STEEL

The Magazine of Metalworking and Metalproducing

VOL. 117, NO. 21 NOV. 19, 1945

NEWS

TECHNICAL

FEATURES

MARKETS

NEXT WEEK...

How Electrodeposited Plastics Protect Metals

Metallurgical Factors Affecting Die Life

Tubular Products Formed by Flame Spinning

Selecting Electrodes for Welding Mild Steel

Layout Reproduction Without Camera or Projector

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THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET
NEW YORK 5, N. Y.

STEEL
November 19, 1945

Persistent Injustice

The more one studies the circumstances surrounding strike voting conducted by the National Labor Relations Board, the more one wonders how responsible officials in President Truman's administration can condone such foolishness and why Congress does not put a stop to it.

NLRB is stretching a technicality to absurd limits when it assumes authority under this act to conduct strike votes under non-war conditions. This act was passed by Congress to provide a cooling-off period to discourage impetuous strikes that would retard war production. The war is over, but because the President has not proclaimed that the period of war emergency has ended NLRB takes dubious license to invoke the act.

Because balloting is conducted ostensibly under wartime legislation, the question asked employees is in effect "Are you willing to interrupt war production in order to decide the dispute at issue?" Inasmuch as no war production is involved in the present dispute, the question is meaningless. Nevertheless, NLRB persists in wasting half a million dollars seeking phony answers to this impossible question.

NLRB makes no effort whatever to determine whether or not a strike vote is desired by employees. It takes a list of employers submitted by CIO and writes a form letter to each: "Your company is one of several hundred employers named in a labor dispute notice filed . . . . by USA-CIO, pursuant to provisions of the War Labor Disputes Act. Under the provisions of this act, NLRB is obligated to conduct a strike vote among certain employees in your company on Nov. 28, 1945."

Note the admission that "your company is one of several hundred employers." CIO took no pains to distinguish between employers who are paying high wages and those paying low wages, between those who have had no labor trouble and those who have had much, nor between employers who have no-strike contracts and those who have not. CIO simply supplied a list of steel producers, forge shops, foundries and fabricating shops. NLRB dutifully sent notices to all, including many whose employees have not registered grievances of any kind.

This mass persecution is unjust. To herd all employers—large and small and good and bad—into a CIO-NLRB concentration camp regardless of deed smacks too much of the treatment accorded political prisoners by our late axis enemies.

The only encouraging aspect of this terrible situation is that the stench of persistent injustice is becoming so nauseating that the decent elements of society will demand corrective action.

CRISIS IN PRICES: A poll of industrial executives on the desirability of continuing price controls probably would reveal wide differences of opinion. Perhaps a majority would favor sensible price control as a curb against inflation only until such time as the influence of competition and the law of supply and demand become strong enough to control the situation.

However, the patience of those who see the need of stabilizing influences during the present difficult period is being sorely tried by the failure of OPA to adopt and administer realistic price policies. An examination of complaints indicates that while OPA may be holding the line against inflation in a general sense, it is doing so at the expense of grave injustices which if continued much longer will wreck many individual companies and further delay reconversion.

Unfortunately some of these injustices have the effect of promoting inflation instead of retarding it. In numerous instances OPA policies practically force a manufacturer to discontinue low-price lines and concentrate on high-price goods if his business is to

(OVER)

survive. Many small manufacturers refrain from seeking needed price relief because the obstacles of red tape, delay and confusion are too formidable.

An about-face in OPA is imperative. Less-involved formulas that can be applied promptly and equitably are needed. —pp. 88, 102

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ON THE WRONG TRACK: A study of government policies affecting labor relations, conducted by Dr. Harold Metz under a grant from the Falk Foundation and published by the Brookings Institution, emphasizes a number of points that should command the attention of Congress.

One is that federal labor policies tend to place more emphasis upon increasing workers' bargaining power than upon either the right of self-organization or the peaceful settlement of labor disputes. Another is that while federal agencies encourage the making of collective agreements, little is done to make these agreements binding or enforceable. Still another point is that the government's approval of closed-shop, union-shop and maintenance-of-membership clauses in collective agreements runs contrary to the individual worker's legal right to organize or not to organize.

Employers have objected to these and other defects in government policy repeatedly. Renewed emphasis on these weaknesses by impartial bodies, such as the Brookings Institution, should carry more weight with the public and may eventually help to convince government and union officials that they are on the wrong track. —p. 87

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POWDER METALLURGY: Manufacturers desiring to know more about the possibilities and limitations of powder metallurgy as a means of producing machine parts will find considerable helpful information in an exhaustive analysis of this subject in this issue.

In it are data to support the conclusion that for the design engineer who wishes to make use of powdered metal parts in his design, a minimum of only 5000 pieces is required to make the method economical and competitive with other processes, provided design of the parts is relatively simple. For intricate parts, especially if unusual properties are required, the lowest practical quantity probably would range from 20,000 to 50,000 pieces.

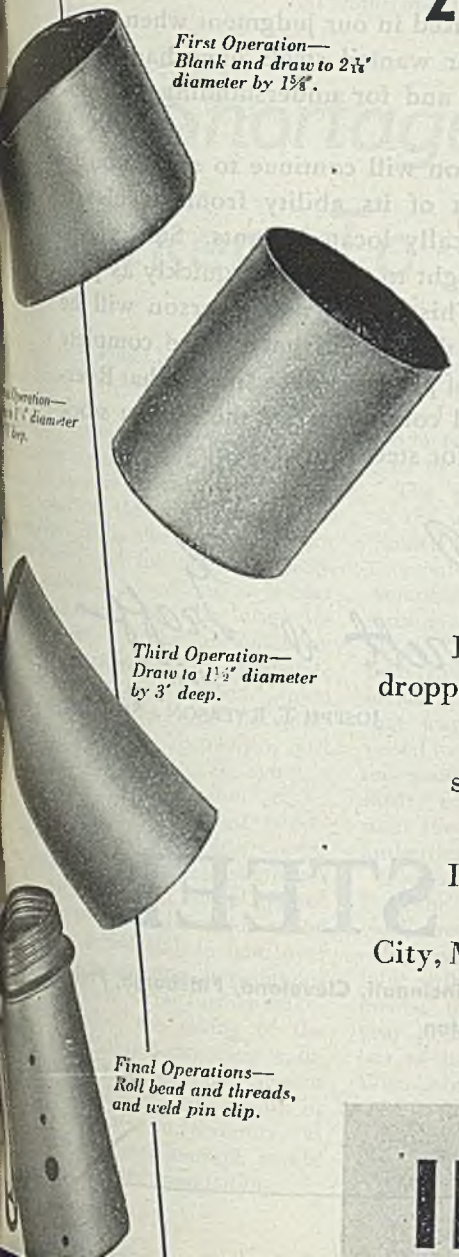
Considerable development work and additional pilot plant operation will be needed to clarify the true possibilities of powder metallurgy, but progress to date points to a steady broadening of its application. —p. 116

POSTWAR POSTSCRIPTS: Significant straw in the wind is the report of the Department of Commerce that during the first quarter of this year 130,000 new companies entered business compared with 50,000 companies which discontinued operations. Before the war (p. 98) about 100,000 new ventures were launched quarterly, just offsetting the 100,000 companies that suspended during the same period. . . . Civilian Production Administration, recent successor to the War Production Board, is exhibiting in the Social Security building in Washington (p. 99) statistical material collected by WPB during the war period. . . . San Francisco, already proud possessor of the world's two largest bridges, is tentatively considering construction of a third (p. 107) to link San Francisco and Oakland over San Francisco bay. . . . Consolidated Vultee Aircraft will convert its Nashville plant from aircraft production (p. 110) to the manufacture of gas and electric kitchen ranges. . . . The exhaustive report of Arthur G. McKee & Co. on the future possibilities of the government-owned steel plant at Geneva, Utah (p. 91) is fairly optimistic as to its profitable operation by private interests. . . . In refuting the Department of Commerce report on the ability of automobile manufacturers to absorb substantial wage increases without raising selling prices, the Automobile Manufacturers' Association (p. 102) cites six concrete examples of alarming decreases in employee productivity, some of them reflecting deliberate restriction of output by union dictation. . . . News that a big corporation has acquired the property of a smaller competitor is so commonplace that on the rare occasions when the reverse is true, industry sits up and takes notice. A noteworthy case in point is the purchase by Sharon Steel Corp. (p. 90) of the Farrell Works of Carnegie-Illinois Steel Corp. In many respects this is an interesting and gratifying transaction. . . . Manufacturers continue to be hard hit by shortages of labor, materials and component parts. Production of trucks and busses by White Motor Co. (p. 112) is retarded by lack of components, particularly cylinder blocks. . . . Largely because of the coal strike steel ingot production in October (p. 89) dropped to the lowest monthly tonnage recorded since May, 1940. . . . Scores of small employers whose employees have registered no grievances (pp. 81, 85, 86) resent being herded into strike votes en masse. . . . Ford Motor, despite rumors it would be liberal toward union wage appeals (p 87) has turned down CIO demand for a 30 per cent increase in wages.

E. L. Shaner

EDITOR-IN-CHIEF

Breakage Reduced from 20% TO LESS THAN 1% by INLAND STEEL



First Operation— Blank and draw to 2¼" diameter by 1⅝".

Third Operation— Draw to 1½" diameter by 3" deep.

Final Operations— Roll bead and threads, and weld pin clip.

When the battery tube for this life-saving flashlight was put into production, breakage was as high as 30 percent and the average was 20 percent. This deep draw, 1½ inches in diameter by 3 inches deep, was then being made from 0.014-inch, special coated manufacturing terne plate, produced from deep drawing rimmed steel. The high breakage was a particularly serious matter, not only because of high cost, but because of an urgent production schedule.

This breakage problem was not solved until an Inland engineer and the production experts of the manufacturer, The J. L. Clark Mfg. Co., Rockford, Ill., met to study all requirements. At this meeting, they determined the type of sheet steel to be used. From receipt of the first shipment of the new steel, breakage dropped to less than 1 percent and has remained there ever since.

Inland engineers have helped many manufacturers with similar production and steel selection problems. They will be glad to work with you.

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

INLAND SHEETS

Statement of Position—

Until the present tight steel situation is eased, there will be an unbalanced condition in all steel stocks.

There are three principal reasons for this:

1. Labor and coal shortages are currently lowering steel production.
2. Every industry is anxious to get on with reconversion and peacetime production.
3. There is a tremendous backlog of maintenance and repair requirements.

Ryerson stocks, largest in the nation, reflect current conditions. And because of the great load, it is not always possible to supply the desired steel or deliver available steel as quickly as usual. But we are doing everything we can to satisfy every customer's requirements.

When a certain kind or size of steel is not immediately available, every effort is made to suggest satisfactory alternates which buyers may use with confidence.

Ryerson's 103 years of experience in maintaining large and complete stocks and working closely with all industries, makes the recommendations of Ryerson metallurgists and engineers particularly practical and helpful.

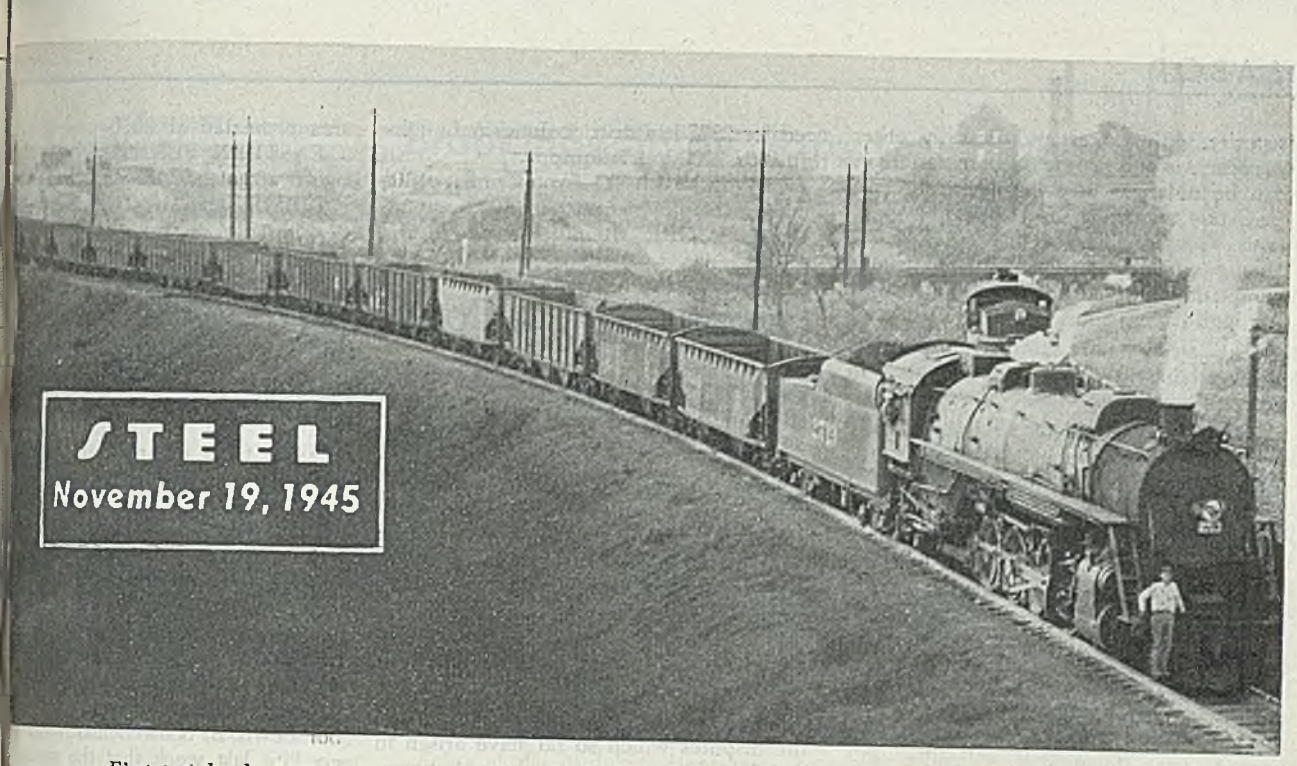
We thank our customers for their courtesy and patience, for the confidence they have placed in our judgment when alternates for wanted steels have had to be offered, and for understanding our position.

Ryerson will continue to serve you to the best of its ability from its eleven strategically located plants. Stocks will be brought to normal as quickly as possible. This means that Ryerson will be among the first to have more complete stocks of present scarce steels—that Ryerson will continue to be the largest stock source for steel in the country.

Everett D. Graff
President
JOSEPH T. RYERSON & SON, INC.

RYERSON STEEL

Steel-Service Plants at: Chicago, Milwaukee, Detroit, St. Louis, Cincinnati, Cleveland, Pittsburgh, Philadelphia, Buffalo, New York, Boston



First trainload of Minnesota ore arrives at Birmingham to supplement local ore supplies at the furnaces of the Tennessee Coal, Iron & Railroad Co. Imports of 250,000 tons of northern ore are necessitated by a shortage of workers in southern mines. Movement will require more than 100 trains and the tariff alone will approximate $750,000

Labor Shortage Slows Steel Output; Workers To Vote on Strike Issue

WHILE the steel industry faces a possible strike as result of deadlocked wage negotiations, producers are more immediately concerned over the loss of production resulting from the present shortage of workers in the mills.

Strike votes of the steelworkers will be taken Nov. 28 by the National Labor Relations Board and the unionists probably will authorize a walkout to bolster their demands for a $2-a-day wage increase. However, a strike authorization will not necessarily mean an immediate widespread stoppage of operation. Union leaders insist neither they nor the workers want a strike. Management is just as emphatic that it wants to avoid a strike or stoppage. Authorization of a strike vote, consequently, would not necessarily mean an immediate industry-wide walkout although some wildcat stoppages might be experienced at some points. Likewise a strike vote would provide union leaders with an added club to hold over management in bargaining negotiations which would seem likely some further negotiations would follow the taking of the vote before an actual industry-wide walkout occurred. To read into the present situation that a strike late this month or early next month was a certainty, as has been done in some quarters, would appear to be unwarranted speculation.

Steel producers have refused to grant the wage increase demanded on the ground present ceiling prices on steel products do not permit a sufficient return to meet present costs.

The position of the steel producers on the wage and price problem was explained to the public last week in advertisements in leading newspapers by the American Iron & Steel Institute, representing companies having 95 per cent of steel capacity. These pointed out that steel prices are held at prewar levels, generally less than 1937 prices, that wages and other costs have been raised to a point where losses are incurred on many products, and that the industry cannot grant any wage increases until the Office of Price Administration authorizes higher prices.

Producers have protested to the NLRB that the strike votes to be taken next week are a violation of the provision in company-union contracts which prohibit strikes during the life of the agreements, most of which have about a year to run. NLRB has replied that it has no discretion in the matter under the War Labor Disputes Act and must proceed with the strike votes.

Meanwhile, fifty thousand jobs in the steel industry are going begging.

This situation exists in the face of swollen rolls of unemployment and while hundreds of thousands of people displaced from high-paying war jobs are drawing unemployment compensation. It continues despite aggressive recruiting campaigns by the steel producers. It is accentuated by a high rate of absenteeism.

This incongruous picture is revealed in a survey by STEEL's editors in leading production centers.

Additional workers are needed to fill vacancies created by revisions of production schedules for peacetime operation and to meet a high demand for sheets, strip and other steel products needed for automobiles, washing machines, refrigerators and hundreds of other civilian items.

The apparent incongruity of mills being unable to hire workers while many are unemployed is explained by the potential worker's reluctance to accept a lower take-home pay than that to which he became accustomed during the war and by the fact that unemployment compensation payments and idleness appear preferable to working.

A large portion of the workers needed by steel mills are for common labor, for which the rate is 78 cents an hour, or $31.20 for a 40-hour week. This wage, after deductions for income tax, social

security, union dues and possibly other purposes, is only a few dollars more than can be obtained in unemployment compensation, which is free of all deductions. Consequently, a disposition exists among workers to draw unemployment compensation and loaf or shop around for high-paying jobs.

The steel labor shortage in various steel producing districts, as reported to STEEL's editors:

CHICAGO—Current needs are 6100 workers, bulk common labor. Shortage prevents mills from returning to 40-hour week.

CLEVELAND — Scarcity of workers retards production, especially in finishing mills, although some easing has been noted in past month. Republic Steel Corp. lists needs for all plants at 4450, of which 576 are needed in Cleveland. One district mill is resuming hiring of women for mill jobs, a practice which had been discontinued at the end of the war.

DETROIT—Great Lakes Steel Corp. wants to hire 1500 in next 30 days, but USES sees little likelihood of success.

ST. LOUIS—Flat and bar steel mills need more than 400 immediately, 775 when new facilities are completed. Eighteen hundred openings listed with USES by steel mills and foundries.

BUFFALO — Job openings available for 4000.

CINCINNATI—Thousand more workers needed.

PITTSBURGH — Carnegie-Illinois has need for 2875 in district. Jones & Laughlin needs 1000 at Aliquippa.

NEW ENGLAND—Wire mills could increase employment 10 to 20 per c[illegible].

BALTIMORE—Requirements in this area estimated at 3000 workers.

EASTERN PENNSYLVANIA — tween 1300 and 1400 currently requi

BIRMINGHAM—Tennessee Coal, & Railroad Co. needs 3000.

Hopes Rise for Constructive Action at National Labor-Management Conference

HOPES that the National Labor-Management Conference in Washington will result in constructive action were somewhat higher at the end of the second week of discussions than when the delegates convened Nov. 5. Few believe, however, that the conference will be able to evolve a formula for effectively smoothing out industrial disputes from this time forward.

Observers find significant the fact that the disputes which so far have arisen in the discussions have not been between the management delegates and the labor representatives but betwen opposing labor factions. Considerable significance has been attached to the action of the American Federation of Labor, United Mine Workers and Railway Brotherhood delegations in siding with management to oppose the Congress of Industrial Organizations' attempt to inject current wage issues into the meeting.

Industry delegates last week were working on a statement of their position on the principle subjects on the agenda.

Aside from the preliminaries and organizational matters, a large portion the conference's time to date has b devoted to committee work, results which are not yet apparent.

While newsmen must depend on p conferences and statements from d gates buttonholed outside the confere for information on the progress of conference, statements of delegates generally optimistic. Secretary of bor Lewis B. Schwellenbach told rep ers late last week that the meeting making "very definite progress," tow the elimination of industrial strife. is moving along very nicely," he sai

Steel Corp. Shipments Show Loss in October

Shipments of finished steel by United States Steel Corp. in Oct totaled 1,290,358 net tons, a decreas 31,218 tons from the September t and of 484,611 tons from those of O ber, 1944. For ten months this

Pictured here is the executive committee of the National Labor-Management Conference, attending a luncheon with Secretary of Labor Schwellenbach. Left to right, seated: Philip Murray, president, CIO; George W. Taylor, conference secretary; Judge Walter P. Stacy, conference chairman; Eric A. Johnston, president, Chamber of Commerce of the United States; Ira Mosher, president, National Association of Manufacturers; and William Green, president, AFL. Standing: Ted F. Silvey, CIO; Lee Pressman, CIO general counsel; Boris Shishkin, AFL economist; H. W. Steinkraus, president, Bridgeport Brass Co.; William Simkin, secretariat; David Sarnoff, president, RCA; Ray Smethurst, NAM counsel; [illegible] W. Prentis Jr., president, Armstrong Cork Co.; John Holmes president, Swift & Co.; Joyce O'Hara, U. S. Chamber of Commerce; John L. Lewis, president, United Mine Workers; Fred Smith, press committee; M. W. Clement, president Pennsylvania Railroad; William Rand, president, Monsanto Chemical Co.; Charles Symington, chairman, Symington Gould Corp.; Thomas Cashen, chairman, Railway Labor Executives Association; George M. Harrison, president Brotherhood of Railway & Steamship Clerks; and Matthew Woll, AFL. NEA photo

shipments were 15,678,067 tons, compared with 17,639,435 tons in the comparable period in 1944.

(Inter-company shipments not included)
Net Tons

	1945	1944	1943	1942
	1,569,115	1,730,787	1,658,992	1,738,893
	1,362,488	1,755,772	1,691,592	1,616,587
	1,802,672	1,871,795	1,772,397	1,780,993
	1,722,815	1,756,797	1,630,828	1,758,894
	1,797,987	1,776,934	1,706,513	1,834,127
	1,902,882	1,747,769	1,552,663	1,774,068
	1,808,901	1,751,525	1,660,762	1,765,719
	1,332,180	1,713,485	1,704,289	1,788,650
	1,321,576	1,733,602	1,664,577	1,703,570
	1,290,358	1,774,969	1,794,968	1,787,501
	.....	1,713,753	1,660,594	1,665,345
	.....	1,767,600	1,719,624	1,849,635
Total	.....	21,150,788	20,244,830	21,064,137
Adjustment	.....	*98,609	*97,214	*449,020
Total	.....	21,052,179	20,147,616	20,615,137

*Decrease.

Bolt, Nut, Screw and Rivet Price Regulation Revised

Bolt, nut, screw and rivet manufacturers now may apply to the Office of Price Administration for an upward revision in their ceiling prices when it can be shown that existing maximum prices impose financial hardship upon the applicant.

Brookings Study Raps U. S. Labor Policies; "Trenches Upon Rights of Minorities"

FEDERAL labor policies have tended to place more emphasis on increasing workers' bargaining power than upon either the right of self-organization or the peaceful settlement of labor disputes, according to a study made public by the Brookings Institution, Washington.

The study, conducted by Dr. Harold Metz under a grant from the Falk Foundation, points out that there is no unified structure of policy guiding the government's effort to improve the economic position of workers, some lines of action being inconsistent with others. Only by a comprehensive analysis of the actual administration of the various labor laws by executive agencies can the substance of policy be ascertained.

Some of the study's findings are:

Major objectives of government labor policies are to increase earnings and to reduce hours of work. In the attainment of these objectives, the government has sought: (1) To increase the bargaining power of workers; (2) to protect workers' right of self-organization; (3) to facilitate the peaceful settlement of labor disputes. Efforts to increase bargaining power generally prevail when in conflict with other lines of action.

To increase the bargaining power of employees, the government has protected their right to organize, strike, picket, boycott, and bargain collectively, with very few limitations on these activities even though interstate commerce is thereby impeded. Even minority groups of workers can utilize these weapons against the interests of majority groups. The purpose of the policy of protecting the right to engage in concerted action is to encourage the making of collective agreements, yet little is done to insure that these agreements are binding and enforceable. Even though an agreement contains a no-strike provision, workers are not prevented from using strikes or boycotts in violation of the agreement.

Federal labor laws, as they are administered, favor large bargaining units represented by unions affiliated with national organizations. Legally, employees have the right to form their own labor organization. But before deciding which group represents the majority in a collective bargaining unit, the government must determine what constitutes an appropriate unit. The nature of the unit, however, is a significant factor in determining what organization will be chosen as representative of a majority; consequently the government agencies that perform these functions inevitably interfere with the free right of workers to choose their own form of organization.

Infringes on Individual's Freedom

Vesting of the exclusive bargaining right in the representatives of the majority, as is required by law, increases the bargaining power of the majority and trenches upon the rights of minorities. Likewise, the government's approval of closed-shop, union-shop and maintenance-of-membership clauses in collective agreements runs contrary to the individual worker's legal right to organize or not to organize.

In its efforts to facilitate the peaceful settlement of disputes, the government has set up various types of machinery for mediation, investigation and arbitration. In nearly all instances, labor has the right to use or reject this machinery, but in no case is labor's right to strike really limited or restricted in order to encourage its use. Furthermore, the possibility that labor may strike as an alternative to accepting the terms developed is a significant element in shaping the settlement.

Present, Past and Pending

GENERAL MOTORS GRANTS INCREASE TO SALARIED WORKERS

DETROIT—A 10 per cent increase on the first $500 of monthly salary has been authorized by General Motors Corp. for approximately 70,000 salaried workers.

PARKER-WOLVERINE, UDYLITE CORP. TO MERGE

DETROIT—Proposed merger of the Parker-Wolverine Co. with the Udylite Corp., both of this city, has been agreed upon by the directors of both companies and will be submitted to shareholders Feb. 20.

ALUMINUM CO. GRANTS 10-CENT WAGE INCREASE

CLEVELAND—Aluminum Co. of America has granted a 10-cent wage increase to hourly workers at Cleveland and Garwood, N. J.

KRUG WANTS TO REMAIN IN BASIC INDUSTRIES

WASHINGTON—J. A. Krug, former chairman of the War Production Board, has declined a position as vice president of the Motion Picture Producers Association at a salary of $75,000 a year because he wishes to remain in the basic industries.

WESTINGHOUSE PLANS $4.7 MILLION EXPANSION

BLOOMFIELD, N. J.—A $4.7 million expansion and modernization program for its lamp division has been announced by Westinghouse Electric Corp.

CONTINENTAL HAS LARGE ORDERS FOR PLANE ENGINES

DETROIT—Continental Motors Corp. has orders for 34,739 engines for personal airplanes to be delivered in the next 12 months.

CERTAIN PRODUCTS EXEMPTED FROM PRICE CONTROL

WASHINGTON—OPA has exempted or suspended from price control a number of products including reusable steel storage tanks, pure nickel scrap, monel metal scrap, stainless steel scrap, aluminum and secondary aluminum scrap, fine and specialty wire, ordnance armor castings, aluminum and magnesium mill products, textile machinery and accessories, certain scientific instruments.

FORD REJECTS UNION DEMAND FOR 30% WAGE INCREASE

DETROIT—Rejecting UAW-CIO demand for a 30 per cent wage increase, Ford Motor Co. last week told the union: "This is not the time to settle on a general wage increase which would have to be based on guesses as to volume of production, costs and earnings."

OPA Steel Price Action Expected

Government agency reported about to authorize some increases. Announcement awaits policy determination by top officials

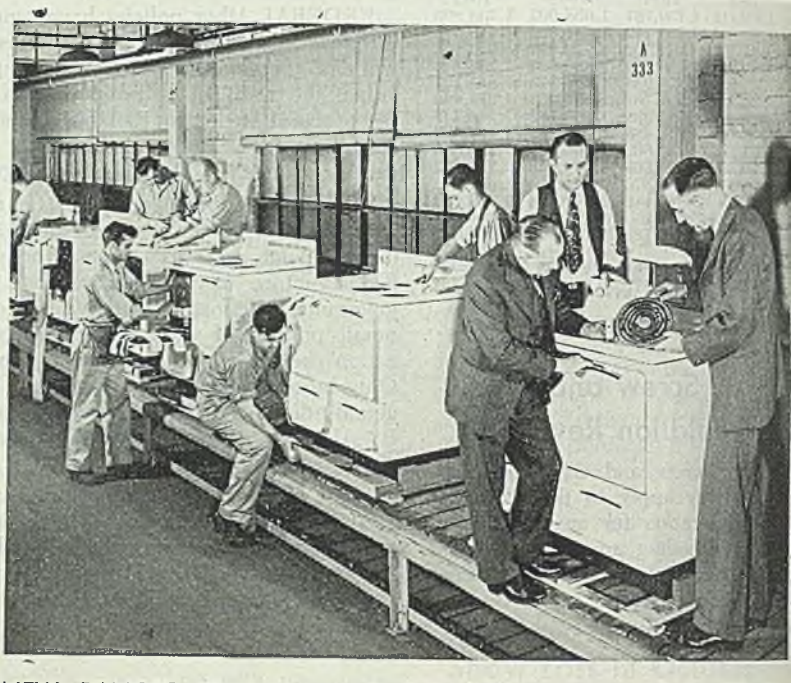
RUMORS circulating in steel industry circles last week were to the effect the Office of Price Administration was momentarily expected to authorize an increase in steel product prices to offset accumulated increased wage and other costs.

All that is holding up the announcement by OPA of an increase in ceiling prices is said to be determination of policy by top government officials. In view of the fact that it will take some time to work out details it is considered unlikely that OPA will be able to announce authorization of an increase until some time this week, and it may possibly take even longer. In any event it is certain that the increased pressure of the past week or so for OPA to do something on the steel price question assures early action.

This action, if taken, would be on a request entered several months ago by the steelmakers for an increase of up to $7 per ton, but would not take into consideration any increased costs which would result from any wage increase which may stem from the current wage controversy. Steelmakers have made it plain that additional price relief will be necessary should wage costs go above current levels.

Some time ago it was indicated in official quarters that OPA favored increasing steel prices $2 to $2.25 per ton, the increase, however, not being an across-the-board raise but applying on specific products and varying from product to product and taking into consideration certain revisions in extras.

The rumor that OPA would permit an increase has been circulating ever since the steelmakers made their request. However, action has been held up for one reason or another, the latest being the desirability of getting the wage dispute out of the way before announcing a change in ceiling quotations. In the past week to ten days, however, the steelmakers have become increasingly insistent on getting OPA to move, emphasizing that it will be impossible for them to even consider a wage increase until prices are raised to a level that will at least permit them to cover current wage and other production costs. In an advertisement last week, the American Iron & Steel Institute said: "Until OPA authorizes fair prices, nothing can be settled through collective bargaining." The Institute points out that present OPA ceiling prices are generally less than steel prices in 1937.



NEW RANGES: T. J. Newcomb, left, sales manager of the Westinghouse Electric Appliance Division, Mansfield, O., and Dean Fighter superintendent of range production, listen while R. M. Beatty, manager of the range department, explains features of the company's new electric ranges, now coming off the production line

Elsewhere on the steel price front great interest continues in developments with respect to adjustments in the basing point system of pricing. Latest move in this connection was the announcement last week by the Carnegie-Illinois Steel Corp., Pittsburgh, subsidiary of the United States Steel Corp., that effective Nov. 10 it had established Youngstown, O., as a basing point applying to sales of tobacco hogshead and slack barrel hoop. At the same time another subsidiary of the Steel corporation, Tennessee Coal, Iron & Railroad Co., set up Birmingham, Ala., as a base on these products.

Further changes in the basing point system are expected from time to time as the industry adjusts to the postwar distribution pattern. Within the past few days an interesting development in connection with basing points, was the action of the Circuit Court of Appeals for the third circuit at Philadelphia denying the United States Steel Corp.'s petition for an additional period of nine months to examine the record in the Pittsburgh Plus case and to designate the portions of the record to be printed. Instead the court gave the Steel corporation 90 days from Nov. 7 to decide whether it will apply for leave to adduce new evidence to support its contention expressed ear this year that the Federal Trade Co mission's cease and desist order sho be set aside on the ground that cos tions have changed since the order o inally was issued in 1924.

Damage Suit Filed Agains Unions in Work Stoppage

Morden Frog & Crossing Works, C cago, closed by strike since Sept. 29, week filed in federal district court Chicago a $150,000 damage action aga the two unions involved. The question whether unions and their officers m be held accountable for strikes called violation of their responsibilities un the Smith-Connally labor disputes a will be an issue in the suit.

Named defendants in the action are United Mine Workers, their presidei John L. Lewis; United Construct Workers and Lewis' brother, A. D. Lew president; local 387, Construction Wo ers and 11 of its officers; four inter tional representatives of the Constru tion Workers; and 36 members of t local employed in the company's plant Chicago Heights, Ill.

Claim is the company's losses by re son of the strike aggregate the $150,0 demanded. W. Homer Hartz is presider of the company.

October Steel Production Drops To Lowest Point Since May, 1940

STEEL production in October was crippled by coal strikes and dropped sharply to the lowest monthly total since May, 1940, according to statistics of the American Iron & Steel Institute.

Total of steel ingots and steel for castings produced in October was 5,620,007 net tons, compared with 5,983,361 tons in September and 7,620,885 tons in October, 1944.

Steel operations during October averaged 69.3 per cent of capacity, compared with 76.3 per cent in September and 95.6 per cent in October last year. An average of 1,268,625 tons was produced per week in October, against 1,-[illegible]982 tons per week in September and 1,720,290 tons per week in October, 1944.

For ten months this year total production was 67,481,497 tons, compared with [illegible],996,886 tons in the comparable period in 1944, a decline of 7,515,189 tons.

Steel shipments of 4,391,143 net tons in September compared with 4,512,637 tons in August and 5,743,437 tons in September, 1944.

As in previous months during the post-war decline plates represented an important part of the loss, production in September being 424,804 tons, compared with 470,575 tons in August and 5,214,-074 tons in July.

Deliveries of standard steel rails rose in September, 206,356 tons against 176,-093 tons in August. Hot-rolled bars gained, with 514,063 tons in September.

STEEL INGOT PRODUCTION STATISTICS

Based on reports by companies which in 1944 made 97.8% of the open hearth, 100% of the bessemer and 86.7% of the electric ingot and steel for castings production

1945

	Estimated Production—All Companies								Calculated weekly produc-tion all companies Net tons	Num-ber of weeks in mo.
	—Open Hearth— Net tons	Per cent of capac.	—Bessemer— Net tons	Per cent of capac.	—Electric— Net tons	Per cent of capac.	—Total— Net tons	Per cent of capac.		
Jan.	6,468,815	90.5	379,062	76.0	358,346	77.3	7,206,223	88.8	1,626,887	4.43
Feb.	5,967,842	92.4	347,227	77.1	339,520	81.1	6,654,589	90.8	1,663,647	4.00
Mar.	6,927,377	96.9	398,351	79.8	382,237	82.4	7,707,965	95.0	1,739,917	4.43
1st qtr.	19,364,034	93.3	1,124,640	77.6	1,080,103	80.2	21,568,777	91.6	1,677,199	12.86
Apr.	6,541,097	94.4	372,952	77.2	377,877	81.4	7,291,926	92.8	1,699,750	4.29
May	6,663,577	93.2	402,100	80.6	386,075	83.3	7,451,752	91.8	1,682,111	4.43
June	6,129,266	88.5	379,807	78.6	333,217	74.2	6,842,290	87.1	1,594,969	4.29
2nd qtr.	19,333,940	92.1	1,154,859	78.8	1,097,169	80.6	21,585,968	90.6	1,659,183	13.01
1st hlf.	38,697,974	92.7	2,279,499	78.2	2,177,272	80.4	43,154,745	91.1	1,668,139	25.87
July	6,318,463	88.6	381,832	76.7	286,713	61.9	6,987,008	86.3	1,580,771	4.42
Aug.	5,171,905	72.3	347,088	69.5	217,383	46.9	5,736,376	70.7	1,291,993	4.43
Sept.	5,425,358	78.7	352,847	73.2	195,156	43.5	5,983,361	76.3	1,397,982	4.28
3rd qtr.	16,925,716	79.9	1,081,767	73.1	699,252	50.9	18,706,745	77.8	1,421,733	13.13
9 mos.	55,623,720	88.3	3,361,266	76.5	2,876,504	70.4	61,861,490	86.6	1,586,192	39.00
Oct.	5,172,350	72.3	242,177	48.5	205,480	44.3	5,620,007	69.3	1,268,625	4.43

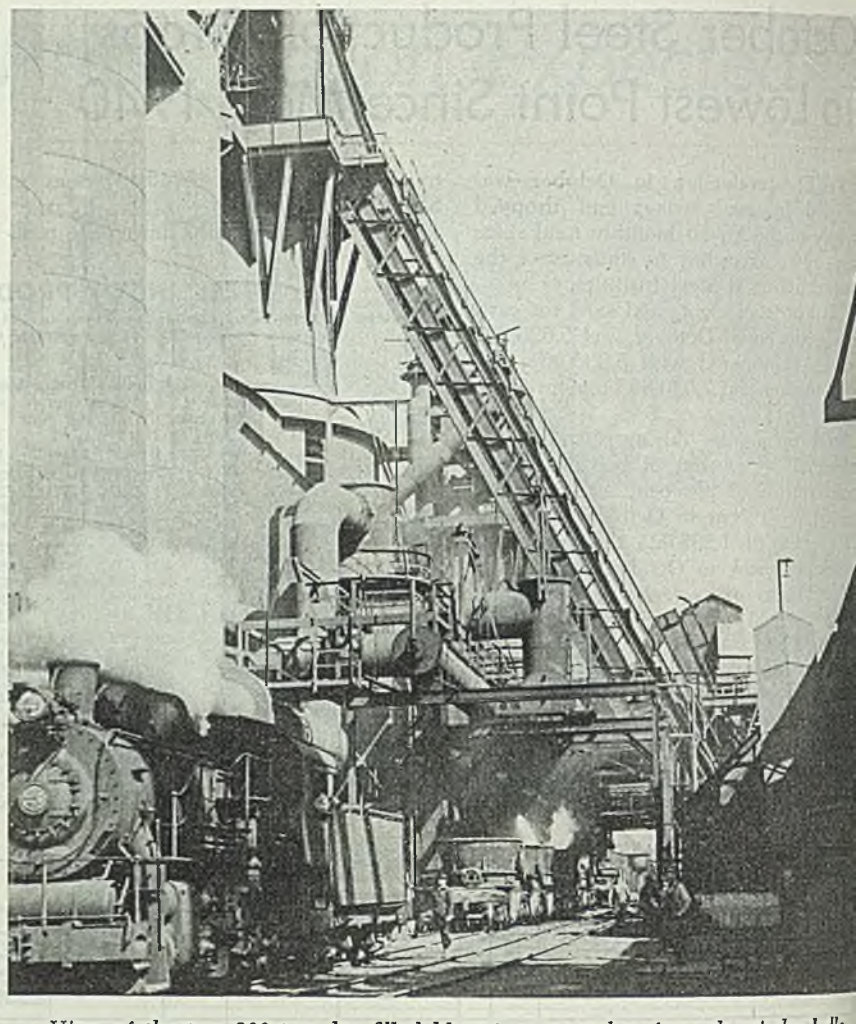
For 1945 percentages are calculated on weekly capacities of 1,614,338 net tons of open hearth, 112,658 tons of bessemer and 104,640 tons of electric ingots and steel for castings, total 1,831,636 tons; based on nannual capacities as of Jan. 1, 1945 as follows: Open hearth 84,171,500 net tons, bessemer 5,874,000 tons, electric 5,455,890 tons.

AMERICAN IRON AND STEEL INSTITUTE
CAPACITY, PRODUCTION AND SHIPMENTS
Period SEPTEMBER - 1945

Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month: Production Net Tons	Current Month: Production Per cent of capacity	Current Month: Shipments (Net Tons) Total	Current Month: Shipments (Net Tons) To members of the industry for conversion into further finished products	To Date This Year: Production Net Tons	To Date This Year: Production Per cent of capacity	To Date This Year: Shipments (Net Tons) Total	To Date This Year: Shipments (Net Tons) To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	51	1	xxxx	xxxx	xxx	329,254	174,186	xxxx	xxx	5,904,366	1,689,832
Structural shapes (heavy)	11	2	9,580,550	282,571	37.7	272,165	xxxx	2,577,975	38.5	2,570,758	xxxx
Steel piling	4	3		14,141		13,987	xxxx	168,495		171,249	xxxx
Plates (sheared and universal)	27	4	17,841,320	448,095	30.6	424,804	35,896	5,959,235	44.7	5,815,371	443,292
Skelp	6	5	xxxx	xxx	xxx	64,151	28,243	xxxx	xxx	579,621	300,538
Rails—Standard (over 60 lbs.)	1	6	3,669,000	205,794	67.7	206,356	xxxx	1,682,023	61.3	1,653,831	xxxx
—All other	5	7	512,000	10,106	24.0	14,066	xxxx	121,985	31.9	128,775	xxxx
Splice bars and tie plates	12	8	1,745,960	62,232	43.4	65,153	xxxx	567,513	43.5	587,464	xxxx
Track spikes	10	9	349,400	13,290	46.3	13,845	xxxx	115,541	44.2	120,144	xxxx
Hot Rolled Bars—Carbon	38	10	xxxx	623,155	xxx	514,053	79,820	6,389,328	xxx	5,052,173	793,497
—Reinforcing—New billet	13	11	xxxx	65,696	xxx	68,464	xxxx	498,804	xxx	508,862	xxxx
—Rerolled	14	12	xxxx	6,785	xxx	6,129	xxxx	55,091	xxx	61,422	xxxx
—Alloy	24	13	xxxx	160,091	xxx	120,181	13,070	2,128,528	xxx	1,545,679	185,319
—TOTAL	46	14	22,381,700	855,727	46.6	708,837	92,890	9,071,751	54.2	7,168,136	978,816
Cold Finished Bars—Carbon	23	15	xxxx	100,225	xxx	96,437	xxxx	1,288,664	xxx	1,280,778	xxxx
—Alloy	25	16	xxxx	20,524	xxx	16,321	xxxx	304,013	xxx	272,440	xxxx
—TOTAL	32	17	3,015,910	120,749	48.8	112,758	xxxx	1,592,677	70.6	1,553,218	xxxx
Pipe and Tubes—Butt weld	17	18	273,010	7,537	33.6	7,559	xxxx	97,838	47.9	96,979	xxxx
—Lap weld	16	19	2,232,520	130,265	71.1	122,165	xxxx	1,162,112	69.6	1,132,790	xxxx
—Electric weld	9	20	830,200	36,840	54.1	37,466	xxxx	394,197	63.5	406,767	xxxx
—Seamless	11	21	1,570,900	74,793	58.0	65,112	xxxx	768,244	65.4	682,313	xxxx
—Conduit (cap. & prod. incl. above)	16	22	3,377,700	193,997	70.0	159,587	xxxx	2,212,414	87.6	1,757,280	xxxx
—Mech. tubing (cap. & prod. incl. above)	7	23	xxxx	xxxx	xxx	6,919	xxxx	xxxx	xxx	63,868	xxxx
Wire rods	11	24	xxxx	xxxx	xxx	37,388	xxxx	xxxx	xxx	539,305	xxxx
Wire—Drawn	27	25	7,266,670	332,470	55.7	102,505	32,488	3,356,754	61.8	982,432	337,356
—Nails and staples	41	26	5,664,690	246,880	53.1	139,739	8,363	2,613,899	61.7	1,553,920	88,354
—Barbed and twisted	19	27	1,253,360	45,840	44.5	47,248	xxxx	442,841	47.2	449,074	xxxx
—Woven wire fence	15	28	539,610	17,826	40.2	18,208	xxxx	174,910	43.3	175,554	xxxx
—Bale ties	16	29	1,113,860	29,465	32.2	29,754	xxxx	270,304	32.4	269,440	xxxx
Black Plate—Ordinary	12	30	149,700	5,827	47.4	6,571	xxxx	55,174	49.3	61,795	xxxx
—Chemically treated	9	31	xxxx	xxxx	xxx	50,845	167	xxxx	xxx	388,573	3,486
Tin and Terne Plate—Hot dipped	8	32	465,000	8,839	23.2	7,763	xxxx	84,610	24.3	77,299	xxxx
—Electrolytic	10	33	3,793,850	158,899	51.0	150,349	xxxx	1,543,877	54.4	1,628,701	xxxx
Sheets—Hot rolled	10	34	2,231,850	71,811	39.2	62,762	xxxx	659,471	39.5	664,580	xxxx
—Cold rolled	30	35	19,197,320	1,115,521	70.8	517,337	41,627	10,125,859	70.5	5,079,771	353,251
—Galvanized	12	36	7,131,460	408,425	69.8	237,025	xxxx	3,413,176	64.0	1,977,847	xxxx
Strip—Hot rolled	16	37	2,915,130	128,780	53.8	124,921	xxxx	1,290,234	59.2	1,291,128	xxxx
—Cold rolled	24	38	7,055,390	195,806	33.8	113,819	22,085	1,988,312	37.7	1,225,853	207,008
Wrought iron, rolled (steel)	35	39	3,119,850	98,084	38.3	84,359	xxxx	1,027,519	44.0	958,824	xxxx
Skelp	5	40	319,400	22,050	84.1	22,259	xxxx	218,515	91.5	219,001	xxxx
All other	6	41	408,170	12,048	36.0	11,544	xxxx	110,522	36.2	112,626	xxxx
TOTAL STEEL PRODUCTS	5	42	190,490	3,132	20.0	2,563	xxxx	35,211	24.7	32,027	xxxx
	152	43	xxxx	xxxx	xxx	4,391,143	435,045	xxxx	xxx	48,080,680	4,401,933
Effective steel finishing capacity	152	44	67,310,000	xxxx	xxx	xxxx	xxxx	xxxx	xxx	xxxx	xxxx
Percent of shipments to effective finishing capacity	152	45	xxxx	xxxx	xxx	71.6 %	xxxx	xxxx	xxx	86.8%	xxxx

Purchases Farrell Steelworks

Sharon Steel Corp. acquires important producing unit of U.S. Steel. Plant provides pig iron and semifinished steelmaking capacity



View of the two 800-ton skip-filled blast furnaces taken from the cinder ladle track at the Farrell Works just purchased by Sharon Steel Corp. from the Carnegie-Illinois Steel Corp.

PURCHASE by Sharon Steel Corp., Sharon, Pa., of the Farrell Works of the Carnegie-Illinois Steel Corp., Pittsburgh, subsidiary of the United States Steel Corp., announced last week by Henry A. Roemer, president of the Sharon company, is viewed in steel circles as one of the most significant developments in the industry in recent years.

Competent observers see in the move a reflection of the economic forces at work in the steel industry. They see in it not only transfer of an important producing property from one steelmaker to another but also the trend toward concentration of steel production in the most compact and efficient units as the industry adjusts itself to the postwar pattern of distribution. Further, changes in marketing and pricing practices, with freight rate considerations looming large in the background, stand out prominently in the picture.

In this particular instance is seen contraction of plant facilities by a producing organization with capacity located at strategic points throughout the nation. On the other hand is seen a smaller steel producer acquiring an efficient, low-cost plant adjacent to its existing properties which will strengthen its position to serve a relatively smaller market than that which the larger firm seeks to serve.

Sharon Steel on Dec. 15 will assume operation of the Farrell Works, idle since Oct. 7 because of the recent coal strike. Meanwhile, the plant will be placed in production immediately now that the coal strike is over.

Mr. Roemer describes the purchase as "the most important step ever taken by Sharon Steel." As for the city of Sharon, the move is viewed as representing a turning point in the city's industrial history. For Sharon Steel it means acquisition of semifinished steel capacity which will substantially improve the company's competitive position. Also it will eliminate transportation cost between the Sharon Steel plant at Sharon, Pa., and its plant at Lowellville, O., (about 26 miles), estimated at about $250,000 annually. Purchase of the Farrell Works also will eliminate for the Sharon company problems of remote control and duplication of supervisory force.

Sale of the Farrell Works to Sharon Steel includes 591 acres of land, two blast furnaces (800-ton capacity each) capable of producing slightly over 500,000 gross tons of pig iron annually, and 15 open hearths (105-ton capacity each) with rated capacity of 1,000,000 net tons of ingots annually. The blast furnaces are equipped with all facilities for modern operation, including an ore yard with a storage capacity of 750,000 tons, a modern car dumper and ore bridge, also a 250-ton mixer for open-hearth furnaces, and a sintering plant of 375 tons daily capacity. One stack has just been completely rebuilt and enlarged and is ready for blowing in, while the other is said to be in good working condition.

The Farrell Works also will provide Sharon Steel with a 36-inch blooming mill equipped with a battery of soaking pits, and followed by four stands of 24-in. mills and eight stands of 18-in. mills, with full equipment for production of slabs, billets, tube rounds and sheet bars, forging billets and other semifinished products. Semifinished capacity of the plant is estimated at 484,500 gross tons.

Ordnance buildings situated on the Farrell Works property, used for producing tank armor sets for the Chrysler Corp. during the war, are equipped with cranes and other facilities, and it is understood they are adaptable to extension of steel finishing capacity.

Facilities at the Farrell Works, named for the late James A. Farrell, president of the United States Steel Corp. from 1911 until 1932, will provide the Sharon company with sufficient pig iron and semifinished steel for its finishing mills at Sharon, as well as its subsidiary plants at Niles, O., and Dearborn, Mich. The plant at Dearborn was acquired by Sharon last spring when it took over the Detroit Seamless Steel Tubes Co. Sharon Steel's plant at Sharon, Pa., has a rated capacity of 360,000 net tons annually of hot-rolled strip and 75,000 tons of cold-rolled strip.

Mr. Roemer stated last week that additions to the newly acquired Farrell Works are contemplated by Sharon Steel, the first probably being installation of two electric furnaces for production of

(*Please turn to Page 214*)

Doubts Geneva's Profit Possibilities

Cyrus Eaton tells Senate committee Utah plant too far removed from present steel markets to operate at profit under private operation

Cleveland financier sees brighter future for Fontana, provided purchase price is not too high. Opposes acquisition by U. S. Steel

GENEVA Steel Co., largest of the war-built government-owned steel mills, is so far removed from present consuming markets as to preclude the probability of its being operated by a private company at a profit, even if the plant were taken over at a very low figure. This was the testimony of Cyrus Eaton, Cleveland financier who played an important part in the formation of Republic Steel Corp. and who recently has been associated with Henry J. Kaiser in the financing of the Kaiser-Frazer Corp., before a subcommittee of the Senate Military Affairs committee conducting hearings on the disposition of government-owned steel plants.

Mr. Eaton told the committee he believed Geneva should remain a government property, against the hazards of another war.

"Possibly one of the largest steel companies could afford to take Geneva at a greatly reduced price," Mr. Eaton said, adding that the object of such action would be to neutralize Geneva's possibilities as a competitive factor which he believed would be against the public interest.

"The West, as it is likely it will, should develop industries that would be large users of finished steel products, for the manufacture of automobiles, agricultural machinery and supplies, railroad cars and locomotives, the status of Geneva would change very quickly."

CYRUS EATON

Mr. Eaton contended the Fontana, Calif., plant, on the other hand, is adjacent to the largest steel consuming center in the West and can participate in the competitive field, provided the purchaser "does not have to pay more for it than the price at which an investor can buy any other existing steel company in the securities market."

The witness submitted an estimate of $7,500,000 to $9,950,000 as the "economic value" of the Fontana plant.

Mr. Eaton told the committee the United States Steel Corp. was too big for its own good and the good of the country and that he was opposed to the acquisition of the government-owned plant by the corporation.

This statement drew a rebuttal from Roger Blough, general counsel for U. S. Steel, who pointed out that Mr. Eaton apparently was using this form of statement to further his own interests.

Earlier in the hearings, W. Stuart Symington, surplus property administrator, had indicated his agency favors U. S. Steel as operator of Geneva plant because it believes it is the only company that can undertake such a project without a government subsidy.

U. S. Steel currently is not a bidder for the Geneva plant, having withdrawn last August an earlier declaration of interest in purchasing or leasing the plant. U. S. Steel's withdrawal from the Geneva picture was accompanied by announcement of plans to expand its Columbia Steel Co. facilities on the West Coast, and is believed to have been actuated in part by statements by former Attorney General Biddle and members of the old Surplus Property Board opposing the corporation as operator of the Geneva plant.

McKee Survey on Geneva "Fairly Optimistic"

IN A comprehensive report just delivered to the Reconstruction Finance Corp., future of the government-owned steel mill at Geneva, Utah, is viewed with fairly optimism by its authors, Arthur G. McKee & Co., Cleveland. The firm recommends a choice between two reconversion programs, one to cost about $37 million and the other $30 million.

However, the optimistic forecast was based on studies conducted prior to announcement by United States Steel Corp. in August of its projected Pacific Coast plant expansion program, including erection of a plant with capacity for producing 1,200,000 tons of tin plate a year. An addendum to the report indicates that execution of this program by U. S. Steel would render the future somewhat less bright for Geneva, with much depending on whether U. S. Steel arranged to purchase hot-rolled coils from Geneva.

While the study was concerned primarily with Geneva, it also dwelt upon the extent to which Geneva and the Fontana, Calif., plant of Kaiser Co. Inc. are likely to affect each other in their postwar operations.

Market areas selected for study comprised substantially all territory in the United States to which freight rates from Geneva and Fontana are as low as or lower than those from the large eastern steel plants. On this basis, domestic shipments from Geneva would be restricted largely to two groups of states, one comprising Washington, Oregon and California, the other Idaho, Montana, Wyoming, Utah, Colorado, Nevada, Arizona and New Mexico. The former area is referred to in the report as the Pacific Coast section, the latter as the Rocky Mountain section, and the two groups together as the Western states.

Geneva, to a greater degree than Fontana, also has limited potential markets in Texas, Oklahoma, Kansas, Nebraska and North and South Dakota; the report refers to this area as the Prairie section.

In the Pacific Coast section, the report says, Geneva will be competitive not only with other western plants, but also with plants located on or near the eastern seaboard "that have a greater diversity of products and can ship by water to Pacific ports at comparatively low rates." In the Rocky Mountain section Colorado Fuel & Iron Corp. will be the principal competitor. In the Prairie section Geneva would compete with Colorado Fuel & Iron Corp. and with companies whose plants are located in the central and southern parts of the United States.

Also, Geneva should be competitive, as regards cost of transportation, in Hawaii, the Philippines, Western Canada and in certain countries of South America and the Asiatic mainland.

Using the year 1937 as the basis, and the old National Resources Planning Board as the authority, the report sets forth the prewar consumption statistics

APPRAISAL OF PHYSICAL ASSETS OF GENEVA STEEL CO.

Properties	Actual Cost of Present Plant	McKee Replacement Cost of Present Plant	McKee Cost of Equivalent Plant
Mines and Quarry:			
Geneva coal mine	$11,185,009	$8,714,000	$8,110,000
Iron Mountain ore mine	1,293,991	872,000	700,000
Payson quarry	1,186,715	787,000	646,000
Total mines and quarry	13,665,715	10,373,000	9,456,000
Geneva plant:			
Acquisition and preparation of site	1,321,692	887,000	887,000
Cost of acquisition and land for water supply and reservoir	3,822	3,822	3,822
Equipment and facilities	175,363,837	122,736,178	111,153,178
Total Geneva plant	176,689,351	123,627,000	112,044,000
Grand total	$190,355,066	$134,000,000	$121,500,000

As reported to Reconstruction Finance Corp. by Arthur G. McKee & Co.

shown in an accompanying table. As will be noted, the table lists the statistics for the Prairie states separately, for the reason that the Geneva plant will have freight rate advantages in a relatively small part of this area; in most of that area the plants at Duluth, St. Louis, Kansas City and Houston have lower freight rates.

In commenting on export possibilities for the western steel plants the report states that Pacific Coast exports in 1937 were 55,000 tons, of which 38,000 tons were rails. It points out, however, that these figures should not be regarded as postwar criteria. Exports of steel by all western producers, it states, should approximate 465,000 tons annually—spread rather uniformly over all the products of the western steel mills.

The report also devotes some space to a study of population trends in the West and the resultant effect on domestic consumption in that region. Whereas the 1937 steel consumption of the Western states was 2,847,200 tons, the annual postwar consumption, due to population increments, should be in the neighborhood of 3,014,700 tons.

Total estimated postwar market potential for the western producers—obtained by adding the estimates for domestic and export markets—therefore, comes to 3,479,700 tons annually. This would be further enlarged by whatever portion of the business of the Prairie state requirements was filled by the western producers.

In the prewar years, say 1937 and 1938, the report states, western steel mills had some surplus capacity in bars, wire, rails, structural and semifinished. Their deficiencies were in strip, sheet, tin plate, pipes and tubes, and plates. During the war Fontana and Geneva were built primarily to manufacture ship plates, shapes and shell steel. This unbalanced situation is to be remedied in some part according to a recent agreement between RFC and Kaiser Co. Inc. by which the annual capacity of the Fontana plant in the near future would encompass 520,000 tons of finished products including 150,000 tons of plates, 20,000 tons of strip, 120,000 tons of pipe, 100,000 tons of structurals, 90,000 tons of bars and 40,000 tons of billets.

After reconversion of Fontana on the above basis, surplus capacity of western mills would stand at 644,600 tons of plates, 340,200 tons of bars and rods, 29,100 tons of plain wire, 68,100 tons of rails, 376,200 tons of structurals, and 206,600 tons of semifinished.

Further, after such reconversion at Fontana, deficiencies in the capacity of western mills would stand at 23,500 tons of strip, 256,300 tons of sheet, 484,100 tons of tin plate, 361,800 tons of pipe and tubes and 236,500 tons of "other products."

"Even after conversion of Fontana," the report sums up at this point, "there will be a deficit in western production of 1,362,200 net tons annually of other products, an amount which could absorb all of Geneva's ingot capacity. Geneva would not secure all of this tonnage even if properly equipped to produce it, but if its rolling mill facilities could be adapted to the manufacture of strip, sheets, tin plate and tubing, a substantial part of Geneva's ingot capacity could be utilized in a way that would not seriously curtail the output of the other western producers."

As to ingot and pig iron capacity, the West is in good shape, the report finds. Steelmaking capacity of western plants was 4,667,000 net tons in 1945. "The amount of pig iron and purchased scrap required for this production would be about 2,670,000 and 1,170,000 net tons respectively. Present blast furnace capacity at 2,875,000 net tons is ample. With increased manufacturing operations in the West more scrap would be available so that there would be no scarcity of this raw material.

As to selling prices, the report states that Pacific Coast prices have, for the most part, been equal to Pittsburgh prices, plus from $10 to $15 per ton, these additions representing roughly transportation charges on the various products from the principal sources of supply. "Western consumers hope that these differentials may eventually be reduced through operation of integrated steel plants in the West because the method of pricing is modified occasionally when there are producing plants of sufficient size to be competitive in the consuming areas. This does not mean that prices in the West will be lower in the near future than they are at present.

WESTERN CONSUMPTION OF STEEL PRODUCTS IN 1937

(In Net tons)

Products	Pacific section	Rocky Mountain section	Total West	Prairie section separately
Heavy structurals and steel piling	136,500	31,100	167,600	205,600
Rails over 60-pound	57,300	208,400	265,600	64,800
Bars and rods	306,400	76,600	383,000	157,300
Plates, all kinds	189,700	25,600	215,300	123,700
Sheets, hot rolled	170,100	14,000	184,100	94,300
Sheets, cold rolled	15,500	300	15,800	3,800
Sheets, galvanized	129,600	24,900	154,500	100,300
Total sheets	315,200	39,200	354,400	198,800
Strip, hot rolled including skelp	31,800	2,500	34,300	19,200
Strip, cold rolled	12,300	100	12,400	400
Total strip	44,100	2,600	46,700	19,600
Pipes and tubes	357,200	124,800	482,000	949,500
Tin plate	444,600	20,900	465,500	58,200
Wire, plain drawn	83,300	2,600	85,900	10,100
Semifinished	19,500	500	20,000	9,900
Totals	1,953,800	532,300	2,486,000	1,797,000
Other Products	284,000	77,200	361,200	261,400
Total consumptions	2,237,800	609,500	2,847,200*	2,058,400

*The McKee report estimates annual steel consumption in the Western states in the immediate postwar period (not including the Prairie states) should be in the neighborhood of 3,014,700 net tons.

creases in labor rates and costs of materials and supplies during the war have been compensated by increases in prices of steel products either in the East or the West, and higher prices are generally to be expected. The amounts of increase, however, cannot be predicted or estimated and, for the purpose of this report, it is assumed only that the present quoted prices for the western area will not be decreased."

Taking the effects of future competition into account, the report merely states that "the effects of final competitive bidding cannot be measured but it may be assumed that producers that have until now held the western markets will use every legal means to retain them. Quality, means of transportation, delivery, business relationship between producers and consumers, and other factors, will enter into the determination of final sales. In some cases, however, these considerations will favor the new suppliers as much, if not more, than they do the present ones." Too, the report adds, the recent United States Supreme Court decision in the two glucose cases may eventually affect the pricing system in the steel industry; "the f.o.b. mill method of pricing might alter considerably the present structure of steel prices in the western area."

Cut in Freight Rates Implied

Implied in the report is an expected reduction in freight rates from Geneva. Whereas the published rates from Geneva at present are $12 per ton of finished steel products to Los Angeles, San Francisco and Portland, Oreg., "the consulting engineers have been instructed by the Reconstruction Finance Corp. to use lower rates from Geneva." These lower rates are $8 to Los Angeles and San Francisco and $9.50 to Portland.

As a prelude to discussing improvements that may be made at Geneva the report finds a good basis for such improvements exists.

"The Geneva plant," it says, "is fully integrated, having coke ovens, blast furnaces, open-hearth furnaces and rolling mills for the production of structurals and plates. On the structural mill can be rolled blanks for the production of pipe by the seamless process. The plate mill by changes to existing equipment and the addition of others, can be converted for hot rolling of strip sufficiently wide for cold rolling into sheets and tin plate. Moreover, the nature of the plate mill installation at Geneva is such that it can be equipped for strip rolling at a relatively small expense. A complete new strip mill might cost as much as $80 million but the plate mill at Geneva can be converted to this purpose for approximately $5 million."

Following broad discussion of a number of improvement programs, the report gives preference to one in which finished steel output would be 635,000 net tons per year, comprising 100,000 tons of plates, 75,000 tons of strip and sheets, 280,000 tons of tin plate, 150,000 tons of seamless pipe and 30,000 tons of rerolling and forging billets. To carry out this program, the cost of new facilities would be $37,250,000 and the potential annual manufacturing profit is figured at $14,261,000—or 38.3 per cent on the cost of the new facilities.

In this program structurals have not been included for Geneva "because these have been utilized to fill out the schedule for Fontana, and because they are already produced at Colorado Fuel & Iron Corp. The structural mill at Geneva will be utilized four-fifths of its time in rolling blanks for seamless mills and billets, but will also have capacity for producing up to 40,000 tons of structurals, and more, of course, when the demand for pipe is less than schedule.

"Certain other products, of a secondary nature, might ultimately be produced at Geneva."

While this program would use only 70 per cent of the existing facilities at Geneva, says the report, this showing would compare "not unfavorably with that of many departments in the older plants in the iron and steel industry."

An addendum to the report analyzes the effect upon the above program for Geneva by reason of the announcement on Aug. 8, 1945, of U. S. Steel's plan to install cold reduction mills and make 200,000 tons of tin plate annually on the Pacific Coast.

"It is obvious," says the addendum, "that if both Geneva and other plants are equipped for the manufacture of these products, each would suffer in volume of sales and, consequently, also in respect to manufacturing costs. Geneva, at least for some years, would suffer most, since the prospective competitor already has established sales connections, warehousing facilities and highly qualified operating and selling organizations.

"The other company has inferred that arrangements might possibly be made by which Geneva would sell them semifinished material in the form of hot-rolled coils. This suggestion has some merit for Geneva in that it would reduce the initial cost of new facilities by at least $15 million. If coils could be sold in the quantities required and at the presently quoted price of about $55 per ton, such arrangement might not decrease the value of the Geneva properties to a prohibitive degree.

"However, it seems likely that the other company could not afford to pay Geneva more for coiled strip than it would cost it to obtain it from one of its several eastern plants.

The remainder of the report goes into detail on the steps that would have to be taken to carry out the reconversion program summarized briefly above.

Details also are presented on an alternate program which would enable Geneva to turn out 635,000 net tons of finished steel products annually, comprising 100,000 tons of plates, 75,000 tons of strip and sheet, 280,000 tons of tin plate, 150,000 tons of electrically welded pipe (instead of seamless tubing) and 30,000 tons of billets. In this program, cost of new facilities would be about $30 million and potential manufacturing profit is estimated at $13,666,400—or 45.6 per cent on the cost of new facilities.

TRANSITION TOPICS

LABOR— Shortage of workers retarding steel production, as mills need 50,000 additional employees. Strike vote of steelworkers will be taken next week, as negotiations on wage demands are deadlocked. See page 85.

SURPLUS STEEL PLANTS— Opposing views on profit outlook for Geneva Steel plant presented at Senate committee hearings. See page 91.

TERMINATION COSTS— Revised renegotiation regulation outlines recognition to be given cost of expenses incurred by business firms in winding up war contracts. See page 94.

CONSTRUCTION— New building in 1946, including public and private works, expected to amount to at least $6½ billion. Shortages of certain materials and equipment seen as hindering factor. See page 98.

WEST COAST— Scarcity of components and materials slowing reconversion in Pacific states. Housing shortages contribute to difficulties in obtaining labor. See page 107.

AIRCRAFT—Remote radio control of high-speed, high-performance operational-sized test planes and simultaneous transmission of flight data to recording instruments made possible by equipment developed by Bell Aircraft and Air Technical Service Command. See page 108.

Termination Costs To Be Recognized For Renegotiation Purposes Outlined

Revised regulation allows most expenses connected with winding up war business, but no costs of getting into peacetime production. Time limits within which recognizable costs must be established not defined, but may be in forthcoming revision

RECOGNITION to be given costs or expenses incurred by business firms in winding up war contracts is clarified in a recent revision of the renegotiation regulation.

Effect of the new regulation, according to one official, will be that all costs and expenses connected with getting out of war business will be recognized for purposes of renegotiation, but that no costs connected with getting into peacetime business will be allowed.

The new regulation, known as Revision 21, does not state any time limits within which recognizable costs or expenses must be established. This is of special importance since the recent amendment extending the Renegotiation Act to Dec. 31, 1945, provides a power to the Price Adjustment Board to issue regulations with regard to recognition or nonrecognition of profits, costs, expenses, etc., subsequent to next Dec. 31, to be taken into account in renegotiation.

