September 23, 1946

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

EDITORIAL INDEX, PAGE 69

STEPLESS
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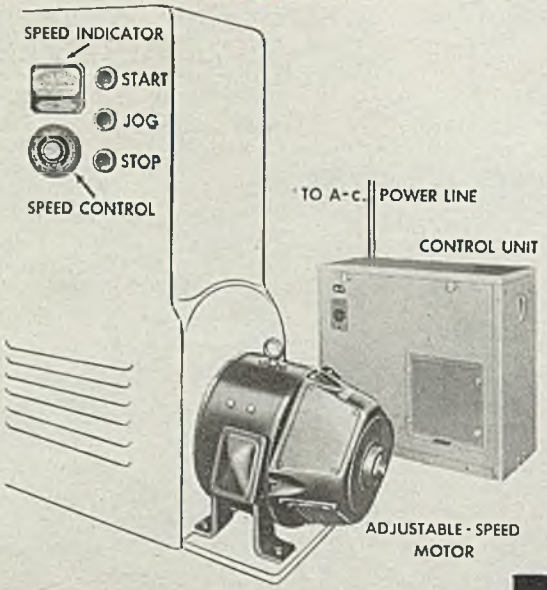

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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 119, NO. 1 JULY 1, 1946

NEWS

TECHNICAL

FEATURES

MARKETS

NEXT WEEK...

Technical Advances in Electroplating
Wet Belt Machining Eliminates Grinding Heat
Effect of Sulphur on Sulphite Treated Steels
Handling Emergencies in Steel Plant Water Service
Steel in Modern Building Construction

As the EDITOR VIEWS the NEWS

Difficult Road Ahead

A visitor in some sections of the Far East witnesses certain conditions of industrial employment which make one wonder what steps will be necessary to restore world trade to a semblance of order and stability.

For instance, last week in a large harbor this writer saw six or seven vessels being loaded with coal. No mechanical coal handling apparatus was in evidence. Instead coal was being carried from dock to ship in baskets suspended from poles carried on workers' shoulders or in two-wheeled carts pushed by hand. Among the hundreds of natives engaged in this hard labor were numerous women.

At another point one saw boys charging a cupola by handing pig iron and baskets of coke to other boys on a ladder, a teen-age girl operating a drop hammer, small barefooted boys catching and passing red-hot bars in a rod mill, and blacksmith helpers of grade-school age.

These sights aroused an interest as to what the labor statistics for industry in this section of Asia would reveal. Investigation showed that of every hundred of the quarter million industrial workers covered by the statistics 71 are adult males, 21 are adult women, and eight are children.

Of equal interest was the compensation received by workers in this area. In one of the best shops skilled workers receive 80 yen for eight hours of work. Each employee pays 12 yen for the lunch provided for him in the plant's attractive cafeteria. This means that the employee has to work one hour and 12 minutes to earn enough to buy his lunch. In the United States an employee in a comparable shop probably would be able to buy an adequate lunch with the compensation for about 15 to 20 minutes of work.

While this picture of the liberal use of women and child workers for hard manual labor, and of wages which have low purchasing power in terms of food cannot be called typical of conditions extending over large areas of the world, it certainly is indicative of the sort of discrepancies that will be encountered when world trade brings about attempts to exchange the products of the Orient with those of the Occident. When to these differences in wages and working conditions are added the further complications of national currencies that are distorted by varying degrees of inflation it is obvious that the road to a wholesome state of international trade will be anything but smooth.

STEEL
July 1, 1946

PRODUCTION BLOCKS: With major labor disputes out of the way, it has been widely assumed the last half of this year will prove a period in which new peacetime highs in industrial activity will be registered. Surface signs, assuredly, point in that direction, the rapid recovery in the basic industries since ending of the work stoppages auguring well for manufacturing in general.

Recovery in steel has been encouraging. Currently ingot operations are estimated at about 88 per cent of capacity, up some 45 points since the coal strike ended four weeks ago. The rate was just under 90 per cent when the miners walked out April 1.

Naturally, such a rebound would incline many to expect correspondingly rapid improvement in industries dependent on steel as a raw material. This however, is a mistaken notion since empty supply pipelines must be refilled before material can flow into consumption with the regularity which continuous operations demand.

Furthermore, a very serious check on manufacturing stems from lack of vital components. Hundreds of annoying work stoppages in progress, though largely local in nature, are proving an effective

(OVER)

brake on the manufacture of components and parts.

Until current supply and component shortages are definitely eliminated manufacturing will be subject to fits and starts. Consequently, while optimism for the last half of the year is justified, it would be a mistake to expect clear, untroubled sailing from here on. Conditions are bound to improve steadily, of course, but the economic firmament remains to be cleared of a number of dark clouds before there can be any assurance of unthrottled production.

—p. 74

° ° °

PAYING THE FREIGHT: The fool notion wages can be increased without a compensatory hike in prices has now been most thoroughly discredited. Prices have advanced all along the line as the result of recent general wage boosts, and they are still rising. The end is not in sight.

Most recent twist to the inflationary spiral comes in the form of a general interim freight rate increase of somewhere around 6½ per cent allowed by the Interstate Commerce Commission. Still higher rates probably will be allowed by ICC when it completes its study of the railroad situation since the increased return estimated on the interim raise falls far short of making up the carriers' deficit stemming from the wage advances forced upon them.

The ultimate consumer, of course, will pay this higher freight bill. It means another charge against production which eventually will be passed on to the buyer in the form of higher prices.

And so it goes, definitely and conclusively demonstrating, OPA notwithstanding, the fallacious thinking of the union labor leaders who fell for the Utopians' economic baloney—you can get something for nothing.

—pp. 70, 71

° ° °

SCRAP TO THE RESCUE: An analogy recently was drawn between the division of loaves and fishes of biblical times and the problem of distributing steel among its clamoring users. Noble efforts notwithstanding, it was admitted the miracle could not be repeated. Materials specialists of Chrysler's Dodge Division too were dubious so they adopted their own plan to offset the steel shortage.

Each week the pressed steel department saves 300 tons of small pieces normally sold as scrap. This is channeled into immediate use. Flat scrap from fender blanks is saved and sorted to be drawn into smaller parts; those pieces too small for use by themselves are spotwelded together and trimmed into blanks for drawing into internal structural body parts, fender guards, engine dust shields, etc., while irregular shaped pieces of flash from large body parts become seat backs. With scrap saving the day, production marches on.

