss from hot topping and bottom cropping frequently exceeds 25 per cent.

With an order for very large sizes, such as 16 in. OD by 1 9/16 in. wall (Schedule 160), the ordinary mill setup used for rolling 16 in. OD pipe of nominal wall thickness is not satisfactory and it is necessary to adjust the first and second piercers, use a different Hi-mill bar and plug, change the reeling machine, and sometimes change the sizing rolls. In addition, the billet weight for such a pipe size is so heavy, often being over 6000 lb, that the heating furnace will not accommodate the desired round because of excessive length. This requires the use of a billet of greater diameter than normally required to keep the length within the heating furnace limit. Therefore, the piercing mill passes used for ordinary 16 in. OD pipe cannot be employed.

As a result of these conditions, extensive changes and rearrangement of equipment always becomes necessary when special heavy wall pipe is to be made, either when the pipe mill has previously been rolling a similar diameter with a light wall, or a smaller diameter. It takes from 3 to 5 hr to change the mill setup, and the cost of this nonproductive delay is high. During these mill changes, furnaces are kept in operation and the full mill crew is engaged in the rearrangement. After the special rolling, a similar set of changes is required to resume production of normal pipe.

Most heavy-wall large diameter, seamless pipe has been used for high pressure steam mains connecting the high pressure boilers within turbines, where service conditions range from 800 to 2000 lb pressure and temperatures up to about 1000° F. Occasional uses for such pipe also are found in high pressure chemical plant and oil refinery equipment, and for special hydraulic piping used at room temperature. Pipe for high temperature use has been purchased to ASTM Specification A-206-447. Accompanying table shows typical sizes which have been most commonly used.

TYPICAL PIPE SIZES MOST COMMONLY USED

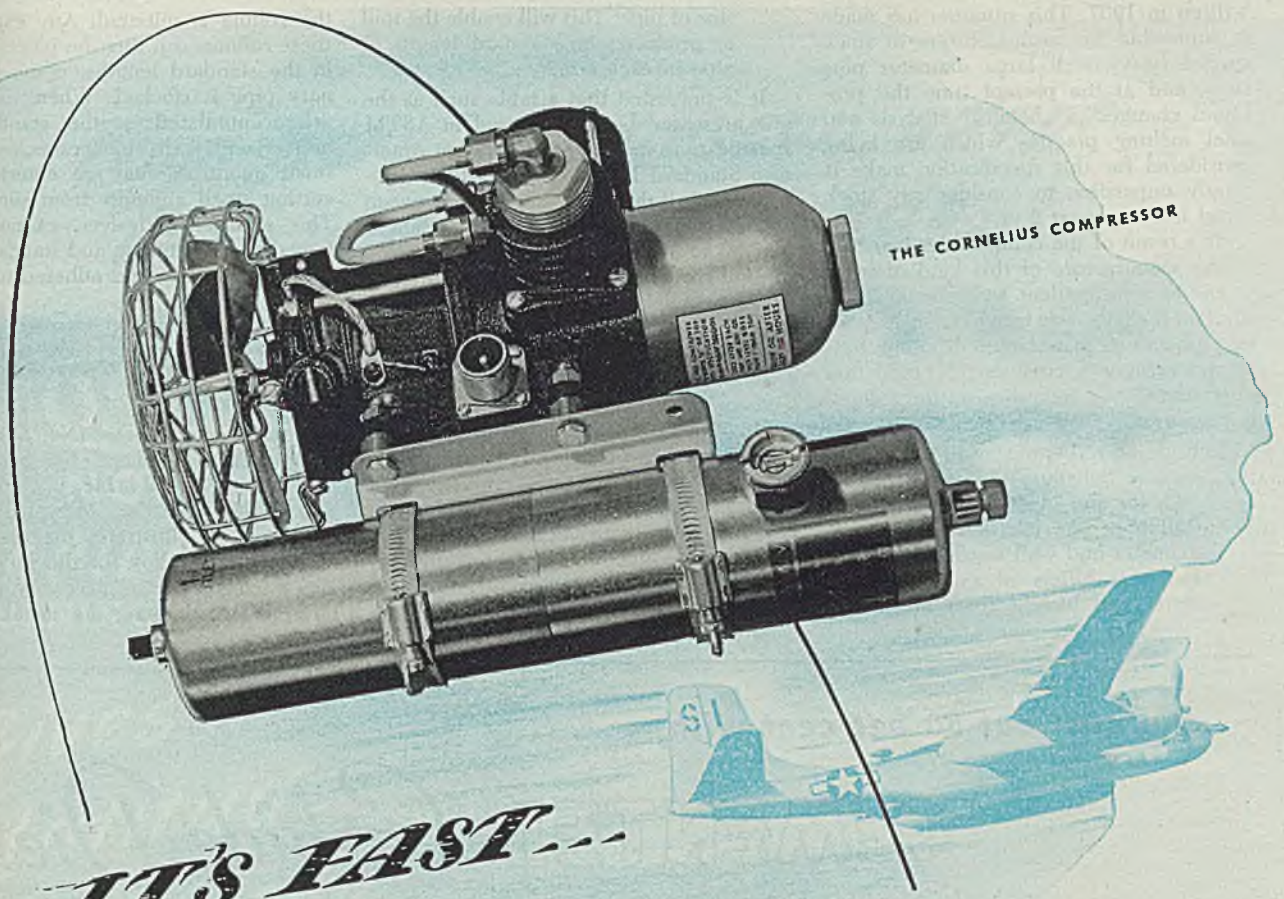
OD Inches	Wall Thickness Inches	Schedule No. 1	Weight Per Lin. Ft.-Lb.	Nominal Length to Cut—Feet	Rolled Length (Ft.) Before Cutting	Weight (Lb.) Rolled Pipe
10¾	1.125	160	116	25	31	3596
10¾	.843	120	89	30	36	3204
12¾	1.312	160	160	25	31	4960
12¾	1.000	120	125	30	36	4500
14	1.406	160	189	35	31	5860
14	1.062	120	147	30	36	5192
16	1.562	160	241	20	26	6266
16	1.218	120	192	25	31	5952

Rolling of Special Sizes

Orders for large diameter and heavy wall pipe rarely exceed 1000 ft, and this represents only 40 pieces 25 ft long. Such a quantity can ordinarily be rolled in 1 to 2 hr. The total mill time employed in producing 1000 ft of a special size would approximate 10 hr, so the operating cost and overhead charges per ton for producing such quantities in these sizes are often from five to ten times those for producing a given quantity of ordinary pipe and tubing sizes. Further, the rolling of special sizes on the mills is extremely difficult and frequently a number of pieces are cobbled or lost due to difficulties in handling the heavy billets and to the lack of experience of the crews in setting the mills and operating them to the best advantage. As a result, large rollings of special analysis and special large diameter heavy wall pipe are never made, because they are not standard purchases and overages of these odd pipe sizes cannot be sold within a reasonable time and frequently must be scrapped. Consequently, pipe manufacturers have generally insisted that rollings of this nature be limited to minimum quantities of 1500 ft.

Due to the fact special heavy-wall alloy steel tubes are used for very high pressures and severe temperature conditions the inspection of the finished material is the most severe that is encountered in the pipe industry. It is necessary to pickle or descale the surface of the metal to develop the defects, and then a considerable amount of grinding is required for the removal of pits, scratches and light seams. Frequently a long length must be cut in the center to remove a defect and this will leave two short lengths, sometimes less than 10 ft of good material. It is mainly because of the severe inspection that the mills insist upon shipping short lengths down to 6 ft.

ASTM Specification A-206 has been changed every year since it was originally



THE CORNELIUS COMPRESSOR

IT'S FAST...

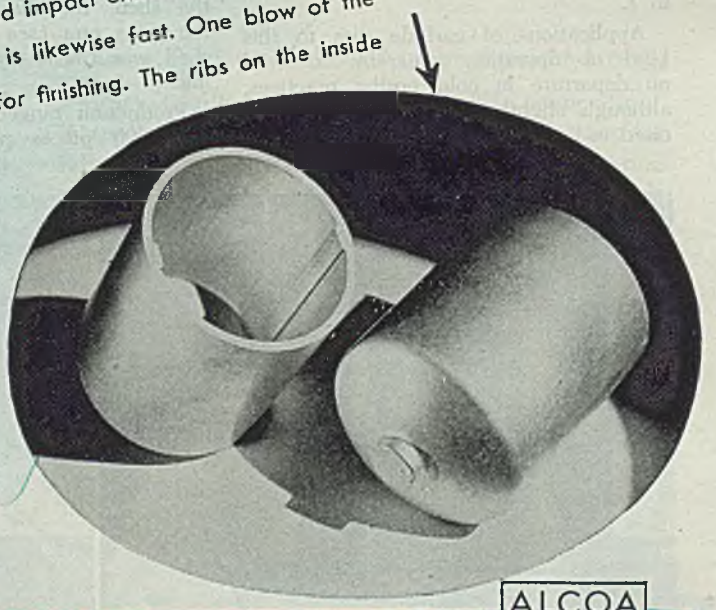
When Tokyo was the target, bomb-bay doors snapped open in 7/10ths of a second, sparing bomber crews the former, agonizing 15-second wait. Air, stored at 1,500 pounds pressure, actuated the doors.

Heart of this new, fast system is the Cornelius compressor—little but mighty—weighing only 10 pounds. And storing that air is an aluminum cylinder, fabricated by threading together the two Alcoa heat-treated impact extrusions you see here.

Production of these aluminum cylinder halves is likewise fast. One blow of the impact extrusion press and the part is ready for finishing. The ribs on the inside form bosses in which piping is attached.

Alcoa Aluminum impact extrusions may help speed up your production and reduce costs. We'll help you find out.

ALUMINUM COMPANY OF AMERICA, 2112 Gulf Bldg., Pittsburgh 19, Pennsylvania.



Thick walls of heat-treated Alcoa Aluminum provide great strength.

ALCOA REG. T. M.

ALCOA FIRST IN ALUMINUM

written in 1937. This situation has made it impossible for manufacturers to stock special heavy wall large diameter pipe sizes, and at the present time the profound changes in chemical analysis and steel melting practice which are being considered for this specification make it utterly impossible to consider any stock for at least the next 2 yr.

As a result of the complexities involved in the manufacture of this kind of pipe, it has become evident to National Tube Co. that the only way in which such special pipe can be manufactured on any basis approaching a commercial production operation is to standardize on the following features:

1. Roll only certain wall thickness, such as Schedule 120 and Schedule 160, for any given diameter.
2. Roll only one length in any given diameter and wall thickness.
3. Purchase billets of only one diameter and weight for rolling each size of pipe. This will enable the mill to produce one standard length of pipe in each size.

It is suggested that a table such as the one presented be incorporated in ASTM specifications instead of the present American Standard B36.10-1939, as the manufacture of all the 20 sizes of pipe between 10 3/4 in. OD and 16 in. OD and Schedules 80 to 160 would make it impossible for mills ever to accumulate commercial stocks in all these sizes. Under the program proposed, however, it will be possible for mills gradually to accumulate a stock of round billets suitable for rolling a given pipe size, the length varying according to mill's facilities.

Rolling of the pipe must be limited to minimum quantities of 1500 ft, which will make it necessary for consumers to purchase such a quantity or have their orders for lesser amounts accumulate at the producer's plant until a sufficient number of orders to total 1500 ft are entered before the rolling is initiated. Any excess from these rollings can then be placed in stock in the standard lengths, much like ordinary pipe is stocked. When such stocks are accumulated in the standard diameters and wall thicknesses, orders for small quantities may be entertained by cutting small amounts from such stocks. This situation, however, cannot be attained until a definite and standard specification is written and adhered to without annual changes.

Condensation of paper presented in Bulletin of American Society for Testing Materials.

—o—

A letter size bulletin (No. 58) entitled "Ampco Metal in Dies" has been issued by Ampco Metal Inc., 1745 South Thirty-Eighth Street, Milwaukee 4. It describes and illustrates the use of aluminum bronze alloy for die service, and also discusses factors necessary for good forming and drawing die metal.

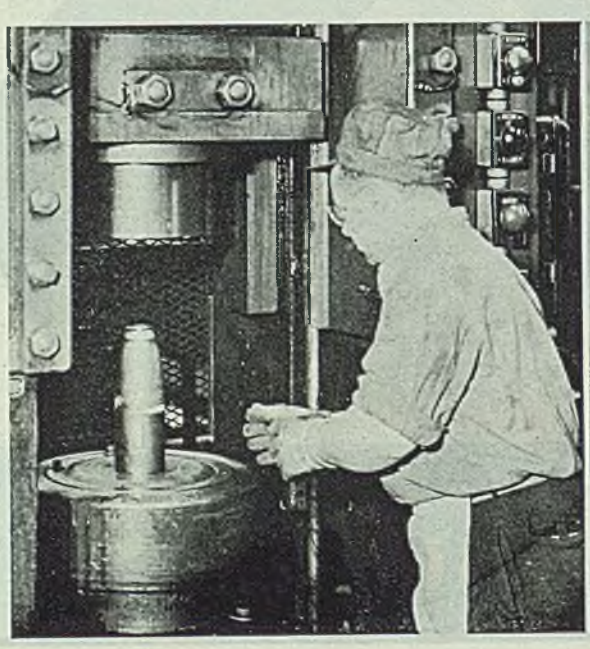
Die cost cut 80 per cent with

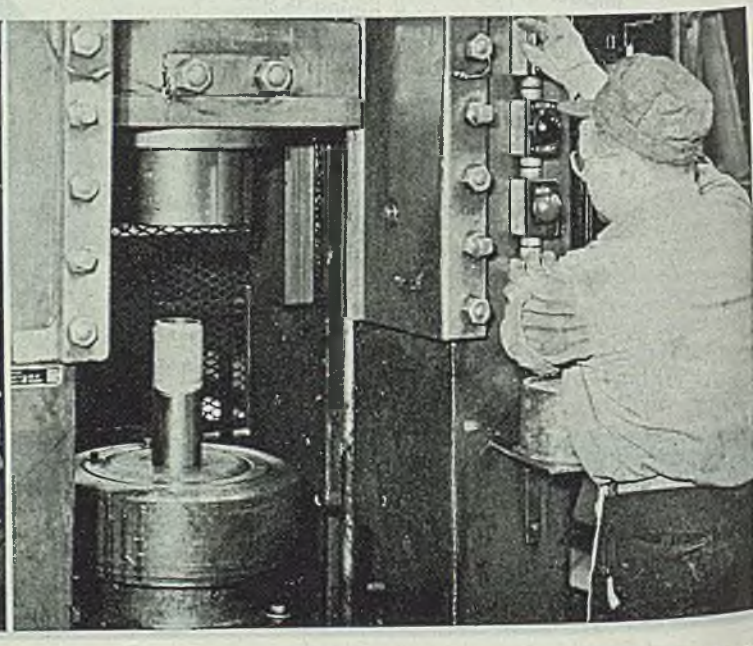
CEMENTED *Carbide Dies*

USE of cemented carbide dies for cold nosing artillery shells not only reduced die cost by some 80 per cent but also materially lowered die maintenance costs, according to a study by Carboloy Co. Inc., Detroit. Increased utilization of presses was obtained, inasmuch as carbide nosing dies apparently outlasted all other types on an average of 40 to 1.

Applications of carbide dies to this kind of operation generally involved no departure in cold nosing practices, although slightly more care was exercised in lining up dies. Before the actual cold nosing operation, shells were rough turned. Lubrication was applied to that portion of the shell which was to be nosed. Lubricated 105 mm shell was placed in a holding collet in the bed of the press as shown in photo at the right with the portion to be nosed extending from the collet. A single stroke of the press formed the nose on the shell, the dies being attached to the press ram (see photo at left). The shell was finish turned after cold nosing.

Production ranged from 1,000,000 to 3,000,000 pieces per die under continuous operation, reports covering a production period of more than 2 yr indicate. This compared with an average of 50,000 shells per die of other material. Increased life of the carbide dies was attributed to their high resistance to wear caused by rubbing and friction. Since initial cost of the average cemented carbide cold nosing die was 5 to 6 times that of a comparable steel die (the carbide nib in the 105 mm shell nosing die weighed 45 lb), the increased productivity per dollar of initial die cost ranged from approximately 230 per cent to as high as 1100 per cent.



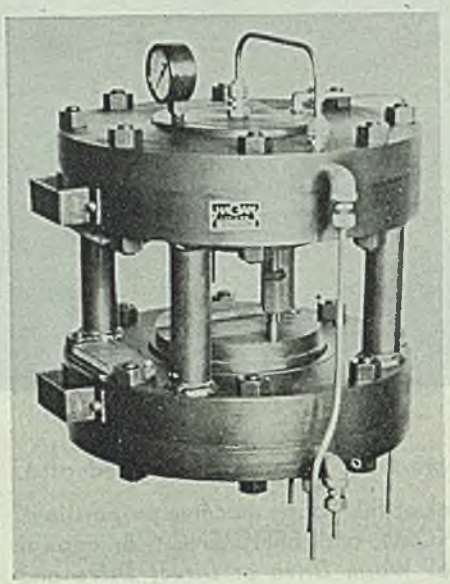


Thrust-torque tester

New instrument employs compressed air to counterbalance force under test

A MECHANISM so accurate and sensitive that it will measure the force of a pea from a boy's pea-shooter or the thrust of a giant jet airplane engine, has been made possible with the development of the instrument shown in the accompanying photo. This measuring device, called the Thrustorq, is being used in engine testing laboratories and factories to determine and record the thrust and torque of conventional airplane and automobile engines, and the thrust by a jet airplane engine.

The measuring mechanism of the instrument is a flexible diaphragm which forms one face of an airtight chamber. Compressed air is admitted to this chamber through a poppet type pilot valve. The force to be measured is applied to the outside of the diaphragm and is opposed by internal pressure. As the force increases the pilot valve is opened and admits more air to balance the increased force. As the force decreases, air is exhausted until the external force and internal pressure are equal. Thus the air pressure within the chamber provides a direct measure of the externally applied force.



The response of the instrument is practically instantaneous because the diaphragm movement necessary to operate the pilot valve is extremely small.

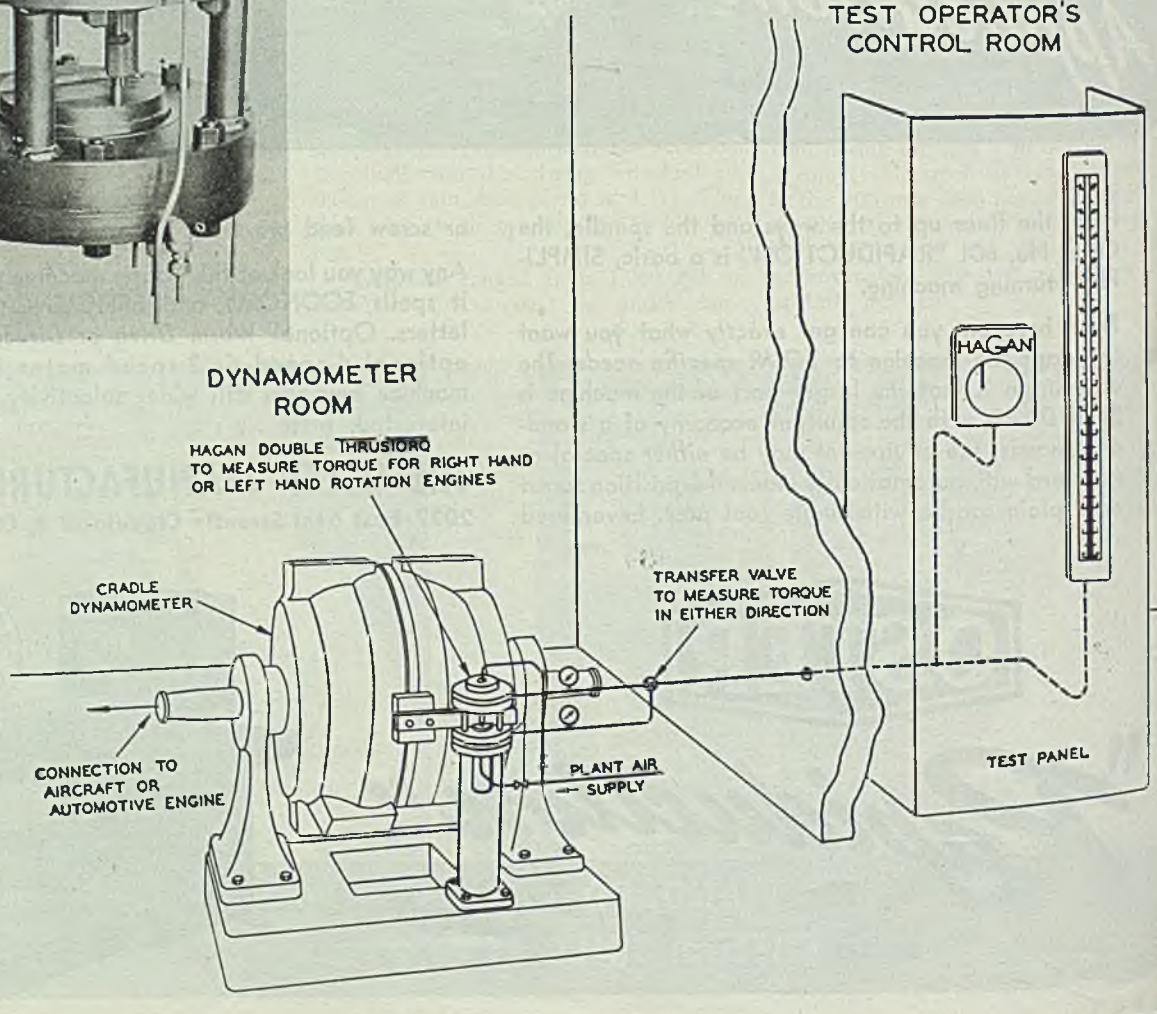
Because the force is measured by air pressure, remote reading is possible on any number of manometers, pressure gages or recording devices in a different room, as illustrated in the accompanying diagram, or different building from that in which the test is being made.

The instrument's ability to function in any position has made possible the measurement of torque of vertical helicopter engines, without recourse to complicated mechanical linkage which formerly had been necessary to obtain similar data. The unit's compactness and the small deflection necessary to provide a reading of force are said to have favored its use in many structural stress and strain analysis problems.

Once installed, and with a pressure recording device in the system, a continuous record can be obtained.

Its absence of intricate mechanism, knife edges, etc., permits its use under conditions where dust and dirt and cramped quarters previously had precluded the making of measurements with any device.

The instrument is a development of the Hagan Corp., Pittsburgh.



Electric

ARC-WELDING STANDARDS

Bath machines and electrodes are included in new NEMA program which now also covers small alternating-current welders

ELECTRIC Welding Section of National Electrical Manufacturers initiated welder standards in October, 1936, and has revised them from time to time to conform to requirements of the rapidly growing arc-welding art. Latest revision of standards, in Publication No. 45-105, September 1945, was developed by consultation among manufacturers, users, power companies, and national engineering societies. It incorporates changes resulting from wartime experience, and covers an important post-war requirement--alternating current welders for farm and small community repair shops.

Standards completely cover direct-current welders of both variable-voltage and constant-potential types, including circuit control equipment for the latter. Also included are two types of alternating-current, transformer-type arc welders, designated as industrial type, single-operator and limited input type. They co-ordinate and simplify the method of rating welders without basically changing size of the welder. For example, the direct current 300-amp welder with a specified maximum and minimum output as covered by the revised standards does not basically differ in actual welding capacity from a direct current 300-amp welder meeting requirements of the superseded standards.

Direct-current welders formerly were rated on a short-time basis, and alternating-current welders (except large machines used in automatic welding) were rated on a duty-cycle basis, each with a maximum and minimum welding current. Duty cycles serving as a basis for rating the alternating current welders were slightly lower than the duty cycle corresponding to short-time, 1 hr and ½ hr ratings of the direct current welders. New standard, using direct current welders as a base, rates both direct current and alternating current welders on basis of same duty cycles. In addition, a definite duty cycle has been assigned to maximum output.

As all arc welding imposes a duty-cycle load, desirability of using a duty cycle method of rating is apparent. Standard defines duty cycle as ratio of arc time to total time. For the purposes of rating and testing, time period of a complete test cycle is 10 min. In the case of a 60 per cent duty cycle, for example, load is applied under specified conditions

TABLE I

RATINGS—VARIABLE-VOLTAGE DIRECT-CURRENT WELDERS

EW4-14 Current, Voltage and Duty-Cycle Rating—Variable-voltage arc welders shall have the ampere ratings shown in Column 1, at rated-load voltages shown in Column 2, and with per cent duty cycles shown in Column 3.

1	Rating 2	3	Welding Current Range 4	5 *	6 *
Amperes	Load Volts	Duty Cycle Per Cent	Minimum Amperes at 20 Load Volts	Maximum Amperes at Rated-Load Volts	Duty Cycle Per Cent at Maximum Amps. and Rated-Load Volts
150	30	50	20	185	30
200	30	50	30	250	30
200	40	60	40	250	35
300	40	60	60	375	35
400	40	60	80	500	35
600	40	60	120	750	35

* Welders may be operated at the specified maximum current and duty cycle at maximum current at rated load volts with approximately the same temperature rises as those specified for the rated amperes and duty cycle (Columns 1 and 3).

NOTE I—Load voltage is the voltage between the welding terminals of the welder when current is flowing. See EW50-92.

NOTE II—In arc welding, duty cycle shall be defined as the ratio of arc time to total time. For the purpose of this standard the time period of one complete test cycle shall be 10 min. For example, in the case of a 60 per cent duty cycle, load shall be applied continuously for 6 min and shall be off for 4 min. Load shall not be applied for more than 6 min out of any 10-min period.

TABLE II

RATINGS—INDUSTRIAL-TYPE SINGLE-OPERATOR TRANSFORMER ARC WELDERS

EW5-14 Current, Voltage and Duty-Cycle Rating—Transformer type arc welders shall have the ampere ratings shown in Column 1, at rated-load voltages shown in Column 2 and with per cent duty cycles shown in Column 3.

1	Rating 2	3	Welding Current Range 4		5 *	6 *
Amperes	Load Volts	Duty Cycle Per Cent	Minimum Amperes and Load Volts Amp	Load at Volts	Maximum Amperes at Rated-Load Volts	Duty Cycle Per Cent at Maximum Amps. and Rated-Load Volts
150	30	50	20	20	185	30
200	30	50	30	20	250	30
200	40	60	40	20	250	35
300	40	60	60	20	375	35
400	40	60	80	20	500	35
500	40	60	100	20	625	35
750	40	1 Hr**	187	30	935	
1000	40	1 Hr**	250	30	1250	

* Welders may be operated at the specified maximum current and duty cycle at maximum current at rated-load volts with approximately the same temperature rises as those specified for the rated amperes and duty cycle (Columns 1 and 3).

** These sizes are rated for service with automatic machine welders. In testing to determine the rating, temperature rise and other characteristics, rated current at rated-load voltage shall be applied for 1 hr immediately followed by the application of 75 per cent rated current at rated-load voltage for 3 hr. Temperature rise shall be measured at the end of the 1 hr period and at the completion of the 3 hr period at 75 per cent rated current and load voltage.

NOTE I—Load voltage is the voltage between the welding terminals of the welder when current is flowing. See EW50-92.

NOTE II—In arc welding, duty cycle shall be defined as the ratio of arc time to total time. For the purpose of this standard, the time period of one complete test cycle shall be 10 min. For example, in the case of a 60 per cent duty cycle, load shall be applied continuously for 6 min and shall be off for 4 min. Load shall not be applied for more than 6 min out of any 10 min period.