It is understood, however, that a new regulation will be issued soon defining the time factors in a manner likely to be considered satisfactory by contractors.

It is believed that under some circumstances costs or expenses incurred any time in 1946, directly attributable to closing up renegotiable war business, will be recognized.

Interpretations May Follow

Revision 21, which is couched in legal language the layman may have difficulty understanding, may be followed by official interpretations.

The new document deals with agreements for fixtures, construction and improvements on real property; profit, cost allocation and allowance; rebates in connection with respread of amortization deductions; conversion to war production, including costs of conversion, costs in connection with the discontinuance of renegotiable business, inventory losses, losses from sale, exchange or abandonment of facilities in performing renegotiable contracts and subcontracts and other costs and expenses, embracing severance pay, rent and other obligations in connection with property inventories and depreciation.

The regulation also defines the procedure which must be followed by contractors in requesting statutory statements concerning determination of excessive profits, changes the date of Feb. 26, 1944, in connection with failures to reach agreement (so-called impasse cases) to Aug. 10, 1945, and provides instructions relating to certain renegotiation forms.

The revision also lists new renegotiation personnel and offices. It is printed in the *Federal Register* for Nov. 3, 1945.

A critical appraisal of the new regulation indicates that war contractors may not consider it very helpful except in a few particulars, as in connection with treatment of inventories and of losses on facilities.

The value of the provisions relating to severance pay will depend on how the prescribed formula works out in particular cases.

The provisions concerning costs allocable and allowable against renegotiable business are unsatisfactory in that they permit substitution of the judgment of the Price Adjustment Board or any agency it designates for the judgment of the commissioner of internal revenue with regard to deductions and exclusions under the Revenue Act.

There has been a continuous tendency on the part of renegotiation authoriti to cut down the benefits of the requi ment of the law that they should gi full recognition to deductions and exc sions permitted by the Internal Reven Code.

There is general complaint of the di culty contractors are experiencing obtaining statutory statements as to basis for determinations of excess profits. The new regulation threat to complicate this situation still more.

Chairman Andrew J. May, of House Military Committee, in a spe on the House floor recently, critici the renegotiation authorities severely onerous treatment of small compan

He referred to numerous complai which had been received by his comm tee and proposed that it make a st of the situation and report to Congr

Additional Surplus Plants Offered for Sale or Lease

Reconstruction Finance Corp. is of ing for sale or lease the following g ernment-owned plants which have b declared surplus: Edo Aircraft Co College Point, Long Island, N. Y.; Fa Crops Processing Corp., Omaha, Ne Ford Motor Co., Dearborn, Mich.; G eral Electric Co., Fort Wayne, Ind., (two plants) Cleveland; Lockheed A craft Corp. (two plants), Burbank, Ca and (one plant) Van Nuys, Calif.; K pers Co. Inc., Granite City, Ill.; Libe Planers, Hamilton, O.; Keokuk Elec Metals Co., Keokuk, Iowa; Walter Ki

PRESIDENT GREETS LABORITE: President Truman, left, greets British Prime Minister Clement Attlee on the latter's arrival at the White House. In center is Secretary of State James F. Byrnes. NEA photo

Co. Inc., Belleville, N. J.; Kinney minum Co., Vernon, Calif.; Nash-ator Corp., Kenosha, Wis.; National minum Cylinder Head Co., Cleveland; tional Carbide Corp., Ashtabula, O.; nal Bronze & Aluminum Foundry, land; Marquette Metal Products Cleveland; Houdry Process Corp., boro, N. J.; Kearney & Trecker , Milwaukee; J. S. Abercrombie Co. Harrison Oil Co., Sweeny, Tex.; Aero-al Products Inc., Detroit; Western par Corp., Northgate, Colo.; Wheel-Bronze Casting Co., Glen Dale, W. Zuni Milling Co., Los Lunas, N. ; Northwest Flax Industries, Win-, Minn.; Wico Electric Co., West field, Mass.; Foote Mineral Co., n, Pa.; Bearfoot Sole Co. Inc., Wads-th, O.; Aviation Corp. (Republic tion Div.), Detroit; Mueller Brass , Port Huron, Mich.; Vinco Corp., it; Hercules Mfg. Co., Centerville, Hooker Electrochemical Co., Ta-, Wash.; Hughes Tool Co., Houston, High Standard Mfg. Co. Inc., Ham-Conn.; Snead & Co., Orange, Va.; ss-Wright Corp., Beaver Falls, Pa.; n Fork & Hoe Co., Rome, N. Y.; s Aircraft Co., Pottstown, Pa.; Na-l Carbon Co. Inc., Charlotte, N. C.; lo Arms Corp., Buffalo; Mathieson Works (Riverside power plant), Lake Charles, La.; General Mo-Corp. (Buick Motor Division), Mel-Park, Ill.

ish Steel Industry ported on by Visitor

Damaged little by German bombings, land's steel industry is on its way d modernization and specialization, ding to Fred C. T. Daniels, vice ident, Mackintosh-Hemphill Co., burgh, manufacturer of rolls and g mill equipment.

Daniels, who recently returned a month's tour of the steel industries England and France, said that the n bombings seemed to be aimed gets to break morale rather than r production. Full production and ual quality were both maintained ughout the war, he said.

England's roll manufacturing indus-however, never compared to that of country and they are awake to that Ten years ago, before they adopted American practices, both their pro-ion and quality was far below ours, now they are making as good rolls e are. The steel industry as a whole, ver, is making big plans for modern-. Now, they have virtually no ialty mills. Every mill tries to put every kind of product, but their plans for the construction of specialty he pointed out.

Speaking about the French steel in-try he said that although the plants not damaged much, it will be a time before the industry can get on its feet.

Domestic Sponge Iron Compares Favorably with Swedish Product

Bureau of Mines experiments show two most common types of Swedish iron can be duplicated in American plants. Reports describe production at New York brick yard, without alteration of plant, and at Ohio quarry company

SPONGE iron comparable in quality to that made in the famous ceramic plants at Hoeganaes, Sweden, can be produced by carbon reduction in American common shale-brick plants without alteration of the plants, the Bureau of Mines reported last week.

Experiments conducted by the bureau at a New York state brick yard and at an Ohio quarry company several months ago demonstrated that the two most common types of Swedish sponge iron, said to be superior for use in furnaces where high-grade steels are made, can be duplicated readily in tunnel kilns or periodic down-draft kilns.

In a report describing the New York project, Donald W. Ross, bureau chemical engineer, said about 100 tons of brick-yard sponge iron were made by the regular brick-yard personnel with the equipment already at the ceramic plant. Of this amount, 62 tons, made from commercial magnetite concentrates, were shipped to three steel plants where it was used to replace some of the scrap in the regular steel furnace heats.

Ordinary Ceramic Kiln Used

The Swedish sponge iron process involves filling clay refractory containers, called "Saggers," with iron ore plus the necessary quantity of solid reducing agent, and then firing in an ordinary ceramic kiln. A characteristic of the Swedish sponge iron is the remarkably low sulphur content, which is obtained by mixing a desulphurizing agent with a solid fuel reducing agent.

Production of sponge iron in both clay and steel saggers was successful in the Ohio research, described in a report by J. P. Walker, bureau metallurgist. In addition to experiments with three sizes of clay refractory saggers and two sizes of low-carbon steel containers, this project included investigation of five types of desulphurizing agents and the testing of four commercially available fuels as reducing agents.

One of the problems involved in the production of sponge iron is the determination of the degree of reduction attained in the manufacturing process, and this phase of sponge iron production is discussed in article prepared by J. P. Morris, bureau chemist.

Because sponge irons made by different processes may vary in physical characteristics as well as in chemical composition, a method of analysis that is suitable for one type is not necessarily applicable to all other types.

Four methods for determining metallic iron and oxygen are discussed in the bureau report, the mercuric chloride method, copper sulphate method, hydrogen-reduction method, and hydrogen-evolution method. In these analyses specially prepared test samples of known composition were used and each method was evaluated under controlled conditions.

Aluminum Imports Limited By Swedish Government

Swedish imports of aluminum and alloys containing over 50 per cent by weight of that metal are now permitted only under government license according to a report received by the United States government. The license requirement applies to the unworked metal or alloy and to scrap, anodes, sheet, strip, tube, rod, wire, cable, including insulated cable, ash and dross, it was added.

Private Trading Between U.S. and Greece Resumed

Private export and import trade between the United States and Greece has been resumed, subject to continued tight controls in Greece, on Greek imports, and certain restrictions by American authorities on some classes of American goods if exported to Greece.

The following restrictions are maintained by the Greek government. it is reported by the State Department: Applications for an import license must be accompanied by evidence of a firm offer by the American shippers; a separate import license, including foreign exchange authorizations, is required for each order; Greek exporters, intending to ship commodities from Greece, must secure an export license.

The Greek government will continue to bar imports by private trade of goods included in the UNRRA procurement program, to preclude large-scale imports beyond immediate domestic requirements.

U. S. exporters will be subject to American export license on commodities still scarce or otherwise restricted by this government, it is stated; U. S. importers

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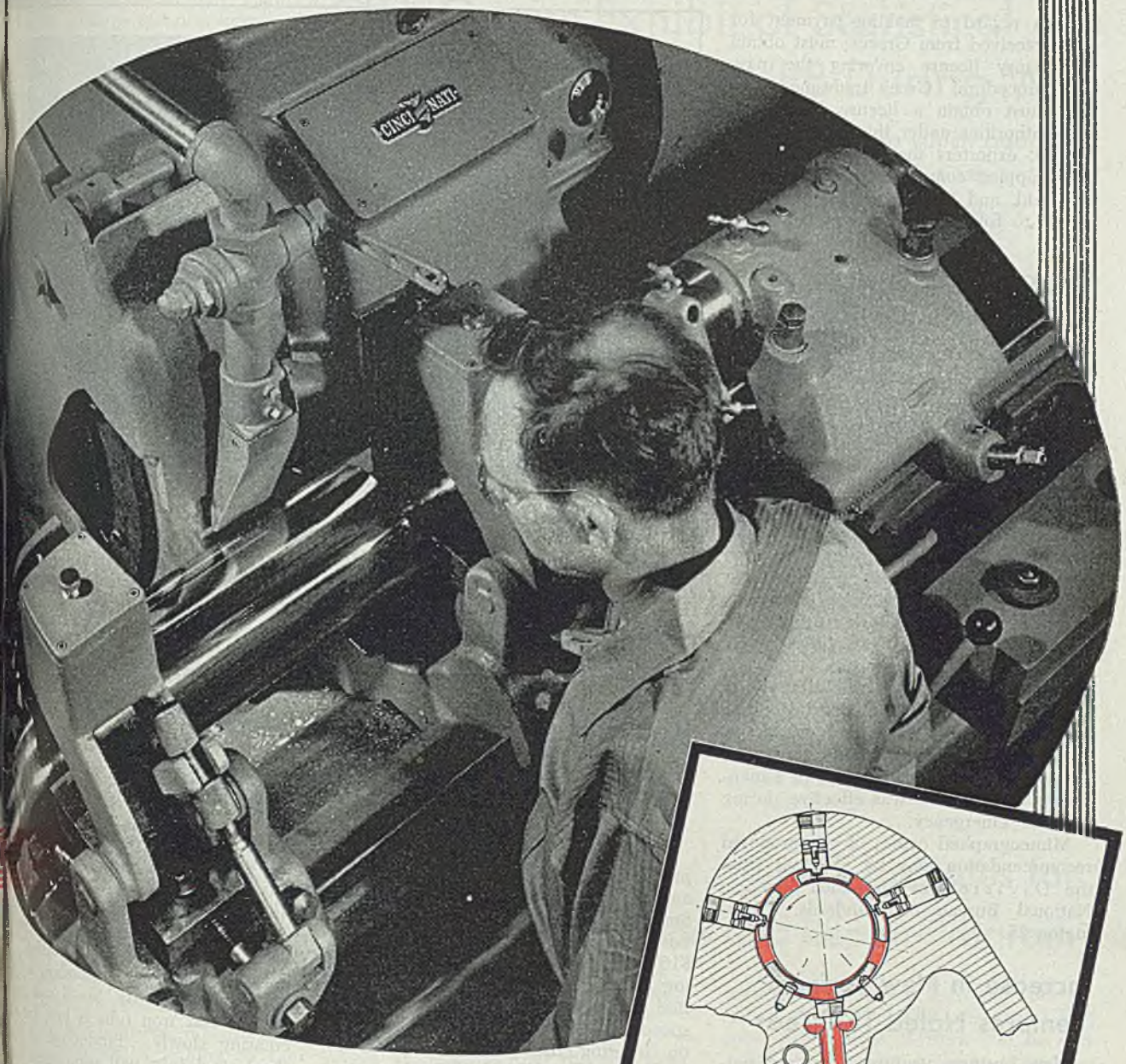
CINCINNATI

CENTER TYPE GRINDING MACHINES

STEEL



This roll was rough and finish ground on a CINCINNATI Plain Self-Contained Grinder equipped with Swivel Table Type Roll Crowning Mechanism. Like all CINCINNATI Plain, Universal and Centerless Grinding Machines, the Plain Self-Contained Grinders are equipped with FILMATIC Bearings. Complete details may be obtained by writing for Catalog G-491-1. For a brief description look in Sweet's Catalog File for Mechanical Industries.

THE FILMATIC PRINCIPLE. *Self-adjusting shoes produce independent, converging oil films which develop high radial pressures, forcing spindle into central position and keeping it there. "The wedge-shaped oil film does the trick."*

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also, in regard to making payment for goods received from Greece, must obtain a Treasury license covering the payment procedure. Greek tradesmen likewise must obtain a license from their own authorities under this head.

U. S. exporters should apply directly to a shipping company for cargo space, it is said, and Greek tradesmen are required to follow the same procedure.

Propose Simplified List of Automatic Regulating Valves

A proposed Simplified Practice Recommendation for automatic regulating valves has been submitted to producers, distributors, and users for approval or comment, according to the Division of Simplified Practice, National Bureau of Standards.

Automatic regulating valves are used for controlling the temperature, pressure, level or rate of flow of fluids. The purpose of the recommendation is to establish as a useful standard of practice a simplified list of pressure ratings and sizes of seven types of these valves, made of steel, iron, and bronze.

Recommendation was developed in co-operation with a simplified practice committee of manufacturers, and if approved will retain on a voluntary basis the simplified practice features of a mandatory order which was effective during the war emergency.

Mimeographed copies of the proposed recommendation may be obtained from the Division of Simplified Practice, National Bureau of Standards, Washington 25.

Increase in New Business Ventures Noted This Year

New business ventures increased notably in the first quarter of 1945, according to the Department of Commerce.

During this period about 130,000 firms entered business, against less than 50,000 discontinuances in the same period. The prewar rate was respectively 100,000 firms entering business per quarter, against the same number of terminations. Post V-J figures are not available but the department estimates a substantial increase in the number of firms entering business in these past months.

Revival of business, the department believes, was undoubtedly due to the prospect of getting supplies, with the war demand tapering off. The majority of firms entering business during 1944 and the first quarter of this year were in the retail and service trades, 56 per cent being in retail fields alone. Also sharing in the general increase were the transportation-communication-public utility group, wholesale trades, and the finance, insurance and real estate groups. Manufacturing, construction and mining showed a declining trend from wartime levels.

RATIFY TREATY: Shown exchanging ratifications of a treaty between the United States and Mexico are left to right, seated: James F. Byrnes, secretary of state; Delos Monter, Mexican ambassador. Standing: Sen. Tom Connally (Dem., Tex.); Rep. Sol Bloom (Dem., N. Y.); Sen. Joseph C. O'Mahoney (Dem., Wyo.); Sen. Eugene Milliken (Rep., Colo.); Sen. Warren Austin (Rep., Vt.); and Dean Acheson, under secretary of state. NEA photo

Building Program for 1946 Threatened by Certain Materials and Equipment Shortage

NEW construction in 1946, including private and public works, is expected to amount to at least $6½ billion, John D. Small, administrator of civilian production, said recently. This total includes $1675 million for 400,000 family dwelling units. This program must be carried out, he added, in the interests of speedy reconversion and to get a start on meeting the pent-up demand for housing, commercial buildings and other construction. It is being hampered, however, by shortages of cast iron soil pipe, plumbing and heating equipment and other key building materials.

Reviewing the cast iron soil pipe situation, Mr. Small said:

"In 1941, 52 foundries produced 565,000 tons of cast iron soil pipe. By 1944, shutdowns had reduced the number of plants to 32, with output of 165,000 tons. Production during the first six months of 1945 was at the annual rate of only 156,000 tons, with only 28 plants at work. To take care of anticipated 1946 requirements, a minimum production of approximately double this 1945 rate is needed.

"The industry now employs from 4500 to 5000 workers. Some 2500 more workers are needed. The Tennessee-Alabama area alone, where two-thirds of present production is concentrated, can use an additional 1500 workers.

"Price and wage increases have been granted in the industry. The most recent price increase of $3 a ton was made in early September. While it is as [illegible] too early to estimate fully the effect this increase on production, we do [illegible] that as a direct result of the increase foundries have gone back into production and that output is increasing."

In connection with plumbing and [illegible] ing equipment, Mr. Small said pro[illegible] tion of cast iron tubs is low, but is increasing slowly. Production of [illegible] sheet steel tubs will supplement that cast iron tubs but this is dependent the supply of sheet steel, which was fected by the recent coal strike.

Commerce Dept.'s Article Stresses New Steel Uses

Increased use of flat rolled steel light fabricated structural members during the war is expected to be reflected in demand for these products in post years, according to the Department Commerce.

Donald B. Stough, Metals and Min[illegible] als Unit, Bureau of Foreign and Domes[illegible] Commerce, points out that improv[illegible] practice in producing metal for [illegible] steel, improved techniques in fabricat[illegible] and improved coatings are the th[illegible] factors which are counted upon to furth[illegible] expand the use of sheet and strip pr[illegible] ucts. He adds:

"The shaping, in a huge press, of [illegible] turret top of an automobile from [illegible] single piece of sheet steel is a go[illegible]

ample of the need of high quality
steel in modern manufacturing.

"Improvements in the production of
ssed metal parts and stampings, with
ased use of better welding methods,
contribute to wider and more effi-
processing of fabricated products.
Steel tempered to specification will
more confidence to fabricators in
rtaking new types of manufactures.
"Improved steel of all types is bring-
a higher strength-weight ratio and
lighter-weight products. And, parti-
ly, the improvements developed in
strength, temper and surface of cold-
ed steel and strip have set in motion
easing advancement in fabrication
dd more and more new products."

ow-Cost Process for oducing Barium Reviewed

barium, now selling in small lots at
minal price of $15 a pound, prob-
could be produced at a cost of less
45 cents a pound by a large-scale
ration using processes reviewed in a
Bureau of Mines publication, ac-
ding to a report issued by the Bureau.
se processes should be a stimulant
seeking new commercial uses for ele-
tal and alloyed barium, according to
report.

Tariff Commission Report vailable in Printed Form

"Postwar Imports and Domestic Pro-
ction of Major Commodities," a re-
of the United States Tariff Com-
ion, is available in printed form.
ies may be had at $1.75 from the
perintendent of Documents, Govern-
Printing Office, Washington 25, D.C.
The report was prepared in conformity
a Senate resolution calling on the
mission to prepare a series of esti-
s of the postwar production, employ-
, consumption, and import trade of
articles which were imported in ex-
of $100,000 valuation in 1939.

Uruguay Reduces Tariff on rtain Cold-Drawn Wire

Uruguay has reduced its import tariff
cold-drawn wire for certain purposes,
rding to the Department of Com-
. Cold-drawn wire of a maximum
thickness, for use in manufacture
keys to open tin cans, has been in-
ded in a lowered tariff schedule on
ific raw materials. This wire will be
itable at 15 per cent, plus a 21 per
surtax on a fixed customs valuation
650 pesos per 100 gross kilograms.
wire is exempt from the 50 per cent
eral increase in duty of July 24, 1942.
duty, including surtax, on this type
wire was formerly 52 per cent of the
ial fixed valuation.

CPA Opens Exhibit of Statistical Data Collected by WPB During War

Industry's aid sought in establishing extent to which additional tabulations of material would help business in postwar plans and operations. All information presented in summary form, replies of individual companies remaining confidential

TO ACQUAINT industry with statistical information collected by the War Production Board and its predecessor agencies, the Civilian Production Administration has established a statistical research room in the Social Security building in Washington in which exhabits of statistical matter will be shown until Dec. 28.

During the war, government received from industry factual reports on such matters as production, materials consumption and inventories which were invaluable in planning production for military needs and for the civilian economy.

Exhibits will include some material which could not be published during the war for reasons of military security, or could not be made available previously because of the pressure of war work upon WPB's statistical staff.

Officials emphasized that the material available for examination will not include any information relative to individual firms, because this information was given to the War Production Board on a confidential basis. Only summary facts will be presented.

In general, the material will be of four types: (1) Blank copies of all application and report forms issued by WPB and its predecessor agencies; (2) copies of published tabulations drawn from these forms as returned by industry; (3) information indicating the extent to which other data have been tabulated but not published; and (4) estimates of statistical coverage on particular phases of industry.

Purpose of the exhibit is to insure that the data collected during the war, which may be of interest and value to industry, are used effectively. CPA officials believe that industry and organizations offering professional service to industry can be of considerable assistance in postwar business.

Federal Funds Now Available to States for Highway Construction and Repair Program

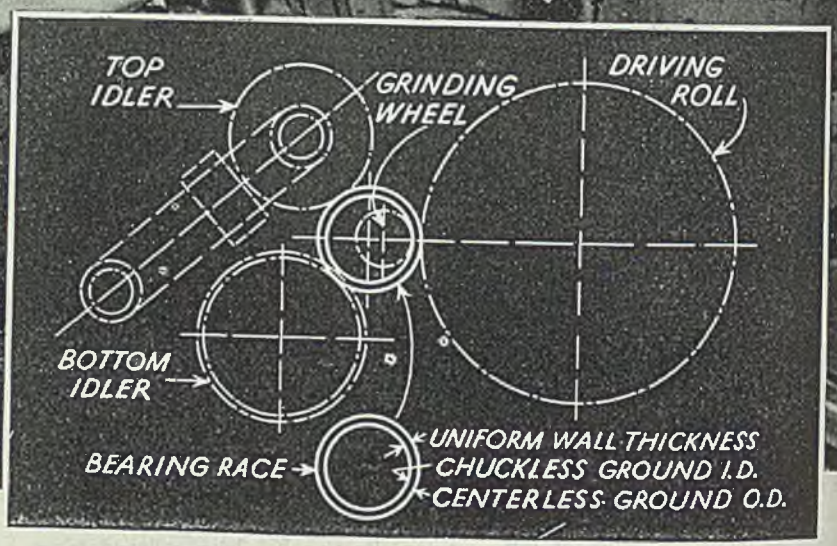
BY PASSAGE of concurrent resolution, in the House on Sept. 28 and in the Senate on Oct. 2, Congress is on record as declaring that the war emergency situation has been relieved to an extent that will justify immediate launching of the nation-wide highway construction and repair program provided for in the Federal-Aid Highway Act of 1944.

As a result, federal funds now are available to the states under this statute which provides for highway construction at the rate of $1 billion a year for three years. The federal government will provide $500 millions annually, with matching amounts appropriated by the states. Because $106 millions of federal funds remain unexpended from a previous appropriation, also calling for matching amounts by the state, the total available for highway construction and rehabilitation during the first of the three years will be $1,212 millions.

Surveys conducted by the American Road Builders Association show that the various states have completed plans, and can begin advertising for bids without delay, for highway work coming to some $616 millions. In addition, plans for some $2.5 millions of highway work are under way. The ARBA estimates that some $16 billions of work will be necessary to bring our highway system up to what it ought to be—and this estimate does not include a vast amount of work that will have to be started in the near future on airports and on new highways to serve new airports.

Highway work at the rate of $1 billion a year, the American Road Builders Association has calculated, normally brings a $3.15 billion lift to the national income. This calculation makes provision for investments in construction equipment and for resulting expenditures in the numerous industries that benefit from highway construction. Just how much the lift to builders of road construction machinery will be over the next year is not clear because the Department of Commerce Surplus Property Office has no idea at the present time how much road building equipment it will be able to offer as surplus property. All that spokesmen at this office will say at present is that road building equipment is being purchased as rapidly as it is declared surplus and that there apparently is a big unsatisfied demand.

We built the skill of the craftsman into the machine!



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First we externally grind by our improved arborless grinding method. Then the perfect outside periphery thus obtained is used as a guide in grinding the inner diameter of outer races, the track upon which the rollers operate.

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This is just another example of the many exclusive manufacturing processes which enable us to build accuracy, longer life and more dependable performance into Hyatt Roller Bearings for every application.

* * *

Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

HYATT ROLLER BEARINGS

S. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

Fallacies in union's arguments for 30 per cent wage increase pointed out as negotiations continue between General Motors and United Automobile Workers. Loss of overtime in motor plants will be less than generally claimed

DETROIT

ICKED into the 34-page "brief" ed by statisticians and economists General Motors and submitted in tiations with the UAW-CIO over its r cent wage increase demands is d deal of basic economic thinking h bears importantly on the entire e-price problem of the country. That eived little study by union officials dent from the fact a 40-page mim- ied reply, rejecting the GM pro- was forthcoming inside of 40 after the corporation submitted ysis which itself required 10 days to prepare. Author of the union's was Walter Reuther. His lengthy t constituted merely a flat nega- everything GM included in its plus an official charge to the NLRB the corporation of violating the Labor Relations Act.

union has insisted right along in tions that prices and profits are its business in bargaining over The corporation denies this main- all argument having to do with past and assumed future prof- of place, since the National lations Act restricts bargain- considerations of wages, hours, conditions and other conditions yment.

Earnings Claim Distorted

luded in earlier charges made by was a statement that in 1941 fac- employees of GM earned $1.09 per for the stockholders for every $1.07 they earned for themselves. This was arrived at by dividing gross before taxes of all domestic and operating and nonoperating divi- of GM by the total number of rated factory employees in do- plants. This is an obvious distor- the true picture, since stockholders receive profits which go to pay and further since no consideration given to salaried employees, there one salaried employee for every factory employees. The truth is net profits were less than 25 cents dollar of payroll in 1941.

GM and the union quoted from book *Price Making in a Democracy* Edwin G. Nourse of the Brook- institution in support of their argu- On the question of union officials price-making executives, Dr. Nourse this interesting comment to make: general practice of wage raising through in the absence of (or in of) efficiency gains will be borne part by the supposed beneficia- ries. In the end the workers will be disbursing more money but not enjoying a higher scale of living. If the efforts of labor unions come to be directed toward raising wage rates in situations where the higher pay is not accompanied by enlarged output, the net result is nothing but price inflation. Such an outcome does not mean merely that the workers fail to gain from the nominal increase in earnings. They lose directly the money they have put into the support of the agency that conducts this bootless kind of wage boosting."

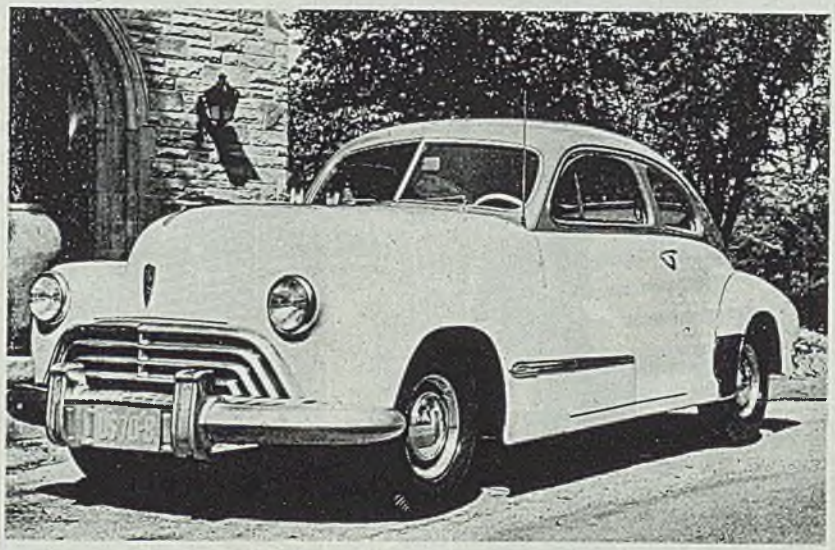
And further: "If all labor were effectively organized and insisted on a general wage raise of, say, 15 per cent, it seems clear that the result would be more price inflation and consequent trade demoralization or checking of operations and immediate unemployment."

Among exhibits presented by the union to support its case was an anonymous memorandum from the Office of War Mobilization and Reconversion purporting to show industry could raise wages 24 per cent without raising prices, as the combined result of a 4.5 per cent savings in elimination of overtime premiums, 10 per cent from elimination of excess profits taxes, and 9.5 per cent from reduction of wage rates or down-grading.

GM points out the fallacious reasoning behind this absurd analysis. In the first place, no broad generalizations about elimination of overtime work can be made.

In the months ahead, many working forces will continue on an overtime basis to meet production requirements. As GM puts it, the country is not faced with a reduction from 48 hours' work with 52 hours' pay to 40 hours work with 40 hours pay, rather it will be a reduction from an average of 45.1 hours' work with 47.7 hours' pay to somewhere between 39 and 45 hours' work with 39 to 47.5 hours' pay. In the second place, elimination of the excess profits tax was designed by Congress as an incentive to employers to reconvert their operations from war production to peacetime more quickly and to expand operations and employment, not to pass out as wage increases. Thirdly, downgrading of workmen has absolutely no effect on the overall wage bill, since it does not involve a reduction in wage rates.

With all the hue and cry initiated by unions over wage rates based on "ability to pay," and the "purchasing power" theory of wages, it becomes of interest to examine briefly some of the basic concepts of the American free enterprise system which over the years has operated so successfully. As outlined by General Motors, but applying equally well to all industry, it is something like this — competition keeps prices low and thus distributes the benefits of increased industrial efficiency to the whole population. Customers' purchases determine the volume of sales and hence the production and employment in each of the millions of business establishments throughout the country. A part of the



NEW OLDS: Twelve body styles in three series will be offered by Oldsmobile, now increasing production of 1946 models as rapidly as availability of materials permits. Bodies now are completely bonderized and at many points where exposure to weather is greatest, thickness of metal has been increased by one-third

system is the idea of non-discrimination in price. Everyone who rides on a railroad train pays the same fare for the same distance and class of service, all pay the same price for a loaf of bread in the same store, all pay the same price for the same make of automobile and the same price for gas and tires, regardless of income.

Under the system, obviously the most efficient producers will make the largest profits and the most competent individuals will earn the highest wages. A producer buys materials at market prices and offers workmen wages sufficient to recruit a good working force. These represent the market value of the materials and labor. The producer furnishes the tools for the workmen. The better these tools, the more work can be done without extra effort. When the producer supplies good tools and properly organizes and directs the business, the profits will be good. He will then be able to give the public a better product for less money and get more customers. This will encourage him to expand business and create more jobs.

Only to the degree that increasing technological efficiency serves to reduce costs can there be any gain to the economy as a whole. The benefit to the greatest number, which must be the prime objective of industry and which means advancing living standards to the maximum, occurs when technological efficiency is reflected in lower selling prices so that all can buy more. Hence more can be produced. That objective cannot be accomplished by confining the benefits of technological progress to those in the industries in which technological progress occurs.

Unless the more efficient businesses can make good profits there will be no incentive to increase the efficiency of their operations or to expand them and create new jobs. When a business grows by serving the public in competition with others, while paying competitive prices for materials and high wages as compared to what people generally can get for their labor (as in the automobile industries) whatever profits it makes are reasonable. Profits made this way represent a net gain in value to the country, because they are newly created values that did not exist before. Such profit has no relationship to wages.

What the union is demanding is that these profits and future presumed profits now be paid to its members in the form of a 30 per cent increase in the going wage rates, and this is an industry where current rates are well above the average for all manufacturing.

The ambitious Mr. Reuther has further injected himself into the wage-price picture by calling on Price Administrator Bowles and the OPA to revise its formula for new car prices which would permit slight increases over 1942 levels, and by calling on automobile dealers to join with labor to fight against any price increases or any cuts in dealer margins. Word had leaked out of Washington that dealer discounts were to be cut sharply, perhaps by 50 per cent, to avoid any appreciable increase in retail prices. Automobile dealers at once became incensed and through their association appeared before the Small Business Committee of the House to stave off a slashing of their margins. They apparently were successful, because the OPA is still withholding announcement of automobile price ceilings and Administrator Bowles has denounced "government by pressure" tactics. At the same time, however, he said he was rejecting demands of dealers for "higher automobile retail prices." The crafty Reuther immediately sensed the opportunity to line up another pressure group on his side in the fight against manufacturers.

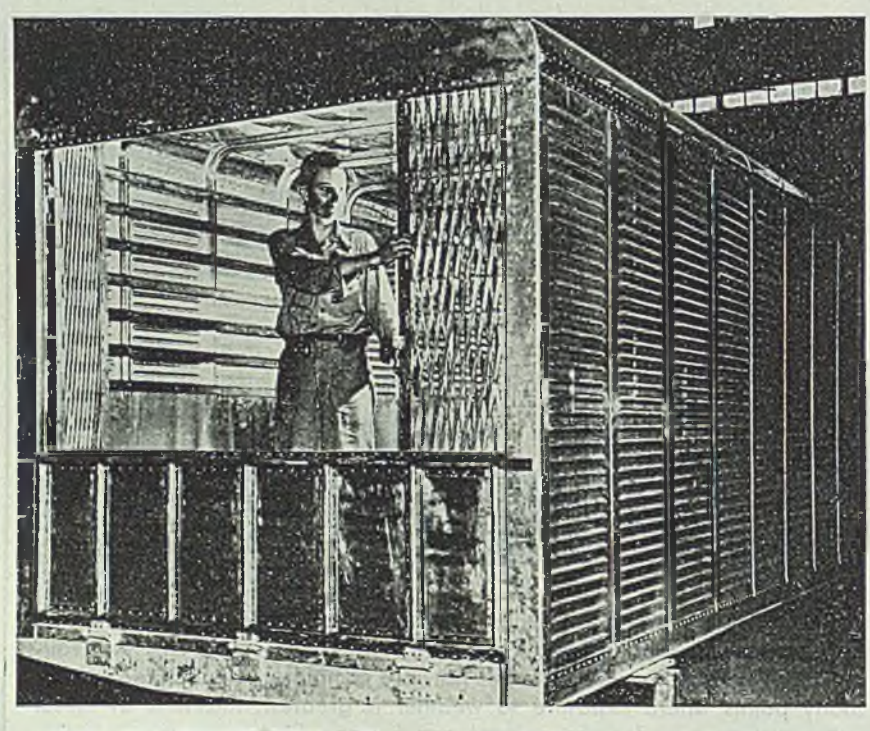
Negotiations between the union and GM were scheduled to be resumed last week, and the executive board of the union has delegated authority to a six-man strategy board of union officials in Detroit to determine a course of action should negotiations break down. Negotiations between Ford and the UAW will start this week.

Productivity Drops Sharply

Six concrete examples of alarming decreases in productivity, resulting largely from union-imposed slowdown tactics are cited by the Automobile Manufacturers Association in support of its claim to the Department of Commerce that the true picture of productivity was not presented in the secretary's recent analysis of the wage-price question. 1. A manufacturer of passenger car frames produced 100 frames per hour prewar, is getting only 55 per hour now, with the same number of men, same process, same type of frame. 2. Output in a plant of a miscellaneous auto parts manufacturer is only 70 per cent of standard, off 15 per cent from prewar period. 3. Time studies in a motor truck plant show employees producing only 70 per cent of normal volume. 4. Spring manufacturer reports production in one department is limited by workers to 108 spring plates per shift, despite demonstration that 200 plates can be made easily. 5. Output in a passenger car manufacturer's small press shop is only 60 per cent of prewar standard, in the main press shop 85 per cent. 6. Workmen in an automotive trailer plant using same methods as before war are producing only 70 per cent of standard today, compared with 90 per cent prewar.

Many of the figures currently being cited to show increased productivity ignore on the part of labor completely ignore the effect of the increased mechanization of operations. A measure of such mechanization is given by figures on horsepower operated per wage earner. In 1910, for example, the figure was 1.5, and by 1939 it had increased to 5.6.

General Motors has leased the entire plant of North American Aviation Inc. in Kansas City, Kans., for assembly of Buick, Oldsmobile and Pontiac. Plant will be taken over shortly and many changes in equipment effected to permit a start on assemblies next spring. Employment eventually will total 4000.



ALUMINUM TRUCK BODY: This test model of a new truck body is made of Reynolds aluminum alloy. It soon will undergo field tests

MEN of INDUSTRY

ROY J. KELLER

WILLIAM M. NEAL

HAROLD E. BLISS

Roy J. Keller has assumed the post of general sales manager, TelAutograph Corp., New York. Mr. Keller formerly served as manager of the St. Louis branch, joining the company in 1924. **Harry A. Lawrence,** 24 years with the company, has been transferred from his post as branch manager, Cleveland, to serve in the same capacity in Newark, N. J. **Edward C. Campbell** succeeds Mr. Lawrence as manager of the Cleveland branch.

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Herbert D. Rollo has been made New England sales manager, Wickwire Spencer Steel Division, Colorado Fuel & Iron Corp. Mr. Rollo has been with Wickwire Spencer since 1933 in Chicago and New York, as wire rope sales engineer. Prior to 1933 he was with the American Chain & Cable Co., engineering department. Mr. Rollo will make his headquarters at the New England district office, Boston.

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John Sheppard, formerly chief metallurgist, Kelsey-Hayes Wheel Co., Detroit, and more recently plant manager and metallurgist, Michigan Metal Treating Co., Detroit, has been appointed metallurgical technical service representative to the metal trades in Detroit, by American Cyanamid & Chemical Corp., New York. **Victor R. Farlow** has become associated with the company as technical service representative in the Chicago district office. Mr. Farlow formerly was with Caterpillar Tractor Co., and during the war was metallurgist at the Caterpillar military engine plant, Decatur, Ill.

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John C. Enblom has been named president and general manager, Donaldson Co. Inc., St. Paul, manufacturer of dust protection equipment for internal combustion engines. Mr. Enblom formerly was executive vice president and general manager. He succeeds the late **Frank A. Donaldson,** founder. The company has appointed the following district representatives: **G. C. Bohn,** Cleveland; **C. D. Walter,** Chicago; and **F. H. Funke,** Detroit.

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William M. Neal, vice president and secretary, Sloss-Sheffield Steel & Iron Co., Birminghan, has been named president, Associated Industries of Alabama, succeeding **George M. Mattison Jr.,** president, Woodstock Slag Corp., Birmingham.

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Dr. William T. Griffiths, London, has been elected a vice president and director, International Nickel Co. of Canada Ltd. He succeeds the late **David Owen Evans.** Dr. Griffiths is chairman of Mond Nickel Co. Ltd., British affiliate of International Nickel company.

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Robert W. Gloyd recently was appointed sales and engineering representative for Dayton, Springfield, Hamilton, O., and vicinity, Kelly Reamer Co., Cleveland.

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Cleveland chapter of the Steel Products Warehouse Association has elected the following officers: Chairman, **S. M. Friedman,** Nottingham Steel Co.; vice chairman, **Robert Cole,** Ohio Steel & Supply Co.; secretary, **David Moritz,** Regent Steel Co.; and treasurer, **H. Mervis,** Singer Steel Co.

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Warren H. Mayo recently was named assistant manager for the Pittsburgh district, Metallurgical Division, Carnegie-Illinois Steel Corp., Pittsburgh.

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Luther D. Shank has been appointed Philadelphia district manager for the Appleton Electric Co., Chicago. **William A. Davidson** has been named Pittsburgh district manager for the company, succeeding **C. L. Snyder,** retired.

—o—

E. K. Henley has been appointed manager and **W. H. Wild,** manager sales, of the new Marine Division, General Electric Co., Schenectady, N. Y. The Marine Division consolidates the Navy Ship, Merchant Ship and Diesel-Electric Divisions. **F. C. Ruling** has been name assistant manager of the compan Washington office. **L. D. T. Berg,** f the past five years a sales engine Welding Division, has been appointe welding specialist of the company Atlantic district with headquarters Philadelphia.

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Harold E. Bliss has been appointed a sistant secretary and assistant treasure Graham-Paige Motors Corp., and w have charge of the financial departme Warren City Mfg. Co., Warren, O., a su sidiary.

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Eugene C. Bauer, president, Kensing ton Steel Co., Chicago, has been elect a director and vice president, Poor Co., Chicago, manufacturers of railw supplies, forgings and malleable ir castings.

—o—

J. W. Gething has been named gener superintendent of Laclede Steel Co., Alton, Ill., succeeding Lafayette Youn who recently was appointed vice pres dent.

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R. Wayne Gates has been named the research and development st Pemco Corp., Baltimore. **John Steenck** has become a member of the compan service organization.

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M. C. Turpin has been appointed a sistant secretary, American Society Refrigerating Engineers, New York. F the past 15 years, Mr. Turpin has be supervisor of the Westinghouse Electr Corp. Electric Appliance Division Washington.

—o—

Allan R. Ogilvie has been named vice president, Maguire Industries In and is in charge of its plant at Bridg port, Conn. Formerly he was chief e gineer of the Electronics Division, which post **Carlton Wasmansdorff** su ceeds.

—o—

F. H. Hoge, executive vice pres

CARL A. GRAY

ROBERT M. HATFIELD

DONALD A. CAMPBELL

W. A. Jones Foundry & Machine Chicago, has been elected president succeed **William Coleman**, resigned.

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Carl A. Gray, president, Grenby Mfg. Plainville, Conn., has been elected man, Allen D. Cardwell Mfg. Corp., klyn, N. Y., of which the Grenby pany recently acquired full con- **Ralph H. Soby**, vice president and r, Grenby Mfg. Co., has been president, Allen D. Cardwell cor- succeeding Mr. Cardwell, re- Other officers of the Cardwell ation include: **Joseph K. Fabel**, president and sales manager of the pment and Engineering Division; **Ray L. Morehouse**, sales manager, mercial Products Division.

—o—

burgh chapter of the Institute of Iron & Steel Inc., re-elected the ing officers: President, **J. G.** **ens, Stephens-Ruffner & Co.**; vice dent, **L. W. Landay**, M. N. Landay treasurer, **Robert Jacobson**, Luria & Co.; secretary, **Ray H. Meister**, Solomon Co.

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C. M. Williams recently retired as vice president, Curtiss-Wright and executive vice president, Aeronautical Corp., has resumed presidency, Russell Mfg. Co., Mid- n, Conn.

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rge S. Forman has been named di- factory representative in Latin erica for the Baker Industrial Truck sion, Baker-Raulang Co., Cleveland.

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John D. Gordon has been advanced to eral manager and **Cal L. Halpin** has appointed manufacturing works ger, Progressive Welder Co., De-

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Fred C. Abbott has been appointed ager, New Products Division, Penn- nia Salt Mfg. Co., Philadelphia. has been associated with the market search and sales departments of the pany since joining the organization in 1943. The following have been named to the company's research and development staff: **Dr. E. B. Gunyou, Dr. Harry G. Walker, Dr. Thaddeus Parr, Murray Zakheim.**

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Robert M. Hatfield, formerly deputy vice chairman, War Production Board, Washington, has become assistant general sales manager, Combustion Engineering Co. Inc., New York.

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Col. Louis F. W. Stuebe has returned from the armed services and has joined the Chicago sales engineering staff, Hyatt Bearings Division, General Motors Corp., specializing in railroad applications.

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Sterling F. Smith has been named general sales manager, Baker Ice Machine Co., Omaha, Nebr. He formerly was associated with Mills Industries Inc., Chicago.

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Dr. Howard Doolittle has joined the engineer staff of Machlett Laboratories, Springdale and Norwalk, Conn.

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Benjamin M. McDade has been appointed executive representative, Acme White Lead & Color Works, Detroit.

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Charles A. Thompson has been placed in charge of a branch office recently opened in Birmingham by Robins Conveyors Inc., Passaic, N. J., subsidiary of Hewitt Rubber Corp. **C. B. Davis**, the company's representative in that territory since 1916, has retired.

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George H. Lange has been appointed purchasing agent, Alan Wood Steel Co., Conshohocken, Pa., succeeding **Walter D. Heist.** Mr. Lange formerly was purchasing agent, Phoenix Iron Co., Phoenixville, Pa.

—o—

Hendley Blackmon has resigned as manager, editorial service, Westinghouse Electric Corp., Pittsburgh, to become electrical editor *Product Engineering*, New York. Pending return of **Lt. Carl Nagle**, now serving in the U. S. Navy, **H. C. McDaniel** will act as supervisor of editorial service for Westinghouse.

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Donald A. Campbell has been placed in charge of the recently organized Industrial Division, Bryant Heater Co., Cleveland.

—o—

J. Ralph Walker has been appointed director of purchasing and **Dr. Robert Lee Freeman**, chief electronics engineer, Lewyt Corp., Brooklyn, N. Y. Mr. Walker succeeds **George E. Stone** in the Purchasing Division while Dr. Freeman will head up the company's Electronics and Radio Divisions.

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Dr. William M. Murray Jr., formerly in charge of research work in analytical chemistry, General Electric Co.'s laboratory at Pittsfield, Mass., has joined the staff of Southern Research Institute, Birmingham.

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Howard W. Booth has been appointed manager of sales, Wilson-Snyder Mfg. Division, Braddock, Pa., Oil Well Supply Co., Dallas, Tex. Mr. Booth has been assistant to the chief engineer of Oil Well Supply Co. for 12 years, and prior to that time served in an engineering and production capacity with Wilson-Snyder.

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E. Finley Carter and **H. Ward Zimmer** were elected vice presidents, Sylvania Electric Products Inc., Ipswich, Mass.

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John B. Creen, formerly general traffic manager, Oil Well Supply Co., Dallas, Tex., has been appointed director of transportation, Granite City Steel Co., Granite City, Ill. **Edward F. Ledwidge** continues as traffic manager.

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Don W. Randolph has returned as director of engineering, Apex Electrical Mfg. Co., Cleveland, after having served during the war as Naval commander in the Bureau of Aeronautics. **Ralph E. Kortepeter** becomes chief engineer of

MARCUS M. CHAPMAN

Who is manager of sales, Sheet Division, Carnegie-Illinois Steel Corp., Pittsburgh, noted in STEEL, Nov. 12 issue, p. 110.

J. P. LYONS

Who has retired as Ohio sales representative, Elwell-Parker Electric Co., Cleveland, noted in STEEL, Nov. 12 issue, p. 108.

C. E. RILEY

Who is general sales manager, Carbon Ste & Strip Division, McLouth Steel Corp., Detro noted in STEEL, Nov. 12 issue, p. 108.

the company's Cleveland plant. **Archibald H. Davis** has been named chief engineer, Holland-Rieger Division plant, Sandusky, O.

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Adam J. Hazlett vice president in charge of sales since July, 1944, Jones & Laughlin Steel Corp., Pittsburgh, has been elected a director and member of the executive committee.

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Edward C. Hoenicke, formerly assistant general manager, has been appointed general manager, Foundry Division, Detroit, Eaton Mfg. Co. He succeeds J. L. Dostal, who has resigned.

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P. E. Floyd has been named manager of sales of the newly-established Carbide Alloy Sales Division, Allegheny Ludlum Steel Corp., Brackenridge, Pa. Mr. Floyd will have headquarters at Ferndale, Mich. His former position as assistant general manager of sales in charge of tool steels is taken over by **Coolidge Sherman** who will have offices at the company's Watervliet, N. plant. **Truman B. Brown**, formerly spe cial representative, Tool Steel Divisio becomes assistant manager, tool ste sales, with headquarters at Brackenridg Pa.

—o—

Paul E. Tamplin, since 1943 gener superintendent of the Sharon, Pa., work National Malleable & Steel Castings C Cleveland, has been appointed manag of the company's newly-established Sha on industrial sales and service office.

OBITUARIES...

Dethic H. Wood, 74, chairman, Converse Bridge & Steel Co., Chattanooga, Tenn., died Nov. 3 at his home in Missionary Ridge, Tenn.

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Joseph B. Andrews, 66, from 1922 until March 1943, president of the Newport Rolling Mill Co. and Andrews Steel Co., Newport, Ky., died at his home in Newport Nov. 11.

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John Hill, 82, president, Hill & Griffith Co., Cincinnati, for nearly 50 years, died Nov. 6.

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Oramel Skinner, 67, for 23 years associated with Thomas & Skinner Steel Products Co., Indianapolis, died Nov. 7.

—o—

Sherman C. Dalbey, president, Ohio Forge & Machine Corp., Cleveland, died Nov. 10. Mr. Dalbey was founder of the Ohio Forge Co. which later became the Ohio Forge & Machine Corp.

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Thomas H. Booth, 55, sales executive of Columbia Steel & Shafting Co., and Edgar T. Ward's Sons Co., Pittsburgh, died Nov. 13 in Muskegon, Mich. Mr. Booth had been associated with the Columbia Steel & Shafting Co. for 34 years.

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S. C. Johnson, 68, who had served as superintendent with Milwaukee Steel Foundry Co., Pelton Steel Castings Co., Maynard Electric Steel Casting Co., and Wehr Steel Co., all of Milwaukee, died recently while on a hunting trip.

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Edward G. Sperry, 54, vice president and treasurer, Sperry Products Inc., Hoboken, N. J., died Nov. 6.

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Mortimer R. Kempton, 58, engineer of freight cars, Michigan City, Ind. plant, Pullman Standard Car Mfg. Co., died Nov. 8 in Martinsville, Ind.

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John M. Studebaker III, 47, of South Bend, Ind., president, Studebaker Machine Co., Maywood, Ill., a company which his father founded in 1941, died Nov. 8 in Chicago.

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F. L. Sage, Chicago district manager, Hiram Swank's Sons, Johnstown, Pa., died in Chicago recently after 21 years with the company.

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Frank A. Smythe, 77, president, Thew Shovel Co., Lorain, O., died recen in an Elyria, O. hospital. Mr. Smyt had served as president of the Th company since 1898.

—o—

Orlando J. Tingley, 92, retired, fo merly in charge of the pattern depar ment, Buffalo Forge Co., Buffalo, died that city Nov. 7.

—o—

Phillip W. Kaufman, 65, office ma ager, W. R. McDonough & Co., Cle land, died recently in that city. Fro 1930 to 1941 he had served as manag Meadville Malleable Iron Works, Mea ville, Pa.

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William H. Rearden, 41, superinte dent of production in the Centralia, I area, Shell Oil Co., died Nov. 6.

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William Wildman, 83, president an founder, Wildman Boiler & Tank C Chicago, died Nov. 8 in that city.

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John J. Pilger, 45, general superi tendent, American Hydraulics Inc., She boygan, Wis., died Nov. 6.

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Charles Wheeler, 55, managing part ner of Controlair Mfg. Co., Los Angeles died recently.

Materials, Component Shortages Hamper Reconversion on Coast

Manufacturers of household and other appliances reported lagging far behind projected schedules. Indications are supplies may not be adequate until well into 1946. Labor supply picture steadily improving

SAN FRANCISCO

ALTHOUGH West Coast manufacturers report a gradually improving labor supply picture, shortages of many materials continue to hamper reconversion.

In some cases basic raw materials are short. For example some companies have not been able to progress with their plans because of a scarcity of certain steel items. Another factor has been a shortage of lumber.

Several companies which had hoped to be well along with production of household appliances by this time are lagging far behind because there are not enough electric motors to go around. Production of washing machines, vacuum cleaners and many other products using small motors consequently is being delayed.

Oil companies are finding it harder to get sheet steel and pipe. Machinery, drilling equipment, valves and fittings are just as difficult to purchase now as at any time during the war.

In some instances manufacturers are being balked by price ceilings which are slow to enable parts and materials producers to get into production.

Nearly all corporations which are having trouble now think it may be well into 1946 before they begin getting adequate supply.

Third Bridge Considered

San Francisco, which already has the world's two largest bridges, is talking of constructing a third span equal or bigger in size. Discussions are in a tentative stage, but prospects for such a project are improving. If finally approved, the bridge would stretch from San Francisco on the west shore of San Francisco Bay to Oakland on the east shore. The bridge probably would at least partly parallel the present San Francisco-Oakland bridge.

Existing bridge facilities no longer are adequate to handle the traffic, which has long outstripped all estimates. In the calendar year 1940, the San Francisco-Oakland bridge averaged about 42,000 motor vehicles daily. During the war the average increased to about 53,000 and when gasoline rationing was relaxed it spurted suddenly until now it is nearly 72,000 cars a day. In all of 1945 it is expected vehicular traffic will rise to 23 million, far and away larger than that of any other bridge in the world. To build the present bridge at depression-level labor and material costs required an expenditure of nearly $82 million, of which more than $25 million went for highway approaches and interurban facilities on the lower deck. Plans for a new bridge do not include interurban tracks; it would be entirely for motor vehicles.

Although there would be some savings in that direction, high material and labor costs would raise the price of a new bridge well above the previous level. Engineers believe that nearly $100 million is approximately a correct figure.

Another project still more tentative, but equally possible, is construction of subway tubes under Market Street, San Francisco's main thoroughfare. No definite idea as to cost of such a project has crystallized, but it is believed it will be at least $25 million.

Meanwhile, San Francisco voters a few days ago gave a go-ahead to another major program on the city's list of postwar developments. By a large majority they approved a bond issue which will result in a $20 million enlargement of the municipal airport to eventually make it one of the largest in the world.

Acute Housing Shortage Blamed for Labor Supply Difficulties in Los Angeles Area

LOS ANGELES

THE HOUSING shortage has reached extremely serious proportions here. It is now being openly blamed by government and industry leaders for many of the worker-shortage woes besetting the area.

According to reliable estimates there is need for upwards of 250,000 dwelling units in southern California, mostly in Los Angeles county. Official figures show that 782,705 persons have settled in Los Angeles county alone since 1941. In that period, 76,688 government-priority homes or dwelling units of other varieties such as barracks or trailers have been occupied.

In the San Francisco area the population has increased by 514,815 since the beginning of the war, and in that period, the San Francisco area acquired 117,358 houses built with materials obtained through priorities.

The Kaiser steel mill at Fontana is negotiating for production contracts for France and Russia, it has been disclosed by Kaiser spokesmen. While no definite description as to kind or volume of production is forthcoming, it is implied that steel ingots and some structural forms will be made when new facilities are ready for use at the mill. Capacity production "for a long time" was seen as a certainty if and when the European negotiations become crystallized into actual orders.

Pacific Intermountain Express, second largest highway transport company west of Chicago and fifth in the nation, plans purchase of new equipment.

A. K. Humphries, in Los Angeles to supervise expansion of the express line's local equipment and shipping schedules, said that while San Francisco is the largest traffic generating point on the coast today, Los Angeles will be in that position soon. He expects traffic from this area to double within the next year.

New equipment will be constructed with unprecedented use of aluminum and magnesium.

Mr. Humphries pointed out that state regulations permit the company on its long hauls to carry a 40,000-pound load from the West Coast to Denver. There restrictions become effective limiting loads to 30,000 pounds to eastern points such as Chicago and St. Louis. The new equipment will give the transportation company a 5000 pound advantage on this basis.

Westinghouse To Produce Unit Electric Heaters

Westinghouse Electric Corp., Pittsburgh, has made arrangements for licensed manufacture of unit electric heaters with Wesix Electric Heater Co., San Francisco. Westinghouse will establish facilities at its Emeryville, Calif., plant for manufacture of units ranging from 1250-watt, 110-volt floor units up to 4-kilowatt, 220 volt floor and wall models, the latter with built-in thermostatic controls. Oregon, Washington and California are expected to be major markets.

Steel Supply Co. Builds Warehouse on West Coast

Drake Steel Supply Co., Los Angeles, is building a warehouse in Fresno, Calif., as a San Joaquin valley distribution point for steel, pipe and tubular goods. Cost of the warehouse and adjoining office building will be approximately $50,000, according to Albert C. Weinert, president. Thomas V. Morgan has been appointed manager of the new branch.

WING TIPS

Remote radio control of high-speed, high-performance operational-sized test aircraft and simultaneous transmission of flight data to automatic recording instruments made possible through equipment developed by ATSC and Bell Aircraft

ENGINEERS of the Air Technical Service Command and Bell Aircraft Corp. have developed equipment which makes possible remote radio control of high speed, high-performance operational-sized test aircraft and the simultaneous transmission of flight data to automatic recording instruments.

The new method of transmitting flight data, both by television and telemetering, is of special significance in the continuous quest for aircraft operating in the range of the speed of sound—about 764 miles per hour at sea level—where hazards to both aircraft and pilots are greatly increased.

In tests conducted since October, 1944, a Bell P-59 Airacomet, jet-propelled plane remotely controlled from either a flight station or a ground station, has successfully performed maneuvers normally associated with flight research operations.

Eliminates Many Risks

The development eliminates many of the risks heretofore undertaken by pilots conducting hazardous tests concomitant with experimental aircraft investigation. In addition, it permits research into phases of flight testing previously considered too dangerous for pilots to attempt. This, for example, would include exceedingly high speed dive tests, wherein aircraft would approach or surpass the speed of sound.

Aircraft remotely controlled by radio also promise possible adaptation for commercial and military flying. Prior to the program developed by Bell and the ATSC, several radio remotely controlled planes for other than target purposes had been produced in this country but were not regarded as being as successful in all-around performance as the new project.

Most important single factor in the success of the robot plane is a new concept of autopilot, called a "rate" autopilot. The "rate" pilot, whose conception is credited to Robert M. Stanley, Bell's chief engineer, takes up where a standard type autopilot leaves off and functions effectively at diving altitudes.

Three physical components were used in its first development of planes remotely controlled by radio—two jet-propelled P-59s and a panel truck. One of the P-59s is the controlled or robot plane while the other is the controlling or flight station and is referred to as the "mother" plane. The truck serves as the ground station and like the flight station, or mother ship, can control and operate the robot.

However, the ground station, unlike the flight station, is equipped with telemetering and television instrumentation and at all times can determine what the robot is doing and where it is. The flight station depends on the pilot's visual contact for the location of the robot.

Turbojet powered planes were selected for the initial development for practical reasons—their characteristic lack of torque and vibration; their speed stability, high altitude efficiency and the ground stability afforded by tricycle landing gear.

Thus far, in all flights of the robot plane, a safety pilot has been in the cockpit, prepared to operate the plane in the event of radio failure. This precaution can be readily appreciated. The project is still one of considerable experimentation and while the presence of a pilot deters not the slightest from th progress of the remotely controlle flights, it does serve as a protective mea sure against possible loss of a valuabl experimental aircraft and equipment.

The "rate" pilot is the key to th success of the robot development. Pri to its conception, research in radio re motely controlled airplanes was hand capped by the fact that the standa autopilot, also known as a "displacemen pilot, was effective for normal level flig only. It did not function effectively an lost control of the aircraft at divi altitudes or in sharp maneuvers.

The standard autopilot is controlle by a gyroscope which spins with i axis vertical and in violent maneuve is subject to "tumbling," or "spilling In this condition, the normal stabilizi qualities of the gyro are no longer e hibited and a plane which incorporat a standard or "displacement" pilot wou behave as if out of control when th standard autopilot's gyro has "tumbled

From Stanley's theory and ideas, Be engineers designed a new type of aut pilot. Two rate-of-turn gyro instrumen were adopted. One was so arranged th the gyro spin axis was vertical in ord to provide a method of sensing change pitch while the second was rotated as to place the gyro fore and aft a provide a method for sensing rate of ro

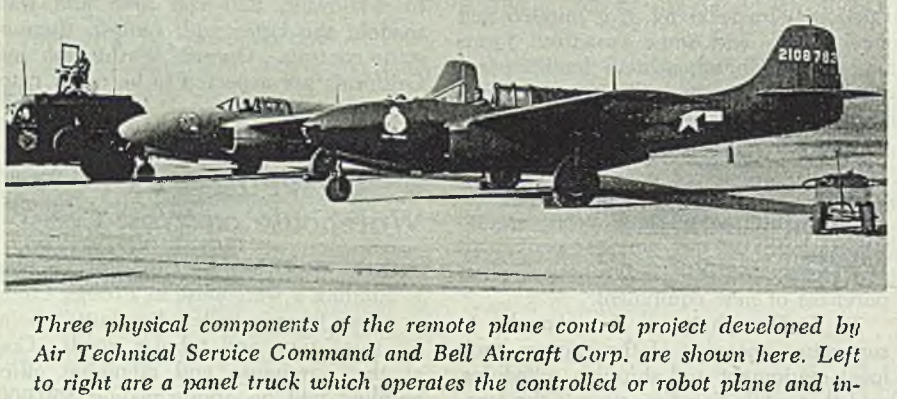
Functions Interchangeable

Then, both sensing devices, the "rat autopilot and the "displacement" aut pilot, were coupled in an electrical brid so that their functions became inte changeable. The "displacement" pilot called upon for maneuvers involving le than plus-or-minus 30 degrees chan in pitch or plus-or-minus 45 degre change in roll while the "rate" pil with its tumbling-proof gyroscopes, employed for all other maneuvers. Bo the flight and ground stations have switch on a conveniently located pane which permits selectivity of the aut pilots. At the same time, either and both autopilots can be controlled fro both stations.

A miniature stick, very similar in ope ation to the stick in a normal plane, mounted on the regular stick in th mother ship and another miniature stic appears on the ground operator's chai which is secured to a platform built o top of the truck.

As further insurance of the success ful operation of the robot, the groun operator's controls are duplicated in th interior of the truck, so that the robo can be controlled by observation of i televised flight instruments when out o sight of either the flight station operato or the ground operator.

The motions of the miniature stic closely parallel those of a normal stick Moved forward, the miniature stick ini tiates the impulse that lowers the ele vators, causing the robot to dive; move backward, the miniature stick produces



Three physical components of the remote plane control project developed by Air Technical Service Command and Bell Aircraft Corp. are shown here. Left to right are a panel truck which operates the controlled or robot plane and incorporates telemetering and television equipment for the observation and recording of flight research data; the robot plane and the "mother" plane. Both aircraft are P-59 Airacomets

4 TOOLS LAST AS LONG AS 5

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a climb, and to the right or left, a turn in either direction.

Such parts of the robot as throttle, flaps, landing gear, brakes, etc. are actuated by servo motors which derive electrical power from circuits controlled by the radio receiver. Thus, by proper co-ordination of these controls, ground or flight station operators can direct the robot through warmup, taxiing, take-off, climb, level flight, banks or turns, dives, loops, and all the other maneuvers involved in flight testing of aircraft.

The telemetering equipment incorporated in the radio remotely controlled program was designed and manufactured by Princeton University and the television was made by the Radio Corp. of America. This equipment is concentrated in the robot plane and the ground station, the mother ship being employed only for control of the robot.

Flight research measurements, such as vibrations, accelerations, structural loads and strains, and other stresses not visible to the eye, are transmitted to the ground station by the telemetering process. This process functions basically as follows: Data desired, i.e., structural deformation, control position, acceleration, etc., are measured electrically by resistance elements. This information is fed in sequence to the transmitter at the rate of 1100 complete cycles per second and transmitted to the ground station where receiving equipment unscrambles the combined signals and feeds them appropriately into separate receiver channels for either recording or observation, or both, in a multi-channel oscillograph.

Television serves a dual role. One of its units televises an instrument panel in the robot plane and gives an image of the robot's instruments, thereby permitting the ground operator to observe the functioning of the robot's instruments. A second unit, installed in the cabin of the robot, televises the horizon as normally seen by the pilot, relaying a vision of the horizon to the ground operator.

As a further aid to the pilot of the mother ship or the ground operator visual location of the robot is helped by a smoke generating system, which emits a trail of smoke from the robot plane for tracking purposes when desired.

Consolidated Vultee To Build Household Appliances at Nashville, Tenn., Plant

CONSOLIDATED Vultee Aircraft Corp. is entering the general manufacturing field while continuing to turn out commercial, personal and military aircraft.

Company's plant at Nashville, Tenn., will be converted immediately from aircraft production to the manufacture of gas and electric kitchen ranges for Aviation Corp., parent company of Consolidated Vultee. First models are scheduled to come off the production line in February, according to President Harry Woodhead.

Later, he said, it is expected the Nashville manufacturing center will begin production of farm machinery equipment for New Idea, Inc., control of which was recently purchased by the Aviation Corp.

"This is the first move of its kind by a major aircraft manufacturer," said Mr. Woodhead. "In assembling the Avco stove, which is designed for low-cost mass production, we will utilize the same manufacturing techniques developed during the war for large-scale production of aircraft.

"During the war Convair adhered strictly to aircraft building, although often we were asked whether the company would ever digress from aircraft manufacturing.

"Following a survey of Convair facilities at the end of the war, we deemed it wise to enter the field of consumer goods production in addition to continuing our output of commercial, personal and military aircraft.

"With a production background which in 1943 made Convair the world's largest producer of airplanes, we feel there is no problem too great for us to solve in converting our Nashville division to the manufacture of household appliances, equipment and farm machinery."

Mr. Woodhead said that retooling of the Nashville plant for the new products was to start immediately at a cost of approximately $2 million.

Manufacture of consumer goods at Nashville means the transfer of production of Stinson Voyager 150 four-place personal airplanes to Convair's Stinson Division at Wayne, Mich.

Formerly built at Wayne, the Voyager 150 was transferred several months ago to Nashville so that Wayne plant facilities could be used exclusively on military projects.

SURPLUS SALE: Crowds jam the Kenmore plant of Curtiss-Wright Inc., near Buffalo, as more than a million dollars worth of surplus aircraft machinery was placed on the auction block. NEA photo

Bell Aircraft Develops New 500mph JP Fighter

Greater than 500 miles per hour, the speed of the XP-83, jet propelled fighter plane developed by Bell Aircraft Corp. Company officials say the new plane has aerodynamic characteristics enabling it to fly from 600 to 750 miles per hour.

RFC Lists Aircraft Parts Plant at Scranton, Pa.

Aircraft parts plants at Scranton, Pa., operated during the war by Murray Corp. of America, has been listed for sale or lease by the Reconstruction Finance Corp. Property includes eight modern factory structures, with a total of 875,000 square feet of floor space, 28 acres of land and more than 400 machine tool items.