—p. 106

SIGNS OF THE TIMES: Work stoppages and supply shortages have seriously interfered with production of farm implements and equipment (p. 67), sorely needed in efforts to increase food production. Repair parts, produced in substantial quantity, have enabled farmers to keep much existing equipment in operation but the need for new machines is desperate. . . . Numerous technical sessions attracted heavy attendance at the annual meeting of the American Society for Testing Materials (p. 72), symposiums being devoted to a wide range of subjects including new research projects of the past several years. . . . President of Republic Steel Corp., Charles M. White, speaking at conference of National Industrial Advertisers Association, first held in several years (p. 73), urged advertising executives to sell to the nation the private enterprise system and our form of democracy. . . . Distortion of delicate parts is prevented and thread stripping is a rare occurrence when using the "Screwstick" developed by Kodak engineers (p. 103). . . . Whether the iron and steel industry will be used as guinea pig in the government's annual wage investigation is undecided (p. 76), with groups making study in disagreement as to advisability of making their initial survey in an industry which is subject to such wide variations. . . . Effect of revamped OPA control on iron and steel prices remains to be determined (p. 70) with producers and warehouses marking time pending final determination of government policy.. Indications are some upward adjustments in mill prices can be expected while warehouse operators are likely to make certain revisions to compensate for increased costs they were forced to absorb since 1941. . . . Extreme precision in multiple drilling, boring and hole machining operations with tolerances of a few 10,000ths is achieved by unusual fixtures (p. 104) which permit working all six faces of a part in a single setup. . . . Additional government-owned steelmaking facilities have been sold to private industry (p. 75), Carnegie-Illinois Steel Corp. acquiring scrambled facilities at Duquesne, Homestead and Braddock, Pa., at cost of more than $65 million. . . . Automobile assemblies have lifted into new postwar high ground (p. 84), all producing plants now being back in the picture for the first time in months. . . . Resumption of operations under private management (p. 88) of two government-owned aluminum plants has confirmed hopes in the Pacific Northwest the area will hold a portion of its war-created industry.

E. C. Shane

EDITOR-IN-CHIEF

Ryerson Deliveries Speed Construction

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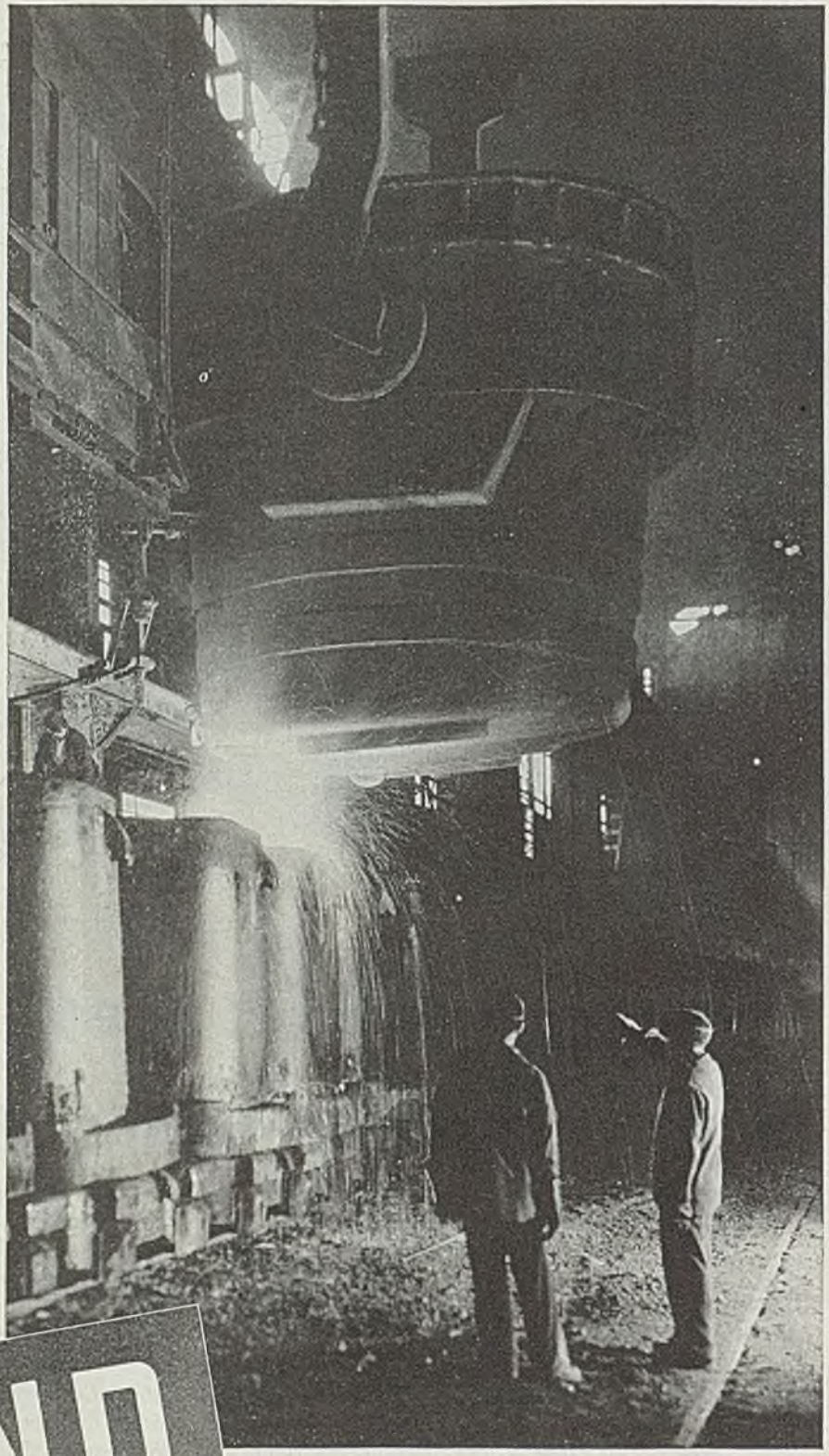
Pouring ingot molds at Inland's Indiana Harbor Plant.



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STEEL
July 1, 1946

"More food production" has become a world-wide cry. As equipment and labor becomes available new land will be cleared to help feed the world

By ERLE F. ROSS
Chicago Editor, STEEL

Strikes, Material Shortages Limit Farm Equipment Production

World food supply imperiled by paralyzing work stoppages in implement manufacturers' plants and those of materials and parts suppliers. Output for 1946 expected to be 25 to 30 per cent below last year's volume

CALLED upon on comparatively short notice to produce food in abundance, particularly grains, to feed war-stricken hungry peoples abroad, American farmers have been forced to assume a difficult and discouraging task. If they succeed in meeting the goal—and all indications are they will come close to it—credit must go largely to their energy and resourcefulness rather than to help afforded by an adequate amount of new farm equipment and mechanical aids.

End of the war in 1945 brought a lifting of controls on the manufacture of farm machinery in midyear but the industry immediately was beset by shortages of basic materials, a deficiency of workers, and loss of production through strikes. When 1946 began, the long-range prospects were good with four or five years of high demand ahead, but clouds were gathering rapidly because of labor's insistent pressing for unreasonable wage increases. During the six months which have now passed, virtually every major farm equipment company has suffered paralyzing strikes of long duration, some of which are still in progress.

Plants of International Harvester Co. were down 12½ weeks, and units of Oliver Corp., Deere & Co., and Caterpillar Tractor Co., were similarly affected. A strike at plants of Allis-Chalmers Mfg. Co. is now in its ninth week and operations of J. I. Case Co. also have been at a standstill for weeks. In the latter two cases, the government has threatened to take over and effect settlement, but this step has been deferred, presumably because the output of the plants is not regarded as vital to public interest as is coal and transportation.

In the strikes already concluded, workers gained wage increases of ap-

proximately 18 cents an hour, compared with the 30 per cent demanded. Settlements were delayed and complicated more by other issues, such as union maintenance of membership, the closed shop and working conditions, than by amount of wage adjustments.