TABLE III

LIMITED-INPUT TYPE, TRANSFORMER ARC WELDERS

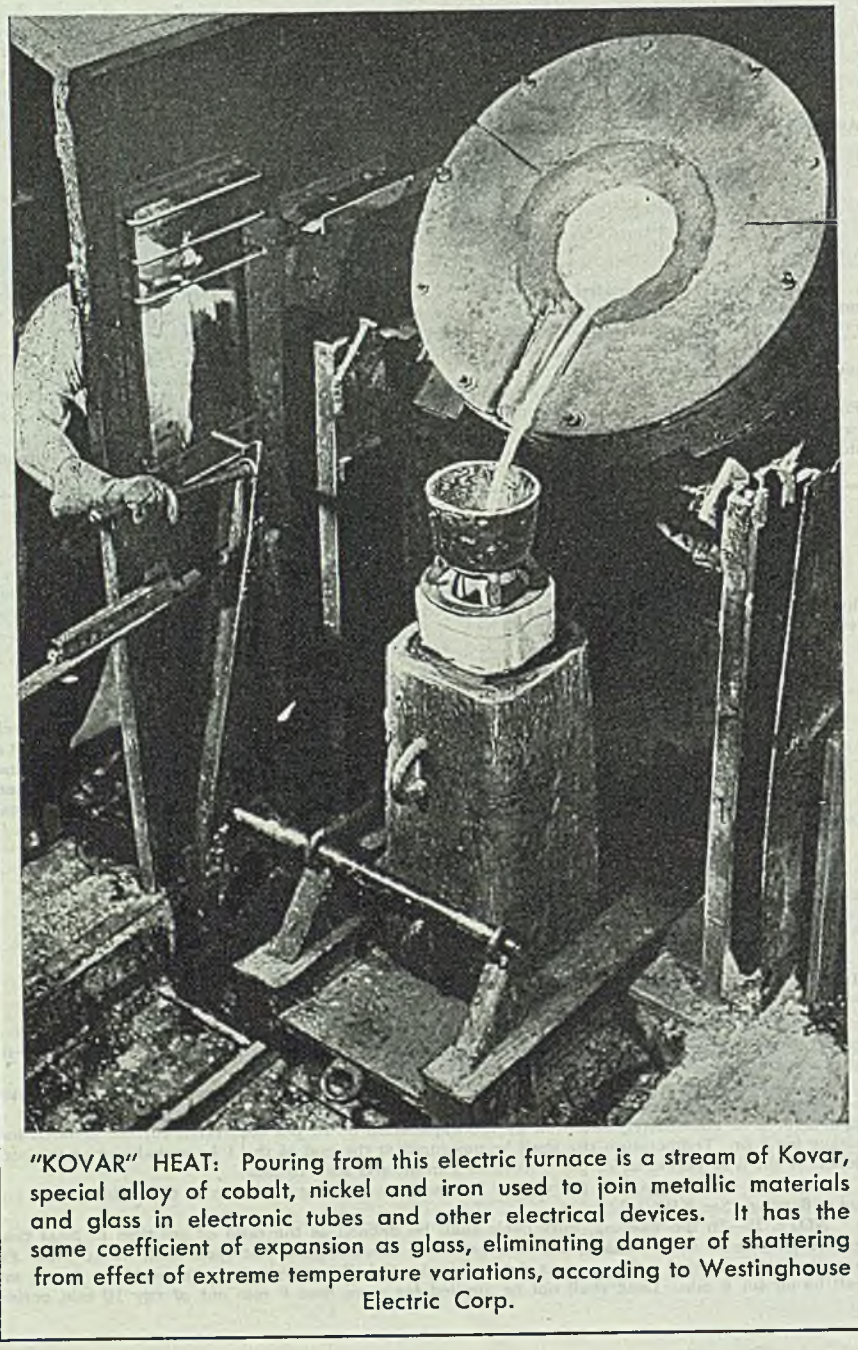
(Tabulated Characteristics Extracted from Standards)

(There shall be two ratings—130 amp and 180 amp.)

Details follow:		
1. Rated load amperes (maximum obtainable at rated load voltage)	130	180
2. Rated load voltage	25V	25V
3. Minimum welding current	20A	20A
4. Duty cycle at rated amperes	20%	20%
5. Maximum open circuit (no-load voltage) at any current setting	65	65
6. Primary volts	230	230
7. Amperes input at rated load when built without power factor correction shall not exceed	33	46
8. Amperes input at rated load when built with power factor correction shall not exceed	27	37
9. Short-circuit current—maximum allowable ratio of short-circuit current to rated current at rated load volts	150%	150%
10. Input current at any reduced output current setting shall not exceed the rated input current.		
11. No-load input current of a power-factor-corrected welder shall not exceed 50% of its rated input current.		

Note I —The same methods of test and temperature rise provided in NEMA Standards for Industrial-type Welders apply.

Note II—These welders shall be supplied with primary connection accessories consisting of not less than 6 ft of three-conductor primary cable, one conductor of which will serve to ground the case, cores or other non-current carrying parts and a three-prong polarized plug and matching receptacle.



"KOVAR" HEAT: Pouring from this electric furnace is a stream of Kovar, special alloy of cobalt, nickel and iron used to join metallic materials and glass in electronic tubes and other electrical devices. It has the same coefficient of expansion as glass, eliminating danger of shattering from effect of extreme temperature variations, according to Westinghouse Electric Corp.

for 6 min and is off for 4 min. In testing, this cycle is repeated until constant temperature is reached, or for a maximum of 4 hr.

Industrial-Type Welders

Tables I and II show new standard ratings and duty cycles for industrial-type welders. Welders corresponding to old 1 hr rated direct current and 50 per cent duty cycle alternating current welders now are rated on the basis of a 60 per cent duty cycle and must be capable of delivering a maximum welding output of 125 per cent rated load at a 35 per cent duty cycle. Smaller sizes, 200 amp and below, previously rated 30 min, 30 v direct current and 40 per cent duty cycle alternating current now are rated on the basis of a 50 per cent duty cycle and must be capable of delivering a maximum output of 125 per cent rated load at a 30 per cent duty cycle.

Limited-Input Type Transformer Arc Welders

Standard for transformer arc welders below 200 amp is introduced for the first time. These welders are designated as limited-input type, transformer arc welders. Standard applies to welders served by single-phase power lines of limited capacity supplying farm or small communities. They are rated (Table III) on basis of maximum output at 20 per cent duty cycle at a load voltage which gives satisfactory welding, as it is believed that these welders will not be subject to severe duty encountered in industry. A maximum input is assigned which must not be exceeded in meeting maximum output. Input is limited so that power companies serving the welder may know what to expect as maximum line load conditions.

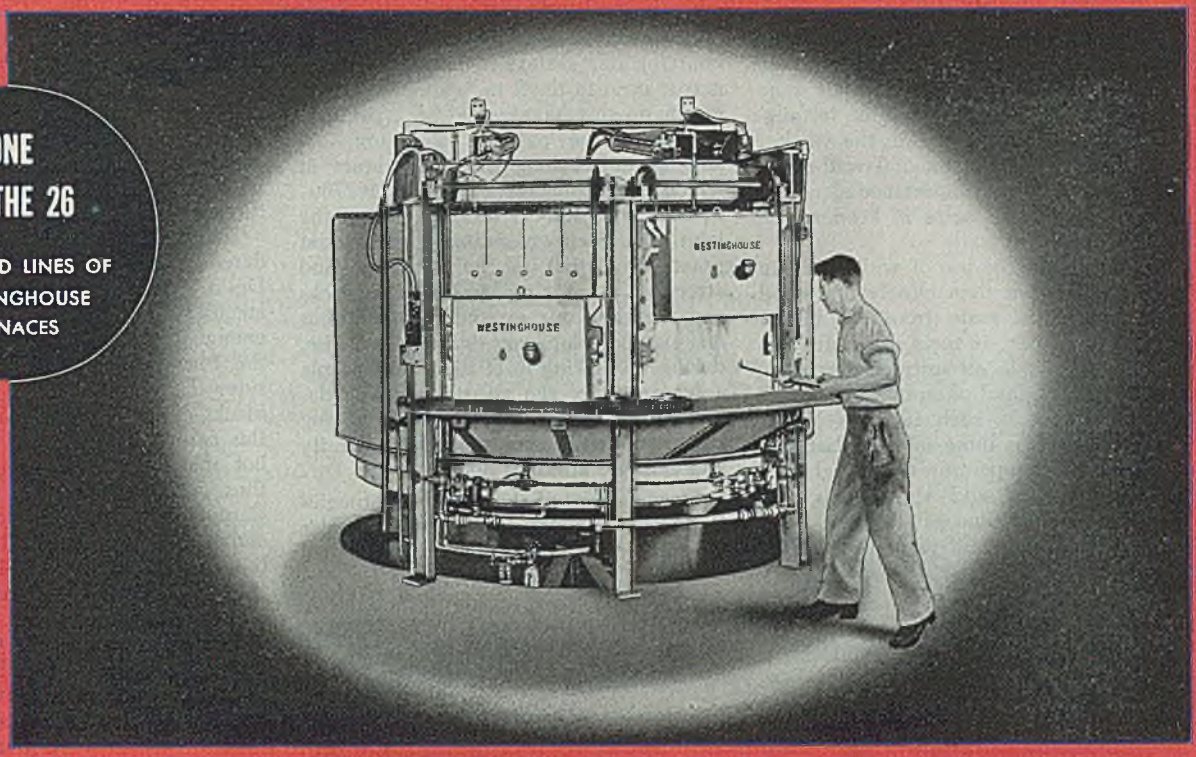
Procedures for temperature, efficiency and dielectric tests have been revised and brought up to date to correspond to latest American Sandards. Electrode standards have been revised and are divided into two parts. Part covering classifications, standard diameters and package weights is included in the present publication. New standard for color markings for electrode identification published as a separate standard, Publication No. 45-108.

Complete definitions covering terms referred to in the standards, such as duty and service classifications, rating welds and welding, complete apparatus and parts, etc., are included in the standard, published at 155 East Forty fourth Street, New York 17.

—o—

Strike-easy, an electric-welding compound, in paste form, designed to aid instantaneously creating and maintaining a metallic welding arc where low currents and small-diameter electrodes are employed, is announced by the Electric Welding Division of the General Electric Co., Schenectady, N. Y. It can be applied on any kind of metal with any type of electrode, and no mixing or other preparation is required.

ONE
OF THE 26
STANDARD LINES OF
WESTINGHOUSE
FURNACES



FOR HIGH PRODUCTION HEAT TREATING OF MISCELLANEOUS PARTS WITHOUT SCALE OR DECARB

Specify one of the type RD Rotary Hearth Furnaces with ENDOGAS atmosphere

(TEMPERATURE RANGE 1200°F TO 1800°F)

ADVANTAGES OF TYPE RD ROTARY HEARTH FURNACES:

- NO DECARB—NO SCALE—The use of Endogas atmosphere eliminates expensive finishing costs of machining or grinding.
- PRECISION CONTROL—Hearth rotates automatically with time clock control. Bell rings with each movement.
- UNIFORMITY OF PRODUCT—Definite preset time cycle assures constant production flow without heat or time fluctuations.
- SAVES MAN POWER—Only one operator required for charging and discharging furnace.

Continuous high production hardening of parts which require individual handling or fixture quenching—such as gears, shafts and pinions—is accomplished economically in the Type RD Furnace. RD Rotary Hearth Furnaces are designed for use with a protective gas atmosphere, and when used with Endogas (a balanced atmosphere), parts are hardened free from decarb and scale. They, therefore, require no machining or grinding before use.

The Type RD Rotary Hearth Furnace line is only one of 26 lines of standard Westinghouse furnaces. For practically every heat treatment operation, a *standard* Westinghouse furnace and suitable gas atmosphere are available.

For information on Type RD Furnaces, ask for DB-28-410; or DB-28-400 for small capacity rotary hearth furnaces. Call your Westinghouse office or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-10277

Westinghouse
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

ELECTRIC FURNACES

Carbon Linings

(*Continued from Page* 63)

ment is less resistant to attack than the baked carbon ramming mix but in some cases it is used as the least of installation evils as, for example, in the vertical wall joints. In the horizontal wall joints the matter is of less importance since the weight of the wall helps in keeping the joints tight.

The basis for the use of wide joints in the hearth rather than closely machined minimum joints, aside from the higher cost of the latter, is their successful use for many years in all sorts of ferroalloy, calcium carbide and phosphorus furnaces. The conditions in such furnaces are at least as severe as those in any blast furnace, for the temperatures run higher in many operations and the metals and slags are as liquid and as corrosive. With a single exception, all carbon-lined furnaces of the types referred to use wide joints in the hearth sections.

Comment has been made that carbon ramming mix shrinks in baking and that is true even in the 2 in. wide joints. The maximum shrinkage would be 2 per cent but while the paste is shrinking that amount in reaching the temperature at which the shrinkage stops, about 700° F, the carbon blocks on each side of the joint have been expanding in an amount practically equal to the shrinkage and after that point is passed both the blocks and ramming mix expand together, thus making the joint even tighter. Likewise, during the baking in of the ramming mix a large part of the volatile is being deposited in the pores of the adjoining blocks thereby increasing their density and forming a strong bond.

Since the first of the year the Carnegie-Illinois Steel Corp. has placed an order for sufficient carbon brick approximately the same size as before, these brick to be installed in another Carrie furnace at Rankin, Pa. about as previously described. Carnegie-Illinois Steel Corp., South Works, Chicago, ordered a carbon pad 3 ft thick to be installed 18 in. below the normal top of the hearth and to extend from shell to shell in a furnace having a hearth diameter of 23 ft. The furnace went in blast in September.

Early in 1945 Interlake Iron Corp. ordered a lining for its small furnace at Duluth, Minn. The hearth is 14 ft diameter and the blocks in it will be long enough for each length to extend across the furnace and under the walls. The sidewalls will be 12 in. thick with the blocks cut to approximately a circle. In this case the carbon will be next to the hot metal and backed up by ceramics thus differing from the practice of the Carnegie-Illinois Steel Corp., where the carbon is against the shell with a ceramic lining against the metal—in that way protecting the carbon, at least for that time until the ceramics go out.

In July National Tube Co., Lorain, O., decided to try a carbon lining in one of its furnaces which was available quickly and which was lined for a 26 ft diameter hearth. Arrangements were made to take the second Carrie furnace lining and secure additional hearth and wall blocks to adapt the 23 ft diameter lining to the larger furnace. The Carrie lining is to be replaced.

Long Used in German Stacks

In Sept. 1945 Republic Steel Corp purchased carbon blocks to install as a pad 30 in. thick to run across the hearth section and under the sidewalls far enough to prevent possibility of floating

In 1912, after German blast furnace operators had experimented with carbon for 20 years they evidently reported to the Blast Furnace Committee of the Vereins Deutcher Eisenhüttenleute[5], an organization evidently not too different from the Blast Furnace and Coke Oven Associations in the United States, on the results secured up to that time. Many points which are pertinent now were emphasized.

The claim that Burgers originally made that with a carbon lining the hearth need not be water cooled was considered not proved though it is true that he operated his furnace in that manner.

It was stated that when the blocks are properly made and carefully installed the good properties claimed for them have been confirmed in actual operations pro

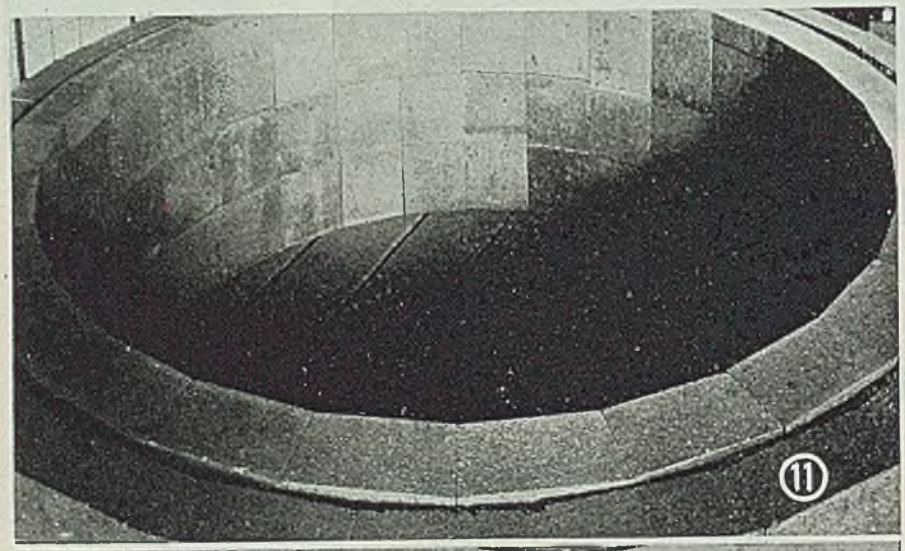


Fig. 11—*Assembled hearth bottom and walls. Space between hearth blocks, wall blocks and rings of wall blocks to be filled with tamped carbon ramming mix*

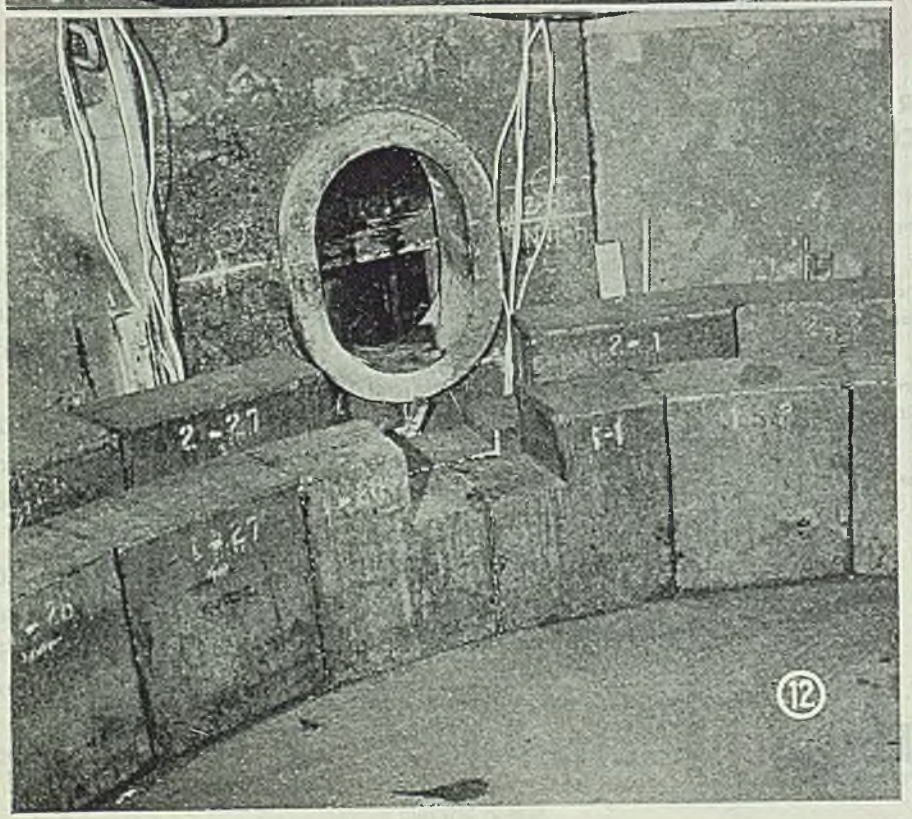


Fig. 12—*Interior of hearth looking toward iron notch and showing top of hearth and two rings of carbon wall blocks*

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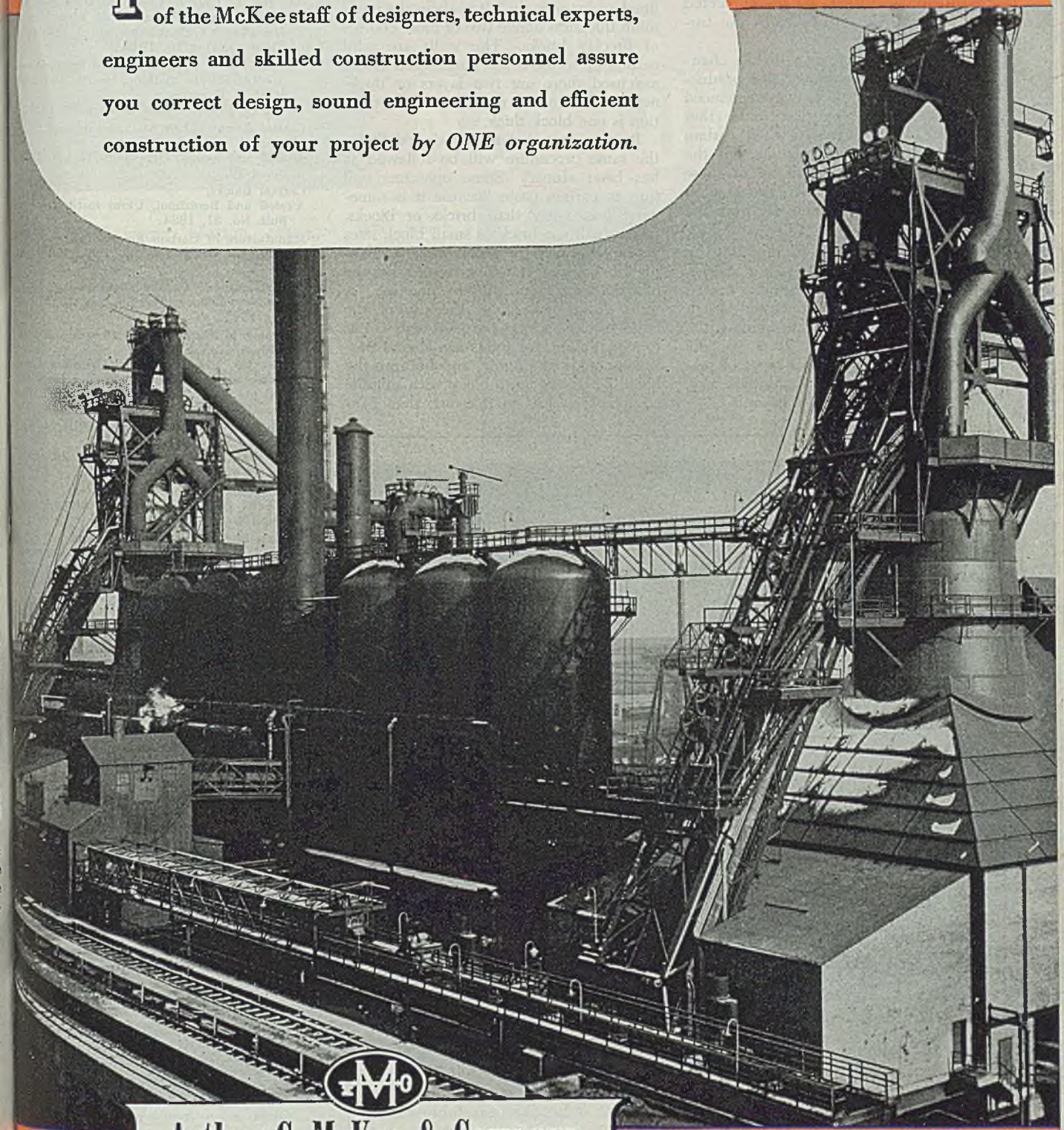

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ducing gray, as well as white varieties of pig iron, from low-carbon ferrosilicon to the carbon-rich ferromanganese, that is, in the production of all kinds of pig iron such as foundry and basic as well as puddle, Thomas and open-hearth (Thomas) iron without regard to the carbon content.

It is emphasized that only the best material be used, that the blocks be as large as can be handled, that the surfaces and edges be prepared with extreme care, that only the most careful workmen be used for installing them in the furnace and that air be prevented from reaching the blocks when the furnace is in blast.

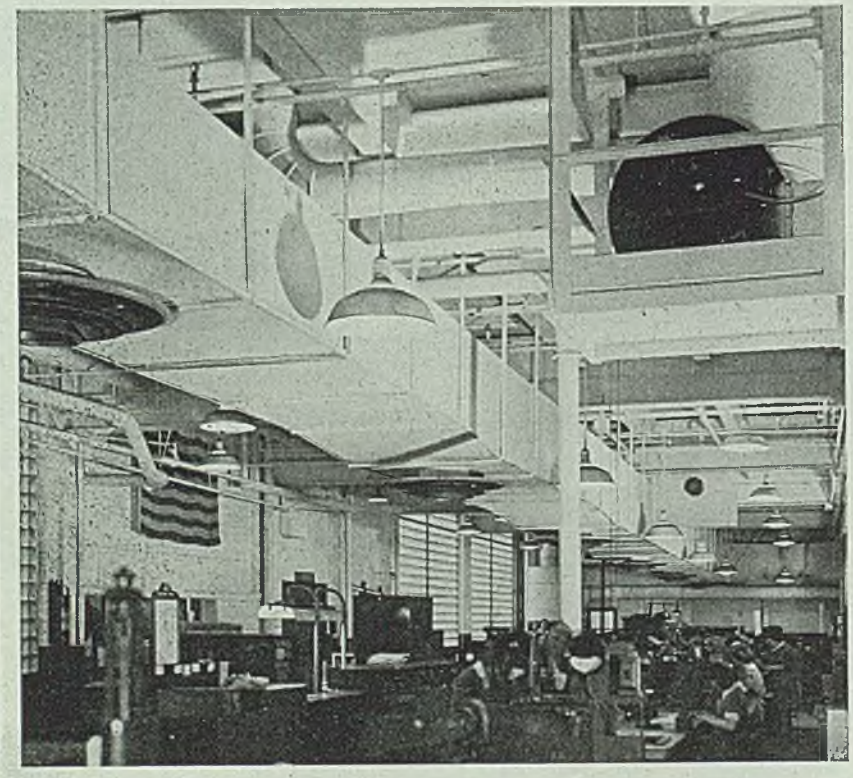
One operator disagreed with the chairman's statement regarding the production of white iron as he was convinced that carbon would not last under that condition. He said also "when carbon blocks are used, it is essential that the entire lining of the hearth be of these blocks and that a jacket be provided so that the water cannot penetrate from the outside."

Still another operator in reporting on difficulties encountered using carbon blocks blamed part of the trouble on the fact that the outer portion of the hearth was of fireclay material surrounding the carbon blocks. He says "It is possible the combination of the two types of masonry was shown to be unsatisfactory, because the two materials expand quite differently, which could easily result in a loosening of the joints."

While discussing his troubles another operator was asked about the thickness of his hearth. He replied "900 mm (36 in.). I do not know whether that was too much." The answer from the audience was "too little."

It might be said that as a result of the many years of the use of carbon in blast furnaces that except about the iron and cinder notches carbon and ceramic materials are not mixed. The hearth is carbon only for the portion that is carbon lined and seemingly 5 ft is about the minimum thickness above two or more courses of fireclay bricks. The walls are solid carbon up to the tuyeres and when blocks are used there are two layers or thicknesses. Above the tuyeres the construction is one block thick.

It is evident that in the United States the same procedure will be followed as has been abroad. Some operators will turn to carbon paste because it is somewhat less costly than bricks or blocks. Others will use brick or small block sizes perhaps because they seem easier to handle or because handling would not be too different from present practice. A third group will adopt the use of the large blocks because the joint area is cut to a minimum, for joints are always possible sources of trouble, and because the handling of one large block with suitable equipment is less troublesome than handling the 25, 50 or even 1000 small blocks that the large block represents.



CONDITIONING FOR QUALITY: As functioning of circuit breakers depends on response to heat generated by flow of electric current, all units must be calibrated at the same uniform temperature. Westinghouse air conditioning equipment, installed in small-circuit breaker assembly room at East Pittsburgh, maintains temperature at 77° plus or minus 1° F, dry bulb, the year around. Application of air conditioning to entire assembly area has speeded up delivery by 31 per cent

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By EARNEST H. LYONS JR.
Chief Chemist
Meaker Co.
Chicago

Is a "Clean" Surface Necessary for Electroplating?

Rarely does a metal article to be plated enter the plating bath with a truly clean surface, even after exhaustive "cleaning" cycles. Thus it becomes important to know whether the various types of films encountered are objectionable, harmless or advantageous. In this report, also presented to the Electrochemical Society, Mr. Lyons classifies films according to their effects on the electroplate

FROM the electroplater's viewpoint, a "clean" surface is one carrying no material which interferes with the deposition of a smooth, adherent electroplate. Cleanliness is associated primarily with adhesion of an electroplate, and only secondarily with its appearance. The usual impurities may be classified as follows:

A.—Substances not chemically associated with the plating metal or with the basis metal itself: Oils, greases, waxes, soaps, drawing compounds, buffing and polishing compounds, and miscellaneous dirt picked up in manufacturing, fabrication, handling, or shipping. Such substances may have been altered by subsequent treatment or processing of the metal.

B.—Substances derived from the basis metal, comprising generally oxides of the metal, but also including carbonates, sulphides, and other corrosion products as well as sulphates, chlorides, phosphates, nitrides, or other compounds resulting from previous chemical treatment of the metal to be plated; the so-called "acid black," consisting of finely divided grains of the metal itself, as well as of undissolved impurities and constituents, such as carbides, left on the surface as residues from pickling, belongs to this class.

C.—Substances due to an altered basis-metal surface layer. The surface of the basis metal itself may be physically unsound because it consists of a film of stressed, distorted, broken, or disordered basis metal resulting from grinding, polishing, rolling, drawing, or other finishing processes, and so fail to provide an acceptable basis-metal surface for an adherent electrodeposit.

Distinction must be made between mechanical failure of the bond, whereby the electroplate pulls away from the basis metal, and structural failure of either the basis metal or the deposit. The peeling of certain nickel deposits has been ascribed to intrinsic surface weaknesses resulting from machining or abrasive-polishing of the steel basis, aggravated by increased susceptibility of the strained metal film to hydrogen embrittlement. Iron was detected on the inner surfaces of the detached deposits.

On the other hand, burnished surfaces, such as those of cold-rolled, cold-drawn, or abrasive-polished steel or brass, tend to induce a weak, columnar microstructure in copper electrodeposited thereon, which accordingly splits open under stress of bending. Although personally we have not observed such failure resulting from bad surface conditions, we do know that weak microstructures of electrodeposited nickel, copper, and zinc sometimes result from accidental or intentional impurities in the electroplating baths, functioning as "malevolent" addition agents or brighteners; the electrodeposit cracks open readily on sharp bending, although it is not detached from the basis metal. This, of course, is not the fault of the surface.