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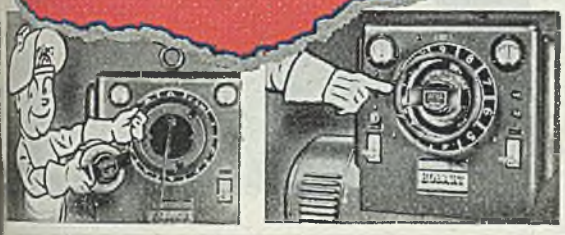
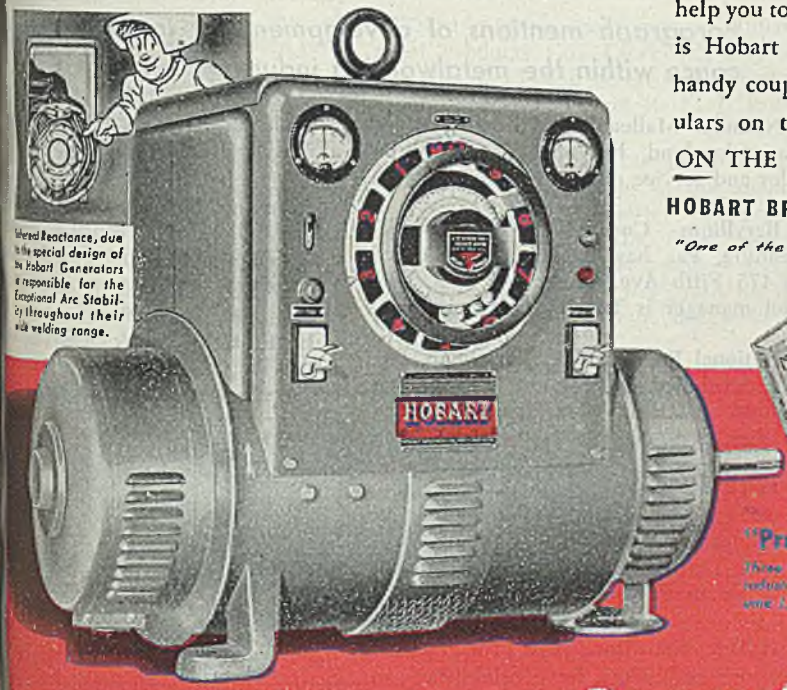


Iveotic Control, an exclusive Hobart feature that allows the operator to make adjustments of welding heat right at the work.

Multi-Range Dual Control makes possible over 1,000 combinations of voltage and amperage without a single dead spot in the entire welding range.



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Output of White Trucks, Busses Increases Slowly

Component shortages hamper operations, scheduled to reach 50 per cent above prewar level by yearend

PRODUCTION of trucks and busses at White Motor Co.'s plant in Cleveland has been retarded since the beginning of reconversion operations by a shortage of components, such as cylinder blocks. While the difficulty in obtaining steel and manpower has not affected the company's operations directly, it undoubtedly is a factor in the tight supply of components.

Although reserve and working stocks of steel are smaller than normal, the company has not found it necessary to apply for a "CC" priority rating in its steel buying program. The types of steel now being purchased by the company are the same, except for size in some instances, as those bought under war contracts. They consist mainly of carbon steel plate, sheet and rolled products and alloy pressed items.

White Motor is experimenting with the lighter metals, however, and is considering stainless steel and aluminum for certain applications.

The company's order backlog is increasing steadily, although many inquiries are not being accepted for models which are not yet in production. Output is now being concentrated on those trucks and busses which are most essential to the welfare of the country and which will stimulate employment in other industries.

Plant operations now are at a rate of only 75 per cent of schedule. Steady improvement is expected over the remainder of the year, barring a strike in the steel industry, with output scheduled 50 per cent above the prewar rate by Jan. 1 and 100 per cent higher by the end of 1946. This increase in production is made possible by utilization of improved and expanded manufacturing facilities which were developed during the war to meet heavy military requirements.

Galvanizers To Meet, Visit Armco Plant, Nov. 29-30

Inspection of the research laboratories and the East Side plant of the American Rolling Mill Co., Middletown, O., will feature the meeting of the Galvanizers Committee, sponsored by the American Zinc Institute, in Cincinnati, Nov. 29-30.

LAYS CORNERSTONE: John Ballantyne, president, Philco Corp., lays the cornerstone of a new plant for the company's storage battery division in Trenton, N. J. Company is anticipating a large increase in business in 1946

BRIEFS . . . .

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

National Malleable & Steel Castings Co., Cleveland, has opened a southern sales and service office in Richmond, Va.

—o—

Beryllium Corp. of Pennsylvania, Reading, Pa., has opened a sales office at 475 Fifth Ave., New York 17. District manager is Thomas F. Davis.

—o—

National Radiator Co., Johnstown, Pa., has developed a new unit for cooling liquids, particularly acids and strong alkalies.

—o—

Firestone Tire & Rubber Co., Akron, is using a high-speed production line installation for electronic curing and drying of foamed sponge rubber for seat cushions in its Fall River, Mass., plant.

—o—

Hill & Knowlton, New York, public relations counselors, have established an office in Dallas, Tex. W. W. Sherrill heads the regional branch.

—o—

Briggs Clarifier Co., Washington, has named Equipment Supply Co., Salt Lake City, Utah, as distributor for Utah, part of Wyoming, eastern Nevada and southern Idaho. Weeks Engineering Co., St. Louis, is distributor for the St. Louis area. Curtis Engine & Equipment Co., Baltimore, will handle the marine products for the Chesapeake bay area.

—o—

Graham-Paige Motors Corp., Detroit, will price its Rototiller, revolutionary tillage implement, approximately 30 per cent below the price of the pre-war machine as a result of mass produc at Willow Run.

—o—

Herman Machine & Tool Co., T madge, O., is constructing a plant ad tion, enlarging shipping and receiv facilities.

—o—

L. F. Grammes & Sons Inc., Alle town, Pa., has available to manufact ers a color catalog illustrating new me ods for beautifying metal products.

—o—

Bridgeport Brass Co., Bridgepo Conn., has just celebrated its eighti anniversary.

—o—

Hercules Powder Co., Wilmingto Del., has announced a $30 million co struction program that will cover the chemical manufacturing departme of the firm. Construction of new pla and increased facilities will be co pleted within the next three years.

—o—

Pitney-Bowes Inc., Stamford, Conn will fly its Army-Navy "E" flag until a of its employees who entered service be fore or during the war receive discharg or re-enlist.

—o—

Hewitt Rubber Corp., Buffalo, has or dered new machinery for expanded pro duction of parts for passenger automo biles and trucks.

—o—

Hobart Trade School Inc., Troy, O has announced a specialized welding training course for veterans under th

Bill of Rights conducted by Ho- Bros. Co.

—o—

Osgood Co. and General Excavator Marion, O., have appointed Udo as distributor in Brazil. Reidel ales offices in Rio de Janeiro and Paulo.

—o—

eem Mfg. Co., San Francisco, ex- to be turning out a full line of matics" by mid-December at its go plant. The Chicago plant will facture for new midwestern and markets, and the original Salt City, Utah, "Stokermatic" plant continue to produce the automatic for the west and northwest.

—o—

L. Maxson Corp., New York, pro- of engineering, computing and mechanisms, will occupy the ich, Conn., plant of Hamilton ard Propeller Division, United Air- Corp.

—o—

nd Building Products Co., Detroit located now in room 954 Buhl

—o—

ar W. Hedstrom Corp., Chicago, ning to produce a new line of ools as part of its reconversion pro-

—o—

ndry Rubber Compounds Corp., ington, has purchased from St. John Service Inc., Long Island, New the latter's Bonis permanent mold the coating business.

—o—

ston Wire Stitcher Co., East Green- R. I., manufacturer of stapling ther wire-forming machines, will begin operations Jan. 1, at the Lorraine mills, Pawtucket, R. I., formerly occupied by Hamilton Standard Propeller Division, United Aircraft, Hartford, Conn.

—o—

Superior Tool & Mfg. Co., Ft. Worth, Tex., is a newly-organized firm making machine tools, steel blanking, and piercing and stamping dies.

Allegheny Ludlum Reports Profits Down For Quarter

Allegheny Ludlum Steel Corp., Pittsburgh, has announced a third quarter net profit of $537,079 after providing $1,398,150 for federal income and excess profit taxes and for estimated refund on renegotiation of war contracts. These earnings compare with $926,400 for the same quarter of 1944.

Net profit for the nine months ended Sept. 30, 1945 was $2,500,866 compared with $2,591,574 for the corresponding period in 1944.

Midland Steel Reports Loss For Third Quarter

Third quarter operations of Midland Steel Products Co., Cleveland, resulted in a loss of $54,618 before adjustment of federal taxes, according to E. J. Kulas, president.

A credit resulting from the reduction of accrued income taxes in the amount of $369,000 for the quarter was responsible for translating the third quarter operating loss into a net profit of $314,382. This brought the net profit for the nine months ended Sept. 30, 1945 to $1,074,992.

OUTPUT AT PEAK: Production of electronic and other industrial instruments is proceeding at a high rate at the plant of the Brown Instrument Co., Philadelphia. This photo shows the loading platform at the company's plant where two or three trucks are almost always loading finished instruments or unloading cases and parts

Blaw-Knox Goes Into Heating System Field

Pittsburgh company acquires Ross Supertherm business in North and South America from J. O. Ross Engineering Corp.

BLAW-KNOX Co., Pittsburgh, is taking over from the J. O. Ross Engineering Corp., New York, all engineering, sales, fabricating and installation work of the Ross Supertherm hot water heating systems in North and South America.

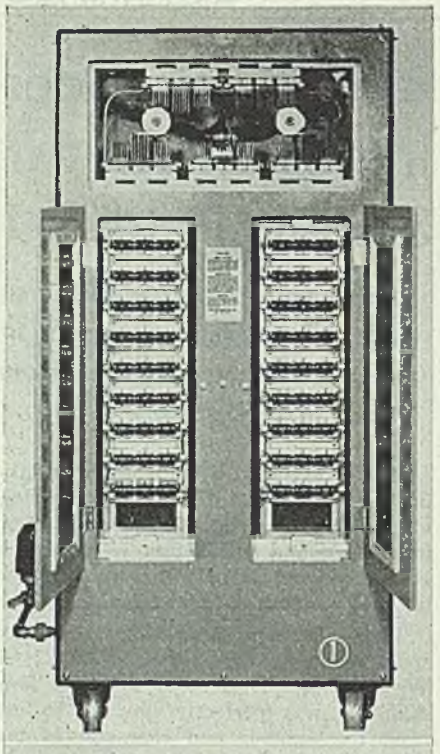
In a statement concerning the new sponsorship by the Blaw-Knox Co., S. W. Fletcher, president of the Ross firm said, "It was perfectly obvious to us, from the number and character of inquiries being received, that the expanding postwar development of the Supertherm business would produce a severe strain on our facilities.

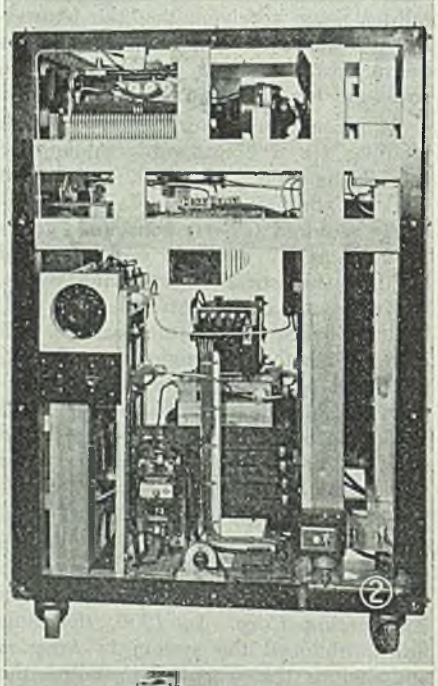
"A Supertherm installation requires facilities for a considerable amount of special engineering, fabrication and field work in addition to those facilities regularly required for our constantly growing volume of work in designing and building industrial dryers and ovens. We were convinced," Mr. Fletcher said, "that no other organization was so well equipped with the engineering knowledge, fabricating facilities and a complete nationwide organization for field work as the Blaw-Knox company and we therefore welcomed its proposal for adding the Supertherm systems.

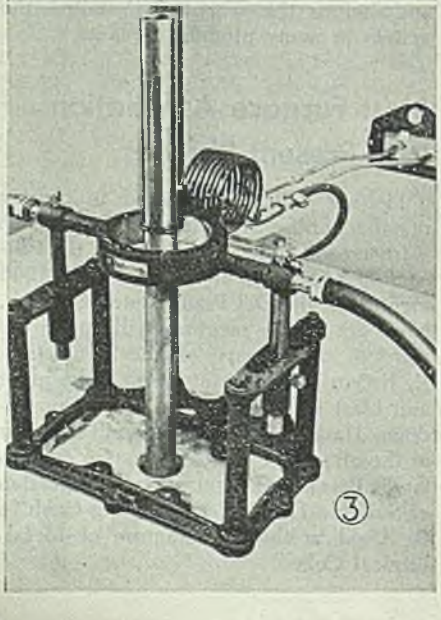
The Supertherm system, which utilizes superheated water for industrial heating was promoted originally in Europe by a company associated with the J. O. Ross Engineering Corp. In 1935, the Ross firm introduced the system in America and before the war had installed the system in many prominent plants.

Blast Furnace Association Will Present Plaques

Plaques will be presented to charter members and past presidents of the Blast Furnace and Coke Association of the Chicago District at its first regular 1945-1946 meeting at the Del Prado Hotel, Chicago, Nov. 28. This meeting will mark the thirtieth anniversary of the association. E. J. Gardner, superintendent, coke plant and blast furnaces, Inland Steel Co., Indiana Harbor, Ind., will present a paper at the afternoon technical session on "Inland's Research Program for the Selection of Suitable Low-Volatile Coking Coal To Be Used in the Manufacture of Metallurgical Coke."







Spark Gap CONVE

As High-Frequency Power Sourc

Various setups attain fine record for uniformity and output in annealing, soldering, brazing, progressive heating for harden- ing, and in melting ferrous and nonferrous metals

THE spark gap converter is today one of the most widely used sources of high frequency power for the purpose of induction heating. As such, these converters are in constant operation in many industrial plants, 24 hr daily, and have attained a remarkable record in production and uniform output even under such unfavorable conditions as dust, dirt, varying line voltages, widely varying and low water pressures, poor maintenance, etc.

The spark gap converter is not a recent development. As a matter of fact, it has been in use for about 20 years for induction heating applications. It was first employed to heat the elements of radio tubes right through the glass envelopes in which they were enclosed. Because this presented a poor load, it was found desirable to develop a high frequency source which not only was capable of supplying maximum power output to such poorly or loosely coupled loads, but also to accommodate efficiently a great variety of load coil sizes.

Operation of the spark gap converter is extremely simple and does not require highly trained personnel. In many installations these units are operated and maintained by unskilled help; in many cases, by women. No time delay functions or waiting periods are involved; it is merely necessary to step on the footswitch and power is instantaneous. The original Lepel circuit which is basic in all quenched spark gap converters aptly illustrates this simplicity. (See Fig. 7, p. 130.)

High frequency oscillations are produced by charging and discharging a group of condensers. When the charging voltage has reached a certain va which is determined by the spark setting, the charged condensers discha across the spark gaps mounted on back unit, Fig. 1. When the charge dropped to a low value, the conden begins charging again and entire cycl repeated. Oscillations so produced called damped oscillations as they s with a high peak value and drop gr ually to a very low value. Many of th damped oscillations are produced dur each alternating current supply cyc Number of damped wave groups in e

(*Please turn to Page* 130)

Fig. 1—*Spark gap arrangement in converter cabinet*

Fig. 2—*Interior of modern spark gap converter*

Fig. 3—*Arrangement of transformer coil for progressive hardening of shafts*

E R

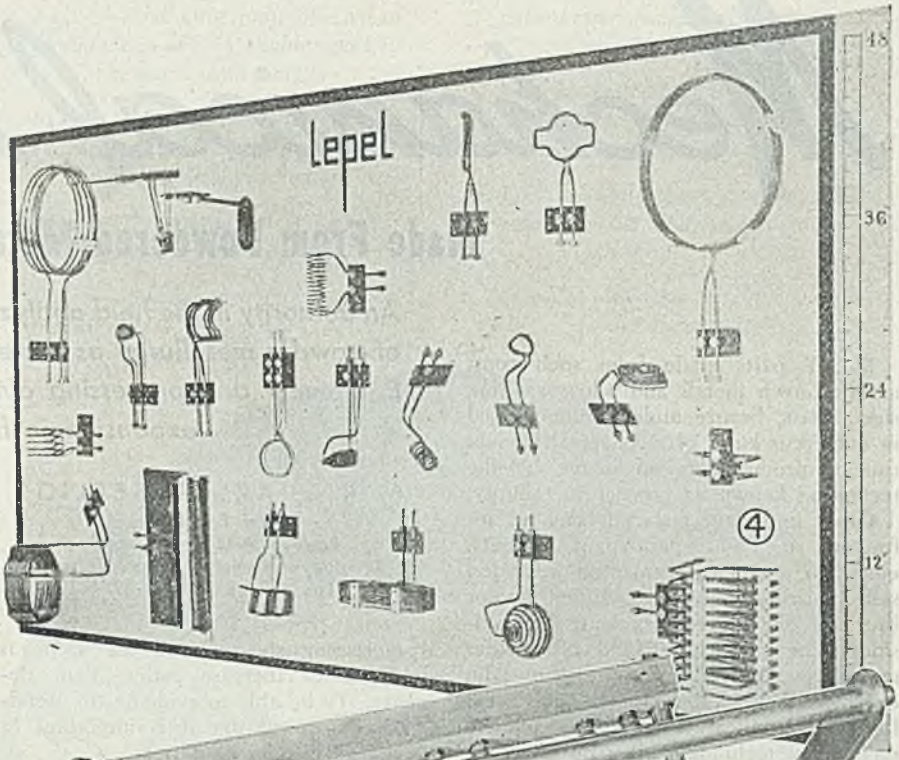
tion Heating

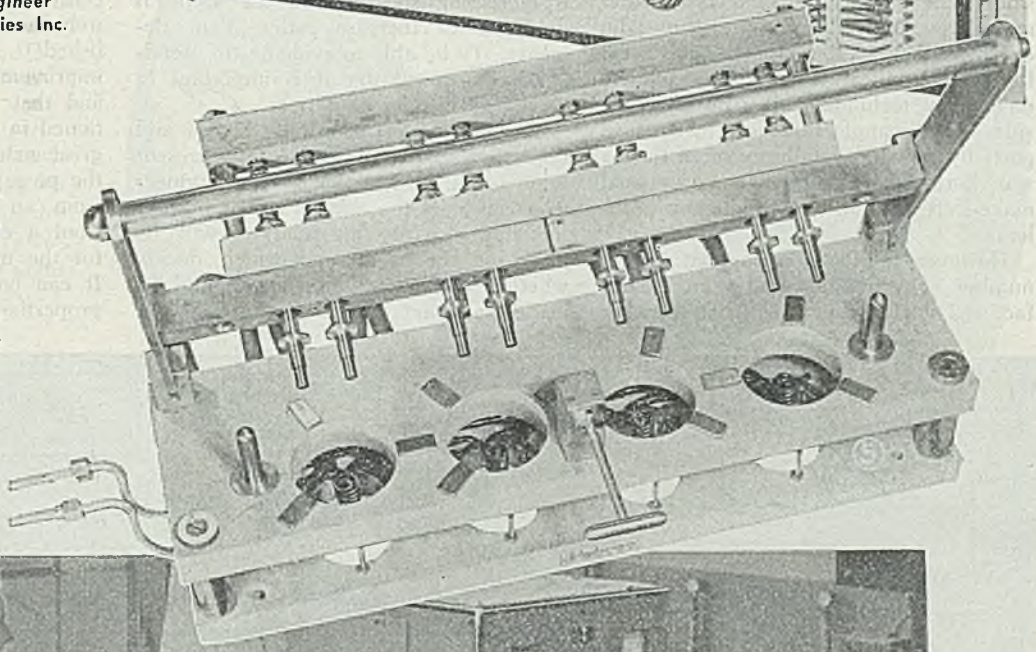
By OTTO WEITMANN
Research and Development Engineer
ed High Frequency Laboratories Inc.
New York

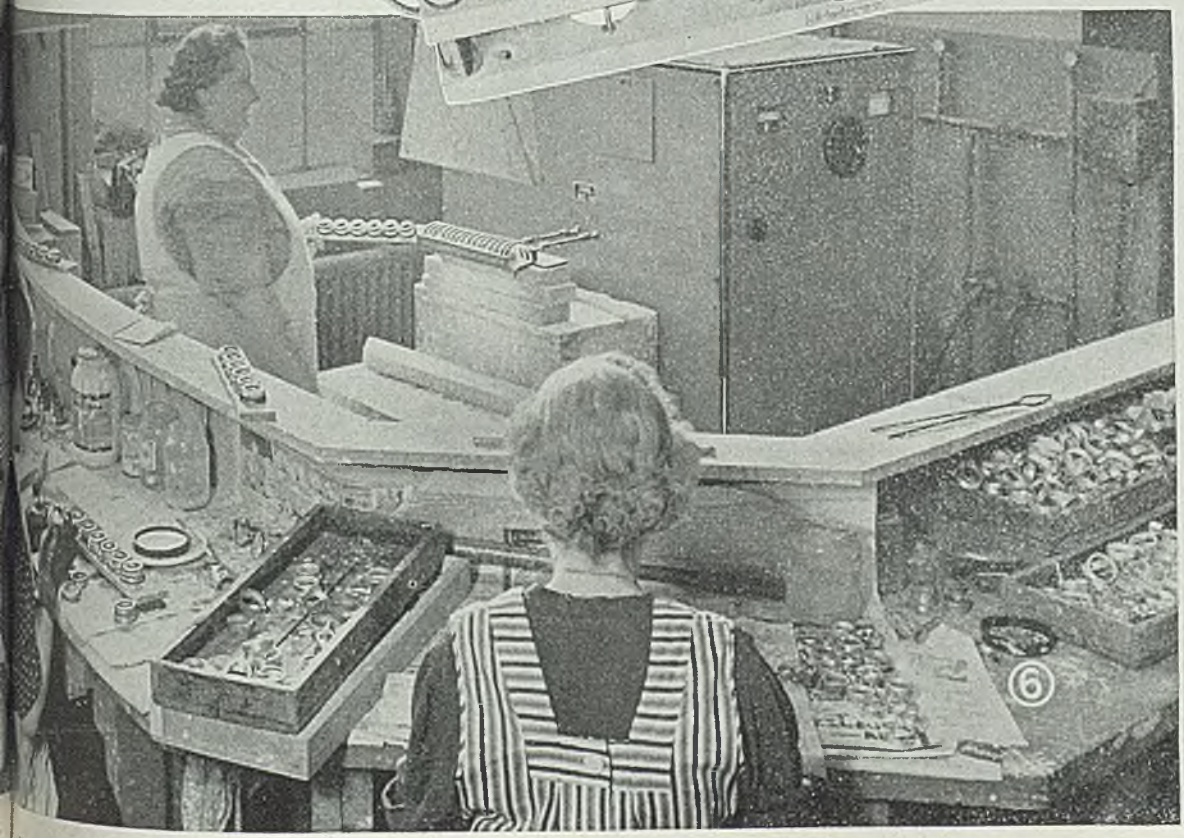
4—Various load coil sizes and shapes

5—Multiple coil and pressfixture for brazing applications

6—Manufacturing layout ng a 15 kw converter unit







Mechanical Parts

Made From Powdered Metals

An authority in the field analyzes the possibilities and limitations of powder metallurgy as a means of producing machine parts. Equipment and processing outlook also reviewed. Important expansion in field is predicted

By RICHARD P. SEELIG
Chief Engineer
Powder Metallurgy Corp.
Division of General Bronze Corp.
Long Island City, N. Y.

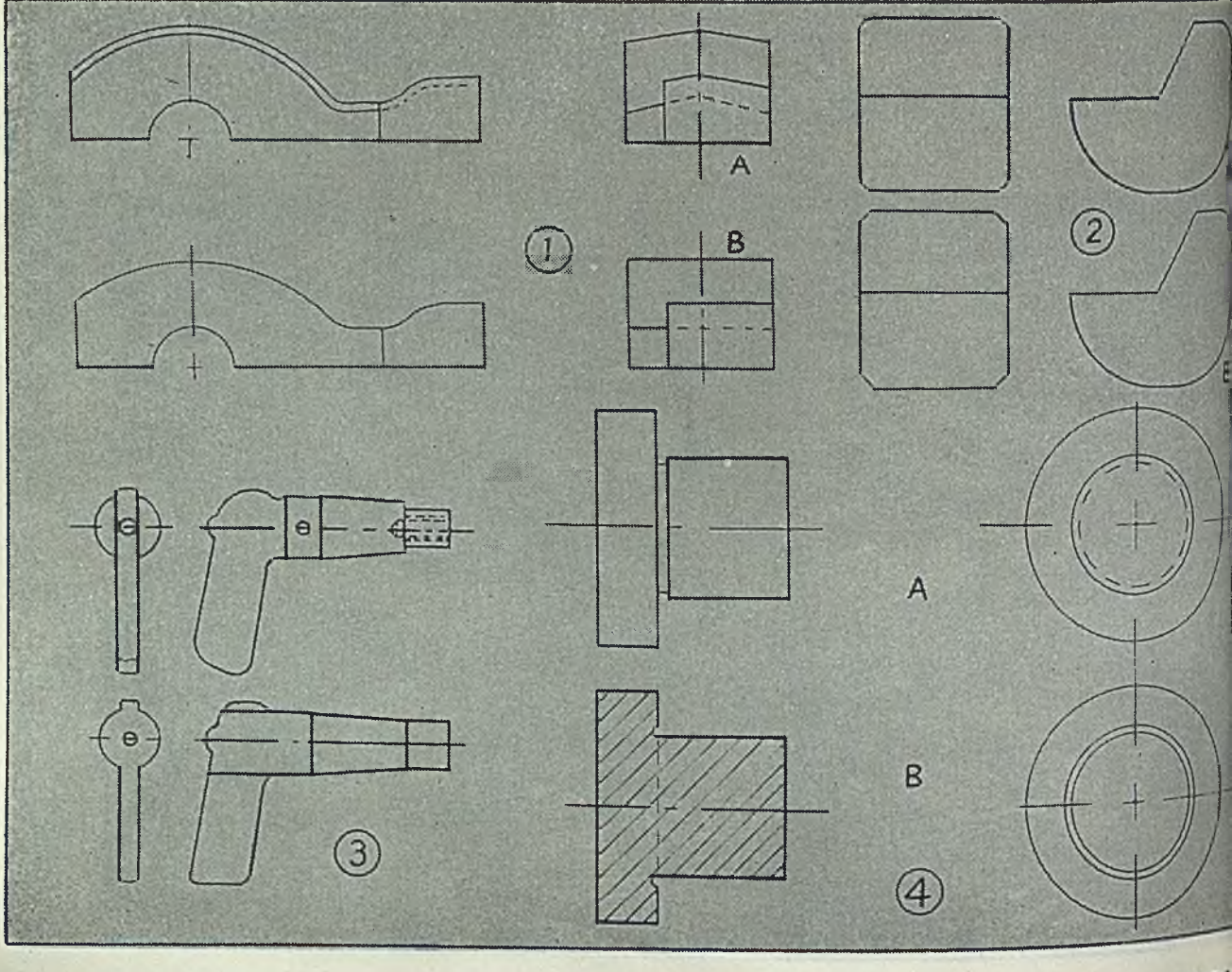
MANY parts made from such commonly known metals and alloys as iron, steel, brass, bronze and aluminum used in numerous kinds of mechanical devices can be produced to advantage by the technique known as powder metallurgy.

Other important materials such as refractory metals, permanent magnets, electrical contacts, cemented carbides, self lubricating bearings, filters, motor brushes, clutch facings, must be considered as a separate field of powder metallurgy. Indeed, there are many who consider these latter as the only real fields of application for the powder metallurgy technique; they do not consider the manufacture of mechanical parts by powder metallurgy more than a war born emergency or an occasional make-shift solution to a production problem.

However, the fact remains that a great number of structural parts were manufactured during the war. Their number is increasing steadily and the scope is expected to increase rather than decrease. To be able to evaluate the trends in this new industry it is important to clearly realize its limitations.

In order to explain these trends and limitations and at the same time present some useful information to the engineer who considers the application of powder metallurgy parts, an analysis will be made of the factors which decide whether or not certain parts should be made from metal powders.

Physical Properties: It goes without saying that a part should not be considered for powder metallurgy manufacture if the requirements and service are such that the properties of sintered metal are not sufficient. Some commercially obtainable properties of sintered iron, brass and bronze have been published[1]. It must be borne in mind that improvements are constantly being made and that superior properties can be obtained in many cases. This depends to a great extent on the shape and size of the piece and whether the part is made from an adapted bearing material or from a composition especially designed for the manufacture of structural parts. It can now be stated that some of the properties obtainable in comparative



sections are as per Table I.
better results have been ob-
experimentally in the laboratory
research is constantly considering
and means to make these laboratory
opments suitable for commercial
duction. The question of cost (dis-
later) is more often than not the
ive factor limiting the properties
ed in a given part. In other words,
almost always possible to obtain
least physical properties if sufficient-
high pressing pressures, sintering tem-
ures, times, etc. are used. But such
edure invariably results in higher

e surprising fact that actually higher
erties can be obtained in sintered
than in wrought iron has been
ed by Balke[2]. He found that when
an electrolytic iron powder con-
ng only a small amount of oxide,
using a pressure of 160 tons per
re inch sintered at 1100° C for 1
a tensile strength of 47,700 psi
an elongation of around 37.5 per
can be obtained.
erial of this type is characterized

Fig. 1—Here part originally made by forging (a) and machining on three sides, is made by powder metallurgy (b) and finished without machining by making the slight design change noted

Fig. 2—Changing radii of (a) to chamfers as at (b) enables part to be made from powder

Fig. 3—Another complicated part redesigned from (a) to (b) for powder metal production

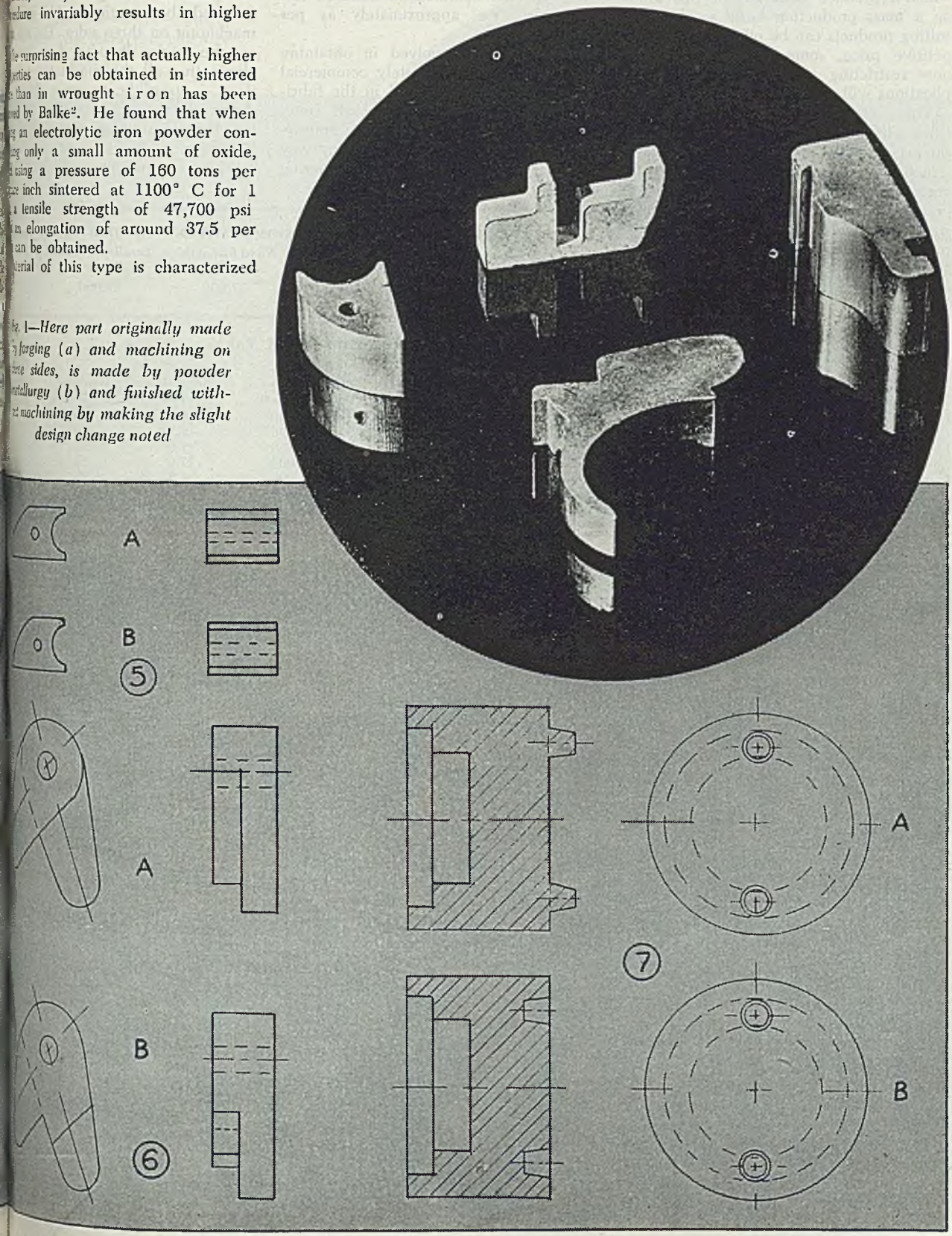
Fig. 4—Here undercut at (a) was replaced by groove at (b)

Fig. 5—Pole piece at (a) made by machining is made from powder with better functional design and a saving of material

Fig. 6—Instead of a forging (a), this is now a powder metal part as shown at (b)

Fig. 7—Both these can be made from powder but (b) permits a much simpler die design

(Circle) — Group of typical powder metal parts



by smaller grain size compared to ingot iron whose tensile strength is in the neighborhood of 39,000 psi with an elongation of around 35 per cent. With steels a similar result has been obtained in that tensile strength values of around 125,000 psi were developed for a manganese-molybdenum steel whose standard properties were only around 104,000 psi.

These results are mentioned here because they serve as an indication that if commercial techniques can be developed which reproduce materials of this kind on a mass production basis so that resulting products can be offered at a competitive price, some of the limitations now restricting powder metallurgy applications will disappear.

There are, of course, other characteristics which may in some cases be more important than mechanical strength in structural parts. There is, for instance, corrosion resistance which is of ever increasing importance in equipment design. The problems involved in making parts of sintered stainless steel are considerable and many powder metallurgists are inclined to believe that this material will not be utilized by that method. Nevertheless, it seems theoretically possible that the problem can be solved and there are people who claim to be able to make stainless steel parts from metal powders on a commercial basis.

Realizing the inherent limitations of powder metallurgy in this sphere a new material has been developed recently which is very well suited for many applications requiring corrosion resistance but which does not have the strength usually associated with stainless steels. The properties obtained on standard test specimens are approximately as per Table II.

The technique involved in obtaining these properties is definitely commercial and has already been used in the fabrication of parts. A standard salt spray test for 96 hr does not affect the appearance appreciably nor does it in any way alter the structure. A simple weathering test leaves the material completely u affected.

Design and Shape of Parts: Much h been said in the past about the gene shape limitations which are characteris of parts molded from metal powd Some of the general principles were forth in a paper by Colin Carmicha

In the following an analysis will attempted illustrating not only some the limitations but also indicating h they can be overcome by slight mod cations in design.

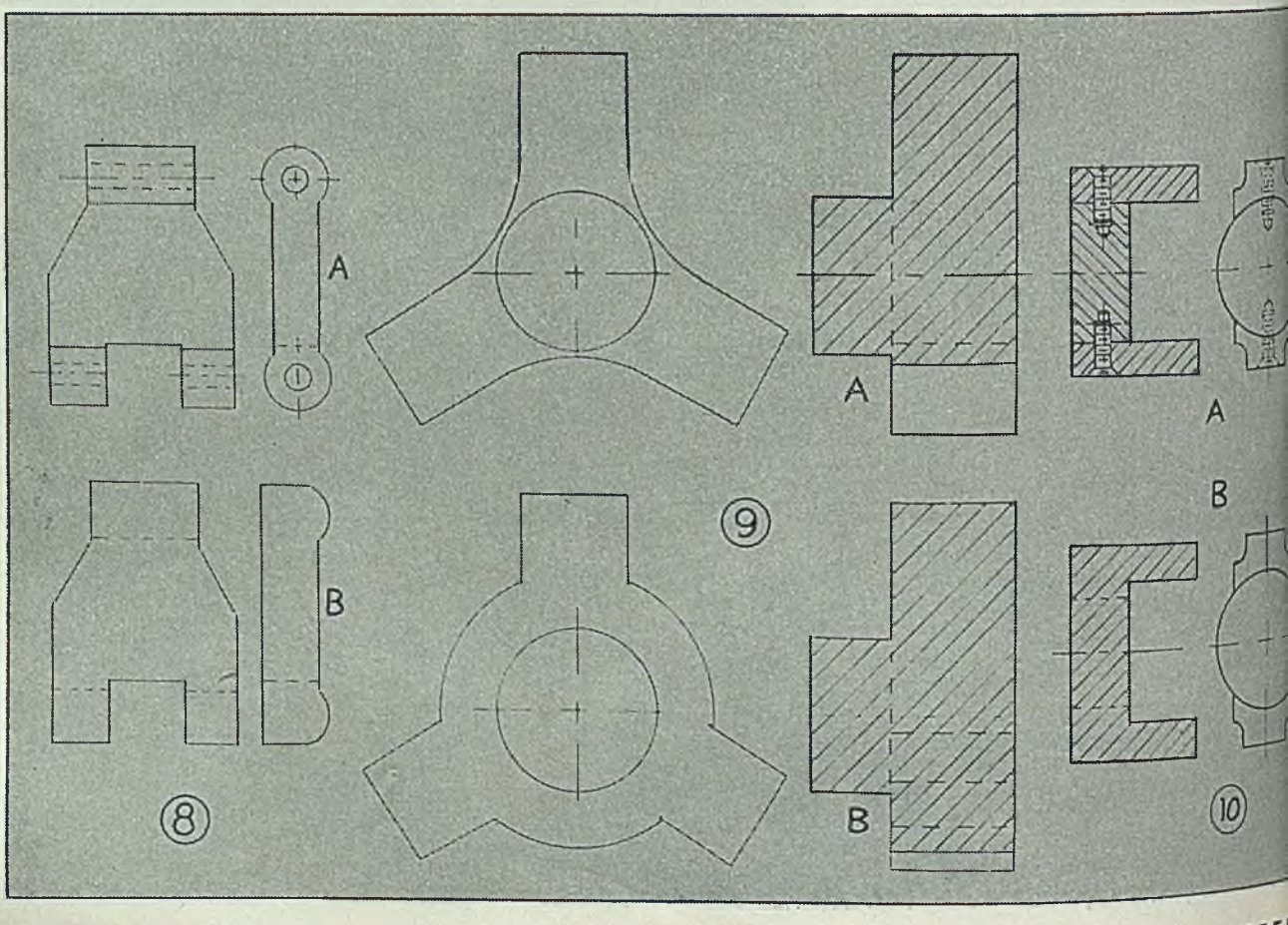
Fig. 1 shows a part originally ma factured by forging with subsequ machining on three sides. The same p can be made by powder metallur eliminating all the machining operati if it is possible to omit the angu shape of the curved surface. It turn out that these angles represented o a forging draft and that even a sli continuous taper as required by press

TABLE II—PROPERTIES OF CORROSION-RESISTANT POWDER-METAL PARTS

Material	Yield Strength lbs/in²	Tensile Strength lbs/in²	Hardne Rock
Corrosion-resistant metal (POMET 141)	37,000	58,000	70-9

TABLE I—TYPICAL PROPERTIES OF POWDER-METAL PARTS

Material	Composition	Yield Strength lbs. per sq. in.	Tensile Strength lbs. per sq. in.	Elongation % in 2"	Hardness BHN.	Density grams per cc
Low-C steel (POMET 309) fully annealed	.20 to .30% C	28,000	38,000	8.0	60	7.0
Low-C steel (POMET 309) work-hardened	.20 to .30% C	.....	44,000	2.5	80	7.0
Low-C steel (POMET 309) heat treated	.....	.....	55,000	1.0	250	7.0
Low-tin bronze (POMET 117B) fully annealed	95% Cu–5% Sn	18,000	35,000	17.0	54	8.0
Low-tin bronze (POMET 117B) work-hardened	95% Cu–5% Sn	30,000	37,000	4.5	71	8.0
High-tin bronze (POMET 117) fully annealed	90% Cu–10% Sn	22,000	35,000	12.0	62	7.9
High-tin bronze (POMET 117) work-hardened	90% Cu–10% Sn	32,000	38,000	3.5	72	7.9



metal powder could be tolerated. Fig. 2 is the outline of a fuse part ...g rounded corners at both faces. ...changing these radii to chamfers, ...der metallurgy became an economic- ...ay of manufacturing the part. De-

(Please turn to Page 156)

...g. 8—*Here again study devel- ...d a simplified powder metal part (b)*

...g. 9—*While looking different, ...ese two parts do same work; (b) is powder metal part*

...g. 10—*Here a single powder ...tal part (b) takes the place of three (a)*

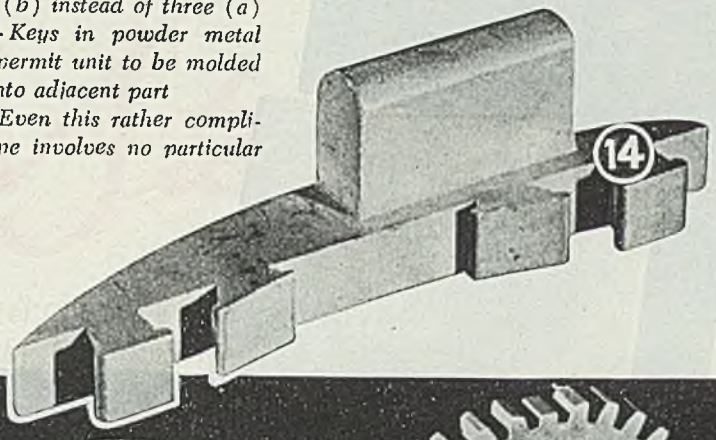
Fig. 11—Powder metallurgy permitted key at (a) to be incorporated in part itself at (b)

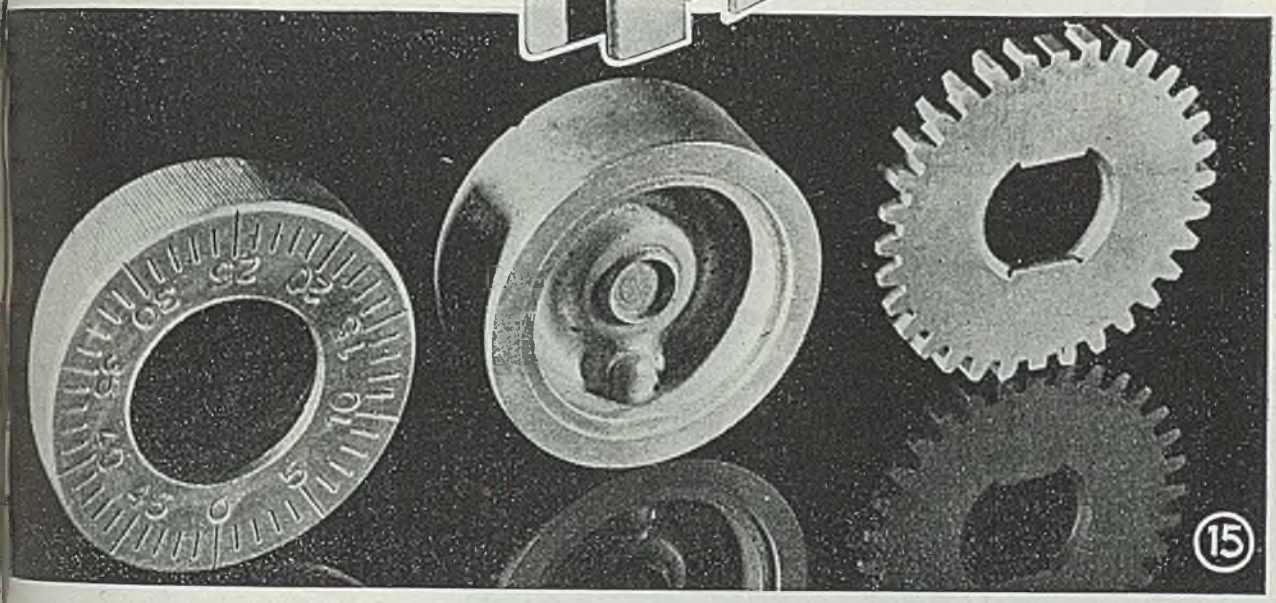
Fig. 12—Another part made from one piece (b) instead of three (a)

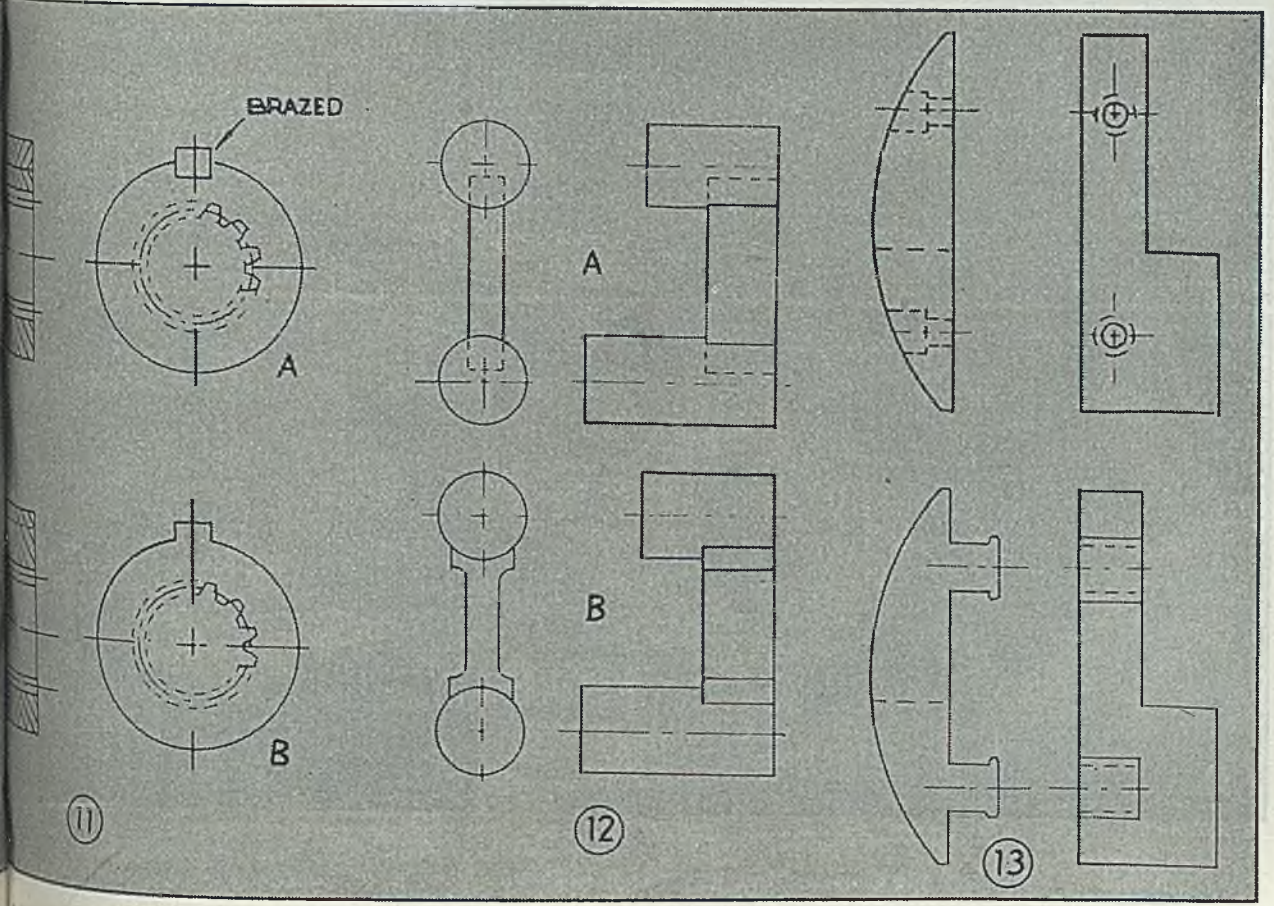
Fig 13 — Keys in powder metal part (b) permit unit to be molded into adjacent part

Fig. 14—Even this rather complicated shape involves no particular difficulties in powder metallurgy production. Photos by Birdsall

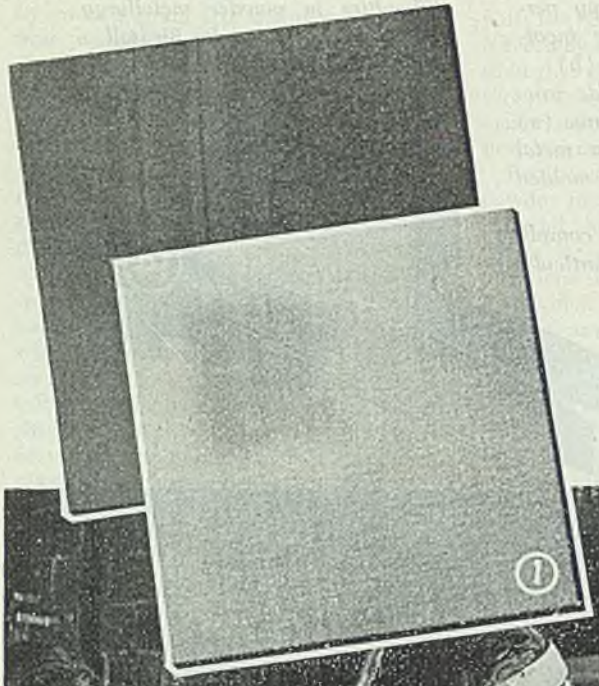
Fig. 15—"Engraved" scale, gear teeth, recesses are easy to produce

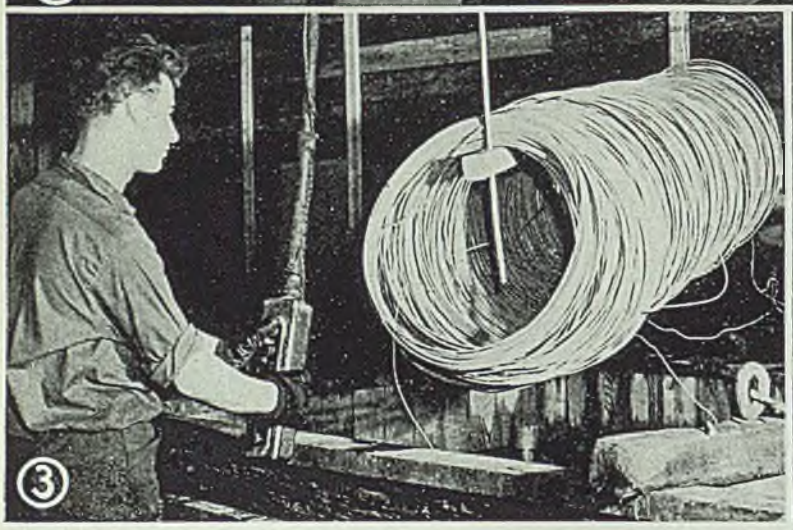


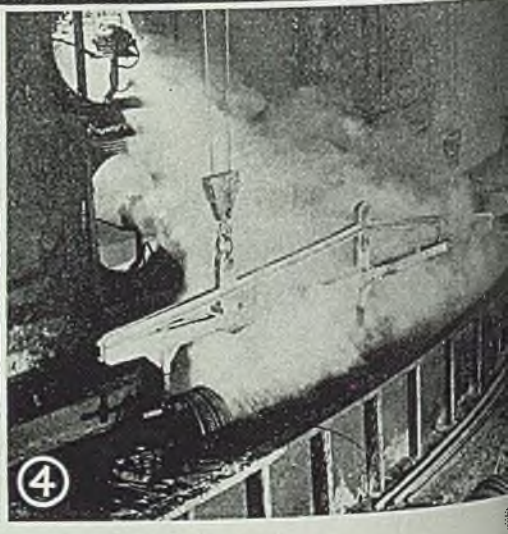




Descalin







Stainless Steel

Installation at Rustless Iron & Steel Corp. provides uniformly scale-free surfaces for wire and bars by immersing in fused caustic bath

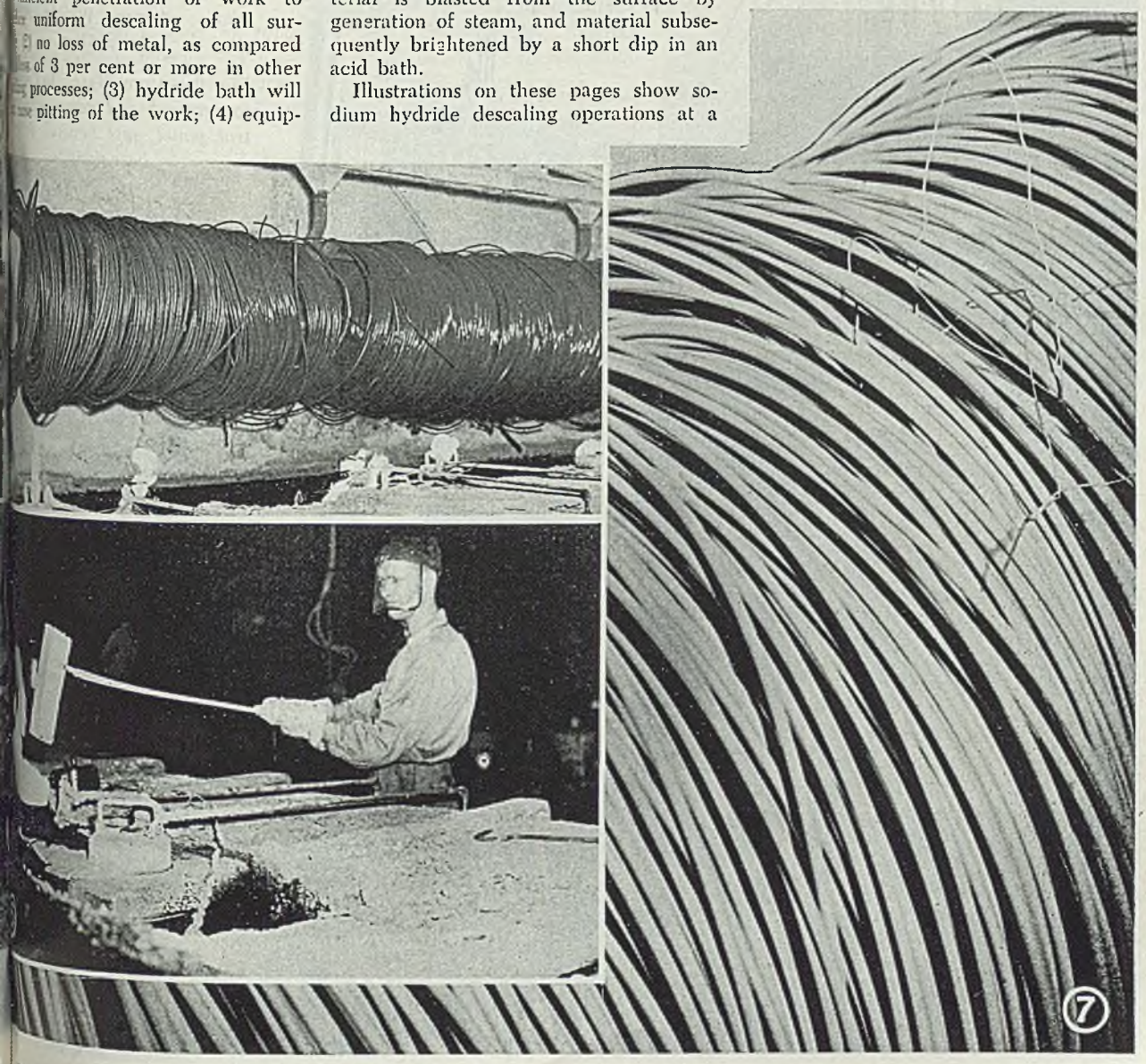
DIUM hydride descaling process for ss steels stirred up considerable in the ranks of steel producers g war years while it was still on the ment's list of secret developments. ow known that a number of instal- have been operating long enough rs to find it entirely practicable. ntages of the process for treat- types of stainless steels include: fficient penetration of work to uniform descaling of all sur- no loss of metal, as compared of 3 per cent or more in other processes; (3) hydride bath will pitting of the work; (4) equipment required is simple; and (5) there is no problem of disposing of waste residue.

In brief, process implies formation of sodium hydride in a fused caustic bath by combining sodium metal with hydrogen in generators built into the caustic tank. In operation, scale is reduced by immersing work in the fused bath. Upon quenching work in water, reduced material is blasted from the surface by generation of steam, and material subsequently brightened by a short dip in an acid bath.

Illustrations on these pages show sodium hydride descaling operations at a Rustless Iron & Steel Corp. plant, one of the larger installations authorized by E. I. du Pont de Nemours & Co. Inc., developer of the process and owner of the patent.

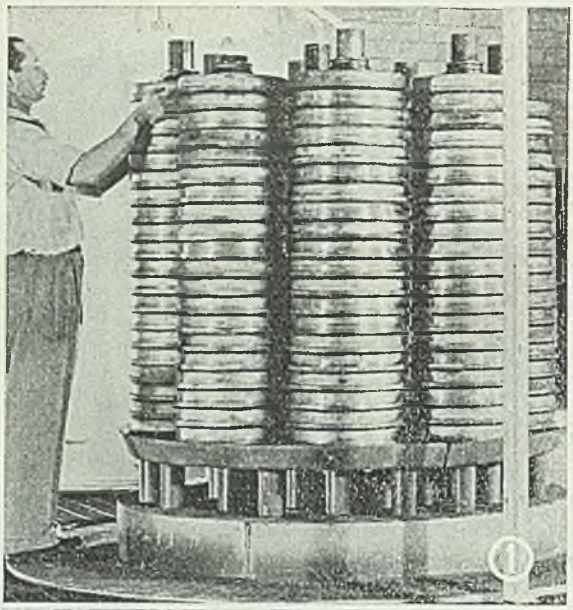
Fig. 1. Samples of stainless steel sheet before descaling (above) and after descaling (below) but without brightening dip.

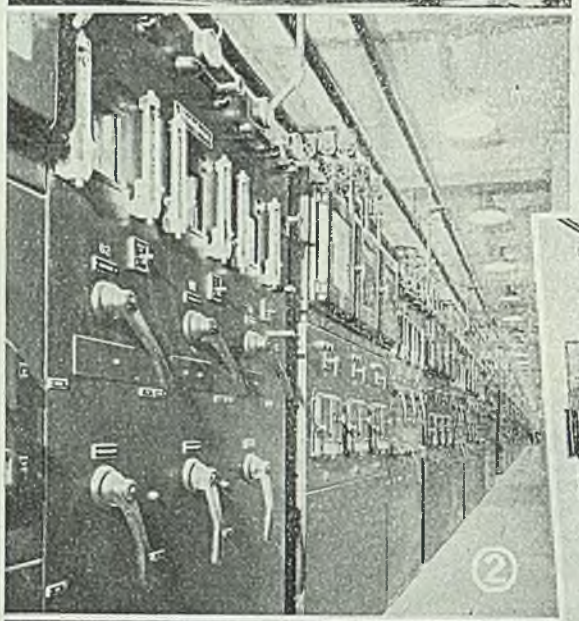
(*Please turn to Page* 180)

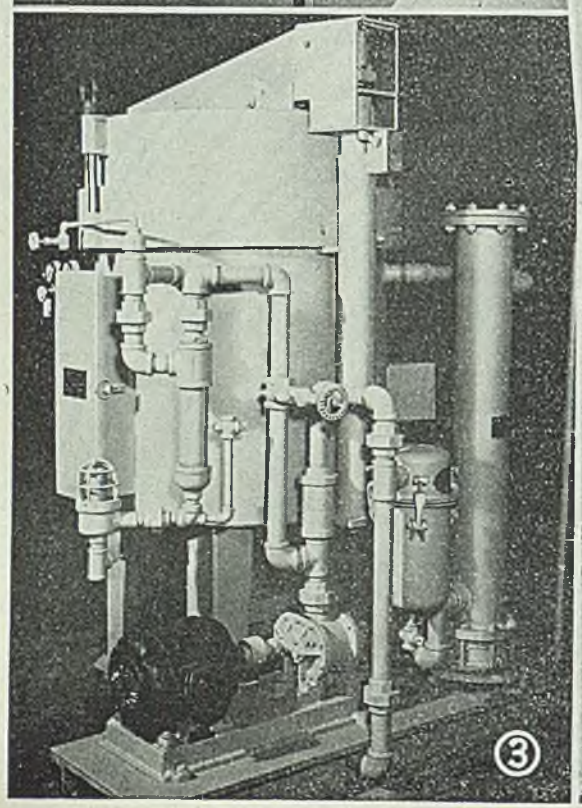


Nitridin

Experience in the large-scale manufacture of aircraft engines has resulted in improvement in equipment and practice and consequently in much lower costs . . . Likely to influence methods of heat treating parts for automotive and aircraft engines for domestic use







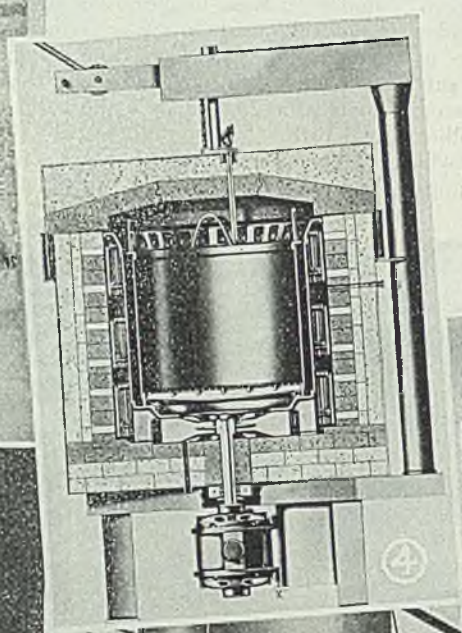


Fig. 1 — Closeup of loading b with charge of gears. Support r ings have been removed from b in foreground to show circula fan and charge thermocou Photo courtesy Wright Aero tical Corp.

Fig. 2—Ammonia control pane foreground and temperature c trol panel, just beyond, for t base positions

ngine Parts

By WILLARD ROTH
Industrial Heating Section
Transportation and Generator Division
Westinghouse Electric Corp.
East Pittsburgh, Pa.

FAMILIAR purposes of nitriding are btain (1) high surface hardness, (2) reased corrosion and erosion resist-, (3) wear resistance, particularly at temperatures, (4) high temperature ength and hardness, and (5) increased ue resistance. The aircraft industry taken advantage of these properties itriding such parts as cylinders, gears, shafts, crankshafts, pins, sleeves, etc. sistance, in such highly stressed parts rankshafts, nitriding is an ideal meth- producing, virtually without distortion, the surface compression layer which increases fatigue resistance.

This rather large scale use of nitriding seems significant and likely to be a factor in practice for years to come. Then, too, nitriding equipment and procedure have been improved and costs have been reduced. More specifically, through use of proper container materials and lower heater surface temperatures, ammonia consumption has been reduced. Also, except where corrosion resistance is needed, higher dissociation rates have been found practicable for the nitriding steels, and this means lower ammonia consumption. Another factor is the recently lowered price of the ammonia itself. In some larger installations, ammonia has been saved by use of exhaust gases for purging the air from freshly loaded containers. The sum of these represents substantial savings over older practices, and will undoubtedly influence the extent to which nitriding is to be used in competitive manufacture of both aircraft and automotive engines for domestic consumption.

For that reason, it may be of interest to review present day nitriding practice and equipment embodying these various refinements. The practice and the equipment fall naturally into two general groups; one for large scale or production line nitriding; the other for small production and jobbing work. In the former class, cylinders, gears, crankshafts, camshafts, etc. are typical; in the latter class are miscellaneous machine parts, usually small or medium sized. The following example will serve to illustrate practices in these groups, and to show what the ammonia and power requirements are for specific cases.

Nitriding Engine Cylinders and Gears

Wright engines use nitrided cylinders,

(*Please turn to Page* 184)

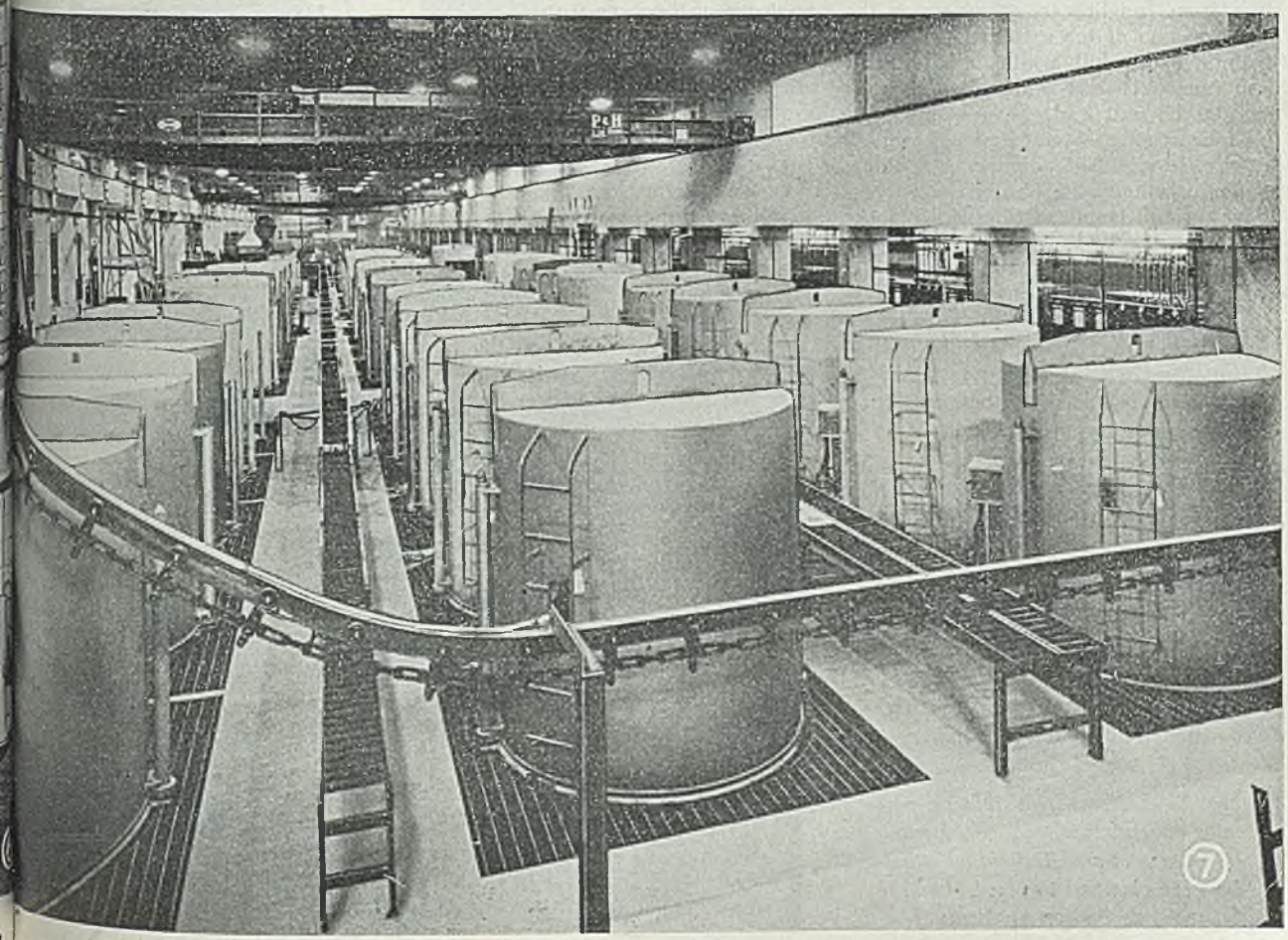
Fig. 3—Pit type nitriding furnace with external gas cooler and gas pump used to recirculate ammonia for rapid cooling

Fig. 4—Sectional view of pit type nitriding furnace, showing circulating fan, radiation shield, charge basket, oil seal cover

Fig. 5—Sectional view of bell type furnace showing removable furnace bell, inner hood, loading base, and baffle for directing ammonia circulation

Fig. 6—Battery of bell type furnaces for nitriding crankshafts. Photo courtesy Packard Motor Car Co.