There is no accounting of production lost by strikes in the first half of 1946, but it is tremendous. Some indication may be gained, however, from International Harvester's report that because of its strike customers were deprived of approximately 33,800 tractors, 26,400 mowers, 11,800 hay rakes, and 3600 pick-up hay balers, just to mention a few of the more important items.

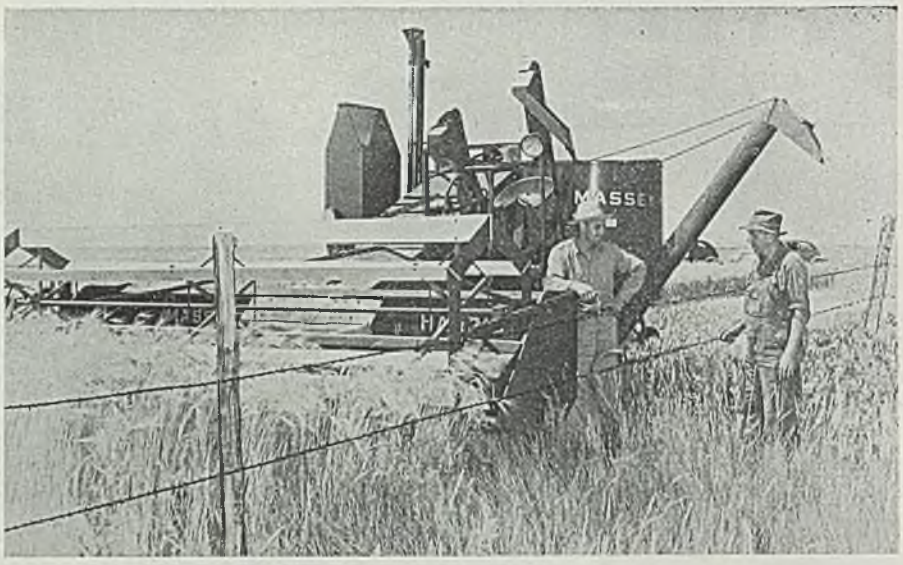
Aside from lost production because of strikes in their own plants, farm machinery manufacturers have suffered from shortages of materials arising from strikes in other industries. The long steel strike followed more recently by the coal mine shut-down has made steel a most critical item. The long tie-up of copper mining has resulted in extremely short supplies of copper needed for radiators and wiring for tractors and bearings for various implements.

Castings, both gray iron and malleable, have constituted a continual bottleneck. Most farm equipment makers have their own foundries to provide the bulk of needs, but almost all depend upon outside supplies as well. Throughout all this year, pig iron has been acutely short, a condition brought about partly by the steel and coal strikes and partly by the tremendous demand for castings for civilian and industrial products. Foundries have suffered either for manpower or raw materials ever since the war ended.

Steel Shortages Acute

Another critical item is steel chain, which, with other steel deficiencies, is said to have cut tractor production schedules in half. Forgings have reasonably well kept pace with requirements, for since the war ended few forge shops have been scheduled to capacity. A No. 1 headache, however, has been the inadequate supply of steel sheets and strip.

Coupled with these materials shortages has been another harassing difficulty, namely, strikes in plants of parts suppliers. Few farm implement manufacturers are self-contained, depending upon outside sources for special parts or assemblies. A large midwestern tractor builder found recently that over half of its parts suppliers were closed down by srtikes. It is common throughout the industry for some models to be curtailed for short periods, and continued shutdowns are in prospect in the next few months unless strikes in plants of vendors are cleared up promptly.



Use of self-propelled combines, such as the unit pictured, would result in a tremendous saving of grain which is trampled under the wheels of the tractor in a tractor-pulled combine in the opening swath. However, only a few thousand are available. Massey-Harris photo

Because of wide-spread strikes, the equipment industry has not felt manpower shortage as acutely as would have been the case under full production. Nevertheless, some shortage does exist.

Farm implement makers are well covered with mills as to steel and shipments have been proceeding as well as restricted steelmaking operations would permit. Now that full output seems assured, serious shortage is not expected, nor is it likely that the emergency allocation program set up by CPA in mid-June and embracing the farm machinery industry will have to be invoked in any major way.

Despite the fact that the need for new farm equipment it tremendous and has behind it the backlog built up by shortage of the war period, production currently is below the prewar levels of 1940 and 1941. For the full year 1946 it is expected to range from 25 to 30 per cent below 1945. Because of strikes and materials shortages, only a small number of tractors and other heavy equipment was produced for spring planting, and much of the new harvesting machinery will be available too late. It is estimated that half of the equipment in Cook county, Illinois, is obsolete. Used tools sell readily.

That the farmer is going to do an outstanding job in crop production this year, is due largely to his keeping his old equipment serviceable. In this maintenance, he has had co-operation from machinery makers in a reasonably adequate supply of replacement parts. With output of complete new machines stymied for one reason or another, concentration on repair parts was a necessity.

Recognizing higher wage rates and higher costs of materials and parts, OPA allowed a 10 per cent increase in manufacturers' ceilings on farm equipment early in May, but, to keep the increase to farmers down to an average of 3 per cent, at the same time cut dealers discounts from 20 to 16 per cent on new equipment and 35 to 28 per cent on parts. In protest of this latter action, dealers in Iowa and Illinois voted to hold all new machinery until after June 30, the expiration date of the present price control law. This policy was not carried out, however.

To increase the harvest of much-needed grain, particularly wheat, this year, Joe Tucker, vice president, Massey-Harris Co., Racine, Wis., recently made an interesting proposal. He pointed out that a very large percentage of small grain is harvested with combines, almost all of which now in the fields are tractor drawn. Only a few thousand, perhaps 8000 of a total of several hundred thousand, are self-propelled, thus do not require a tractor to pull them.

The big wheels of the tractor and pull-type combine run down over 50 per cent of the grain on the opening run in the field and crush it beyond recovery, he says. On the other hand, if this first round is cut by a self-propelled combine, the wheat will all be cut just as a lawn mower cuts a clean path. In a 40-acre field, 20 bushels of wheat would be saved. If the 8000 self-propelled combines could be used in opening the total wheat acreage, about 28,000,000 bushels of wheat would be saved. If applied to the 1946 crops of wheat, barley, oats, rye, rice and edible beans, Mr. Tucker contends total savings would be 60,000,000 bushels.

Domestic Output Of Razor Blade Steel Adequate

Limited volume of Swedish steel being imported. American producers took over market during war

BOSTON

AMERICAN producers of razor blade steel are making sufficient volume to supply demand from the two-score blade manufacturers and a threatened shortage of blade steel has been averted.

With the exception of two leading manufacturers, blade makers have caught up with demand and in some instances are tapering off operations. Two-edge blades are now finding their way into distributors' stocks.

Admittedly the margin on blade steel is good, and despite interruptions due to strikes, steel producers have enabled the blade industry to catch up with pentup demand in a remarkably short time.

Normal requirements for razor blade steel are about 8500 tons a year.

Some Swedish steel for blades is being imported, but the volume is below prewar levels due to price ceilings. Swedish producers are able to sell in other countries for higher prices than can be obtained here. However, they want to retain American markets for blade steel and valve spring wire grades.