Strictly, the above instances represent failures of cohesion, not of adhesion, for the failure occurs in either the basis metal or in the deposit, but not in the junction or bond between the two. To describe them as instances of poor-adhesion, as is commonly done, is erroneous.

Such "physically unclean surfaces" are often remedied by the same procedures as are effective for removing stubborn substances of classes A and B from the object to be plated: for example, anodic treatments are said to "skin" the unsound metal from the surface. It is therefore not always possible to determine whether the objectionable substances removed falls into class A, B, or C; no doubt in many cases all three classes are represented.

The blistering of electrodeposits such as zinc and cadmium, which are not permeable to hydrogen, may be a structural or cohesive failure due to gas evolution, and not simply a case of poor adhesion; but faulty bonding or adhesive failure between the basis metal and the electroplate may lead to blistering where the gas pressure would otherwise be too low to produce structural failure, in which case inadequate cleaning is indicated.

It is not generally possible to recognize the "cleanliness", either physical or chemical—that is, the suitability of a surface for electroplating—by visual inspection or, in fact, by any simple test short of actual plating. Often the appearance of "water break" (that is, the pulling away of the water film from a moistened surface because of failure of the water to wet the surface) indicates that the surface is not prepared for plating, but occasionally a surface showing no water break is not suitable, and in at least a few cases adherent plates have been deposited on surfaces with water break.

The theory of adhesion states that deposited atoms must engage those bond energies of the outermost atoms of the basis metal unoccupied because of the peripheral positions of these atoms in the lattices. The presence of foreign matter not only prevents deposited atoms from coming within the distances over which bond energies are effective but also occupies these energies so that they are not available for holding the deposit. Stated most simply, the deposit must be made directly on the basis metal, and not on a surficial film of impurities. This elemen-

(*Please turn to Page* 92)

Box Cover Fastener

A new spring steel fastener for box covers which eliminates all screws, nuts and rivets, as well as tools for attaching, is offered by Tinnerman Products Inc., 2039 Fulton road, Cleveland 13. The clip is self-retaining and need only be snapped by hand into pre-punched holes in sides of box. By flipping clips into locked position, cover is held firmly in place as shown in the accompanying

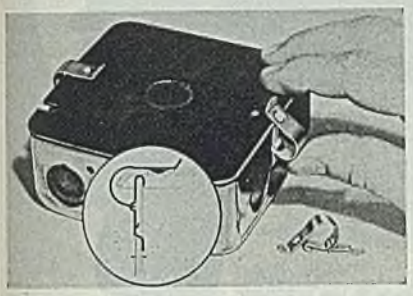


illustration. To remove the cover, clips are unsnapped by pushing them back with the thumb. These clips are entirely outside of the box with nothing inside to obstruct or damage wires or other equipment. They are available for use on sheet metal, die cast, plastic or plywood boxes of varying wall thicknesses.

Item No. 9047

Collet Chuck

Redmer Air Devices Corp., Chicago, announces the addition to their line of collet air chucks of a new model to be known as No. 4. This has collet capacity of 3½-in. and will use a special type 3½-in. master collet. Various size pads can be had to reduce the hole diameter to the desired size. Chuck allows work up to 3½ in. to be held to the desired depth, as parts can drop through the entire depth of chuck. The collet remains stationary; the opening and closing controlled by the sleeve. By this method depth of work can be controlled even though there are variations in diameter of piece being machined.

Item No. 9880

Rotary Surface Grinder

The No. 24 duplex rotary surface grinder of Hanchett Mfg. Co., Big Rapids, Mich., has electronics with fingertip control incorporated into the machine for separate operation of the two rotary work tables. This 24,000 lb machine measures 9 x 15 ft and is 7½ ft in height. Two dc motors attached to the under side of the carriage drive the rotation of magnetic chuck at variable speeds through remote controls. The push-button controls being centralized are within instant reach of the operator. Principles of electronics are used, making it possible to attain variable speed control.

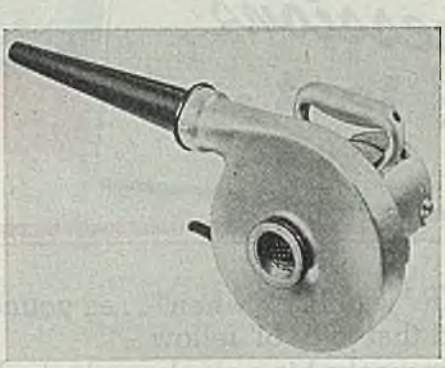
A 25 hp, 900 rpm motor, known as the built-in type, is used to run the grinding wheel. Fine finishes are obtained with segmental type grinding wheel, because of more accurate machine construction and improvements in the manufacture of segmental wheels. Other equipment includes two 30 in. magnetic chucks, 18 in. segmental wheel chuck fitted with set of grinding segments, all small motors and controls for head feed and carriage traverse, two drum type demagnetizing switches, ammeter for wheel motor, flood light, wheel dresser, wet grinding system including two motor driven coolant pumps and tanks, and it is completely wired for installation.

Item No. 9925

Portable Blowers

Four models of portable blowers are available from the Ace Co., 12-40 North Orange street, Ocala, Fla., for cleaning and spraying.

Model A is a 2-speed, 1-hp unit weighing approximately 14 lb. It is rated to develop 48 in. water column pressure and to displace 176 cu ft per minute at high speed, for low speed the values given are 36 in. water column



pressure, 125 cu ft per minute. Model B has a 450 w motor, and displaces 95 cu ft of air per minute and develops 32-34 in. of water column pressure (suction). The unit weighs 9½ lb. Model C has a 330 w motor which displaces 80 cu ft of air per minute and develops 24-26 in. of water-column pressure (suction). Unit weighs 7½ lb. Model D is for light duty, intermittent use. This unit has a 260 w motor which displaces 40 cu ft of air per minute and develops 18 in. of water column pressure (suction). Weight of blower is 7 lb.

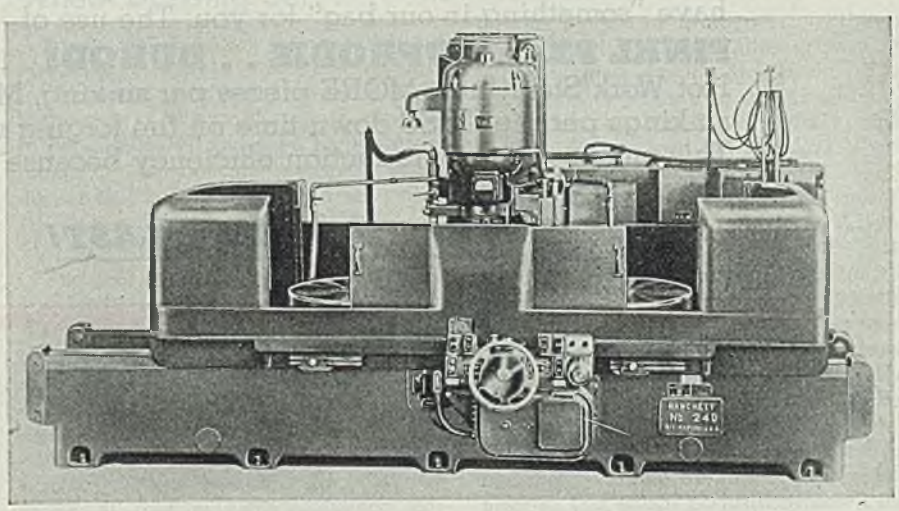
Blowers can be supplied for any voltage from 100 to 275 v, and all units have a 20 ft, three wire, rubber covered cord and grounded housings.

Item No. 9951

Boring Machine

Kearney & Trecker Products Corp., Milwaukee, announces the new Model C Milwaukee Autometric boring machine for precision boring from fine tool room work to precision production jobs. Bed, column, and chip guard are cast in a compact unit. A stationary boring spindle is mounted on machine column, providing an extra long bearing for spindle quill. Construction of the head, spindle, and quill permit sufficient quill travel to take care of entire vertical range of machine without increasing overall machine height (this feature reduces number of sliding members). Coupled with a single lever directional control to quill feeds and power rapid traverse movements this reduces setup and operating time. Accurate means are provided for gaging depth of quill movement to as many as four positions. A weight inside the column counterbalances quill. Spindle has a No. 40 National Standard taper and a quick change nut for convenience in changing tools.

A 1-hp motor mounted in the base drives spindle. Power transmission is vibrationless with direct multiple V-belt drive to spindle at all speeds. Rapid traverse mechanism to the quill is powered by ¼-hp motor which operates only while quill is being traversed. An ample range of spindle speeds and quill feeds assures efficient use of cutting tools on a wide variety of hole diame-



(All claims are those of the manufacturer of the equipment being described.)

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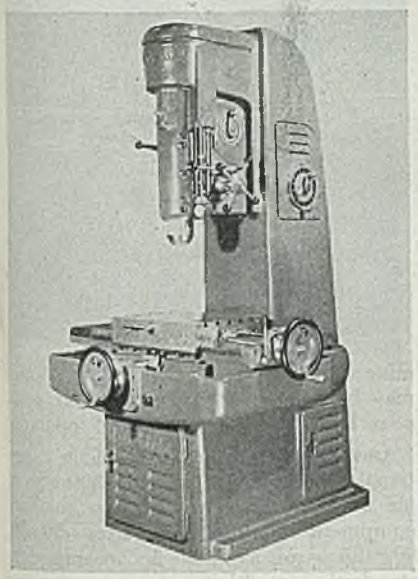
ters, regardless of material being bored.

Table and saddle slide on inverted V-ways of hardened steel. Weight of sliding members holds them in alignment at all times with a minimum of friction, and no gibs are required. Equalizing clamps lock sliding members firmly without distortion.

Precise transverse and longitudinal movements of table are effected by precision measuring screws equipped with large diameter micrometer dials and verniers graduated to read to 0.00001-in. Mechanical counters are set at zero during initial setup giving table position in inches and tenths of an inch. Sturdy 5-pitch measuring screws move the table 0.2000-in. per revolution. As micrometer dial graduations are numbered from 0 to 100 on each half of periphery operation is as simple as though 10-pitch screws were used.

Besides contributing to cleanliness of operation, the integrally cast chip guard



strengthens the entire structure and protects table slides from being bumped by trucks, etc., while work is being loaded on machine table. Chip pan can be removed through door in front of base.

An efficient lubricating system is provided with metered circulating oil to most running parts, including the super-precision spindle bearings. After lubricant has passed through spindle bearings, it is collected in a small reservoir at lower end of the quill from where it is returned to main reservoir by an aspirator pump. This prevents oil leaks at spindle nose.

Lead of the measuring screws is accurate to within 0.0001-in. in any 1 in. and 0.0002-in. within any 12 in. All alignments affecting accuracy of workpiece are held to within a non-accumulative error of 0.0002-in. in any 12 in. Overall height of machine is 90½ in. Other specifications are: Table working surface, 14 x 22½ in.; transverse table travel, 12 in.; longitudinal table travel, 18 in.; table top to spindle nose, maximum 17 in.; vertical quill travel, 11 in.; spindle speeds infinitely variable from 50 rpm to 2500 rpm; and eight quill feeds from 0.0005-in. to 0.0148-in. per revolution of spindle.

Item No. 9969.

Bar Stock Valves

Bar stock valves with carbon or stainless steel bodies and stainless steel stems are announced by Kitson Co., 1500 Walnut street, Philadelphia 2. They are designed specially for flow control in high pressure lines handling air, gas,

oil, gasoline, or any other liquid. A feature of these valves is that, when the valve is full opened and under pressure, the stuffing box can be readily repacked.

Item No. 9965

Wheel Dressing Set

Super-Cut circle set is a dressing set for abrasive wheels introduced recently by Industrial Abrasives Inc., 3724 West 38th street, Chicago 32. It is especially designed to fill the need for a sturdy, efficient, economical abrasive wheel dresser that is built for rugged service on jobs where fast dressing and long tool life are expected.

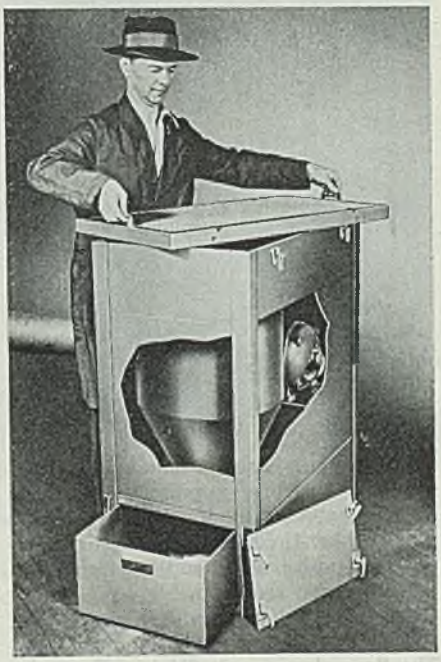
The tool consists of only three parts, the circle set insert, impregnated with diamonds, ⅛-in. deep and ⅛-in. wide, the holder, and one set screw. There are over 5 carats of specially selected diamonds, uniformly distributed in the insert. In case of accident or abuse, only part of the tool is damaged or destroyed, instead of an expensive single point diamond; all diamonds are completely embedded and solidly locked in Super-Cut's special matrix. As top layer of diamonds wears down, other diamonds are uncovered and come into the cutting position so that at all times several diamond points are simultaneously in contact with the grinding wheel. Set is used either horizontally or vertically against the abrasive wheel. As a flat spot is worn on the diamond insert, the set screw is released, the insert rotated, and dressing action repeated. This rotation is continued until all the diamonds are consumed.

Item No. 9048

Dust Collector

Latest addition to the line of individual, self-contained dust collectors of Aget-Detroit Co., 602 First National building, Ann Arbor, Mich., is the model 1150 Dustkop dust collector.

Being of the unit type, no duct work is required for installation. Dust collec-



tor can be placed in operation within a very short time behind the grinder or buffer without moving the latter. The connection between dust outlets and collector can be completed quickly with flexible metal hose or standard sheet metal pipe.

Dust, dirt, and lint from the source, is drawn into the unit by a direct driven, nonclogging paddle wheel fan which is direct driven by a continuous duty 1½ hp, 3450 rpm motor. A cyclone separator contained within the unit separates most of the dust and dirt out of the air streams —the extreme fines being removed by the spun glass filter before the air is returned to the working space.

A hand crank on the end of the cabinet is for shaking the fine dust from the filter so that it can be brushed down the stack hole and into the dust collecting bin. The latter, occupying the entire

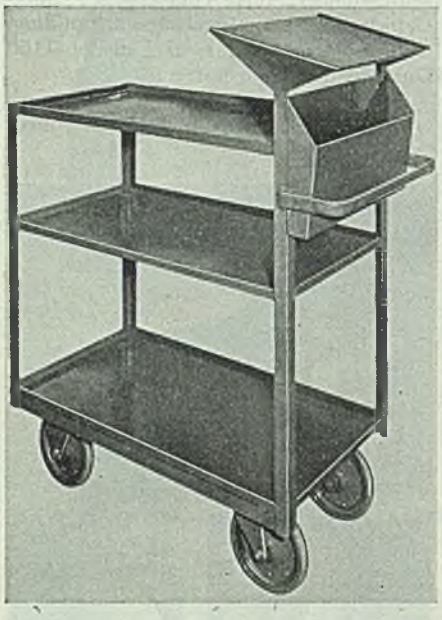
bottom of the cabinet, has a dust drawer to permit easy removel and disposal of the collected dust, dirt, lint, bristles, etc. The unit is available with motors for operation on virtually any type of power and can be supplied with inlet sleeves for various sized connections to one or more dust sources.

Item No. 9829

Stock Checker's Truck

A stock checker's truck is announced by Palmer-Shile Co., 796 South Harrington avenue, Detroit 17.

The construction is all steel welded, with three sheet steel shelves which have



a 1 in. flange. Tubular handle is so positioned as to form a protective bumper for the stationary rack. It is fitted with four rubber-tired, ball-bearing casters; two (at push-handle end) swivel while the other two are rigid.

Overall height to top shelf is 42½ in., and to the top of writing table, 50 in. The floor clearance is 9½ in. From the lower to center shelf the height is 18 in., and between the center and top shelves, 12 in. The writing table is 20 in. wide by 14 in. deep.

Item No. 9942

Safety Pump

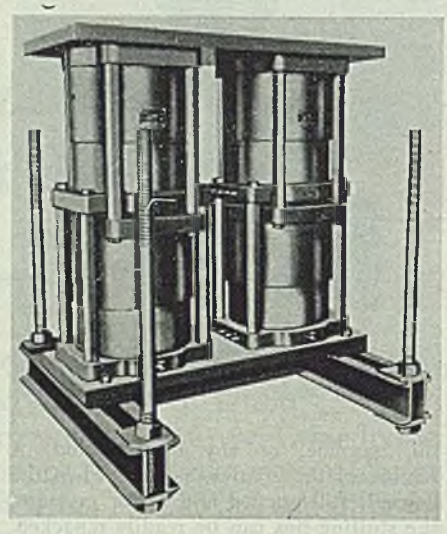
A hand-operated suction pump built of an inert plastic is announced by the manufacturer, Alden Speare's Sons Co., Cambridge, Mass. Designed primarily for safe handling of acid, it attaches to acid carboys of from 5 to 13 gal inclusive. It will withstand constant immersion in practically all grades and kinds of commercial acids. Quickly and easily installed, it eliminates the hazards of juggling heavy carboys. As the plastic is unaffected by alcohols, oil or water, it also has a wide range of usefulness in transferring liquids such as bulk perfumes, essences, flavoring extracts, syrups and liquid soaps from barrels or drums where attack of the liquid on a metal pump would cause undesirable contamination.

Item No. 9876

Pneumatic Die Cushions

A multiple tandem type pneumatic die cushion model is available in cylinder sizes from 6 to 24 in., with capacity for producing a draw ring holding pressure from six to one hundred tons. Hardened and ground pin pressure pad is made to fit a given press bed opening, and is held in constant parallel working alignment at all times by the design of the tandem cylinder construction, compensating for all off-center loading.

The adjustable supporting structure furnished is designed so that the four furnished suspension rods can be mounted to the press bed lugs at any given spacing. Centralized lubricating header block is provided, making it possible to lubricate all cushion cylinders regularly



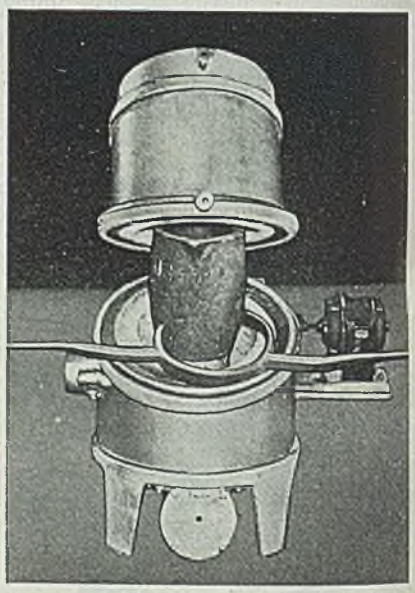
from the side of the press. These pneumatic die cushion models made by Dayton Rogers Mfg. Co., Minneapolis 7, are particularly adaptable to large straight side presses where maximum ring holding pressure is required in proportion to the total overall press tonnage.

Item No. 9939

Draw Furnace

Crucible draw furnace made by Fen Machine Co., 1352 Babbitt road, Cleveland, for non-ferrous foundry operations, is constructed of heavy gage steel. Furnace is divided, on an inclined plane, into two parts, hinged at the back. Lower section contains burner. A closed passage, built into wall of the lower section, conducts air from blower to burner. Air travelling through this passage picks up heat which would otherwise be lost, returning it to combustion chamber. Thus preheated air facilitates combustion, resulting in a short flame, retained down and around the crucible. Only a minimum escapes through port in cover. This is said to effect a saving of 20 per cent in natural gas and a correspondingly greater saving where fuel oil is used.

Raising or tilting upper part of furnace allows quick, easy access for charging or removing crucible. No tongs nor overhead handling equipment is required. Special, open-side shank provided with furnace makes for easy handling, allowing direct pouring. No pit is necessary as furnace is mounted on legs which allow ample space beneath furnace body for air lift mechanism which opens and



closes furnace by control valve. Valve may be located at any convenient point near furnace, within reach of operator.

Gas or oil burning equipment is optional. A blower, delivering 300 cfm of air at 13 oz pressure is only auxiliary equipment required. Four sizes—50, 70, 90, 125 — are available to accommodate standard crucibles of corresponding number.

Item No. 9835

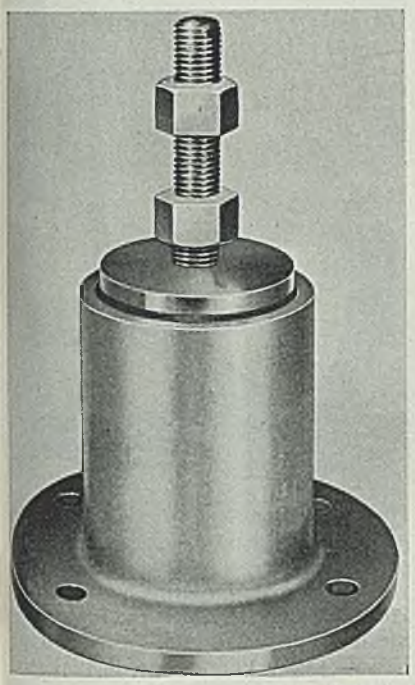
Machinery Mountings

Line of rubber insulated dual purpose machinery mountings for stopping vibration from machinery having a means of leveling of any size, type, or weight is announced by Bushings Inc., Coolidge Highway at 14 Mile road, Royal Oak, Mich. Mountings, known as Vibro-Levelers and manufactured in nine sizes ranging in load capacities of from 10 to 2,000 lb each, are for use on equipment such as punch presses, compressors, blowers, forging hammers, grinders, buffers, etc. They can be installed quickly with no floor cutting or fitting.

Synthetic rubber mountings are not liable to attack by oil or grease, they are simple in design and construction, are fool-proof and once installed require no oiling, greasing, or other maintenance. Insulating material separates outer shell,

which also forms base of the mounting, from inner cylindrical member, to which is fastened a single stud.

Leveling is by means of two nuts supplied with each mounting; one nut adjusts machine to exact level desired; other locks in leveled position. When used to support new equipment where operating height is not important, mountings usually are placed immediately under base of machine. Where machinery is already installed and height must be maintained at approximately same level, a series of standard brackets are



available so that mountings can be installed without cutting floor.

Standard brackets are of two types; Z and angle. Z-brackets are for attaching to existing hold-down bolt holes in machine base and require no cutting or welding to attach. Angle brackets are for mounting to side of machine base with either bolts or by arc welding.

Item No. 9905

Vertical Grinder

M-601 Master-Power vertical grinder, produced by Master Tool Co. Inc., 5605 Herman avenue, Cleveland 2, is a tool with plenty of power for extra-heavy-duty grinding and polishing. Low over-all height, and handles close to the guard, give excellent balance and close control over work. Handles are separate parts and are easily replaced. Large strainer in air intake handle, readily removed for cleaning, keeps dirt out of working parts. Automatic lubricator provides continuous flow of atomized oil to complete tool. All major wearing parts are hard chromium plated.

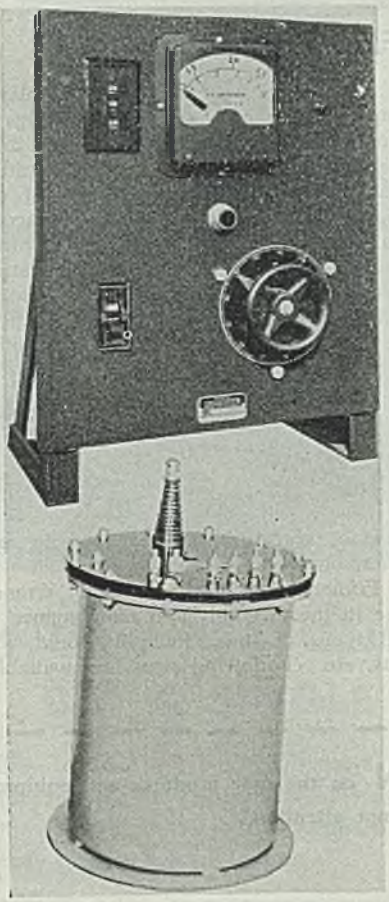
Speed of the 7-in. disk or pad is 5500 rpm, with 6 x 1½ x 5/8-in. organic wheel. Nine-inch disk units attain speeds of 5000, 4500 and 3500 rpm, with 6 x 1½ x 7/8-in. vitrified, 6.4 x 2 x 5/8-in. organic, and 6.4 x 2 x 7/8-in. vitrified wheels, respectively. Weight, less guard, is 12½ lb; height 7 3/4 in.

Suitable applications include general grinding on large and small castings, butt and seam grinding on sheet and plate fabrications, preparation of plate edges, flush grinding of all welded surfaces—flat, convex or concave.

Item No. 9049

AC Test Set

A 15,000-v, stationary, ac test set, especially designed for accurate fixed-location testing of medium sized motors, generators, transformers, insulators, and other equipment where a portable set would be of no particular advantage, is announced by General Electric Co., Transformer Division, Pittsfield, Mass. Operating from any single-phase, 60-cycle, 115-v supply circuit, it provides



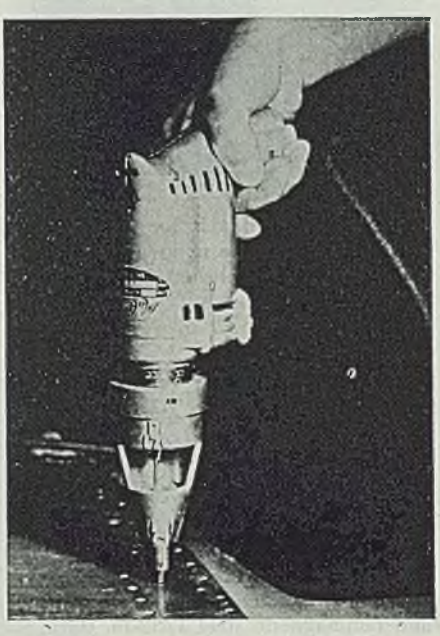
variable test voltages up to 15,000 v, ac, with a capacity of 2 kva.

Set consists of an oil-insulated step-up transformer and a separate vertical-type control panel, permitting a variety of installation arrangements to meet individual requirements. With over-all dimensions of only 23 x 18 x 25 in., it is suitable for installation where space is limited. Included in set is a variable-voltage autotransformer for smooth stepless control of output voltage, a highly accurate double-scale switchboard-type voltmeter energized from the voltmeter coil of the transformer, a voltmeter-scale selector switch, an air circuit breaker with instantaneous overload trip, and a red signal lamp.

Item No. 9890

Drill Guide

Drill guide pressure foot, to be used with hand motors in jig template drilling is announced by Products Engineering Co., 9045 Wilshire boulevard, Beverly Hills, Calif. It provides a means of utilizing steel metal template stock in place of heavy drill plates and bushings in production line assembly drilling by indexing to standard size holes in template. Its construction also allows use of standard size tips, which can be quickly in-



terchanged to provide various drill sizes. Templates can be duplicated quickly from master templates by employing use of clips and fasteners, and can be used as assembly jigs as well as drill templates. It also is used as a substitute for slip bushings of various drill sizes to same index hole.

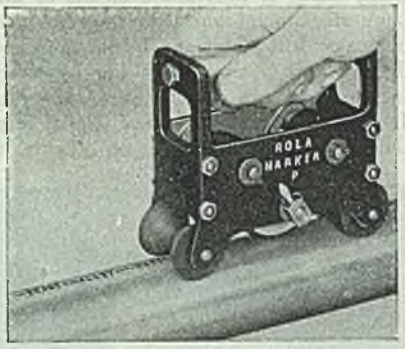
Item No. 9841

Roll Marker

Adolph Gottscho Inc., 190 Duane street, New York 13, offers a marking assembly designated as Rolamarker P, used for marking round tubes, bars, pipes, rods, etc. with a repeated impression to identify materials. It can be used to mark the nature of the material, hardness, alloy and diameter the complete length of the metal piece. Then, if a very short length is cut from the tube, bar, rod or pipe there is sufficient identification. By this means, too, the user is sure that he has the proper material.

Die cylinder is preceded and followed by vee rollers for guiding the impression to the top of the round metal piece. With these, it is not possible to run off the top of the tube or pipe. For changes in diameter there is an adjustment by a

wing nut; setting an indicator and then tightening the wing nut. One model covers range of diameter variations from ⅜-in. to 2 in.; another from ¾-in. to 3 in. With Rolamarker P, permanent dies, interchangeable complete dies or parts of dies or interchangeable individual type pieces may be used in the die cylinder as the imprinting medium. Inks may be permanent, light in color for



dark metals or black for light metals. Metals must be free of grease or oil and not too highly polished. Manufacturer features four models.