Fig. 7—Battery of bell type nitriding furnaces for cylinders, large gears, shafts, etc



Transfer CRANE SYSTEM

By G. W. BIRDSALL
Associate Editor, STEEL

Mechanical handling aids are correlated with plant layout and processing work to greatly facilitate wide range of manufacturing operations

OCCUPYING a plant 325 ft wide and some 610 ft long, Ceco Steel Products Corp. at 5701 West 26 street, Chicago, produces a large volume of steel sash, joists, metal lath, window frames, window screens, steel roof deck, doors and other items that form a complete line of steel building products. Some idea of the volume of steel fabricated can be had on looking over the 6000-8000 tons of steel bars, sheet and plate kept on hand in the stock area.

Next to the wide variety of products being made and different fabricating operations involved, a feature of this plant that most impresses the visitor is the excellent provision for materials handling through all stages of manufacture.

As seen from floor plan, Fig. 1, overhead transfer cranes cover the side and end bays of the large plant. Raw steel is stocked in the 66-ft wide triple bay that extends the full 611 ft of the plant along the south. Stock is loaded into this area from freight cars which enter the plant on one of three tracks, two tracks extending the full width of the plant near the west end and a single track serving the east end.

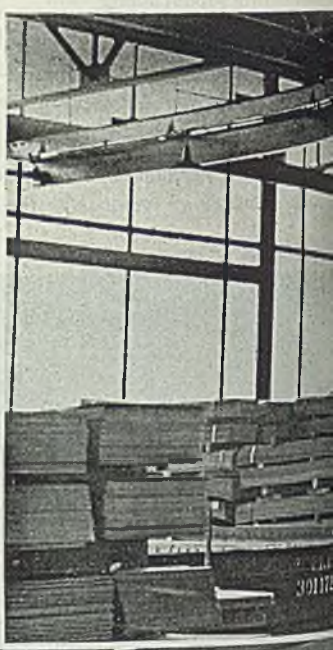
Crane System: Storage area is served by two 3-ton hoists mounted on a single monorail bridge on a 65-ft span that extends the full length of the plant. Hoists are moved on the bridge manually but the bridge is powered so its movement can be controlled from a pendent pushbutton station at floor level where the hoists are also controlled. As shown in Fig. 2, the two hoists are utilized in tandem to lift and carry bundles of sheet and other loads. Fig. 2 is looking across the double track at west end of plant to where two workmen are seen unloading a double bundle of sheet from an open gondola car. Two of these double crane units are employed in the stock area.

Other transfer cranes serve fabricating areas and the shipping dock. Two 1-ton units on individual 40-ft spans serve the west end of the plant. Another 1-ton unit covers a 40-ft span at extreme east end. A 3-ton crane on a 55-ft span serves the east end of the north side of the plant with a 2-ton unit covering the west end of the same span.

In addition to the three railroad tracks extending into the plant, two truck docks are also available on the north side of the plant facing Twenty-sixth street. All these are diagrammed in the plant layout, Fig. 1.

In general, production lines are set up so that raw material from the stock on the south side flows across the plant through processing operations to end up at the shipping floor on the north side of the plant.

Flow of material through the plant is by a number of routes, according the production operations involved the particular item. In general, i made continuously are handled on sp setups where processing equipmen arranged for continuous flow of from one machine to another for m mum handling efficiency. Throug all portions of the plant, it is ob that careful attention has been when planning to the end that hand



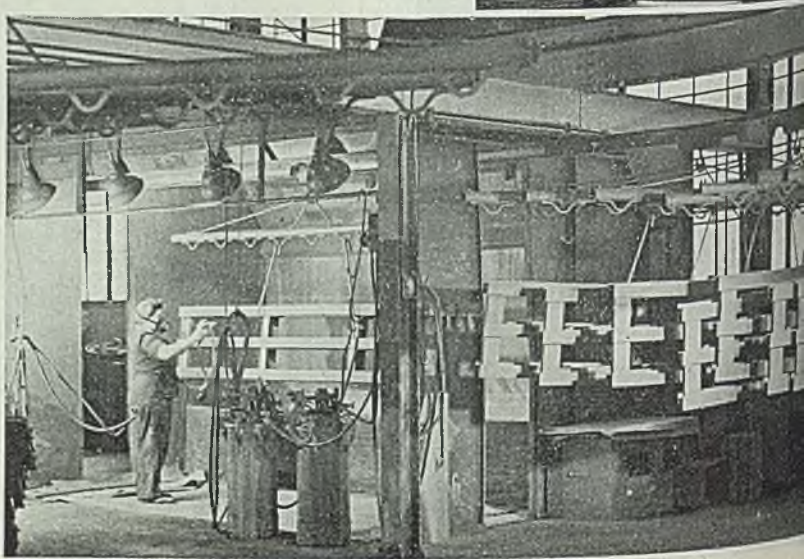


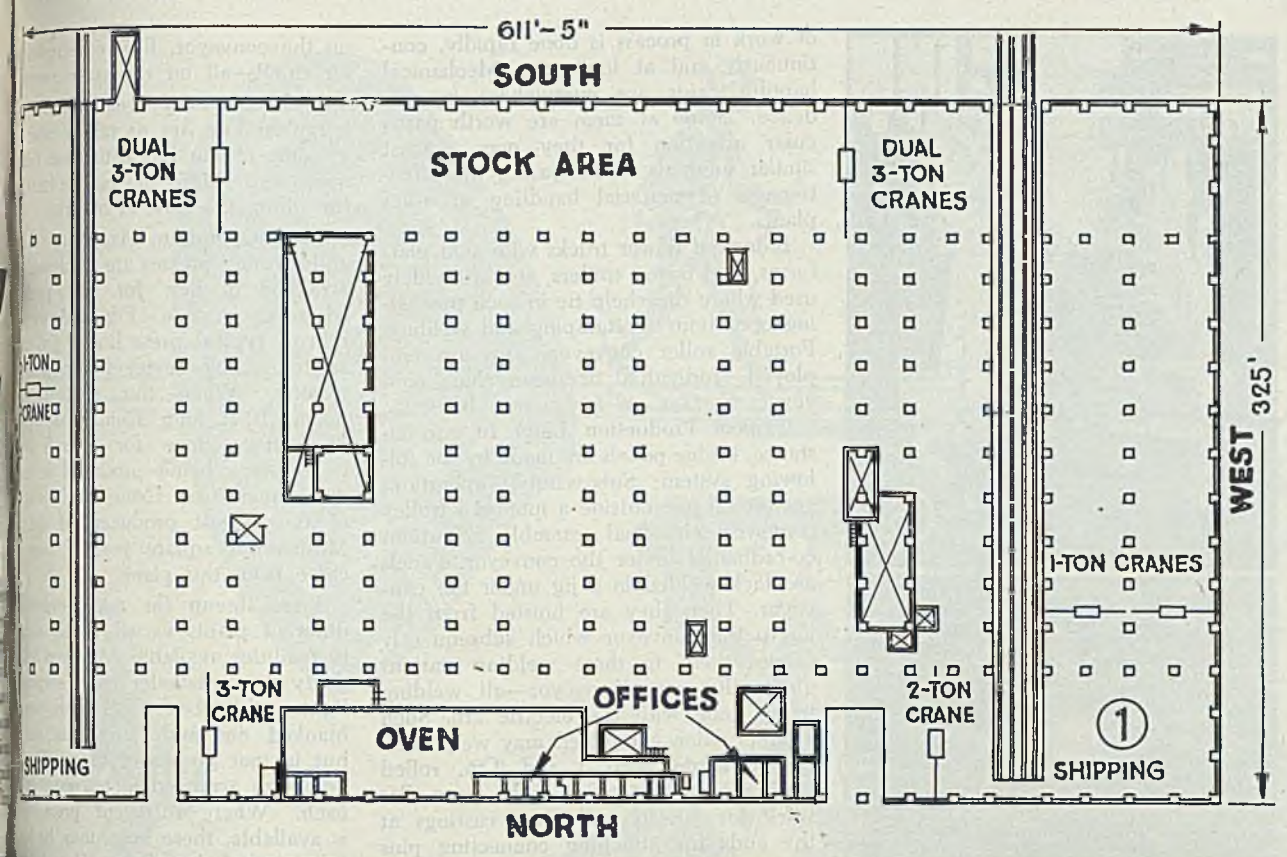
Fig. 1—Plant layout showing arrangement of principal cranes and areas served

Fig. 2—Dual 3-ton cranes operate on single bridge over stock area at south side of plant to handle sheet bundles as shown here. Units are controlled from pendant pushbutton station at floor level

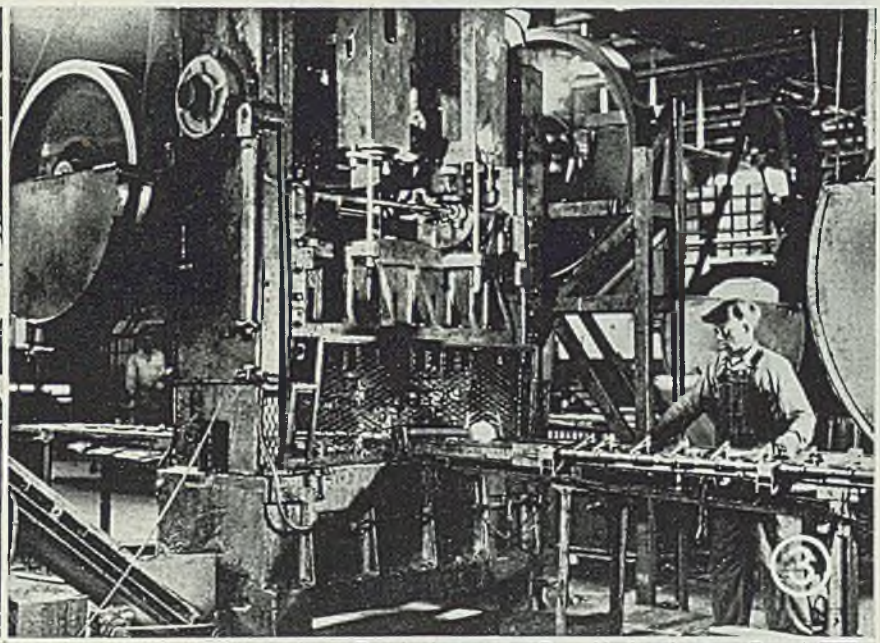
Fig. 3—Portion of high production press setup showing multiple stops on roller conveyor at right connecting blanking and flanging press to notching press at left

Fig. 4—Work is hung on load bars on monorail for spraying and drying in this line

Fig. 5—Extremely flexible jig permits construction of wide variety of truss sections. Individual members are clamped in place, then arc welded. Photos by Birdsall


611'-5"
SOUTH
DUAL 3-TON CRANES
STOCK AREA
DUAL 3-TON CRANES
1-TON CRANE
WEST 325'
1-TON CRANES
3-TON CRANE
OFFICES
OVEN
2-TON CRANE
SHIPPING
1
SHIPPING
NORTH


2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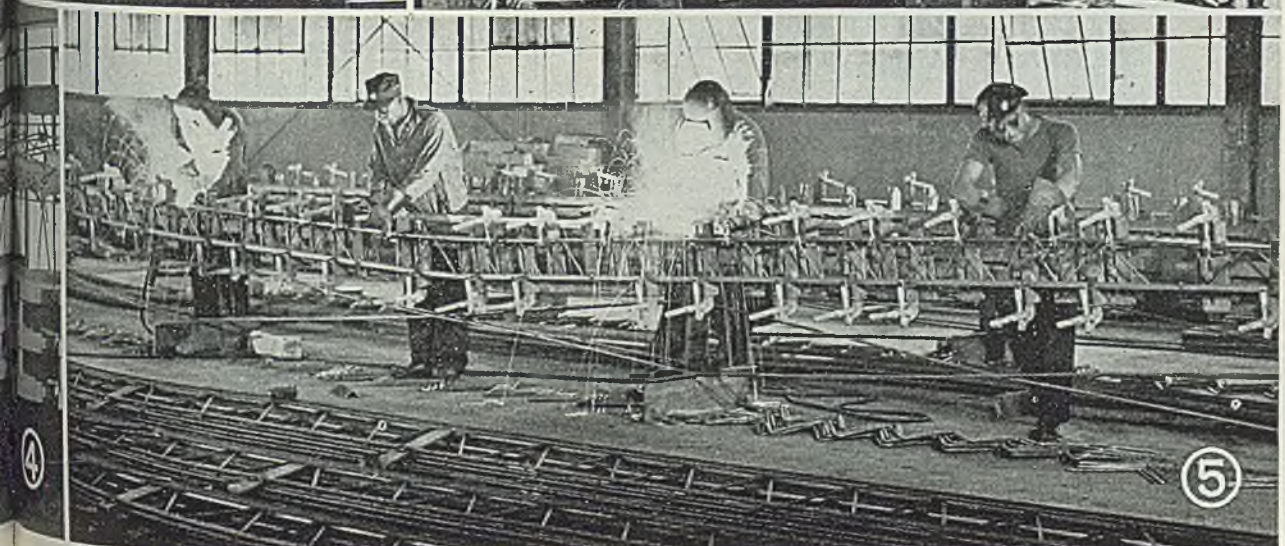
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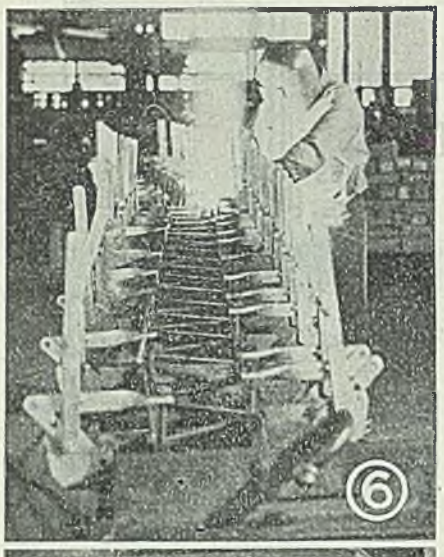
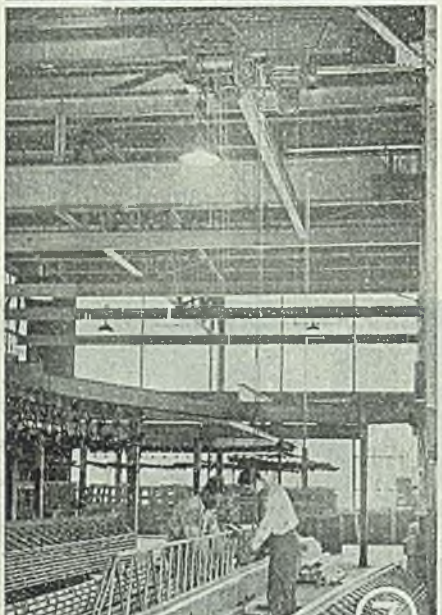




of work in process is done rapidly, continuously and at low cost. Mechanical handling aids are everywhere in evidence. Some of them are worth particular attention for they may suggest similar methods of increasing the effectiveness of material handling in other plants.

Industrial power trucks with skid platforms, skid boxes, trailers, etc. are widely used where they help tie in such processing operations as stamping and welding. Portable roller conveyors also are employed. Individual overhead chain conveyors are set up for certain lines.

Typical Production Line: In one instance, bridge panels are made by the following system: Subassembly operations are set up just outside a monorail trolley conveyor with final assembly operations co-ordinated under the conveyor. Panels are tack welded in a jig under the conveyor. Then they are hoisted from the jig to the conveyor which subsequently carries them to three welding stations under the same conveyor—all welding being done with the electric arc. Such a panel when completed may weigh 600 lb, be made from 3 and 4-in. rolled steel channel sections with some flat stock for gussets and some castings at the ends for attaching connecting pins to join adjacent sections together.

The same conveyor then carries panels past a station for drilling four holes for the panel pins and on to three cleaning stations where slag is removed from welds by means of air-driven scaling hammers and wire brushes. After going on past a water wash spray station, work is given a zinc chromate coat, air dried on the conveyor, final coat applied a air dried—all on the same conveyor.

With this brief overall description a typical line, let us take a closer l at some of the fabricating and finish operations. Many devices are found h for aiding the flow of material.

Press Operation: Many large blank and forming presses are employed, be arranged in line for fast product wherever possible. Fig. 3 shows a p tion of typical press lineup and par an interesting device for multiple p tioning. When this photograph taken, 10-ft long 15-in. wide "plas or mat sections for aircraft lan fields were being produced in trem dous quantities, Ceco Steel being of the largest producers of this it Millions of square feet of these m came from this plant.

Press lineup for mat production different plants varied widely accor to facilities available. At Ceco Steel thirty 3-in. diameter holes employe lighten the ½-in. thick mats were blanked out and flanged at one t but in mat groups of three. The th holes are arranged in ten rows of th each. Where sufficient press capa is available, these holes may be han in groups of six or more. Here it was sirable to do the work in groups three, indexing the work at ten p to produce the thirty holes.

This indexing is handled accura and with great speed by a novel arra ment of multiple stops incorporated the roller conveyor connecting the bl

(*Please turn to Page* 144)

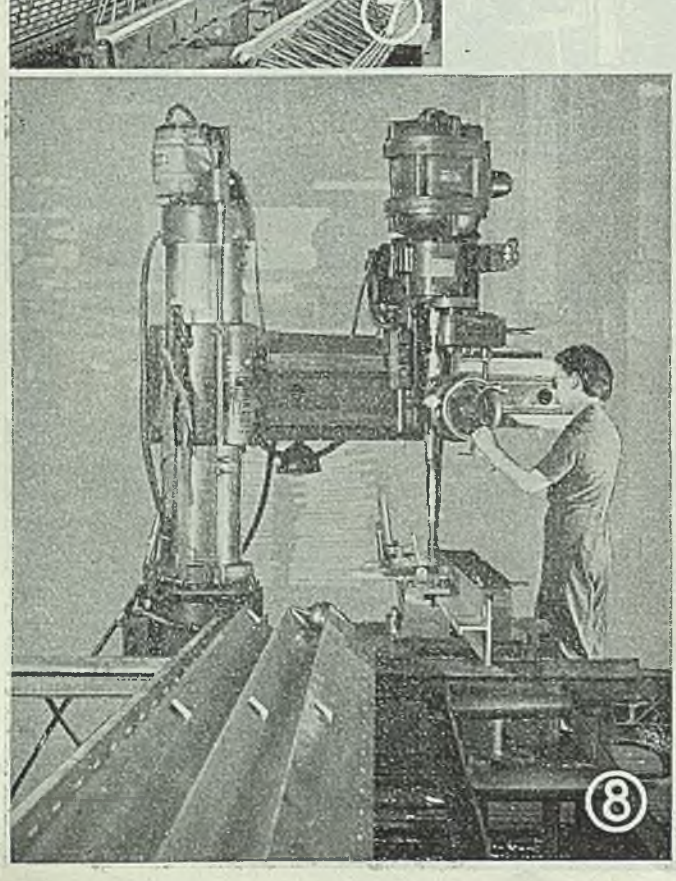
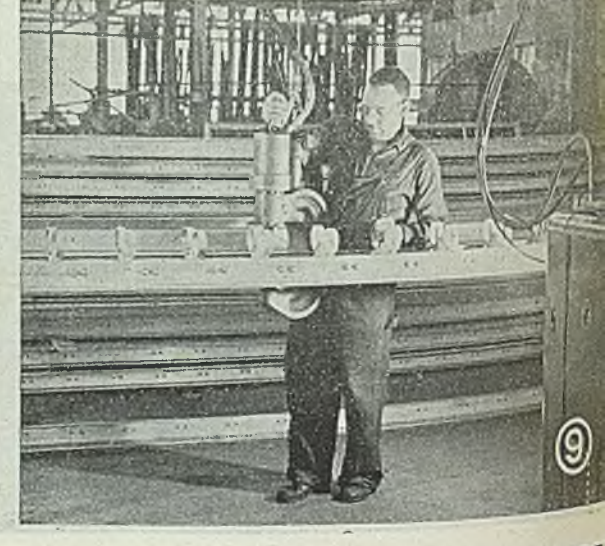


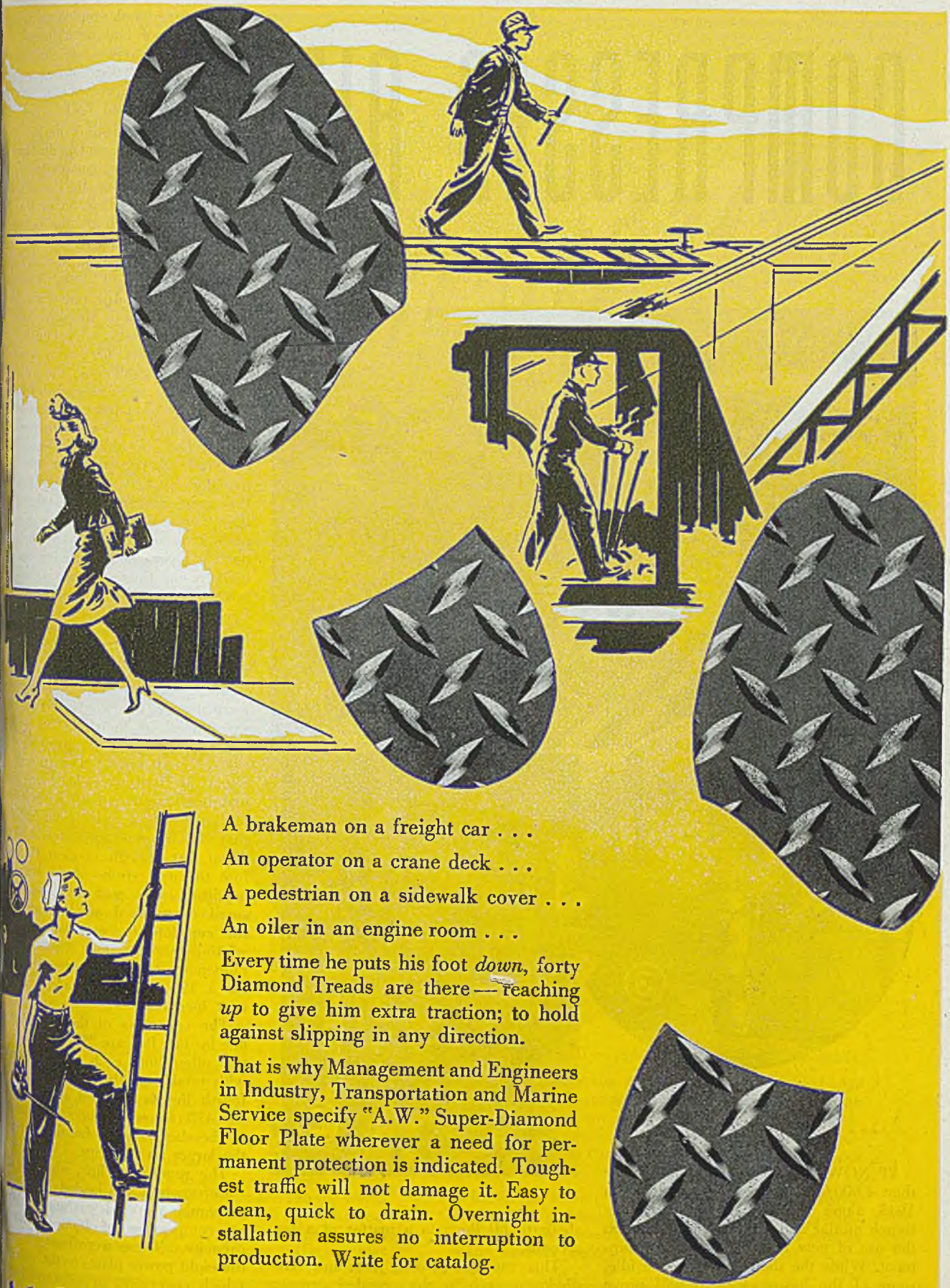
Fig. 6—Closeup of jig in Fig. 6 showing speed clamps and work in flat position for assembling. Entire jig tilts 90 degrees right or left to permit downhand welding. Note how jig elements have been adjusted to produce truss with angle that fits pitch of roof

Fig. 7—Crane on monorail bridge can transfer from one bay to another, aiding work

Fig. 8—Roller conveyor and fixture with quick acting clamps speed drilling here

Fig. 9—Portable cold riveter suspended from swivel can be turned easily to accommodate work; applies up to 35 tons pressure from power unit at right





A brakeman on a freight car . . .

An operator on a crane deck . . .

A pedestrian on a sidewalk cover . . .

An oiler in an engine room . . .

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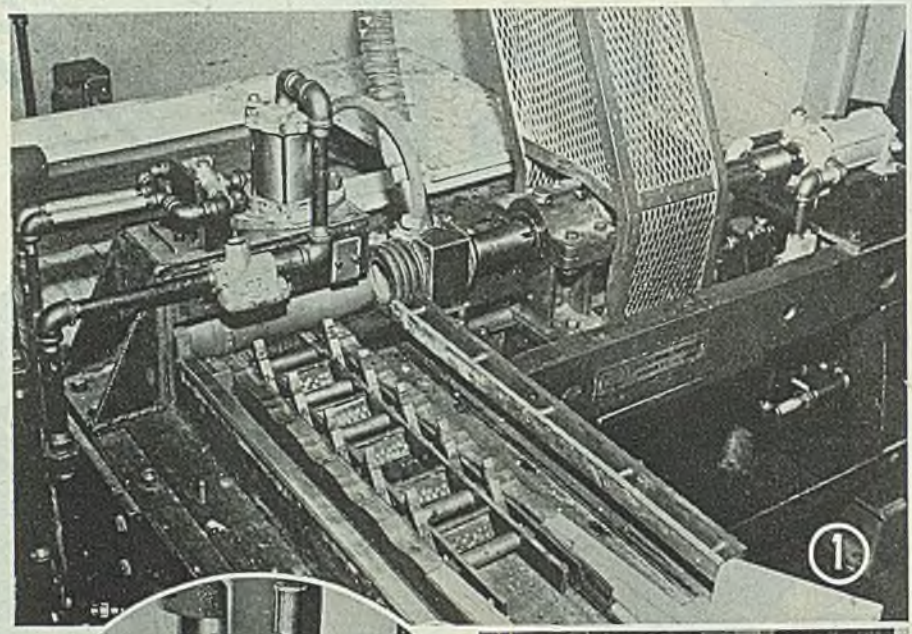

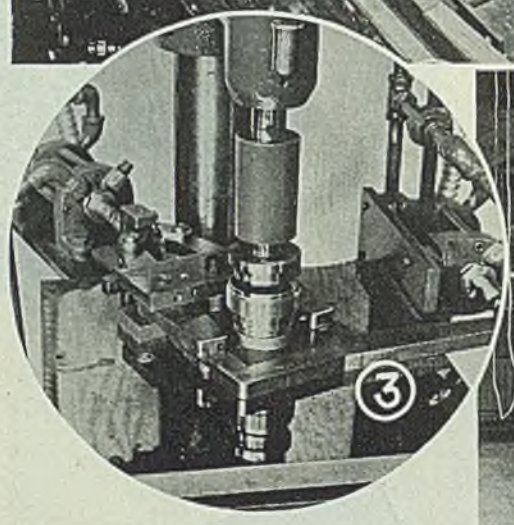

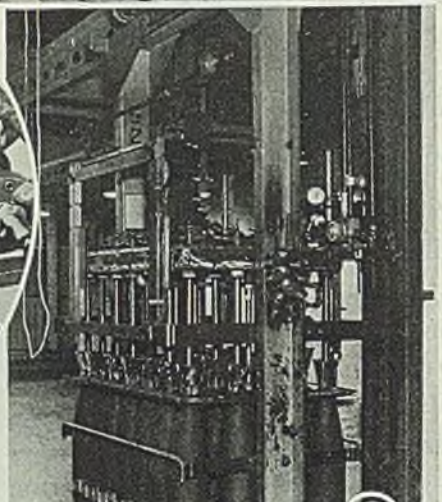

IT NOW may be revealed that more than 4,900,000 manhours were saved in 1945 alone in loading and handling trench mortar and artillery shells through the use of new type air-operated equipment. While the shell lines now are idle, some of the lessons learned will prove useful in manufacturing peacetime products.

Hand poured loading was replaced by a machine where cups were exactly filled with a load for each of the 28 waiting shells underneath. Then, at the touch of a lever, compressed air was released to open the valves above each of the shells to fill them in a matter of a few seconds.

This multiple-pouring machine handled one step in the speeded process. The other was handled by the multiple core machine, shown in Fig. 1. Steam heated bayonets were thrust into the TNT to the bottom of the shell casing where air cavities were found to form. This automatic method of eliminating possibility of faulty shell performance from cavitation replaced the manpower-consuming, hand puddling processe After the core had been formed, bay nets and steam chest, weighing appro mately 600 lb, were raised by a h operated by compressed air. The co was filled later with TNT.

An automatic drilling device, Fig. at the ordnance center illustrates a other application of compressed air. O operator drilled out the booster cav on 8000 75-mm shells in an 8-hr sh Shells were placed on the incline fa to the machine and as each one rol into place, an air-operated vise autom ically clamped it in place. Then a d operated by the air piston seen at t right in the photo speedily drilled the booster cavity. Vacuum was u to draw off the TNT thus removed

On the booster line, the majority the machines were air-operated and m were adapted in principle from the press. Fig. 3 shows a tension press wh turned the booster to the exact ten required by regulating pressure of machine so that its turning stopped the right moment. A sludging p crimping press and other air-oper presses were in each line to pro flexible power and speed for the wo workers on these precision parts. E positive control of the machine was tained by foot pedals connected to valves.

Compressed Air Line Used

These many applications of compre air made the plant engineers air-min exemplified by their solution for be ing the speed on trimming of pe sion element cups. The trimming chine at best was handling app mately 90 cups a minute but was cap of faster output were it not for the that the trimmed cups would not down fast enough to clear the die fore the next stroke of the knife. condition was met by introducin small compressed air line which the cup into the container rather waiting on gravity. That simple rangement permitted setting the mac for a 120 per minute speed, a 33 cent increase.

The capacities of the compressor one loading line are 350 and 150 cfm two other lines each have compre with total capacity of 425 cfm, and fourth line is supplied air by 1600 and 420 cfm compressors. The larger of the shells on the fourth line req the larger air capacity.

The renovation line, where old s were repaired and loaded, kept shot in regular use and was supplied by air compressors of 1600 and 420 capacity. These were housed in on the eight power plants on the reserva which covers 36 sq miles and has miles of railroad.

Production lines on primers, detona fuses and boosters—as well as se other operations get their compre air from three air compressors of cfm capacity each. Total capacit all air compressors at the center is cfm.

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NEWEST COMFORT FEATURE OF HY-TEST *Safety Shoes*

Top slants gradually to front of shoe so that shoe top does not chafe or cause irritating rub in walking. The rounded corner lets the foot flex and bend at ease . . . no square-cut corner to bite into the ankle.

No raw edge in Slant-eze. The edging of tops and lace-stays is skived, folded and then stitched to give a neat "dressy" look and a smooth, easy-wearing feel.

Here's the new slant that does away with ankle-biting of sharp-corner uppers . . . makes it possible for workers to keep safety shoes always fully laced and still enjoy perfect foot comfort. By slanting the top and rounding the corners, Hy-Test creates a new design, the advantages of which are readily evident to all who wear work shoes.

These are the shoes workers will lace up neatly and fully . . . no loose strings to catch in moving machinery . . . no gaping, unlaced uppers to tire the feet and rob the worker of important ankle support. Hy-Test's new Slant-eze top brings extra freedom . . . permits more "bend", allows twisting and stooping without suffering that irritating rub of rough leathers against the ankle.

Hy-Test Slant-eze also introduces the new folded-edge top and lace-stays as another comfort feature. This eliminates the harsh, raw edge which has been a frequent source of foot irritation in many work shoes. This Slant-eze binding gives comfort without bulkiness, and adds another dress-shoe feature to Hy-Test.

With all the extra protection from Hy-Test's exclusive Anchor-Flange Steel Box Toe, and with the extra comfort of the shoe itself, it is easy to understand why so many workers prefer Hy-Test Safety Shoes.

HY-TEST *Safety Shoes*

THE ONLY SHOE WITH THE ANCHOR-FLANGE STEEL BOX TOE

HY-TEST DIVISION • INTERNATIONAL SHOE COMPANY • ST. LOUIS 3, MO. • EASTERN OFFICE • MANCHESTER, N.H.

Spark Gap Converter

(*Continued from Page* 115)

supply cycle is determined by capacity, inductance, and gap spacing in the oscillation producing circuit.

Tuning inductance in this type of equipment is made variable while associated capacitors are fixed as to their value. This permits the selection of any frequency within a range of from 100 to 450 kilocycles which is essential to tune the oscillation producing circuit to the most efficient operating frequency of any load coil size and shape.

Delivers Uniform Output

The load coil and its load, in parallel with the tank condenser, determine the optimum operating frequency of a particular job. When the converter is "tuned" to this load, a maximum current flow through the load coil is assured. Inasmuch as the load coil current and the number of turns employed in the load coil determine the heat rate at which a particular piece of work comes up to temperature, it is only natural to have either or both at maximum for most efficient results.

It is for this reason that the circuit was developed for industrial applications, as it is capable of delivering a uniform output and a maximum load coil current with minimum power input from the line. Spark gap converters are usually equipped with power factor correction condensers which further improve the input to output power ratio. Under good load conditions the overall efficiency on spark gap equipment is 70 per cent, and the power factor is unity which is most desirable, as the majority of plants operate on power factors below 80 per cent, in which case a certain power factor penalty is imposed on the user by the power company.

Main components in the spark gap oscillator or converter are the spark gaps, the high voltage transformer, and the oscillatory circuit condensers. The condensers, which are referred to as tank and blocking condensers, are of the power type and are built up of many sections of the very best mica and tinfoil, enabling them to carry the total oscillation energy.

Compact layout of individual components is illustrated in Fig. 2. Handwheel at the front of converter is the tuning wheel which changes the inductance in the circuit and with it the produced frequency. All low frequency equipment — such as the high voltage transformer, line choke coil, and magnetic switch—are in the lower part of the cabinet. The air and water-cooled spark gaps are accessible in the back of the cabinet, while the high frequency choke coils, tank and blocking condensers, and tuning coils are visible in the central portion. The high voltage transformer is high reactance type and is water-cooled.

Electrical characteristics of the spark gap converter are indeed ideal in regard to the generation of high - frequency power. No wave form distortion or transients exist in the power supply line nor need one worry about parasitic oscillation.

No Danger of Overloading

There is no danger of overloading a gap converter because the condensers receive at all times the same amount of energy from the high voltage transformer. This fact, and the circuit design in general, are responsible for the ability to maintain practically constant output during the entire heating cycle which means that the same amount of power is fed to the load coil whether the work is in the cold or hot stage or whether the material being processed is ferrous or nonferrous.

The heating of ferrous as well as nonferrous materials with the same converter up to and beyond the melting point with maximum efficiency is an excellent illustration of its adaptability to a wide range of industrial applications. Annealing, soldering, brazing, local heating for the purpose of hardening and forging, as well as melting of all metals, are typical applications performed by the gap converter.

All conceivable types and sizes of load coils can be directly connected to the converter output terminals without adjustments and conversions. A few of the many possible types and sizes of lo coils are shown in Fig. 4. For exam a single turn coil 4⅜ in. in diameter m be used for hardening a ring gear 1 in width, or, the same coil can be u for shrinking a ring of such size on t rim. Similarly, a 27-turn coil of 10 diam, 14 in. long, for melting 30 lb steel in about 1 hr, can almost insta be connected to such a converter.

The load coils are made up to form with the individual contour of part, and are made either of 1/4, 3 or 1/8-in. copper tubing through w cooling water is passed. Temperatur the water may rise to as high as 18 without affecting the performance of converter.

Load coils used in conjunction spark gap converters need not be s to critical electrical impedance va Any differences in inductance of load coils are compensated for by tuning arrangement. Whatever the ticular impedance of the load coil be, it will work at maximum effici once the converter is "tuned." Du this fact, the spark gap converter i stantly ready for operation, it can as be instantly shut down once a jo finished or in the event the operator leave to attend to other work. Star periods are thus eliminated, resulti considerable savings in power, w and time.

Can Be Fully Mechanized

Operation of the spark gap con can be either manual or fully autom depending upon the extent the use sires to mechanize the equipment. example, the heating of steel slugs in. in diameter and 1 in. long ca made continuous and fully autom without complications. Equally adap is the application involving the co uous soldering of small condenser or similar parts.

Silver brazing applications, how are performed one or more pieces time in a single coil as illustrated in 6. Here it is possible to join in a h efficient manner two brass rings by m of silver solder, as is evidenced by fact that four operators may be us assembling and preparing the par soldering, in order to keep the con in continuous operation. The six a blies in the illustration are soldere 36 sec with a power input of only 1

Some types of brazing jobs also re the application of pressure while ing; on others, slight pressure is ap immediately after the heating is pleted. This is necessary to eliminat gap in the assembly which was for taken up by thickness of the prep ring of silver solder. In these ap tions it is important for best resu have a close fit of the two parts joined. When heating the outer me of an assembly with an external coi expansion of this part may cause

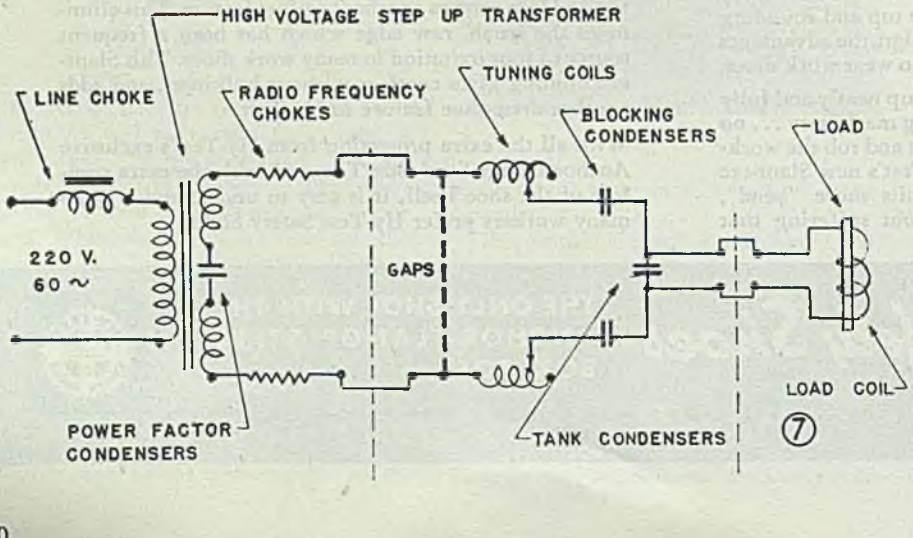
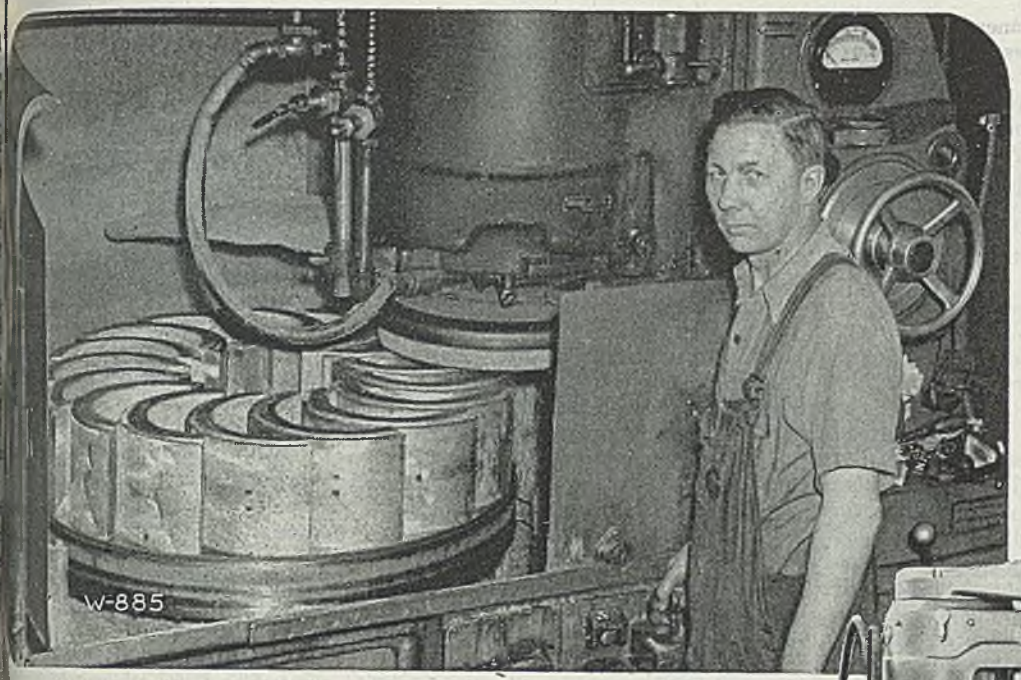
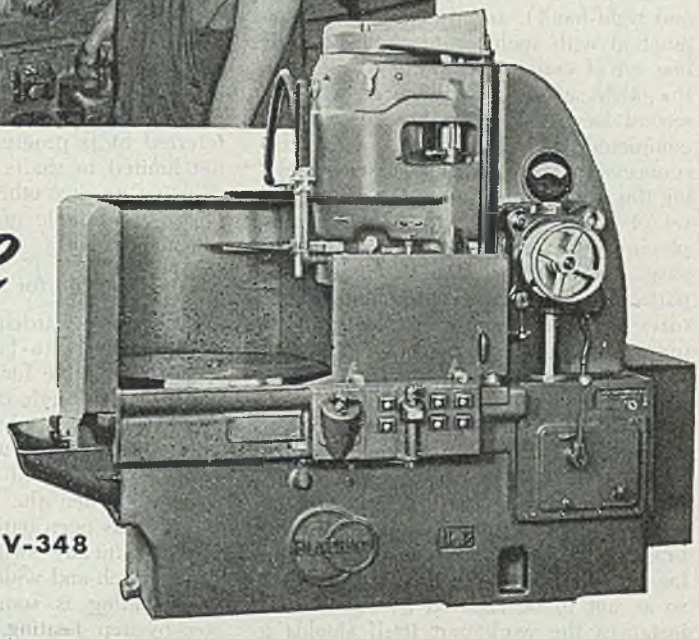


Fig. 7—Schematic of basic Lep converter circuit



Send for your free copy of "Work Done on the Blanchard", third edition. This new book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.

Put it on the Blanchard"



These turbine bearings measuring 12⅞" O. D., " I. D. and 7⅝" long of steel and bearing babbit ground on a No. 18 Blanchard Surface Grinder ipped with a 36" chuck.

⅛" of stock is removed from each bearing grind- to limits of ±.005", 32 pieces are ground per r on one end. (16 pieces per load on the chuck.) This is an excellent demonstration of how you get greater production from the Blanchard by any other method for machining work of s character. Other methods would involve ecial holding devices or fixtures — the Blanchard thod is 3 to 4 times faster.

Get These Advantages

- **Production ✓**
- **Adaptability ✓**
- **Fixture Saving ✓**
- **Operation Saving**
- **Material Saving**
- **Fine Finish**
- **Flatness**
- **Close Limits**

The BLANCHARD MACHINE COMPANY

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much space between inner and outer parts. Since in many cases the inner part is primarily heated by conduction from the outer part, an air space between the two will cause an appreciable increase in the heating cycle. A slight press fit to permit conduction to take place in such cases is advisable.

In cases where parts are of large dimension or where construction does not lend itself to heating in a single coil, the multiple coil arrangement is used, as in Fig. 5. Each part then has its own coil, and these coils are connected in series of from two to as high as twelve coils across the spark gap converter output terminals. The advantage gained is the ability to correct the heat pattern of each part without difficulty and to heat more pieces simultaneously. A changeover switch and two sets of coils (left-hand and right-hand), are always used in conjunction with such arrangements. While one set of coils is heating the first load, the other set is being prepared with the second load. After the heating cycle is completed, the changeover switch disconnects the heated set and starts heating the work already loaded in the second set of coils. Another advantage of employing coils connected in series is the easy accessibility to the parts, which is particularly important when aligning fixtures or where pressure fixtures are required.

In general, fixtures and supports, either for aligning or merely holding the work concentric with the load coil, are constructed of metals such as brass or steel. Fixtures for the specific purpose of applying pressure to the work must necessarily be strong and are also made of brass or steel. They are usually situated far enough away from the load coil field so as not to be affected by it. In most instances the work part itself shields to a certain degree the metal of the fixture. Where this is not the case, the plunger or cup which exerts the pressure on the part must be made of transite of micalex, for otherwise unnecessary heating of the fixture portion results.

Continuous heating of flat or round stock for the purpose of annealing or hardening is very effectively performed with the spark gap converter, employing the use of a transformer type coil. (See Fig. 3.) In such applications, the total power of the converter is concentrated on a very small section of the material which results in exceedingly fast heating of that particular section. The material being moved through the coil at a uniform rate of speed makes possible the heating of very long bars, shafts, or sections thereof. A 30-kw spark gap converter will satisfactorily accommodate the heating of shafts having diameters as large as 3½ in. If the purpose of the application is hardening, a water quench is applied to the shaft as soon as it emerges from the load coil, as in Fig. 3. This method of continuous heating is often referred to as progressive heating and is not limited to shafts alone; it is equally effective on any other concentric assemblies, an example of which are stacked gears and blanks.

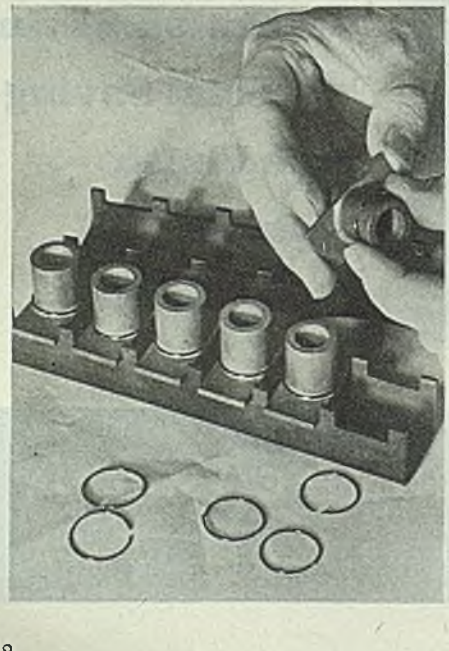
Suitable for Large Gears

Progressive hardening is applied very advantageously to large gears. A small load coil suitable for heating the area of one or more teeth is used. The gear is slowly and uniformly rotated while heating. A continuous water quench is applied to the heated portion of the gear surface. When the entire gear circumference has been hardened, the converter is automatically switched off. On very coarse pitch and wide gears, this progressive heating is sometimes modified by step-by-step heating, i.e., the teeth are heated and quenched one at a time, providing a surface hardness which otherwise could not be produced economically.

Included in the wide scope of applications which may be performed by spark gap converter is the melting ferrous and nonferrous metals, as well precious metals such as gold and s While it is not considered good econ to melt large quantities of metals gap converters at the higher frequen the melting of about 30 lb or less in charge has been found quite desirable metallurgical purposes or in centri casting production. In the latter app tion, the load coil is arranged so th can be removed readily from the cr before the rotating mechanism is st When small crucibles are employed or more casting machines may be nected to the same converter by m of a switching arrangement which mits the selection of the casting ma desired. For melting applications dinary casting work, the load coil an crucible are suitably mounted in support and are adequately insulat reduce radiation losses at the m temperature. Crucibles large enou 15-lb melts are generally of the pouring type, whereas the 30-lb size cible rests in a cradle which can be for pouring by means of a leverag rangement. The current may be h while pouring the melt, thus minim the freezing of the melt at the lip crucible.

Flexibility of the spark gap con insures that it will play an equally portant part in the peacetime working industry as it did in war pr tion. In fact, many units originally chased for use in the manufacture o ious types of ordnance and other fi equipment today are being used in ing and hardening products of a s peacetime nature.

Copper Brazing Assembly



Saves 13 Cents Per Part

USE of a two-piece copper brazing assembly method at Glenn L. Martin Co., Baltimore, makes possible a saving of 13 cents per part on standard cam followers. Assembled part consists of a rectangular flange with small tubular projections at each side from center hole of flange. This is handled by a setup which produces five parts at a time.

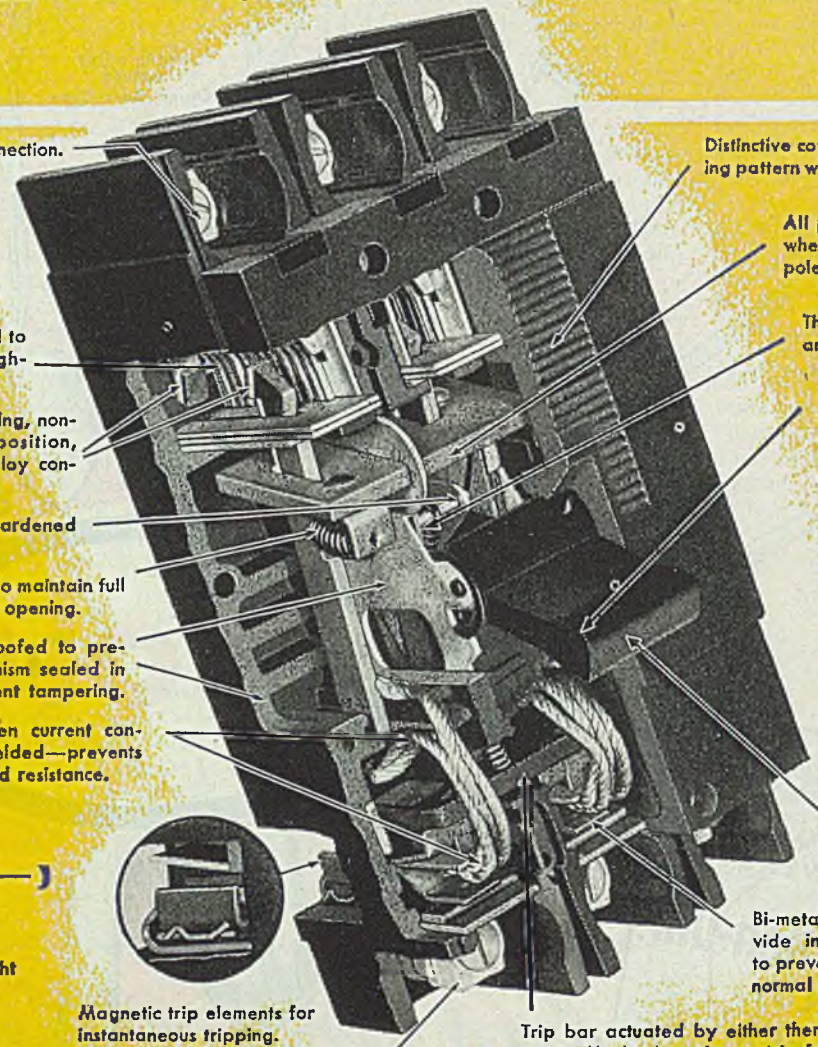
Cylindrical portion of assembly is a piece of stock steel tubing sized to proper diameter for brazing and cut off in screw machine. Rectangular flanged portion is blanked from strips of steel stock by a progressive die. The round hole in this rectangular piece through which cylinder passes is blanked and sized to proper dimensions in one operation. For brazing, cylindrical portion is slipped into hole in flange as trated, after which assembly is on a part holder and rings of brazing are placed on each assem joint.

Parts holder is loaded with assem and placed in an electric brazing fur During brazing process, the copper melts and creeps into joint by cap attraction, resulting in a strong joint. After brazing, manufacturing cedure to finish parts is the same former method. The two attaching are drilled and burred, the cam pr profiled by milling, and the e hardened by induction heating. show that the new type followers strength beyond previous design req ments and fully meet standards.

A New and Improved

100-AMPERE FRAME CIRCUIT BREAKER

Type ML2 • 15 to 100 Amperes, 600 Volts AC—50 to 100 Amperes, 250 Volts AC-DC



Designed for front connection.

Distinctive cover design provides pleasing pattern when breakers are grouped.

All poles trip simultaneously when overload occurs on any pole.

The mechanism is quick-make and quick-break.

Automatic tripping is clearly indicated; handle assumes intermediate position between "ON" and "OFF" when breaker is tripped by overload.

Arc chambers designed to provide effective, high-speed interruption.

Contacts are non-welding, non-oxidizing silver composition, mounted on copper alloy contact arm and terminal.

Bearing surfaces are hardened to reduce wear.

Springs cause contacts to maintain full pressure until instant of opening.

All steel parts rust-proofed to prevent corrosion; mechanism sealed in bakelite case to prevent tampering.

All connections between current connecting parts are welded—prevents loosening and increased resistance.

Breaker Unit Dimensions

9 9/16" long
4 15/32" wide
3 3/4" high
4 7/8" maximum height including handle

Strong bakelite handle moves in sealed grooves.

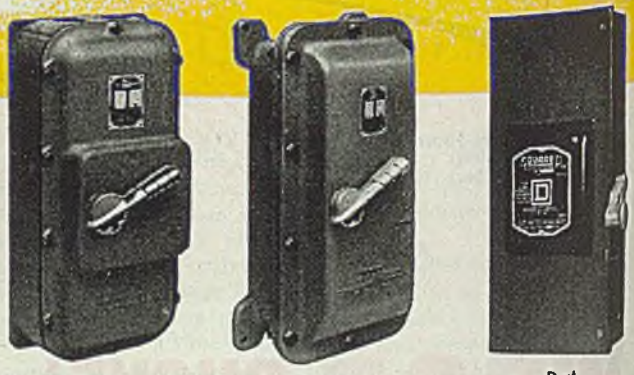
Bi-metal overcurrent elements provide inverse time characteristic to prevent tripping on momentary normal overloads.

Magnetic trip elements for instantaneous tripping.

Trip bar actuated by either thermal or magnetic trip elements. Mechanism always trip-free, so contact cannot be held closed against short circuits or abnormal overloads.

Solder-Solderless connectors furnished on ratings of 35 to 100 amperes. Screw and eared washer 15-20-25 amperes.

• The new ML2 is furnished in distribution panelboards, as well as the three types of enclosures shown at right. Write for ML2 Bulletin, which gives complete details.



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Explosion Resisting

Dust Resisting

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Operation of SMALL vs. LARGE Blast Furnaces

Furnacemen in a joint meeting with coke oven operators discuss efficiency of small and large hearth diameter stacks, methods of blowing them out and problems with which by-product coke-makers are faced

AMOUNT of cooling water used on last furnaces has an important bearing on the better operating practice of small-er stacks compared to larger stacks. This tendency was cited by Owen R. Rice, metallurgical engineer, Freyn Engineering Co., Chicago, at the joint meeting of the Blast Furnace and Coke Association of the Chicago district and the Eastern Sales, Blast Furnace and Coke Oven Association, Hotel Carter, Cleveland, Oct. 9, at which 305 members and guests were registered.

Mr. Rice in speaking on the dimensions and rating of a blast furnace submitted data on 81 Lake ore blast furnaces which had a campaign of 200 months. As a general basis for blast furnace rating he used the formula 6300 (% of coke) × area of 6 ft in front of tuyeres. Lower coke rates are secured in the operation of small furnaces than in the larger ones, as shown by the following data:

Hearth diameter, ft.	Ave. lb coke per n.t. pig
18 and under	1508
19-22	1693
24-26	1730
28 and over	1700

On some of the larger furnaces in this country 18 tons of cooling water are used per ton of pig iron compared to 14.7 tons on smaller stacks. Mr. Rice raised the question as to whether operators are not overly liberal in the use of cooling water on the larger furnaces. If so, it was his thought that coke rates suffer accordingly.

That lower coke rates may be contributed to relative furnace volume are shown by the following data submitted by the speaker:

Hearth diameter	--No. of furnaces-- 55	19
Tuyere, ft	20½-27½	13½-19
Diameter, ft	24	18.2
Total effective area, sq ft	317	199
Total working volume, cu ft	33,600	23,000
Total relative working vol., cu ft	106	115
Fuel rate, lbs/n.t. pig	1730	1670

The subject of slow blowing was brought up in the discussion of Mr. Rice's report. At a plant in the Chicago district where a stack was blowing 62 per cent of normal for 8 to 9 months and another stack 43 per cent of normal for a few months, a coke reduction comparable to figures shown by Mr. Rice was obtained. For the stack operating at 62 per cent normal a reduction in the quantity of flue dust made was 51 per cent whereas for the stack blowing 43 per cent of normal a reduction of 64 per cent in flue dust was secured. Another point in the economy of slow blowing mentioned by this operator was to the effect that if smaller coke at lower cost per ton is available an appreciable saving can be shown by slack wind over normal furnace operation using regular furnace coke.

Another operator stated that larger furnaces show a better coke rate per ton of pig than smaller furnaces thus indicating that the relative working volume is a significant figure.

A Pittsburgh district blast furnaceman took exception to the practice of going down below the proper amount of air to get 100 per cent furnace performance. He pointed out that if the stack is blown at 10 per cent below its rated capacity, a lower coke rate per ton of pig will be secured but he warned that one blown 20 per cent of its normal capacity does not always show a decline in the coke rate. Furthermore, he stated, when you blow from 15 to 20 per cent below the rated capacity, inwalls of the stack frequently are damaged.

Mr. Rice, in discussing slow blowing, pointed out that the practice does not always harvest the lowest coke rate. The tuyere size has an important bearing on the blowing rate, he contended, and frequently when the wind is cut, the size of the tuyeres is not reduced enough. He advocated the use of 3-in diameter tuyeres on a 16-tuyere furnace.

At a plant in the Pittsburgh district where one tuyere is used for every 31 sq ft of hearth area, the superintendent stated that with small tuyeres it is difficult to keep the blast from climbing the walls and to hold the penetration.

Carl F. Hoffman, superintendent blast furnaces, Bethlehem Steel Co., Sparrows Point, Md., cited the following method as employed at his plant for blowing out a blast furnace: After a cast from 70,000 to 140,000 lb of ore are charged as a blank. The bell is then keyed up and an ore blank is dumped on the top of the bell to serve as a seal. Water sprays from 2-in. pipe are employed at the top of the stack where 150 psi pressure is made available by the use of fire pumping equipment. The top temperature is controlled by water and when this is no longer possible, then the wind is cut. During the blowout, two casts are made, the last iron being taken out when the stock is down to the mantel. Water is sprayed in the furnace until it runs out the taphole. A section is cut out of the tuyere breast and the stock is raked out of the furnace, which requires a period of 6 to 8 hr. The speaker pointed out that he has not encountered any trouble by following this method to get a clean hearth 1½ ft below the taphole.

The method followed at Gary for blowing out includes filling the furnace with domestic coke, draining the salamander and then flushing out the coke while rather hot.

At another plant, the practice of dumping the big bell every 2 skips affords more uniform top temperature, according to the operator. He advocated the use of a recording meter for water used to lower the top temperatures.

D. A. Russell, chief chemist, Youngstown Sheet & Tube Co., Youngstown, O., in discussing "Coking Coal Quality" warned that higher ash content will be encountered in the near future and he recommended an immediate survey of conditions. He advocated that a minimum amount of ash and sulphur should be established and that cleaning plants should be installed to produce three separate grades of coal including steam and coking grades. Mr. Russell also stated that the ash content in coal at the ovens × 1.30 gives the percentage of ash in the coke, whereas the sulphur in coal at the ovens × 0.80 gives the percentage of sulphur in the coke.

Warning also was sounded by another operator that we are faced with higher priced coal as well as coal of inferior quality. He referred to high sulphur in particular. He cited mechanical mining as a means of lowering the cost of coal and emphasized washing as a prerequisite.

W. T. Brown, consultant, coal, coke

(*Please turn to Page* 191)

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IMPROVED VAPOR SAVING STRUCTUR

NEW AND IMPROVED WIGGINS PONTOON ROOFS

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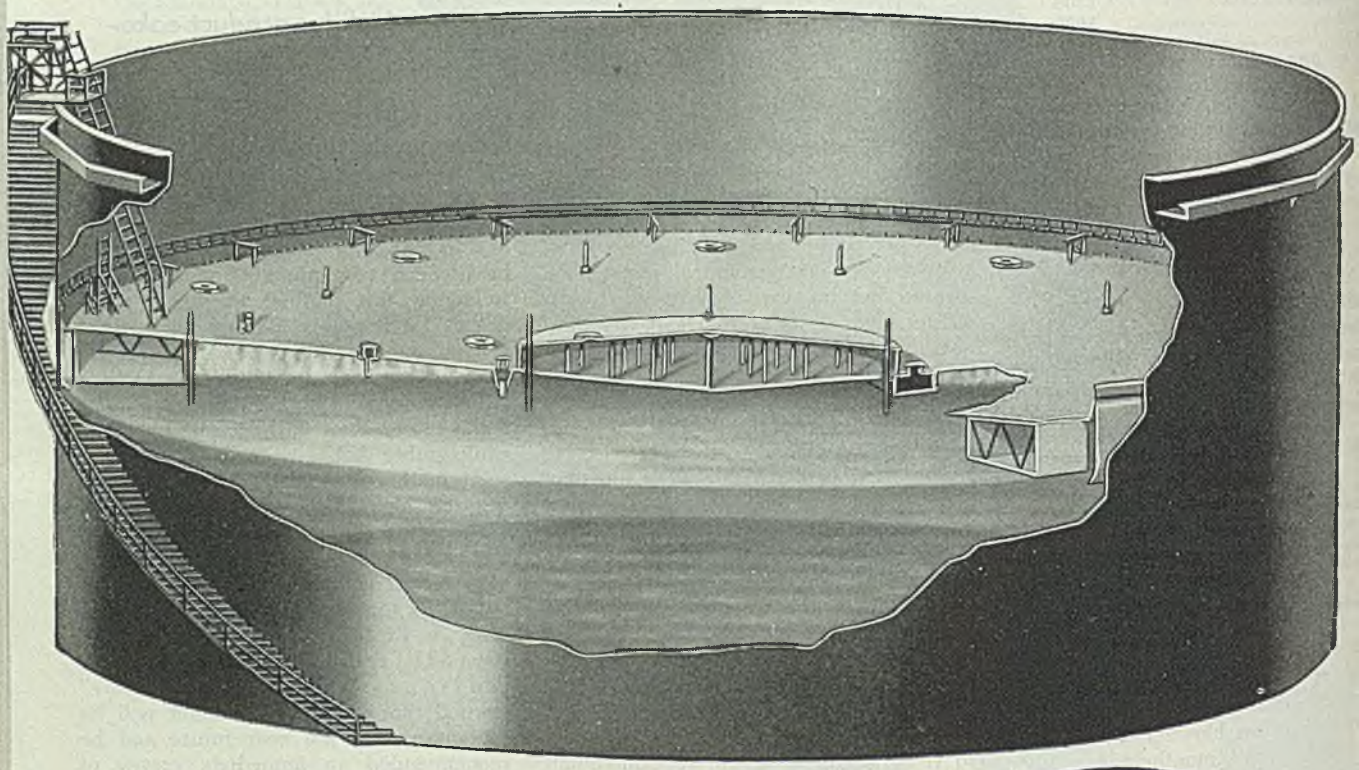


CUT-AWAY VIEW of an improved Wiggins Pontoon Roof installed on butt welded tank. Note how roof floats directly on liquid, blanketing surface at all levels, thus stops evaporation loss and reduces fire hazard by eliminating active vapor space in tank. Note covered center pontoon which prevents evaporation of the liquid due to the heat of the sun, and new improved ladder which provides safe, easy access to deck from top of tank. Upper end of ladder rides around an ingenious "ferris wheel" and lower end is pivoted on peripheral pontoon. Handrails are provided for safety.

WIGGINS VAPOR SEALS
GATX
GENERAL AMERICAN

Exclusively THE NEW AND PATENTED BY JOHN H. WIGGINS

Wherever volatile liquids are stored or processed, Wiggins structures assure important savings, greater safety!

For years General American Transportation Corporation has been out in front in rendering service to the petroleum industry. Now General American has fortified its leadership by acquiring the sole rights to manufacture and sell, as exclusive licensee under John H. Wiggins patents, the new and improved Wiggins vapor-saving structures.

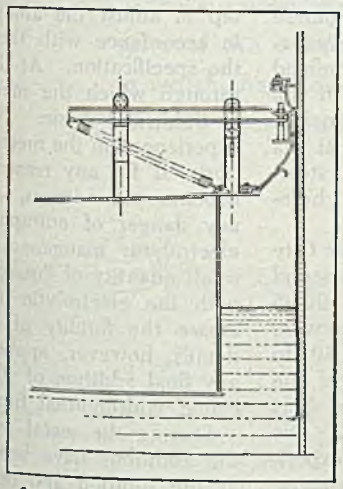
The new Wiggins Pontoon Roof, featuring many improvements, is typical of the many new and improved Wiggins structures manufactured by the General American Plate and Welding division. It can help you solve your evaporation-loss problems, safely and surely, because it floats directly on the surface of the liquid, stops evaporation loss, and reduces fire hazard.

COST AMORTIZED QUICKLY IN SAVINGS

Here are some of the losses which are prevented, eliminated, or reduced by the new and improved Wiggins Pontoon Roof, illustrated at left:

BREATHING LOSSES . . . Whenever increasing temperature causes expansion in vapor space of tanks having a fixed roof, vapor is vented to atmosphere. Losses resulting from this daily exhalation of vapor are called breathing losses—an expensive waste which is stopped by "improved" Wiggins Pontoon Roofs because of their elimination of *active* vapor space.

FILLING LOSSES . . . With fixed roof tanks, vapor is displaced through roof vents during filling. When a tank equipped with an "improved" Wiggins Pontoon Roof is filled, no vapor is displaced because roof floats on the liquid surface. No filling loss occurs from the small space between roof and tank shell because the volume of this space remains constant even when roof is rising.