Domestic Steel Replaced Imported

When Swedish steel was cut off during the war, American producers took full advantage of the opportunity offered and by improving the quality of their steels were able to supply material for name brands of blades that previously had used imported steel. On a quality basis, domestic producers are in a better position than ever to compete, but the factors of costs and prices ultimately will enter into the division of this small but attractive tonnage.

American Steel & Wire Co. supplied Gillette Safety Razor Co., this city, with blade steel during the war and still does with the bulk of requirements. The blade fabricating company has made some changes in practice to fit the change and developed its own slitting process, but has found the American product satisfactory.

Frank Forsberg, chief metallurgist, Gillette Boston plant, is in Europe and will visit Sweden. He also will go to London where the Gillette plant formerly fabricated blades of Swedish steel.

The British are bearing down on imports now and the problem is to get British steelmakers to improve quality and uniformity to reduce rejections. Much the same situation prevails in Gillette's French plant.

Steel Industry Earnings Hit Lowest Point Since 1939

Steel companies' earnings, declining year by year since 1941, dropped last year to the lowest point since 1939, according to the American Iron & Steel Institute. Only 4.89 per cent was earned on investment in 1945, in contrast with 7.53 per cent earned in 1940 and 6.18 per cent in 1937.

Steel companies accounting for approximately 91 per cent of the industry's ingot production had a combined net income of $179,653,000 in 1945 after meeting all charges but before paying dividends. This was 36 per cent lower than in 1940. In 1944, greatest production year on record, the same companies' earnings were nearly identical—$179,834,000.

Although steel production was 19 per cent higher last year than in 1940, dividend payments totaled only $137,796,000 slightly lower than in 1940. At the same time the industry's wage and salary payments of $2,282,371,000 were nearly double the total 1940 payroll.

Payrolls in 1945 were 16.6 times greater than dividends last year. For every dollar paid to employees, stockholders received only 6 cents in dividends. In 1940, dividends were equal to 11.7 cents for each dollar going into payrolls.

Contrasted with 4.89 per cent earned on investment in 1945, earnings in 1941 were 8.1 per cent on investment, which compared with 5.6 per cent in 1942, 5.1 per cent in 1943, and 6.2 per cent in 1937. In 1944 the figure was 4.70 per cent.

A total of $5,764,295,000 in gross income was received by the steel companies in 1945, including income from their nonsteelmaking activities. That total represented a decline of about $825,889,000 from 1944 income.

Present, Past and Pending

■ SUBSIDY PURCHASING OF SHEET BARS MAY BE CONTINUED

WASHINGTON—Pending extension of the War Powers Act, the RFC proposes to continue subsidy purchases of sheet bars during the first quarter. Tentatively, it proposes to buy 90,000 tons from Sharon Steel Corp. and 25,000 tons from Jones & Laughlin Steel Corp. for resale to nonintegrated sheet mills.

■ FOLLANSBEE AND SHEET METAL SPECIALTY CO. MERGE

PITTSBURGH—Merger of Follansbee Steel Corp. and its wholly-owned subsidiary, Sheet Metal Specialty Co., was approved last week. Follansbee also has leased the steel production equipment and mill section of Parkersburg Iron & Steel Co.'s plant at Parkersburg, W. Va., for production of electrical sheets.

■ AMERICAN ROLLING MILL OUTLINES EXPANSION PLANS

NEW YORK—Expansion and improvement program of American Rolling Mill Co. up to the end of 1949 calls for expenditure of $68,700,000, Charles R. Hook, president, said last week. The company spent $17,400,000 in 1945 and has authorized $27,200,000 for the current year.

■ WESTINGHOUSE STEPS UP APPLIANCE PRODUCTION

PITTSBURGH—Electric Appliance Division, Westinghouse Electric Corp., is producing about 1000 refrigerators a day, about 50 per cent of its normal prewar output. The division also is turning out about 3000 electric irons and roasters daily, exceeding prewar record production. The company reports good progress in converting a $422 million order into sales billed.

■ CPA APPROVES CONSTRUCTION OF HOUSTON PLANT

PITTSBURGH—Civilian Production Administration has approved construction of a $5,750,000 electro-chemical plant at Houston, Tex., for Diamond Alkali Co., this city.

■ MINE OWNERS LOSE FOREMEN UNION CONTRACT CASE

WASHINGTON—Federal district court here last week dismissed an injunction suit filed by Jones & Laughlin Steel Corp. and 124 other mine owners to restrain the government from bargaining with the United Mine Workers-AFL for a contract covering foremen and other supervisory personnel. The decision will be appealed to a higher court.

Senate-House conferees agree to extend OPA for one year. Seated, left to right: Sen. Charles W. Tobey (Rep., N. H.); Sen. Robert F. Wagner (Dem., N. Y.); Sen. Alben Barkley (Dem., Ky.); Rep. Brent Spence (Dem., Ky.); Rep. Paul Brown (Dem., Ga.). Standing: Sen. Sheridan Downey (Dem., Calif.); Rep. William B. Barry (Dem., N. Y.); Rep. Ralph Gamble (Rep., N. Y.); Rep. Wright Patman (Dem., Tex.); Rep. Jesse P. Wolcott (Rep., Mich.); Sen. Eugene Millikin (Rep., Colo.); Sen. Robert A. Taft (Rep., O.); Rep. Fred L. Crawford (Rep., Mich.). NEA photo

Steel Price Rise Seen; Costs Mount

Advances up to $6 per ton thought likely in near future regardless of future government price control. Rapidly rising costs expected to force early upward adjustment all along line in manufactured goods

UPWARD revision of price schedules on raw materials and manufactured goods seemed in early prospect last week regardless of the outcome of the debate in Congress over the extension of price control legislation.

Adoption of recommended extender legislation incorporating drastic changes in the existing law would result in some automatic advances in price lists in virtually all manufacturing industries and would result in wholesale and retail markups. But even though the proposed measure fails to get past the White House and the existing law is extended by congressional resolution, as suggested as a possibility, it appears some sharp adjustments in price lists are imminent due to recent and impending increases in production and distributing costs stemming from government wage and price action of the past few weeks.

In the iron and steel industry the general view is that prices are due for an increase of at least $6 per ton. The overall increase of $5 per ton in ceiling prices allowed by OPA to compensate the industry for the 18½ cents per hour wage boost granted last February fell far short of covering steelmakers' increased production costs. Actually, of the $5 per ton price raise, the steelmakers only netted something like $1.30 per ton after providing for the wage increase. Even before the question of wages had come up, OPA had conceded the industry was entitled to an increase of $2 to $2.50 per ton.

Since the steel strike settlement and the accompanying wage increase, production costs have continued to rise. Raw materials prices have advanced steadily and more of the same is in prospect. Within the past 10 days coal prices have been raised an average of 40 cents per ton and freight rates have been boosted between 6 and 6½ per cent. Additional freight rate increase, possibly up to 25 per cent, is in prospect. Iron ore prices were advanced 50 cents per ton the past week. An increase of $1.35 per ton in byproduct coke prices is reported impending, while talk is heard of a projected $2 per ton increase on scrap. OPA also is reported considering increasing pig iron prices $1.50 to $2 per ton in the North and $4 in the South. One report circulating in the trade last week was to the effect one southern iron producer had been assured of a $4 per ton increase.