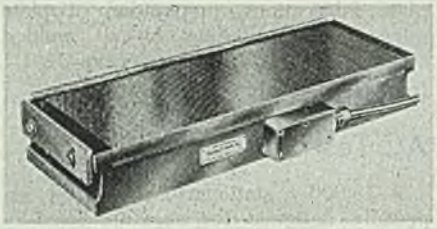
Item No. 9768

Laminated Top Plate

A new laminated top plate of all steel construction has been added by Hanchett Mfg. Co., Big Rapids, Mich., to their electro magnetic chuck line. Pole sections traverse the entire width of the chuck top. Laminations are composed of magnetic steel 1/8-in. thick and nonmagnetic steel 1/32-in. thick.

By utilizing all steel top plate construction, the entire top plate can be hardened, thus adding hours to the production life of the separate top plate. The fine spacing of the poles permits holding the smallest parts without difficulty and a 22 per cent greater magnetic surface is available with this design.

Coils are carefully protected from moisture. In addition, the installation of

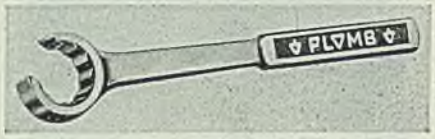


these coils in the chuck is arranged so that the magnetic flux will be transverse to the length or opposing the action of the grinding wheel or cutting tool, thus reducing the possibility of work slippage.

Item No. 9933

Flare Nut Wrench

A flare nut wrench for use on plastic pipe, tubing and soft metal fittings is announced by Plomb Tool Co., 2209 Santa Fe avenue, Los Angeles. Head is flat, based on a modified 12-point design, with opening which allows access to fittings around tubing. These features, coupled with deep, thin walls, permit use in close places and small turning arcs. Possibility of damage to the fitting is reduced because wrench has better



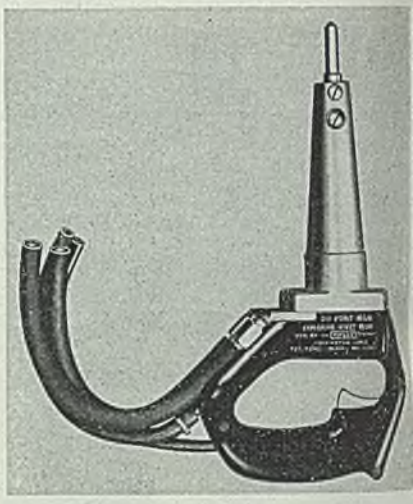
contact with nut and cannot slip and chew it.

Primary uses of the flare nut wrench are in the assembly and maintenance of all types of lines, including fluid, air, gas, etc. Following sizes are available: No. 3716 (1/2-in.); No. 3718 (9/16-in.); No. 3720 (5/8-in.); No. 3724 (3/4-in.); No. 3728 (7/8-in.); No. 3730 (15/16-in.); No. 3732 (1 in.); No. 3734 (1 1/16-in.); No. 3736 (1 1/8-in.).

Item No. 9930

Explosive Rivet Iron

Ripley Co., Torrington, Conn., has acquired all Goodyear rights to the low voltage riveting iron used for setting du



Pont explosive rivets used in blind applications and hard-to-reach places. Company also has completed arrangements with Explosives Department of E. I. du Pont de Nemours & Co. Inc., to produce the du Pont No. 6 riveting iron. It will be sold by du Pont for production applications.

No. 6 riveting iron is designed so that upon pressure of trigger, electric current instantly produces intensive heat at point of contact with the rivet head. Head detonates expansion charge within rivet shank and sets it, forming a strong, tight joint.

Item No. 9996

FOR MORE INFORMATION on the new products and equipment mentioned in this section, fill in this form and return to us. It will receive prompt attention.

Circle numbers below corresponding to those of items in which you are interested:

9047	9829	9890
9880	9942	9841
9925	9876	9768
9951	9939	9930
9969	9835	9996
9965	9905	9933
9048	9049	

NAME ..... TITLE .....

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Sectional Nib Molds

(*Concluded from Page 57*)

of sintered metals at Firth-Sterling, affirms that sectional nibs have produced per grind from seven to ten times the number of compresses possible with steel molds; also that they have equalled or surpassed the production of solid carbide nib molds.

Carbide Die & Mold Co., Pittsburgh, is reported to be the first fabricator of finished nibs and molds.

Specifically cited by Mr. Loach was the case history of a plant engaged in pressing tungsten-silver electrical contacts. Tool steel molds originally used, operated in connection with hydraulic presses exerting a pressure of 40 tons psi. When this setup proved incapable of producing points tense enough to reduce burning and such molds had to be discarded after 12,000 or fewer compresses, the decision was made to shift to sectional carbide nibs and carbide-tipped plunger. Manufacturer also stepped up the pressure from 40 to 60 tons, and then, ultimately to 70 tons.

After 27,000 compresses had been achieved with the new setup, the copper brazing holding carbide tip to steel plunger failed. The manufacturer ordered a redesigned plunger of solid carbide, shrink-fitted into the steel shank. With this change, the mold continued in service from 27,000 to 124,000 units, at which time the mold was examined and was found to have worn 0.001-in. Plunger was redressed, 0.008-in. being removed from its head.

After noting that the mold had worn 0.001-in. and that tolerance permitted on these electrical contacts is 0.005-in., the engineer on the job estimated that the mold should be good for 500,000 compresses before re-cutting would become necessary. The estimated number of re-cuts of this mold, based on the amount of carbide stock in the nibs, is reported to be five, which forecasts a production of 2,500,000 units during the complete life of the mold.

Regular operating test runs of the new type molds in other of the plants co-operating with test installations, indicate that production of 500,000 pieces per cut are commonplace, according to Mr. Loach. Specifications governing amount of stock in the original sintered carbide nibs in such molds is determined by the anticipated production, as the re-cutting has proved to be not only practical but economical.

Sectional nibs are made of Firthite of a hardness determined by the metal powder to be compressed. Test applications to date have covered the following powdered metals: Carbon, brass, bronze, copper, iron, tungsten, and tungsten-silver. A number of molds are in use in connection with pellet presses for compressing certain pharmaceutical powders.

Decision of Firth-Sterling to shift from solid to sectional nibs followed the observation that a sharp corner in a solid nib subjected to load doubles, or further multiplies the stress, depending upon the angle and sharpness of the corners. It was noted that under such repeated stress, high local stresses at the corners caused fatigue failure by cracking and chipping.

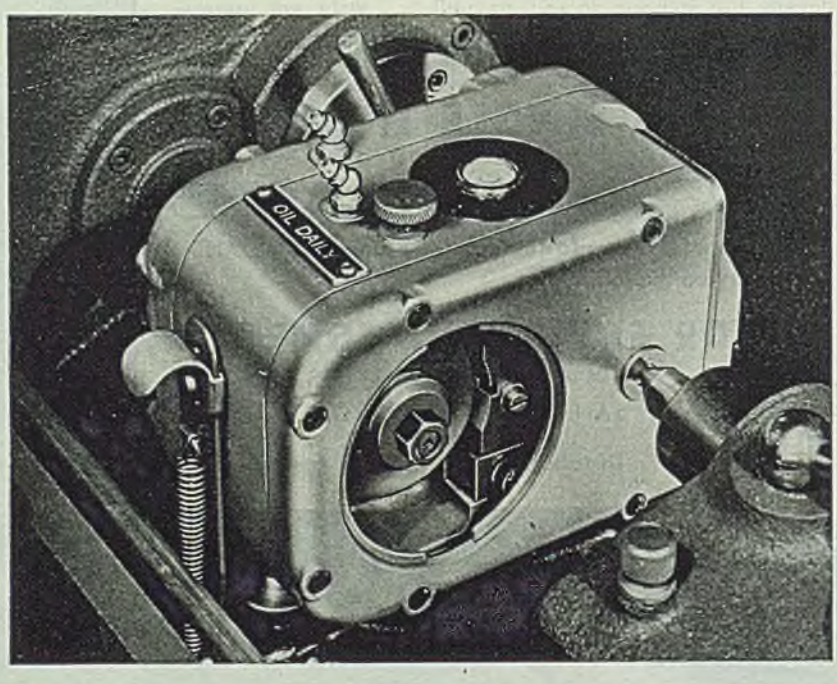
Re-cutting of solid nibs was only possible by hand, which was impractical. By comparison, the lapped seams in the sectional nibs achieved "controlled" cracks comparatively free of trouble and insuring full life for the mold.

Converts THREAD GRINDERS...

from single to multi-ribbed units

Many single point thread grinders can be converted to multi-ribbed wheel work by means of the dressing device illustrated.

Advantage of having more than one rib on grinding wheels has long been recognized, but the dressing problem has prevented its widespread use. In single point or single grinding, one rib must bear entire load, whereas load is divided among all ribs of the multi-grooved wheel. Consequently, ribs retain their form longer, less frequent wheel dressing is required and more parts can be produced per dressing.



This device, a semi-automatic diamond dresser, is mounted between centers of the grinder and is actuated by the driving pin on the face plate. Precision ground cam for required pitch is mounted upon an accurately ground and lapped spindle and controls the movement of a suitable diamond. Reciprocating movement of diamond in conjunction with the uniform lateral motion imparted by lead-screw results in desired wheel profiling action.

It is recommended for use on: (1) Work demanding long lengths of thread, and where breakdown of a single point wheel necessitates making a number of passes; (2) thread gage grinding for elimination of thick first and last threads; (3) maintenance of minimum lead variation; (4) fine pitch threads over 32 threads per in.; (5) wheel dressing at required helix angle; and where it is desired to traverse grind, and the sharp corner and small radii exceed the limits of crush dressing.

This dresser, made by Sheffield Corp., Dayton, O. permits use of a multiform wheel on single point thread having sufficient table space to permit its installation.

Trends in Broaching

(*Concluded from Page 61*)

velopment of a three-pass broach operation as shown in the illustration.

Fig. 1 shows a mass production method which has proved to be fast, accurate and low in cost for the cutting of slots on each side of the body of a fuse. This was done on a horizontal dual ram machine, using two long broaches for each slide.

Broaching of internal gears offers considerable savings in time over previous methods. A typical gear and the type of tool required for its broaching are shown in Fig. 3. High productivity and accuracy are obtained by this method of producing gears in quantities.

Typical example of how automatic broaching setups using relatively simple broaches can be designed to broach complex parts and effect substantial savings in production costs, can be obtained from the method employed in the production of clutch disks. The clutch disks are of mild steel and are 14 in. ID. Since each disk is approximately 0.115-in. thick, a stack of 13 pieces can be worked simultaneously.

The broach which cuts the 120 teeth, 10 at a time, around the inside diameter is in six sections. Each individual section can be replaced separately if necessary. Total broach length is 66 in. and length of the stroke is 72 in. The rings are stacked in the sliding fixture when the fixture is in the extended position, and work is held securely in the fixture by four dogs which are clamped down by hand. Disk teeth are cut in a single stroke by pushing the bar carrying the broaches down past the work.

Significant advantages provided by this setup are the increased rate of production and the reduced production costs. When internal shaping tools were used to cut these teeth, it required from ¾ to 1 hr to complete one disk load, whereas 10 to 12 disk loads are now produced in an hour. Since each set contains 13 individual disks, this is an output of 130-156 pieces per hr from one machine.

Fig. 5 shows a turbine wheel in which entire groove contour is produced in one setting; Fig. 4 illustrates internal and external broached surfaces which were produced in large quantities during the war and point the way to further extension of the same principles to present peacetime products. Fig. 6 shows the set-up employed for straddle broaching of tank track links.

There is today a definite trend in the reduction of cost in broaching. Work of nominal volume can be done economically; the demands of the future for this method of metal removal will have a pronounced effect on this factor. Higher speed, greater power and more flexibility of design, as well as greater use of automatic control, can be anticipated.

Much of the data for this article was made available through courtesy of the Broaching Tool Institute, 74 Trinity Place, New York 6.

Recent Patents

Deep-Drawing Steel: J. E. Lose, Wilkinsburg, Pa., No. 2,387,919, Oct. 30, 1945.

A method of making steel, comprising bottom pouring a steel ingot of rimming, plain-carbon steel; allowing an ingot skin to form; and, prior to solidification of the ingot core, further bottom pouring plain-carbon steel, into the same ingot, containing sufficient aluminum to render the ingot core nonaging, fully killed, plain-carbon steel; and allowing the core to solidify.

—o—

Method of Manufacturing Stopper Rods: J. T. Labadie, Gary, Ind., No. 2,389,517, Nov. 20, 1945.

The method of forming a one-piece stopper rod for ladles, includes heating one end of an elongate blank to forging temperature, indenting the heated end of the blank upon opposite sides, then partially slotting the blank inwardly from opposite sides thereof at right angles to and in the region of indentations, upsetting the extreme end portion of the blank to form a head of enlarged diameter, and longitudinally drilling the end of the blank to intersect the slots formed therein.

—o—

Ingot Mold Sprayer: J. W. Stewart, Donora, Pa., assignor to the American Steel & Wire Co., No. 2,387,362, Oct. 23, 1945.

A sprayer for coating the interior of an ingot mold cavity, comprising an elongated reservoir for coating material, a head spaced from the lower extremity thereof, and an impeller rotatably mounted between the reservoir and head. The impeller has distributor vanes on one face adapted to throw coating material outwardly and propeller vanes on its other face. Means also are provided for impinging a fluid against the propeller vanes so as to rotate the impeller, and for delivering a controlled quantity of coating material from the reservoir to the central axial region of the impeller.

—o—

Production of Electrical Silicon Steel: J. D. Gat, Edgewood, Pa., assignor to Carnegie-Illinois Steel Corp., No. 2,389,497, Nov. 20, 1945.

In the processing of electrical silicon steel sheets and strip, the improvement which includes hermetically sealing such steel within an enclosure in the presence of a substance active at elevated temperatures toward the nonmetallic elements within the enclosure, and heating the steel and substance sufficiently to effect diffusion of the nonmetallic elements through the steel. The method further includes evacuating the atmosphere from the enclosure incident to the hermetic sealing.

—o—

Steel in Elevated Temperature Service Under Stress: M. A. Grossman, Chicago, and R. F. Miller, Pittsburgh, assignors of one-half to Carnegie-Illinois Steel Corp. and one-half to United States Steel Corp. of Delaware, No. 2,389,043, Nov. 13, 1945.

A method of maintaining stress in steel within the temperature range of from about 850 to 1100° F. It includes making a steel of the pearlitic, non-air-hardening type containing from 0.08 to 0.20 per cent carbon and from 0.45 to 0.65 per cent molybdenum in conjunction with from 0.15 to less than 1 per cent chromium. This is proportioned with respect to the carbon content to fix substantially all the carbon in the form of carbide that is stable within the temperature range. The steel otherwise is of a composition suitable for its type. Force is applied to this steel to maintain stress therein while maintaining it within the temperature range.

—o—

Method of Coating Sheets: F. E. Fairley, Birmingham, L. T. Lindquist, Bessemer, Ala., and C. D. Michaels and H. C. Rodgers, Birmingham, assignors to Tennessee Coal, Iron & Railroad Co., Birmingham, No. 2,388,131, Oct. 30, 1945.

In the production of metal-coated sheets involving passing each sheet through a bath of molten coating and then through a body of oil superposed on the bath, the improved method comprises elevating some of the molten metal above the top level of the bath in a path in spaced relation to the path of movement of the sheet, and emptying the thus elevated metal into the upper portion of the oil body and allowing it to cascade by gravity therethrough so as to maintain the oil at the optimum operating temperature.

—o—

Flue Insert for Regenerative Furnaces: J. J. Seaver, Evanston, Ill., No. 2,389,166, Nov. 20, 1945.

A circumferentially and longitudinally continuous tubular flue insert having longitudinal ribs on each of its interior and exterior surfaces respectively. The insert is open at each of its opposite ends and is installed in a vertical flue coaxially therewith and with the exterior surface of the insert spaced inwardly from the internal surface to the flue. This affords selective passage of high or low-temperature gaseous fluids axially through the open center of insert and longitudinally about the exterior of the insert in contact with the internal and external surfaces of the insert and the interior surface of flue for the purpose described.

Surfaces For Electroplating

(*Continued from Page* 82)

tary consideration appears to demand an absolutely clean or unoccupied surface.

Plating on Filmed Surfaces: However, electroplating does not actually require a surface which is clean in the absolute sense of freedom from all foreign material. Few, if any, surfaces enter the plating bath in a sound condition unsullied by oxides, slight oil films, or surface contamination of some sort. That this need not interfere with plating can be seen from the practice of electroplating on anodized aluminum or phosphated ("Bonderized") steel, as well as on cleaning bath films due to the generally incomplete rinsing of cleaning baths from surfaces to be plated. Rinse tanks in plating lines in successful operation not infrequently contain as much as 3 to 4 per cent of dissolved solids, as well as an undetermined amount of suspended matter, according to measurements made in our laboratory and also reported occasionally by others. On immersion in the plating bath, metal articles carry a film no cleaner than the last rinse; and it is by no means certain that the film dissolves completely into the plating bath.

Moreover, most freshly pickled, wet surfaces are so quickly oxidized that the transfer from pickle bath is certain to be accompanied by the formation of a thin film of oxide, unless the film of water is somewhat acidic, and perhaps even then an oxide film develops. A weakly alkaline film preserves steel from rusting during transfer to a plating bath, but only by establishing an impermeable, invisible oxide film, so that the surface is not "clean" in the absolute sense; yet adherent plates may result even from cyanide baths.

Further, freshly cleaned and pickled steel, dried and exposed to the air in our laboratory for as long as several weeks, sometimes accepts an adherent zinc plate when immersed dry into either a sulphate or a cyanide bath, in spite of being covered with an oxide film. Hothersall reports that even when the steel is stored at 100° C, nickel deposits 0.02 in. thick may be strongly adherent. While in the latter case the steel may have been passive, since it had an anodic treatment, even so, the most generally accepted explanation of passivity is an oxide film. Some commercial plating processes deposit metal directly on a passive surface, although passive surfaces generally interfere with adhesion.

Again it is common practice to remove oil less scrupulously from surfaces to be plated in alkaline baths than from those which are to enter acid plating baths. We have even seen plants where work was being cadmium plated without any cleaning whatsoever; although a thick film of emulsified oil and flocculated dirt covered the surface of the baths, the plate adhered satisfactorily. Work pickled in acid containing an inhibitor invariably carries a thin adsorption film of the inhibitor into the plating bath, unless special treatments are employed to remove it; yet adhesion is frequently obtained. Moreover, electroplates made over even heavy deposits of "acid black" often show very good adhesion.

Furthermore, it is well known that a truly clean surface is so highly adsorptive that, even if it is obtained, it is doubtful if it could be immersed in a plating bath without becoming filmed at once, at least to some extent.

Classification of Surface Films: Obviously, then, even after entering an electroplating bath, the presence of surface films of various sorts is not to be regarded as an insurmountable obstacle to the production of a satisfactory and adherent electroplate. Yet in many instances it is an obstacle. The following cases may be distinguished:

(1) Non-deposition of metal: Insulating films. The film is so thick that the surface is electrically insulated from the bath and little or no electrodeposition occurs. This is often the case with heavy grease, "stop-off" paints, heavy scale or oxide, or drawing or buffing compounds, which result in unplated areas on the surface, an all too frequent occurrence in the plating shop. Both cause and remedy are usually obvious.

(2) Peeling of metal deposit: Conducting film. The film is conductive because it is quite thin or because of its structure or composition, and electrodeposition occurs on top of the film. Because the film is structurally weak, it fails readily under stress and the electrodeposit peels. This is observed with certain grease and oxide films, as well as with some others. The weak-structured films of basis metal (class C above) already discussed belong to this class. Objects not completely cleaned, or recontaminated from floating oil films on rinse tanks or on the plating bath itself, provide examples familiar in every plating shop (although often the contamination may belong in part to type (1) above). In acid plating baths, inhibitor films remaining from pickling may sometimes be offenders of this class.

(3) Varying degrees of adhesion: Penetrated films. The film is porous, or discontinuous, so that the electroplate, although continuous, penetrates only in certain places to the basis metal. Porosity may be characteristic of the film, or it may be produced in the cleaning process before plating, or in the electroplating bath, or in treatments especially designed for this purpose, as in the Travers process for electroplating on a modified anodic film. The degree of adhesion obtained will depend on the number, area and distribution of the "penetrations," or "anchors," as well as on the soundness and strength of the electroplate in the "bridges" over non-adherent areas; which, in turn, may depend on the conductivity of the film. The adhesion may vary from very unsatisfactory values to those obtained in ideal electroplating, where the deposit is held by atomic bonds over the entire surface of the basis metal itself. Probably atomic bonding is generally spotty even in a "good" electroplate, so that this case includes the majority of plated work. Phosphate coatings on steel, if not removed in the plating bath, are doubtless of the penetrated type.

Adhesion due to cleaning in the plating bath: Displaced (or replaced) films. The film covering the surface on immersion is completely removed in the plating bath and a normal, adherent electroplate is deposited. This may be the case with a light oil film in a warm, highly alkaline plating bath, or a light oxide film in an acid bath, or occasionally in a cyanide bath. This automatic displacement of the surface film is doubtless the underlying reason for the popularity of the cyanide copper strike before nickel plating; for the cyanide copper bath has unusually effective cleaning powers, and, in fact, has been recommended and used for cleaning and plating in the same bath, thus replacing an unsuitable film with a copper film affording a better basis for subsequent nickel plating.

We have observed a number of instances where residual oily matter has been removed in alkaline plating baths, such as the example already described. We also have noticed that sometimes acid zinc or acid nickel plating takes place through a light, compact film of iron hydroxides on a steel basis surface, leaving the film intact but raised from the original surface, and giving a perfectly adherent deposit under the film. After plating, the film may be rinsed or wiped off. In other instances, work entering these acid baths has been oxidized sufficiently to show a distinct green film, which could be scrubbed off, but which entirely disappeared in a second or two in the plating bath, either with or without current.

(5) Exceptional cases. A conductive film may be neither removed nor penetrated but furnish in itself a satisfactory basis for an adherent electroplate; that is, the metal-film-plate structure is as sound as the usual metal-plate structure. Or the shape of the plated object may be such that the electroplate adheres by reason of its own tensile strength, as with cylindrical objects, or by being "keyed" into crevices and recesses. (These are actually special cases of type (2) above.) No instances of these kinds, where the adhesion has been satisfactory in practice, have been noted, except on non-conductors such as plastics. We have seen zinc coatings on improperly cleaned wire, which had no actual bond to the steel, and yet the coating appeared to adhere until the zinc "sleeve" was broken by repeated bending after which it could be slipped off the wire as a ductile, hollow tube. Electrodeposits on lead may belong in this category; the adhesion is fairly good but often a film of oxide lies between the lead and the plate. It is probable, however, that this film is really of the penetrated type. It is best removed by sand blasting before plating. Similar films are said to be encountered on pewter and britannia metal. Examples may also be selected from electrotinning and electro refining where cathode deposits are subsequently stripped from starting sheets.

(6) Filming in plating baths. An other

wise clean surface may receive a film from the electroplating bath before the electroplate is deposited. Such a film may either prevent or promote good adhesion. Examples are the immersion films deposited by baths of simple salts of the nobler metals (copper, silver, gold) on brass, steel, or zinc alloy surfaces, which prevent good adhesion of subsequent electroplates. It seems likely that in bright plating baths the surface of the metal may be coated with an adsorbed organic film before actual electrodeposition of the metal commences; this, however, is a step in the bright metal electrodeposition, and should not interfere with adhesion. Nevertheless, many effective brighteners are known which are not acceptable because they materially reduce adhesion. This must be due to the intervention of an organic film between the basis metal and the plate. Even baths containing no brighteners doubtless supply hydrated oxides or other products, mostly colloidal, which are adsorbed by any unoccupied portions of the metal surface.

In fact, it is likely that case (4) should be regarded not merely as the removal of a film, but more precisely as the replacement of an objectionable surface film by one more suitable for electroplating. Moreover, it is not essential that existent surface films be removed before filming from the bath occurs. Finally, while films originating in the plating bath are not, of course, a function of the cleaning process, they are nevertheless significant in the consideration of a "clean" surface.

There is no sharp distinction between these cases, and several of them may be, and usually are, observed in a single instance. They represent different degrees of the same phenomenon, here represented as individual for the sake of clarity. It seems probable that on most surfaces unsuitable films must be replaced by others which the electrodeposit can penetrate more extensively. Accordingly, the general case is doubtless wide-spread penetration of a replacement film.

Examples: Oxidation films on freshly cleaned and pickled steel surfaces are instructive examples. As the film forms on the wet surface, it goes through a number of stages. At first it is invisible and does not interfere with adhesion (case 4). In the course of a minute or two, it thickens enough to become visible, and at some point it begins to interfere slightly with adhesion of the electrodeposit, probably being partly displaced and partly penetrated to some extent (case 3). As it begins to dry, it becomes less subject to penetration, but causes peeling of the subsequent electroplate (case 2). And finally, in a more advanced stage of rusting, it carries no current and electrodeposition is, at best, spotty (case 1).

Blue oxide films or mill scale (formed at high temperatures) usually prevent deposition, while invisible oxide films may either prevent or promote adhesion. The distinction may be one of thickness alone, but more likely the structure and chemical nature of the film control the ease of removal or penetration. Generally the thicker films must be replaced by thinner films penetrable by the deposit, as is often done in pickling.

Another interesting example is provided in producing adherent electrodeposits on magnesium alloys. The ordinary nickel sulphate bath produces a loose, immersion film of nickel which is sloughed off, along with nickel and magnesium hydroxides, by hydrogen evolved from the acid attack of the bath upon the magnesium. This film, therefore, does not afford adhesion. The successful technique involves plating from a nickel fluoride or fluoborate bath on a replacement film which is either nickel fluoride or a lower chromium oxide modified by hydrofluoric acid. While it is not known whether the film is removed before the deposit is made, it permits adhesion of a nickel electroplate, while the magnesium oxide film otherwise present does not. It is possible that the need for excess fluoride ions in the bath arises from the necessity of maintaining a fluoride film on the unplated surface, as well as of keeping the nickel ion concentration to a sufficiently low value (by means of complex ion formation) to prevent deposition of a nickel film by chemical displacement.

Finally, certain aspects of bright plating are of interest, although their interpretation remains speculative. Most brighteners are adsorbed at the cathode surface during electrodeposition, as was noted long ago. Even if the film is not formed before deposition commences, it is certain that deposition proceeds satisfactorily in the presence of the film, without necessarily introducing cohesive weaknesses; indeed, the banded structures of almost all bright deposits strongly suggest the influence of a colloidal film on the deposition process.

Moreover, organic brighteners are doubtless strongly adsorbed at metal surfaces, since most of them are also acid inhibitors; inhibition has been used as a means of evaluating potential nickel brighteners. It is very probable, therefore, that adsorption to some degree at the cathode surface precedes electrodeposition.

Bright nickel has been deposited from a dull nickel bath by interrupting the deposition every 5 sec in order to apply a fresh adsorption film of inhibitor to the cathode by redipping it in inhibited acid. It can hardly be denied that deposition occurred on, or through, a film. We have repeated the experiment with similar results, with nickel and with zinc baths. When inhibitors are applied to the cathode before zinc plating, the adhesion of the deposit may be markedly reduced, suggesting that the film on the basis metal is a poorly penetrated one of type (3), or even, in extreme cases, of type (2). Yet, when adsorbed on the electrodeposit itself, the inhibitor film may be more highly penetrated, or even, in extreme cases, of type (4). The reduction of adhesion is less marked or not observed at all in cyanide zinc baths, probably because acid inhibitors are removed in the alkaline baths, which possess certain cleaning powers; this is then an example of case (4).

Experiments with nickel were less convincing because the laminated deposit made adhesion tests difficult; yet the occurrence of the laminations is evidence of plating on an adsorbed film, which may consist of inorganic, as well as organic colloids, and is doubtless a poorly penetrated film tending towards type (2). Laminations in nickel plate are well known in plant practice and offer further evidence of filming taking place in the plating bath.

Conclusion: Although the classification of films presented above must be somewhat speculative, and certainly cannot be absolute, yet it is clear that plating on a truly "clean" surface, consisting of bare, virgin, basis metal, is a very remote possibility. Furthermore, the presence of films of the proper sort is not objectionable and may even improve the deposit.

Nevertheless, because almost invariably substances of one kind or another must be removed from the surface of the article to be plated before a satisfactory electroplate may be applied, the term cleaning is not inappropriate, and to speak of a "clean" surface is acceptable if these limitations are recognized. A "clean" surface is one on which any objectionable films have been replaced by others more suitable for electroplating—a replacement accomplished either in a series of cleaning baths, or in the electroplating bath itself, or most likely in both.