Section of new and improved Wiggins Pontoon Roof seal showing details of shoes used with butt welded tank shells. A continuous strip of flexible seal material forms wind-proof connection between top of shoe and roof of deck.

BOILING LOSSES . . . In addition to eliminating all filling loss and reducing breathing loss to a minimum, the "improved" Wiggins Pontoon Roof traps vapor, formed by boiling, under the deck. This vapor is retained under roof until recondensed by cooler temperatures.

PROTECTION FROM FIRE

By eliminating the conditions which permit contents of tank to burn, the "improved" Wiggins Pontoon Roof effectively helps prevent fire. Liquid beneath deck cannot become ignited because there is insufficient oxygen present to support combustion. And since the tank has an open top, there is no danger of an explosive mixture forming above roof. The only point where a fire might conceivably burn is in space between rim of roof and tank shell. This space, however, is sealed with a fire-resistant material consisting largely of asbestos woven with glass, and repeated tests have proved that even if seal becomes damaged, a fire in this area can be easily extinguished, even after burning for some time. A complete discussion of the fire retardant features of the unimproved Wiggins Pontoon Roof may be obtained in the "Report on Floating Roof for Vertical Steel Storage Tanks" issued by the Underwriters' Laboratories, Chicago, Ill.

WIDE APPLICATION TO NEW OR EXISTING TANKS

The "improved" Wiggins Pontoon Roof is applicable to either riveted or welded tanks of all 15 ft. diameters or larger. It can be furnished with new tanks or installed in existing tanks, and for this reason finds wide application at pipeline stations, refineries, bulk stations, marine terminals and chemical plants. A sound investment for any large tank storing crude oil or gasoline, the "improved" Wiggins Pontoon Roof is also recommended for service on working tanks, blending tanks and tanks containing corrosive oils.

For complete information regarding the "improved" Wiggins Pontoon Roof or other "improved" Wiggins structures and their possible application to the solution of your special problems, get in touch with our nearest office.

General American Transportation Corporation

maintains offices in Chicago, New York, Washington, Cleveland, Buffalo, Pittsburgh, St. Louis, New Orleans, Tulsa, Dallas, Houston, Seattle and Los Angeles

Steelmakers Test Usefulness of ELECTROLYTIC MANGANESE

By R. T. C. RASMUSSEN and F. SILLERS, Jr.

Senior Metallurgist and Metallurgist
Bureau of Mines
Washington, D. C.

Absence of phosphorous and carbon in the pure metal facilitates meeting difficult specifications and affords larger charges of available alloy scrap. Product is handled conveniently and weight of additions calculated readily. Operators claim time saving when product is used in low-carbon heats of open-hearth steel

ELECTROLYTIC manganese produced in the pilot plant of the Bureau of Mines at Boulder City, Nev., has been added to commercial heats of various grades of carbon and alloy steels, ingot iron, and malleable iron at 25 of the 40-odd iron and steel plants cooperating with the Bureau.

During three years of pilot-plant operation on Three Kids manganese ore of southern Nevada, numerous improvements were made in the electrowinning process and the applicability of the process to Three Kids ore was established. In November, 1944, a program of tests on other important low-grade domestic manganese ores was begun and to date successful pilot-plant campaigns have been completed on samples of Ladd Mine ore from California and nodule concentrate from the vast manganiferous shale of deposits exposed along the Missouri river in South Dakota. A campaign on a sample of the Metals Reserve Co. stock pile at Deming, N. Mex., was almost completed when this paper was written, and samples of other ores were on hand for testing. The South Dakota reserve alone would supply the nation's entire manganese requirements for several hundred years. The pilot-plant operations (1-ton-a-day production capacity) have provided reliable data for estimating production costs in commercial plants large enough to produce low-cost metal. Electrolytic manganese has been produced on a small, but expanding, commercial scale since 1939, using the basic patent of the Bureau of Mines.

Several years ago it became apparent that evidence of successful treatment of low-grade domestic ores by the electrowinning process was not enough to establish the method as a practical means of attaining a substantial degree of self-sufficiency with respect to manganese; the acceptability of electrolytic manganese in place of other forms of manganese produced largely from high-grade imported ores had to be demonstrated. The Bureau's pilot plant has another important function here of supplying electrolytic manganese for industrial tests to determine the usefulness and possible advantages of pure manganese in the manufacture of ferrous and nonferrous alloys. This article is confined to results of cooperative tests with the iron and steel industry, the principal consumer of manganese. Tests at six plants representative of various steelmaking practices, are reported herewith.

Chemical analysis of the Boulder City product for a recent six-month period showed the average purity to be 99.95 per cent. The principal impurities were 0.026 per cent sulphur and 0.010 to 0.015 per cent hydrogen. Most of the hydrogen can be eliminated by a short heat treatment at about 500°C. No hydrogen difficulties have been experienced in any of the plant tests, however, when the electrolytic chips are used without heat treatment.

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Although the test program is not c
pleted, results of tests at enough pl
are available to indicate that electro
manganese can be used satisfactorily
acid and basic steel of plain ca
and alloy grades made in both the o
hearth and the electric furnace.
ther, definite advantages have
proved for electrolytic manganese
high-alloy steels, and advantages
been indicated for ingot iron and ca
steels, particularly the low-carbon gr

Rustless Iron & Steel Corp., B
more, Md., was the first steel com
to make co-operative tests using
trolytic manganese supplied by the
reau of Mines. The interest of A
Field, technical director of Rustle
electrolytic manganese lay in the
sible benefits to be derived from
use of manganese containing
tually no carbon or phosphorus.
reports submitted by the corpor
covered the use of electrolytic m
nese in 1596 heats of stainless steel
to 22 different specifications. A
part of the electrolytic manganese
in the heats was purchased on the
ket to supplement the quantity
plied by the Bureau of Mines afte
vantages in the use of pure mang
became evident.

No Difference in Logs

The log of a typical heat melted
electrolytic manganese does not
from the log of a heat melted with
romanganese. In both instances
manganese is added 5 to 10 min b
tap to adjust the analysis of the
in accordance with the requiremen
the specification. At this time, th
through which the manganese is
is fluid and basic. No difficulty
experienced in the mechanics of the
tion. If for any reason the slag s
become too viscous, so that the
any danger of entrapping some
electrolytic manganese in the sl
small quantity of fluorspar may be
with the electrolytic manganese
crease the fluidity of the slag.
details, however, apply equally w
any final addition of alloy and are
ciated with normal furnace practic

Stirring the metal and the slag
the additions have been made to
in the solution and distribution o
manganese is good practice. The
poration has found that the percen
recovery of manganese from electro
manganese is at least as high as
low-carbon ferromanganese. Ave

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In the spring of 1942, eleven heat-treating furnaces, lined with B&W Insulating Firebrick, were moved outside an automobile plant to make room for war production. For three years they weathered summer rains and winter storms—with nothing for protection but a tarpaulin.

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TABLE I

EFFECT OF FORM OF MANGANESE ON PHOSPHORUS AND CARBON IN TYPE 310 STEEL

Form of manganese	Ave. P content, %		Avg. C pickup, %	
	RM heats	VM heats	RM heats	VM heats
Electrolytic	0.022	0.018	0.022	0.072
Ferro	0.024	0.021	0.036	0.073

TABLE II

WORKABILITY OF TYPE 310 HEATS

Rating	% Heats in each rating group	
	Electro Mn	Ferro
Good	37.1	26.8
Good to fair	20.0	2.4
Fair	28.6	56.1
Fair to poor	5.7	2.4
Poor	8.6	12.1

TABLE III

EFFICIENCY OF MANGANESE ADDITIONS IN LOW-CARBON RIMMING HEATS OF 0.07/0.10 C AND 0.32/0.40 Mn STEEL

Steel made, lbs.	Weight of ladle addition, lbs.	Manganese added, points	Manganese recovered, points	Efficiency of addition, %
Electrolytic manganese added in ladle				
122,800	500	41	28	68
120,900	400	33	25	76
126,850	450	35°	30°	85°
122,800	400	32°°	20°°	62°°
125,850	500	40	26	65
121,000	450	37	23	62
124,000	350	28	17	61
119,650	400	33	23	70
125,300	400	32	20	62
123,240 Avg.	428	35	23	66
Standard 80% ferromanganese added in ladle				
123,300	675	44	26	59
123,800	650	42	20	48
121,000	700	46	20	44
122,600	650	42	19	45
122,000	650	43	25	58
129,000	700	43	25	58
119,800	650	43	20	47
122,700	700	46	24	52
122,650	650	42	22	52
122,980 Avg.	669	43	22	51

°Omitted in average; sample taken too soon after addition of spiegel.
°°Omitted in average; sample taken by mistake before addition of spiegel.

manganese recovery was 87.8 per cent for 63 heats in which electrolytic manganese was used in the furnace as compared to 84 per cent for an equal number of heats in which ferromanganese was added in the same manner. The average recovery from ladle additions of electrolytic manganese to six heats was 89.9 per cent.

Rustless reported that the use of electrolytic manganese in place of low-carbon ferro has not caused any changes in hot-workability, quality, or performance of the steels other than those brought about by the advantage of closer control over carbon and phosphorus content made possible by use of the pure metal.

Advantages determined for electrolytic manganese were presented on page 156 of the April 12, 1945, issue of STEEL. Briefly, the absence of phosphorus and carbon in the pure metal makes it possible to meet difficult specifications more easily and to use larger proportions of readily available alloy scrap; the high purity and physical form of electrolytic manganese are responsible for several operating advantages. No disadvantages were found in its use.

Rustless Iron & Steel Corp. has gone over entirely to the use of electrolytic manganese for manganese additions to alloy steels.

A test program involving the use of electrolytic manganese in 103 commercial heats of stainless steel was carried out in cooperation with the Universal-Cyclops Steel Corp., Bridgeville, Pa. The principal purpose of the investigation was to establish the usefulness of electrolytic manganese in meeting the difficult phosphorus and carbon maximum specifications of types 310 and 307-modified stainless-steel welding rod used by the Army and the Navy. Thirty-six heats of type 310 were made in which the entire manganese addition was in the form of electrolytic metal; 59 heats of type 307-modified were made, using electrolytic manganese in some and only part electrolytic in others. Records were kept of regular heats of the same grades to which ferromanganese was added for comparative purposes. The specifications for the two types are:

Element, %	Type 310°	Type 307-mod.
Carbon	0.07-0.15	0.07-0.15
Manganese	1.50-2.00	3.75-4.75
Silicon	0.25-0.60	0.25-0.60
Sulphur, max.	0.025	0.030
Phosphorus, max.	0.025	0.050
Chromium	26.50 (min)	19.50-21.50
Nickel	21.00 (min)	9.00-10.50

° Cu, Mo, Sn, Pb, V, and Ti maximums also specified.

During the course of the tests (about 10 months in 1944) the shop phosphorus maximums were lowered to 0.020 and 0.040 per cent, respectively, for the two types, in accordance with the requirements of welding rod manufacturers. Numerous type 310 heats were made to a phosphorus maximum specification of 0.018 per cent.

Basic electric steelmaking practice is used at the plant. In compliance with the wartime necessity of obtaining a substantial part of the alloy content from alloy scrap. Universal-Cyclops uses remelt practice to a large extent. Melting procedure comprises melting down under oxidizing conditions provided by iron ore in the charge, addition of fine ferrosilicon and lime to reduce and condition the slag, complete slag-off, addition part of the manganese to the bare ba building of a new reducing slag w clinker cement and spar (lime and f ferrosilicon added as needed to condit the slag), addition of ferrochromi and the balance of the manganese a nickel required, tap, and addition of c cium-silicon in the ladle to deoxidi The fine ferrosilicon reduces any ph phorus that may have been oxidized a taken up by the slag during meltdo as well as the alloy metals that it is sired to recover from the slag. Her virtually all the phosphorus contai in materals charged and added to furnace is recovered in the finis steel. The extent of decarburizat during meltdown is limited by the n for controlling oxidation so that excess ferrosilicon will not be required to duce oxidized metal from the slag.

Basic Slag Is Used

Virgin-metal heats, wherein only c bon-steel scrap is charged and the en alloy content is obtained from additi of ferroalloys and pure metals, so times are made when an extremely phosphorus maximum is specified. initial slag is made strongly basic w limestone and is removed without be reduced, thereby providing some opp tunity for getting rid of phosphorus c tained in the charge. The greater opp tunity for eliminating phosphorus carbon during meltdown afforded this practice is offset to some extent the greater quantities of these eleme introduced in the larger additions ferrochromium and ferromanganese quired.

Most of the trial heats were made a 12-ton Heroult-type electric furnace the corporation's own design; these w compared with regular ferromangan heats made in the same furnace. factors on which the relative me of electrolytic manganese and ferrom ganese (mostly the 0.10 per cent car grade) were compared included: e ciency of manganese addition, ph phorus content of the finished st carbon pickup from the manganese alloy additions, and hot workabil Owing to the much larger addition ferrochromium than manganese to e heat and variations in composition charge materials, the effect of the fo of manganese on phosphorus and carb is largely masked in any comparis of individual heats. Enough heats the two types of stainless steel w made, however, to provide average d relatively free of heat-to-heat variatio

The 36 heats of type 310 steel ma with electrolytic manganese were co

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Cable insulated with Dow Corning Silicone rubber (at right) shows no change after one hour at 260° C., in contrast with organic rubber, which has melted and exuded freely through the braid.

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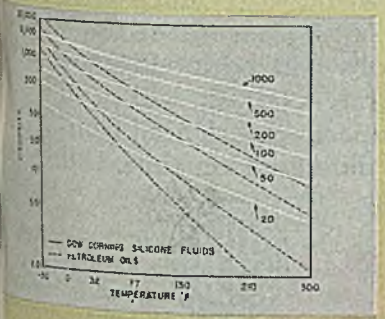

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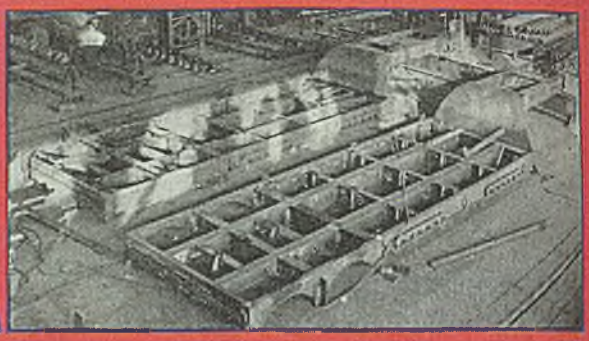

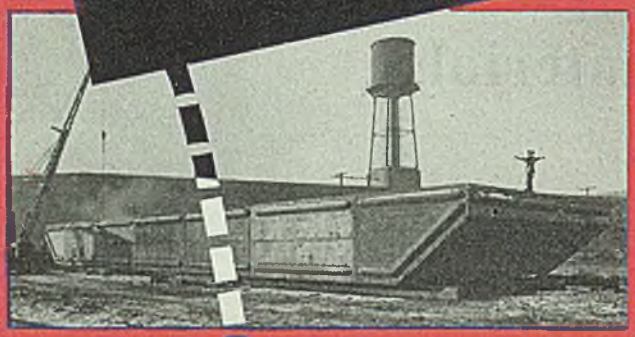

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...ed with 41 regular heats of the same ... in which ferromanganese was used. ...wing to lack of necessary data in ...eral instances, a few trial and regular ...s have been omitted in the comparis... of a particular factor. The average ...anese recovery obtained from elec...tic manganese additions was 95.6 ...ent, as compared with 98.6 per cent ... ferromanganese. In comparing ... phosphorus content and carbon ...p, both trial and regular heats ...divided into remelt and virgin met... groups, as shown in Table I.

...arbon introduced with the much ...ferrochromium additions to the vir... metal heats accounts for the markedly ...er carbon pickup noted in the aver... for both electrolytic manganese and ...manganese heats made by this prac... the influence of the form of man...se on carbon content also is partly ...ed by the relatively larger quantity ...arbon added with the chrome in ...virgin-metal heats. The more pro... lowering of phosphorus content ...rgin-metal heats resulting from the ... pure manganese, on the other ... is due to the larger additions of ...horus-bearing ferromanganese to ...mparative heats than in the case ...e remelt practice.

How Quality Was Determined

...ide from chemical analysis, hot ...ability and macroetching were the ...bases employed for determining the ... of stainless welding-rod steel. ...tching showed no apparent dif... in quality resulting from the ... of manganese used. Table II ...s workability data supplied by the ...ersal-Cyclops rolling department. Of ... eats made with electrolytic man..., 37.1 per cent rated "good" as ...ared with 26.83 per cent for heats in ... ferromanganese was used. On ... basis of "good to fair" or better, ...ectrolytic manganese heats showed ... even better advantage, with 57.1 ...cent against 29.27 per cent.

...e same general trends with respect ...phosphorus content, carbon pickup ... workability were developed in the ... and regular heats of type 307-... stainless steel. The superior... of electrolytic manganese was not ...t out so clearly in this series ...eats, however, because less than ... of the manganese was added as ...lytic manganese in about two-... of the heats in which it was used.

...rators have a decided preference ...ectrolytic manganese because it is ...enient to handle, the weight of ...tion can be calculated readily, the ...tion can be weighed out quickly ...accurately, and the weight of ad... is 20 per cent less than an equiva... addition of ferromanganese. Tests ...Universal-Cyclops confirmed the find... of the Rustless Iron & Steel Corp., ... electrolytic manganese has num... advantages over ferromanganese ... no disadvantage in the manufacture ... stainless steel. Since completion of ... test program Universal-Cyclops has ...ed part of its manganese require...

TABLE IV

PHYSICAL PROPERTIES OF ACID STEEL MADE WITH ELECTROLYTIC MANGANESE AFTER 5-HR ANNEAL AT 1650°F AND 4-HR DRAW AT 1100°F

TS, psi	YS, psi	Elong. in 2 in, %	Red. in area, %	Fracture
70,500	38,700	85.0	57.1	½-cup
		Open-hearth heats*		
67,000	38,450	31.5	41.9	Irreg.
66,900	37,000	33.0	49.4	Irreg.
72,150	38,050	34.0	55.2	½-cup
71,700	41,000	29.0	39.7	Irreg.
69,600 Avg.	38,400	31.8	47.2	
		Electric furnace heats†		
72,100	32,000	36.5	61.8	2/3-cup
75,100	39,450	34.0	55.2	½-cup
70,050	40,050	35.0	55 5	Irreg.
71,050	39,400	35.0	56.0	Irreg.
72,075 Avg.	37,725	35.1	57.1	

*Heats averaged 0.20 C., 0.74 Mn, and 0.38 Si.
†Heats averaged 0.20 C., 0.67 Mn, and 0.38 Si.

TABLE V

PHYSICAL PROPERTIES OF ACID ELECTRIC CARBON STEELS

Property	Normalized	Normalized and drawn at 1000° F — Time of draw — 2 hrs	6 hrs	10 hrs	20 hrs
(Average of two heats made with electrolytic manganese)					
Ultimate strength, psi	73,850	73,450	72,850	71,500	72,350
Yield strength, psi	51,425	50,875	51,325	49,325	49,250
Elongation, %	28.5	31.8	31.5	30.5	31.0
Reduction of area, %	36.18	41.86	45.56	42 61	44.04
Quality factor*	28,000	34,000	36,000	32,400	33,700
(Average of two heats made with ferromanganese)					
Ultimate strength, psi	73,750	73,125	72,938	72,475	71,625
Yield strength, psi	51,175	51,125	49,300	50,050	48,375
Elongation, %	25.5	27 8	28.0	29.5	31.0
Reduction of area, %	31.45	36.25	38.49	42.77	41.27
Quality factor*	23,300	27,200	27,900	31,500	31,600

*Note: Q. F. = $\frac{\text{(Ultimate strength + yield strength) \% elongation}}{2\ (100 - \%\ \text{reduction of area})}$

ments with electrolytic manganese purchased on the market.

Use of electrolytic manganese in low-carbon rimming heats is being investigated at a number of plants with interesting results. At the Stanley Works, Steel Division, American Tube & Stamping Plant, Bridgeport, Conn., electrolytic manganese was added to the ladle in nine heats of 0.07/0.10 carbon, 0.32/0.40 manganese steels, and standard ferromanganese to the ladle in nine comparison heats of the same composition. Efficiencies of recovery from the ladle additions averaged 66 per cent for electrolytic manganese and 51 per cent for the standard ferromanganese, as shown by Table III.

Electrolytic manganese was added to the ladle in 2 heats of 0.05/0.08 carbon, 0.25/0.35 manganese steel in which regular previous practice has been to add medium-carbon ferromanganese to the ladle. Operators state that there are definite indications of time saving in these low-carbon heats when electrolytic manganese is used because it is not necessary to reduce the carbon in the bath to the point required when ferromanganese is added to the ladle.

Since no carbon is introduced when electrolytic manganese is added, further savings may sometimes be effected on other types of steel. In the case of strip from two heats of SAE X-1015 killed steel (specification 0.12/0.16 carbon, 0.70/0.90 manganese) in which carbon ran on the low side owing to the use of electrolytic manganese in place of ferro in the ladle, it was possible to omit an annealing operation before shipment because of the improved properties obtained. On this X-1015 steel the practice had been to add part of the manganese as standard ferromanganese in the furnace and the balance in the ladle as medium-carbon ferromanganese, with 50 per cent ferrosilicon. Six hundred pounds of electrolytic manganese was equivalent to an 800-pound addition of medium-carbon ferromanganese.

The reduction in weight of addition made possible by the purity and better efficiency of electrolytic manganese reduces the chilling effect of the ladle addition. The smaller quantity of electrolytic as compared with contained manganese in ferro required might be explained on the basis of (1) finer state of division and greater effectiveness, (2) the fact that it is not alloyed with iron and carbon before addition of the steel in the ladle because tapping can be done on a higher carbon when the carbon is caught coming down.

Use of electrolytic manganese instead of ferromanganese in the manufacture of steel castings is also being studied. At the Sharon, Pa., plant of the National Malleable & Steel Castings Co., several acid electric furnace heats were made in

(*Please turn to Page* 188)

Transfer Crane System

(*Continued from Page* 126)

ing and flanging press at the right, Fig. 3, to the notching press at the left. The ten stops are spaced down the conveyor in the form of lever arms, all lifted and lowered together by a common shaft running lengthwise of the conveyor. Stops can be seen immediately in front of the operator, Fig. 3.

Another operator on the entrance side of the blanking press pushes a mat through against the first stop, press operates to blank and flange three holes. As dies open, the rod operating the stops lifts all stops so the operator can move work forward a few inches to clear the first stop. Immediately, the stops fall again so the operator can push work against the second stop, ready for the die to blank and flange the second set of three holes. The first stop merely rides on top of the work.

As the operations continue down the plank, sufficient stock comes through the press so that the second operator can grip the work and move it for the last four group of holes. Then he immediately slides the mat on into the next press at left, Fig. 3, for notching and trimming, work passing through press and onto another conveyor section for the next stage.

At the extreme lower left, Fig. 3, can be seen a section of a small conveyor belt. Scrap from the dies falls through the press bed onto this conveyor which lifts it up and discharges it automatic ly into a skid box for further handli eliminating the necessity for remov scrap manually from the press. Simi aids to handling are found through the plant.

Truss Fabrication: Figs. 5 and show a special jig designed to speed f rication of light all-metal trusses m from rolled steel angle sections and stock. Trusses are made to fit a w variety of roof pitches, and in vari lengths and widths on the same jig means of ingenious design of cla and holding devices.

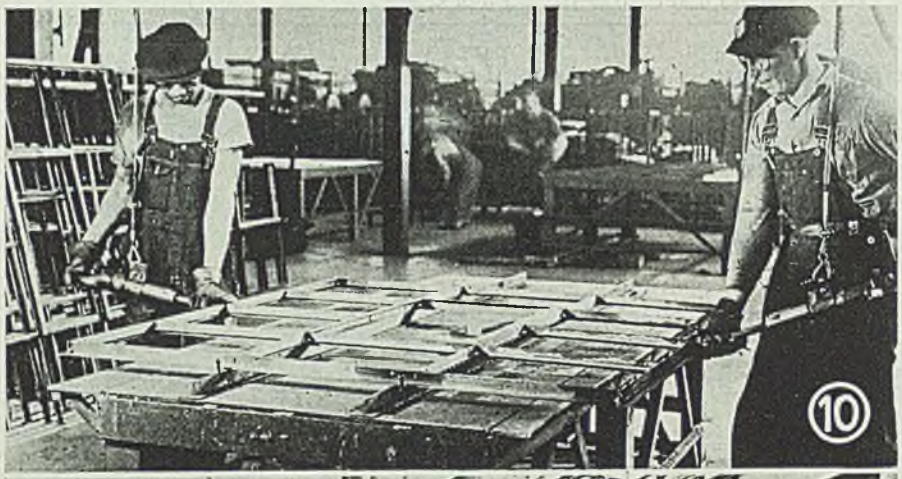
The main member of this jig con of a pair of U-sections arranged bac back. Bolts extend down between two members to clamp in any cross p tion desired the longitudinal mount strips carrying the speed clamps ployed to hold the individual part the truss. This system permits the s clamps and guide strips to be arra at various angles throughout the le of the truss, in turn permitting tr to be built with any desired included gle to accommodate various pitch r Figs. 5 and 6 both show a truss wi small angle in it.

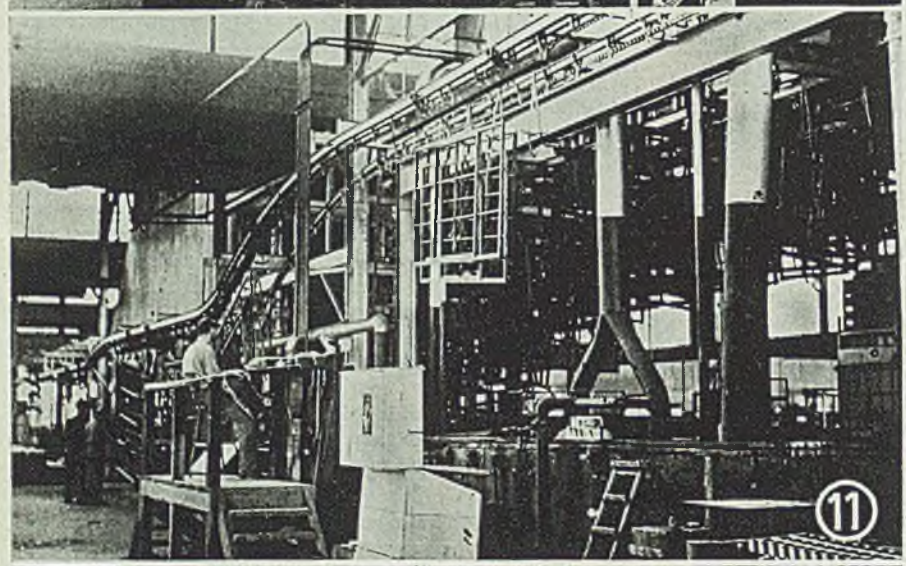
The entire jig is arranged on pi so that the truss can be assembled the jig in a horizontal position as sh in Fig. 6 where the bent bar stock easily be positioned correctly betwee side members. Complete assembly be clamped up and checked quickly the jig in this position. Then the j swung over on one side as shown Fig. 5 where welds joining the members to the side members are e made in the downhand position. Su ing the jig up and over turns it for welding the joints along the o side of the truss.

This arrangement is extremely ible. It can handle trusses up to in length. Bars vary from ⅜ to in diameter with angles running ¾ x ¾ x ⅛-in. up to 1¾ x 1¾ x

Welds are made at speeds up to per hour. A typical weld is made some 500 amp of direct current in joi a ⅛-in. angle to a ½-in. round by m of a short puddle-type weld.

Transfer Cranes: A feature of handling system in this plant is the tensive use of a transfer system for overhead cranes. Additional overh monorail track connects into the m rail bridges on which the overh cranes usually run. These additio monorails may be fixed to serve a ce





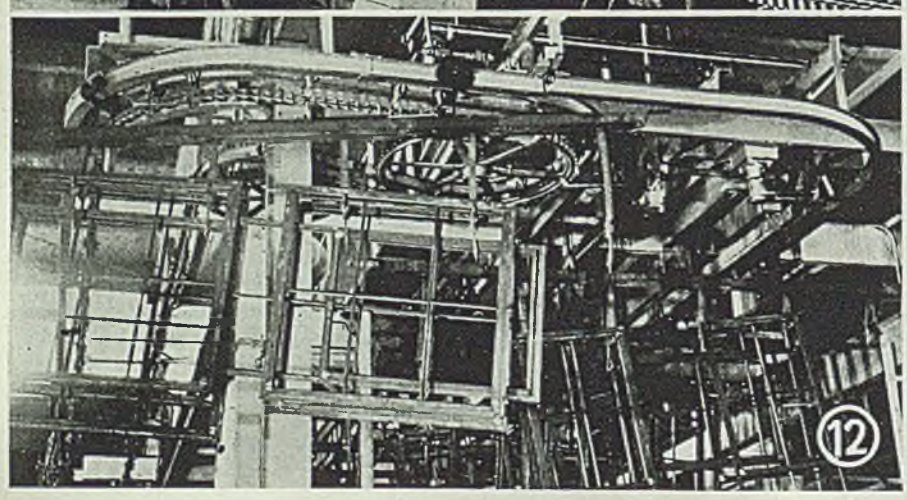


Fig. 10 — *Counterbalances tak weight of riveting gun, aidin manipulation of units*

Fig. 11—*Outside chain conveyo serves loading end of automati finishing line*

Fig. 12—*Automatic transfer fro outside conveyor to double con veyor serving five dip tanks and large A-type drying oven*

BATTERY TRUCKS

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The handling operations necessary to keep work moving continuously through production are essentially stop-and-go-jobs which a battery industrial truck performs efficiently because it gets the necessary surges of power instantly from its battery, yet consumes no power during stops. Thus not only does it give high efficiency in the use of power, but the power it uses for battery charging is the lowest-cost power available.

Its electric-motor drives operate quietly, without vibration, and with almost negligible repair requirements. With batteries exchanged two or three times per 24-hour day, the truck is continuously supplied with power. One battery is charged while another operates the truck.

For continuous, 24-hour-a-day material-handling work, therefore, a battery industrial truck is an inherently economical and dependable machine... especially when powered by Edison Alkaline Batteries. With steel cell construction, a solution that is a preservative of steel and a fool-proof electrochemical principle of operation, they are the most durable, longest-lived and most trouble-free of all batteries. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. In Canada: International Equipment Company, Limited, Montreal and Toronto.

Edison

ALKALINE BATTERIES

special area or may in turn connect to other bridges which permit the crane to move laterally over a much wider area.

With a system of this type, it is possible for a crane to pick up a load at one point and transfer to any of a wide variety of paths to reach extensive areas of the plant. This is especially valuable in moving raw stock as well as semi-finished and finished sections. It is also useful in many processing operations.

For example, Fig. 7 shows a 1-ton crane being used in connection with fastening wooden nailing strips to steel trusses. A pneumatic hand drill makes holes for the screws used to hold the wood strip to the truss, while the assembly is clamped on the upper flange of an H-section which is employed as both a jig. The overhead crane is used to move the truss from the stock pile at left, to the jig, and on to the finished stack at the right. It also holds the truss upright while attaching the nailing strip as shown in Fig. 7.

The crane system was furnished by the Conco Engineering Works and the Hil-Howe Co.

Portable Tools—Cold Riveter: Fig. 9 shows a setup for riveting members of bridge sections using a hydraulic riveter suspended from a jib crane covering the work area and counterbalanced to permit positioning the riveter on the work easily. Here main longitudinal members of the section are placed at a convenient work level and the section assembled by driving rivets cold.

The particular job shown employs two steel rivets at each point, rivets being ⅝-in. thick, ½-in. diameter with a button head on one side (formed by riveter dies) and a countersunk head on opposite side.

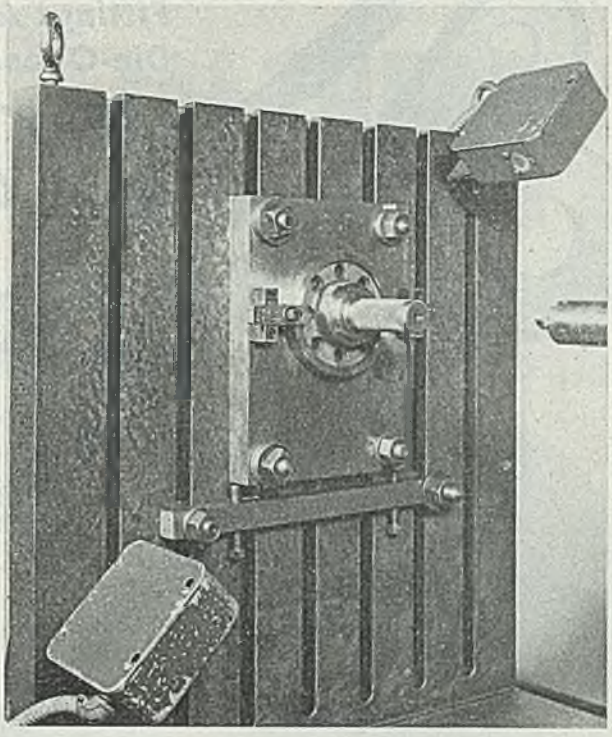
Hydraulic riveter is suspended through a curved swivel and hung on a spring so that it can easily be turned to work either in a horizontal or a vertical position. Riveter is powered by the compact self-contained unit seen at the right in Fig. 9. Flexible connections transmit power to the riveting head to develop pressures up to 35 tons for riveting cold 1-in. size steel rivet up to ½-in.

Production Aids: Practically every production unit in the shop is served by one or more mechanical handling aids. For instance, Fig. 8 shows a large radial drill working on extruded aluminum sections for portable bridges. Note the section of roller conveyor employed to aid in moving work in place under the drill head.

Also note the special fixture to hold the work while drilling. Speed clamps save hold setup time to a minimum.

Air powered riveting hammers employed in essembling steel window sash such as in Fig. 10 are fitted with counterbalanced suspension systems which take the weight of the hammer.

Window sash such as this 12-light unit are constructed from special rolled steel sections which are given a unique notching where the horizontal and vertical members cross one another. This notching permits the members to be opened to receive the mating member and then closed to produce a tight fitting joint. Outside or T-joints with framing members are made by upsetting a tongue which extends through the outer member—the riveting operation being done in Fig. 10. Short arc welds at the outer corners complete the construction.



SAFETY MEASURE: Injury to both hands and equipment through accidental starting of boring machine is prevented by a photoelectric cell-controlled circuit attached as shown. This arrangement, employed by Michigan Tool Co., Detroit, for finish boring the ID of high-precision cone-drive gear blanks, utilizes the aligning plug to interrupt the light beam and thus break circuit

"Load Bars" For Flexibility: Since an extremely wide variety of sizes, shapes and weights of assemblies must be finished in the cleaning and painting departments, the conveyors employ so-called "load bars" in carrying the work. These load bars are standardized units that can carry one large assembly or several smaller ones. Since they are hung from a single point on the conveyor in Fig. 4, they can easily be swung around so that the operator can spray both sides of the work hung on them.

Automatic Conveyorized Finishing Line: Figs. 11 and 12 are two views of an exceptionally novel and efficient handling arrangement employed in connection with an automatic finishing line that takes work through five baths in succession and on through a large A-type drying oven. The five tanks and drying oven are in line in an area 24 ft wide and 90 ft long.

Extending down one side of this area is an "outside loop" conveyor made from a single line of overhead chain working at two levels as shown in Fig. 11. Far end shown at left in Fig. 11 is the loading area where window sash and frames are hooked onto the "load bars" carried by the conveyor. Conveyor rises as it passes the oven and the control pulpit, carrying the work on towards the entry end of the line.

As it reaches this end, it makes a turn and automatically transfers the load bar with the work onto a double line conveyor which then carries the load bars in a closely spaced parallel position on through the finishing line. On the outside loop, the load bars have been traveling end-to-end to take up minimum space in loading operations. Now they are transferred to travel side-by-side through the finishing cycle.

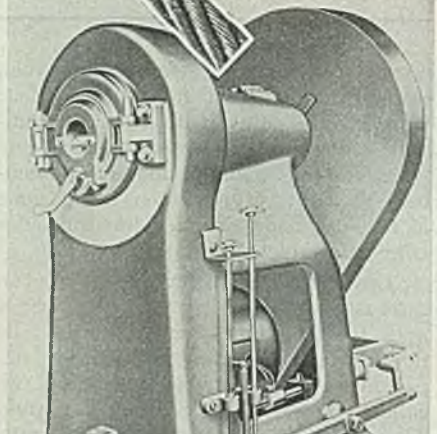
Each load bar is suspended from the conveyor by two trolleys riding on the lower flange of a track consisting of an H-section set with the web vertical. Trolleys can be seen riding around on the H-section track in Fig. 12. As they reach the transfer point, a movable section of the track lines up with the outside loop track to take the first trolley of the load bar, allowing this trolley to pass on to the far track. Passage of this trolley trips a switch that causes a second track to line up with the outside loop track in time to take the second trolley. Now the two trolleys of the load bar are each suspended from separate tracks which guide the work on down the line to pass through the automatic drops that in turn carry the work through an alkaline wash, a hot water rinse, a bonderize bath, a cold water rinse, and a chromic acid dip. After drying 15 min. on the conveyor, work goes through a paint dip tank and over a drainboard, then up through the A-type oven where it is baked for 30 min at a temperature of 300° F. Tanks are each 12 ft wide, this being the length of the load bars, also.

Coming from the oven, work is removed from the load bars which then are automatically transferred to the outside loop conveyor where they are again loaded and taken up to the start of the finishing line. This unique double conveyor setup is highly effective, accommodating an enormous amount of work.

Fittings Are Attached to Cable by Fast, Automat Die-Opening and Feeding Unit for

Cable Swaging

Redesigned machine deliv- ers positive relation be- tween cable and fitting by rotary action which works shank metal around strands. Dies need not be removed for each operation with large-end fittings



A CABLE swager widely used by aircraft plants has been redesigned into a fast, automatic die-opening and automatic feeding unit requiring only 3 sec for each complete operation. The machine has increased production rates obtained in the attachment of fitting to cable as much as 15 times, through the use of its quick-acting die-opening device and its automatic feed. It delivers a positive relation between cable and fitting in the processing, makes it a one-man operation, and eliminates the necessity for removing the dies for each cable swaging operation using large end fittings.

The cable swager, made by Standard Machinery Co., Providence, R. I., utilizes rotary swaging action for working the shank metal of the fitting around the cable strands. Operation of the machine shown in Fig. 3. is simplified by a hand control for opening and closing the dies from the front of the machine while it is running at normal flywheel speed. Clearance when dies are open is sufficient to accommodate all standard types of fitting attachments.

Cycle of operations consists of passing a fitting that is loosely hung over the end of the cable through open dies into the adjustable feed socket. The cable end is held firmly against the bottom of the fitting and ready for swinging handle on the door front to a ver position to start swaging action. foot treadle is released and work moved automatically through the die the completion point, as set for particular length of shank fitting u The work moves from back to fron this swaging action. Dies are ope by making a quarter turn upon this s lever, and the attached fitting is moved to complete the cycle. Exam of shank type fitting as swaged on ca are shown in Fig. 1.

Fittings after attachment have smooth surface on the circumfere of the shank and are swaged so fir on the cable that the fitting and ca strands appear to be fused. The stren of the connection exceeds the ten limitations of the cable itself. The larged cross-section in Fig. 2 shows positive attachment of fitting to cable

Cable sizes which can be handled machines of this type are from 1/16 1½ in. Other production operations economically performed on this machi A shank fitting may be tightly swa around a rod or tube, for example, tubing can be attached to a pin fitting another tube of smaller diameter.

Cooling Elements Resist Acid, Fumes

Using experience gained during the war in producing units that cooled highly concentrated sulphuric acid from 475 to 175°F or lower in making high explosives, National Radiator Co., Johnstown, Pa., has developed a new U-cast Hairpin cooler element for peacetime applications. Unit may be used for cooling any liquid, but is especially adapted for cooling acids or strong alkalies under extreme conditions that usually result in the solutions attacking other metals.

Elements are submerged in solution and the coolant, usually water, is passed through the element itself. Sections of the unit are cast of gray iron that is highly resistant to attack from both solution and fumes.

Coils of the elements formerly used in acid cooling vats for munitions had to be completely replaced at least every 3 months, resulting not only in high replacement costs, but in loss of time th was even more important in the accel ated munitions program. After mont of service in the same vats the new c iron elements showed no corrosion eith above or beneath the liquid line. some cases a small amount of sulpha deposit formed above the liquid lin but a coating of acid-resistant paint elim inated this. Cooling capacity and e ficiency of the new elements were re ported to be satisfactory as or better tha the coils formerly used.

FOR SAFE FOOTING USE JAL-TREAD

FOR ALL FLOOR-PLATE APPLICATIONS

You follow in the footsteps of Uncle Sam when you specify this new and improved rolled-steel floor-plate, for the Army, Navy and Maritime Commission have used it widely. Where the safety factor of sure, non-slip footing is needed to support heavy industrial traffic, maritime loads, or the moving public, it is the ideal installation.

Designed to offer maximum friction surfaces at point of contact, **JAL-TREAD** and **Junior JAL-TREAD** checker floor plates are easy to cut, weld, bend and install . . . present a pleasing appearance . . . are easy to keep clean. Available in wide range of sizes and weights.

For delivery information, consult your local J & L office or favorite warehouse. Illustrated booklet gladly sent on request.

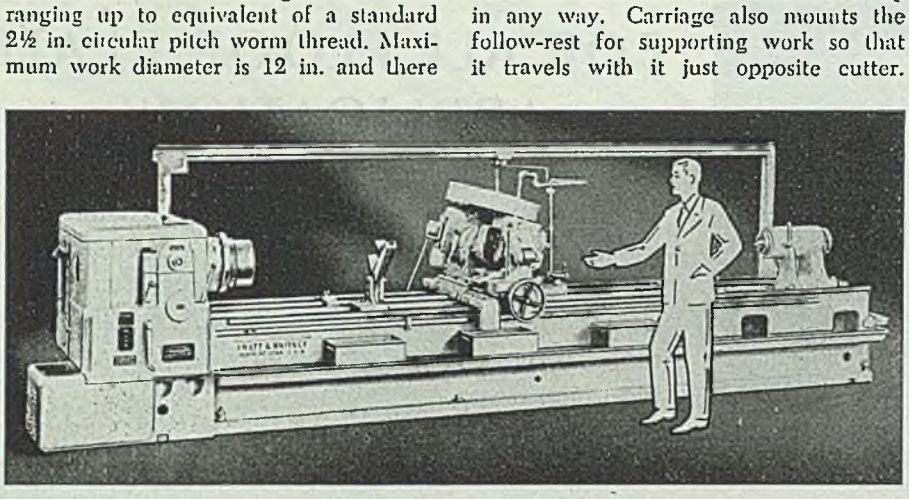
JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH 30, PENNSYLVANIA

INDUSTRIAL EQUIPMENT

Thread Miller

A new thread miller is announced by Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford, Conn. It is known as the 12 in. universal model C thread miller and is designed for work ranging up to equivalent of a standard 2½ in. circular pitch worm thread. Maximum work diameter is 12 in. and there



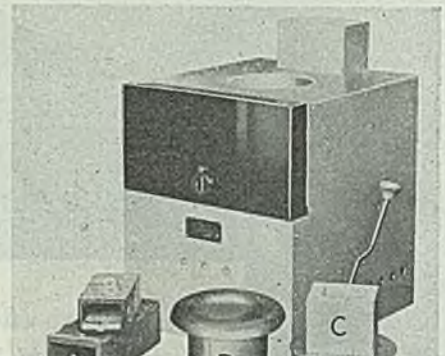
is a swing of 19 in. over carriage and 27 in. over bed. The unit is available in several bed lengths with center to center distances of 30, 60, 90, 120 and 168 in. Three motors supply power: A 7½ hp motor for cutter drive, a 3 hp motor for work spindle and a motor driven coolant pump. All are equipped with built-in automatic starters and pushbutton control and are electrically interlocked to prevent damage due to any electrical failure. Machine is designed for "climb" milling with a suitable speed and feed range for this faster method. However, speed range also permits conventional cutting if desired.

Work head contains all mechanism for driving work spindle, lead screw and power traverse. Lead and feed changer are made through pick-off change gears and are entirely independent of each other. Either right or left-hand threads may be cut and work spindle can be run in either direction for either hand of thread. Forty work speeds are provided, ranging from 0.05 to 3.25 rpm. Work head mechanism is electrically operated. Two levers located at operator's station control feed and power traverse. Automatic stops are provided for power feed and traverse. Carriage and cutter head are mounted on broad ways and carry both the 7½ hp cutter drive motor and motor driven coolant pump. Incorporated in the work head is an indexing device capable of producing 2, 3, 4, 5, 8, 12 and 24 starts with regular index plate.

Two cutter spindles are provided as regular equipment, each mounted on its own block for quick changeover. Cutter head swivels for proper helix angle up to 45° from vertical for right-hand leads and 90° from vertical for left-hand leads. In addition, cutter head is provided with a transverse adjustment for taper correction in hobbed threads. Carriage is lead screw actuated, using a pair of lead screw nuts which are adjustable axially for removing backlash. Built into the carriage is a device for picking up threads already cut. Device is entirely independent and does not affect machine setup in any way. Carriage also mounts the follow-rest for supporting work so that it travels with it just opposite cutter. Work is supported in a hardened and ground steel bushing. Rest has hinged cap to facilitate loading work.

Bench Furnace

Designed to fulfill the requirements of a wide variety of applications a new three-way bench type laboratory furnace is offered by Surface Combustion Corp., Toledo, O. It combines three different types of furnaces in one casing. It may be used as a direct-fired oven unit at temperatures from 300 to 2400° F. For direct heating a muffle can be placed



on the hearth. If an atmosphere is desired a diamond block can be used in the muffle. A removable plug built into the arch of furnace provides a means of inserting a pot.

This unit is recommended for small shops of laboratories where a wide variety of heat treatments in relatively small quantities of small parts must be performed. Such operations as annealing, carburizing, hardening, cyaniding and tempering, with or without a furnace atmosphere can be handled by one nace. It functions as a direct fired o indirect heated muffle, gaseous at phere, salt or lead bath type and also be used for melting soft and metals such as tin, lead, alumi magnesium, etc.

It is equipped with three atmosp type gas burners, each of which ca independently controlled. Burners arranged under hearth to provide form and rapid heating throughout ing chamber. A gas pressure regu insures uniform control of burner ation. Fuel under low pressure wi air under pressure is sufficient for b under operation, such as manufact or natural gas at 3 to 6 in. water pre or butane or propane at 9 to 11 in. sure.

The accompanying photo shows furnace with accessory equipment in ing (A) muffle, (B) protective atmosp equipment, (C) plug and (D) pot.

Loading Trailer

An underslung design incorporate the new trailer offered by Palmer- Co., 796 South Harrington street, De 17, drops the platform down to 6 from the floor, providing a low cent

gravity for loading from floor, ski rack. On a platform 38 in. wide 78 in. long, heavy loads roll on h metal wheels with rubber tires and n bearing. Drums, barrels and other liable to shift are held secure by st chains.

Trailer has an all welded struct steel framework, braced and reinfo to handle loads of 2½ tons. Exclu of drawbar (40 in. long) overall le is 126 in.

Testing Machine

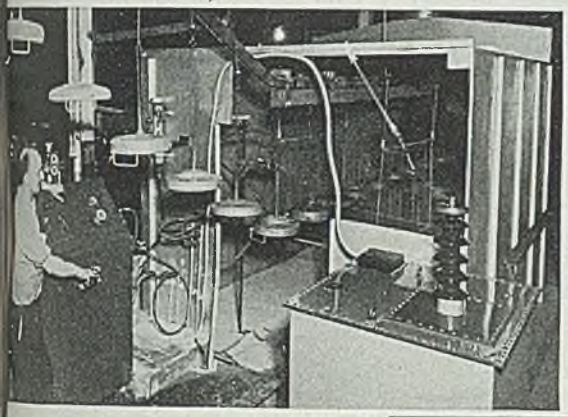
Baldwin Locomotive Works' So wark Division, Eddystone, Pa., annou two new fatigue testing machines. of these machines which provides a namic load application of 20,000 l one direction is made possible thro a hydraulic preloading attachment of 000 lb capacity. It has a high opera speed of approximately 2000 load cy per minute, at constant force as oppo to constant deflection. Any prede mined alternating load is kept a matically constant regardless of changes of deflection that may occu the specimen under test. Dynamic l

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

THE FINISHING TOUCH

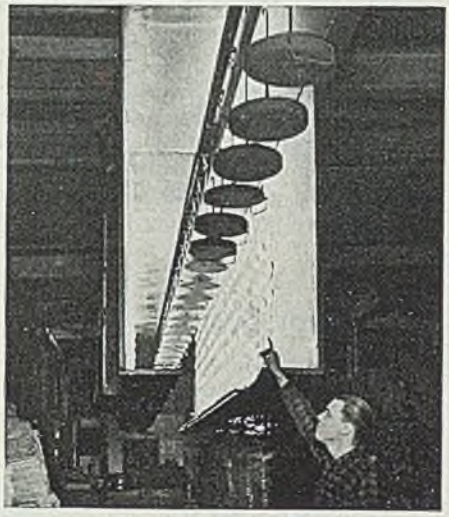
SECOND SERIES—NUMBER FOUR

ANY FIRMS NOW SHIP PARTS O CLEVELAND FOR FINISHING



Left: *Electrostatic spraying process used on metal parts, 6240 of which are given two coats of paint in a single day.*

Below: *Same parts going through one of the Japan Company infra-red ovens.*



nt survey of 5000 metal working in the eastern half of the United made by the Japan Company, that 60 percent of manufacturers t-weight metal parts are interested ding their work here to be finished y can gain advantages of price and by doing so.

equent research work has revealed of the 60 percent, approximately 85 *can* gain such advantages with or no sacrifice of delivery speed. acts were determined by analysis manufacturer's product—its size, the material of which it is made, various other factors.

ying parts up to 500 miles to be is a new idea to most manu- Here's why it can be done:

e Japan Company has the most te and modern electrostatic finish- infra-red baking equipment in United States. Production is ex- fast—up to 100,000 small parts ght-hour shift. The quality of the finish is unexceeded by any other method. Japan Company facilities include equipment for simple assemblies, before or after finishing. Packaging (domestic or export) is speedy and efficient, and work is shipped L.C.L. or carload from our own railroad siding.

The result: if you are manufacturing metal parts in Chicago and shipping them to such cities as Cincinnati, Philadelphia or New York, you can send them to Cleveland for finishing as easily as you can to a local finishing shop, and we ship them safely and promptly to their destination. In some cases we can actually *reduce* delivery time.

The Japan Company has 75,000 square feet of space devoted to such finishing tasks as metal degreasing, cleaning, pickling and etching; enameling, lacquering, graining, japanning and application of decorative wrinkle and hammered finishes; roller coating and silk screen lettering and designing; and processing and packaging of all varieties for export shipment.

If you have a finishing problem which is not now handled to your satisfaction, contact us for advice. If we can make improvements, we shall tell you so promptly; if not, we shall be just as prompt to let you know. We have no time for jobs which do not benefit both you and us. Drop us a line or call us for quotation.

THE FACTS ABOUT ELECTROSTATIC FINISHING

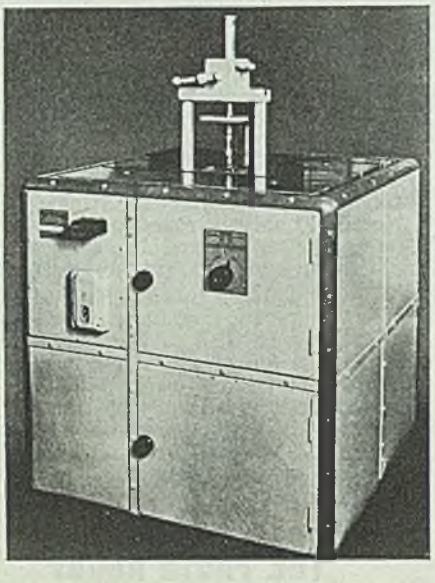
Most paint finishes—enamel, lacquer, wrinkles, hammerloids, etc.—can be applied electrostatically. This method saves material and labor, eliminates spraying where dipping is possible, and reduces both finishing time and cost substantially while producing a highly superior coating. The whole story is told in the *Iron Age* article, "Electrostatic Spraying and Detearing"; write now for a free reprint.

NOTE:—The Japan Company is solely an industrial finishing concern, and does not manufacture or sell electrostatic spraying or detearing equipment.

(Reprints of other advertisements in this series sent free upon request.)

is produced by a centrifugal force type oscillator, the force of which is amplified by working near resonance of the system. Load is measured and controlled electronically. Maximum alternating force is plus and minus 10,000 lb, which may be applied in increments of 10 lb.

The other testing machine of 1000 lb alternating force capacity (shown here) also has a static preloading attachment which results in a force capacity of 2000 lb in one direction. It was developed for tests in tension-compression, bending or torsion. Torsion testing attachments for latter have a capacity up to 30,000 in.-lb and permit the testing of specimens exceeding 1 in. in diameter. Standard

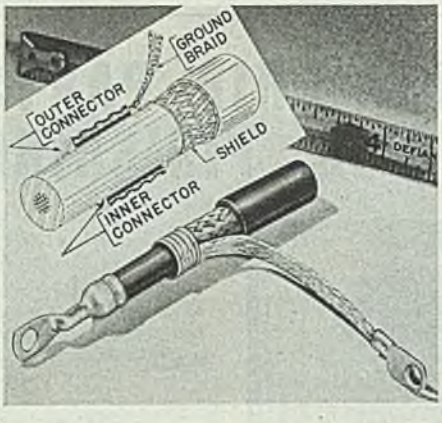


tension-compression fixture for testing specimens is equipped with tapered collets to grip plain cylindrical pieces. Bending fixtures are available up to 6000 in.-lb bending moment for testing flat plate specimens up to approximately 3/8-in. in steel, ½-in. in aluminum alloys and 1 in. in plastics. As in the other new machine, this 1000 lb tester operates at high speed and may be set for any predetermined alternating load which is then kept automatically constant. An inertia force compensator cancels all inertia forces and accuracy of loads transmitted is kept well within plus or minus 2 per cent. Entire mechanism of the machine, including large T-slotted work table attached for use in testing assemblies, structure, components or parts, is seismically suspended in the frame to eliminate transmission of vibration to floor.

Ground-Tap Connectors

Designed for use in the making of connections, taps and splices in coaxial and shielded cable, new connectors are announced by Burndy Engineering Co., 107 Bruckner boulevard, New York 54.

Connector for braided conductor or shield may be installed with a braid tap to make a terminal connection or group tap, or it may be used to anchor shield to prevent braid from slipping. Connection with inner conductor is made with a Hylug having an insulation shroud. Lug is indented to conductor, and shroud is crimped to insulation to form a mechanically strong and moisture-proof terminal. Outer conductor or shield, as the case may be, is grounded or terminated by connection which consists of two ferrules and a braided tap which is equipped with a lug. Smaller ferrule is slipped between inner insulation and outer conductor and is used to take up

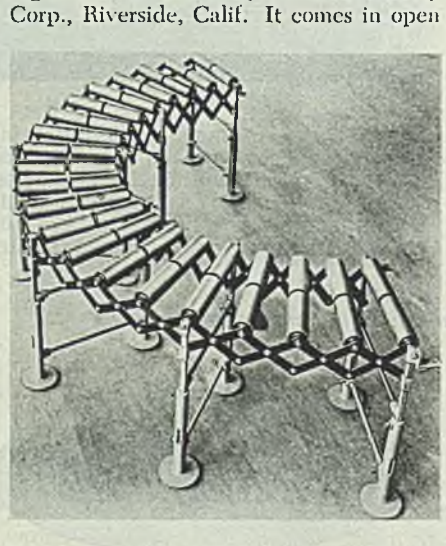


pressure when assembly is crimped. Inner ferrule is required on coaxial and other cables where inner insulation is of the type that flows under pressure. Larger ferrule is large enough to accommodate a braid jumper tap and is slipped over outer conductor or shield. Whole assembly is then crimped with interlocking dies.

Splices are made in a similar manner. A Hylink is used for connecting the two ends of the inner conductors. Braided conductors are spliced by a tubular connector crimped over two ends; ferrules again being placed under braid to take up pressure and protect inner insulation.

Conveyor System

A portable conveyor system, designed to meet the assembly line needs of packing houses is offered by Food Machinery Corp., Riverside, Calif. It comes in open



lengths of 60 or 100 in. and the sections can be folded like an accordion to 21 or 35 in. Shorter section has four telescopic legs and the longer six, permitting movement of material by gravity alone.

Unit also features split rollers in widt of 10 to 18 in. With roller split in tw material traveling down the conve can be made to take S-turns witho talling off, or without need for sidi As each roller is built to carry a load to 80 lb, the system can be used transporting semiheavy material from part of a plant to another without m ing fixed features in buildings such as lars and heavy machines.

Portable Beam Scale

Designated as model No. 54, a portable beam scale, offered by Ho Scale Co., Rutland, Vt., has a capac of 1000 lb. For quicker and more ac rate readings, graduations are die- on the lower edge of the beam on scale where they shine out against a red background. Possibility of error reading is further minimized by a cen indicating poise with a nonremovabl screw. Both beam and poise are die- from corrosion resistant metal.

Sustained accuracy over long per of service is achieved by four ball b

ings set between platform and pivot b ings. These ball bearings absorb b of platform movements which w otherwise be transmitted directly to knife edges of pivots and dull t Other features include heavy cast le with extra sized pivots and bea made of specially tempered tool s interchangeable pivots; and self-alig load bearings suspended in forged which allow complete contact of bea and pivot knife edges at all times.

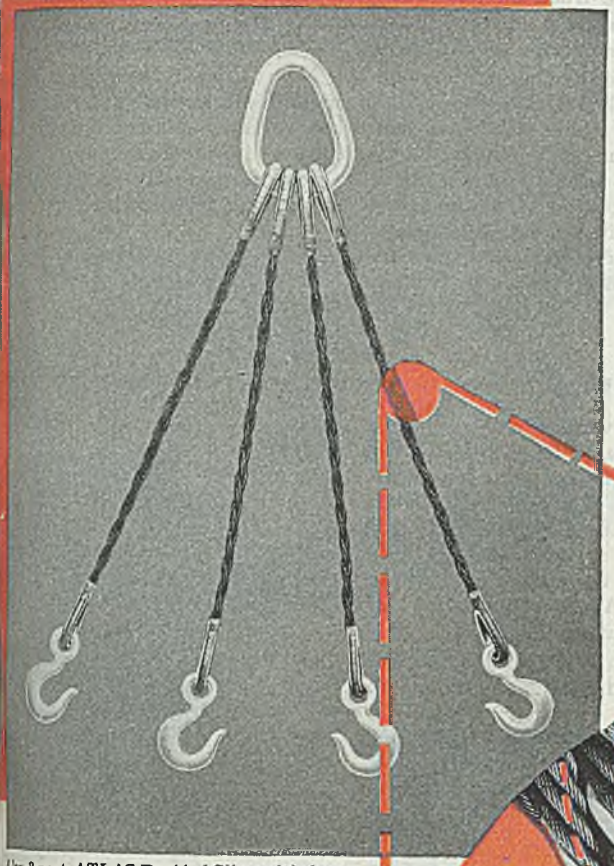
This model is available with eith single beam graduated 100 by ½-l double beam similarly graduated, full-capacity beam graduated 100 ½-lb on the upper bar and 100 to lb on the lower bar. A drop lever, p guard and balance indicator can als provided for this model.

Tool Grinder

A redesigned 12 x 28 in. unive and tool grinder is announced by La Tool Co., Waynesboro, Pa. It will h dle cylindrical, internal, taper, surfa

Don't take chances with safety! Always specify

MACWHYTE *Atlas* *Braided* WIRE ROPE SLINGS!

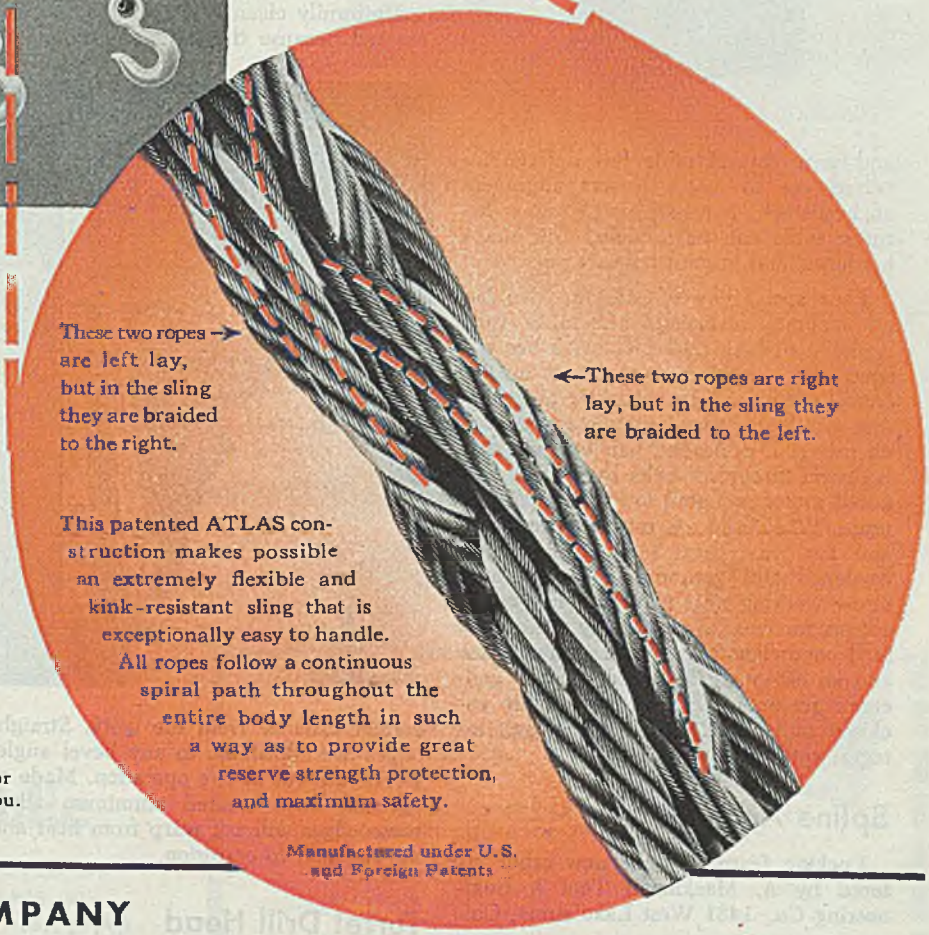


4-leg, 8-part, ATLAS Braided Sling with drop-forged hooks—just one of many sizes, types and assemblies custom-made for your safety.

Rigging up loads for connection to crane hooks is a hazardous business. Only slings with adequate safety factors are good enough for safe handling in your plant. For your safety, breaking strengths and safe loads at various angles of use are listed for each size of Macwhyte ATLAS Sling, and published in Macwhyte Sling Catalog S-7.

Send for Sling Information!

Ask for your copy of Macwhyte Sling Catalog S-7 and book of photographs "Safe Slings for Industry" 44-1. Mail request on your Company letterhead to Macwhyte Company or any of our distributors or mill depots near you.



This patented ATLAS construction makes possible an extremely flexible and kink-resistant sling that is exceptionally easy to handle. All ropes follow a continuous spiral path throughout the entire body length in such a way as to provide great reserve strength protection, and maximum safety.

Manufactured under U.S. and Foreign Patents

MACWHYTE COMPANY

2912 *Fourteenth Avenue, Kenosha, Wisconsin*

Manufacturers of the CORRECT wire rope for your equipment

Left & Right-Lay Braided Slings · Aircraft Tie-Rods
Aircraft Cable · "Safe-Lock" Swaged Terminals

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UNIVERSAL SAFETY

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NO. 44-1

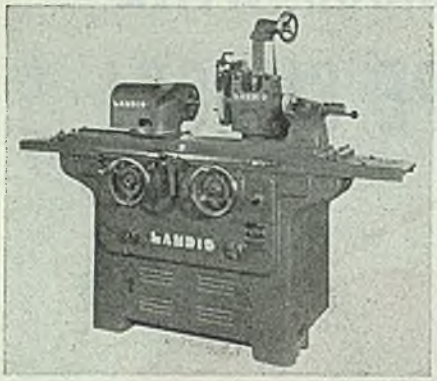
RIGHT-LAY **MACWHYTE SLINGS FOR INDUSTRY** LEFT-LAY

"Lifting safety to new heights"

Macwhyte Wire Rope Slings are made to meet the capacity of any crane built

tool sharpening and form tool grinding. Headstock design features are: Variable voltage, combination live and dead spindle, it is unnecessary to change belts or guards when changing from live to dead spindle; work speeds are controlled by a dial on the front of the machine. Spindle and face plate are mounted on precision perloaded ball bearings.

Other design advantages include starting and stopping of work and traverse by single lever, either may be operated independently of the other, also this lever automatically disengages hand traverse when table is operated by power. Footstock is fully protected from water



and grit. Swivel table has a large inverted vee to insure correct alignment of headstock, footstock and various fixtures; table can be swiveled 180° on a hardened and ground tapered pin.

Four speed power traverse drive has an accurate reversing mechanism fully enclosed in bed. Hand traverse has one speed for rapid movement and an extremely fine feed for shoulder and form tool grinding. Wheel spindle is mounted on precision preloaded ball bearings and is driven through V-belts by a finely balanced motor mounted low at rear of column. Wheel slide is mounted on a vee and flat way; cross feed is through a hardened and ground, fully enclosed screw working in a two-piece nut which adjusts for wear automatically. The cross feed handwheel is provided with a coarse and an extremely fine feed. Motor, generator set and electrical controls are enclosed in bed. Coolant tank is cast integral with bed.

Spline Arbor

Locking feature of the new arbor offered by A. Mackmann Tool & Engineering Co., 1431 West Lake street, Chi-

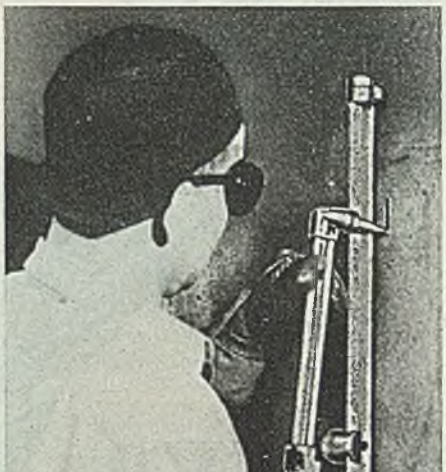
cago 7, distributes load over all splines, eliminating possibility of eccentric mounting. Internal, external diameters and end-surfaces all can be trued on this arbor. Chucking is never done on root diameter or the inside diameter.