OPA extender legislation under consideration in Congress late last week called for removal of price controls when supply anl demand come into approximate balance. This would be done by a specially created decontrol board, independent of OPA and with power to overrule the price administrator. The proposed bill would prohibit reduction of prewar profit margins of wholesalers and retailers of "reconversion" items, and it provided that price ceilings for producers, manufacturers and processors must include prices during Oct. 1-15, 1941, plus average industry-wide increases in unit costs since that time. Also, distributors, wholesalers and retailers would be allowed trade markups and discounts prevailing last Jan. 1, and no price ceiling would be permitted that would give such wholesalers or dealers a lesser return.

Officials of the steel producing companies were studying last week the pend-

ing price control legislation to determine what probable effect it will have on their prices. They were unwilling to hazard a guess on the effect, however, until the legislation is enacted and they have had an opportunity to study it in connection with a survey of the market conditions in the various steel products.

Present prospects are that the supply of steel cannot be brought in balance with demand for at least six to eight months. It was pointed out that a great deal depends upon the rate of operations, both in the steel industry and consuming industries over the next year. Some mills have not yet resumed operation following shutdowns due to the fuel shortage and a few others have been hampered in their recovery by the extensive damages resulting from work stoppages earlier in the year.

Warehouse steel distributors feel present prices have not "solidified" and that upward adjustments are pending. The advances, if and when made, will vary widely according to market conditions and price history of the various products. Warehousemen point out that a considerable portion of increased costs, including advances in mill product prices, has been absorbed in recent years. As soon as permitted by the government, many warehouses are expected to advance quotations so that at least part of absorbed costs can be recovered. Since the beginning of the year, costs of handling steel at the warehouse level have increased sharply on a per ton basis because of the comparatively small turnover. Stocks are low and unbalanced.

Tower Predicts Auto Steel Tonnage Will Be Sufficient

With steel production nearing wartime peaks, automobile makers and other users will be able to get enough steel for anticipated needs if the industry is able to continue full scale operations without interruption in the coming months, Walter S. Tower, president, American Iron & Steel Institute, said last week.

"A responsible automobile executive has stated output of passenger cars in 1946 will approximate 2 million units, and reach a peak of 5 million passenger cars and 1,500,000 trucks in 1948," Mr. Tower said.

"The amount of steel needed to produce this total of 6,500,000 passenger cars and trucks would be about 11,500,000 tons, or only 18 per cent of the present annual capacity of finished steel.

"Approximately 8,775,000 tons of sheet and strip steel will be needed to build the anticipated 1948 maximum of 6,500,000 passenger cars and trucks."

Railroads Disappointed in Interim Freight Rate Increase Averaging 6½%

AN EMERGENCY freight rate increase averaging about 6½ per cent over present levels and estimated by the Interstate Commerce Commission to net the nation's railroads $390 million annually is being received by the carriers with disappointment.

Railroad spokesmen contend the emergency increase will be insufficient to compensate for increased wages granted railroad workers a month ago. These are estimated as costing about $800 million annually.

Executives of leading roads are confident the ICC will grant further increases after full hearings have been held on the carriers' petition for a 25 per cent increase in freight rates.

The emergency increase was described by the ICC as "in general 6 per cent," with exceptions for certain basic commodities such as the products of agriculture, livestock and its products, and low-grade products of mines such as sand, gravel, broken rock and slag. On such commodities the approved increase is 3 per cent.

An additional increase of 5 per cent of the approved rates was granted in the eastern area, except on coal, lignite and iron ore. Rates on coal, iron ore and other specified commodities generally are applicable over the whole country. Iron ore was increased 2 cents a gross ton in the East and 3 cents in the West and South, and 3 and 3½ cents a ton, net or gross, on interterritorial traffic.

"What the net effect of the increases authorized will be is, of course, problematical because it is dependent on the volume of traffic," the ICC summary of the ruling said.

"Members of the commission's staff estimate, on the volume of traffic in sight, the increase in gross revenue will be about $390 million on an annual basis, plus whatever increases will come after Oct. 1 next (chiefly to Western railroads and to a lesser degree to those in the Southeast) from abolition of the mandatory reductions in rates on land-grant railroads which other roads have equalized.

"This is approximately 6½ per cent on present rates for the country as a whole with greater percentages of increase in Official (Eastern) Classification Territory."

The railroads in a petition filed Apr. 15 asked for a 25 per cent increase which would have added about $1 billion annually to the nation's freight bill. On the basis of their existing rates, they estimated total operating revenue this year would amount to $6.8 billion of which $5.1 billion would constitute freight, $1.2 billion passenger fares, and $500 million revenue from other sources. Under the railroads' proposals the freight revenue would have been advanced to $6.1 billion.

No request for increased passenger fares was filed as the carriers expect increasing competition.

The commission's report analyzes in detail data on valuation, revenues, expenses and net operating revenue of the carriers by districts. It found the valuation of Class 1 railroads for rate purposes is $19,571,000,000 on which the 1945 return varied from 3.09 per cent in New England to 7.45 per cent in the Southwestern region. Eastern roads as a group realized a return of 4.80 per cent, compared with 5.89 for Southern carriers and 5.71 for Western roads.

"It would have required additional revenue in the amount of $96 million in 1945 to have brought the Eastern district to the same earning basis as the remaining lines," the ICC said in explaining the higher increase granted Eastern carriers.

The increases, the ICC pointed out, are granted "as an emergency matter." The ruling permitted the railroads to put them into effect July 1 after giving three days' notice. Full hearings on the railroads' petition for higher increases are to be held as promptly as arrangements can be made.

WSA Raises Ocean Freight Rates to Pacific Ports

War Shipping Administration increased vessel transportation charges 3 per cent recently on shipments from Atlantic and Gulf ports to Pacific Coast. The increase will equalize vessel transportation charges on government operated ships with those of private companies. Advance in transportation charges on vessels operated by WSA will offset a provision in the Revenue Act of 1943, which provides for a 3 per cent transportation tax except when paid to or by a government agency.

The Class B line rates from Atlantic ports to West Coast will be discontinued July 1 and Class A rates substituted. On July 6 the Class B line rates from Gulf ports to West Coast will be put on same basis as Class A rates from Atlantic ports.

ASTM Convention Program Covers Wide Range of Technical Topics

Broadest possible selection of subjects grouped in symposiums, and presentation of progress reports on many new research projects holds attention at Buffalo meeting. Arthur W. Carpenter named president for 1946-47 term

PROGRAM arranged to give members of the American Society for Testing Materials the widest possible selection of technical subjects suitably grouped in symposiums, and an array of new research projects upon which progress reports were presented for the first time, drew record attendance to the society's forty-ninth annual meeting in Buffalo, June 24 to 28.

To the credit of the various groups and society officers who co-operated in program planning, the complex proceedings of the many branches of technology represented went on as scheduled, with over 200 committee meetings taking place on Monday and the remainder of the week being devoted to 24 separate technical sessions.

High point in the program was the twelfth Edgar Marburg lecture in the afternoon and the president's address and dinner session on Wednesday.

Dr. J. J. Mattiello, vice president and technical director, Hilo Varnish Corp., Brooklyn, N. Y., chosen as this year's Marburg speaker, discussed "Protective Organic Coatings as Engineering Materials." His work in this field has won him international recognition. He said that while empirical methods still play a significant part in development of new coatings, the industry's progress is guided mainly by application of fundamental physical and chemical principles. While technical knowledge will permit the chemist to develop organic coatings with increased film strengths, flexibility, hardness, toughness or other specific properties, the preparation of the surfaces prior to application of coatings is equally as important as the designing of organic coatings themselves, Dr. Mattiello said.