Data File Offered on Lift Trucks, Accessories

A compact product data file on lift trucks and lift truck accessories, complete with information and illustrations, has been published by Towmotor Corp., 1226 East 152nd Street, Cleveland 10. One section of the file describes the abilities of each model lift truck, and lists each truck's operating capacities. A section devoted to accessories explains special uses for which each accessory has been designed, and itemizes construction specifications, along with dimensions and capacities which each accessory can handle. Another section concentrates on actual case studies. Also included are guides for lift truck operators and those engaged in materials handling work.

Glossary Defines Variety of Machine Shop Terms

A 32-page booklet entitled "Glossary of Machine Shop Terms" has been published by Kropp Forge Co., 5301 West Roosevelt road, Chicago 50, to aid buyers and users of machined forgings. Words and terms are defined as used in heavy machine shop practice, and recognition is given the fact that other definitions are sometimes employed in various industries for describing identical processes or operations.

THE BUSINESS TREND

Year-end Holidays Cut Industrial Activity Rate

SLACKENED operations in some industries during the year-end holiday season have pushed the current level of industrial activity a little below the steady rate that had prevailed in the previous weeks of this month. In some areas, heavy snows and cold weather, accompanied by insufficient supplies of fuel gas, also contributed to reduced operating rates.

Lowered rate of operations accentuates the already tight situation in the steel industry. Demand for steel has been far ahead of supply, and that situation threatens to become even more acute in the face of the steel strike scheduled for Jan. 14.

AUTOS—In the week before the strike-handicapped automobile industry slackened operations for the holiday season there was an 8 per cent increase in the number of cars assembled. Assemblies in the week ended Dec. 22 totaled 17,580 units compared with 16,240 in the previous week. Seventy-seven per cent of the production in the latest week came from plants of the Ford Motor Co. and Chrysler Corp. As to auto production in 1946, *Ward's Automotive Reports* says that present indications do not bear out some predictions that the new year will be a 6 million unit passenger car period. It appears, that publication says, to be more probable that the aggregate for the 12 months, even assuming fairly early labor-management reconciliation, may approximate 4 million such vehicles. After settlement of labor difficulties, car builders must acquire suitable banks of their various essentials before attaining the required scale of production necessary to meet high schedules. To realize a 500,000 monthly figure would be an extraordinary accomplishment in the first 90 days of 1946, *Ward's Reports* says.

MACHINE TOOLS—Shipments of machine tools reached their lowest levels of 1945 in November, when value of estimated total shipments was $25,923,000 compared with $31,200,000 in October.

STRUCTURAL STEEL—November bookings of fabricated structural steel for bridge and building construction totaled 107,684 tons, compared with 109,182 tons for October. The November bookings were exceeded in 1945 only by those of September and October.

RAILROADS—Volume of freight traffic handled by Class I railroads in November amounted to 49 billion ton-miles, 2 per cent under October. In the first 11 months of 1945, revenue freight amounted to 633,826,036,000 ton-miles, 6.8 per cent less than in the corresponding period of 1944. Railroad operating revenues also were down in November, being 15.1 per cent less than in the same month of 1944. Estimated freight revenues in November, 1945, were less than in November, 1944, by 20.3 per cent, while estimated passenger revenues increased 2.7 per cent.

COAL—Bituminous coal production in the week ended Dec. 15 was 2.5 per cent above that of the previous week but was 20 per cent above output in the corresponding week of last year.

FOUNDRY EQUIPMENT—Index of foundry equipment orders closed in November was 416.8 per cent compared with 457.8 in October. Highest month this year was March with 604.7 per cent, and lowest month was April with 325.0 per cent.

GEAR SALES—November sales volume in the gearing industry increased 1.6 per cent over October. These figures do not include turbine or propulsion gearing.

INDUSTRIAL PRODUCTION INDEX—Increased output at factories and mines pushed the Federal Reserve Board's November index of industrial production up 5 per cent over October. The November index, at 171 per cent of the 1935-1939 average, was about the same as it was in September, 1945, and in the autumn of 1941. Output for civilian use in November, especially of fuels, industrial materials, and producers' equipment, was larger than in those earlier periods. However, production for civilians of many finished consumer products, like automobiles, radios, clothing, and shoes, while much higher in November than in September, was still greatly under 1941.

GOVERNMENTAL DEBT—A new report from the U. S. Census Bureau shows that on June 30, 1945 the combined debt of all the 155,000 governmental units (federal, state, and local) was $275 billion, an increase of $57 billion, or 26 per cent, from June 30, 1944. Compared with the summer of 1940, when rearmament began, the increase is $212 billion, or 336 per cent. Of the 1945 total, federal debt accounted for nearly $259 billion, state debt for $2.4 billion, and local debt for $14.2 billion. Federal debt in 1945 increased 28.6 per cent over that of 1944, but the movement of state and local governmental debt has been in the opposite direction and in 1945 decreased 5 per cent from the previous year.

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	80.5	83.5	82.5	96.0
Electric Power Distributed (million kilowatt hours)	4,100†	4,154	3,841	4,617
Bituminous Coal Production (daily av.—1000 tons)	2,058	2,007	1,900	1,708
Petroleum Production (daily av.—1000 bbls.)	4,450†	4,515	4,469	4,729
Construction Volume (ENR—Unit $1,000,000)	$63.8	$67.6	$46.1	$20.2
Automobile and Truck Output (Ward's—number units)	17,580	16,240	16,750	21,100

*Dates on request. †Preliminary.

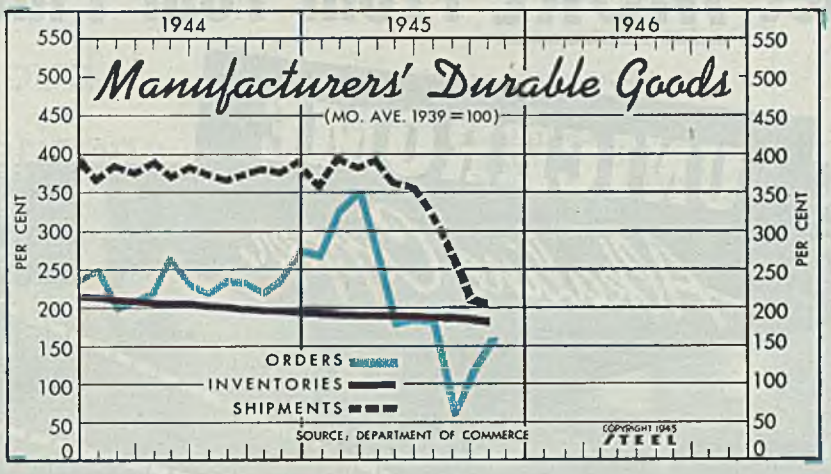
TRADE				
Freight Carloadings (unit—1000 cars)	725†	772	716	762
Business Failures (Dun & Bradstreet, number)	8	10	7	15
Money in Circulation (in millions of dollars)‡	$28,557	$28,370	$28,198	$25,280
Department Store Sales (change from like week a year ago)‡	+14%	+10%	+9%	+17%

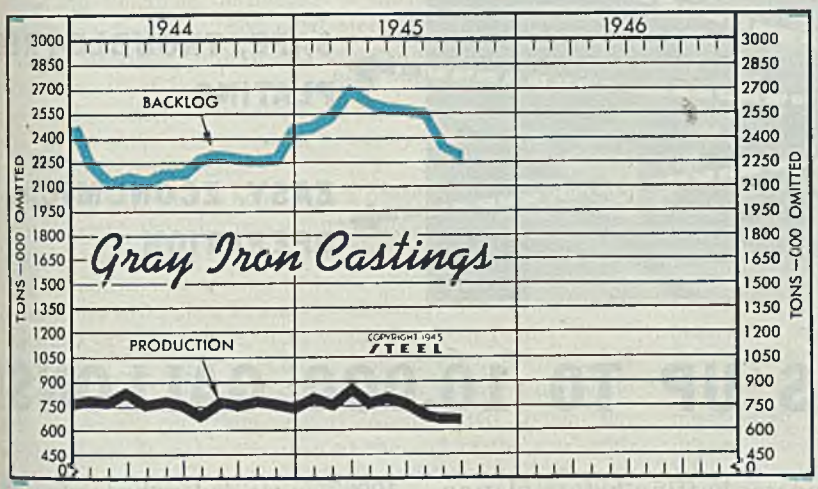
†Preliminary. ‡Federal Reserve Board.

Index of Manufacturers' Durable Goods

(Mo. Ave. 1939 = 100)

	Orders		Shipments		Inventories	
	1945	1944	1945	1944	1945	1944
January	267	248	354	364	190	212
February	326	195	394	384	189	209
March	351	202	382	377	189	207
April	267	215	389	389	189	205
May	177	265	361	371	189	204
June	182	227	356	383	189	204
July	180	213	320	373	187	202
August	54	231	262	366	185	201
September	122	230	216	372	185	199
October	165	214	205	380	182	197
November	...	232	...	374	...	195
December	...	276	...	390	...	192
Average	...	229	...	377	...	202





Gray Iron Castings

(U. S. Bureau of Census)

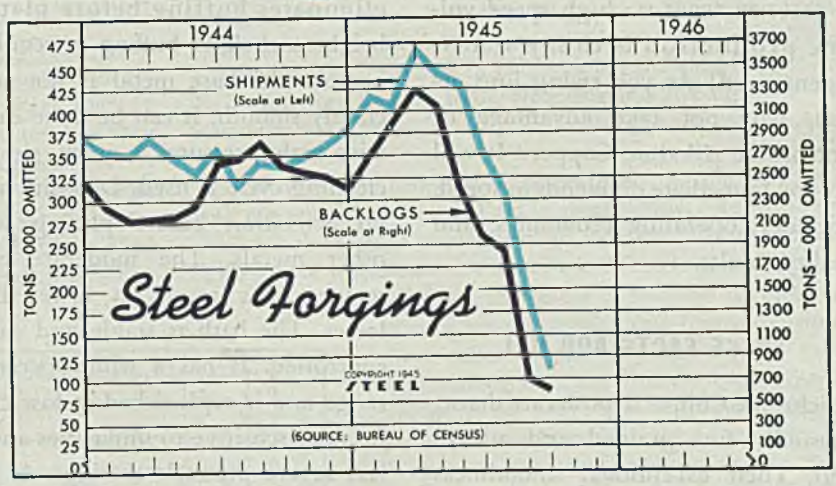
Tons—000 omitted

	—Production—		—Backlog—	
	1945	1944	1945	1944
Jan.	807	794	2,497	2,259
Feb.	753	773	2,562	2,145
March	851	841	2,714	2,184
April	769	766	2,641	2,159
May	806	789	2,603	2,205
June	773	766	2,596	2,213
July	693	698	2,565	2,314
Aug.	675	778	2,375	2,335
Sept.	666	769	2,325	2,304
Oct.	...	788	.....	2,297
Nov.	...	770	.....	2,300
Dec.	...	744	.....	2,475
Mo. Ave.	...	773	.....	2,266

Steel Forgings

Tons—000 omitted

	Shipments		Backlog		Consumption of steel	
	1945	1944	1945	1944	1945	1944
Jan.	417	355	2,723	2,256	556	521
Feb.	406	350	3,018	2,132	544	509
Mar.	469	370	3,304	2,142	632	521
Apr.	442	347	3,147	2,166	576	494
May	430	330	2,428	2,252	567	453
June	357	359	1,947	2,637	467	487
July	306	315	1,855	2,670	393	441
Aug.	195	341	696	2,821	257	483
Sept.	110	336	623	2,602	152	463
Oct.	...	348	.....	2,564	...	488
Nov.	...	360	.....	2,510	...	488
Dec.	...	377	.....	2,408	...	506



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$13,757	$13,466	$12,595	$12,517
Federal Gross Debt (billions)	$278.3	$278.6	$264.6	$231.4
Bond Volume, NYSE (millions)	$30.7	$41.3	$41.3	$61.8
Stocks Sales, NYSE (thousands)	6,667	8,488	8,205	6,508
Loans and Investments (billions)†	$68.0	$67.1	$61.1	$59.5
United States Gov't. Obligations Held (millions)†	$48,817	$48,654	$45,176	$43,551

†Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$58.27	$58.27	$58.27	$56.73
All Commodities†	106.5‡	106.5	106.3	104.4
Industrial Raw Materials†	119.1‡	119.1	119.1	115.1
Manufactured Products†	102.5‡	102.5	102.2	101.3

†Bureau of Labor Statistics Index, 1926 = 100. ‡Preliminary.

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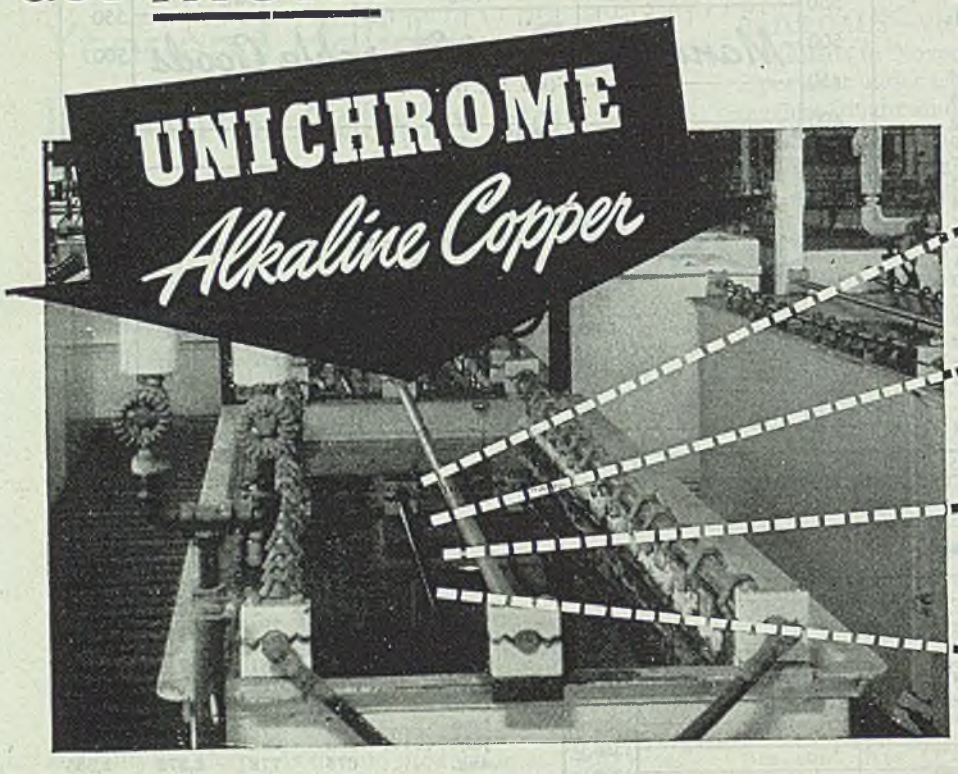

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Strike Threat Only Cloud On Steel Industry Horizon

Holiday observance cuts production sharply . . . Raw material shortages still hamper output . . . New peacetime records possible

STEEL production was slowed last week by the holiday and will feel holiday effect this week, but output is expected to recover promptly after New Year's Day.

The only cloud on the horizon is the threat of a strike by steelworkers Jan. 14. Extended steel strike would threaten economic paralysis, with manufacturers forced to close their plants because of lack of steel. Steel producers are likely to suspend shipments of raw materials, such as pig iron, scrap and coke, if the strike seems certain to occur, to avoid having cars strikebound in their yards.

The steel trade still is hopeful of a peaceful settlement before the strike date, though there are no definite indications of such. However, reports are circulating in the trade to the effect that the government was seeking to apply pressure on the union to postpone its strike date at least until the OPA can complete a new study of steel prices. This would be about Feb. 1.

In case of an early solution of present labor disputes and continuation of harmony, steel production in first half should well exceed all peacetime records. Accumulated civilian demand appears even heavier than at the end of the war, with purchasing power, in spite of important labor interruptions in the past few months, still tremendous. Apparently all that manufacturers need is opportunity to produce, as they have made important strides in plans to meet this accumulated demand. Steel requirements are indicated by the heavy tonnage fabricators have on mill books and the additional tonnage they are seeking to place, especially in light flat-rolled steel.

With pressure for steel as heavy or perhaps heavier than ever before in the history of the industry the new year promises to equal or break records in tonnage. With mill books filled far into the year, in some cases almost to its end, production should be heavy, as consuming industries complete reconversion and get well under way in output of civilian goods, for which demand is greatest in years.

DISTRICT STEEL RATES

(Percentage of Ingot Capacity Engaged in Leading Districts)

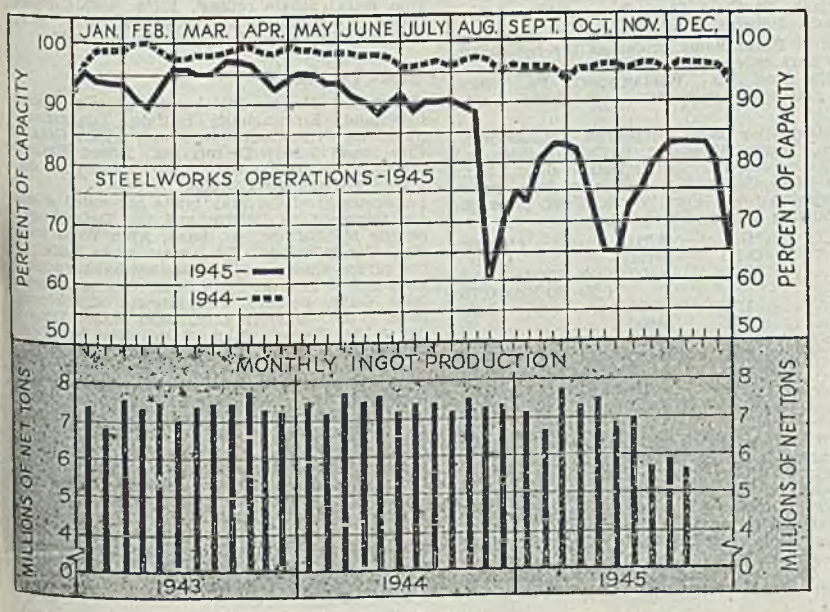
	Week Ended Dec. 29	Change	Same Week 1944	Same Week 1943
Pittsburgh	60	—18.5	79	94
Chicago	67.5	—17	99.5	96
Eastern Pa.	70	— 8	94	96
Youngstown	67	— 8	83	75
Wheeling	70	—25	91.5	79
Cleveland	67.5	—19	85	60
Buffalo	37	—9.5	93	86
Birmingham	85	—10	95	95
New England	80	— 3	87	95
Cincinnati	55	—12	92	77
St. Louis	68	None	75	85.5
Detroit	62	—22	79	64
Estimated national rate	65	—15.5	92.5	91.5

[a]Based on steelmaking capacities as of these dates.

The first peacetime Christmas in five years found general observance and steelmaking was interrupted for 24 to 36 hours in almost every case, the estimated national production rate declining 15½ points to 65 per cent of capacity. Some further interruption will be met this week, though probably to a less degree. In all areas but one a decline in rate was reported. Pittsburgh dropped 18½ points to 60 per cent, Chicago 17 points to 67½ per cent, Detroit 22 points to 62, Wheeling 25 points to 70, Cleveland 19 points to 67½, eastern Pennsylvania 8 points to 70, Cincinnati 12 points to 55, Buffalo 9½ points to 37, Youngstown 8 points to 67, New England 3 points to 80 and Birmingham 10 points to 85. St. Louis reported its rate held at 68 per cent.

Scarcity of raw materials continues over into the new year, both pig iron, scrap and coal are in short supply. Added to the general lack of scrap production and inability of blast furnaces to keep pace with demand weather conditions have had adverse effect on movement of iron and on preparation of scrap in yards. New England melters have suffered most severely, most of their iron coming from the Buffalo district, hardest hit by the heavy snow. Borrowing among foundries has been resorted to in order to keep operations going. Inventories are low and interruption of foundry work is feared at a time when demand is heaviest for some time. Scrap consumers are reaching far afield and paying premiums for scrap and much larger freight charges than normally, resulting in meeting current needs but not providing reserves. With several blast furnaces down for repairs a leading Chicago steelmaker has lost considerable steel production because of lack of scrap to supplement its iron output.

Average composite prices of steel and iron products are steady at ceilings, finished steel composite at $58.27, semifinished steel $37.80, steelmaking pig iron $24.80 and steelmaking scrap $19.17.



COMPOSITE MARKET AVERAGES

	Dec. 29	Dec. 22	Dec. 15	One Month Ago Nov., 1945	Three Months Ago Sept., 1945	One Year Ago Dec., 1944	Five Years Ago Dec., 1940
Finished Steel	$58.27	$58.27	$58.27	$58.27	$58.27	$56.73	$56.73
Semifinished Steel	37.80	37.80	37.80	37.80	37.80	36.00	36.00
Steelmaking Pig Iron	24.80	24.80	24.80	24.80	24.05	23.05	22.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	18.95	21.40

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. Finished steel, net tons; other, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for last Month, Three Months and One Year Ago

Finished Material

	Dec. 29, 1945	Nov., 1945	Sept., 1945	Dec., 1944
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.15c
Steel bars, Philadelphia	2.57	2.57	2.57	2.47
Steel bars, Chicago	2.25	2.25	2.25	2.15
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	2.25	2.25	2.25	2.10
Plates, Philadelphia	2.30	2.30	2.30	2.15
Plates, Chicago	2.25	2.25	2.25	2.10
Sheets, hot-rolled, Pittsburgh	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.70	3.70	3.70	3.50
Sheets, hot-rolled, Gary	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.70	3.70	3.70	3.50
Bright bess., basic wire, Pittsburgh	2.75	2.75	2.75	2.80
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.90	2.90	2.90	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$36.00	$36.00	$36.00	$34.00
Slabs, Pittsburgh, Chicago	36.00	36.00	36.00	34.00
Rerolling billets, Pittsburgh	36.00	36.00	36.00	34.00
Wire rods, No. 5 to ⅜-inch, Pitts.	2.15	2.15	2.15	2.00

Pig Iron

	Dec. 29, 1945	Nov., 1945	Sept., 1945	Dec., 1944
Bessemer, del. Pittsburgh	$26.94	$26.94	$26.19	$25.19
Basic, Valley	25.25	25.25	24.50	23.50
Basic, eastern del. Philadelphia	27.09	27.09	26.34	25.34
No. 2 fdry., del. Pitts., N.&S. Sides	26.44	26.44	25.69	24.69
No. 2 foundry, Chicago	25.75	25.75	25.00	24.00
Southern No. 2, Birmingham	22.13	22.13	21.38	20.38
Southern No. 2 del. Cincinnati	26.05	26.05	25.30	24.30
No. 2 fdry., del. Philadelphia	27.59	27.59	26.84	25.84
Malleable, Valley	25.75	25.75	25.00	24.00
Malleable, Chicago	25.75	25.75	25.00	24.00
Lake Sup., charcoal del. Chicago	37.34	37.34	37.34	37.34
Gray forge, del. Pittsburgh	25.94	25.94	25.19	24.19
Ferromanganese, del. Pittsburgh	140.00	140.00	140.33	140.33

Scrap

Heavy melting steel, No. 1 Pittsburgh	$20.00	$20.00	$20.00	$19.75
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.45	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	16.70
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke

Connellsville, furnace, ovens	$7.50	$7.50	$7.50	$7.00
Connellsville, foundry ovens	8.25	8.25	8.25	7.75
Chicago, by-product fdry., del.	13.35	13.75	13.75	13.35

STEEL, IRON RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941, Feb. 4, 1942 and May 21, 1945. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to individual companies are noted in the table. Finished steel quoted in cents per pound.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O. may quote carbon steel ingots at $33 gross ton, f.o.b. mill Kaiser Co. Inc., $43, f.o.b. Pacific ports.)

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop, $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $36; Detroit, del. $38; Duluth (bll) $38; Pac. Ports, (bll) $48. (Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Laclede Steel Co., $34 Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives. Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co., Kaiser Co. Inc., $58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $42, Detroit, del. $44; Duluth, billets, $44; forg. bll. f.o.b. Pac. ports, $54.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O. Geneva Steel Co., Kaiser Co. Inc., $64.64, Pacific ports.)

Open Hearth Shell Steel: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section; 3-12 in., $52; 12-18 in., excl., $54.00; 18-in. and over $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich. (Kaiser Co. Inc., $76.64, f.o.b. Los Angeles.)

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54, del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $36. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, 5—⅜ in. inclusive, per 100 lbs., $2.15 Do., over ⅜—41-in., incl., $2.30; Galveston, base, $2.25 and $2.40, respectively. Worcester add $0.10; Pacific ports $0.50 (Pittsburgh Steel Co., $0.05 higher.)

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3: Pittsburgh, Youngstown, Chicago Gary, Cleveland, Buffalo, Birmingham base 20 tons one size, 2.25c; Duluth, base 2.35c; Detroit, del. 2.35c; Eastern Mich. 2.40c; New York del. 2.59c; Phila. del. 2.57c; Gulf Ports, dock 2.62c; Pac. ports, dock 2.90c, (Calumet Steel Division. Borg-Warner Corp., and Joslyn Mfg. & Supply Co., may quote 2.55c, Chicago base; Sheffield Steel Corp., 2.75c, f.o.b. St. Louis. Phoenix Iron Co., 2.50c.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit del., 2.80c. (Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.70
		(.20-.30 Mo)	0.75
2300	1.70	4300	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.85	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

* Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.75c; Detroit 2.80c; Toledo 2.90c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City, New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.)

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.45c; Eastern Mich. 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c.

Iron Bars: Single refined, Pitts. 4.40c; double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, single ref., 5.00, double ref., 6.25c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.20c; Granite City, base 2.30c; Detroit del. 2.30c; Eastern Mich. 2.35c; Phila. del. 2.37c; New York del. 2.44c; Pacific ports 2.75c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.35c on hot carbon sheets, nearest eastern basing point.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.70c; Granite City, base 3.80c; New York del. 3.94c; Phila. del. 3.78c; Pacific ports 4.25c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.36c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific ports 4.25c; copper iron, 3.90c; pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.25c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 2.85c; Granite City, base 2.95c; Detroit, del, 2.95c; eastern, Mich. 3.00c; Pacific ports 3.50c; 20 gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.45c; Detroit del. 3.55c; eastern Mich. 3.60c; Pacific ports 4.10c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.30c	4.05c	3.30c
Armature	3.65c	4.40c	3.75c
Electrical	4.15c	4.90c	4.25c
Motor	5.05c	5.80c	5.15c
Dynamo	5.75c	6.50c	5.85c
Transformer			
72	6.25c	7.00c	....
65	7.25c	8.00c	....
58	7.75c	8.50c	....
52	8.55c	9.30c	....

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; Eastern Mich. 2.25c; Pacific ports 2.75c.

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.05c; Eastern Mich. 3.10c; Worcester base 3.25c.

Cold Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.25 lb. tin, $4.35; 0.50 lb. tin, $4.50; 0.75 lb. tin $4.65; Granite City, $4.45, $4.60, $4.75, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed, 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.25c; New York, del. 2.44c; Phila., del. 2.30c; St. Louis, 2.49c; Boston, del. 2.57-82c; Pacific ports, 2.80c; Gulf ports, 2.60c.

Granite City Steel Co. may quote carbon sizes 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. mill; Kaiser Co. Inc., 3.20c, f.o.b. Los Angeles. Central Iron & Steel Co. 2.50c f.o.b. basing points; Geneva Steel Co., Provo, Utah, 3.20c, f.o.b. Pac. ports.)

Floor Plates: Pittsburgh, Chicago, 3.50c; Pacific ports, 4.15c; Gulf ports, 3.85c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del. 2.27c; Phila., del. 2.215c; Pacific ports. 2.75c; Gulf ports. 2.45c.

Phoenix Iron Co., Phoenixville, Pa., may quote the equivalent of 2.45c, Bethlehem, Pa., on the general range and 2.55c on beams and channels from 4 to 10 inches.)

Steel Piling: Pittsburgh, Chicago, Buffalo, 2.40c; Pacific ports, 2.95c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham to manufacturers in carloads.

Bright basic, bessemer wire ..... °$2.75

Spring wire ..... °†$3.35

Wire Products to the Trade:

Standard and cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, $2.90; Pac. ports, $3.40; galvanized, $2.55 and $3.05, resp.

Annealed Merchant quality wire, 100-lb., Pittsburgh, Chicago, Cleveland, Birmingham ..... ††$3.20

Galvanized Merchant quality wire, 100-lb., Pittsburgh, Chicago, Cleveland, Birmingham ..... ††$3.55

Woven fence, 15½ gage and heavier, per base column 67

Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 72; twisted barbless wire, column 72.

°Add $0.10 for Worcester, $0.05 for Duluth; add $0.30 for bright, annealed, galvanized and $0.70 for other finishes for Pacific ports.

†Same bases as for bright basic except Birmingham.