The work piece is chucked circumferentially by applying load, evenly distributed, over all spline teeth or gear teeth, thus producing a balanced enveloping contact around bore. Work piece is held concentric with previously cut splines permitting finishing operations such as shaving and grinding to be performed to close tolerances in relation to splines.

Straight Edges

Flame cutting vertical and overhead, as well as horizontal surfaces, is facilitated by the new magnetic straight edges introduced by B & W Co., 7616 South Figueroa street, Los Angeles 13. An 18-lb pull holds the straight edge firmly to the work whether the plate is rusted, oily or painted. The Alnico magnets are not affected by electricity.

Uniformly clean and accurate cuts are assured because the torch tip is held at

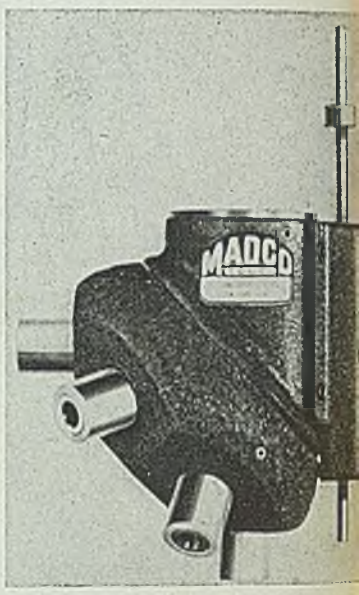


correct distance from the work. Straight edges are adjustable to any bevel angle. Bevels are cut in one operation. Made of specially heat treated aluminum alloy, these edges will not warp from heat and are resistant to corrosion.

Turret Drill Head

Model No. 275, one of three new six spindle turret attachments for drill presses available from Madco Products Inc., 516 Fifth avenue, New York, features a new type of indexing depth stop designed to control the drilling depth of each of the six spindles of the turret head. The depth stop mechanism which is completely enclosed, comprises a cylindrical drum carrying six adjustable stops which are positioned through an opening in its aluminum alloy housing. Drum is geared to turret head and automatically indexes when turret head is turned. Thus an adjustable stop brought into control position when corresponding turret spindle is inde to operating position.

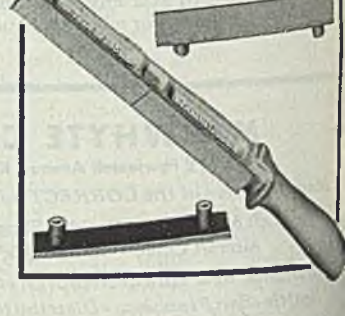
No. 1 Morse taper precision grou spindles are another feature of this tur head. These spindles also make possi greater interchangeability of tools a eliminates necessity of chucks. Spin are of one piece construction, harde



and ground to a precision of 0.000 Other features incorporated in this m el include: Heads fully enclosed, lubricated bearings, aluminum alloy c struction, ball and detent arrangem to indicate correct indexing positi friction type clutch mechanism, drilling accuracy of 0.001-in.

Lathe File

Kennametal Inc., Latrobe, Pa., nounces a new lathe file in which bla have brazed-on nuts, as shown in insets on the accompanying illustrati and are attached to the light-weight minum alloy handle by screws. T can be replaced when worn. Two ty



of blanks, fine (30 teeth per inch) coarse (20 teeth per inch), are availa and are interchangeable on the sa handle. Handle grip is shaped to fit hand and has a thumb rest and knuc guard. It is 13½ in. in overall leng and has a filing surface ¾-in. wide by in. long, comprising two ¾ x 4 in. blan

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Mechanical Parts

(*Continued from Page* 119)

pending upon the exact location, chan fers often have to be provided with slig flats in order to avoid knife edges punches.

Fig. 3 shows a rather complicated p and, below, the blank which can readi be produced from metal powders. O the drilling of the small cross hole a drilling and tapping of the hole in t bottom were necessary to make the p ready for use.

The under-cut in the top view (a) Fig. 4 was provided in order to pern the part to set snug against the flan The same effect can be produced by t groove as illustrated in the bottom vi (b). The part has been selected only illustrate the slight change in des which is applicable in many cases. T shape of the part itself as shown is course not particularly desirable powder metallurgy as it can readily produced on a screw machine, a meth with which powder metallurgy usua cannot compete.

The top views (a) in Fig. 5 show small pole piece as made by conventio machining operations. In changing powder metallurgy the user of this p could take advantage of the saving material and better functional design illustrated by the bottom views (b).

Fig. 6 shows a lever-cam combinat which was originally to be produced forging. As the sketch shows it was only necessary to straighten out two sl but it was also desirable to move surface away from the inter-section the two parts of the lever. This chan did not in any way affect the funct of the lever.

Both designs shown in Fig. 7 actually suitable for powder metallu fabrication. However, the die des could be simplified considerably adopting the shape shown in view The manufacturer of the assembly mer had to incorporate a slight revision the mating part in order to be able use the modified design. The additio advantage gained was the fact that were to transmit a considerable torq The top design would have resulted i slightly weaker structure at the bott of the two lugs; incorporating the l in the mating part which was ma from alloy steel, transmission of momentum to the depressions in powder metallurgy part was assured.

Fig. 8 shows a link which was signed for conventional manufactur methods. In studying its function turned out that rounded surfaces clearance purposes were needed o at one side. Thus, the design sho in the lower views (b) of the figure worked out. The drilling of holes the only operation required to finish part ready to use.

At first glance it would appear t the two parts shown in Fig. 9 are e tirely different; yet, they performed t exact same function. While the desi (a) was not suitable for powder meta

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lurgy it was easier to produce by c ventional methods. The lower half the figure shows the powder metallu design.

The following figures illustrate w can be done by using powder metallu in eliminating assembly operations thereby realizing considerable savi Examples are shown in Fig. 10 wher single part took the place of th Fig. 11 where a brazed key was incor rated in the piece proper and in Fig where it was possible to make the seembly in one piece by reinforcing center section. Fig. 13 shows in its up section a piece which was to have b assembled to a plastic part by mean two screws. The view below shows design developed for powder metallu which permitted molding of the piece to the adjoining plastic part.

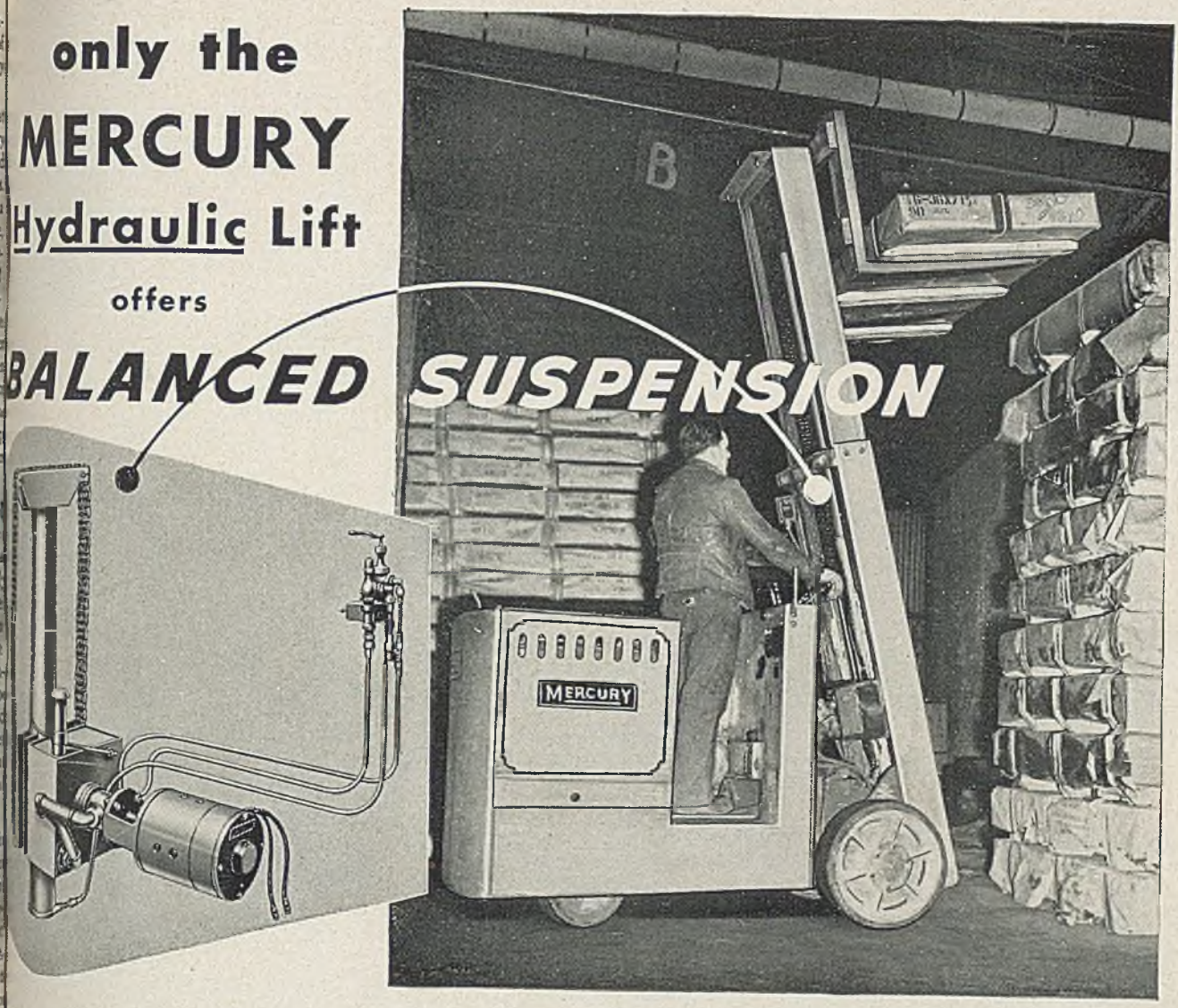
Quantity and Other Factors Con ling Costs: It was pointed out ab that many of the present time lim tions of powder metallurgy are clo tied in with the costs of manufact Another factor having a great bearing production cost and independent of aforementioned limitations is the qu tity in which a given part is to produced. With the present knowledg the art there are two substantial b costs connected with a production ru a new part; first, dies and tools; sec set up and experimental work.

These factors vary greatly with complexity of the part and the na of the material. A simple piece to produced from a standard material quires a simple die which does not much to design and produce. The ting up time is short and no experim al work at all is required in connec with such a run.

When starting the manufacture c complicated piece to be made fro material not heretofore used in pro tion, it is often necessary to build m than one set of dies with intermed design changes. Punch movements form intricate changes in cross-sec are complicated and delicate, requi high skill in the design, manufact heat treatment and assembly of the The setting up process is slow and m be done carefully in order not to enc ger the complicated parts of the Experimental work may have to be ried out to assure the ability to ob the required properties in the part. anyone not familiar with powder me lurgy this may be a surprising statem However, it is true that any propert particularly those which are depend upon density may vary considerably fr those obtained in a simple test piece.

This analysis may be sufficient to lustrate to the design engineer wishes to make use of powder metallu parts in his design, why for simple p a minimum of only 5000 pieces may required to make the method econom ally superior to conventional procedu When planning on using intricate p and especially if unusual properties required, the lowest practical quan

only the MERCURY Hydraulic Lift offers BALANCED SUSPENSION



cury engineers were the first to apply success- the hydraulic principle to the lift mechanism ndustrial trucks. The Mercury hydraulic lift these advantages:

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oundness of the hydraulic lift principle, and portant advantages it offers, are today widely nized throughout industry. The Mercury lift, ever, in addition to providing the usual advan- s of the hydraulic system, offers the exclusive patented "Balanced Load Suspension" feature, ch prevents side loading of the ram even with g-center load.

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There are no guides to ring or score the stock. The action of the rolls can be controlled to produce the exact quality of surface finish that is required. Elimination of supporting guides, the use of symmetrical passes, and a balanced arrangement of the drives, result in a very considerable power saving—the power consumed per foot of product sized or straightened is usually about fifty per cent of that required by other machine types.

Because Mackintosh-Abramsen straighteners are not closed in, all parts can be easily reached for rapid adjustment and roll changes. This feature results in less "down-time,"—more production.

By setting the middle pair of rolls out of line in relation to the other two pairs, an ideal condition for end to end straightening is accomplished thus guaranteeing absolute straightness of stock. The double roll middle pass prevents weaving or sidewise movement of the stock and causes straightening of long bends and end camber to take place in three passes instead of one. The bending action on the stock takes place from the end of the rolls in the first pass to the end of the rolls in the middle pass, and again from the middle pass to the third pass. Thus the bending or straightening action on the stock is from section to section of the stock, and is not dependent on the contour of the rolls.

The symmetrical contour of the rolls forming the three passes and the balanced arrangement of the driven rolls result in a uniform wear on the surface of the roll. The rolls are continuously "wearing in" instead of "wearing out." The machine, therefore, requires fewer roll dressings and, hence, gives greater roll life.

The straightener is available for cold finishing of hot rolled or cold drawn bars up to 9" diameter, and tubing or pipe in all sizes from ¼" O.D. to 28" O.D. On some products, production speed in excess of 500 feet per minute is attained.

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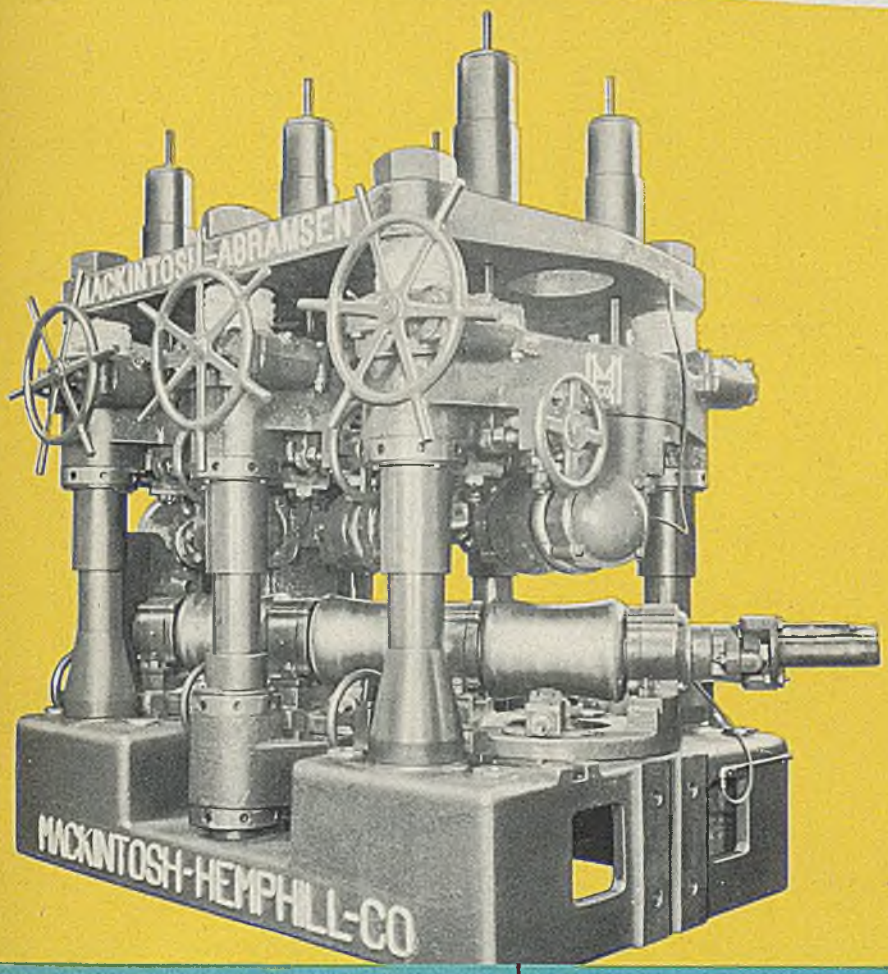

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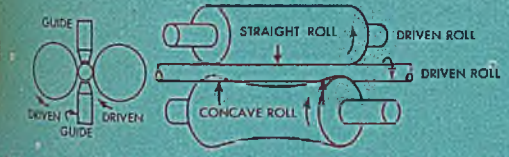
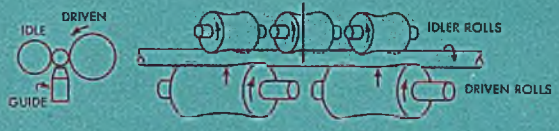


Method No. 1: Straightening is done in one set of cross rolls. Guides are used to hold material on the pass line. The straightening takes place from point to point on the rolls and against the guides. Efficiency drops with wear on the rolls.



Method No. 2: Straightening is done by a pressure roll between two cross roll passes—Material is held on the pass line by a bottom guide—The straightening takes place from point to point on the rolls and against the guide. Efficiency drops with wear on the rolls.

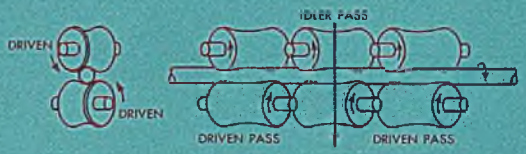
Investigate the possibilities of the Mackintosh-Abramsen Straightener

it will:

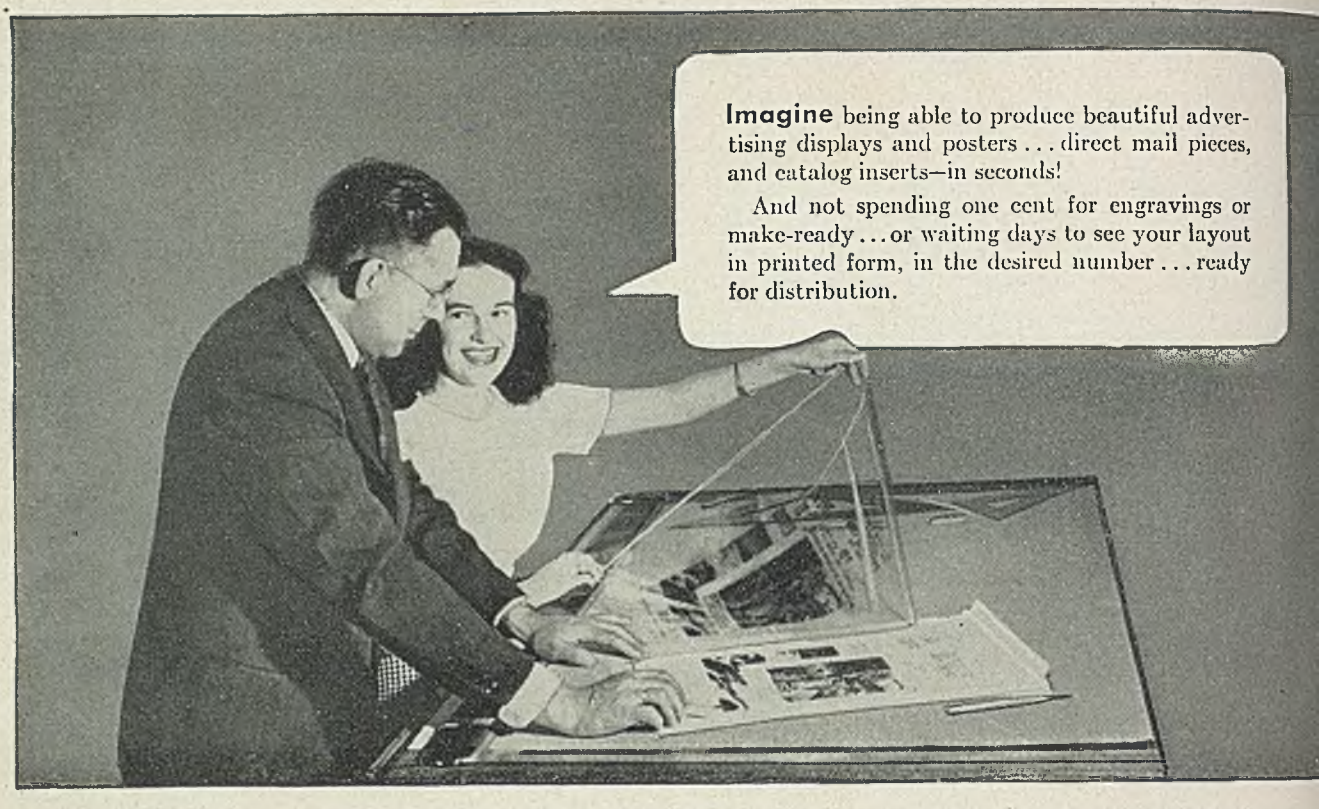
1. Give you a straighter product hot or cold
2. Give you a smoother, cleaner product
3. Increase production rates
4. Lower production costs
5. Remove out of roundness

it won't:

1. Spiral mark thin wall tubes or soft material
2. Guide score finished material
3. Unduly harden ductile materials
4. Destroy the surface on coated materials



The Mackintosh-Abramsen Method—Straightening is accomplished by an offset cross roll pass between two fixed cross roll passes (patented)—No guides are required because the rolls are driven on both sides of the material which is supported by the bottom rolls. With this balanced arrangement there is no decreasing efficiency from uneven wearing of the rolls. The straightening takes place from section to section and not from point to point.



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ould probably be 20,000 to 50,000 ever.

The greatest advantage which can be ferred to the manufacturer who wants subcontract the fabrication of certain rts to a powder metallurgy producer n be realized when these parts are ed over considerable length of time in sizable quantities per batch.

mpetitive Methods: There are va- mass production methods which be compared to powder metallurgy. standing among them are die casting, ision casting, screw machining and ers.

As a very general statement, to which re are quite a number of exceptions, can be said that any parts which can ily be die cast, manufactured on a w machine, or produced by stamping t metal, cannot be made by powder allurgy competitively. It has been therefore, that as a result of this ation and considering some of the available methods, there is only ited field for powder metallurgy for ural parts. This is admittedly so, recognizing the condition and an- these competitive methods, one easily say that the limitations are quite as narrow as might be ex- ted.

The following comparison will show there is a definite place for powder allurgy in the machine parts field, it will also point the direction in ch improvements have to be made in to increase its share of it.

Casting: Zinc die casting is an dingly economical way of manu- ing large quantities of parts which not have to withstand high loads or ck.

sting dies for zinc can remain soft, mitting changes and adjustments to readily made after impressions are . This is an important advantage powder metallurgy, but it is lost for minum and brass die casting. Thus, be seen that with high melting and alloys, powder metallurgy the advantage.

cision Casting: Various related esses are collectively known under erm of "precision casting". Use is e of the "lost wax (or investment ique combined with centrifugal or vacuum methods. Tolerances ible are not as close as in powder llurgy, usually about plus or minus en., but the design flexibility is greater. Very intricate parts can, be cast by these methods includ- ndercuts, bosses, etc.

e tooling-up cost is much lower, the piece prices are considerably r due to the fact that a high per- ge of skilled labor is needed. Pro- on rates are low compared to der metallurgy. A great variety of erials can be handled all the way up stainless steels, stellites, etc. These esses are best adapted to medium quantities, although they are also for very large runs.

crew Machine and Cold-Headed

Parts: These two production metho although widely different in the te niques used, are mentioned here at t same time because the resulting e products and their competitive positi with powder metallurgy are very simil the main difference is that cold headi is much more limited in shape varie Both methods are of the high-prod tion, low-cost category.

Similarly, as in die casting, chan for powder metallurgy to compete w these methods are remote as long as t offer all the requirements made on part. Tolerances which can be held screw machining are just as close by powder metallurgy. For both me ods, raw material, tooling up and p duction costs are lower than in pow metallurgy.

Thus, these two methods point way for powder metallurgy in the di tion of more complex designs, away fr shapes with circular cross sect throughout.

Cut Extrusions: Powder metallu comes up against this method freque because easy or "natural" powder me lurgy parts can often be produced by extrusion and cold drawing meth which permit forming lengths c certain profile at reasonably close to ances so that all the machinist needs do is cut off blanks to the requi thickness.

This type of stock can now be p duced not only from brass, bronze aluminum alloys, but also from steel even stainless. Tolerances are about same as in powder metallurgy and t ing as well as production costs are v low.

In competition with this meth powder metallurgy has to be able handle a greater variety of shapes sizes, especially with varying thickne A particular advantage in powder me lurgy results from the fact that inte shapes can be produced much m readily.

Blanking, Piercing, Shearing, Form Drawing, Coining Etc.: Products of series of processes are often referred as stampings or pressed metal pa These high production techniques h relatively high tooling cost, but v low piece cost with cheap raw mate and fairly low scrap loss. Close to ances can be held, especially on dim sions directly controlled by the d however, where heavy stock is used trimming operation is often neces in order to produce tolerances in same range as those held by pow metallurgy.

Powder metallurgy holds its against stampings, in the manufacture parts requiring greater wall thickne and varieties of sectional changes.

Hot Press Forging: This method gained in importance both for ferr and nonferrous metals, but especially brass. Occasional combinations of and cold forging can be used and h dimensional accuracy can be acc plished. This is done at a sacrifice in t

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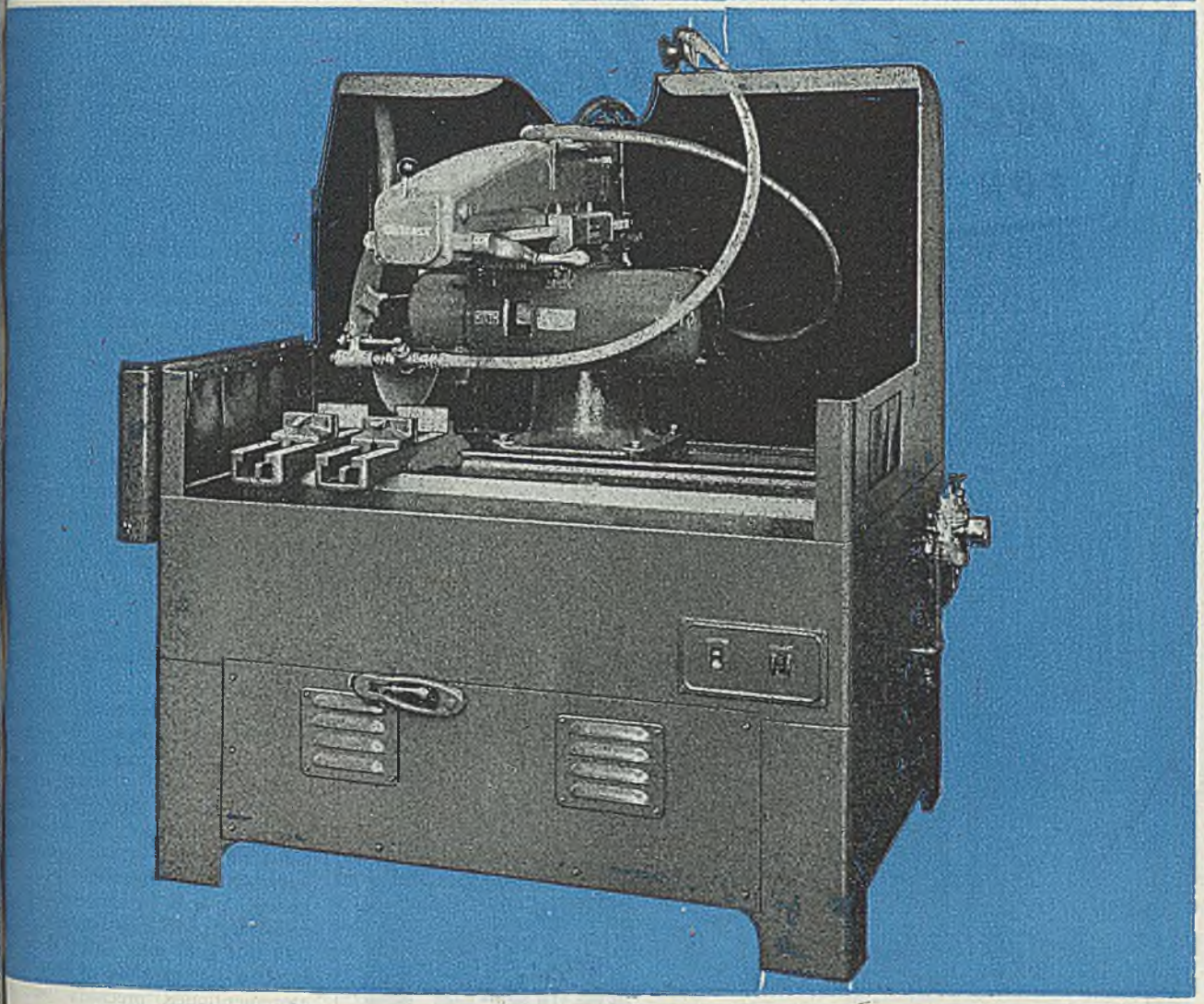

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life, however. Design limitations quite similar to those applying to pow metallurgy.

In order for powder metallurgy to able to compete with this method is necessary to reduce die wear and crease production speeds. More wi useful materials can and should be dled.

Assemblies: In many cases, parts be produced very economically by sembling components made by on more of the precision parts manufa ing methods, such as stamping, s machining, etc. They can be joine peening, threading, brazing or spot ing. Accuracy is usually inferior to obtainable by powder metallurgy, shape variations are considerable. methods are not restricted to any sp group of alloys, but they do not among the cheapest in tooling nor cost.

Powder metallurgy can often tak place of this method mainly due t lack of intermediate handling oper and due to the greater accuracy. over, powder metallurgy should w considered as a method for prod component parts for assemblies and indeed being used for this purpo many instances.

Plastic Molding: Although not a working process, it has to be listed as it is recently in competition i precision parts field. It ranks as o the most economical methods for ducing large runs of pieces, but herent weakness is in the lack o chanical strength and heat resistanc costs are quite similar to those in p metallurgy.

Production Machining: In addit the methods analyzed, we have to sider production machining as a petitive method. A great deal c accomplished by modern machine ods and equipment. Yet, since har chucking, hand feeding, and other operations are frequently involved, go up. It may be expected that p metallurgy will continue to find it into this field most easily as the is often not as close as in some aforementioned precision parts facturing methods.

It is not often realized that th a great deal of variation in m ability depending on the material so that high production method though suitable for the particular and tolerances involved, may n suitable to the material needed. machining alloys have been dev in many cases, but as a result necessary additions, properties o material usually go down.

Thus, it can be seen that high p tion machining operations have limitations too. These consider lead to the conclusion that ma with high physical properties, goo rosion resistance, or other desirable acteristics, which are difficult to chine, offer a very promising fiel powder metallurgy.

So far, some of the trends and l

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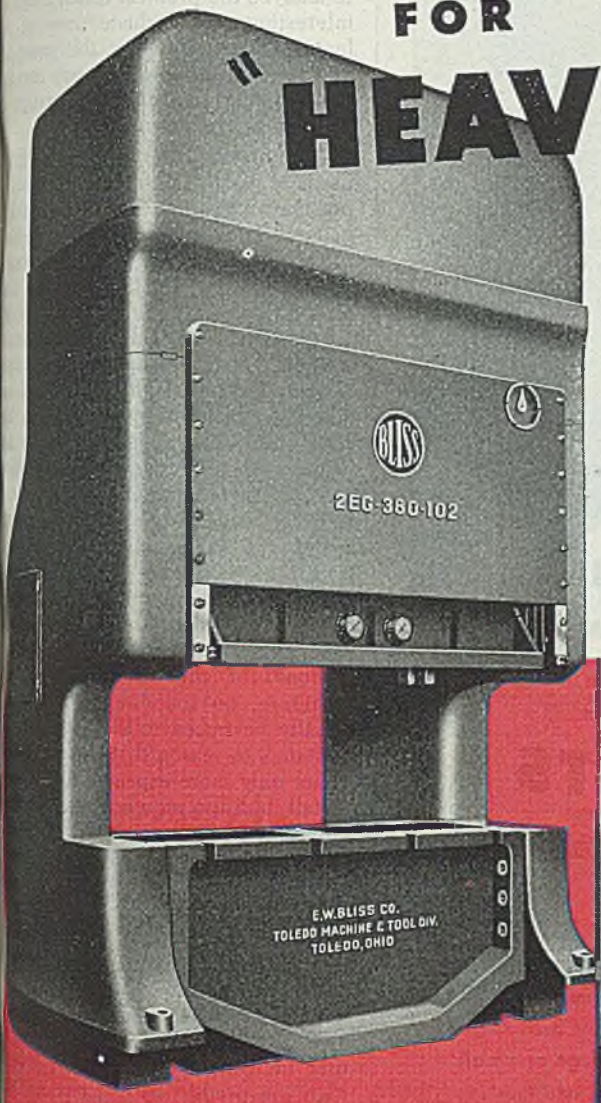

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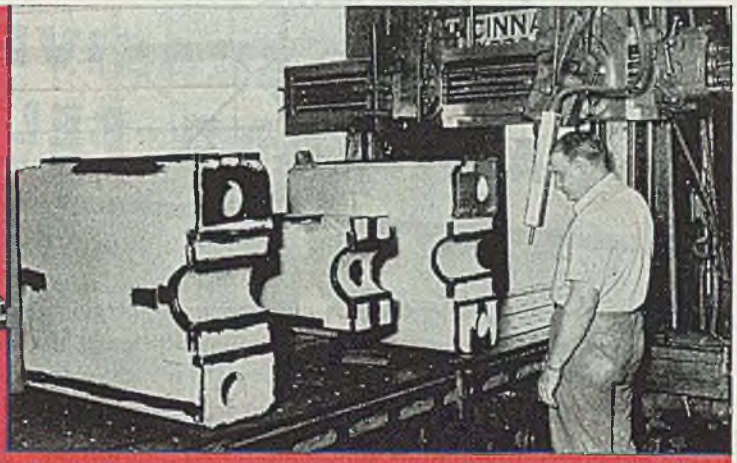
* *Finishing a precision-tested Bliss press crown, fabricated from welded steel plates at Warren City*



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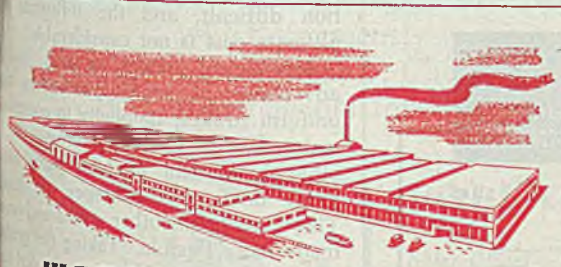

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tions as they are known today h
been considered. In order to enable
designed and user of metal powder p
to analyze the problem better, it migh
interesting to evaluate some of
factors responsible for the present-
limitations and which in many cases
account for the unique advantages
be gained by this method.

Equipment: The type of equipm
used in the manufacture of m ol d
powder parts can now be consid
general knowledge. However, it is
often realized that few of the limitat
in the process can be blamed on a
able equipment. While it has been
for instance, that the size of part
limited by the available press tonna
it can be stated that presses of
siderably higher tonnage capacity
been built for applications other
powder metallurgy and obviously, th
fore, there is no reason why they c
not be made available to the pow
metallurgy manufacturers.

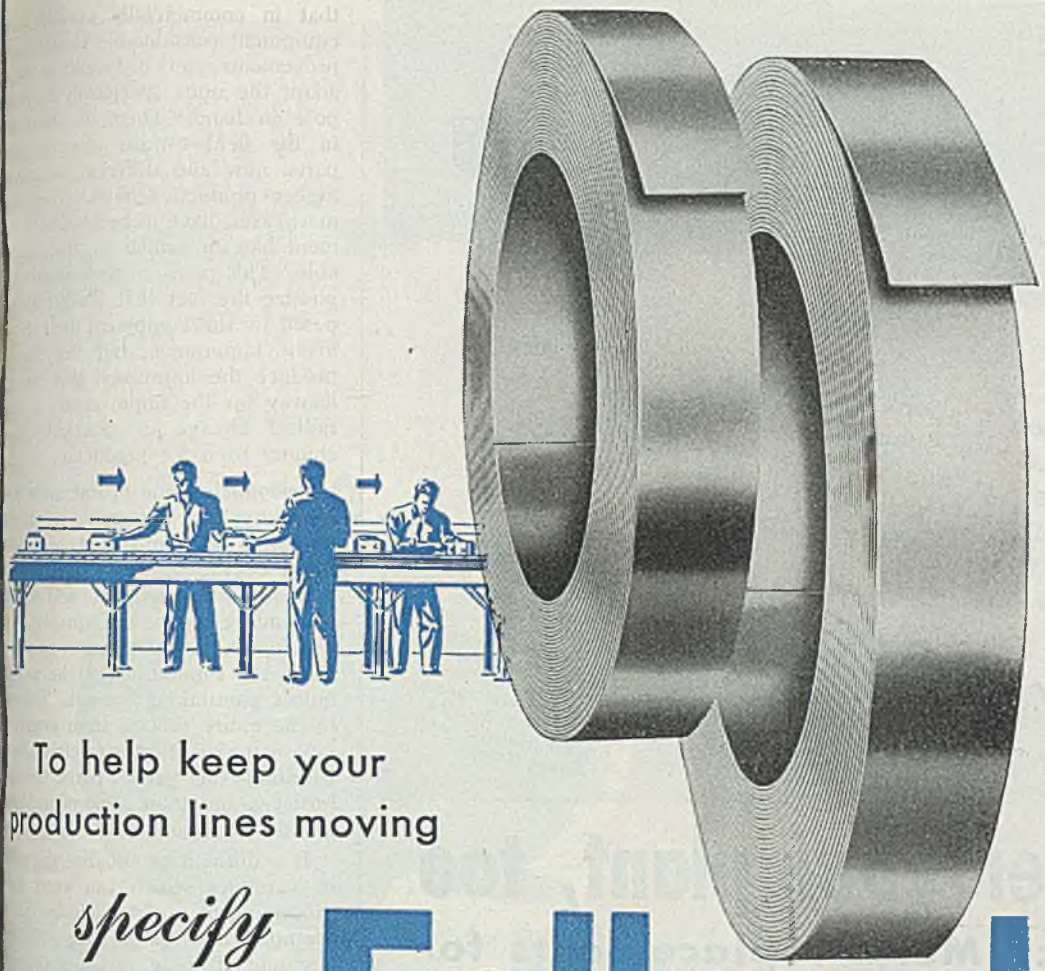
The same is true of heat-treating
naces which are now being built for
greater loads than are usually consid
commercially practical for sintering.
reasons for the size limitations
therefore, be found elsewhere and
usually be traced to the element of
It stands to reason that heavy equip
is not only more expensive to buy an
install, but also requires more labor,
power and more maintenance to ope
Coincidental with these increased
ating costs incurred by large parts,
relatively high powder cost and ex
sive tooling also play an important

As far as the press equipment is
cerned, there are definite limitation
the flexibility of the available equip
and much is let to the ingenuity of
user in working out problems conne
with the production of complicated p
Although some progress has been
by the press builders since a sim
statement was made by the writer
years ago[1], some of the machines in
ing complex mechanisms and intr
timing are difficult to build and do
retain the required precision after
service.

, In general, two types of presses
available for molding metal powde
hydraulic and mechanical. Alth
there are several types of mecha
presses such as crank type, cam
etc., enough can be said in favo
each of these types to make the se
tion difficult, and the influence
ultimate cost is not considerable.

Mechanical presses, as such, have
advantage of rapid production
uniform strokes, simplicity in control
maintenance. Hydraulic presses, on
other hand, can produce parts wit
great deal of consistency in den
They have a smoother action and ca
made more flexible. Taking the pres
capacity into consideration, the first
of both types of presses are about
line, but the operating cost is, of cou
in favor of the rapid type press where
feasible.

It has also been the writer's experie



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that in commercially available f equipment considerable changes a provements can be made in or adapt the units specifically for th pose in hand. There are many in the field toward more comp parts, new and different material higher production rates. They most cases, have to be handled by ment like, or similar to, that now able. This point is made merely phasize the fact that the limitatio posed by the equipment itself are major importance, but this shou produce the impression that ther leeway for the improvement or, radical change in practically a chinery used for production.

Personnel: Some operations in metallurgy are automatic, others unskilled or semi-skilled help, b major operations involving labor a great deal of skill, care and exp Depending upon the quality o which the manufacturer wants duce, the supervision of the pro quires painstaking control. This to the entire process from prepar raw materials through setting th handling the green parts, setti furnaces and their atmosphere, h the sintered parts to the final ins

It is difficult to visualize the m of variables which can enter i processing of a part made by suc ple operations" as pressing and si any one of these variables can sizeable difference in the quality resulting product.

Raw Material: If a given pa be made from a ferrous material petition with a part which w viously machined from cold-rolle the powder metallurgist has sources of iron powder at his d A great deal has been said and about the difference between types of iron powder as to chemi ity, particle size, distribution, shape and the resulting charac of the powder such as compac flow, resistance to rust, cost, etc not generally recognized, howeve the resulting properties in the part depend very greatly on th of raw material used.

It has been demonstrated by that a relatively small difference i content of iron powder made same method may have profou fluence on the density and mec properties obtainable. Other inv ors have studied the effect of size not only on the properties sintered metal but also on its b during the sintering operation itse as size change. (See e.g. P. R scher[5]).

It is not always true that the m pensive material results in the efficiency for a certain part, no true that the material of the g chemical purity will result in th properties. It becomes clear, the that when considering the feasibil a part for manufacture by powder

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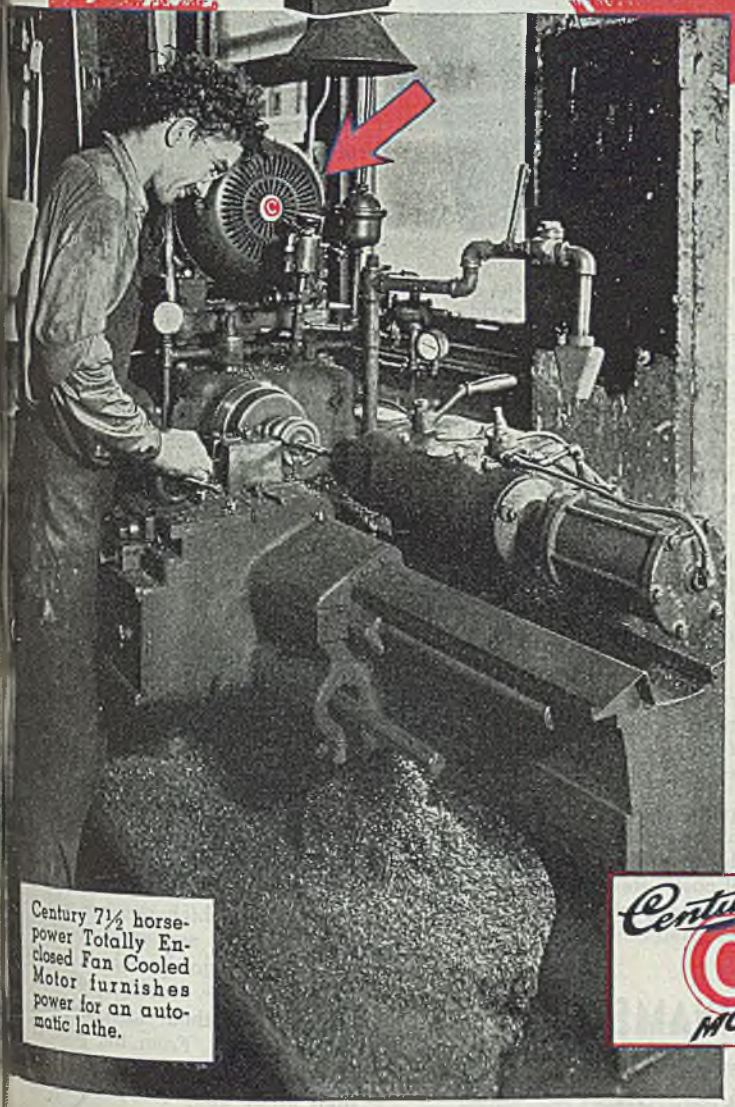

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lurgy, the service under which the p will be used has to be known in de so that the decision can be made on type of raw material to be used.

To show how important this fa alone can be, it may be said that at present time the price of iron pow varies all the way from around 10 c a pound to around $1 a pound. On s of the nonferrous materials this ferential is not as great, but it still h true that with certain types of po better properties can be obtained certain applications than with others.

In connection with the raw mat question, it must also be considered some powder, although more expe as far as initial cost is concerned, is easily handled and, therefore, red the production cost of the part be the original extra cost. A further to be considered is die wear, as powders are much harder on dies others; this property, strange at it se cannot be correlated with the che composition.

It is often claimed that a major vantage of powder pressing results the fact that there is no waste in material. This is not entirely tru there is always some loss in han and pressing due to leakage, spl contamination, etc.

Processing Technique and Subse Operations: The various steps inv in making parts from metal powde well known but the actual detail volved and the methods employe overcome certain difficulties are still of the know-how of those who have working in the field for the past se years. The manner in which a ce part is made by powder metallurg cause a considerable difference in resulting properties and, at the time, in the ultimate cost.

This point is very well brought in a paper by F. V. Lenel[6]. He that a piece with nonuniform sec can be made in a die with simple pu containing steps to form the va sections. This way, a difference in rate of compression of the powde sults in a difference in density in various sections of the part.

Where this is not permissible, m ple punches have to be used so substantially uniform density can be tained in all sections of the part. obvious that the latter method is sup as far as resulting properties are cerned, but it is also more expe because tooling is more intricate and operation may be slower.

Generally speaking, the design, workmanship and the application of dies are very important elements in successful production of a sintered Inasmuch as high pressure will pro great density, and great density in will produce good mechanical proper high pressure would appear to b desirable method for producing quality parts. From the point of v of tool making, this involves the use high grade alloy tool steels for dies

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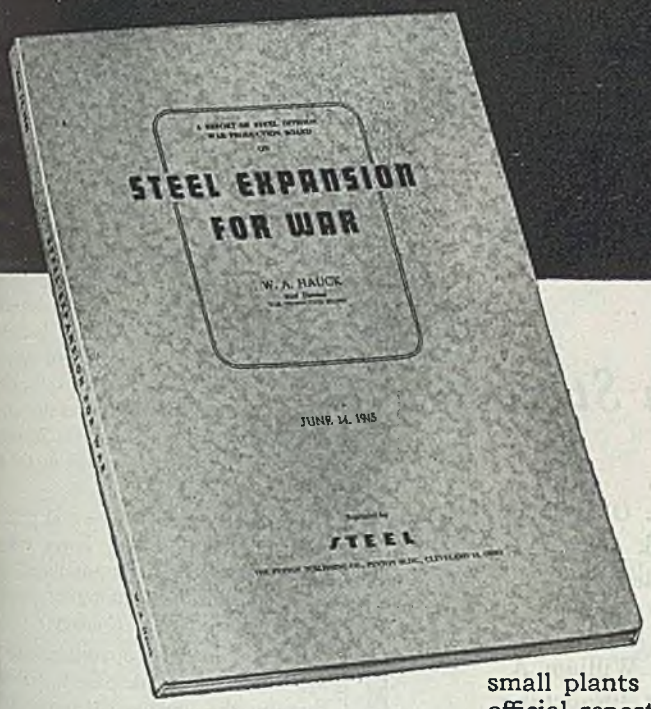

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punches, with their initial high
and the difficulty in machining
finishing and great care in the
treating of the die parts.

Even if these precautions are carefu
observed, it only stands to reason
the wear on the dies is consider
greater with the higher pressures.
is one of the reasons why the maker
powder metallurgy parts do not
materials which have tensile strengt
the range of 150,000 psi, although
are references in the literature st
that such materials have been prod
in the laboratory.

It has often been suggested that
resistance of the metal powder t
formed into a dense mass can be
come by means of heat. This would
the metal powder into a plastic
and, therefore, allow the particle
conform more readily to each o
shape and close the voids between
This assumption was proved to be
rect by means of laboratory experim
Yet, the set-up is difficult because
necessary to use controlled atmos
to avoid oxidation. Moreover, die
is rapid and production rates are
Therefore, this method is non-com
cial for most applications at the pr
time.

From the point of view of press d
and press operation, lower compa
pressures are also desirable becau
will enable the making of larger
per available total tonnage.

In the sintering operation, other
are available to increase the density
thereby the mechanical properties
materials. These consist in higher
peratures, longer sintering times
better controlled atmospheres.
it is purely a question of production
to decide how far one can go in
ducing materials with outstanding
erties. The sintering temperature
is, of course, limited not only by
economical consideration, but als
the melting point of the material in
and in some cases, by the temperatu
which grain growth will occur or
distortion of the parts will take pla

The length of the sintering ti
more purely a question of cost, alth
in some cases the tendency to deca
ization, dezincification or other str
al changes is enhanced by ex
heating time.

On iron parts, increasing the sint
temperature from 800 to 1450° C
duces an increase in density of 10.
cent. An increase of the sintering
from 1 to 4 hours produces an inc
in density of 4.6 per cent. With
time, however, this rate of increase
not continue. After about 32 hours,
a very slight increase in density oc

The application of controlled at
pheres to the sintering process is s
what more critical than in the ca
bright annealing, hardening, bra
etc. because in this instance any e
which the atmosphere might have on
metal would not be confined to the
face, but would also cause a reactio


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take place inside the material. T must be avoided under all circumstanc The care required in maintaining a s able atmosphere for the particular terial used cannot be over-emphasiz The first cost as well as the operation commercial atmosphere generators cleaning and control devices are high add to the cost involved in the proc tion of powder metallurgy parts.

Although molded parts are usu made with the purpose of having finished product which require no fur machining of any kind, there are m cases where parts are so intricate they cannot so be made entirely molding. In those cases, some mac finishing operation has to be used, the machinability of the sintered pro is of the utmost importance. All the s which go into the processing of the enter into this picture, from the raw terial to the final heat treatment.

Control and Inspection: It is com knowledge how important a part trol and inspection have played in war production program. Their imp ance in the manufacture of prec parts by powder metallurgy has not sufficiently emphasized in the past.

This phase of powder metallurg strictly a precision business, its rel importance is probably much greate this field than in many other indust

It is necessary, in many cases, to ercise constant vigilance throughout cycle of manufacture with interme inspection at every step and with p cularly careful inspection of raw terials and the finished parts. Elim tion of any one of the control and spection operations might result in duction of cost, but it would inv a sacrifice in quality and consist which would more than offset the ing realized in this manner.

Unfortunately, it is not possibl cast test samples with production p as in common practice in the foun As pointed out by Lenel[6], properties tained on test bars are only an appr mate indication of the properties obta from a certain material by means certain processing cycle. Special ins tion tools have been devised often, th fore, to handle production control.

The rockwell hardness test can used as an indication, but is often leading. A part which has not thoroughly sintered may actually s a greater rockwell hardness due to work hardening in the compressed m powder particles. Then, when the terial is fairly well sintered, i.e., a s factory bond between the particles been developed, the hardness may to below the rockwell B range. Fin upon completion of the sintering cy i.e., when complete diffusion has ta place between the various ingredie the hardness again rises according the desired structure of the material.

Heat treatable steel can not be m consistently by powder metallurgy te nique, and rockwell hardness of C65 readily be obtained in the laborat

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For reasons of economy, the reproduction of this type material in production does not seem to afford many advantages at this time. This high hardness reading is all the more surprising, however because due to the slight porosity which is always present in sintered metals, the rockwell C reading is usually found to be lower than would be expected according to tests which are not sensitive to porosity. Much development work will be required to produce this type of material in production with a guarantee of repeating the properties in each piece and in each section.

This need for development work and pilot plant operation, in order to translate research laboratory results into commercial practice, exists in many branches of powder metallurgy. These activities will broaden the application of the precision parts manufacturing method as time goes on. Some unsuitable applications will be discarded, while new and improved methods and materials, combined with increased economies, will be introduced if and when some of the restrictions and limitations described in the preceding paragraphs have been overcome.

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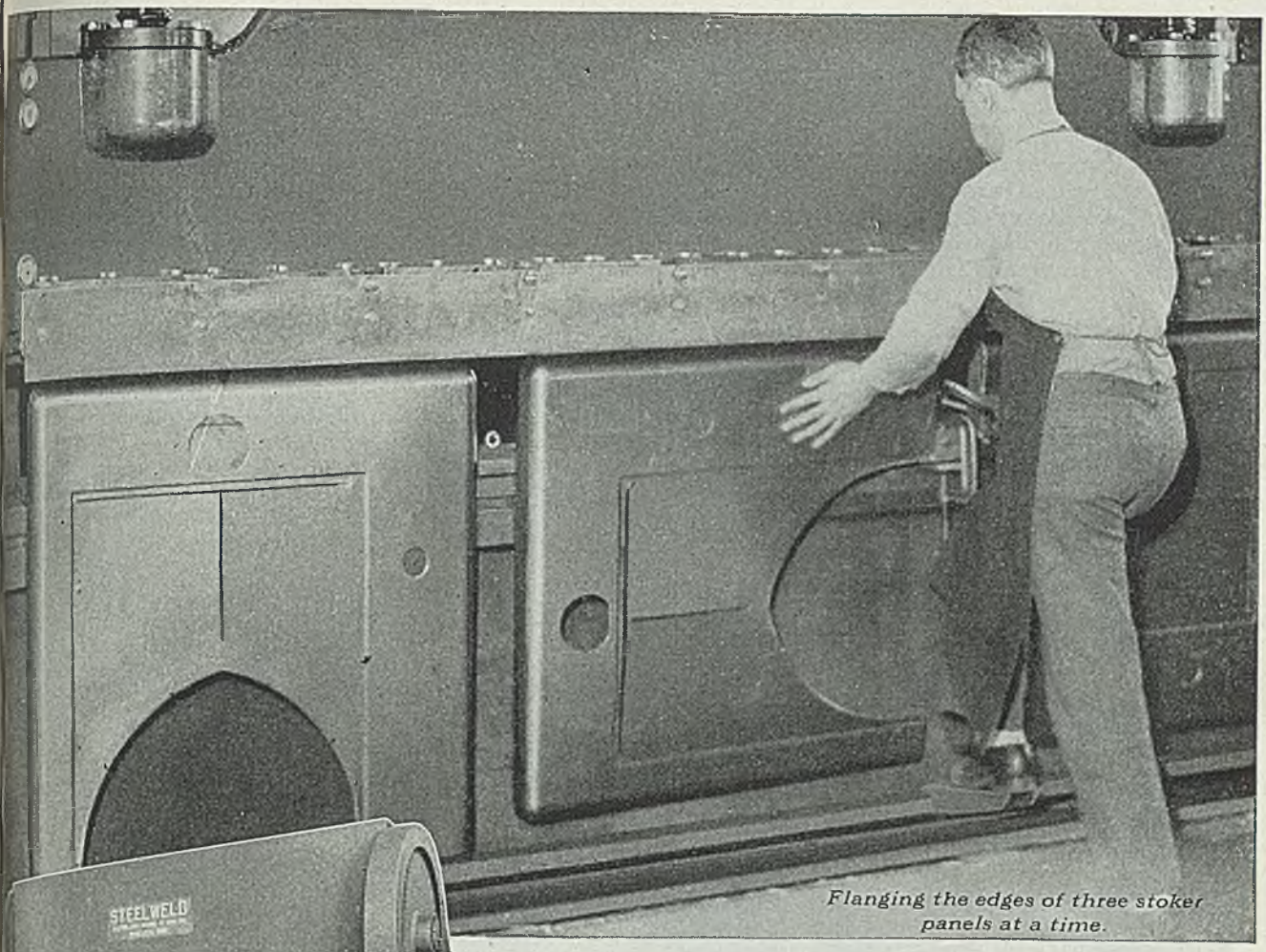
Chemistry as Basis of Art of Electroplating

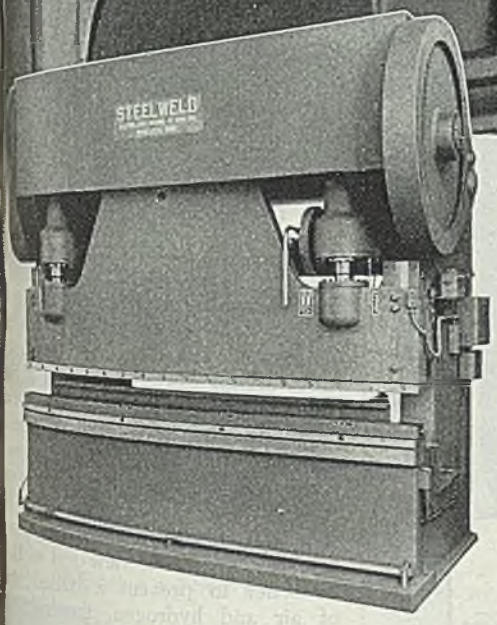
Chemistry for Electroplaters, by C. F. Young; cloth, 205 pages, 5½ x 8 inches; published by Chemical Publishing Co. Inc., 234 King St., Brooklyn, Y, for $4.

Developing of plating of metals a chemical and electrical process has been a major achievement of the metallurgical industries for a century. Although electroplating involves some of the most complicated theoretical aspects of chemistry and electrical physics few attempt to operate such processes on theoretical background.

An art rather than a science has developed in most electroplating plants and much is done by those who have a feeling and skill rather than understanding of the laws governing their work. It has been the attempt of the author to present the theory in a way to aid those who work with the processes to become more familiar with fundamentals of their art.



Flanging the edges of three stoker panels at a time.



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Descaling Steel

(*Continued from Page* 121)

Note uniform, oxide-free surface sample below.

Fig. 2. After the brightening dip, w is rinsed in high-pressure water stre as shown. This removes whatever particles of loose scale may remain also any nitric acid which may be cli ing to the wire. In addition, the ho down passivates the steel and prev formation of new scale.

Fig. 3 shows rack of stainless coming out of the quick brightening which follows descaling bath treatm and water quench. This usually nitric acid bath maintained at 160 time of immersion again varies accor to materal — stainless bars or sheets quire several minutes, fine wire a m of seconds.

Fig. 4 is a view of the quench operation, tank at Rustless being up with and adjacent to caustic tank (not shown in photo). Steam fo

> For full details of the sodiu hydride pickling process, s STEEL, Nov. 5, p. 122. In th article, second paragraph, line —beginning with the word "U on"—should read "Upon quench ing work in water, reduced mat rial is blasted from surface b generation of steam, and all th remains is to brighten surface b a few seconds' dip in acid."

by the metal at 700° F blasts loose the quench bath water a substa amount of reduced oxide. Note loc of ventilator fans for removal of fu

Fig. 5 shows rack of stainless steel emerging from bath. Time of immer depends upon such factors as natur scale, mass of work, etc., and can r from a few seconds to 20 min. flames from vent holes in lids of ge ator boxes in this view and in Fig In order to prevent a critical mix of air and hydrogen, the hydroge fed in in such amounts (from 80 to cu ft per ton of metal descaled), there is enough to satisfy the so fill the generator boxes, and burn a fl

Fig. 6 shows attendant replenis bath by dropping new sodium through charge hole in generator. sodium bricks, weighing about 2½ each, are added with tongs—one to generator—at intervals of about 15 From 6 to 12 lb of sodium is requ per ton of steel treated, depending relative amount of surface to be descal

Hydrogen, obtained by dissociating monia by standard means, passes thro the metallic sodium, dissolving it to the sodium hydride of the solution. dium hydride reacts with the scale form caustic soda, which is the mat comprising the bath itself. Sodium dride content is determined by a sim

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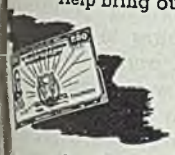

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gas test with a gas evolution apparat
If test is low, feed is increased;
creased if test exceeds 2 to 3 per c
sodium hydride.

Fig. 7 is a closeup view of stain
steel wire descaled by the du Pont
dium hydride descaling process
brightened by quick dip in acid.

A steady stream of material should
fed through the descaling system
order to hold cost per pound to pickl
line economically. This continuous w
feeding principle of operation justi
maintenance of the bath at all time
condition and at temperature. Strai
chromium stainless steels and
chromium-nickel stainless steels can
white pickled by this method wit
and blasting. The process is not
fined to stainless, but also can be utili
to treat other alloys.

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A soft, ductile alloy which can
hot or cold formed into intricate sh
and then hardened by a comparati
low temperature aging treatment,
been developed by Driver-Harris
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dependable and uniform harden
sponse does not involve critical co
of chemical analysis, fabricating
nique, or heat treatment, accordin
company.

The alloy, No. 720, has a nom
chemical analysis of 60 per cent co
20 per cent nickel, and 20 per
manganese. The alloying constitu
used are all electrolytically produ
Aging is characteristic of a wide r
of alloys of the general composition gi
and there are no critical limits w
must be held to assure uniformity
hardening.

Hardening of parts involves only h
ing in the temperature range of
to 900° F for the time interval w
will produce the desired hardness.
appreciable drop in hardness is s
even after several days of contin
heating. By heating to 1050°-1
F the alloy returns to the hardne
had before cold working or aging.
alloy may be water quenched or
cooled from this temperature and
rehardened by repeating the aging
cedure. Due to its low thermal
ductivity, this alloy can be heated
local areas to increase ductility or so
hardened section. Negligible disto
of formed elements occurs during
treatment. Hardened parts retain
structure and physical dimensions w
they had upon attaining hardening t
perature.

Since it has a modulus of elasticity
18 x 10^6 when soft annealed, and 2
10^6 in the heat treated condition,
alloy part which does not meet spe
cations can be brought within li
either by further heat treatment or
heat drawing, Driver-Harris metall
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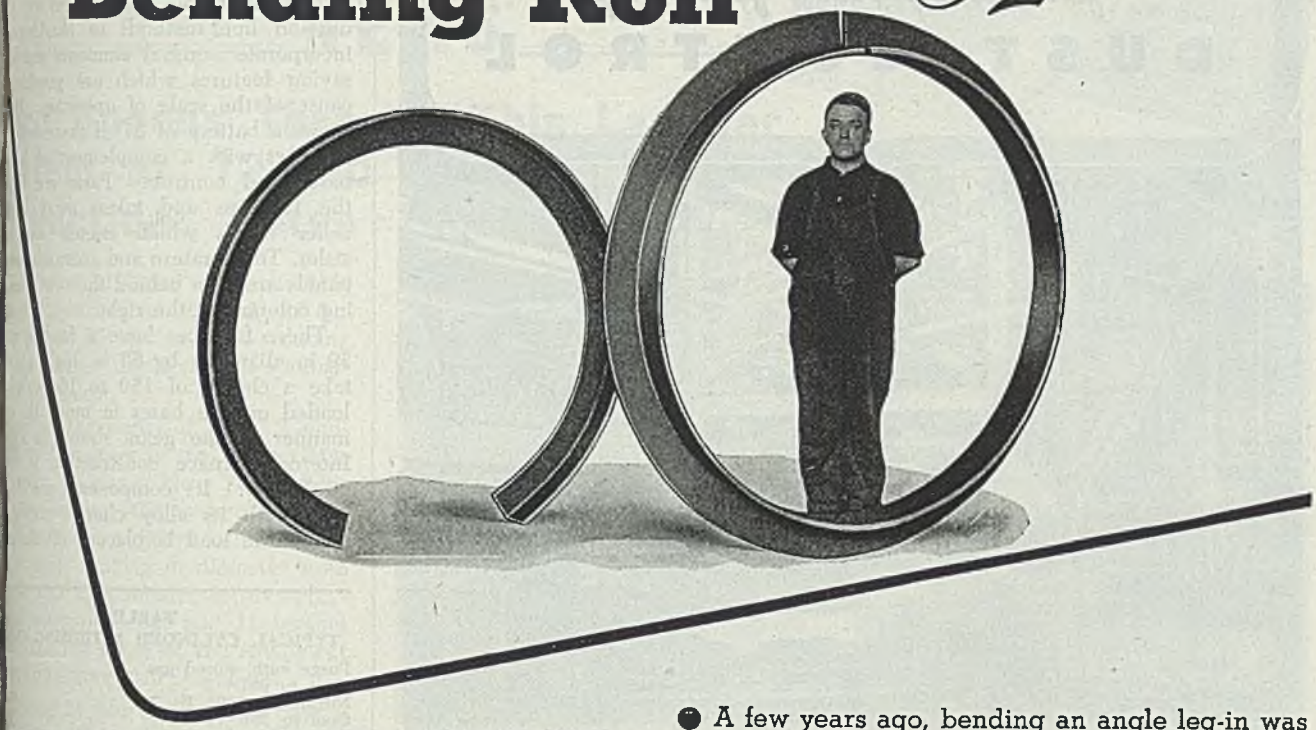
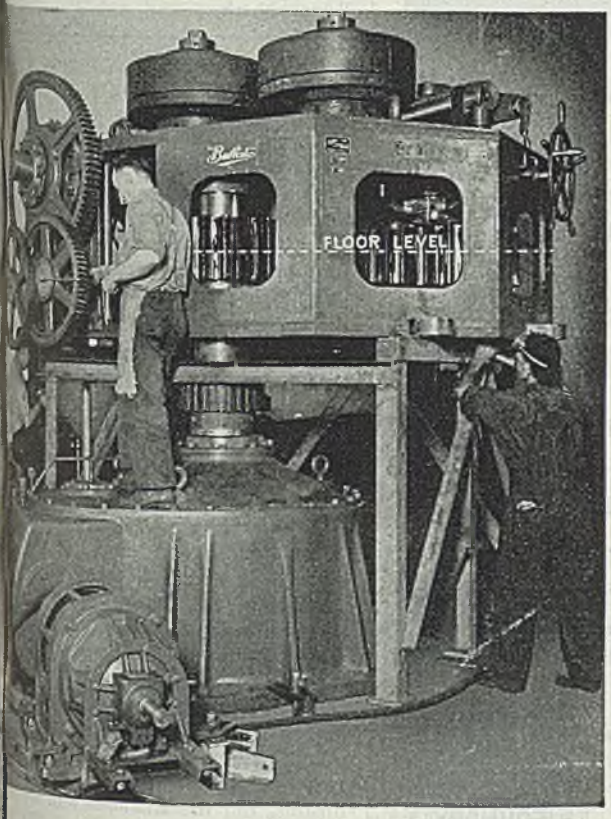




● A few years ago, bending an angle leg-in was a job which took plenty of time and when finished, was not too satisfactory. Then Buffalo engineers developed and patented the "leg-in attachment", a simple, fool-proof device which makes the leg-in job a cinch.

Today, thousands of Buffalo Bending Rolls handle angles, tees, channels, flats, rounds and other shapes with an ease and speed which is astonishing the first time you see it.

If you bend metal as part of your manufacturing process, there is a Buffalo Bending Roll which will do it better, and cheaper, than any other method.

Write us, telling what you bend and the diameter, and we'll tell you what machine you should have. Don't put it off—start NOW to reduce your bending costs!

BUFFALO FORGE COMPANY

158 Mortimer St. Buffalo, N. Y.

Canadian Blower and Forge Co., Ltd., Kitchener, Ont.