Following the Marburg lecture, award of the Charles B. Dudley medal was made to H. R. Copson, research chemist, Research Laboratories, International Nickel Co. Inc., Bayonne, N. J., for his paper "A Theory on the Mechanism of Rusting of Low Alloy Steels in the Atmosphere."

The Richard L. Templin award was established in 1945 when the executive committee of the society received a gift from Richard L. Templin to be used for a prize award for papers describing new testing methods and apparatus and to stimulate research in this field. Recipient of the first Templin award, R. C. Brumfield, Department of Mechanical Engineering, California Institute of Technology, was to have received it at this meeting for his paper on "A Sulphur Print Method for the Study of Crack Growth in the Corrosion-Fatigue Metals." As he

ARTHUR W. CARPENTER

was unable to be present, the ceremony was deferred until the California district meeting sometime in the fall.

The Sanford E. Thompson award, recognizing the author of a paper of outstanding merit on concrete and concrete aggregates, was awarded C. W. Muhlenbruch, associate professor of civil engineering, Carnegie Institute of Technology, for his paper "The Effects of Repeated Loading on the Bond Strength of Concrete."

At the annual dinner at Hotel Statler, the retiring president, John R. Townsend, Bell Telephone Laboratories, presented his conclusions from an extensive experience as materials standards engineer and materials engineer with Bell Laboratories. Guest speaker at the dinner was Dr. Bernard Keble Sandwell, managing editor of *Saturday Night*, one of Canada's most widely read weekly news periodicals.

The first symposium on bearings, held Monday evening, included five subjects: "Life Testing of Plain Bearings for Automotive Engines," by E. T. Johnson, Chrysler Corp.; "Fatigue Testing Machines for Ball and Roller Bearings," by Thomas Barish, consulting engineer; "Metallographic Observations of Ball Bearing Fatigue Phenomena," by A. B. Jones, New Departure Division, General Motors Corp.; "Fatigue Testing of Roller Bearings," by H. R. Gibbons, Hyatt Bearing Division, General Motors Corp.; and "Testing of Bearings under Controlled Load," by J. M. Frankland, Chance Vought Aircraft Division, United Aircraft Corp.

The symposium on fatigue and symposium on spectroscopic light sources were held simultaneously on Tuesday morning, followed by additional sessions on these two subjects and a symposium on oil procurement practices in the afternoon. The evening meeting was for presentation of technical papers on methods of testing.

Symposium on testing of parts and assemblies headed the program on Wednesday, with the reading of technical papers on cement and concrete taking place concurrently. The symposium on testing of parts and assemblies was continued in the afternoon along with a continuation of the oil procurement practices discussion and reading of papers on paint.

On Thursday, four sessions covered "Effect of Temperature on the Properties of Metals" and symposiums on pH measurement. Reports of committees on ferrous metals, paints and miscellaneous subjects also were given on Thursday. Two symposiums—Atmospheric Weathering of Corrosion-Resistant Steels and Freezing-and-Thawing Tests of Concrete—were held on Thursday evening.

Technical papers on plastics and wood, nonferrous metals and bituminous materials were part of the Friday program, supplemented by reports of many technical committees including cement, concrete, lime, refractories, masonry materials, nonferrous materials, insulating oils and miscellaneous materials such as adhesives, soaps, etc.

Testing Apparatus Displayed

At the society's seventh exhibit of testing apparatus and related equipment, manufacturers of testing instruments and laboratory equipment sponsored displays of the many new developments that have taken place in the past two or three years. A wide range of physical, chemical, electrical and related equipment was on display, most of it in operation. There were also a number of non-commercial displays sponsored by the Society's technical committees, and also displays were arranged by the local exhibit committee.

Arthur W. Carpenter, manager, Testing Laboratories, the B. F. Goodrich Co., Akron, O., was elected president of the society for the 1946-47 term. He has been active in the work of ASTM Committee D-11 on rubber products, having been secretary since 1928 and a member of more than ten of its subcommittees including the Advisory Committee. During the war he was for many months a consultant in the WPB Conservation Division.

Richard L. Templin, assistant director of research and chief engineer of tests, Aluminum Co. of America, New Kensington, Pa., was elected vice president for a two year term.

Members of the board of directors were announced as follows: A. G. Ashcroft, director of research, Alexander Smith & Sons Carpet Co., Yonkers, N. Y.; A. T. Chameroy, manager of laboratory, Sears, Roebuck & Co., Chicago; J. H. Foote, supervising engineer, Commonwealth & Southern Corp., Jackson, Mich.; F. E. Richart, research professor of engineering materials, University of Illinois, Urbana, Ill.; and L. H. Winkler, metallurgical engineer, Bethlehem Steel Co., Bethlehem, Pa.

The Society for Experimental Stress Analysis, holding its regular spring meeting, conducted a joint symposium with the American Society for Testing Materials on the closing day of its meeting. The program of the society featured, in addition to welcoming addresses and business reports, 19 technical papers presented at three technical sessions and the joint symposium with the ASTM.

Officers of the society were announced as follows: President, C. Lipson, Chrysler Corp., Detroit; vice president, R. D. Mindlin, Columbia University, New York; secretary-treasurer, W. M. Murray, Massachusetts Institute of Technology. The executive committee consists of C. O. Dohrenwend, Illinois Institute of Technology, O. J. Horger, the Timken Roller Bearing Co., Canton, O., E. L. Shaw, Goodyear Aircraft Corp., Akron, O., and E. K. Timby, Princeton University.

World Minerals Conference Planned for September

World Conference on Mineral Resources will be held in the United States next fall in connection with official observance of the seventy-fifth anniversary of the American Institute of Mining & Metallurgical Engineers, it was announced recently.

The three-day conference will be at the Waldorf Astoria, New York, Sept. 16-18, it was said, and "will cover virtually every phase of the world's situation at this time" with respect to iron and steel, coal, petroleum, nonferrous metals and other important industrial minerals.

White, Republic Steel President, Urges Industrial Advertisers Sell Democracy

MEMBERS of the National Industrial Advertisers Association meeting at Atlantic City recently were urged by C. M. White, president, Republic Steel Corp., Cleveland, to make their No. 1 job that of selling the American economic system to the nation.

Keynote speaker at the association's first conference in five years, Mr. White told the advertising executives they should begin aggressively selling both the free enterprise system and our democratic form of government.

"Isn't it time," he said, "that we have an aggressive campaign in this country which will sell the blessings of democracy? Isn't it time that you men who are skilled in the presentation of ideas devote some of your thought and energy and skill and experience to this problem?"

Mr. White also commented on a statement made by President Truman before the graduating class of Washington College in Chestertown, Md., in which he stated his preference for a thousand insurance companies with $4 million in assets rather than one with $4 billion; a hundred steel companies instead of the one United States Steel Corp., and a thousand banks instead of the one National City Bank.