††Add 10 cents for Worcester; 50 cents for annealed, bright basic and 70 cents for all other finishes for Pacific ports.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

	Steel			Iron	
In.	Blk.	Galv.	In.	Blk.	Galv.
⅛	56	33	½	24	3½
¼ & ⅜	59	40½	¾	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

	Steel			Iron	
In.	Blk.	Galv.	In.	Blk.	Galv.
2	61	49½	1¼	23	3½
2½-3	64	54½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½-3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	....	....
1¼"	13	9.26	10.67	....	....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	....

Rails, Supplies

Rails, Supplies .....

Standard rails, over 60-lb., f.o.b. mill, gross ton, $43.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $45.00.

°Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates $46 net ton, base, Standard spikes, 3.25c.

°Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels .....

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb.; Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

Tung.	Chr.	Van.	Moly.	Base, per lb.
18.00	4	1	...	67.00c
1.5	4	1	8.5	54.00c
.....	4	2	3	54.00c
6.40	4.15	1.90	5	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	....	....
°316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
°°410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
440A	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	§§18.00	19.00	.....	.....

°With 2-3% moly. ‡With titanium. †With columbium. °°Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago Birmingham

Structural 3.75c

⅞-inch and under ..... 65-5 off

Wrought, Washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l. ..$2.75-3.00 off

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%

Carriage and Machine

⅛ x 6 and smaller	63½ 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
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; bulk 80 off on 15.000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

	U.S.S.	S.A.E.
Semifinished hex	62	64
⅞-inch and less	59	60
1-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extra mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices, wasters 75%, waste-wasters 65% except plates, which take waster prices: tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	°7.50
Connellsville, foundry	8.00- 8.50
New River, foundry	9.00- 9.25
Wise county, foundry	7.75- 8.25
Wise county, furnace	7.25- 7.75

By-Product Foundry

Kearney, N. J., ovens	13.05
Chicago, outside delivered	13.00
Chicago, delivered	13.75
Terre Haute, delivered	13.50
Milwaukee, ovens	13.75
New England, delivered	14.65
St. Louis, delivered	†13.75
Birmingham, delivered	10.90
Indianapolis, delivered	13.50
Cincinnati, delivered	13.25
Cleveland, delivered	13.20
Buffalo, delivered	13.40
Detroit, delivered	13.75
Philadelphia, delivered	13.28

°Operators of hand-drawn ovens using trucked coal may charge $8.00; effective May 26, 1945.

†14.25 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c

Per lb. f.o.b. works

Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do., tank cars	11.50c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls., to jobbers	8.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$20.20

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold-rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series	NE hot bars 9400 series
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[14]	4.244[21]	4.715	6.012[23]	6.012[23]
New York	3.853[1]	3.758[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[13]	4.613[24]	4.203[21]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[13]	4.613[14]	4.203[21]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[1]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[13]	4.872[24]	4.172[21]	4.772	5.816[23]	5.860[23]
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[24]	4.152[21]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.196[17]	4.841[24]	4.141[21]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[24]	4.265[21]	.....	.....	.....
Ideham, Pa.*	.....	3.45[21]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del*	.....	.....	3.45[21]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.45[21]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.63[1]	5.26[1]	3.35[1]	3.819[1]	3.819[1]	4.75[13]	4.40[10]	3.85[21]	4.669	5.60[23]	5.75[23]
Buffalo (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.81[1]	3.50[1]	4.65[13]	4.30[10]	3.75[21]	4.35	5.60[23]	5.75[23]
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[13]	4.40[24]	3.85[24]	.....	.....	.....
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[13]	4.30[24]	3.75[21]	.....	.....	.....
Cleveland (city)	3.35[1]	3.588[1]	3.40[1]	5.188[1]	3.35[1]	3.60[1]	3.60[1]	4.877[13]	4.40[24]	3.85[21]	4.45[21]	5.60[23]	5.65[23]
Cleveland (country)	3.25[1]	.....	3.30[1]	.....	3.25[1]	3.50[1]	3.50[1]	.....	4.30[24]	3.75[21]	4.35[21]	.....	.....
Detroit	3.450[1]	3.661[1]	3.609[1]	5.281[1]	3.450[1]	3.700[1]	3.700[1]	5.000[13]	4.500[24]	3.900[21]	4.659	5.93[23]	5.93[23]
Omaha (city, delivered)	4.115[1]	4.165[1]	4.165[1]	5.765[1]	3.865[1]	4.215[1]	4.215[1]	5.608[19]	5.443[24]	4.543[13]	.....	.....	.....
Omaha (country, base)	4.015[1]	4.065[1]	4.065[1]	5.665[1]	3.765[1]	4.115[1]	4.115[1]	5.508[19]	.....	.....	.....	.....	.....
Cincinnati	3.611[1]	3.691[1]	3.661[1]	5.291[1]	3.425[1]	3.675[1]	3.675[1]	4.825[13]	4.475[24]	4.111[21]	4.711	6.10	6.20
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.40[13]	.....	.....	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.65[13]	.....	.....	.....	.....	.....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	5.231[13]	4.20[24]	3.85[21]	4.65	5.75[23]	5.85[23]
Milwaukee	3.637[1]	3.687[1]	3.687[1]	5.287[1]	3.387[1]	3.737[1]	3.737[1]	5.272[13]	4.337[24]	3.987[21]	4.787	5.987[23]	6.087[23]
Indianapolis	3.58[1]	3.63[1]	3.63[1]	5.23[1]	3.518[1]	3.768[1]	3.768[1]	4.918[13]	4.568[24]	4.08[21]	4.78	6.08[23]	6.18[23]
St. Paul	3.76[3]	3.81[3]	3.81[3]	5.41[3]	3.51[3]	3.86[3]	3.86[3]	5.257[13]	4.46[24]	4.461[21]	5.102	6.09[23]	6.19[23]
St. Louis	3.647[7]	3.697[1]	3.697[1]	5.297[1]	3.397[1]	3.747[1]	3.747[11]	5.172[13]	4.347[24]	4.131[21]	4.931	6.131[23]	6.231[23]
Memphis, Tenn.	4.015[5]	4.065[5]	4.065[5]	5.78[5]	3.965[5]	4.215[5]	4.215[5]	5.265[13]	4.78[24]	4.43[21]	.....	.....	.....
Birmingham	3.50[1]	3.55[1]	3.55[1]	5.903[1]	3.45[1]	3.70[1]	3.70[1]	4.75[13]	4.852[24]	4.64	5.215	.....	.....
New Orleans (city)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	4.058[4]	4.20[4]	4.20[4]	5.25[26]	5.079[10]	4.70[21]	5.429	.....	.....
Houston, Tex.	3.75[3]	4.25[3]	4.25[3]	5.50[3]	3.763[3]	4.313[4]	4.313[3]	5.313[26]	4.10[10]	3.75[21]	.....	.....	.....
Los Angeles	4.40[4]	4.65[4]	4.95[4]	7.20[4]	5.00[4]	4.95[4]	6.75[4]	6.00[13]	7.20[6]	5.683[21]	5.613	5.85[23]	5.95[23]
San Francisco	4.15[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	5.75[7]	6.35[13]	7.30[15]	5.483[21]	7.333	8.304[23]	8.404[23]
Portland, Oreg.	4.45[27]	4.45[27]	4.75[27]	6.50[27]	4.65[27]	4.75[27]	6.30[27]	5.75[13]	6.60[24]	5.633[13]	.....	.....	8.00[23]
Tacoma	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[13]	7.60[13]	5.883[21]	.....	.....	8.00[23]
Seattle	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[13]	7.05[15]	5.883[21]	.....	.....	8.00[23]

*Basing point cities with quotations representing mill prices, plus warehouse spread.
NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 33 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[1]400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]— 300 to 4999 pounds.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) 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, units, del. E. Pa.

Foundry and basic 56-63% contract	13.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00

Tungsten Ore

Chinese Wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.
(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (seller's nearest rail)	
48% 3:1 less $7 freight allowance	52.80

Manganese Ore

Sales prices of Metals Reserve Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85.0c; Fontana, Calif., Provo, Utah, and Pueblo, Colo. 91.0c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 24[illegible] effective as of May 15. Price basing points which are also points of discharge of imported manganese ore is f.o.b. cars,, shipside, dock most favorable to the buyer.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.[illegible]

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Basic open-hearth Electric furnace

Designation	Chemical Composition Limits, Per Cent — Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per G[illegible]
NE 8612	.10-.15	.70-.90	.20-.35	.40-.60	.40-.70	.15-.25	$0.65	$13.00	$1.15	$23.[illegible]
NE 8720	.18-.23	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.70	14.00	1.20	24.[illegible]
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.[illegible]
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.[illegible]
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.30	26.[illegible]
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.15	23.[illegible]
NE 9830	.28-.33	.70-.90	.20-.35	.70-.90	.85-1.15	.20-.30	1.30	26.00	1.80	36.[illegible]
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.[illegible]
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.[illegible]

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, and Oct. 22, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included.

	Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$26.75	$26.25	$27.75	$27.25
Newark, N. J., del.	28.28	27.78	29.28	28.78
Brooklyn, N. Y., del.	29.25	.....	.....	29.75
Birdsboro, Pa., base	26.75	26.25	27.75	27.25
Birmingham, base	22.13	20.75	26.75	.....
Baltimore, del.	27.36	.....	.....	.....
Boston, del.	26.89	.....	.....	.....
Chicago, del.	25.97	.....	.....	.....
Cincinnati, del.	25.81	24.48	.....	.....
Cleveland, del.	25.87	24.99	.....	.....
Newark, N. J.	27.90	.....	.....	.....
Philadelphia, del.	27.21	26.71	.....	.....
St. Louis, del.	25.87	24.99	.....	.....
Buffalo, base	25.75	24.75	26.75	26.25
Boston, del.	27.25	26.75	28.25	27.75
Rochester, del.	27.28	.....	28.28	27.78
Syracuse, del.	27.83	.....	28.83	28.33
Chicago, base	25.75	25.25	26.25	25.75
Milwaukee, del.	26.85	26.35	27.35	26.85
Muskegon, Mich., del.	28.94	.....	.....	28.94
Cleveland, base	25.75	25.25	26.25	25.75
Akron, Canton, del.	27.14	26.64	27.64	27.14
Detroit, base	25.75	25.25	26.25	25.75
Saginaw, Mich., del.	28.06	27.56	28.56	28.06
Duluth, base	26.25	25.75	26.75	26.25
St. Paul, del.	28.38	27.88	28.88	28.38
Erie, Pa., base	25.75	25.25	26.75	26.25
Everett, Mass., base	26.75	26.25	27.75	27.25
Boston, del.	27.25	26.75	28.25	27.75
Granite City, Ill., base	25.75	25.25	26.25	25.75
St. Louis, del.	26.25	25.75	.....	26.25
Hamilton, O., base	25.75	25.25	.....	25.75
Cincinnati, del.	26.19	26.36	.....	26.86
Neville Island, Pa., base	25.75	25.25	26.25	25.75
Pittsburgh, del. No. & So. sides	26.44	25.94	26.94	26.44
Provo, Utah, base	23.75	23.25	.....	.....
Sharpsville, Pa., base	25.75	25.25	26.25	25.75
Sparrows Point, base	26.75	26.25	.....	.....
Baltimore, del.	27.74	.....	.....	.....
Steelton, Pa., base	.....	26.25	.....	27.25
Swedeland, Pa., base	26.75	26.25	27.75	27.25
Philadelphia, del.	27.59	27.09	.....	28.09
Toledo, O., base	25.75	25.25	26.25	25.75
Youngstown, O., base	25.75	25.25	26.25	25.75
Mansfield, O., del.	27.69	27.19	28.19	27.69

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. § For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenbridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., $2 per ton; for each additional 0.25% nickel, $1 per ton.

High Silicon, Silvery

6.00-6.50 per cent (base)	....	$31.25
6.51-7.00	$32.25	9.01- 9.50, 37.25
7.01-7.50	33.25	9.51-10.00, 38.25
7.51-8.00	34.25	10.01-10.50, 39.25
8.01-8.50	35.25	10.51-11.00, 40.25
8.51-9.00	36.25	11.01-11.50, 41.25

F.o.b. Jackson county, O., per gross ton. Buffalo base $1.25 higher, whichever is most favorable to buyer. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Electric Furnace Ferrosilicon: Sil. 14.01 to 14.50%, $45.50; each additional .50% silicon up to and including 18% add $1; low impurities not exceeding 0.05 Phos., 0.40 Sulphur, 1.0% Carbon, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Northern

Lake Superior Furn. $34.00
Chicago, del. 37.34

Southern

Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. $33.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $25.25
Valley base 25.25

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo, N. Y., $31.25 base; $32.49, del. Philadelphia. Intermediate phos., Central Furnace, Cleveland, $28.25.

Switching Charges: Basing Point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differential: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$68.50

First Quality

Pa., Ill., Md., Mo., Ky.	54.40
Alabama, Georgia	54.40
New Jersey	50.35
Ohio	47.70

Second Quality

Pa., Ill., Md., Mo., Ky.	49.35
Alabama, Georgia	40.30
New Jersey	52.00
Ohio	38.15

Malleable Bung Brick

All bases	63.45

Silica Brick

Pennsylvania	54.40
Joliet, E. Chicago	62.45
Birmingham, Ala.	54.40

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press	32.90
Wire Cut	30.80

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

Metallurgical grade, f.o.b. Ill., Ky., net tons, carloads, CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. After Aug. 29 base price any grade $30.00 war chemicals.

Ferroalloy Prices

Ferromanganese (standard) 78-82% c.l. gross ton, duty paid, $135 f.o.b. cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer; Rockdale or Rockwood, Tenn.; where Tennessee Products Co. is producer; Birmingham, Ala., where Sloss-Sheffield Steel & Iron Co. is producer; $140 f.o.b. cars, Pittsburgh, where Carnegie-Illinois Steel Corp. is producer; add $6 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese (Low and Medium Carbon); per lb. contained manganese; eastern zone, low carbon, bulk, c.l., 23c; 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c; 2000 lb. to c.l., 24.40c; medium 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.75c and 17.20c; f.o.b. shipping point, freight allowed.

Spiegeleisen: 19-21% carlots per gross ton, Palmerton, Pa., $36; Pittsburgh, $40.50; Chicago, $40.60.

Electrolytic Manganese: 99.9% plus, less ton lots, per lb. 37.6 cents.

Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, per lb. contained chromium bulk, c.l., 79.50c, 2000 lb. to c.l. 80c; central 81c and 82.50c; western 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l. 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome; Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l. max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65 for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

Special Foundry ferrochrome: (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome, high carbon: (Chrom: 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed: 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil. 4-6%, mang. 4-6% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium, 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

Silcaz Alloy: (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed, 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

Silvaz Alloy: (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir. 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern, freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up ¼c.

CMSZ Alloy 4: (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c.

CMSZ Alloy 5: (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%, car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75c, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western; spot up .25c.

Ferro-Boron: (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% max.) per lb. of alloy contract ton lots, $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Manganese-Boron: (Mang. 75% approx., boron 15-20%, iron 5% max. sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract ton lots, $1.89, less $2.01, eastern; freight allowed; $1.903 and $2.623, central, $1.935 and $2.055 western; spot up 5c.

Nickel-Boron: (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract, 5 tons or more, $1.90, 1 ton to 8 tons. $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Chromium-Copper: (Chrom. 8-11%, cu. 88-90%, iron 1% max. sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide, approx. 2%, or Red Cake; Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity, $1.10 eastern, freight allowed per pound vanadium oxide contained; contract carlots, $1.105, less carlots, $1.108, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

Calcium metal; cast: Contract ton lots or more $1.80, less, $2.30, eastern zone, freight allowed, per pound of metal; $1.809 and $2.309 central, $1.849 and $2.349, western; spot up 5c.

Calcium-Manganese-Silicon: (Cal. 16-20% mang. 14-18% and sil. 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c.

Calcium-Silicon: (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, carlot, lump 18.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up .25c.

Briquets, Ferromanganese: (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.) per lb. of briquets. Contract, carlots, bulk .0605c, packed .063c, tons .0655c, less .068c eastern freight allowed; .063c, .0655c, .0755c and .078c, central; .066c, .0685c, .0855c, and .088c, western; spot up .25c.

Briquets: Ferrochrome, containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l., and .2c for 2000 lb. to c.l.; **silicomanganese,** eastern, containing exactly 2 lb. manganese and approx. ½ lb. silicon, bulk, c.l., 5.80c, 2000 lbs. to c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; western, add .5c for c.l., and 2c for 2000 lb. to c.l.; **ferrosilicon,** eastern, approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l., and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75% per lb. contained molybdenum f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all f.o.b. Bridgeville, Pa., usual freight allowance.

Silicon Metal: Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c; 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon.

Manganese Metal: (96% min. manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 30c, 2000 lb. to c.l., 32c, central, 30.25c, and 33c; western 30.55c and 35.05c.

Ferrotungsten: Spot, carlots, per lb. contained tungsten, $1.90; freight allowed as far west as St. Louis.

Tungsten Metal Powder: Spot, not less than 97 per cent, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40 eastern. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20% contract basis, per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi River and North of Baltimore and St. Louis, 6.8% carbon $142.50; 3-5% carbon $157.50.

Carbortam: Boron 0.90 to 1.15% net ton to carload, 8c lb. f.o.b. Suspension Bridge, N. Y., frt. allowed same as high-carbon ferrotitanium.

Bortam: Boron 1.5-1.9%, ton lots 45c lb., less ton lots 50c lb.

Ferrovanadium: 35-55%, contract basis, per lb. contained vanadium f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80 highly-special grade $2.90.

Zirconium Alloys: 12-15%, per lb of alloy, eastern contract, carlots bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads, bulk per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot ¼c per ton higher.

Zirconium Alloy: 35-40%, Eastern contract basis, carloads in bulk or package, per lb. of alloy 14.00c gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼ cent higher.

Alsifer: (Approx. 20% aluminum 40% silicon, 40% iron) contract basis f.o.b. Niagara Falls, N. Y., per lb. 5.75c; ton lots 6.50c. Spot ¼ cent higher.

Simanal: (Approx. 20% each si., Mn., Al.) Contract, frt. all. not over St. Louis rate, per lb. alloy; carlots 8c; ton lots 8.75c; less ton lots 9.25c.

Borosil: 3 to 4% boron, 40 to 45% Si., $6.25 lb. cont. Bo., f.o.b. Philo O. freight not exceeding St. Louis rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page 150 of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.75
No. 2 Heavy Melt. Steel	18.75
No. 2 Bundles	18.75
No. 3 Bundles	16.75
Mixed Borings, Turnings	13.75
Machine Shop Turnings	13.75
Billet, Forge Crops	23.75
Bar Crops, Plate Scrap	21.25
Cast Steel	21.25
Punchings	21.25
Elec. Furnace Bundles	19.75
Heavy Turnings	18.25

Cast Grades

(F.o.b. Shipping Point)

Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:

(Dealers' buying prices.)

No. 1 Heavy Melt. Steel	$15.33
No. 2 Heavy Melt. Steel	15.33
No. 2 Hyd. Bundles	15.33
No. 3 Hyd. Bundles	13.33
Chemical Borings	14.33
Machine Turnings	10.33
Mixed Borings, Turnings	10.33
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstrip Motor Blocks	17.50
Stove Plate	19.00

CLEVELAND:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	14.50
Short Shovel Turnings	16.50
Mixed Borings, Turnings	14.50
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	13.50-14.00
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec. Furnace Bundles	20.50

BOSTON:

(F.o.b. shipping points)

No. 1 Heavy Melt. Steel	$14.06
No. 2 Heavy Melt. Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	14.06
No. 1 Busheling	14.06
Machine Shop Turnings	9.06
Mixed Borings, Turnings	9.06
Short Shovel Turnings	11.06
Chemical Borings	13.31
Low Phos. Clippings	16.56
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

Boston Differential 99 cents higher, steel-making grades; Providence $1.09 higher.

PITTSBURGH:

(Delivered consumer's plant)

Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Mach. Shop Turnings	15.00
Mixed Borings, Turnings	15.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	22.00

VALLEY:

(Delivered consumer's plant)

No. 1 R.R. Heavy Melt.	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Cast Iron Borings	16.00
Machine Shop Turnings	15.00
Low Phos. Plate	22.50

MANSFIELD, O.:

(Delivered consumer's plant)

Machine Shop Turnings	15.00

BIRMINGHAM:

(Delivered consumer's plant)

Billet Forge Crops	$22.00
Structural, Plate Scrap.	19.00
Scrap Rails Random	18.50
Rerolling Rails	20.50
Angle Splice Bars	20.50
Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.00
Long Turnings	8.50- 9.00
Cast Iron Borings	8.50- 9.00
Iron Car Wheels	16.50-17.00

CHICAGO:

(Delivered consumer's plant)

No. 1 R.R. Heavy Melt.	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dlr. Bundles	18.75
Baled Mach. Shop Turn	18.75
No. 3 Galv. Bundles	16.75
Machine Turnings	13.75
Mix. Borings, Sht. Turn.	13.75
Short Shovel Turnings	15.75
Cast Iron Borings	14.75
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00

(Cast grades f.o.b. shipping point, railroad grades f.o.b. tracks)

BUFFALO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	14.25
Short Shovel Turnings	16.25
Mixed Borings, Turn.	14.25
Cast Iron Borings	15.25
Low Phos.	21.75

DETROIT:

(Dealers' buying prices)

Heavy Melting Steel	$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	12.32
Short Shovel, Turnings	14.32
Cast Iron Borings	13.32
Low Phos. Plate	19.82
No. 1 Cast	20.00
Heavy Breakable Cast	16.50

ST. LOUIS:

(Delivered consumer's plant)

Heavy Melting	17.50
No. 1 Locomotive Tires	20.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	10.5
Shoveling Turnings	12.5
Rerolling Rails	21.0
Steel Car Axles	21.50-22.0
Steel Rails, 3 ft.	21.5
Steel Angle Bars	21.0
Cast Iron Wheels	20.0
No. 1 Machinery Cast	20.0
Railroad Malleable	22.0
Breakable Cast	16.5
Stove Plate	19.0
Grate Bars	15.2
Brake Shoes	15.2
(Cast grades f.o.b. shipping point	
Stove Plate	18.0

CINCINNATI:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.5
No. 2 Heavy Melt. Steel	18.5
No. 1 Comp. Bundles	18.5
No. 2 Comp. Bundles	18.5
Machine Turnings	9.50-10.0
Shoveling Turnings	11.50-12.0
Cast Iron Borings	11.00-11.5
Mixed Borings, Turnings	10.50-11.0
No. 1 Cupola Cast	20.0
Breakable Cast	16.5
Low Phosphorus	21.00-21.5
Scrap Rails	20.50-21.0
Stove Plate	16.00-16.5

LOS ANGELES:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$14.0
No. 2 Heavy Melt. Steel	13.0
No. 1, 2, Deal. Bundles	12.0
Machine Turnings	4.5
Mixed Borings, Turnings	4.0
No. 1 Cast	20.0

SAN FRANCISCO:

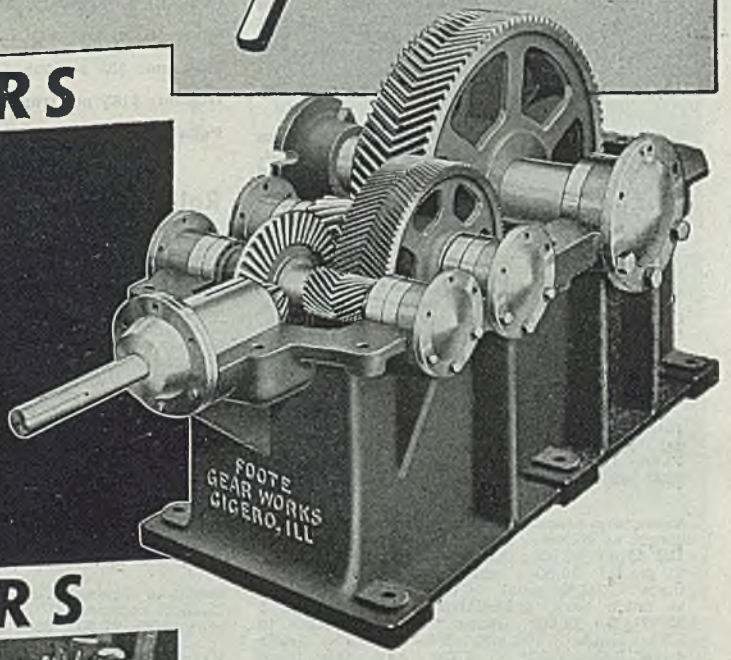
(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$15.5
No. 2 Heavy Melt. Steel	14.5
No. 1 Busheling	15.5
No. 1, No. 2 Bundles	13.5
No. 3 Bundles	9.0
Machine Turnings	7.5
Billet, Forge Crops	15.5
Bar Crops, Plate	15.5
Cast Steel	15.5
Cut, Structural, Plate, 1", under	18.0
Alloy-free Turnings	7.0
Tin Can Bundles	14.5
No. 2 Steel Wheels	15.5
Iron, Steel Axles	23.0
No. 2 Cast Steel	15.5
Uncut Frogs, Switches	15.5
Scrap Rails	15.5
Locomotive Tires	

Brad Foote Gears

FOR

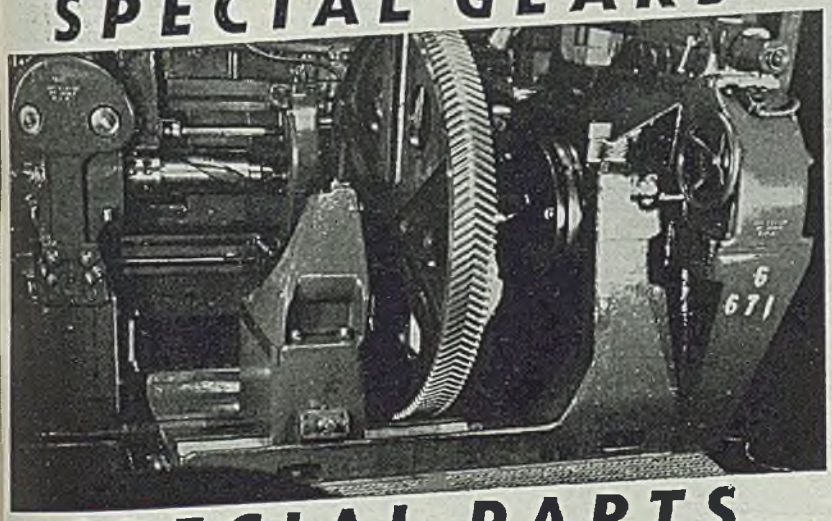
SPEED REDUCERS



RATIOS

HERRINGBONE	2:1 to 295:1
WORM	3⅝:1 to 60:1
GYRO	16:1 to 30,000:1
SPUR	2:1 to 40:1
VERTICAL HELICAL	2:1 to 80:1
SPIRAL BEVEL	1:1 to 5:1
PLANETARY	4:1 to 400:1
OIL WELL UNITS	12:1
LITTLE GIANT	28:1

SPECIAL GEARS



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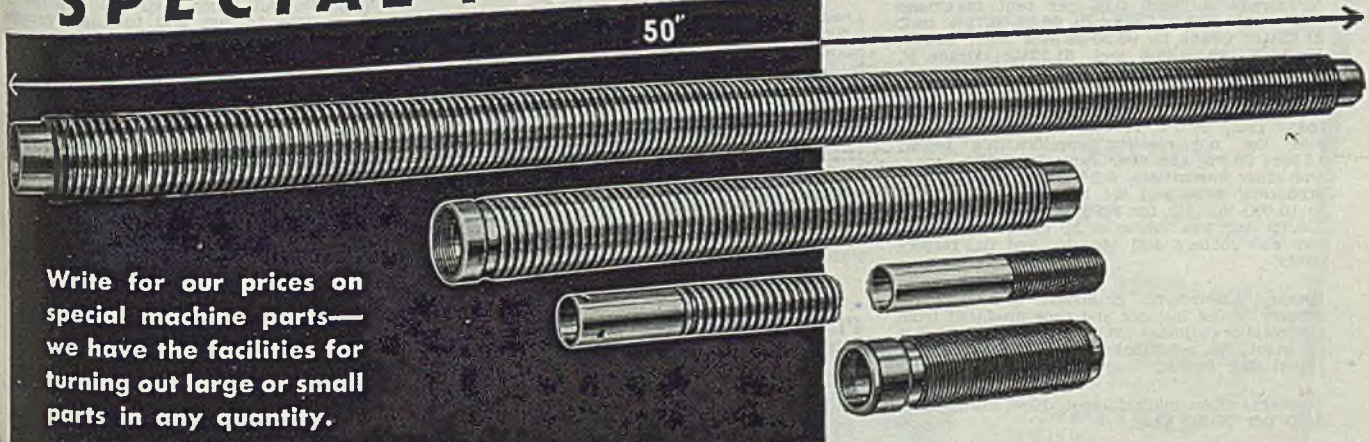
SPECIAL PARTS



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ARMY E NAVY

BRAD FOOTE GEAR WORKS

1309 SOUTH CICERO AVENUE
DEPT. S. CICERO 50, ILL.

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12,12½c, refinery; dealers may add ¼c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1¼c; 0-499 2c. Castings 11.75c, refinery for 20,000 lbs., or more. 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, chemical, 6.45c, corroding, 6.45c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester, cSpringfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less through 2000 lbs.