"Buffalo" **BENDING ROLLS**

Nitriding Engine Parts

(*Continued from Page* 123)

and nitriding installations for that p
pose at Wright Aeronautical are amo
the largest. Studebaker Corp. likew
has employed nitriding extensiv
These installations are laid out with p
duction line methods of handling
incorporate unusual ammonia and la
saving features which are possible
cause of the scale of operation. Fi
shows a battery of 37 of these bell t
furnaces with a complement of load
bases and controls. Parts are fed
the furnaces and taken away by
roller tables which stretch along
aisles. Temperature and ammonia con
panels are seen behind the row of bu
ing columns at the right.

These furnaces have a loading sp
59 in. diameter by 53 in. high, and
take a charge of 150 to 164 cylind
loaded on the bases in much the s
manner as the gears shown in Fig
Internal furnace construction is sh
on Fig. 5. Its components are (1)
base with its alloy charge castings
which the load is placed; (2) the s

TABLE I
TYPICAL CYLINDER NITRIDING CY

Purge with reused gas	
Heat to 980° F	
Nitride at 980° F	
Cool to 250° F	
Purge with air	

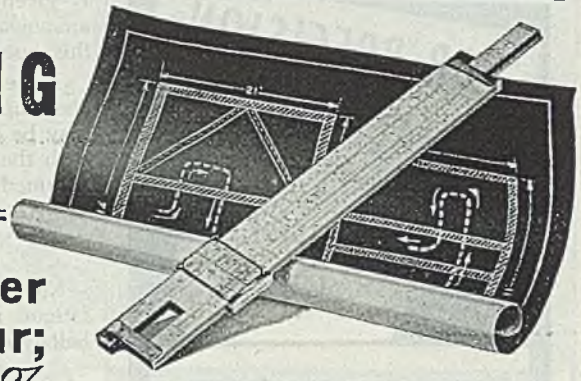
alloy hood, for sealing in the ammo
(3) and the bell furnace which is han
by crane, moving from base to bas
continuous operation.

The base is equipped with a circula
impellor type fan and may or may
have a cylindrical sheet alloy baffle
directing the fan circulation, depen
on the nature of the load. No b
is used for cylinders or for the
gears in Fig. 1. The hood is se
to the base in the oil trough at the p
phery and the fan shaft is also se
in oil, so there is no ammonia leak
One can walk along the line of furn
in Fig. 7 without detecting amm
odor.

Temperature is controlled from
thermocouple projecting through
furnace side, and from one in the b
projecting into the load. The temp
ture control panels are seen along
the ammonia control panels in Fig

Ammonia control includes provision
(1) flushing out the air from a fres
loaded base, using exhaust gases f
other bases; (2) then turning in f
ammonia for nitriding; and (3) fina
flushing out the ammonia with low p
sure air before unloading. The
monia which is transported in tank
and transferred to a storage tank,
delivered to the control panels at
proximately 35 lb pressure. Manomet
flowmeters, and bubblers give operat
visual indication of furnace pressure
flow. Each panel group has a diss
ation pipette for periodic checking
dissociation and purging. Typical p

OVEN ENGINEERING NEWS



ire Speeds Through This Lacquer ystem at 72,000 Feet per Hour; roduction Rates Increased 25%

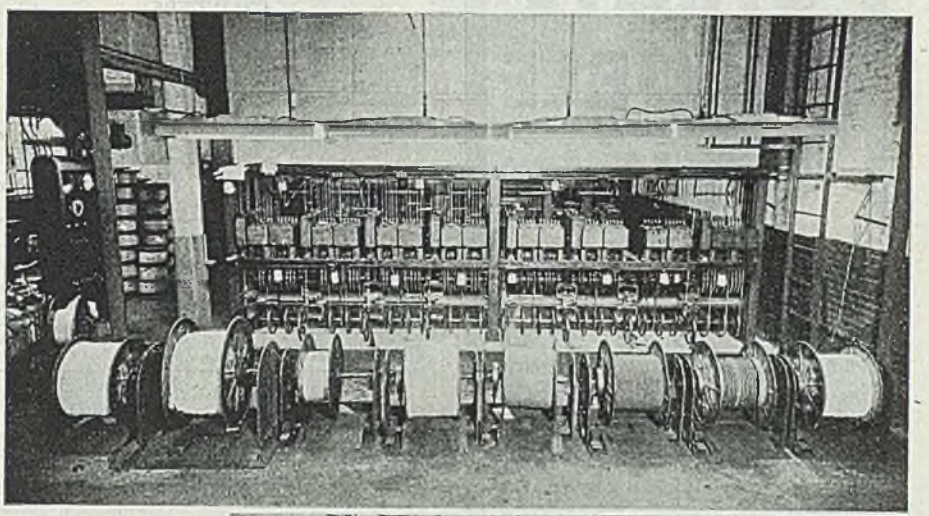
Our Industrial Oven wire and cable ering system has stepped up our ing speed 25 percent while reducing labor cost for this operation approxiely 30 percent."

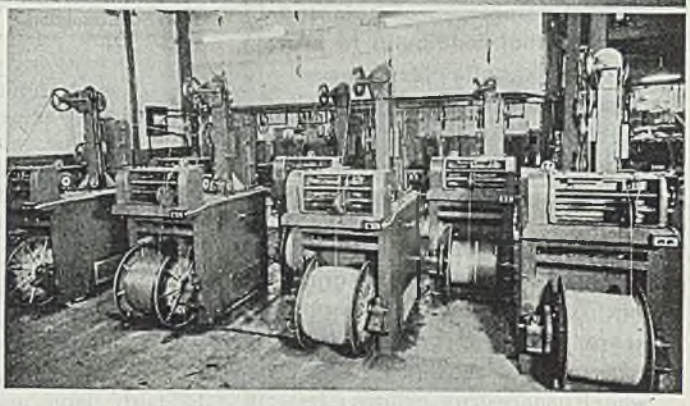
ose are the words of E. W. Gundchief engineer of the Rome Cable oration of Rome, New York. This any uses its **IOE** system to bake finishes on radio hook-up wire and ion cable ranging in diameter from " to .600" OD. simultaneously applyone saturating coat and 11 lacquer . The full range of the equipment les wire from .010" to .750".

erating 24 hours a day, six days a , Rome Cable has enjoyed satisfactory continuous operation, with down for maintenance and repairs a ible factor.

e have made a great improvement e quality of the finish with our **IOE** ipment," said Mr. Gundstrom. "This to better heat distribution in the , constant tension and speed through ating passes, proper wiper design highly efficient lacquer and saturant e equipment. Other advantages mean a lot to us are the excellent exhaust system, which is safer and es the work more pleasant; the comly automatic safety and production ols, which give us a feeling of security have not had in the past; and the idual takeup machines, which enable stop one wire without interfering general production."

IOE oven processing units are ed with the most complete and matic control systems, inand field wired by our engineers. lacquer towers are explosion proof ther heated by electricity, gas, oil or





ABOVE—At the Rome Cable Corporation, eight controlled-tension payoffs feed wire into the saturation and lacquer pots of the **IOE** cable lacquering system. The oven tower is seen above the pots.

RIGHT—In this view of the system, windup machines draw the finished wire from the oven and wind it on reels. These machines maintain constant tension within a wide range of speeds, allowing high-speed processing under tensions ranging from a few ounces to hundreds of pounds.

Similar systems, with minor adaptations necessitated by the nature of materials processed, are used by other industries. **IOE** payoffs, lacquer pots, ovens and windup machines save time and money in the impregnation and coating of paper, textiles, rope, tape, fishline, surgical suture and other continuous materials.

How Do They Work?

The operation of **IOE** systems such as the one at Rome Cable is described in our 16-page reprint of a *Wire and Wire Products* article. A copy will be sent to you on request.

(This is No. 23 of a series. Reprints of previous advertisements will be sent free upon request.)

ENGINEERING VERSATILITY

THE INDUSTRIAL *Oven Engineering* COMPANY

11621 DETROIT AVE., CLEVELAND 2, OHIO

Engineering Representatives in Principal Industrial Areas

★ ASSOCIATED COMPANY: JAMES DAY MACHINERY LTD., LONDON, W. 1, ENGLAND ★

formance data for a load of cylinders is given in Table I. Table II shows ammonia and power consumption for this operation.

These figures on ammonia and energy consumption are representative of what may be obtained in large scale operation with the fairly dense loadings which are obtained with cylinders, gears, shafts, etc.

Nitriding Crankshafts

Nitriding of crakshafts for wear and fatigue resistance is carried on also in bell type furnaces. Fig. 2 shows a battery of such furnaces which are used in nitriding crankshafts for a water-cooled, in-line, aircraft engine. Each shaft has a floating "double-whiffletree" support, so there is no sagging out of line. Statistics on the nitriding cycle for small parts and data on ammonia and power consumption for a typical cycle appear in Tables III and IV, respectively.

TABLE II
CYLINDERS
AMMONIA AND POWER CONSUMPTION

Case depth	0.015-in. (average)
Average Dissociation	33% (approximate)
Ammonia Consumption	64 lb
Ammonia Consumption	0.022-lb per lb of cylinders
Ammonia Consumption	0.025-lb per sq ft of nitrided area
Power Consumption	618 kwhr
Power Consumption	0.21-kwhr per lb of cylinders

TABLE III
SMALL PARTS NITRIDING CYCLE

Purge out air	1 hr
Heat to 975° F	2.5 hr
Nitride at 975° F	35 hr
Cool	4 hr
Purge Ammonia	½–hr

TABLE IV
SMALL PARTS
AMMONIA AND POWER CONSUMPTION

Case Depth	0.015-in.
Ammonia Consumption	25 lb
Ammonia Consumption	0.063-lb per lb parts
Power Consumption	247 kwhr
Power Consumption	0.62-kwhr per lb parts

Nitriding Miscellaneous Small Parts

The bell type furnace is best suited to fairly large scale production. For smaller parts and production, the pit type furnace is used. Fig. 4 shows such a furnace in sections. Parts to be nitrided are loaded into the charge basket outside the furnace and the loaded basket is then placed into the furnace. A radiation shield protects the basket from direct radiation from the heating elements, and also serves to direct circulation set-up by the impellor fan in the bottom. Heating elements have low dissipation rates to minimize dissociation. Temperature is controlled from the thermocouple projecting through the top, just above the basket. The cover is sealed to the furnace by the circumferential oil trough. The furnace is cooled with the charge and so an external gas cooler and pump are provided. This is seen in Fig. 3.

Typical performance data for this type are as follows:

Basket—30 in. diam by 30 in. deep.

Charge—400 lb net, small gears, bush-

...ings, pins and similar small parts.
Temperature—975° F

...s might be expected, the cost per ...nd of nitriding in the pit furnace ...greater than in the bell furnace. Aside ...m the smaller scale of operation, the ...furnace must be heated and cooled ...ith the charge; while in the bell furn... only the base and hood are cooled ...h the charge, the furnace bell re...ing its heat during continuous op...tion.

...While the foregoing examples are typi... and nitriding results are uniform ... dependable, it is not unlikely that ...monia consumption will be further ...uced. That is, present day practice ...adheres largely to the tradition of ...ing dissociation to 35 per cent or ...er. In many cases, not involving ...sion resistance, the dissociation ...ld be as high as 60 per cent. This ...ld reduce overall consumption to ...t 60 per cent of the figure cited ...e.

...is the writer's belief that gradually ...industry will take advantage of this ...to reduce costs.

...Those familiar with nitriding practice ...recognize that the figures for am...a consumption in the above in...ces are generally lower than in pre... years for comparable conditions. ...range of from 0.022-lb per lb of ...led parts in the large scale bell fur... operation to 0.063-lb in the small ...pit furnace operation, is representa...of good current practice. It is un...to generalize beyond this, because ...many variable factors. The signi... point is that ammonia cost is one ...e major cost items in nitriding and ...reduction in ammonia consumption ...ially reduces overall cost. This ...been the objective in making the re...ents in furnace design.

...ctroplating Handbook ...t in Fourth Edition

...ctro-Plating, by Samuel Field and ...Dudley Weill; cloth, 437 pages, 5 x ...hes; published by Pitman Publishing ..., 2 West 45th, street, New York, ...5).

...The fourth edition of this work has ...published to keep abreast of de...ments in the electroplating field, in ...advances have been definite since ...prior edition. Several departments ...been revised and enlarged, in...ing increasing application of bright ...plating, usually followed by de...tion of chromium. Filtration of elec...ting solutions is treated at length. ...Extending range of electrodeposition ...esses and application in numerous ...facturing methods have necessitated ...sition of specifications and testing ...deposits to insure adaptation to the end ...A separate chapter has been ...ted to this.

...Dependent are practical operations ...theoretical aspects some enlargement ...the fundamental principles has been ...med necessary.

Electrolytic Manganese

(*Continued from Page 143*)

which electrolytic manganese was ad to furnace and ladle. As recoveries manganese with oxidizing slags may low when the electrolytic manga chips are scattered on top of the s two methods of adding the manga to the furnace were studied. In 1/32 to 1/16-in. by 1/2 to 2-in. c of electrolytic manganese were show into the furnace on top of the slag. coveries in this case were only 47.5 cent at the time of blocking the and 44 per cent on final addition of bulk of the manganese before tap. the other case the chips were adde 50-lb lots, in burlap sacks; recov of 78 and 70 per cent were calcul for the manganese addition at tim block and final addition before tap spectively. Furnace recoveries with romanganese normally range from 6 70 per cent in this practice. Add of electrolytic manganese to the gave a recovery of 89 per cent; here of the slag was held back by the use 6-in. tap hole. Thus, it is demonst that recovery of electrolytic manga is not a serious problem with oxid slags when a suitable technique for ing the addition has been develope

Time of Addition Important

A good illustration of the use of ganese to reduce the FeO (ferric o content of the slag and to secure b deoxidation of the steel was had the electrolytic manganese was a at the time of the silicon block. slag taken after the boil in each showed the expected high FeO correspondingly low SiO_2 (silica). A heat was blocked the FeO decre and the SiO_2 increased. When electrolytic manganese was added, MnO (manganese oxide) incre markedly in both heats so treated, the FeO as well as the SiO_2 dro The action of the electrolytic manga may be attributed to the relatively state of division of this material as pared with ordinary ferromanga This was confirmed by experimen which finely divided ferromanganese added to the slag and the reaction ceeded in the same direction. In heat in which electrolytic manga was added to the ladle the analys the furnace slag remained fairly stant after the heat was blocked.

As considerable attention is pa the effect of hydrogen at this plant, for hydrogen, as well as tensile after different heat treatments, made on bars from the heats in que The tensile tests yielded results stantially as would be expected fo normalizing treatment received. An treatment of the normalized test ba 200° C increased the ductility mater It is of interest to note that bars were first heated at 200° C and normalized from 930° C did not the improvement in ductility found tempering was carried out after nor zing. The impression was gained

there were more "birds eyes" in the fractures of test bars that had been normalized only than would ordinarily be found in this type of steel, but these were not pronounced enough to be deleterious. It appeared that the electrolytic manganese introduced more hydrogen than the ferromanganese but the cast products from these heats were acceptable from every point of view. Further experimental heats will be made using electrolytic manganese that has been heat treated to remove hydrogen.

A series of tests was made in cooperation with the Atlas Steel Castings Co., Buffalo, in which electrolytic manganese was added to heats of acid steel produced in both the open-hearth and the electric furnace. Most of the heats were in the upper part of the low-carbon range (0.20 to 0.25 per cent C), with manganese between 0.60 and 0.80 per cent. Heats also were made of high-manganese steel (1.15 to 1.60 per cent Mn) in the medium-carbon to low-carbon range. All the grades tested are used for green-sand or cured-sand castings.

In the usual open-hearth practice of the plant, standard ferromanganese is added (3/5 of the addition to the furnace and 2/5 to the ladle) to provide the necessary manganese content and to recarburize from about 0.14 per cent carbon at which the carbon is blocked with 50 per cent ferrosilicon. The only departures from usual practice in the trial heats with electrolytic manganese were the addition of all the manganese to the ladle and recarburization with pig iron shortly before tapping; only occasionally is pig iron required for recarburizing when ferromanganese is used.

Two Practices Differ

The electric furnace practice differs somewhat from that of the open hearth. The initial slag is removed after the heat boils, and a new slag is built from sand and limestone; neither slag is heavy. The entire ferromanganese addition is made on top of the slag in the furnace about three minutes before tapping. When electrolytic manganese was used the entire addition was made to the ladle in some heats, to the furnace in others, and in still others part to the furnace and part to the ladle. Additions were shoveled into the furnace in the usual manner. Pig iron was added to recarburize after the carbon was blocked in each heat using electrolytic manganese.

All the trial heats in both open-hearth and electric furnace worked normally. Manganese recoveries were at least as high as those normally obtained from ferromanganese additions. Recoveries for 14 comparative electric furnace heats of the 0.20/0.25 carbon, 0.60/0.30 manganese grade made with ferromanganese ranged from 67.4 to 90.1 per cent and averaged 76.2 per cent; recoveries from electrolytic manganese in four electric furnace heats of the same grade ranged from 72.4 to 92.8 per cent and averaged 82.7 per cent. According to Atlas metallurgists, the steel made with electrolytic manganese had better physical properties than the same grades made

with ferromanganese. Physical properties of the electrolytic manganese heats to the above-mentioned specification are shown in Table IV.

No difference in cleanliness of the steel was reported. The ladle additions of electrolytic manganese, which were considerably larger than Atlas will make with ferromanganese, caused no difficulties, such as excessive chilling of the metal or hard spots in the castings owing to segregation of manganese. The open-hearth melter considers the ability to make larger ladle additions a decided advantage for electrolytic manganese.

Tests on the use of electrolytic manganese in the manufacture of acid electric steel for green sand castings were carried out in cooperation with the Detroit Steel Castings Co., Detroit. Preliminary tests were made with the addition of electrolytic manganese and ferromanganese to 100-lb samples of steel from a regular production heat, after which electrolytic manganese was added to the ladle to three 3-ton heats; two heats were carbon steel, and one was low-alloy steel. For comparative purposes, an equal number of heats of each grade was made in which all the ferromanganese was added in the ladle. Normally, part of the standard ferromanganese is added to the furnace and the balance in the ladle.

Behavior of Heats

All heats behaved similarly, finished satisfactorily, and produced sound castings irrespective of the form of manganese used. There was no significant difference between the yields from electrolytic manganese and ferromanganese, the former averaging 77.4 and the latter 77.7 per cent. Severe deoxidation with aluminum and other powerful deoxidizers to insure sound castings made comparison of the deoxidizing effect of the two forms of manganese impossible.

R. B. Melmoth, metallurgical assistant of the Detroit Steel Casting Co., carried out extensive microscopic studies and physical tests on test bars from the electrolytic manganese and comparative heats after various heat treatments. The microstructure and the inclusion shape, size, and distribution were not influenced to any noticeable degree by the form of manganese used.

The physical properties of the low-alloy heats agreed closely and showed no appreciable advantage for either form of manganese. The heat made with electrolytic manganese analyzed: carbon 0.30, manganese 1.02, copper 0.42, molybdenum 0.15 and nickel 0.63 per cent. In the normalized, oil-quenched and drawn condition its physical properties were: Ultimate strength, 98,200 psi; yield strength, 81,000 psi; elongation, 25.0 per cent; reduction of area 59.84 per cent; and rockwell B hardness, 98. The carbon steels were made to the specification: carbon 0.24/0.28, manganese 0.65/0.70 and silicon 0.30/-0.35 per cent. Average physical properties after various treatments for the two electrolytic manganese heats and the

...o ferro heats are shown in Table V. ...e ductility of the steel made with ...olytic manganese is slightly better, ...maximum physical properties are ...oped with shorter time of draw, ...with the steel made with ferro-...nese. These properties are re-...ed also in the consistently higher ...y factor and the attainment of ...mum quality factor after a 6-hr draw ...the electrolytic manganese-treated ... The same trends are true of the ...idual heats represented by the ...ges. Although the evidence of ...physical properties and quicker ...nse to heat treatment shown by so ...heats is not conclusive, it does in-... the possibility of improving the ...y of medium-carbon acid steel by ...e of electrolytic manganese.

...eration of Blast Furnaces

(*Concluded from Page* 135)

...by-products, Pittsburgh, stated that ...e past, coke oven operators have ...able to select their coal. However, ...sources have been worked out and ...which never have been coked be-...are now being drawn upon. The ...er suggested that coke oven opera-...learn more about these newly opened ...s in order to get the proper mix. ...Pocahontas coal is now being ex-...sted, Mr. Brown stated, and it is now ...ssary for Pocahontas operators to ... This, in his opinion, should be ...at the ovens and not the mines.

...of washed coal at the Kaiser ... Fontana, Calif., lowered the ash ...lphur contents and afforded a re-...on of 46 cents per ton in the cost ...e and 41 cents per ton in the cost ...metal, according to J. H. Thomp-...superintendent, coke plant, Kaiser ... He also pointed out that 1.7 per ...pitch added daily to Sunnyside ...coal increased the strength of the ... All physical properties of coke ...at the Fontana plant, with the ex-...on of porosity, were increased by ...ing Sunnyside coal with coal se-... from Oklahoma. The rate of im-...ment is the greatest when 12½ per ...Oklahoma coal is added to the coal ... Moreover, he stated, blast furnace ...tions smooth out as a result of the ...oma-Sunnyside mix. Data follows:

	Sunnyside coke	Oklahoma-Sunnyside coke
...-y iron		
...ction, n.t.	1154	1235
...-ton hot metal	1778	1468
...ton hot metal	1100	1000
... loss/mo	33	26

...decided improvement in the coke ...was obtained by using 10 per cent ... Mr. Thompson stated. Improvement ...ked up to 10 per cent char and then ...ped off when a higher percentage is ...ed with Sunnyside coal, according ... oven tests. Char containing 16 per ... volatiles when added to Sunny-...coal gave the best tumbler tests. A ...ked improvement in the coke was ...ieved by blending 83.3 per cent Sun-...de coal with 15 per cent char and ... per cent pitch.

THE BUSINESS TREND

Reconversion Progress Lags Behind Schedule

THE END of the first quarter-year since cessation of war finds industrial activity increasing, with some new high marks for the year recorded in the latest week. However, production has not attained the rate that had been hoped for, because as industry started adjusting to peacetime pursuits it was beset with strikes.

Failure to have progressed further makes the outlook for fourth-quarter earnings of leading industrial corporations no brighter than performance in the third quarter when net earnings of 320 large firms dropped 10.1 per cent under the corresponding period of 1944. A tabulation by the National City Bank of New York showed that a 12 per cent increase which those 320 firms made in the first half of 1945 over the same period of 1944 was reduced to 2 per cent by end of the third quarter.

COAL—Production of 12,400,000 tons of bituminous coal in the week ended Nov. 3, only two weeks after mining was resumed after a strike, hit a new mark for this year.

AUTOS—Another new record for this year is assembly in the week ended Nov. 10 of 34,325 automobiles, a 25 per cent increase over the preceding week. That weekly production figure is the highest since Feb. 7, 1942.

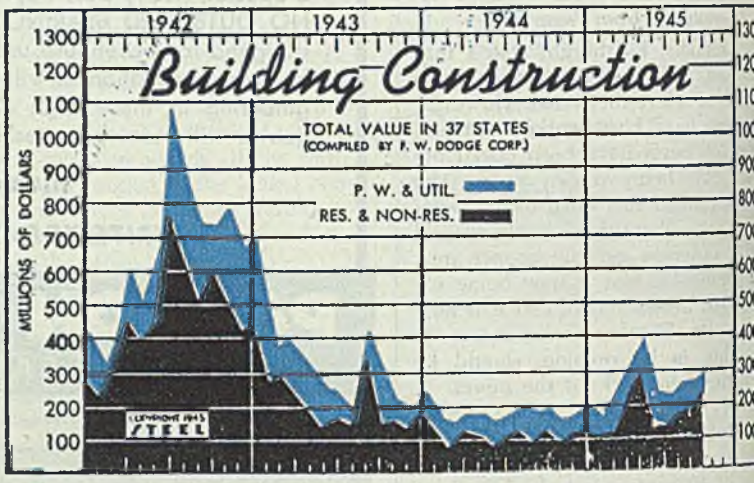
STEEL—Also continuing an upward trend is steel ingot output which undoubtedly could climb to and hold at 90 per cent of capacity, favorable labor conditions prevailing.

INFLATION—Reflecting inflation, a 3-cent rise sent the Dun & Bradstreet wholesale food price index in the week ended Nov. 6 to $4.14, exceeding the war peak of $4.12 of May 18, 1943, and representing the highest level since Oct. 14, 1920.

TRADE—Pent-up demand for merchandise caused the department store October sales index (seasonally adjusted) to exceed that of S tember by 15 percentage points, more than the us amount. Likewise, sales to Nov. 3 of this year are per cent higher than to the same date in 1944.

STOCKS—As the stock market's bullish trend continu the Dow-Jones industrial share average closed the w ended Nov. 10 with a rise of 2.79 points over the prec ing week's close. Also up were railroad and utilities erages, the former rising 0.16 point and the latter m ing 0.87 point over the previous week's close.

CASTINGS, FORGINGS—Production and backlogs steel castings and steel forgings in August declined f July. Steel castings production and backlog fell 3.4 cent and 23 per cent, respectively, and shipment and b log of steel forgings dropped 36 and 62 per cent, res tively.



Construction Valuation In 37 States

(Unit—$1,000,000)

	Total		Public Works-Utilities		Residential & Non-Residen
	1945	1944	1945	1944	1945
January	140.9	159.2	39.8	50.3	101.2
February	147.0	137.2	32.0	55.1	115.0
March	328.9	176.4	90.6	61.3	238.3
April	395.8	179.3	111.9	72.0	283.9
May	242.5	144.2	107.9	55.8	134.6
June	227.3	163.9	95.0	70.7	132.3
July	257.7	190.5	89.9	80.5	167.8
August	263.6	169.3	77.5	69.4	186.1
September	278.3	175.7	54.6	64.1	223.6
October	.....	144.8	.....	52.2	.....
November	.....	164.9	.....	48.0	.....
December	.....	188.5	.....	66.6	.....
Total	.....	1,993.9	.....	746.0	.....

FIGURES THIS WEEK

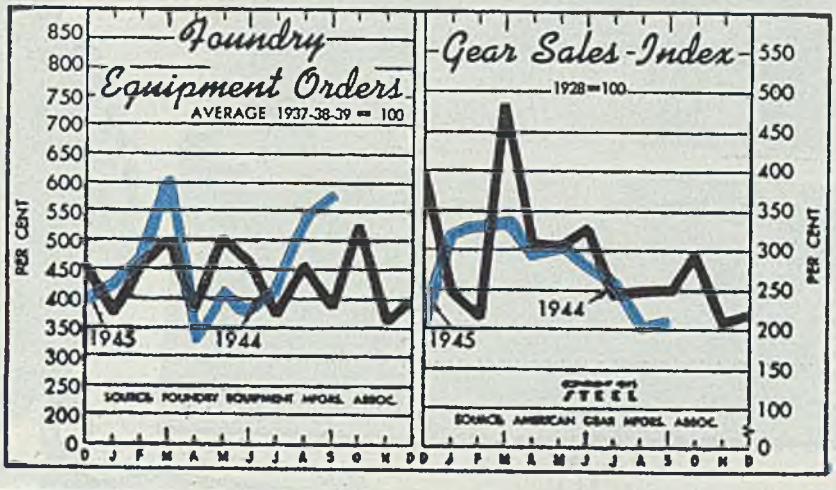
INDUSTRY	Latest Period°	Prior Week	Month Ago	Ye Ag
Steel Ingot Output (per cent of capacity)	76	73	73.5	9
Electric Power Distributed (million kilowatt hours)	3,900†	3,899	3,934	4,3
Bituminous Coal Production (daily av.—1000 tons)	2,067	2,022	1,333	2,0
Petroleum Production (daily av.—1000 bbls.)	4,451	4,318	3,781	4,7
Construction Volume (ENR—Unit $1,000,000)	$45.8	$87.8	$33.2	$87
Automobile and Truck Output (Ward's—number units)	34,325	27,320	11,825	20,9

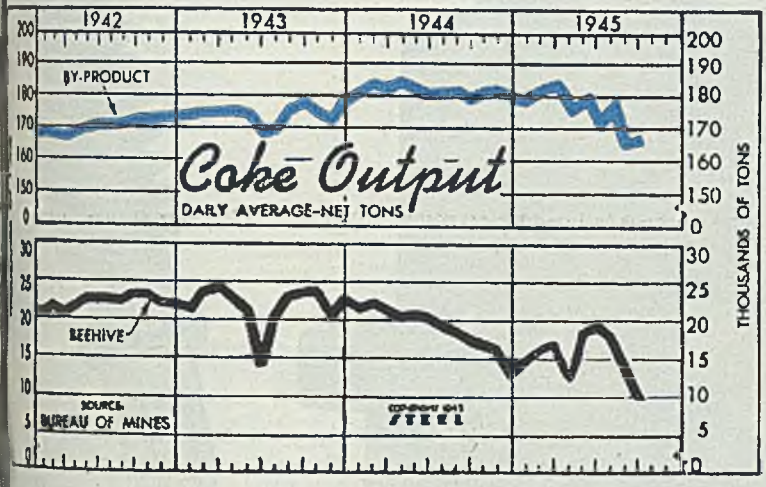
°Dates on request. †Preliminary.

TRADE				
Freight Carloadings (unit—1000 cars)	850†	852	755	8
Business Failures (Dun & Bradstreet, number)	17	17	12	
Money in Circulation (in millions of dollars)‡	$28,137	$28,026	$27,962	$24,67
Department Store Sales (change from like a week a year ago)‡	+10%	+12%	+11%	+

†Preliminary. ‡Federal Reserve Board.

Foundry Equipment Orders Index (1937-38-39=100)			Gear Sales Index (1928=100)		
1945	1944	1943	1945	1944	1943
422.4	378.3	429.8	323	246	208
465.3	456.8	399.5	331	214	303
604.7	498.4	562.7	339	485	334
525.0	385.7	362.7	296	308	240
404.7	503.9	348.9	309	305	312
375.4	466.1	413.6	271	328	401
411.7	375.8	379.4	264	242	374
532.2	450.5	390.4	205	247	312
577.2	388.0	346.6	213	248	320
....	526.5	436.6	...	293	368
....	369.5	388.0	....	209	387
....	397.4	442.8	...	219	387
....	433.1	408.4	...	279	336





Coke Output

Bureau of Mines

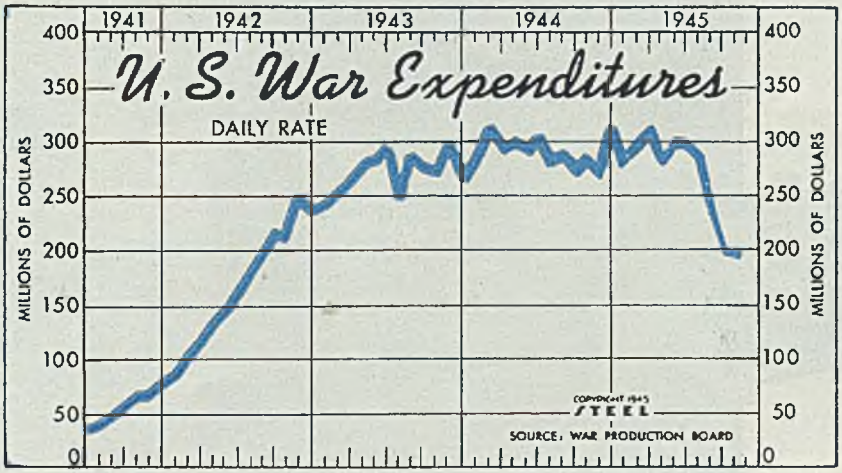
(Daily Average—Net Tons)

	By-Product		Beehive	
	1945	1944	1945	1944
Jan.	179,879	182,226	14,745	21,933
Feb.	180,727	184,384	16,210	22,248
Mar.	182,120	183,123	17,115	21,529
Apr.	174,239	185,259	12,554	20,157
May	178,838	184,071	17,963	20,783
June	173,201	181,891	18,616	20,172
July	175,168	181,506	17,682	19,531
Aug.	163,567	181,718	14,669	18,572
Sept.	166,559	179,234	9,980	17,305
Oct.	.....	181,772	.....	16,994
Nov.	.....	182,383	.....	16,199
Dec.	.....	180,746	.....	13,307
Ave.	.....	182,359	.....	19,128

War Expenditures

(millions)

1945 Monthly Expenditures	1945 Daily Rate	1944 Monthly Expenditures	1944 Daily Rate
$7,519	$278.4	$7,416	$285.2
6,965	290.2	7,808	312.3
8,018	308.1	7,948	294.4
7,045	281.8	7,493	299.7
8,166	302.5	7,918	293.3
7,885	303.4	7,957	306.0
7,324	281.7	7,355	282.9
6,398	246.1	7,798	288.8
5,365	206.3	7,104	273.2
5,124	197.1	7,447	286.4
....	....	7,095	272.9
....	....	7,835	313.4
....	....	91,174	Ave. 292.4

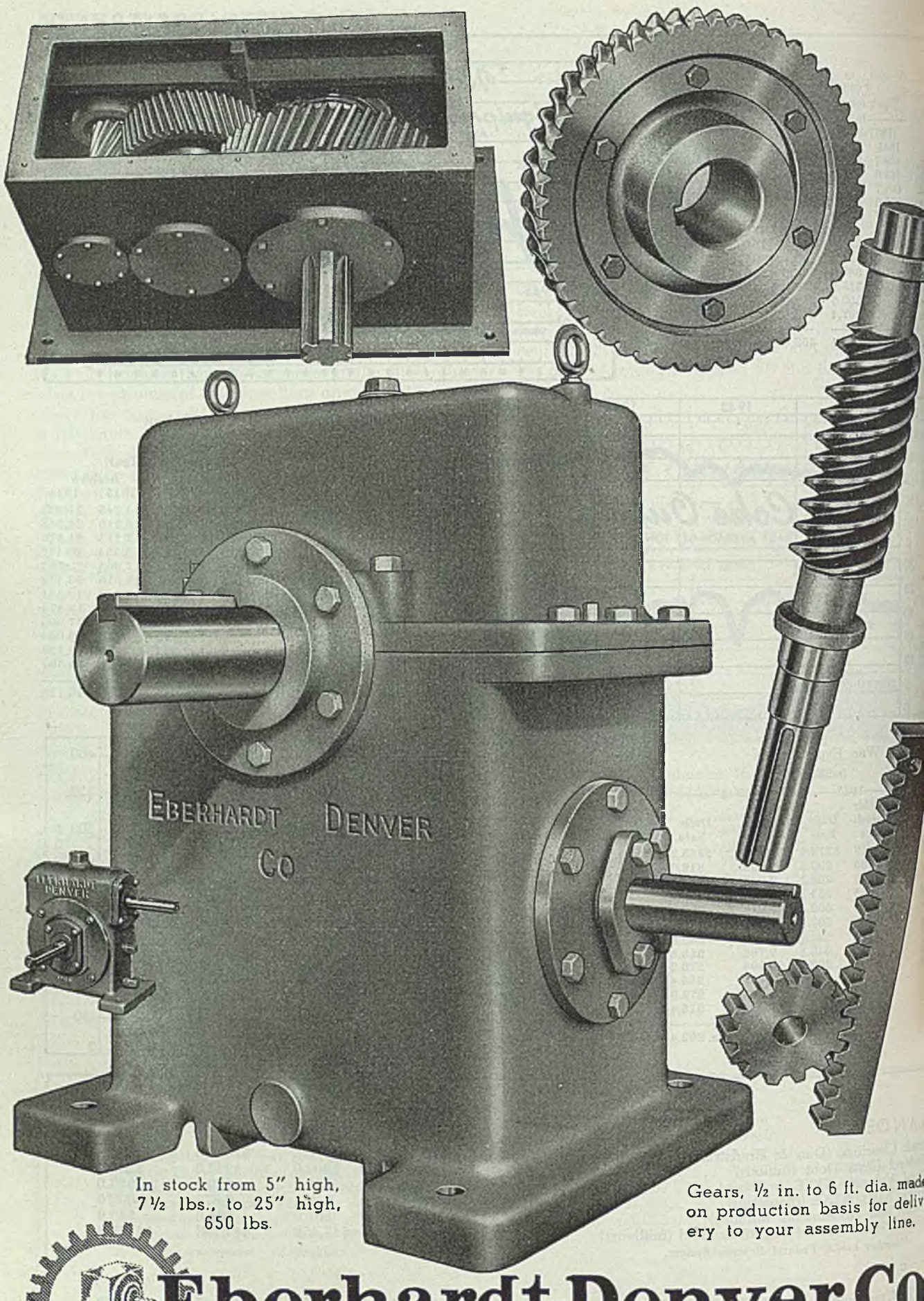


FINANCE	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$10,326	$11,376	$10,146	$9,229
Federal Gross Debt (billions)	$262.8	$262.0	$262.3	$210.5
Bond Volume, NYSE (millions)	$32.4	$36.3	$26.2	$33.0
Stocks Sales, NYSE (thousands)	8,949	9,464	6,672	3,570
Loans and Investments (billions)†	$60.9	$61.0	$61.0	$53.9
United States Gov't. Obligations Held (millions)†	$45,142	$45,458	$45,143	$39,656

†Member banks, Federal Reserve System.

PRICES				
STEEL's composite finished steel price average	$58.27	$58.27	$58.27	$56.73
All Commodities†	105.9	105.7	105.2	104.0
Industrial Raw Materials†	118.2	117.4	116.3	114.0
Manufactured Products†	101.9	101.9	101.8	101.1

†Bureau of Labor Statistics Index, 1926 = 100.



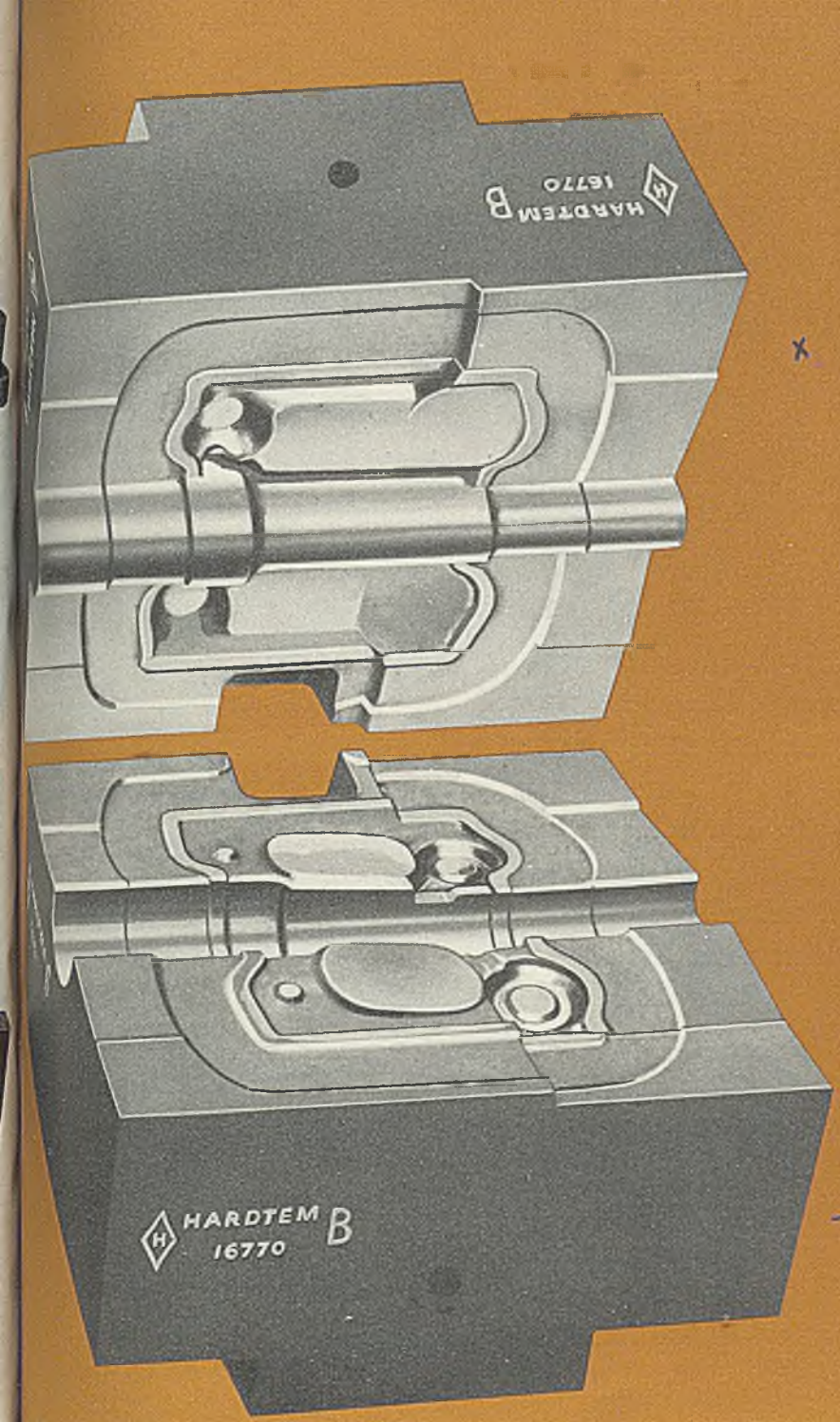
In stock from 5" high, 7½ lbs., to 25" high, 650 lbs.

Gears, ½ in. to 6 ft. dia. made on production basis for delivery to your assembly line.

Eberhardt-Denver Co

GEARS AND SPEED REDUCERS

1418 West Colfax Ave., Denver 4, Colorado Phone TAbor 7134



You're 5 steps ahead

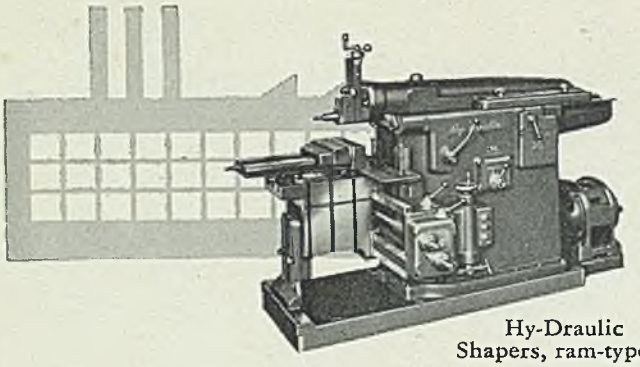
with Heppenstall Die Blocks

IT'S NOT SURPRISING, that Heppenstall's customers represent the leaders in the forging field. Heppenstall's *exclusive* Hardtem process gives them a five-point lead. It assures (1) easier machinability, (2) adaptation for use without heat treatment by the user, (3) an impression that can be resunk repeatedly without annealing, (4) a block that can be replaced in service without hardening, and of course, (5) *more forgings per sinking.*

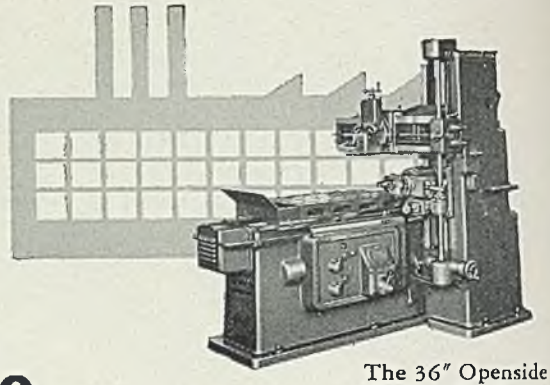
THEN TOO, people who are alert to such basic manufacturing advantages are certain to be on their toes in other phases of their business. Heppenstall Co., Pittsburgh 1, Pa.

Heppenstall

the most dependable name in die blocks



Hy-Draulic
Shapers, ram-type.



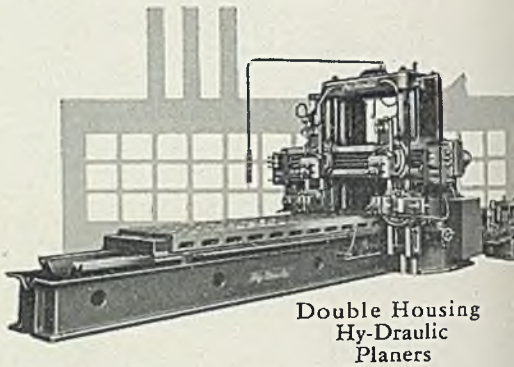
The 36″ Openside
Hy-Draulic Shaper

An Invitation to the 14 and 20

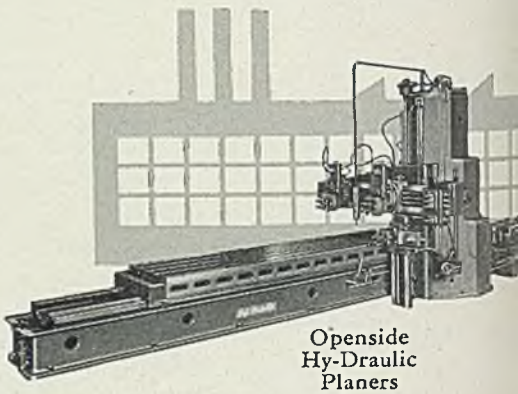
Of the plants studied in a recent survey, 14% report intentions to buy new planers and 20% new shapers.

Executives of these plants, and all others having similar intentions, are invited to investigate Rockford Hy-Draulic Planers and Shapers before making their decisions.

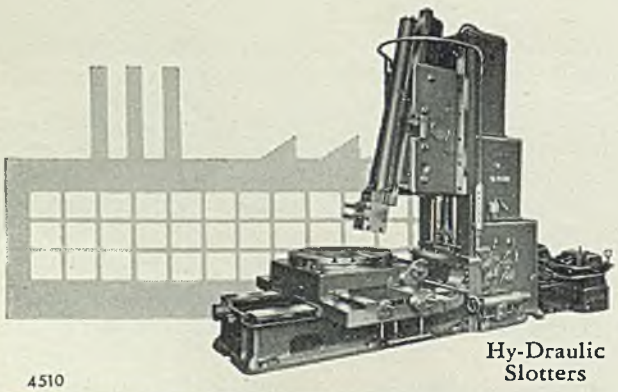
High grade in every respect, Rockford Hy-Draulic machine tools have the outstanding advantages of hydraulic drive and hydraulic feeds. They give you extra speed of set-up, ease of operation and rapid production of high quality work at low cost . . . plus values that have special importance right now. Write for details. Please mark your inquiry for the attention of Dept. 2912.



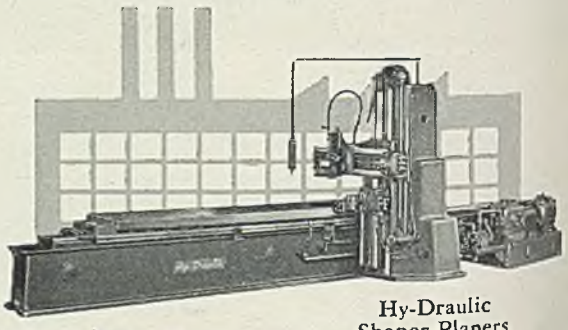
Double Housing
Hy-Draulic
Planers



Openside
Hy-Draulic
Planers



Hy-Draulic
Slotters



Hy-Draulic
Shaper-Planers

4510

Hy-Draulic

ROCKFORD MACHINE TOOL CO.

ROCKFORD, ILLINOIS

Larger Steel Output Fails To Balance Heavy Demand

Price advance expected soon to compensate for past cost increases . . . Production nearly back to pre-strike level

IN SPITE of accelerating steel production backlogs continue to mount and most producers are far behind on current commitments, with present demand at a rate far in excess of production for all major lines. This now extends even to plates, and premiums on this product set up during the war by OPA to relieve some producers are reappearing.

Indications are Office of Price Administration will authorize an increase in some steel prices within a week or ten days. Under increased pressure to act on steelmakers' request for an advance up to $7 per ton, entered several months ago, it is reported that action deferred for weeks will be taken as soon as top government officials decide policy and details are worked out. Some time ago it was indicated OPA favored granting increases averaging $2 to $2.25 per ton. Whatever increases are allowed will be to compensate for past accumulated higher wages and other production costs and will not take into consideration any possible wage increase which may stem from the current wage controversy in the industry.

Steelmakers have controlled the buying situation to a great extent by restrictions on order acceptance and by quotas, relating sales to previous consumption by buyers. In sheets, which are most in demand, various producers are refusing to accept tonnage for shipment beyond first quarter, which means under present circumstances that they are out of the market. In other products restrictions sharply limit order acceptance.

In view of the menacing labor situation, not only in the steel industry, but in various consuming industries, pressure for steel is astonishing. Undoubtedly one factor is progress in reconversion to civilian production since the war's end, progress which would have been more rapid had it not been for labor difficulties already encountered. The question arises whether demand and perhaps actual bookings have not been in excess of actual requirements, as some trade leaders believe, on the theory that shortage in supply stimulates undue demand.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

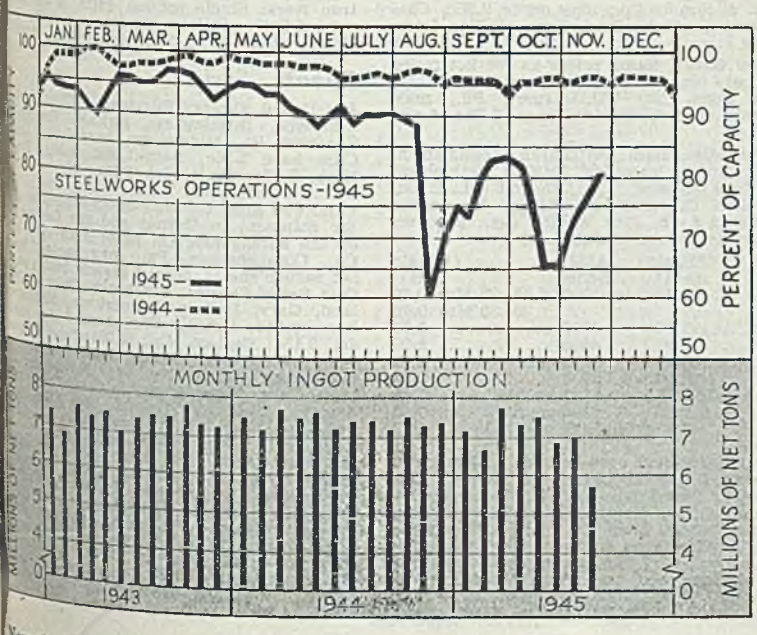
	Week Ended Nov. 17	Change	Same Week 1944	Same Week 1943
Pittsburgh	77	+2	93	101
Chicago	86.5	+4.5	99	101
Eastern Pa.	78	+4	95.5	95
Youngstown	75	+20	88	95
Wheeling	90	+5	91	101.5
Cleveland	83	+2	89	85.5
Buffalo	86	None	90.5	86
Birmingham	95	None	90	100
New England	81	—1	90	97
Cincinnati	67	—10	89	91
St. Louis	68	None	75	98
Detroit	87	None	88	88
Estimated national rate	80.5	+4.5	96.5	99

*Based on steelmaking capacities as of these dates.

Continued progress is being made in recovery from effects of the coal strike, the estimated national steelmaking rate regaining 4½ points last week, reaching 80½ per cent of capacity, only slightly below the prestrike level. Youngstown made the greatest gain, 20 points, to 75 per cent. Chicago rose 4½ points to 86½, Pittsburgh 2 points to 77, Wheeling 5 points to 90, Cleveland 2 points to 83 and eastern Pennsylvania 4 points to 78. Cincinnati declined 10 points to 67 and New England lost 1 point, to 81. Other districts made no change, as follows: St. Louis 68, Buffalo 86, Birmingham 95 and Detroit 87.

A further step in setting up new basing points has been taken, Carnegie-Illinois Steel Corp. establishing Youngstown and Tennessee Coal, Iron & Railroad Co. making Birmingham basing points on tobacco hogshead and slack barrel hoops. Prices will be those formerly quoted at the Pittsburgh base.

Effect of the coal strike on steel production is shown in output of ingots in October, 5,620,007 net tons, compared with 5,983,361 tons in September. Percentage of operation dropped from 76.3 to 69.3 as a result of fuel shortage. Ingot production for ten months this year falls 7,515,189 tons short of output in the comparable period last year, reflecting labor and reconversion difficulties.



Finished steel shipments by the United States Steel Corp. in October totaled 1,290,358 net tons, 31,218 less than in September and 484,611 tons less than in the comparable month last year. This fairly represents the general downward movement of steel production under prevailing conditions.

Pig iron production is increasing as fuel supply allows more blast furnaces to resume and the pinch is lessening. However, supply still is short and melters will enter the winter with far less protection than usual, causing some apprehension. Great care continues in distribution of the iron to assure supply for actual needs without inventory accumulation.

COMPOSITE MARKET AVERAGES

	Nov. 17	Nov. 10	Nov. 3	One Month Ago Oct., 1945	Three Months Ago Aug., 1945	One Year Ago Nov., 1944	Five Years Nov., 1
Finished Steel	$58.27	$58.27	$58.27	$58.27	$58.27	$56.73	$56.7
Semifinished Steel	37.80	37.80	37.80	37.80	37.80	36.00	36.0
Steelmaking Pig Iron	24.80	24.80	24.80	24.25	24.05	23.05	22.0
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	16.40	20.8

Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composit Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steel Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; o gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for last Month, Three Months and One Year Ago

Finished Material

	Nov. 17, 1945	Oct., 1945	Aug., 1945	Nov., 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	2.60
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

	Nov. 17, 1945	Oct., 1945	Aug., 1945	
Bessemer, del. Pittsburgh	$26.94	$26.35	$26.19	$
Basic, Valley	25.25	24.65	24.50	
Basic, eastern del. Philadelphia	27.09	26.53	26.34	
No. 2 fdry., del. Pitts., N.&S. Sides	26.44	25.85	25.69	
No. 2 foundry, Chicago	25.75	25.15	25.00	
Southern No. 2, Birmingham	22.13	21.57	21.38	
Southern No. 2 del. Cincinnati	26.05	25.50	25.30	
No. 2 fdry., del. Philadelphia	27.59	27.03	26.84	
Malleable, Valley	25.75	25.15	25.00	
Malleable, Chicago	25.75	25.15	25.00	
Lake Sup., charcoal del. Chicago	37.34	37.34	37.34	
Gray forge, del. Pittsburgh	25.94	25.35	25.19	
Ferromanganese, del. Pittsburgh	140.00	140.26	140.33	1

Scrap

Heavy melting steel, No. 1 Pittsburgh	$20.00	$20.00	$20.00	$
Heavy melt, steel, No. 2, E. Pa.	18.75	18.75	18.45	
Heavy melting steel, Chicago	18.75	18.75	18.75	
Rails for rolling, Chicago	22.25	22.25	22.25	
No. 1 cast, Chicago	20.00	20.00	20.00	

Coke

Connellsville, furnace, ovens	$7.50	$7.50	$7.50	
Connellsville, foundry ovens	8.25	8.25	8.25	
Chicago, by-product fdry., del.	13.35	13.75	13.75	

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 M 1945. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel pro and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal lished basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to indi 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 (bil) $38; Pac. Ports, (bil) $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. bil. 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, Calcago, 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, Pa., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, 5—⅝ in. inclusive, per 100 lbs., $2.15 Do., over ⅝—$\frac{47}{64}$-in., incl., $2.30; Galveston, base, 2.25c and 2.40c, respectively. Worcester add $0.10; Pacific ports $0.50 (Pittsburgh Steel Co., $0.20 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.)

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 f on hot-rolled bars from Buffalo to Mans

Cold-Finished Alloy Bars: Pittsburgh, Ch Gary, Cleveland, Buffalo, base 3.35c; D del. 3.45c; Eastern Mich. 3.50c.

Reinforcing Bars (New Billet): Pittsb Chicago, Gary, Cleveland, Birmingham, rows Point, Buffalo, Youngstown, base Detroit del. 2.25c; Eastern Mich. and 2.30c; Gulf ports, dock 2.50c; Pacific dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, cago, Gary, Cleveland, Birmingham, Yo town, Buffalo base 2.15c; Detroit, del. Eastern Mich. and Toledo 2.30c; Gulf dock 2.50c.

Iron Bars: Single refined, Pitts. 4.40c; refined 5.40c; Pittsburgh, staybolt, 5.75c; Haute, single ref., 5.00, double ref., 6.25

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Birmingham, Buffalo, Youngst Sparrows Pt., Middletown, base 2.20c; G City, base 2.30c; Detroit del. 2.30c; E Mich. 2.35c; Phila. del. 2.37c; New York 2.44c; Pacific ports 2.75c.
(Andrews Steel Co. may quote hot-rolled for shipment to Detroit and the Detroit on the Middletown, O., base; Alan Wood Co., Conshohocken, Pa., may quote 2.3 hot carbon sheets, nearest eastern basing p

Cold-Rolled Sheets: Pittsburgh, Chicago, land, Gary, Buffalo, Youngstown, Middle base, 3.05c; Granite City, base 3.15c; D del. 3.15c; Eastern Mich. 3.20c; New York 3.39c; Phila. del. 3.37c; Pacific ports 3

Galvanized Sheets, No. 24: Pittsburgh, cago, Gary, Birmingham, Buffalo, Youngst Sparrows Point, Middletown, base 3.70c; ite City, base 3.80c; New York del. 4.25c. Phila. del. 3.78c; Pacific ports 4.25c.
(Andrews Steel Co. may quote galva sheets 3.75c at established basing point

Corrugated Galv. Sheets: Pittsburgh, Chi Gary, Birmingham, 29 gage, per square

Culvert Sheets: Pittsburgh, Chicago, e Birmingham, 16 gage not corrugated, Pacific alloy 3.60c; Granite City 3.70c; Pacific 4.25c; copper iron, 3.90c; pure iron 3.85c; coated, hot-dipped, heat-treated, No. 24, burgh, 4.25c.

...ing Sheets: 10-gage; Pittsburgh, Chi... Gary, Cleveland, Youngstown, Middle... base 2.85c; Granite City, base 2.95c; ...t. del. 2.95c; eastern, Mich. 3.00c; Pa... ports 3.50c; 20-gage; Pittsburgh, Chicago, ...y, Cleveland, Youngstown, Middletown, ...e 3.45c; Detroit del. 3.55c; eastern Mich. ...r Pacific ports 4.10c.

...ical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
...grade	3.30c	4.05c	3.30c
...ture	3.65c	4.40c	3.75c
...ial	4.15c	4.90c	4.25c
...	5.05c	5.80c	5.15c
...ial	5.75c	6.50c	5.85c
...eformer			
	6.25c	7.00c	....
	7.25c	8.00c	.....
	7.75c	8.50c	.....
	8.55c	9.30c	.....

...olled Strip: Pittsburgh, Chicago, Gary, ...land, Birmingham, Youngstown, Middle... base 1 ton and over, 12 inches ...and less 2.10c; Detroit del. 2.20c; Eastern ...2.25c; Pacific ports 2.75c

...olled Strip: Pittsburgh, Cleveland, ...stown, 0.25 carbon and less 2.80c; Chi... base 2.90c; Detroit, del. 2.90c; Eastern ...2.95c; Worcester base 3.00c.

...ality C. R. Strip: Pittsburgh, Cleveland ...stown, base 3 tons and over, 2.95c; ... 3.05c; Detroit del. 3.05c; Eastern ...3.10c; Worcester base 3.25c.

...olished Spring Steel: Pittsburgh, Cleve... ...ases, add 20c for Worcester; .26-.50 ...2.80c; .51-.75 Carb., 4.30c; .76-1.00 ...4.15c; over 1.00 Carb., 8.35c.

Terne Plate

...ates Pittsburgh, Chicago, Gary, 100-lb. ...x, $5.00; Granite City $5.10.

...ydric Tin Plate: Pittsburgh, Gary, 100-... box, 0.25 lb. tin, $4.35; 0.50 lb. tin, ...75 lb. tin $4.65; Granite City, $4.45, ...4.75, respectively

...n Back Plate: Pittsburgh, Chicago, ...ase 29 gage and lighter, 3.05c; Granite ...3.15c. Pacific ports, boxed, 4.05c.

...Ternes: Pittsburgh, Chicago, Gary, No. ...ncreted 3.80c; Pacific ports 4.55c.

...Coating Ternes: (Special Coated) Pitts... Chicago, Gary, 100-base box $4.30; ...City $4.40.

...ter Ternes: Pittsburgh base per pack... ...sheets; 20 x 28 in., coating I.C. 8-lb. ...5-lb. $14.00; 20-lb. $15.00; 25-lb. $16; ...lb.25; 40-lb. $19.50.

...ates

...ow Steel Plates: Pittsburgh, Chicago, ...Cleveland, Birmingham, Youngstown, ...Point, Coatesville, Claymont, 2.25c; ...ore, del. 2.44c; Phila., del. 2.30c; ...2.40c; Boston, del. 2.57-82c; Pacific ...2.55c; Gulf ports, 2.60c.

...City Steel Co. may quote carbon ...2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. ...Baker Co. Inc., 3.20c, f.o.b. Los Angeles. ...el Iron & Steel Co. 2.50c f.o.b. basing ...Geneva Steel Co., Provo, Utah, 3.20c, ...Pac. ports.)

...Plates: Pittsburgh, Chicago, 3.50c; ...ports, 4.15c; Gulf ports, 3.85c.

...Hearth Alloy Plates: Pittsburgh, Chi... Coatesville, 3.50c; Gulf ports 3.95c; ...ports 4.15c.

...ars

...ural Shapes: Pittsburgh, Chicago, Gary, ...ham, Buffalo, Bethlehem, 2.10c; New ...del. 2.27c; Phila., del. 2.215c; Pacific ...2.75c; Gulf ports, 2.45c.

...s

...rgh, Chicago, Buffalo 2.40; Pacific ports, ...

...Products, Nails

...Pittsburgh, Chicago, Cleveland, Birm... ...to manufacturers in carloads.

...basic, bessemer wire *2.75c

...wire ..... *†3.35c

...oducts to the Trade:

...ed and cement-coated wire nails, ...staples, 100-lb. keg, Pittsburgh, ...A & O, Birmingham, Cleveland, ...Pac. ports. $3.40; galvanized, ...and $3.05, resp.

...ed merchant quality wire, 100-... Pittsburgh, Chicago, Cleveland, ...ingham ..... ††$3.20

...alized Merchant quality wire, 100-... Pittsburgh, Chicago, Cleveland, ...ingham ..... ††$3.55

...fence, 15½ gage and heavier, ...base column 67

...wire, 80-rod spool, Pittsburgh, Chicago, ...Birmingham, column 72; twisted ...wire, column 72.

...Pittsburgh Steel Co., 0.20c higher; add ...for Worcester, 1 cent for Duluth; add ...for bright, annealed or galvanized and ...for other finishes for Pacific ports. ...bases as for bright basic except Bir...

...10 cents for Worcester; 50 cents for ...bright basic and 70 cents for all other ...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	¼	24	3½
¼ & ⅜	59	40½	⅜	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	—Seamless— Hot	Cold	—Lap Weld—	Char-coal
Sizes	B.W.G Rolled	Drawn	Steel	Iron
1"	13 $ 7.82	$ 9.01	.....	.....
1¼"	13 9.26	10.67	.....	.....
1½"	13 10.23	11.72	$ 9.72	$23.71
1¾"	13 11.64	13.42	11.06	22.93
2"	13 13.04	15.03	12.38	19.35
2¼"	13 14.54	16.76	13.79	21.63
2½"	12 16.01	18.45	15.16	.....
2½"	12 17.54	20.21	16.58	26.57
2¾"	12 18.59	21.42	17.54	29.00
3"	12 19.50	22.48	18.35	31.38
3½"	11 24.63	28.37	23.15	39.81
4"	10 30.54	35.20	28.66	49.90
4½"	10 37.35	43.04	35.22	.....
5"	9 46.87	54.01	44.25	73.93
6"	7 71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $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: 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	8	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

½ x 6 and smaller	65¼ 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

Semifinished hex	U.S.S.	S.A.E.
⅞-inch and less	62	64
⅞-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	69 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	3.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$28.20

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
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[34]	4.244[11]	4.715	6.012[23]	6.0
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[12]	4.613[14]	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[12]	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[15]	4.872[25]	4.172[21]	4.772	5.816[23]	5.
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[25]	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[20]	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]	.....	.....	..
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..
Claymont, Del*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	..
Coatesville, Pa.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	..
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[15]	4.40[10]	3.85[21]	4.669	5.60[23]	5.
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[15]	4.30[10]	3.75[21]	4.35	5.60[23]	5.
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[21]	.....	.....	..
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[31]	5.60[23]	5.
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[12]	4.500[24]	3.900[21]	4.659	5.93[23]	5.
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[12]	.....	.....	..
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[12]	4.475[24]	4.111[21]	4.711	6.10	6
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.40[12]	.....	.....	.....	.....	..
Middletown, O.*	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.65[15]	.....	.....	.....	.....	..
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[15]	4.20[24]	3.85[21]	4.65	5.75[23]	5.
Milwaukee	3.637[1]	3.687[1]	3.687[1]	5.287[1]	3.387[1]	3.737[1]	3.737[1]	5.272[15]	4.337[24]	3.987[21]	4.787	5.987[23]	6.
Indianapolis	3.58[1]	3.63[1]	3.63[1]	5.23[1]	3.518[1]	3.768[1]	3.768[1]	4.918[15]	4.568[24]	4.08[21]	4.78	6.08[23]	6.
St. Paul	3.76[2]	3.81[2]	3.81[2]	5.41[2]	3.51[2]	3.86[2]	3.86[2]	5.257[15]	4.46[24]	4.461[21]	5.102	6.09[23]	6.
St. Louis	3.647[1]	3.697[1]	3.697[1]	5.297[1]	3.397[1]	3.747[1]	3.747[11]	5.172[15]	4.347[24]	4.131[21]	4.931	6.131[23]	6.
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[15]	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[15]	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[3]	4.313[3]	5.313[26]	4.10[10]	3.75[22]	.....	.....	..
Los Angeles	4.40[1]	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[22]	5.613	5.85[23]	5.
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[15]	7.30[16]	5.483[21]	7.333	8.304[23]	8.
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[15]	6.60[15]	5.633[15]	.....	.....	..
Tacoma	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[15]	7.60[15]	5.883[21]	.....	.....	..
Seattle	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[16]	7.05[15]	5.883[21]	.....	.....	..

*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 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 bu [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 p [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—10 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 p [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, [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	18.00

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	52.80
less $7 freight allowance	

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, 91.0c; prices include duty o ported ore and are subject t miums, penalties and other sions of amended M.P.R. No effective as of May 15. Pr basing points which are also of discharge of imported nese ore is f.o.b. cars, ships dock most favorable to the

Molybdenum

Sulphide conc., lb., Mo. cont., mines	

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Basic open-hearth Electric

Designation	Chemical Composition Limits, Per Cent — Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Bars per 100 lb.	Billets per GT	Bars per 100 lb.
NE 8612	.10-.15	.70-.90	.20-.35	.40-.60	.40-.70	.15-.25	$0.65	$13.00	$1.15
NE 8720	.18-.23	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.70	14.00	1.20
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.35
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.30
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.15
NE 9830	.28-.33	.70-.90	.20-.35	.70-.90	.85-1.15	.20-.30	1.30	26.00	1.80
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 1 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
Toledo, 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
Portland, base	25.75	25.25	26.25	25.75
Akron, Canton, O., 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
Rock 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	.....	.....
Coraopolis, Pa., base	25.75	25.25	26.25	25.75
Provo Point, base	26.75	26.25	.....	.....
Baltimore, del.	27.74	.....	.....	.....
Sharon, Pa., base	.....	26.25	.....	27.25
Steelton, 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

Basic 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; Monessen, Homestead, McKeesport, Ambridge, Monaco, Aliquippa, McDonald, Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Bessemer ridge 1.24.