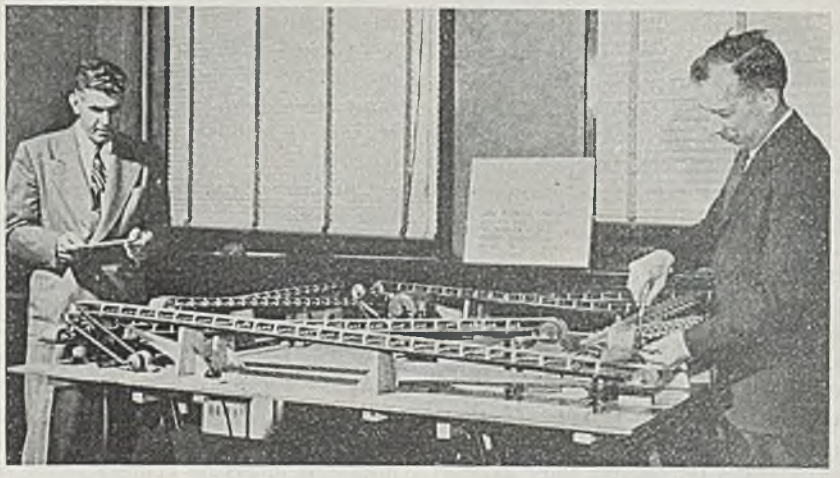
Mr. White said: "Our economy is based on the idea that a small business can be started by an individual or group of individuals and that under our system that business can grow and prosper. But would we ever reach a production of 5 million automobiles a year if we had no larger corporations to do the final manufacturing and selling? Could we have produced 90-odd million tons of steel during the war if we had had many steel companies instead of some very large ones backed up by some smaller ones?

"How many million-dollar companies could develop or build the huge strip mills which are required to manufacture the sheet steel now used as a raw material by so many industries? Such a mill represents an investment of many millions of dollars and would involve the entire resources of not one small steel company but many small steel companies. These strip mills, incidentally, have reduced the price of steel sheets from $107 a ton in 1923 to the present price of $65 a ton."

For many years business has been doing its navigating with only general direction in mind and subject only to the whim of business weather, Paul Ellison, director of public relations, Sylvania Electric Products Inc., told the group.

Likening modern market research to radar, he continued: "Today we can sail confidently forward in spite of the tides and currents of competition."

He described the general pattern of Sylvania Electric's market research as a continuing program in which professional research counsel is retained to make personal interviews.



TWO-WAY CONVEYORS: Four miniature two-way conveyors developed by Goodyear Tire & Rubber Co., Akron, were displayed at a recent conference of the company's Mechanical Goods Division. The belts are installed in a manner that permits each belt to carry material on the "return run." Principal use of the conveyor is expected to be in the steel industry

Industry at Baltimore Limps Along

Most manufacturing companies operating below capacity with copper and steel shortages holding down production schedules

BALTIMORE

METAL fabricators here, in common with those in most other sections of the country, are having to limit production because of inability to get steel and certain other materials and manufacturing components.

Some exceptions are noted, including manufacturers of packers cans who are able to get most of the tonnage they require, but in general operations are running well below capacity, despite adequate manpower at most plants and substantial bookings.

Makers of electrical appliances are having to "limp along," with shortage of copper as well as steel an important factor. Some fabricators are refusing to quote except on fairly small jobs because of their inability to obtain coverage from the shape mills on the larger projects. As a matter of fact, the shape mills generally are booked up for the remainder of this year. There have been a couple of quite sizable jobs placed in this district recently, including 3000 tons for a plant for the National Gypsum Co., in this district, awarded the American Bridge Co., Pittsburgh, and 2000 tons for a power plant for the Consolidated Gas & Electric Co., this city, to the Belmont Iron Works, Philadelphia. Both these jobs, however, are for fabrication next year.

Bars, Wire Rods in Short Supply

Bolt and nut makers are running behind on schedules because of inability to get bars and wire rods and manufacturers of sheet metal products are being particularly delayed in their production. Certain of these latter consumers report they are still awaiting shipment of tonnage promised for delivery three months or so ago.

Shipyards in general have enough material to work with and that is because of fast declining demands upon them rather than ability to obtain new steel. In addition to a falling off in new construction there is a downward trend in repair and reconversion work. In fact, there is not nearly the reconversion work contemplated two or three months ago and one answer for this, it appears, is the program is being deliberately slowed up so that steel and other materials can be diverted to more urgent requirements at this time. However, certain yards are having to scour the market for some items badly needed for work in process —sheets in particular.

The stringency in plates is reflected in the tank shops, where operations are on a reduced basis. Most tank makers are booked well into next year at the present rate of production and are having to turn down considerable new work because of inability to make better deliveries.

One large producer of cold-drawn bars is offering to his regular customers a fairly wide range of sizes for delivery in the fourth quarter, but generally speaking it is difficult for a consumer of such material who is not already protected by orders or by quota obligations to place contracts for shipment this year, except on the larger sizes. Consumers of wire products have difficulty in placing orders for delivery before late fall, except in wire rope and one or two other items.

Jobbers' stocks have never been more unbalanced—sheets, structurals and bars being particularly scarce. Even plates are a difficult item for them to keep in stock. Pipe distributors usually have their tonnage sold before it is received.

In general warehouses are expecting some relief in the third quarter as a result of direction 12, which specifies at least a nationwide allotment comparable to fourth quarter of last year. It admittedly does not set the allotment up on an individual warehouse basis, nor on the basis of individual products; however, most distributors believe they will receive deliveries which will follow closely the pattern of the fourth quarter distribution in 1945. The most scarce item of all, general steel distributors declare, is galvanized sheets and jobbers are confident there will be a special pick-up in shipments of this material because of its importance to the housing program.

Earlier than usual, several eastern railroads are figuring on rail for next year's delivery. Producers claim they will not receive all they are asking for, but that they will likely get more than they are scheduled to receive this year. District car shops at the moment are not pressing too hard for steel because of shortages in other materials which are holding up schedules.

Shortage of pig iron is adversely affecting foundry operations, with a number of plants, because of this situation and with the Fourth of July holiday coming up, starting to close down over the last weekend for a period of at least a week.

GRAB BAG: Uncle Sam sells sight unseen at a grab bag surplus goods sale to civilian buyers. Customers at this St. Louis subdepot could see only the outside of bales, not the contents. No purchase returns were permitted. NEA photo

Carnegie Buys Scrambled Steel Plant Facilities

Government installations at Duquesne, Homestead and Braddock sold for $65,013,000, subject to approval

LARGEST single cash sale of surplus property in the history of the War Assets Administration was effected last week when the government-owned steel facilities at Duquesne, Homestead and Braddock, Pa., were disposed of to the Carnegie-Illinois Steel Corp., subsidiary of the United States Steel Corp., for $65,013,000, which is 100 per cent of the fair value of these facilities as established by the War Assets Administration.

Disposal became effective as of June 30 subject to the attorney general's ruling as to whether the proposed disposition will be in violation of the anti-trust laws.

The facilities were built at a cost of approximately $120 million and during the past three years have brought a return to the government of $23,267,854 in rentals. Installation in 1941 and 1942 was made at the request of the Secretary of the Navy as a part of the speed-up program for increasing the number of ships required for war operations. During the above period, the government blast furnaces at Braddock produced 2,167,794 net tons of pig iron, the electric furnace plant at Duquesne produced 278,981 tons of alloy steel ingots, and the open hearth plant at Homestead produced 3,349,890 net tons of ingots.