Secondary Aluminum: All grades 12.50c per lb. except as follows: Low grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (92½% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 95-97½%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.00c to 8.25c, Grade 4 (85-90%) 7.50c to 7.75c; any other ingot containing over 1% iron, except PM 754 and hardeners, 12.00c. Above prices for 30,000 lb. or more; add ½c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 20.50c lb., add 1c for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing, screening, barrelling, handling, and other preparation charges, 23.50c. Price for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, f.o.b. plant, any quantity; carload freight allowed all other alloys for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239. 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American bulk carlots f.o.b. Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impuritiese, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224 lb.; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: Open market, spot, New York, $108-$110 per 76-lb. flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $17 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $1.50 lb. for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

Indium: 99.9%, $2.25 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 70.625c per ounce.

Platinum: $35 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.08c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.48c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 26.50c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c; Muntz metal 20.12c; Naval brass 20.87c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlot 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%; Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c f.o.b. Niagara Falls.

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ¾c for 15,000-40,000 lbs.; 1c for 40,000 or more.

Scrap Metals

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.785
Commercial bronze 90%	9.375	9.125	8.625
Commercial bronze 95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz Metal	8.000	7.750	7.250
Nickel Sil, 5%	9.250	9.000	4.625
Phos. br., A, B, 5%	11.000	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	8.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 7.50c; Muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Price f.o.b. point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb., 11, 14, etc., to 3.50c lb. All other high grade alloys 3c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50, 4.00c lb. Mixed plant scrap, all solids 2, 2.50c lb. borings and turnings one cent less than segregated.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings 7.25c, old zinc 5.25 f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c, add ½c 20,000 or more. Unsweated zinc dross; die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ¼c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½ copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 98

So tight is the situation in sheets and strip that some producers have arbitrarily canceled carryover tonnage at the end of the year, to start fresh on January allocations. In some cases promised delivery has been impossible because of lack of semifinished steel to nonintegrated sheetmakers. A disturbing factor is tonnage for export which the government is to allocate for first half production, necessitating revision of schedules already set for first quarter and further diminishing tonnage available for domestic users.

New York — Pending definite decision on tonnage to be placed under directive for export in first half, sheet and strip sellers generally are unable to make definite allocations for their regular trade even for first quarter. Some schedules have already been frozen for January but beyond that there is uncertainty and this applies to second quarter as well. Approximately 150,000 tons of sheet and strip are now being considered for export in first half under the program recently proposed. In addition, close to 100,000 tons of sheet bars are being considered.

Flat-rolled products dominate the entire program, which in all involves more than 850,000 tons, for in addition to the sheets and strip, approximately 215,000 tons of tin plate are likely to be required.

Despite the admitted tightness in sheets and strip, many consumers continue to send in orders, asking for early delivery, but that if such shipment is not available the orders be held for handling at mill convenience. Sellers, however, are taking a stiffer attitude with regard to this type of demand. Some only recently returned all such orders as have accumulated, explaining that as it is so difficult to promise even an approximate time of shipment that there is no point to keeping the orders even tentatively on file. This has resulted in complaints from some buyers, where their orders have been on file for some time, even though mills may have never formally accepted. Now the policy of mills generally is to return such orders as may come in promptly.

Boston — Scattered minor openings in hot-rolled carbon sheets are moving some tonnage forward in revised mill schedules as a result of General Motors strike, but with little or no effect on hot-rolled pickled and cold-rolled. Flat-rolled deliveries to fabricators, however, are restricted by curtailed shipments rather drastically imposed by some producers during December, in an effort to reduce carryovers and start fresh on volume allocated for January. Arbitrary cut in carryover tonnage by 75 per cent is the goal of some producers. Complicating sheet supply also is loss of tonnage to which several mills were committed, now forced to renege on delivery in first quarter because of lack of sheet bars and semifinished.

Chicago — Pressure for sheets is unabated and new business goes begging. Makers who are declining to take orders for last half 1946 are virtually sold out until that time, unless consumers fail to file specifications against quotas assigned to them. So far, shipments are moving to automotive interests closed by strike, the material being warehoused. No suspensions from auto builders have been received, and it is believed they will be able to accept shipments for February schedules if the strike continues.

Cincinnati—Sheet mills in this district limited holiday shutdowns to feasible minimums in face of pressure of demands. Rolling schedules for first quarter are packed, yet allocations to consumers are far from meeting desired volume. Whatever tonnage might be freed because of strikes or other causes would be quickly absorbed. Work on second quarter schedules will not be started until government directives on export tonnage are announced.

Pittsburgh — No significant tonnage yet has resulted from hold-up orders received from General Motors Corp.'s assembly plants or parts suppliers. However, Directive 6 to PR-32, issued Dec. 13, is expected to prevent stockpiling of inventories by plants affected by work stoppages, and soon should be reflected in substantial tonnage diverted to other metalworking companies badly in need of steel. The new directive permits companies affected by work stoppages to continue to build inventories for 30 days, after which their outstanding orders with suppliers must be adjusted (that is deliveries must be held up or orders canceled) to come within inventory regulation of PR-32.

Cleveland — Shipments of sheet and strip steel are from one to two months behind original schedules, due to inability

of producers to step up production to projected levels and to make up production lost during the fuel shortage. With mill schedules well filled through first half, producers generally are rejecting third and fourth quarter inquiries. Some duplication of orders and overbuying are being uncovered but this is more than balanced by the fact that some customers discover they have failed to replace canceled CMP orders and, therefore, do not have as much steel ordered as they had believed. This is causing hardships because of the extended position of mills. No cancellation of orders or suspensions of deliveries have been reported in this district on General Motors' accounts.

St. Louis — The year end finds mills with unabated pressure on sheets and production 20 to 30 per cent below capacity. Pre-victory predictions that schedules could be quickly rearranged to permit more orderly operations have materialized only to a limited extent. Totally unexpected volume of civilian calls, plus persistent postwar manpower shortages have put some rollers in worse disorganization than during the war. Tonnage is sold through 1946 and orders beyond have been discouraged or refused. Unofficial allocations have been in effect some months. Labor supply showed a slight improvement, beginning in November, especially in a better class of workers, but mills are up to 10 per cent short and see little prospect of getting sufficient to man new facilities planned. For the most part deliveries are on schedule.

Birmingham — Sheet output, while consistent on the basis of some ingot allocation on the part of mills, is still about equal to current demand. A large backlog of sheet orders is on local mill books.

Philadelphia — Where sheet and strip mills are not operating on a quarterly quota basis they are booked well into last half and if they were not limiting acceptances they could be booked through the entire year. Cold-rolled sheets and strip and galvanized sheets are in special demand. A leading producer can accept limited tonnage on hot-rolled for July and August but can do no better than October on cold-rolled and November on galvanized. This interest is also booked as far as December on polished stainless sheets, compared with February on unpolished.

Steel Bars . . .

Bar Prices, Page 98

Bar consumers continue to besiege mills for earlier delivery, with small success. Some producers of carbon bars are out of the market for small sizes for all of 1946 and practically nothing can be bought for delivery before late second quarter except in a few extra large sizes. Alloy bars are easier, some being available in February and there is some trend toward these grades for that reason. Suspensions by auto parts manufacturers affected by the General Motors strike have had little effect on production.

Cleveland — Demand for bars continues extremely heavy, with several sellers out of the market for 1946 delivery on smaller sizes. A considerable amount of substitution of open-hearth alloy bars for carbon bars has been effected in order to get earlier shipment. Consumers are able to get as early as February

delivery on alloy grades compared with a few openings in June on carbon grades.

Pittsburgh — Most producers have little to offer before late second quarter on carbon bars, except for some large sizes. Shipment alloy bars generally falls into early March and late February. Cold-rollers' operations have recovered rapidly from slower pace during the coal strike when mill shipments were reduced sharply, but full scale output still is retarded by restricted hot bar shipments. Some improvement in alloy demand is shown as result of extended deliveries on carbon grades, and there also appears to be a definite trend in specifying the richer alloys.

St. Louis — Heavy demand for merchant bars continues, with inquiries double capacity. Furnace repairs and manpower shortages have hampered production but prospects for improvements are good next year when several expansion programs are to be completed. Postwar curtailment of some high-cost operations have cut into output. Production currently is down 30 to 40 per cent. Consumer goods manufacturers staged a veritable postwar run on merchant bars and schedules for a time were badly confused. Deliveries now are extended to June and beyond but schedules and backlogs are in better shape, despite the great variety of buyers.

Philadelphia — On hot carbon bars quotations generally are for third quarter and well beyond on small sizes. Some producers have little capacity left for the entire year, but they are the exception. Cold-drawn bar schedules are being extended, with little available in first half and there is slow but perceptible stiffening in alloy schedules. One large producer has little available before March.

Chicago — While reasonably good delivery can be made on alloy bars, the situation for carbon grades tightens steadily. Demand remains uncomfortably heavy. Struck automobile plants so far have not suspended shipments, and these are proceeding to warehouse storage. Opinion is that if the strike continues the auto builders probably can still take material for February schedules.

Seattle — Merchant bar demand is active as dealers replenish inventories. Northwest Steel Rolling Mills, on single turn for 18 months because of labor shortage, plans to double operations after the strike threat has passed. One mill reports refusing a contract for 20,000 tons of bars for export to France, price being unattractive.

New York — With around 185,000 tons of carbon bars, including a substantial tonnage of hot carbon bars 1½ inches and under, scheduled for export in first half under directives, producers are in the process of revising current schedules. Some sellers could work in the larger sizes for delivery abroad late in second quarter, but indications are that Washington will want to see shipments moving abroad under the new export allocation program as early in first quarter as possible.

Various important sellers, however, have little tonnage available for first half in any size, so that regardless of whether export shipments under the program are wanted early or late in first half, they will have to revise schedules to meet quotas now being set up. Certain producers, in fact, are booked up solidly into fourth quarter and over the remainder of the year on hot carbon bars. Cold-drawn carbon bar deliveries now run late in second quarter in various instances. Hot alloy bars are still available in February.

Boston — Bar mill schedules are filled well into third quarter on hot and cold-drawn carbon bars in small sizes, 2-inch and under, but backlogs are unbalanced, with larger sizes still available in late second quarter. In the former range some are out of the market beyond June scheduling and are turning back orders. Because of strikes extending beyond 30 days there are some suspensions in alloy bars and also in carbon bars by forging shops. This has moved forward a minor tonnage. On the other hand there is moderate increase in applications for CC ratings in bars, as in other products, and some have been favorably considered. Textile mill equipment builders are well covered and in one instance delivery on some material has been extended by the buyer because of the 60-day inventory regulation.

Steel Plates . . .

Plate Prices, Page 99

Plate demand continues to exceed expectations and mills are well booked for first quarter and in some cases well into second quarter. Light gages are in most demand, builders of small tanks being busy meeting demand. Demand is so unbalanced, with light gages predominat-

ing, that some makers demand that orders for some heavy gages accompany such orders.

New York—Sheared and universal plate production has been at an estimated rate of about 400,000 tons per month during the quarter now ending, and unless the steel strike threat does develop, output during the coming quarter should be around that level, according to leading producers.

Demand is being well sustained, in fact, at a far better rate than indicated at the end of the war, and practically all sellers are booked up for first quarter, and in some instances well beyond. One eastern Pennsylvania producer now has nothing to offer before next June. On the other hand, one large interest is still able to make some shipments in March. In special demand are light-gage plates, with the 3/16-inch size, in pressing demand by fabricators of underground fuel oil storage tanks and car builders, exceedingly difficult to obtain. Some producers have adopted a policy of accepting only such tonnage, when it is accompanied by orders for heavier gages.

Pittsburgh—Trend in volume of plate requirements has shown little change in recent weeks, with demand well sustained for railroad car construction, barge work, municipal tank jobs and miscellaneous ship repair. Steel distributors also are taking considerable tonnage although below wartime peak levels. Sellers have not been able to make headway against backlogs, due to substantially reduced operating schedules as result of production emphasis on other steel products. Some mills have openings in schedules for late March delivery, but in most instances sellers are booked through first quarter. Some contractors are reportedly taking into consideration proposed advances in steel plate extras in bidding on new work. The shipbuilding plant of American Bridge Co. at Ambridge, Pa., which turned out 143 navy combat craft, has been placed on the market by Reconstruction Finance Corp.

St. Louis—Steel plates, a big tonnage item here during the war, dwindled last summer to merchant marine repair orders and much capacity was shifted to sheets. Further reduction of 5 per cent of capacity was planned after V-J day but unexpected civilian demand held it to the current 12 to 15 per cent. Shipments have been delayed by lack of finishing labor.

Birmingham—Plate production is estimated at 75 per cent of capacity in this area. Demand continues to exceed supply and several industries report inability to obtain needed tonnage.

Boston — Demand for plates holds surprisingly heavy but orders are out of balance as to sizes, centered mainly in lighter gages, ¾-inch and under, on which deliveries are more extended in second quarter. Heavier plates are available in March. With shipyard buying cut to the bone aggregate volume is maintained at higher level than expected, notably for small welded tanks. Carbuilding backlog with the Worcester, Mass., shop is growing, with heavier tonnage of low-alloy material in prospect.

Seattle — Plates are in improved demand as new projects develop. Seattle will open bids Jan. 10 for 2541 feet of ½-inch electric welded steel penstock pipe 78 inches in diameter, replacing wood. City light department has $300,000 appropriated for the project, which requires about 500 tons of plates and a

small tonnage of reinforcing steel.

Cleveland — Demand for plate continues active with mills well booked ahead. Some rush orders for ship repair are being received but the earliest delivery, even with an MM rating, is February. Delivery of light plates rolled on sheet mills is extended into third quarter while light plates rolled on plate mills are available in late first quarter.

Philadelphia — Plate schedules vary, with some sellers still having tonnage for April shipment while others are booked solidly into May and June. Outlook in this product is much brighter than at the close of the war, in spite of the fact that ship tonnage is almost negligible as compared with a year ago and repairs now the major requirement in that line.

Tubular Goods . . .

Tubular Goods Prices, Page 99

New York — With the turn of the year, all sellers of merchant pipe will be on a quota basis, and almost without exception on a monthly quota basis. A number of producers set up quotas early in the fall, but some are only now making them effective. Some slight revisions are having to be made in anticipation of possibly 13,000 tons or so being placed under directive by Washington for export in first half.

Seattle — Demand for tubular goods continues active and outlook for 1946 is considered promising. H. C. Purcell, Seattle, has booked about 500 tons of 4 to 16-inch cast iron pipe for the 12th St. project at Tacoma, Wash. Award of 2000 tons of cast pipe for the Eighth Ave. SW improvement at Seattle has not been made. Pacific States Cast Iron Pipe Co., Portland, Oreg., has booked about 350 tons for Pasco, Wash. Lake Stevens Public Utility District, Snohomish county, Wash., has called bids for Jan. 17 on 400 to 500 tons of 4 to 8-inch pipe, a reservoir, pumps and accessories, about $160,000. Alternate bids are asked for transite. James W. Carey, Seattle, is engineer.

Wire . . .

Wire Prices, Page 99

Boston — Unshipped carryover tonnage is being written off at the end of each month by a leading producer, to maintain current allocations on a monthly basis. Wire fabricators are becoming more pinched, as indicated by uneven operations, which closely approximate the ebb and flow in receipts of steel. Practically none get all tonnage requested. Demand for spring wire and carryovers in this grade are in excess of allotments for the following month. Rod supply is increasingly tight, with the load heavy on New England production. Several producers have withdrawn from the Worcester base or drastically reduced shipments on both rods and drawn wire. In several cases producers are increasing production of fine drawn wire, utilizing more of their own rod production. Any surplus is sold nearer home and rod schedules for district consumers are filled through second quarter.

Birmingham — Wire production is on a still somewhat flexible basis. No noticeable easing in pressure for delivery is reported and warehouses declare supplies entirely inadequate for current needs.

Structural Shapes . . .

Structural Shape Prices, Page 99

Pittsburgh — Considerable number of structural projects are being held up because of uncertainties as to future costs and deliveries, while shortage of draftsmen and design engineers accentuate the problem. Much of the new volume of municipal work, primarily for bridges, is not likely to reach the bidding stage until early spring. Fabricators are booked through first quarter and report some projects delayed due to lack of steel. Many contractors are shopping around to obtain earliest mill deliveries possible but are having little success for most mills are distributing output under an allocation system based on prewar customer consumption. Overall output of structurals remains restricted due to emphasis on use of raw steel for flat-rolled products. Most mills are booked into second quarter on angles 6 by 6 inches and under channels 15 inches and under; other sizes are available late first quarter. Steel distributors are pressing mills with little success for greater share of current output, particularly in larger sections.

Boston — Electric Boat Co., submarine builder, Groton, Conn., new postwar structural fabricator in New England, has booked a 320-ton bridge at Wallinford, Conn. Although not the first contract this shop has taken, it is the first sizable state bridge. New inquiry has slackened, but considerable volume is accumulating. Prices and costs, uncertain over the period ahead, tend to slow down volume. Demand for plain material, however, is brisk with mill schedules on small and medium sizes well filled into second quarter.

New York — Structural steel fabricating industry enters the new year with an approximate backlog of 325,000 tons for fabrication within the next four months. Members of the American Institute of Steel Construction Inc., in November booked 107,684 tons and volume for the year is estimated at 1,075,678 tons. This compares with 628,877 tons reported, 1944. November shipments totaled 59,935 tons against 59,373 tons, same month last year. Shipments for the year will be around 747,500 tons; last year 597,872 tons. Bridge and building construction only are included in these totals.

Chicago — Structural fabricators in this district are engaged so far as manpower and steel supply will permit. New business is offered faster than it can be handled and contractors virtually are obliged to beg fabricators to submit bids. In this tight situation tendency is for constructors to give most consideration to contractors with whom relations have been maintained over the years. Some construction projects are being postponed until later, but not enough to ease demand appreciably. In normal times, fabricating shops purchase plain shapes from mills in accordance with requirements, but now they are obliged to stay within the quotas.

Seattle — Fabricating shops have a satisfactory run of small jobs of 10 to 50 tons and operations are fairly steady. No large projects are up for immediate attention but potential demand is impressive. Consolidated Steel Co., Los Angeles, is low at $575,000 for coaster gates for Coulee Dam. American Bridge

Co. is low for fixed wheel gates for Keswick Dam, California. Bonneville has opened bids for shapes for substations, Railway Industrial & Engineering Co., Greensburg, Pa., apparently low at $58,718.

Philadelphia — One large shape producer now quotes June and July on standard sections and May and June on wide-flange shapes. Other producers offer much the same schedules. Shape mills are booking tonnage faster than they are producing, with limitations on steel for this purpose a factor.

Pig Iron . . .

Pig Iron Prices, Page 101

Supply of pig iron is light in hands of producers and consumers, with threat of much smaller tonnage if the steel strike actually takes place. In the latter event loss of production will be irreparable as most iron capacity is in connection with steel mills and always blast furnaces are slower to get under way after a shutdown. The coal strike already has cost important tonnage which can not be made up.

Pittsburgh—Pig iron outlook is not favorable. Producers' stocks are low and industry-wide strike possibility Jan. 14 threatens a serious production setback. Merchant iron producers lost 250,000 gross tons during the coal strike period, which they have not been able to make up. The production pattern of merchant iron over the winter months is pretty well established, except for the possibility of the Struthers furnace being relighted if coke and ore were made available. Blast furnace interests do not believe that CPA will reinstate industry-wide allocations of iron, for no foundries have yet been forced to curtail operations due to inability to obtain sufficient iron, although the desired analysis is not always available when needed.

Cleveland—Tightness in pig iron has been aggravated recently by heavier demands from steel producers, who are increasing open-hearth charges of iron, due to scarcity of scrap, and the decline in production because of adverse weather conditions. Producers have sufficient inquiry on hand to fill first quarter books fully but are accepting business cautiously, following the Civilian Production Administration's recent warning that stricter inventory controls will be imposed unless consumers abide by the 30-day limitation.

Birmingham—Pig iron demand is gradually exceeding availability of supply with 6 furnaces remaining on merchant iron, due to one Woodward Iron Co. stack being down for repairs. In some quarters, demand for iron is described as great or greater than in 1944. Scarcity of labor and of iron ore continues.

Boston—Halting of shipments to about a score of consumers who as of Nov. 1 were found to have more than 30-day inventory has failed to benefit others with lower reserves, because of transportation delays and production losses. Undelivered fourth quarter tonnage is larger as a result. Several shops listed as over inventory now are under and the margin of safety has narrowed substantially with a greater number of melters. The increase in melt which developed with some on the basis of better

labor supply is endangered by uncertainty in iron. By far the larger volume delayed from the Buffalo district and shops depending on weekly spot shipments are borrowing iron to keep going.

Chicago — Demand and supply of pig iron are so balanced that only close control of quotas and regulation of shipments by suppliers give equitable distribution. The situation likely would be critical if foundries were not short of skilled workers, a condition which holds melt below full capacity. Gray iron shops are operating between 50 and 60 per cent of capacity. Demand for castings is estimated at about 150 per cent of capacity and the fact that this cannot be satisfied is retarding manufacture of a wide range of civilian goods.

Cincinnati — Most foundries have covered first quarter pig iron requirements. In doing so they have, despite desire for larger inventories, co-operated in a voluntary quota plan to hold requisitions close to actual near needs. This plan followed requests by furnace interests designed to spread available supplies. Contracts, however, represent heavier tonnage in line with prospects, if strikes do not interfere, for expanded melt to meet a demand for castings not satisfied.

Buffalo — Serious delays are reported in pig iron shipments as a result of the record snowfall. In some instances, foundries have been forced to taper operations. Scores of carloads of iron are marooned in snowbound railroad yards. Hundreds of tons of iron have been piled on the ground as producers used limited car supplies. Pig iron production plunged to 51 per cent of capacity at the height of the storm and had rebounded to 76½ per cent. With blast furnaces banked, ingot producers reported a drastic slump in steel operations.

Seattle — Supplies of pig iron are ample for demands in this area, the situation having eased. However, certain grades are difficult to obtain. Except for small tonnages of low phos, no pig is coming here from eastern centers. Local foundries are practically back to peacetime levels, using normal quantities of iron. Cancellations of war time contracts have been severely felt by some large foundries and steel casting operations have declined.

Philadelphia — Pig iron demand is strong with producers generally rationing tonnage. In no instance, however, has melt been reported restricted by lack of iron, and in one or two instances Washington has had to clamp down on shipments as consumer inventories exceeded limits.

Scrap . . .

Scrap Prices, Page 102

Some consumers close the year with depleted stocks and prospects slim for increased supply. All grades are scarce and melters seek material at further distances, paying increased freight equalization. On the average scrap is moving greater distances as needs in consuming centers dictate greater efforts to bring it out.

Pittsburgh — Indicative of scrap scarcity, made more acute by adverse weather conditions with resultant delay in obtaining and processing material through dealers' yards, leading consumers are now willing to pay $3 a ton freight equalization on open-hearth grades and are increasing the proportion of lo phos scrap charged into open hearth Machine shop turnings are commandin $1 springboard and cast scrap $5. freight equalization. Overall scrap su ply shows definite signs of becomi tighter. An industry-wide strike wou alter this trend substantially, althou such a strike would also reduce volu of available production scrap.

St. Louis — Scrap supplies have eas somewhat in recent months though the is no indication prices will drop fro ceilings. Chicago continues to dra much scrap from this area and local me ers are forced to reach out to remo points at greater expense. Terminati scrap, once expected to hit the mark in quantity this fall, has been limit by processing labor shortages and disa pointing delays in declarations.

Detroit — Year-end inventory taki by dealers, continued inclement weath and increasingly short supplies resu ing from strike tieups and producti shutdowns over the holidays have p the scrap market at the lowest level activity in years. Mills continue ope hearth production at near-top level, a are biting into scrap inventories in a preciable amounts. Little relief is se in short supplies before 30 days at lea

Birmingham — A general tightening evident in scrap. Dealers expect the s uation to continue as long as blast fu nace operations are restricted, due stacks under repair. Cast grades a scarce, along with heavy melting a ceiling prices prevail.

Boston — Tightening in pig iron reflected by heavier demand for c scrap and steelmaking grades, at ce ing prices, are coming out slowly wh a few shops are dangerously low. Four ry inventories vary widely and so larger consumers have inventory lim Volume of top grade heavy melting st is limited and industrial scrap is improving. Yard operations are ha pered by weather and slow offerings unprepared.

Chicago — Cold weather and hea snow are seriously retarding flow scrap to mills and foundries and making critical a supply situation whi already was uncomfortably tight. least one large steelmaker already curtailed production for lack of scr Some consumers continue to reach into remote territories for material, the quantity is difficult to ascertain.

Cincinnati — Melters are active quest of more iron and steel scrap. the same time available tonnage has be shrinking. Holidays and unfavora weather have cut activities of deal and brokers but the reduced melt due shutdowns has, in defiance of custo failed to diminish buyers' interest. C siderably less production scrap is com out.

Buffalo — Underlying strength in scrap market became more pronounc as heavy snowfalls completely tied dealers' yards and cut off shipme In addition, a freight embargo stopp inbound scrap shipments. Outside ceipts have been increasing as a lead mill consumer is still short on reser to assure capacity ingot operati through the winter. Dealers find rea market for any grade. New local sa during the week aggregated appro mately 10,000 tons. Outside purcha

included a 10,000-ton order placed by a mill with Detroit sellers.

Philadelphia — Demand for scrap is strongest in months, applying to heavy melting steel as well as turnings and borings and cast grades. Most melting steel consumers have been operating hand-to-mouth, though better weather in the past few days has eased the situation somewhat. However, yards still are short of labor and collections are seasonally light and there also is continued lack of demolition work. Shortage of borings and turnings is greatest since before the war, as reconversion has not reached a point where manufactured scrap is at all comparable to wartime production.

Warehouse . . .

Warehouse Prices, Page 100

Cleveland—Position of warehouses has become more critical in recent weeks with stocks of many items at new lows. Receipts from the mills have dwindled and some material scheduled for November and December shipment will not arrive until February or March and possibly much later if steelworkers strike next month. Structurals and plates are especially tight, mill shipments having been cut sharply, while hot-rolled flat products are also scarce. Inventories of alloy grades are about normal and fairly prompt delivery is being made.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1800 tons, bus service station, Detroit, for Great Lakes Greyhound Lines, to R. C. Mahon Co., Detroit; bids Sept. 26.

1400 tons, soaking pit building, Pueblo, Colo., for Colorado Fuel & Iron Corp., to Kansas City Structural Steel Co., Kansas City, Kans., bids Dec. 5.

1150 tons, generating station, Potomac Electric Co., Washington, to Bristol Steel & Iron Works, Bristol, Va., through Stone & Webster Engineering Corp., Boston.

1100 tons, bridges, Sallisaw, Okla., for State Highway Commission, to Virginia Bridge Co., Roanoke, Va.

625 tons, addition to buildings, Crawfordsville, Ind., for R. R. Donnelley & Sons Co., to American Bridge Co., Pittsburgh; J. L. Simmons Co., Indianapolis, Ind., contractor; bids Dec. 11.

584 tons, lamp manufacturing plant and office building, Mattoon, Ill., for General Electric Co.; to Lee C. Moore Inc., Pittsburgh; H. K. Ferguson Co., Cleveland, contractor; bids Nov. 26.

525 tons, fertilizer plant building, Dubuque, Iowa, for Virginia Carolina Chemical Corp., to Rock Island Bridge & Iron Works, Rock Island, Ill.

500 tons, kiln sheds, Chicago, for Chicago Brick Co., to American Bridge Co., Pittsburgh.

460 tons, factory building, Morton Grove, Ill., for Baxter Laboratories Inc.; to Carnegie-Illinois Steel Corp., Pittsburgh; bids Dec. 4.

430 tons, warehouse addition, Chicago, for Baltimore & Ohio railroad to American Bridge Co., Pittsburgh; George Sollitt Construction Co., Chicago, contractor.

370 tons, experimental building No. 89, Laporte, Ind., for Allis-Chalmers Mfg. Co., to Mississippi Valley Structural Steel Co., Decatur, Ill.; bids Dec. 13.

370 tons, power station, San Benito, Tex., for Central Power & Light Co., to Mosher Steel Co., Houston, Tex.; Sargent & Lundy, engineers; bids Nov. 30.

325 tons, power plant addition, Hunlock Creek, Pa., to Frank M. Weaver Co., Philadelphia, through United Engineers & Constructors Inc., Philadelphia.

320 tons, state highway bridge over New York, New Haven & Hartford railroad, Wallingford, Conn., to Electric Boat Co., Groton, Conn.; M. A. Gammino Co., Providence, R. I., general contractor.

300 tons, sheet piling, dock, East Chicago, Ind., for Cities Service Co., to Carnegie-Illinois Steel Corp., Pittsburgh.