‡‡ Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

§§ Silicon 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. 37.84

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 grades 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	59.35
Ohio	47.70

Second Quality

Pa., Ill., Md., Mo., Ky.	49.35
Alabama, Georgia	40.80
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	30.30

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% gross ton, duty paid, $135 f.o.b. Clairton, Baltimore, Philadelphia or New York, whichever is most favorable to buyer; Rockdale or Rockwood, Tenn., where Tennessee Products Corp. 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 each c.l. $10 for ton, $13.50 for ton; $1.70 for each 1%, or fraction contained manganese over 82% and under 78%.

Spiegeleisen (Low and Medium grade); per lb. contained manganese; eastern zone, low carbon, bulk, c.l., 22c; 2000 lb. to c.l., 23c; medium, 14.50c and 15.20c; low carbon, bulk, c.l., 24.50c; 2000 lb to c.l., 24.40c; medium 14.80c and 16.20c; western zone, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.80c and 17.20c; f.o.b. shipping point, freight allowed.

Manganese Metal: 95-97% min. chromium, 1.50% max. iron, .50% carbon, eastern zone, per lb. contained chromium bulk, c.l., 79.50c, 2000 lb. to c.l., 80.50c; central 81c and 82.50c; western 82.50c 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 $2.023, 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 5 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, .0685c, .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. ¼ 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.

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.

Carboram: Boron 0.90 to 1.10% net ton to carload, 8c lb. f.o.b. Suspension Bridge, N. Y., frt. allowed same as high-carbon ferrotitanium.

Boram: 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, carload 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, packed 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., lb. 5.75c; ton lots 6.50c. Spot ½ cent higher.

Siminal: (Approx. 20% each of Si., Mn., Al.) Contract, frt. all. not to St. Louis rate, per lb. alloy; carlots 8c; ton lots 8.75c; less ton lots 9.25c.

Borosil: 3 to 4% boron, 40 to 50% Si., $6.25 lb. cont. Bo., f.o.b. Niagara Falls, N. Y., 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 [illegible] 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	13.81
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. Hvy 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. Hvy 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	
Shoveling Turnings	
Rerolling Rails	
Steel Car Axles	21.50-
Steel Rails, 3 ft.	
Steel Angle Bars	
Cast Iron Wheels	
No. 1 Machinery Cast	
Railroad Malleable	
Breakable Cast	
Stove Plate	
Grate Bars	
Brake Shoes	
(Cast grades f.o.b. shipping p	
Stove Plate	

CINCINNATI:

(Delivered consumer's plant

No. 1 Heavy Melt. Steel	$
No. 2 Heavy Melt. Steel	
No. 1 Comp. Bundles	
No. 2 Comp. Bundles	
Machine Turnings	9.50-
Shoveling Turnings	11.50-
Cast Iron Borings	11.00-
Mixed Borings, Turnings	10.50-
No. 1 Cupola Cast	
Breakable Cast	21.00-
Low Phosphorus	20.50-
Scrap Rails	16.00-
Stove Plate	

LOS ANGELES:

(Delivered consumer's plant

No. 1 Heavy Melt. Steel	$
No. 2 Heavy Melt. Steel	
No. 1, 2, Deal. Bundles	
Machine Turnings	
Mixed Borings, Turnings	
No. 1 Cast	

SAN FRANCISCO:

(Delivered consumer's plant

No. 1 Heavy Melt. Steel	$
No. 2 Heavy Melt. Steel	
No. 1 Busheling	
No. 1. No. 2 Bundles	
No. 3 Bundles	
Machine Turnings	
Billet, Forge Crops	
Bar Crops, Plate	
Cast Steel	
Cut, Structural, Plate, 1", under	
Alloy-free Turnings	
Tin Can Bundles	
No. 2 Steel Wheels	
Iron, Steel Axles	
No. 2 Cast Steel	
Uncut Frogs, Switches	
Scrap Rails	
Locomotive Tires	

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½c, refinery; dealers may add ¾c for 5000 lbs. to carload: 1000-4999 lbs. 1c; 500-999 1½c; 0-499 lbs. 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; 80-10-10 (No. 215) 16.50c; 80-10-10 (No. 305) 16.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 11.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis. Add for carlots. For 20,000 lbs. to carlots add 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, chemical, 6.40c, 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 or New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Bridgeport, Connecticut, Boston-Worcester, Springfield, New Hampshire, Rhode Lsland.

Primary Aluminum: 99% plus, ingots 15.00c lb., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c for 5000-9999 lbs.; 1c less through 2000 lbs.

Secondary Aluminum: All grades 12.50c per lb. except as follows: Low grade piston alloy (No. 12 type) 10.50c; No. 12 foundry alloy (No. 12 grade) 10.50c; chemical warfare service grade (92½% plus) 10.00c; steel deoxidizers in 2-inch bars, granulated or shot, Grade 1 (94-97½%) 11.00c, Grade 2 (92-95%) 9.50c to 10.00c, Grade 3 (90-92%) 8.50c to 8.75c, Grade 4 (85-90%) 7.50c to 8.00c; any other ingot containing over 1% iron, except PM 754 and 12, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-9999 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 for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, No. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11X, 17X, 25.00c; ASTM B-107-41T, or B90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 1X, 25.00c. Selected magnesium crystals, powder, and muffs, including all packing crating, barrelling, handling, and other preparation charges, 23.50c. Price for 100 lb. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, 5 lb. plant, any quantity; carload freight allowed all other alloys for 500 lbs. or more.

Nickel: Prices ex-dock, New York in 5-ton lots, add 1 cent for 2240-11,199 lbs., 1½c 1000-2239, 2c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum cadmium, 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, 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, 50.00c; 99.8% and over (arsenic, 0.05%. max. all other impurities, 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 224 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; electrolytic shot 28.00c.

Mercury: Open market, spot, New York, $93-$95 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, sticks, slabs, and all other "regular" shapes 1.00 f.o.b. Niagara Falls.

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%, $7.50 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. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.48c, 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 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: 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

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. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; 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., 3 to 3.50c lb. All other high grade alloys 5c 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 5.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c, add ½c 20,000 or more. Unsweated zinc dross; die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 198

Sheets continue most in demand of all steel products and producers are unable to cope with heavy orders offered. Little progress is being made in reducing backlogs, though much of the loss from the coal strike has been recovered. Delivery promises are well into second quarter on some grades. More sellers are adhering to quotas to insure best distribution and in some cases limit acceptances to first quarter.

Pittsburgh — Sheet output has recovered sharply from reduction in steel production during the coal strike. Barring further interruption to production it is expected that producers will be caught up with current commitments by the end of the year. Despite careful screening of orders, new bookings continue heavy, and pressure for early delivery is acute. At least one seller has received specific instructions from automotive customers that under no circumstances is steel sheduled for rolling to be held up in event of strikes in automotive plants. Sellers, awaiting price adjustments, are avoiding low-return or unprofitable items. Cited by some authorities are galvanized sheets, heavy structurals, reinforcing bars, steel piling and some forms of semifinished. One interest soon is expected to withdraw as a merchant source for sheet bars. Withdrawal of some hand mills has placed an added burden on continuous strip mills. Overall requirements for light flat-rolled steel tonnage continue well in excess of current production. An important indication of this situation is fact that jobbers are falling far short of replacing heavy withdrawals from stock of these items. Deliveries on hot-rolled pickled sheets, electrical and galvanized sheets and narrow strip are extended well into second quarter. To satisfy the particularly heavy demand for electrical sheets expected for the early postwar period, U. S. Steel Corp. will soon install a modern single-stand reversing cold reduction mill at the Vandergrift plant of the Irvin works here to produce silicon steel strip in coils. The Navy Material Redistribution and Disposal office here will take bids Nov. 24 on about 65 tons of cold-rolled strip, some of which is copper coated.

Cincinnati — Sheet mills are under heavy pressure for deliveries, and also in many instances for more liberal tonnage than mill quotas had granted. Actual demands account for the situation, district interests believe, although pressure may be augmented by buyers's desire to fortify against strike stoppages and price increases. New buying persists but extent of backlogs is uncertain because actual bookings are, in practice, confined to tonnage scheduled from month to month.

New York — While most sheet sellers are now limiting acceptances to first quarter only and are setting them up on quotas, consumers continue to press for tonnage for future as well as nearby positions. Mills still quoting beyond the first quarter could readily book themselves well into last half of next year, were they not also using selective measures. As it is, certain of the latter producers are now booked solidly into third quarter on certain descriptions of hot and cold-rolled and galvanized sheets. About the only important sheet product that is not under some form of selective acceptance by mills is stainless sheets and it would not prove surprising if polished stainless sheets will soon be put on a quota basis by at least two or three mills. Unpolished stainless sheets are still available in first quarter, with the pressure not too strong. Some producers operating on a quota basis closed their books on tonnage for January rolling Nov. 15; in other words, employing a 45-day lead time, as provided under CMP.

St. Louis — Pressure for sheets is undiminished. Slight improvement in production continues in spite of a 10 per cent shortage in manpower. Sheet and strip schedules are generally filled to third and fourth quarter. A few gaps in galvanized and electrical sheets are reported. Output is approximately 20 per cent less than a month ago.

Boston — From a broad range of fabricators inquiry for narrow strip continues unabated, with mill schedules filling for second quarter. Demand is well distributed as between high and low-carbon and alloys. Buying of shoe shank steel is notably brisk and on some sizes and grades of cold strip backlogs approximate six months. An increasing ratio of sheet volume is accepted without definite delivery promise. Galvanized sheets are among the tightest of flat-rolled products, with producers in some instances turning out less tonnage than during the period of wartime allocations. Silicon sheets, for which demand is in excess of prewar levels here, are also wanted, as are polished stainless, with deliveries on both in June with some mills.

Cleveland — Deliveries of flat-rolled products are up to eight weeks behind schedule, indicating that some material originally scheduled for delivery this month will not reach customers until after the first of the year. Some deliveries are moving out on schedule and those having a time lag of up to 30 days are in about the same position as they were during the war under Controlled Materials Plan. Mills have been unable to reduce order backlogs, due to the sustained pressure for material. Cancellations have been negligible, even though assembly of end products has been far below expectations in most instances. Manufacturers of components have received no reductions in orders and are building up banks of their products for shipment to end product makers as soon as automobile, household appliance and similar production reaches a higher rate. Evidence of placing identical orders with two or three mills has been uncovered, explaining in part the unprecedented demand. It is also believed that many manufacturers have ordered steel for a far larger production schedule than will be justified by the ultimate consumer demand. Correction of these two factors will relieve pressure on mills considerably. Redistribution of surplus material, both government and privately owned, also will tend to ease the situation. A large tonnage of surplus galvanized sheet, for instance, will be declared surplus soon in a central Ohio city. Hot-rolled, hot-rolled pickled, and cold-rolled sheet is available in February with the light gages generally extended one month further. The strip market is much tighter with heavy gages not available before May some mills are not booking additiona business in light strip for 1946 deliv ery. Most of the mills have adopte a policy of not accepting new orders fo delivery beyond first half of 1946.

Chicago — New sheet business con tinues heavy but pressure for deliverie is not as intense as might be expecte Every producer is using some form allocation to assure fair distribution. On important maker is declining business fo second half, 1946, the situation that fa distant being too muddled to give cle appraisal. The same company last wee reported it had not received the r quired 30-day advance filing of specif cations against all cold-rolled tonna for December rolling, but this lat proved to be not the case. Virtual 100 per cent specifications were receive but heavy paper work had prevente their processing prior to the Nov. deadline.

Steel Bars . . .

Bar Prices, Page 198

Demand for small sizes dominates t bar market, with some larger diamete available early in the year, while small sizes are booked as far ahead as secon quarter. Some producers are setting quotas, though not as widely as in fla rolled products. Selectivity is bei used in accepting orders and many i quiries are turned down.

New York — Although some larg sizes of hot carbon bars can still be h in the latter part of February, mo sizes are difficult to obtain before Mar and in the case of the very small siz before late second quarter. Small fla in fact, are now being quoted by o or two sellers for shipment in Augu

Some mills are endeavoring to set the schedules up on a quota basis, althoug this is not being done as extensively in the light flat products. Howeve practically all producers of hot carb bars are accepting tonnage on a more less selective basis, turning down co siderable inquiry in the process. Col drawn carbon bars are now being quo ed generally for delivery in Februar the situation not being as tight as in ho rolled bars. Hot alloy bars are bei quoted mainly for shipment in Januar although some tonnage can still be picke up, depending upon size and mill, f shipment before the end of this year.

Boston — Bar fabricators can get all and cold-drawn stock for first quarter b hot carbon bars are generally in secon notably smaller sizes, in which consum tion is heaviest. While warehou stocks of the latter are limited in mo cases, fabricators are not unduly co cerned as to supply; some substanti deliveries have bolstered inventories an most buyers are covered well throug first quarter. Fabricators who ha taken on contracts during the last fe weeks are in a less fortunate position regards small hot-rolled carbon sizes. S Pierre Chain Corp., Worcester, Mas bought 170 tons from surplus. The has, however, been a sharp decline demand for forged die-lock chains, al for remelting bars required by Wate town arsenal. Tool steel activity is slac large quantities of surplus stock are o fered at 65 per cent off mill price f.o.b location.

Chicago — To distribute their pr

traction equitably, barmakers find it necessary to allocate tonnages to consumers, a plan which the latter do not look upon favorably because tonnage allowed is far below requirements. New business on quality and ordinary carbon bars commands little better than second quarter, 1946, delivery. Some mills decline to accept orders for second half, next year. Buyers appear to have fair steel stocks, as they are not pressing for deliveries.

St. Louis — Pressure for merchant bars continues upward and schedules are filled for the most part to July and August. Few are being accepted beyond first quarter of 1946. Furnace repairs and the price structure continue to hold down shipments, some preference being given to orders for points where the producer can pick up the maximum in freight charges. This has had the effect of cutting out points like Chicago and Indianapolis where rates equalize with those districts. Mills are trying to avoid cluttering books with backlogs. Export inquiries continue with few orders accepted. Production remains at about 75 per cent under capacity. Manpower shows slight improvement.

Seattle—Oregon Steel Mills, Portland, Oreg., announces closing contracts to supply 20,000 to 30,000 tons of merchant steel bars to Russian and French interests for reconstruction. Shipments will be made to Vladivostock, Indo-China and France for rebuilding railroads, bridges and buildings. Under a longtime contract ingots for this project are being rolled by Isaacson Iron Works, Seattle. The latter firm reports most of its current commitments are for tractor equipment.

Pittsburgh — Production loss due to coal strike is expected to be made up by the end of this year on most sizes, barring further interruptions resulting from strikes. Cold-rollers also are recovering from the operating slump resulting from the sharp reduction in mill shipments during the coal strike. These interests are booked well into first quarter and beyond in some instances. Mills are scheduled into May on some carbon bars, but large rounds and alloys are promised for January. New orders continue to exceed output, notably for small shapes. Automotive interests are particularly active in placing forward tonnage and at the same time are pressing for early delivery. Threat of strikes arising out of the steel wage dispute and possibility of higher prices, plus fact that reconversion programs are behind schedule, have prompted many metalworking companies to put additional pressure on steel producers for early delivery. An increasing tonnage of surplus hot and cold-rolled alloy bars, rerolling quality billets and conditioned electric furnace billets is being put up for bids in this district, with the latest list prepared by the local Navy Material Redistribution and Disposal office including over 500 tons of these items.

Cleveland — Pressure for steel bars has shown no sign of easing, forcing some sellers to restrict bookings. In some instances this limit on new orders has been June of next year, although orders have been kept on books for delivery as far ahead as late third quarter. Small rounds are available from at least one seller for July and large rounds in May. Flat-rolled bars are available from January through April. There still has been no appreciable shifting to alloy bars, despite difficulties encountered by users in placing carbon bar tonnages.

Philadelphia — While large carbon bars still can be had for first quarter, most producers have little of any size available before second quarter and some mills are booked for practically all second quarter. While not establishing quotas one producer has set up limits, which in view of orders already in hand have placed some buyers in a position where they cannot expect more tonnage from this source for a year.

Steel Plates . . .

Plate Prices, Page 199

Plate buying continues to be heavier than had been expected and delivery promises now extend into next year with most producers, as far as March in some instances. Bookings in many cases are in excess of production and backlogs are growing.

New York — Plate demand continues to expand, with most sellers now reporting new orders as being in excess of production. Demand has been so strong for nearby positions that one eastern producer has now gone back to the $5 premium which was permitted during the war by the Office of Price Administration. Some sales at this premium have been reported recently on plates for delivery within three to four weeks.

Apart from premium tonnage, deliveries on sheared plates range from late

January through the greater part of March. In fact, one producer is said to be virtually sold out for first quarter. Certain producers have little left before the latter part of February.

Contributing to this situation is substantial demand for export, although some sellers report that it is not quite as active as a fortnight or so ago and describe this decline in part to scarcity in the nearby positions.

Philadelphia — While some sheared plate tonnage can be had in January, most promises fall in February and March, except in the case of some premium tonnage, which is available fairly nearby. The latter is offered by a district mill which during the war was given permission to quote up to $5 per ton above the going market. Offering of tonnage again at a premium is indicative of the tighter situation in plates. Plate producers generally are booking more tonnage than they are making.

Boston — Bath Iron Works is second low at $400,000 for construction of a coast guard lightship; Defoe Shipbuilding Co., Bay City, Mich., bid $398,800. Plate requirements for ships continue to shrink, with delivery pressure easier on tonnage ordered. For fabricating shops inquiry for lighter sizes is well maintained, with industrial buying slowly mounting as inventories are lowered. Surplus sales are slightly heavier, 577 tons at Boston in the last fortnightly compilation. Most went to fabricating shops, with 150 tons bought by a warehouse, New England Iron & Steel Co., Brockton, Mass. More mills are in February on additional sizes.

Birmingham — Plate production ha eased to a little better than 55 per cen of capacity. This reduced schedule i to give more even distribution of ste and not because of slackening demand

Tubular Goods . . .

Tubular Goods Prices, Page 199

Cleveland — Some mills are in a fairl good position on tubular products, ha ing placed their business on a strict quota basis to counteract extreme buyin pressure. At least one producer has ca celed all orders calling for delivery b yond the end of this year and is rebook ing only those for which the custom has actual need. Shipments to jobbe will be scheduled on the basis of month ly sales and will be limited to assu balanced stock. Most other sellers r port little success in attempts to rea range order books and are still tryin to give delivery promises months ahea Mills generally maintain a favorable p sition on oil country goods, which a available for first quarter.

Seattle — Inquiry for tubular goo is active and major projects are comin out for bids. Agencies report slow d liveries but this situation is expected improve soon. H. D. Fowler has be awarded about 100 tons of 8-inch ca iron pipe for Raymond, Wash. H. Purcell, Seattle, has 100 tons or more cast pipe for Tracyton, Wash. Bids ha been opened at Yakima, Wash., for 5 tons or more. Central Point, Oreg., w open bids Nov. 20 for about 500 to Olympia, Wash., has retained J. Carey, Seattle, to prepare plans for proposed $800,000 water system dev opment, including storage and pumpi facilities and eight miles of supply lin Bureau of Reclamation has called bi Nov. 30 at Klamath Falls, Oreg., for t Tule Lake division of the Klamath pro ect, involving 30 to 48-inch corrugat metal pipe, gates and other metal item

Wire . . .

Wire Prices, Page 199

Chicago—Wiremakers are experienci demand for fencing far outrunning pr duction. In view of the shortage, jo bers and distributors are concerned as whether they will be able to obtain r quired supplies. Current requiremen for welded mesh are also heavy and excess of output. Cancellations of weldi wire are heavy, these constituting wi for coating and not now needed follo ing the precipitous drop in welded co struction after the war's end. New bu ness embraces orders for paper and lea cable, magnet wire, weatherproof wi and aluminum conductor.

Buffalo — The low margin of pro on spring wire, which is in pressing d mand from automotive, furniture an other lines, has created a peculiar s uation here. A leading producer h gone on a temporary five-day week whi filling spring orders because the marg of profit is not sufficient to warrant pu ing a work premium for a six-day wee

New York — More tonnage in som wire products is offered than mills ca book, although there are scattered open ings on high-carbon in the 0.018-3 range for first quarter. Jobber stocks merchant products are low, notably i nails. Other tight spots include gal

ined and cold-heading wire and rods. ...ry is about the best on the latter and ...ry for rods has increased. In screen- ...g backlogs some mills are found to be ...rbooked on some items and are ask- ...g cancellations on part of the tonnage. ...ough schedules are somewhat more ...ble, revisions still are frequent.

Boston — Although most wire mills ...screening and allocating tonnage in ...e form no progress in reduction of ...klogs is apparent, with inquiry and ...very pressure unabated. Second ...rter capacity is filling on more prod- ...s and schedules for others extend into ...d quarter. Some orders are held in ...rance, mills being unable to give defi- ...delivery promise. Pressure to buy ...he part of fabricators reflects confi- ...ce in higher production during first ... Volume of inquiry is well in ex- ...s of immediate requirements, fre- ...ently well over former normal con- ...ption, which indicates a general ef- ...t to build up inventory.

Birmingham — Wire production is ...ly at about 80 per cent. Huge de- ...d for wire products, especially fenc- ... and nails, continues unsatisfied and ...houses are unable to meet require- ...s even approximately.

...ctural Shapes . . .

Structural Shape Prices, Page 199

...hicago — Structural steel awards ... taken a decided drop and new in- ... the past few days is negligible. ...e construction projects are being ... in abeyance in view of inability to ... steel in reasonable time. Fabri- ...ave heavy backlogs and the cur- ...bottleneck is detailing of jobs. At ...t this work is being promised on ... 12-week basis, which results in ... in supplying steel cutting lists to ... thereby draining fabricators' own ... as well as those of warehouses.

New York — Notwithstanding the fact ... fabricators and structural engineers ...ing handicapped by a shortage of ...men and estimators, backlogs at ...e mills continue to accumulate. This ...e despite the fact that various jobs ...ing held up because of uncertainty ... labor costs and deliveries of mate- ... a few months from now. Most ...e mills are now quoting February ... in some instances as late as March.

Boston — A 45-day lead time with no ...ges in specifications is geared to ... structural material quotas on a ...thly basis extending well through ... quarter by one leading shape pro- ... Mill backlogs are substantial and ...avy on small and medium sizes. ...ess in deliveries contributes to ...enance of premium prices permitted ... producer, notably with warehouses. ...derable tonnage is held up for ...ation of future costs, involving ...es and wages. New contracts ap- ...mate 1050 tons for a bridge and a ... addition, the latter at Stamford, ..., 655 tons.

Seattle — Fabricators find that while ...r tonnages are lacking a consider- ...e total in small jobs has been booked. ...ivity is fairly large at plants in this ... and many major projects are de- ...ping and much new work is expect- ...after the turn of the year. The Navy ... rejected bids for a drydock subdi- ...n at the Puget Sound Navy Yard, in- ...ing 200 tons of shapes and 80 tons of reinforcing steel. Date for new bids has not been announced. Isaacson Iron Works is supplying 100 tons for the plant of Stack Steel & Supply Co., Seattle.

Birmingham — Shape production currently is above 75 per cent of capacity but not sufficient to care for current requirements. Fabricators see no slackening, with bookings already well into next year.

Philadelphia — Shape mills generally are becoming well booked for first quarter, with one leading interest now quoting April on both standard and wide-flange sections. There is particularly active demand for angles 4 x 4 and under, beams under six inches and channels under five inches.

Phoenix Iron Co., Phoenixville, Pa., has been granted additional price relief of $2 per ton on shapes and an additional $2 on beams and channels from four to ten inches. This brings the general range to the equivalent of 2.45c, Bethlehem, Pa., the nearest basing point, and 2.55c on the four to ten inch sizes.

Cleveland — Fabricated structural producers report a substantial easing in manpower. Subletting of drafting work and training of new men in that and the estimating departments have tended to break the most serious bottleneck. Fabricated structural deliveries are now being made in five months. Delivery of plain material is below requirements and is promised for only a limited time ahead. Several large contracts for industrial buildings in northern Ohio have been

let and an even larger number are pending. There have been comparatively few contracts recently for apartment houses, hotels, and similar projects. Federal, state and county construction work generally is being held in abeyance until essential civilian work has been completed. Pent up demand for housing will not require a great deal of steel directly but will create heavy steel demand for plants and expansion of manufacturing facilities which will be used to manufacture equipment for the new houses.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 199

Pittsburgh — Leading producers report October bookings up sharply, with average increase representing an upturn of about 50 per cent. In some instances October sales were more than four times production. However, bookings this month are expected to decline, due in part to normal seasonal factors and fact that such an unusually heavy volume of tonnage was placed in October in an effort to get on mill books. Uncertainty as to when reinforcing bars will be available and price trend also are factors expected to retard bidding on new expansion programs. Sales of producers east of the Rocky Mountains are estimated to have totaled about 140,000 tons last month, compared with 90,000 in September and 45,000 last March. Contractors are pressing for early deliveries in an attempt to build up stocks for the anticipated sharp increase in construction activity next spring. Exp demand is also up sharply, with p ducers more oversold on this type t nage than on domestic work. Exp business is less than during the war, double that of the immediate pre years.

Theoretical steel allotment for r forcing bar production this month is than scheduled last month, but proc tion should top October fig as considerable carryover tonn will be involved during Novem Present monthly output on nat wide basis is about double average monthly total for the last of 1944. Heavy demand for steel dow sections, steel joists, and small shapes (rolled on 9, 10 and 12-inch m same as for reinforcing bars), are r ing it difficult to step up reinforcing production to desired levels and no provement in output is in sight.

Shortage of reinforcing bars is hol up construction work in many sect of the country, with the situation ticularly acute in Detroit. Produ are quoting a firm price on fabrica jobs they are sure will be compl in 60 to 90 days, but prices on s lengths shipped to fabricators are ject to quotations at time of shipmen

Chicago — Shortage of steel, not of construction projects, is curtailing tivity in reinforcing materials. S pliers find it necessary to dodge inqui rather than to seek them. Industry s of concrete bars during third qua are understood to have averaged al 100,000 tons per month, and it app that October business approximated per cent of that average. Import this is that billet producers are sold into second quarter next year. As a sult, bar distributors are pressing to tain as much of this limited supply possible. Awards of bars in this have been light the past few days, a number of postwar construction proj are being temporarily shelved for of steel.

Pig Iron . . .

Pig Iron Prices, Page 201

Pig iron supply is improving, return of banked blast furnaces as has become available. Further impr ment is forecast as other stacks are ing readied for production. Foun labor situation is improving slowly demand for iron is increasing. Accu lation of inventory for winter use is s

Chicago — Within the past few d pig iron supplies have improved slig and further gains can be expected. W it is a foregone conclusion that iron remain tight for the next several mon foundries will find their position a l more comfortable. This presupp that manpower will not pick up m than moderately; were foundries a to acquire additional help rapidly, m would increase to strain iron supply. terlake Iron Corp. is about to relight Zenith blast furnace at Duluth shor In the Chicago district, 32 of 41 furna are active, same as the previous we By early December, it is expected t five more will have resumed.

New York — Pig iron melt here o daily basis continues to improve, refl ing not only a certain recovery from shortage in coke and pig iron which sulted from the soft coal strike

month but also a somewhat easier labor supply. Due to the number of holidays this month and also to the fact that November has one less day than October, it is still questionable in some minds if the total melt for November will be any larger than for October. First quarter contracting is expected to get under way shortly.

Boston — Melters with authority to stock more than 30-day inventory of pig iron are not getting much additional tonnage, steel works and foundries included. Supply is sufficient to meet current melt, but few are building any important reserve. Slight hope for early relief in limited supply is held with the district furnace down and less iron than expected from one or two steelworks furnaces. Tonnage lost by the latter cannot be made good and stacks shipping to this territory have no stocks to draw on. Steelworks have put down some iron, via water shipments, but are generally still operating on close margin with one or two open hearths frequently down for repair. Shortage of labor and tightness of iron makes difficult placement of subcontracts for castings beyond current volume. More larger shops attempt to sub-let work, including shoe machinery builders. Delayed third quarter iron has generally been delivered.

Buffalo — Leading merchant iron sellers claim they are unable to fill a rather marked increase in buying orders, attributed to easier labor supply. Numerous foundries are said to be in a position to improve their melt, if iron is available, as a result of additional manpower. Sellers report the call for heavier tonnage is also due to backing up of production during the mine strike. Local railroad castings makers and New England textile equipment builders are among melters taking substantial quantities of iron. Shippers find the railroad car situation much improved.

Cincinnati — Shipments of pig iron are steadier, and in adequate volume to support the melt, which is tending heavier. Foundries report labor is moderately easier, enabling some headway against pressing demand for castings. Specifications this month are up, by nearly 25 per cent. Stove manufacturers are exceptionally active, on a delayed-season run.

Birmingham — Pig iron production is on the basis of 16 blast furnaces, with a Woodward Iron Co. stack down for repair. This unit is idle for the first time since 1939 and will be down for five to six weeks. Demand for pig iron continues strong.

Philadelphia — Difficulty in getting three blast furnaces back in full production after suspension during the coal strike is still reflected in pig iron output. However, enough iron is coming out to meet most pressing needs and early good supply is expected from now on, provided there are no more strikes. Consumption of both basic and foundry iron is expanding with foundries converting slow but steadily improving labor supply. Continued shortage of cast scrap is exerting undue pressure for foundry iron.

Scrap . . .

Scrap Prices, Page 202

Demand for scrap continues, with supplies only moderate and prices firm at ceilings. Labor shortage still limits preparation, though to a less degree. Material from terminated war contracts is increasingly in evidence, notably landing mat tonnage. Steelmakers in general take all material offered if up to grade, but threat of a steel strike injects a note of caution.

Pittsburgh — Scrap dealers have predominated among bidders for contract termination inventory offered by steel producers and metalworking companies here. However, most of this material has been absorbed by the latter, with the remainder difficult to move, as most bids on publicly offered material represented scrap prices which were below minimum levels specified by the government. Scrap markets hold firm. Although buying is not extremely heavy, scrap interests are able to move anything of acceptable quality in the major grades. Industrial scrap is still scarce and no improvement is noted in cast scrap items. Railroads lag behind shipping schedules on recent lists, due to continued manpower shortage. With exception of landing mats, eagerly sought by dealers and consumers, not much war surplus material has been disposed of. Bids were received last week on 3900 tons of landing mat scrap at Fort Devens, Mass. A moderate tonnage of this material has been shipped into this district the past few weeks. The Armstrong Cork Co. recently sold 700 tons of shell forging scrap, f.o.b. plant, Beaver Falls, Pa., in 8-pound pieces with sulphur

content of 0.06 to 0.12 guaranteed. Pennsylvania Railroad will close Nov. 19 on 6500 tons of heavy melting steel and 400 tons of No. 1 steel rails, in addition to a number of miscellaneous items.

Cleveland — Scrap still is scarce and all consumers are in the market for any tonnage offered. Springboards of $1.25 and $1.50 are being paid for material from Michigan, Indiana and Pennsylvania in the effort to obtain supply. Open-hearth operators still are buying low phos electric furnace scrap at the higher price for use in their furnace. This is curtailing supply of these grades and a winter shortage is likely. A large Ohio electric furnace operator now is idle because of a strike and is likely to find supply depleted when production is resumed. Under the present eager demand is a note of caution in view of possibility of a steel strike, but this has not yet caused buying to slacken.

New York — Pittsburgh consumers of heavy melting steel are more active here and at least one buyer has increased his springboard to $1.50. Meanwhile there is brisk demand from eastern Pennsylvania. Brokers claim melting steel scrap is being moved as rapidly as it can be prepared. Shortage of turnings and cast grades continues.

Philadelphia — Heavy melting steel consumers press for material in an effort to build up backlogs before winter. For the first time in several weeks all district consumers are in the market, with supply about equal to demand. Considerable unprepared scrap still is coming out but shortage of yard labor restricts preparation. Scarcity of borings and turnings is increasing. One district manufacturer, who until a few months ago was supplying 3500 to 4000 tons per month now is producing 150 to 200 tons. Cast grades also continue scarce.

Chicago — In the face of continued strong demand for all grades of prime scrap, prices hold firm at ceiling. District mills are nearing the production rate which prevailed prior to the coal strike, thereby lifting consumption of scrap. Furthermore, the fact that cold weather is close at hand and mills are seeking to build up inventories adds further strong tone. Some railroad items which have lagged slightly below ceiling show signs of strengthening. On the other hand, a note of easiness may be developing in borings and turnings for blast furnace use. Shipments of scrap to consumers are at a higher level.

Birmingham — Major emphasis continues on cast grades, which are relatively scarce. The market is active with one steelmaker still buying steelmaking material to compensate for an idle blast furnace.

Boston — Offerings of dealer scrap are small but in other directions slightly more heavy melting steel is coming out. Alloy-free carbon turnings also are scarce. District consumers of bundles are buying mainly from regular suppliers. Production of three-way scrap by forge shops has all but ceased in favor of carbon.

Award of 600 tons of landing mat component scrap to Luntz Iron & Steel Co., Canton, O., at $12.33 is the first over-ceiling bid accepted. Over-ceiling purchases for direct mill shipment are not permitted by OPA, but the Canton firm in bidding took shipment to its yard for preparation, thus meeting an OPA interpretation.

An even higher over-ceiling price was submitted by Luntz Iron & Steel Co., Canton, O., on 3942 tons of airfield mat component scrap, offering $12.88, specifying shipment to Warren, O. This is 55 cents over the prior offer by this company. Twelve bid on the material. Of 2000 tons were sold as only one bid arrived and the remaining 1942 tons will arrive at New York.

St. Louis — The scrap market remains tight, with greatest shortage in No. 1 heavy melting. Mills are taking all they can get and making up the deficit with baled turnings. Turnings largely are holding the general market up. The only large tonnage offered currently are in railroad scrap, much of which is used locally since allocations went off. Mill reserves are 45 to 60 days, with melters buying on 30-day basis and automatically extending orders if they do not get delivery. Shipments are around 80 per cent of normal. Some large offerings of termination scrap have been made in the last two weeks, one of 4000 tons and several of 1000 tons. Foundry grades are a little freer but foundries report the best supply in some time.

Cincinnati — Iron and steel scrap is strong even though most melters have normally adequate reserves. Some mill-ers are consuming a greater proportion of scrap than usual, prolonging a practice started during the pinch in supply. Demand for rails and cast scrap is incessant. Yard stocks are generally light, preparation being speeded by more liberal labor supply.

Buffalo — Demand capable of absorbing any tonnage that dealers can offer now appears to be hanging over a stagnant scrap market. Additional sales aggregating 15,000 tons are reported. A steel consumer placed an order for 10,000 tons at ceiling plus springboard and has notified dealers that springboard will be paid at canal points on orders now standing. Three more barge fleets, carrying approximately 10,000 tons, are reported enroute from the seaboard via the canal. Scrap interests attending the big auction of machinery and equipment at the Curtiss-Wright plant came away virtually empty handed as a large proportion of the material offered brought ceiling prices, or much higher than scrap values.

Seattle — Estimates of 350,000 tons of scrap in the Pacific Northwest, including surplus shipyard material and material resulting from war cancellations, could from Portland, Oreg., where strong market position has developed to the request for a reduction of freight rates from $14 to $10 per ton from the Pacific Coast to the Middle West. Local interests maintain this material should be kept here to stimulate the steel industry on the Coast. If the lower rates were granted it is claimed the large stocks involved would be moved in 90 days. Sale of the material is being handled by the surplus property branch of the Maritime Commission and the RFC. Sale of 25,000 tons of unprepared steel scrap from the Kaiser Vancouver shipyard to Durable Steel Products Co., Seattle, at $5.78 gross ton is announced. Bids are called for Nov. 14 for 35,000 tons at the Oregon Shipbuilding Corp. yards at Portland. Rolling mills are paying $10

gross ton f.o.b. plant, for unprepared scrap and state that offerings are in excess of current consumption. Inventories are being slightly increased. The situation is satisfactory as the material available is of high grade.

Warehouse . . .

Warehouse Prices, Page 200

St. Louis — Warehouse stocks continue a decline which is not expected to halt until the first of the year, shipments exceeding receipts by a small margin. All gages of sheets are in heavy demand and virtually none lighter than 10-gage is available. Plates under half-inch also are scarce. Although stocks are better than on V-J Day, warehouses are having trouble keeping them in balance. Some allocation systems are in operation. Dealers are attempting to avoid backlogging. Individual orders are smaller but total tonnage is up. Shopping continues undiminished and many inquiries are coming in from outside or fringe territory.

Cincinnati — Mill replacements for warehouses have sagged so that inventories are badly depleted. Inquiries are diminished, and the most active and scarce items are moved quickly. The supply is especially critical in sheets and strip.

Chicago — With warehouses restricted the same as other customers in shipments from mills according to voluntary allocation systems, and with pressure for material showing no easing the situation remains exceeding tight. Stocks of light-gage sheets, bar-size shapes, and structural shapes and thin narrow strip are discouragingly low or nonexistent.

New Basing Points on Hogshead, Barrel Hoops

Pittsburgh — New basing points have been established on tobacco hogshead and slack barrel hoops, effective Nov. 10. Carnegie-Illinois Steel Corp. has made Youngstown a base for these products and Tennessee Coal, Iron & Railroad Co. has made Birmingham also a base. Prices f.o.b. Youngstown and Birmingham, in carloads, are the same as now quoted f.o.b. Pittsburgh, subject to OPA ceilings.

On slack barrel hoops sizes range from 3 inches by 18-gage to 1⅛ inches by 13-gage. Prices range from 3.45 cents to 4.30 cents per pound, not painted, painted, flared or riveted. Tobacco hogshead hoops range from 10.02 cents to 10.50 cents per hoop, sizes ranging from 13 to 13.8 feet and weight from 2.45 to 2.60 pounds per hoop.

Canada . . .

Toronto, Ont. — Steel demand continues to expand and is rapidly filling books for first quarter. Against increasing demand, however, steel production is at the lowest point since 1941, largely due to reduced output by Nova Scotia mills. Ontario producers are operating close to capacity on ingot production, but are on reduced schedules in some finishing departments. While steel producers are accepting large tonnage orders for delivery in first quarter, they are discouraging excessive buying by consumers and are endeavoring to keep backlogs as low as possible. Progress is being made in filling old orders, accomplished by spreading supply over as many consumers as possible and feeding out small lots to manufacturers to enable them to continue operations.

Iron and steel production in Canada for September made a new low record for more than a year largely due to the fact that most producers were engaged in plant repairs. The greatest decrease in output was reported by Nova Scotia producers. Pig iron output in September at 135,227 net tons was at a rate of 58.5 per cent of rated capacity and compares with 139,812 tons in August when the rate was 60.5 per cent. Production of steel ingots and castings amounted to 198,508 net tons or 65.7 per cent and compares with 224,928 tons or 74.4 per cent in August. Following are comparative production figures in net tons:

	Steel Ingots Castings	Pig Iron	Ferro-Alloys
Sept., 1945 . . .	198,508	135,227	13,517
Aug., 1945 . . .	224,928	139,812	15,668
Sept., 1944 . . .	242,725	145,406	14,568
9 Mos., 1945 . .	2,248,215	1,367,389	143,607
9 Mos., 1944 . .	2,236,481	1,412,385	182,428
9 Mos., 1943 . .	2,237,736	1,331,966	168,637

Scrap iron and steel receipts show further decline and the supply situation is becoming more acute. Many dealers state that they are receiving no iron

scrap, and there has been sharp cut in offerings of iron grades with the result that they have difficulty keeping yard crews busy. Steel mills are having little success in accumulating for winter needs and daily receipts are not sufficient for current consumption.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

5000 tons, refinery extensions, Standard Oil Co., Whiting, Ind., and Sugar Creek, Mo., to American Bridge Co., Pittsburgh.

1000 tons, apartment at 74th St. and Madison Ave., New York, for Sam Mimskoff & Son, to Bethlehem Fabricators, Bethlehem, Pa.

750 tons, factory building, Kalamazoo, Mich., for Upjohn Co., to American Bridge Co., Pittsburgh; Austin Co., contractor; bids Nov. 7.

625 tons, addition for Pitney, Bowes Co., Stamford, Conn., to Bethlehem Fabricators, Bethlehem, Pa.

600 tons, apartment at 79th St. and Park Ave., New York, for Sam Mimskoff & Son, to Bethlehem Fabricators, Bethlehem, Pa.

400 tons, state bridge, Stafford, N. H., to American Bridge Co., Pittsburgh, through Charles Riva, Boston, general contractor.

300 tons, plant addition for Calco Chemical Division of American Cyanimid Co., Gloucester, N. J., to American Bridge Co., Pittsburgh.

300 tons, building, American Locomotive Co., Schenectady, N. Y., to Bethlehem Steel Co., Bethlehem, Pa., shop and field welded project.

150 tons, building for Deerfield Packing Co. at Bridgeton, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, plant for Stack Steel & Supply Co., Seattle, to Isaacson Iron Works, Seattle.

Unstated, 80-foot span at Longview, Wash.; general contract to Early Construction Co., Tacoma, Wash.

STRUCTURAL STEEL PENDING

14,000 tons, bridge superstructure at Memphis, Tenn., for Tennessee and Arkansas; American Bridge Co., Pittsburgh, low bidder, bids being rejected.

10,500 tons, vertical lift bridge, Terminal Island, Calif., United Concrete Pipe Corp. recommended for contract, Bureau of Yards and Docks, Spec. 17365.

7000 tons, store and hotel building, Cincinnati, for Thomas Emery & Sons Inc.; bids Oct. 26.

2700 tons, office building for Du Pont interests, Wilmington, Del.; general contract to Turner Construction Co., New York.

2200 tons, bridge over Potomac river, Sandy Hook, Md.

1000 tons or more, steel syphons and structures, San Diego, Calif., aqueduct; Haddock Engineers Ltd., Los Angeles, low at $640,856, Bureau of Yards and Docks, spec. 17383.

525 tons, fertilizer plant building, Dubuque, Iowa, for Virginia Carolina Chemical Corp.

488 tons, upper guide wall extension and appurtenant work, Gallipolis lock and dam, Ohio River; Maxon Construction Co., Dayton, O.; low; bids to U. S. engineer, Huntington, W. Va.

330 tons, Owens-Illinois Glass Co. at Glasboro, N. J.

225 tons, warehouse addition for Edgecomb Steel Co., Philadelphia, Turner Construction Co., New York, general contractor.

125 tons, record building for RCA-Victor, at Camden, N. J.

REINFORCING BARS . . .

REINFORCING BARS PLACED

20,000 to 30,000 tons, reinforcing and merchant, for reconstruction in Russia, Indo-China and France, to Oregon Steel Mill Portland.

1000 tons, building No. 4, Buick Motors Co Flint, Mich., to Joseph T. Ryerson & Son In Chicago, through Thorgersen & Erickso contractors.

1000 tons, concrete piers, berthing space inactive ships, Norfolk, Va., to Hall-Hodg Inc., Richmond, Va.; steel supplied by Be lehem Steel Corp., Bethlehem, Pa.

450 tons, store, East St. Louis, Ill., for Sea Roebuck & Co., to Laclede Steel Co., Louis; Fruin-Colnon Contracting Co., Louis, contractor.

351 tons, culverts, Flores and Belknap, Io for Chicago, Rock Island & Pacific railro 129 tons to Ceco Steel Products Corp., Cic Ill., 122 tons to Carnegie-Illinois Steel Co Chicago, and 100 tons to Joseph T. Ryer & Son Inc., Chicago.

300 tons, addition, U. S. Rubber Co., Detr to McRae Steel Co., Detroit; steel supp by Republic Steel Corp., Cleveland.

300 tons, Pontiac Motor Car Co., General tors Corp., Pontiac, Mich., to Truscon S Co., Youngstown, through O. W. Burke Co

300 tons, building addition, Sears, Roebuck Co., Buffalo, to Bethlehem Steel Co., Lac wanna, N. Y.

173 tons, new building No. 9, Chicago, Belden Mfg. Co., Chicago, to Joseph T. erson & Son Inc., Chicago; bids Oct. 10.

100 tons, store, Peoria, Ill., for Woolworth to Bethlehem Steel Co., Bethlehem, Pa.; Jobst & Sons, Peoria, Ill., contractor.

REINFORCED BARS PENDING

1500 tons, grain elevator, Tonawanda, N. for Eastern States Milling Corp.

1400 tons, Philadelphia, for North Ameri Warehouse Co.

756 tons, paving, 540 tons in Dubuque Jackson counties, Iowa, and 216 tons Sioux county, Iowa, for state highway co mission; general contract on former to W ern Contracting Corp., Sioux City, Iowa, on latter to Booth & Olson, Sioux City, Io bids Nov. 5.

319 tons, K & L building, Mansfield, O., Westinghouse Electric Corp.

300 tons, warehouse, Hudson Store, Detr Mich.

150 tons, asphalt tile plant, Kankakee, Ill., Armstrong Cork Co.; bids Nov. 2.

105 tons, bridge, Point Pleasant, W. Va., Baltimore & Ohio railroad.

100 tons, bridge, Baltimore & Ohio Railro Point Pleasant, W. Va.

100 tons, dock, Coast Guard, Portsmouth,

PLATES . . .

PLATES PLACED

Unstated, storage tank at Seattle plant for cific Molasses Co., to Western Steel & P Co.

PIPE . . .

CAST IRON PIPE PLACED

100 tons or more, 8, 6 and 4-inch for Tracyto Wash., to H. G. Purcell, Seattle, for U. Pipe & Foundry Co.

100 tons, 8-inch cast iron pipe for Raymon Wash., to H. D. Fowler, Seattle.

CAST IRON PIPE PENDING

500 tons or more, 40,000 feet of 8, 6 and inch for Central Point, Oregon; bids to G Tex, recorder, Nov. 20.

Steel in Europe . . .

London — (*By Radio*) — The pig iro position in Great Britain is improvin

ANNOUNCEMENT

Bowser, Inc. and Kold-Hold Manufacturing Company are pleased to announce that the sub-zero industrial equipment formerly manufactured by the Kold-Hold Manufacturing Company will in the future be manufactured and sold exclusively by Bowser, Inc.

Kold-Hold Manufacturing Company will devote its entire facilities to the manufacture of evaporator plates and cabinet liners.

BOWSER, INC.
WOODSIDE, LONG ISLAND

KOLD-HOLD MANUFACTURING CO.
LANSING, MICHIGAN

with larger supplies of coke and foreign ore. Steel semifinished products are scarce, limiting finished steel production. Sheet mills are fully booked far ahead. Heavy structural steel is quiet.

Farrell Works Purchased By Sharon Steel Corp.

(*Concluded from Page* 90)

stainless or other high-grade steels. These furnaces likely will be of 30-tons capacity.

Disposition of Sharon Steel's Lowellville, O., Works has not yet been determined. Officials of the company state the matter is under consideration. Normally, this plant produces only about half of the Sharon company's pig iron requirements. Operating facilities at Lowellville include the Mary blast furnace, the last hand-filled stack in the country, which was first erected 100 years ago. It has rated annual capacity of 150,000 gross tons of pig iron. Also at Lowellville are six open-hearth furnaces rated at 500,000 net tons annual capacity; one 30-ton electric furnace, 36,000 net tons annual capacity; 34-in. 2-high one-stand blooming mill, 420,000 gross tons annual capacity; a 21-in. 2-high 5-stand sheet bar and billet mill rated at 400,000 tons annually.

In selling the Farrell Works the Carnegie-Illinois Steel Corp. is carrying out a program of consolidation and unification of its properties which has been under way for some time past. The Farrell Works is located in what is known as the Shenango Valley and is more or less isolated from other Steel corporation operations. The Carnegie company, however, has important steel producing properties in the general Youngstown area, but these are more popularly described as being located in the Mahoning Valley. Carnegie has the McDonald mill at McDonald, O., which has about 1,500,000 net tons of finished steel capacity annually, including structural shapes, universal plates, black sheets, hot-rolled strip, strip for cold reduced black plate and tin plate, concrete reinforcing and other bars, skelp and mine tie shapes. Other products include slack barrel hoops, 43,000 tons; automobile wheel disks, 22,500 tons. At its Ohio Works at Youngstown, O., Carnegie has rated capacity of 2,344,000 net tons of steel ingots annually and pig iron capacity of 1,838,000 net tons. The corporation's Upper Union Mills, also in Youngstown, has finished rolled steel product capacity of about 317,000 net tons.

Indicative of U. S. Steel's policy of concentration of production facilities as far as possible, last week Carnegie-Illinois announced its modernizing and expansion program includes installation of equipment at its Vandergrift plant in the Pittsburgh district close to its Irvin Works, for production of silicon steel strip in coils. Completion of this work, scheduled for late 1946, will place Vandergrift in position to meet the newly developed consumer demand for electrical steel strip, used by manufacturers of electrical transformers, motors and generators.

To complete the program, a modern single-stand reversing cold-reduction mill will be transferred from the Irvin Works to Vandergrift, and necessary annealing equipment and other finishing facilities installed.

The Vandergrift plant was the first steel plant in America to produce si sheets. They had previously been ufactured in England. In the past tically all silicon sheets have been chased in the form of hot-rolled s The new program results from res and studies carried on for several to devise means of producing ele steel in coiled form.

CONSTRUCTION AND ENTERPRIS

OHIO

AKRON—Killian Mfg. Co., 355 Morgan St., has let contract for a two-story 60 x 80-foot latex processing plant to cost about $178,000.

CLEVELAND—City Porcelain Enameling Co., Henry C. Wesson, president, 11902 Millegan Road, recently incorporated, has taken over a plant on Fulton Road, which is being remodeled and equipped. Mearl W. Cook, 1442 West 101st St., is secretary-treasurer.

CLEVELAND—Cleveland Trencher Co., V. P. Penote, president and treasurer, 20100 St. Clair Ave., will build a plant addition and also an office building, the latter to cost about $40,000.

CLEVELAND—Ohio Machine & Engineering Co., 6715 Carnegie Ave., will build a one-story 35 x 80-foot shop building at 1140 East 222nd St., Euclid, O.

CLEVELAND—Dobeckman Co., 3301 Monroe Ave., will build a one-story plant addition with 35,000 square feet floor space.

CLEVELAND—Reynard Tool & Guage Co., 3539 West 25th St., has let contract for a plant in Brooklyn Village, one-story, 30 x 90 feet, to cost about $20,000.

CLEVELAND—Ohio Baler Co. has been incorporated by Robert Seltzer to manufacture paper balers, having bought patents of the Ohio Cultivator Co., Bellevue, O. Operations will be continued at Bellevue until a plant in Cleveland is provided. Frank B. Cameron, 1535 Guardian Bldg., Cleveland, is agent.

CLEVELAND—Stuart Lighting Products Co. has been incorporated by Sidney A. Eisenberg of Fluorescent Fixture & Supply Co., 6714 Carnegie Ave., to manufacture electrical equipment.

ELYRIA, O.—Western Automatic Machine & Screen Co., Lake Ave. and B. & O. railroad, will expand its plant by an addition estimated to cost about $50,000.

LORAIN, O.—Baltimore & Ohio Railroad is having plans made for a coal-loading dock on the lake shore at First St., including two piers 1500 feet long, slip 430 feet wide and car dumper with capacity for a car a minute. Project estimated to cost $3 to $4 million.

LORAIN, O.—Master Mfg. Co. has been incorporated to manufacture mechanical, electrical and power-driven appliances, by Isadore Jacoby, 125 East 20th St.

NEW YORK

BROOKLYN, N. Y.—William Z. Taylor Inc., 644 Morgan Ave., plans construction of a 200 x 510-foot foundry and office building to cost about $225,000. Samuel Napp, 1749 Grand Concourse, New York, is engineer.

TONAWANDA, N. Y.—Lucidol Corp. plans expansion, including a two-story addition and a one-story experimental unit, to cost about $50,000.

NEW JERSEY

SOUTH HACKENSACK, N. J.—Linotype Co., Weatherly, Pa., has let contract to C. A. Hunt Engineering Co., 485 Fort Lee Road, Teaneck, N. J., for a plant at Chester and South Main Streets, estimated to cost $100,000. D. C. Boswell, Richfield Park, N. J., is engineer.

RHODE ISLAND

PROVIDENCE, R. I.—New Method Co., 12 Elm St., will let contract soon two-story 60 x 80-foot plant on Allen Barker & Turoff, 1022 Grosvenor Bldg architects.

PENNSYLVANIA

KING OF PRUSSIA, PA.—Jones Mach Tool Works, King of Prussia, will b manufacturing plant and office building separate contracts, to cost about $15 S. A. Greenberg, 1701 Erles Road, delphia, is engineer.

PHILADELPHIA—R. J. Finnesey, body 1701 Cheltenham Ave., is taking bids t C. L. Caspary, architect, 1701 Waln for an auto truck and body works, est to cost over $40,000.

QUAKERTOWN, PA.—R. M. Taylor C asked bids for a plant building to cos $40,000. Charles Talley, Telford, P architect.

MICHIGAN

CLINTON, MICH.—Clinton Foundry C been incorporated with $25,000 capi operate a foundry and machine shop, by ald Thomas, Clinton.

DETROIT—Eaton Mfg. Co., 9771 F Road, has let contract to W. J. C. Kauf Co., 10610 Shoemaker Ave., for a two steel and concrete plant, estimated to about $75,000.

DETROIT—Herron-Zimmers Moulding 3900 East Outer Drive, has asked through Giffels & Vallet, engineers, Marquette Bldg., for a plant building mated to cost about $50,000.

DETROIT—National Broach & Machine 5600 St. Jean Ave., is asking bids th Giffels & Vallet, engineers, 1000 Marq Bldg., for a brick and steel warehouse mated to cost about $55,000.

DETROIT—Aero Pattern & Engineering Ltd., 8607 Grand River Ave., has bee corporated with $22,500 capital to com patternmaking and engineering busines O. C. Bueg, 421 Henry St., Detroit.

DETROIT—Automatic Screw Corp., 6816 Warren Ave., has been incorporated $50,000 capital to manufacture auto screw machine products, by John D. E 7945 St. Paul Ave., Detroit.

DETROIT—C.N.S. Co. Inc., 1858 East S Mile Rd., has been incorporated with $50 capital to manufacture tools, dies, jigs fixtures, by Clyde Shonk, 14203 Hobart East Detroit.

DETROIT—New Bacon Mfg. Co., 5987 W ward Ave., has been incorporated $100,000 capital to manufacture tools, chines and implements.

DETROIT—Untrafinish Corp., 2600 22nd has been incorporated with $10,000 ca to process metals, by Kenneth E. Whitl 2561 Crooks Rd., RFD No. 6, Pontiac, M

DETROIT—Bent Tube Inc., 10321 Morang has been incorporated with $25,000 ca to manufacture metallic tubing, by Will R. Doak Jr., same address.

What about the NUMBER of PLUNGERS in a HIGH PRESSURE PUMP?

In selecting a reciprocating high-pressure pump, careful consideration is needed to determine the most suitable number of plungers for the specific service involved. Generally speaking, the fewer the plungers, the lower the first cost. However, variations above and below the mean discharge rate must be considered if undesirable pulsations are to be guarded against.

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DETROIT—Eli Pratt Heat Treating Co., 3959 Bellevue Ave., has been incorporated with $100,000 capital to do general manufacturing, by Eli N. Pratt, 4845 Nottingham Rd., Detroit.

HAMTRAMCK, MICH.—Quality Machine Products Corp., 9701 Jos. Campau Ave., has been incorporated with $30,000 capital, by Stanley Rudowski, 2956 Berres, Detroit.

HAMTRAMCK, MICH.—Progress Tool & Mfg. Co., 8215 McDougall St., has been incorporated with $10,000 capital, to manufacture and machine tools, dies, jigs, gages.

ILLINOIS

CHICAGO—J. P. Seeburg Corp., 1510 North Dayton St., has let contract to Carl Erickson & Co., 4753 Broadway, for a one and two-story 93 x 194, 28 x 93 and 45 x 184-foot plating room and manufacturing building, estimated to cost about $125,000. R. C. Ostergren, 5153 North Clark St., is architect.

CICERO, ILL.—Ceco Steel Products Corp., 5701 West 26th St., Ned A. Ochiltree, executive vice president, is building two large additions to its plant, to cost about $300,000.

LA GRANGE, Ill.—Electro-Motive Division General Motors Corp., La Grange, has let contract to Ragnar Benson, 4744 West Rice St., for a one-story 220 x 244-foot paint and test shop.

INDIANA

LA PORTE, IND.—Allis Chalmers Mfg. Co., East Lincoln Way, has let contract to Charles Cole Engineering Co., South Bend, Ind., for first unit of a new plant, estimated to cost about $600,000.

GEORGIA

DORAVILLE, GA.—General Motors Corp., General Motors Bldg., Detroit, will let contract soon for a plant estimated to cost about $6,500,000. Albert Kahn Associated Architects & Engineers, New Center Bldg., Detroit, are architects.

ALABAMA

MOBILE, ALA.—National Gypsum Co. has announced expansion program to cost $1 million to meet postwar demand.

KENTUCKY

LEXINGTON, KY.—Kentucky Utilities Co., R. M. Watt, president, First National Bank Bldg., plans a steam generating plant to cost about $4,500,000.

WEST VIRGINIA

NITRO, W. VA.—American Viscose Corp., Ninth and Market Sts., Wilmington, Del., has let contract to J. P. Pettyjohn & Co., 212 Eighth St., Lynchburg, Va., for a manufacturing plant addition estimated to cost about $1,225,000. W. E. Dungan, Gimbel Bldg., Philadelphia, is engineer.

MISSOURI

ST. LOUIS—H. & H. Machine & Motor Parts Co., 4216 West Easton Ave., has let contract to C. A. Welsch Construction Co., 4200 West Easton Ave., for a one-story 54 x 93-foot machine shop addition, estimated to cost $40,000, with equipment. C. A. Koerner, Syndicate Trust Bldg., is engineer.

ST. LOUIS—Duro Chrome Corp., 1814 McNulty St., plans a two-story plant addition to cost $250,000, including equipment.

WISCONSIN

GRANVILLE, WIS.—Continental Equipment Corp., care H. T. Thompson, has been incorporated to manufacture tools.

GREEN BAY, WIS.—Bark River Culvert & Equipment Co., Bark River, Mich., and Eau Claire, Wis., is taking bids for a one-story 100 x 123-foot warehouse and office building. Foeller, Schober, Berners, Safford & Jahn, 310 Pine St., are architects.

HORICON, WIS.—Brunt Mfg. Co. will build a one-story reinforced concrete foundry addition costing about $60,000. N. E. Keller, 1325 Third Ave., Moline, Ill., is architect.

KENOSHA, WIS.—Specialty Brass Co., Lake Shore Road, has let contract to A. J. Larsen, French Drive, for a one-story plant addition 50 x 120 feet.

MILWAUKEE—Wisconsin Motor Corp., 1910 South 63rd St., has let contract to Klug & Smith Co., 111 East Wisconsin Ave., for design and construction of a one and two-story 60 x 137 x 178-foot and one-story 19 x 51 x 144-foot plant additions, estimated to cost about $55,000.

RACINE, WIS.—Dremel Mfg. Co., 1344 Clark St., has asked bids for a one-story plant estimated to cost about $75,000. F. J. Hoffman & William C. Schneider Associates, 201 Sixth St., are architects.

MINNESOTA

MANKATO, MINN.—Perfected Burial Vault Co., W. Chandler, owner, has let contract to Den Boer Construction Co., 1426 Grand Ave., St. Paul, for a one and two-story 62 x 112-foot plant, to cost about $40,000.

MINNEAPOLIS—Minneapolis Electric Moulders Inc., 2300 East 31st St., will build a one-story 90 x 200-foot factory, including office, at 4401 Hiawatha Ave., estimated to cost $58,000. W. G. Door, 2111 West 52nd St., is architect.

MINNEAPOLIS—Snelling Specialty & Engineering Co., 75 Snelling Ave. North, St. Paul, screw machine products has let contract for one-story plant at 27th St. and Washington Ave. North, Minneapolis.

MINNEAPOLIS—Bros Boiler & Mfg. Co., R. J. Bros, president, 1057 SE Tenth Ave., plans a plant addition to cost about $60,000.

MONTICELLO, MINN.—Lehigh Portland Cement Co., Allentown Pa., plans construction of a cement plant near here, to cost about $3 million.

TEXAS

DALLAS, TEX.—Luscombe Airplane Corp., 1410 Camp St., has plans in preparation for reconstructing a shop unit at cost of about $40,000.

EL PASO, TEX.—El Paso Electric Co., E. H. Will, El Paso, has let contract to Stone & Webster Engineering Co., 90 Broad St., New York, for design and construction of a boiler plant estimated to cost about $600,000.

HOUSTON, TEX.—Baash-Ross Tool Co., 5306 Clinton Drive, is having plans drawn for a plant expansion to cost about $100,000.

HOUSTON, TEX.—Atlas Engineering Works, 5206 Navigation Blvd. has plans under way for a plant unit to cost about $100,000.

HOUSTON, TEX.—Ceco Steel Products Corp., 2814 Pease St., plans a steel products plant to cost $250,000 and warehouse costing $125,000.

HOUSTON, TEX.—Continental Springs Corp., 2400 Nance St., has plans for plant expansion costing about $50,000.

HOUSTON, TEX.—Garrott Brass & Machinery Co. Inc., 1718 Ennis St., has plans for shop and storage expansion costing about $50,000.

HOUSTON, TEX.—Hughes Tool Co., 300 Hughes St., is having plans drawn for plant expansion to cost about $150,000.

IOWA

CEDAR RAPIDS, IOWA—Cedar Rapids Engineering Corp., manufacturer of grinding machinery, valve reseaters, etc., has let contract for one-story plant 57 x 160 feet.

COUNCIL BLUFFS, IOWA—Giant Mfg. manufacturer of pipe-pushing machinery, lighting equipment, etc., will soon start duction of truck bodies, planning outpu 50 per week.

DES MOINES, IOWA—Solar Precision Cas Inc., New York, will be moved to a po of Solar Aircraft Co. plant here. Solar craft Co., San Diego, Calif., plans to bu plant from the government and operat part of its facilities.

IDAHO

BOISE, IDAHO—Idaho Power Co., C. J. S president, has let contract to Morrison-K sen Co. Inc., Boise, for a 16,500-kw h electric generating plant, four substations a 120-mile 138,000-volt transmission to cost about $3 million.

BOISE, IDAHO—Olson Mfg. Co., H. J. manager, is spending $75,000 in reconve to larger production of mining and heav dustrial machinery, storage tanks, farm e ment and truck parts.

CALIFORNIA

LOS ANGELES—Bee-Line Acro Sales has been incorporated with $10,000 ca represented by Charles H. Johnston, Mar Vista Ave., Pasadena, Calif.

LOS ANGELES—Merit Engineering & Co. has been incorporated with $20 cajital, represented by Leo M. Zinner, South Spring St., Los Angeles.

LOS ANGELES—Western Oil Tool & neering Co. Inc. has been incorporated 5000 shares of no par value, represente Sol Ruskin, Roosevelt Bldg., Los Angele

LOS ANGELES—Lincoln Machinery Inc. been incorporated with 2500 shares no value, represented by G. Allen Bisbee, South Spring St. Los Angeles.

LOS ANGELES—Bauman Aircraft Corp been incorporated with $250,000 capital resented by Roy R. Colby, 317 South St., Los Angeles.

LOS ANGELES—McClanahan Boiler & H Corp. has been incorporated and is re sented by Burk Mathes, 458 South Sp St., Los Angeles.

WASHINGTON

EAST SOUND, WASH.—Voters have appr proposed water system project estimate cost $177,000, for which $87,000 fe grant has been allocated.

GRAND COULEE, WASH.—Voters have proved a water system project estimate cost $211,000.

LYNDEN, WASH.—City plans construction a 200 000-gallon elevated steel water and 12-inch cast iron inlet pipe. Bids expected to be called for Jan. 7.

MANCHESTER, WASH.—Plans are being m by Parker & Hill, Seattle, for a munic water system to cost about $70,000.

PASCO, WASH.—Northern Pacific railroad let contract to Addison Miller & James struction Co., Seattle, for a $200,000 provement to its ice plant, to which an dition will be built and additional equipm installed.

SEATTLE—Kirsten Pipe Co., 3129 Wes Ave., has plans by G. W. Stoddard, Orpha Bldg., for remodeling four-story plant, cluding installation of heating and air ditioning systems, to cost about $75,000.

TACOMA, WASH.—Independent Insulat Inc., John H. Bridgeford, manager, has bou from Defense Plant Corp. the Taylor W carbide plant and will equip with two naces for production of 50 tons daily rock wool from smelter slag.

TACOMA, WASH.—Everock Products Harold St. Jogns manager, has bought pl at 3008 Sawyer St. for manufacture of w insulation by electric furnace from natu rock, with capacity of 12 tons daily.

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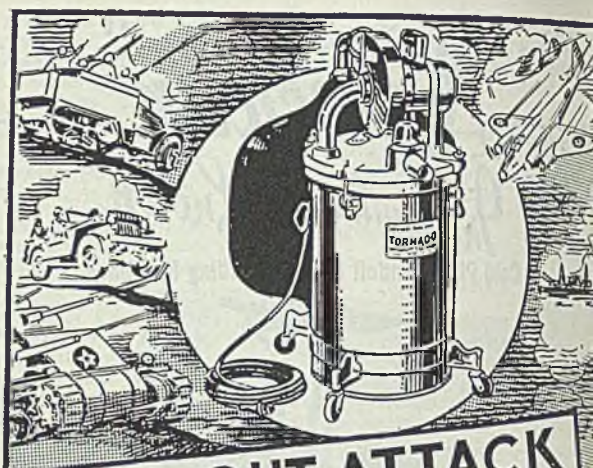

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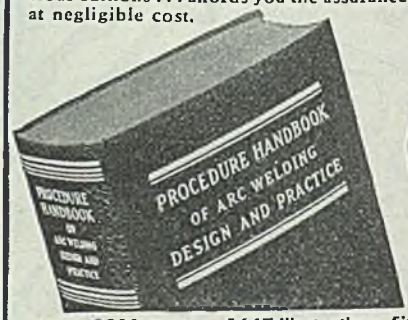

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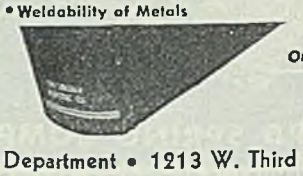

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