300 tons, addition to generation station of Central Illinois Electric Co., Rockford, Ill., to American Bridge Co., Pittsburgh, through Stone & Webster Engineering Corp., Boston.

260 tons, 135 shaft sets, Bessemer, Mich., for Pickands, Mather & Co., to Worden-Allen Co., Milwaukee; bids Oct. 29.

240 tons, du Pont plant addition, Edgemoor, Del., to Bethlehem Fabricators, Bethlehem, Pa.

207 tons, conveyor bridge, Indianapolis, for Indianapolis Power & Light Co., to Hugh J. Baker Co., Indianapolis; bids Oct. 31.

200 tons, turbine foundation for Narragansett Electric Co., Providence, R. I., to American Bridge Co., Pittsburgh.

180 tons, factory, Willow Park, Ill., for Wander Co., to Midland Structural Steel Co., Cicero, Ill.; W. E. O'Neil Construction Co., Chicago, contractor; bids Nov. 26.

100 tons, building for General Electric Co., Lynn, Mass., to A. O. Wilson Structural Co.

Unstated, Ampere substation for Bonneville, to A. Young & Sons, Portland.

STRUCTURAL STEEL PENDING

10,000 tons, office building for John Hancock Insurance Co., Boston; Turner Construction Co., Boston, general contractor.

7800 tons, manufacturing building, Chicago, for Edison General Electric Co.

6200 tons, assembly plant and administration building, Van Nuys, Calif., for Chevrolet Motor Division, General Motors Corp.; bids Dec. 17.

2000 tons, new plant, Willow Island, W. Va. for American Cyanamid Co.

1700 tons, acetate plant extension, Meadville Pa., for American Viscose Corp.

1271 tons, sheet piling, shore protection, 53rd street beach, Chicago, for Chicago Park District; Fitz Simons & Connell Dredge & Dock Co., Chicago, low on general contract; bids Dec. 14.

1000 tons, three bridges, Klinger Road, Washington; bids Jan. 8.

1200 tons, hotel building, Miami Beach, Fla. for Harold Clark.

1166 tons, sheet piling, shore protection, Calumet Park, Chicago, for Chicago Park District; Great Lakes Dredge & Dock Co., Chicago, low on general contract; bids Dec. 1

1000 tons, penstock coaster gates, Grand Coulee Wash., for Bureau of Reclamation.

560 tons, four manufacturing plants, various locations, International Furniture Co., Chicago.

560 tons, asphalt tile plant, Kankakee, Ill., for Armstrong Cork Co.; bids taken Nov. 7 rejected, new bids Dec. 15.

600 tons, building for General Research Corp. Cambridge, Mass.

465 tons, factory addition, Gary, Ind., for Gary Screw & Bolt Division, Pittsburg Screw & Bolt Co.

450 tons, factory addition, Rushville, Ind., for International Furniture Co.

440 tons, beam spans, Conroe and Leonida Tex., for State Highway Commission.

400 tons, beam span, Temple, Tex., for State Highway Commission.

400 tons, building for International Minerals Chemical Corp., San Jose, Calif.; Stone Webster Engineering Corp., Boston, contractor.

400 tons, building for Lever Bros., Baltimore Stone & Webster Engineering Corp., Boston contractor.

340 tons, power station, West Tulsa, Okla., for Oklahoma Public Service Co.

300 tons, woodworking plant, Cornelia, Ga. for International Furniture Co.

300 tons, fixed wheel gate, Keswick dam, Redding, Calif.

257 tons, Soelch overhead bridge, Dane county, Wis., for State Highway Commission; bids Dec. 11.

275 tons, building for General Electric Co., Lynn, Mass.; bids in.

250 tons, manufacturing building, Chicago, for Pyramid Metals Co.

200 tons, beam spans, bridge No. 429, Clifton, Mo., for Wabash railroad.

150 tons, Reading Railroad, bridge, Philadelphia.

Estated, coaster gates for Coulee dam; Consolidated Steel Corp., Los Angeles, low to Reclamation Bureau, $575,000.

Estated, wheel gates penstock intakes, Keswick dam, American Bridge Co. low to Reclamation Bureau, $93,000.

Estated, substations for Bonneville Power Administration, Railway Industrial & Engineering Co., Greensburg, Pa., apparently low $58,718.

Estated, material for Coast Guard control tower, Port Angeles, Wash.; bids to Puget Sound Navy Yard Jan. 8.

REINFORCING BARS . .

REINFORCING BARS PLACED

1,750 tons, intercepting sewer, Chicago, for Chicago Sanitary District, to Carnegie-Illinois Steel Corp., Chicago; S. A. Lealy Co., Chicago, contractor; bids Nov. 8.

1,000 tons, Hotel Plaza terrace and department store, Thomas Emery's Sons, owner; J. C. Penny Co., lessee, Cincinnati, to Pollak Steel Co., Cincinnati, through Frank Messer & Son, Cincinnati, contractor.

850 tons, warehouse, Detroit, for Hudson Store, to Concrete Steel Fireproofing Co., Detroit.

800 tons, ordnance laboratory for Navy, shop building 25, White Oaks, Md., to Bethlehem Steel Co., Bethlehem, Pa., through Dyker Building Co., Washington.

700 tons, alteration to store, Minneapolis, for Dayton Co., to Paper-Calmenson & Co., St. Paul; C. F. Haglin & Sons Inc., Minneapolis, contractor; bids Oct. 20.

650 tons, expansion, St. Paul, for Waldorf Paper Products Co., to Paper Calmenson & Co., St. Paul.

600 tons, expansion, Minneapolis, for Minneapolis-Honeywell Regulator Co., to Hustad Co., Minneapolis; C. F. Haglin & Sons Inc., Minneapolis, contractor.

500 tons, plant addition, Chicago, for White Cap Co., to Ceco Steel Products Corp., Cicero, Ill.; Campbell-Lowrie-Lautermilch Corp., Chicago, contractor.

400 tons, Co-operative office building, St. Paul, to Bethlehem Steel Co., Bethlehem, Pa.; Walter Butler Co., St. Paul, contractor; bids Sept. 25.

300 tons, science building, St. Paul, for St. Thomas College, to Paper Calmenson & Co., St. Paul; McGough Bros., St. Paul, contractor.

300 tons, Coast Guard dock, Portsmouth, Va., to Hall-Hodges, Inc., Richmond, Va., through Tidewater Construction Co., Norfolk, Va.

275 tons, addition, Des Moines, for Meredith Publishing Co., to Ceco Steel Products Corp., Omaha, Neb.; bids Dec. 3.

200 tons, expansion, St. Paul, for Seeger Refrigerator Co., to Paper Calmenson & Co., St. Paul; Grant Construction Co., St. Paul, contractor.

REINFORCED BARS PENDING

500 tons, buildings, East Lansing, Mich., for Michigan State College.

400 tons, power station, Tyrone, Ky., for Kentucky Utilities & Power Co.; Bates & Rogers Construction Corp., Chicago, contractor; bids Dec. 10.

375 tons, engineering building, Highland Park, Mich., for Chrysler Corp.

[illegible] tons, apartment buildings, 6900 South Crandall avenue, Chicago.

300 tons, expansion, Peoria, Ill., for Pabst Brewing Co.; bids Jan. 3.

175 tons, Paducah, Ky., for United States Engineers.

150 tons, expansion, Chicago, for Estee Bedding Co.

130 tons, paving, Pocahontas county, Iowa.

150 tons, expansion, Chicago, for W. O. Kling & Associates.

110 tons, expansion, Chicago, for *Chicago Tribune;* R. C. Wieboldt Co., Chicago, contractor.

110 tons, female veterans unit, Kankakee State hospital, Kankakee, Ill.; Frank Burke & Son, Chicago, contractor, low on bids Nov. 27; project postponed indefinitely.

102 tons, bottling house, Chicago, for Prima-Bismarck Brewing Co.; bids Dec. 6; project postponed indefinitely.

100 tons, addition to buildings, Crawfordsville, Ind., for R. R. Donnelley & Sons Co.

PLATES . . .

PLATES PLACED

11,000 tons, tunnel lining and bracing, intercepting sewer, Chicago, for Chicago Sanitary District, to Commercial Shearing & Stamping Co., Youngstown, O.; S. A. Healy Co., Chicago, contractor.

263 tons, face caissons for maintenance spillways, Grand Coulee dam, Grand Coulee, Wash., for Bureau of Reclamation, to Consolidated Steel Corp. Ltd., Los Angeles.

247 tons, gas holder, Waterloo, Iowa, for Iowa Public Service Co., to Stacey Bros. Gas Construction Co., Cincinnati; bids Dec. 11.

PLATES PENDING

500 tons or more, 2541 feet of ½-inch penstock pipe for Seattle city light department; bids Jan. 10.

100 tons or more, 500,000-gallon, steel water storage tank, water treatment plant, Philadelphia; bids in to public works officer, naval base station, Philadelphia.

Unstated tonnage, steel outlet pipes, Anderson Ranch dam, bureau of reclamation, Denver; Williamette Iron & Steel Corp., $33,982 f.o.b. Portland, Ore., low.

Unstated, outlet pipe Anderson Ranch Dam, Idaho; Willamette Iron & Steel Corp., Portland, Oreg., low at $36,502.

Unstated, 35 miles 10-gage steel water pipe for Aloha Huber water district, Portland, Oreg.; A. L. Soule, Portland, low at $174,762.

PIPE . . .

CAST IRON PIPE PLACED

500 tons, 16 to 4-inch 12th St., improvement, Tacoma, to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

350 tons, for Pasco, Wash., to Pacific States Cast Iron Pipe Co., Portland, Oreg.

CAST IRON PIPE PENDING

400 to 500 tons, Lake Stevens public utility district No. 1, Snohomish County, Washington, 8 to 4-inch, also alternates for transite; J. W. Carey, Seattle, engineer, bids Jan. 17.

RAILS, CARS . . .

RAILROAD CARS PLACED

Bessemer & Lake Erie, 500 seventy-ton hopper cars, to the Pullman-Standard Car Mfg. Co., Chicago; these are in addition to 250 to Pressed Steel Car Co., Pittsburgh, previously reported.

Donora Southern, 40 seventy-to n low-alloy, high-tensile steel gondola cars, to Magor Car Corp., New York.

Newburgh & South Shore, 100 seventy-ton low alloy, high tensile steel gondola cars, to Magor Car Corp., New York.

New York, New Haven & Hartford, 180 streamlined, air conditioned passenger cars, to Pullman-Standard Car Mfg. Co., Chicago, subject to approval of federal court, New Haven, Conn.

CONSTRUCTION AND ENTERPRISE

OHIO

CLEVELAND—Marble Burial Vault Co., care E. Gerard Wolslagel, 1405 Prospect Ave., has been incorporated with 1000 shares of $1 value and 500 shares of $100 value each. Mr. Wolslagel is vice president and general manager.

CLEVELAND—Liquid Carbonic Corp., P. F. Lavedan, president, 1318 West 58th St., will spend about $5,200,000 on new construction and equipment at various plants.

CLEVELAND—Cleveland Cap Screw Co., J. W. Fribley, president, 2817 East 79th St., has improvement program costing about $500,000, to double present floor space. First of three units with 20,000 square feet, is under way, for warehousing facilities, and additional equipment will be installed at the main plant.

CLEVELAND—Kilroy Structural Steel Co., Edward A. Kilroy, president, 13800 Miles Ave., will build a one-story 85 x 400-foot fabricating building at 8500 Union Ave.

CLEVELAND—Euclid Road Machinery Co., E. H. Parkhurst, president, 1361 Chardon Rd., is installing equipment for building heavy-duty and off-the-highway trucks. An assembly plant is to be built at St. Clair Ave. and East 222nd St., to be completed by spring.

DAYTON, O.—Acme Spring & Welding Co., 525 East Second St., has let contract to H. Stock & Son, 30 North Ludlow St., for a one-story shop 70 x 130 feet, to cost about $55,000.

MARION, O.—City, City Hall, has approved bonds for rehabilitating and enlarging the sewage disposal plant at cost of about $842,000.

ORRVILLE, O.—Orrville Milk Condensing Co., L. S. Hallinger, general manager, will build a two-story 40 x 40-foot boiler plant addition and will install a boiler and stoker, at cost of about $25,000.

ROCKY RIVER, O.—City, City Hall, has approved $75,000 issue of bonds for a municipal garbage incinerator plant. T. D. Wier, City Hall, is director of public service.

ST. MARY'S, O.—City, City Hall, has plans for a sewage disposal plant and sewer system, to cost about $150,000, bonds having been approved. F. G. Browne, Marion Bldg., Marion, O., is consulting engineer and F. M. Hagerman, City Hall, is city engineer.

WOOSTER, O.—Timken Roller Bearing Co., William E. Umatatto, president, 1801 Deuber Ave., Canton, O., will build a one-story 35,000-square foot tube mill, 3000-square foot die plant and 6000-square foot substation at Wooster, to cost about $300,000.

MASSACHUSETTS

ATHOL, MASS.—Union Twist Drill Co. has let contract to E. J. Cross Co., 150 Prescott St., Worcester, Mass., for a power plant, boiler and power facilities, to cost about $145,000. G. Adolph Johnson, 390 Main St., Worcester, Mass., is architect.

CONNECTICUT

WALLINGFORD, CONN.—American Cyanamid Co., 30 Rockefeller Plaza, New York, plans factory expansion by several units, to cost about $1,500,000.

WINSTED, CONN.—Winsted Hardware Mfg. Co. has plans by Leo F. Caproni, 1221 Chapel St., New Haven, Conn., for a one and two-story plant 160 x 325 feet, to cost about $250,000.

MICHIGAN

INKSTER, MICH.—Wolverine Fabricating & Mfg. Co., 3530 West Fort St., will let contract soon through A. O. Schmidt, architect,

same address, for a one-story plant to cost about $50,000.

ILLINOIS

CHICAGO—Howard Foundry Co., 1700 North Kostner Ave., has let contract to Freevol Smedberg Co., 5807 West Chicago Ave., for a foundry building 80 x 273 feet, to cost about $43,000. A. W. Krieg, 180 Maplewood St., Riverside, Ill., is architect.

CICERO, ILL.—Henry Lindahl Foundry & Machine Co., 5900 Ogden Ave., has let contract to Clearing Industrial District, 6544 South Central Ave., Chicago, for a one-story 75 x 150-foot machine shop addition, to cost about $45,000.

SKOKIE, ILL.—Austin Wells Foundry, care contractor, has let contract to City Wide Builders, 3602 West Grand Ave., Chicago, for a one-story steel foundry, to cost about $230,000. Engineering Systems, 221 North LaSalle St., Chicago, are architects.

INDIANA

BLUFFTON, IND.—C. B. Arnold, clerk of board of public works, will take bids Jan. 8 for waterworks and power plant improvements, including 300,000-gallon elevated steel tank and 1600-kw diesel engine and generator, to cost about $200,000. B. H. Freeland, City Hall, is waterworks engineer.

TERRE HAUTE, IND.—Shepard Heater Co., 6624 South Park Ave., Chicago, has let contract for a one-story 110 x 220-foot plant to Garmong & Son, 1201 Crawford St., to cost about $150,000.

MARYLAND

BALTIMORE—American Can Co., New York, plans manufacturing plant with about 20 acres floor space, to cost about $6 million, principally for manufacture of food containers for export.

BALTIMORE—Rheem Mfg. Co. will spend about $350,000 on plant improvements, including alterations to equipment and buildings. Will manufacture steel barrels, fuel oil storage tanks, underground tanks, pneumatic and expansion tanks, automatic water heaters, range boilers and steel stampings.

BALTIMORE—Armco Drainage & Metal Products Inc., 1611 Court Square Bldg., subsidiary of American Rolling Mill Co., Middletown, O., has bought five acres and will build four structures next spring, containing about 30,000 square feet of floor space. Will manufacture metal culvert pipe, storage tanks and do general welding fabrication.

BALTIMORE—Arlington Bronze & Aluminum Corp., care Joseph O. Danko, president, has been incorporated to operate a foundry to be built at 4700 East Wabash Ave., for production of brass and aluminum castings and aluminum windows.

BALTIMORE—Worcester Wire Novelty Co., 2635 Boston St., is reconditioning its plant and adding new equipment for production of wire products, waste and display baskets, desk trays, rat traps, rubbish burners, etc.

ELKTON, MD.—Clogg Steel Products Co., 2122 West Pratt St., Baltimore, plans erection of a plant costing about $100,000.

GEORGIA

ATLANTA, GA.—Crown Cork & Seal Co. plans a $2 million plant here. Robert & Co., architects and engineers, are drawing plans.

ATLANTA, GA.—C. & H. Air Conditioning Fan Co. Inc., 1603 DeKalb Ave., has let contract to H. G. Walton, Warlick Place, for a 42 x 72 x 250-foot plant, to cost about $53,000.

MACON, GA.—Mead Corp. Dayton, O., will ask bids early in 1946 for pulp and paper mill, estimated to cost about $10 million.

ALABAMA

DOTHAN, ALA.—Covington Planter Co. will

take bids early in 1946 for a manufacturing building to cost about $75,000, with 30,000 square feet floor space. R. L. Williamson & Associates, Dothan, are architects.

MISSISSIPPI

LOUISVILLE, MISS. — National Automotive Fibers Inc., Detroit, has had plans drawn by N. W. Overstreet, architect, 201 North Lamar St., Jackson, Miss., for a $225,000 plant, one story, with 80,000 square feet floor space. Bids will be asked in February or March.

ARKANSAS

LITTLE ROCK, ARK.—Minnesota Mining & Mfg. Co., 900 Fauquier Ave., St. Paul, has let contract to Ditmars-Dickman-Pickens, Gazette Bldg., for a roofing material plant, to cost about $1,500,000.

RECTOR, ARK.—W. J. Hurst and associates are interested in establishing a soy bean oil mill to cost about $100,000.

WISCONSIN

MILWAUKEE—American Welding & Engineering Corp., 820 South Water St., has let contract to F. J. Hinton, 1721 North Water St., for a one-story 80 x 300-foot plant to cost about $60,000.

MINNESOTA

ST. PAUL—Highway Safety Appliances Inc., F. Doud, secretary, 2429 University Ave., has let contract to W. A. South Co., 120 South Tenth St., Minneapolis, for a plant to cost about $65,000.

MINNEAPOLIS—Minneapolis-Honeywell Regulator Co., 2735 South Fourth Ave., has plans by E. J. Prondzinski, 949 Plymouth Bldg., for a four-story plant addition, to cost about $200,000.

KANSAS

PITTSBURG, KANS.—W. S. Dickey Clay Mfg. Co., Kansas City, Mo., will let contracts soon for a sewer pipe manufacturing plant to cost over $500,000. Alfred Benberg, New York Life Bldg., Kansas City, is architect and engineer.

TEXAS

SAN ANTONIO, TEX.—Argonaut Realty Division General Motors Corp., General Motors Bldg., Detroit, will let contract soon for a one-story 122 x 242-foot motor parts warehouse, with spur track, to cost about $100,000. Allen & Kelly, Architects & Builders Bldg., Indianapolis, are engineers and architects.

CALIFORNIA

EL MONTE, CALIF.—Electric Household Utilities Co., 2900 Valley Blvd., has let contract to E. A. Raulston, 6669 Sunset Blvd., Los Angeles, for a 150 x 260-foot factory and office building, to cost about $145,000.

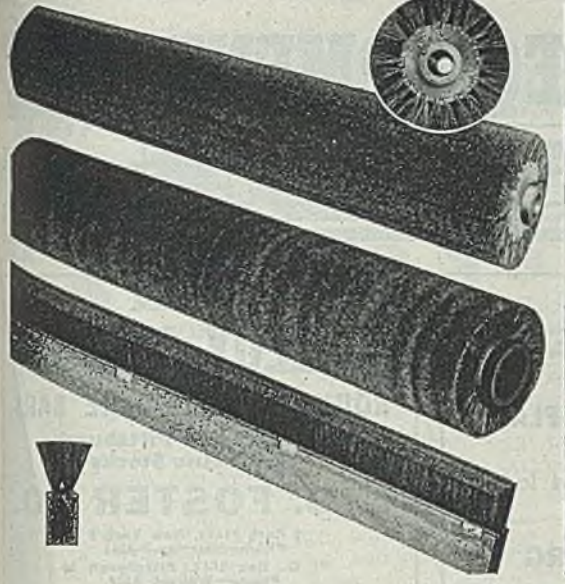
OREGON

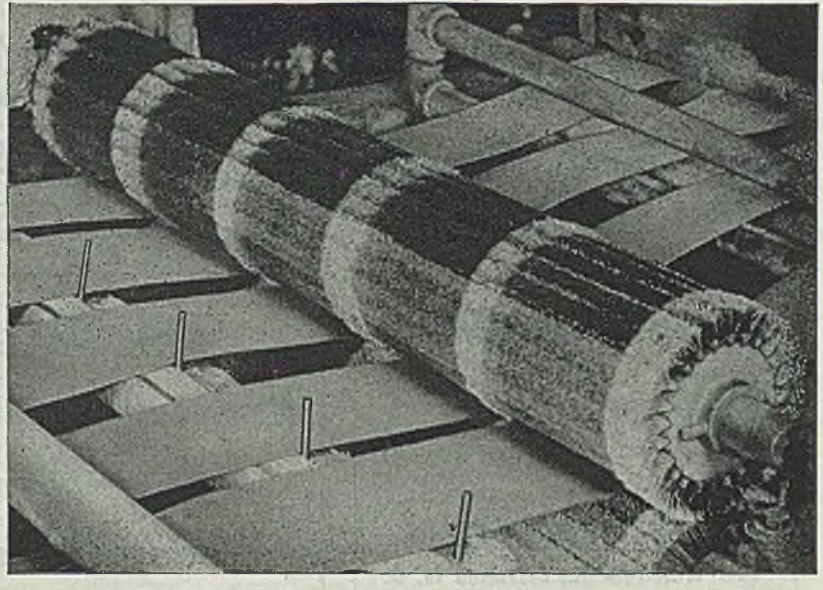
PORTLAND, OREG.—Steel Products Co. of Oregon Ltd. has been incorporated to deal in fabricated arts, sheet metal, etc., by Harry P. Wolf and associates. Company will build two plant structures containing 40,000 square feet at 4000 N. W. St. Helens Rd., including cranes, cutting equipment and other equipment.

WASHINGTON

BELLINGHAM, WASH.—Whatcom Tool Co. has been incorporated with $50,000 capital, by C. I. Phelps, 1204 Ellis St., and associates.

CLARKSTON, WASH.—City plans $76,000 bond issue to finance proposed sewage disposal plant on plans by R. H. Corey, Portland, Oreg.





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305 tons cold rolled NE8750, 1.265" O.D. x .546" wall x 14-16' lgths.

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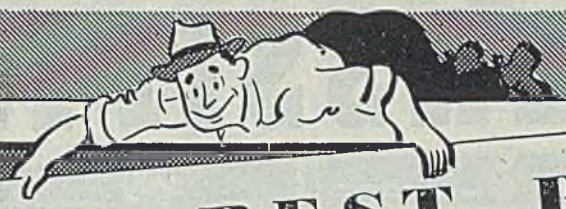

SIMMONS BEST BUYS

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24″ BULLARD New Era Vertical with one swiveling turret head and one side head. AC or DC spiral drive.

42″ BULLARD New Era Vertical with one swiveling turret head and one side head. AC or DC.

NO. 1 PUTNAM Vertical Car Wheel Boring Mill with side head for hub facing and hoist. AC or DC motor drive.

100″ NILES - BEMENT - POND Vertical with two swiveling heads, Power Rapid Traverse. AC or DC motor drive.

120″ BETTS Heavy Vertical with two swiveling heads, Power Rapid Traverse, AC or DC.

120″ NILES - BEMENT - POND Vertical with two swiveling heads, Power Rapid Traverse. AC or DC motor drive.

120″ CINCINNATI Massive Pattern Vertical with two swiveling heads. Power Rapid Traverse. AC or DC motor drive.

2½″ Bar CLEVELAND horizontal boring, milling and drilling machine, table type, all geared power feeds. AC or DC.

NO. 32 3¾″ Bar LUCAS Horizontal Table Type Boring, Drilling, and Milling Machine, Power Rapid Traverse. AC or DC.

4½″ Bar NILES-BEMENT-POND Horizontal table type boring, drilling and milling machine, all geared feeds. AC or DC.

No. 1 4″ Bar DETRICK AND HARVEY floor type horizontal boring, drilling and milling machine. AC or DC.

5½″ Bar NILES-BEMENT-POND Heavy floor Type Horizontal Boring, Drilling, Milling Machine. AC or DC motor drive.

RADIAL DRILLS

4′ AMERICAN Plain triple purpose enclosed head drill with tapping attachment. Single pulley belt drive or AC or DC.

5½′ AMERICAN Full Universal Triple Geared with tapping attachment. Single pulley belt drive or AC or DC motor dr.

6′ CARLTON Plain 15″ round column with DC motor on arm, tapping attachment.

8′ NILES-BEMENT-POND "Right Line" Plain with 230 volt DC motor on arm, tapping attachment.

GRINDERS

No. 2 CINCINNATI centerless grinder.

12″ O.S. WALKER Single Stroke Surface Grinder with 12″ dia. magnetic chuck and 7½ HP, AC or DC motor.

NO. 16 BLANCHARD High Power Vertical Surface Grinder with 26″ magnetic chuck and 20 HP, AC or DC motor.

LATHES

36″ x 30′ LODGE AND SHIPLEY 18 speed geared head screw cutting engine lathe with two carriages. AC or DC.

30″x34′ LEBLOND Boring Lathe geared head, quick change gear. AC or DC.

42″x36′ PUTNAM Geared Head, 25′ between centers. Quick change gear box. AC or DC.

48″x20′ NILES-BEMENT-POND Extra Heavy Geared Head, 11′5″ between centers. Power cross and angular feed to compound rest. Semi-quick change gear, taper attachment.

48″x30′ BRIDGEFORD 9 speed geared head, 20′ between centers. Triple geared internal face plate drive. AC or DC.

48″x59′ BRIDGEFORD Boring and Turning with 9 speed geared headstock, turning carriage with compound rest, AC or DC motor drive.

NO. 4 PUTNAM Extra Heavy Center Drive Axle Turning Lathe with two carriages. AC or DC motor drive.

42″ PUTNAM Heavy Double End Car wheel lathe. Equipped with overhead hoist for loading wheels and axles.

MILLERS

NO. 3B BROWN & SHARPE Plain with double overarm table 14″x60″ with 7½ HP, AC or DC.

NO. 4 CINCINNATI High Power Plain. Power rapid traverse table 16½x64″. Single pulley belt drive or AC or DC.

NO. 4 CINCINNATI High Power Vertical, Power rapid traverse. Table 16½″x64″. Single pulley belt drive.

24″x24″x12′ INGERSOLL Horizontal Spindle Slab Miller with adjustable rail.

24″x24″x12′ INGERSOLL Planer Type milling machine with one head on adjustable rail and two side heads, AC or DC.

48″x48″x16′ INGERSOLL Planer Miller with 2 heads on adjustable rail and 2 side heads. AC or DC motor.

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36″x36″x12′ CINCINNATI standard planer with 2 heads on rail, power elevation to rail, AC or DC.

38″x38″x14′ OHIO Heavy with two heads on rail and one side head. 230V DC reversing type planer motor and control.

48″x48″x15′ NILES - BEMENT-POND Heavy with two heads on rail and two side heads. 230V DC reversing type planer motor and control.

48″x48″x24′ NILES - BEMENT-POND Heavy with two heads on rail and two side heads. 230 Volt DC reversing type planer motor and control.

48″x48″x32′ G. A. GRAY Spiral Drive with two heads on rail and two side heads. 230 Volt DC reversing type planer motor and control.

72″x72″x18′ NILES - BEMENT-POND Heavy, two heads on rail and two side heads. 230 Volt DC reversing type planer motor and control.

84″ widened to 98″ x 32″ x 42′ SOUTHWARK Extra Heavy, two rail heads and two side heads. 230 Volt DC reversing type planer motor and control.

16′x10′x30′ BETTS heavy, two heads on rail and two side heads, forced feed lubrication. 230 Volt DC reversing type planer motor and control.

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15″ NEWTON Crank slotter, 30″ circular table, AC or DC.

15″ NILES-BEMENT-POND 30″ circular table, AC or DC motor drive through gear box.

20″ SELLERS Crank slotter, 48″ circular table, AC or DC.

MISCELLANEOUS

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26″x10′ LIBBY turret lathe with 7½″ hole through spindle pan bed. Power rapid traverse. AC or DC.

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WANTED: DISTRICT SALES MANAGER WATER treating and process equipment for liquids. Must be familiar with these lines and have held similar positions. Location New York City. Write stating experience, education, age, companies worked for, references, positions held, salary expected, etc. Address Box 351, STEEL, Penton Bldg., Cleveland 13, O.

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ADVERTISING INDEX

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