The government-owned alloy steel plant at Washington, Pa., which was leased and operated during the war by the Jessop Steel Co., has just been offered for sale or lease by WAA. The plant has a rated capacity of 25,200 tons a year and cost the government about $1,529,633. The plant consists of 17 structures, including furnace buildings, sheet and bar mills, laboratory and offices. Equipment includes two electric furnaces, 19 annealing furnaces, 10 heat-treating furnaces, an 18-inch bar mill, 100,000-pound cold drawing bench, machine and portable tools, cranes, etc.

Gear Sales Increase 10 Per Cent in May

Gear sales by the members of the American Gear Manufacturers Association showed an increase in volume of 10 per cent in May over April. The index figure for May was 313.

Structural Bookings Gain 35% in May

Fabricated structural steel bookings for May are estimated at 162,908 tons, an increase of 35 per cent over April, and 29 per cent over average May bookings for the five prewar years 1936-40.

May shipments totaled 111,686 tons. Shipments for the first five months this year amount to 498,348 tons.

Tonnage available for future fabrication at the end of May amounted to 615,368 tons, practically double the average backlog of 337,237 tons at the end of May in the five prewar years.

GOVERNMENT CONTROL DIGEST

Weekly summaries of orders and regulations issued by reconversion agencies. Symbols refer to designations of the orders and official releases. Official texts may be obtained from the respective agencies

OFFICE OF PRICE ADMINISTRATION

Iron Ore: Ceiling prices of iron ore produced in Minnesota, Wisconsin and Michigan increased 50 cents per gross ton, effective June 24. New prices are: Old range bessemer, $5.45; old range nonbessemer, $5.30; Mesabi bessemer, $5.20; Mesabi nonbessemer and high phosphorus, $5.05. Maximum prices of all other ores, including special ores and lump ores, also increased 50 cents a ton. (MPR 113; OPA-6587)

Farm Equipment: Wholesale distributors of farm equipment items are not permitted to cut their discounts on sales of these items to other wholesale distributors or manufacturers, effective June 25. (MPR-246; OPA-6588)

Anthracite Coal: Increases ranging from 40 cents to $1.15 a ton, or an average of 91 cents a ton, have been allowed in anthracite coal ceiling prices, effective June 25. (MPR-112; OPA-6591)

Business Machines: Manufacturers of business machines have been provided with a formula that will automatically increase their ceiling prices for repair and maintenance services where the cost of supplying these services has increased. (MPR 165; OPA-T-4670)

Bituminous Coal: Increases averaging 40½ cents a ton authorized in producers' ceiling prices for bituminous coal, effective June 21. The increases range from 10 cents to $1.47 a ton and can be passed on at other levels of sale. (MPR-120; OPA-6581)

Power Transmission Equipment: Interim price increase of 7.8 per cent over Oct. 1, 1941, prices given manufacturers of industrial power transmission equipment, including drive shafts, pulleys and similar parts on Apr. 19, has been increased to 11.6 per cent over base period prices, effective June 19. (MPR-136; OPA-T-4681)

Exemptions: Several categories of hardware, cast and sheet metal building materials, beer cooling and dispensing equipment and pipe accessories were suspended from price control, effective June 26. (SO-129; OPA-T-4706)

Plumbing Fixtures: An interim increase in producers' prices for brass and bronze screwed plumbing fixtures, ranging from 15 to 20 per cent, was authorized, effective June 27. This action affects fittings up to and including 2 inch iron pipe sizes, and brass and bronze valves designed for pressures not exceeding 125 pounds steam working pressure. (MPR-591; OPA-T-4715)

Buff and Polishing Wheels: Producers' ceiling prices for buff and polishing wheels increased 17.4 per cent, effective June 24. (MPR-136; OPA-T-4717)

Radiators: Cast-iron gas-fired steam radiators are covered now by price regulation 272, effective as of June 25, providing for an increase of 37 per cent over October, 1941, prices. At the same time, a provision of regulation No. 591 was clarified affecting transportation charges for manufacturers of cast-iron radiation, cast-iron boilers, boiler repair parts and cast-iron radiation accessories. On shipments of 2000 pounds or over, the manufacturer bears all actual transportation charges, not in excess of 60 cents per 100 pounds, from plant to delivery point. The amount is not to exceed that computed on the basis of the minimum carload freight rate to the nearest point for which the carload freight rate is published. (MPR-591, 272; OPA-T-4688)

Electrical Industrial Controls: Base prices of electrical industrial control products increased 19 per cent, effective June 20. (MPR-136; OPA-T-4690)

Power Driven Tools: Manufacturers of portable electric power driven tools granted an interim price increase of 15 per cent, effective June 21. (MPR-136; OPA-T-4692)

Forged and Mining Tools: Heavy forged tool and mining tool prices increased, effective June 21, 10 per cent over October, 1941, prices. (MPR-188; OPA-T-4695)

Sprocket Chains: Chains of the type suitable for power transmission increased 13 per cent over October, 1941, prices, effective June 21. (MPR-136; OPA-T-4697)

Refractories: Manufacturers' prices for electric furnace refractories increased 24.2 per cent, effective June 26. These refractories include all special refractories, bonded, refractory cements, and grain manufactured from electrically fused materials. The previous ceilings represented March, 1942, levels. (MPR-592; OPA-T-4700)

Sewing Machines: Manufacturers of industrial sewing machines and equipment granted a 7 per cent increase over base date "freeze" ceiling prices, effective June 21. (MPR-136, OPA-T-4704)

CIVILIAN PRODUCTION ADMINISTRATION

Tin Plate: All quota restrictions on the use of 30-pound capacity tin containers for packaging frozen foods have been removed. Previously, processors of frozen fruits and vegetables had been limited in the use of 30-pound cans to 100 per cent of the corresponding 1944 pack of frozen cherries and 100 per cent of either the 1941 or 1945 pack of other frozen foods. Processors who use less than 250 base boxes of tin plate per year now may use the same type of tin plate in containers as large users. Formerly, a small user was restricted to the use of 0.25 pound tin plate for the soldered parts of the container which he was permitted to use. (M-81; CPA-LD-106)

Rated Orders: CPA now reserves the right to limit the amount of a scarce material which a holder of a "CC" rating may order from one source of supply. Provision has also been made for granting "CC" ratings to industrial food manufacturing processing, packaging, preserving and storage (except soft drinks, alcoholic beverages and chewing gum) to permit them to complete construction or alteration where the food is vital for famine relief or for the processing and storage of this year's crops. (PR-28; CPA-441)

Steel Industry Considered as Guinea Pig in Annual Wage Study

OWMR group undecided on advisability of basing initial survey on industry where demand is subject to such wide variations and so far removed from direct consumer demand. Three agencies co-operating in investigation

WHETHER the steel industry will be among the first to be studied for its ability to embrace a guaranteed annual wage system now is under discussion by the Advisory Board of the Office of War Mobilization & Reconversion.

Members are not in agreement as to the advisability of making the steel industry a guinea pig in these studies and a member of the guaranteed wage staff, Murray W. Latimer, recently recommended that the steel industry not be considered in the first studies.

"The demand for steel, arising as it does from a wide variety of industries and in almost all cases at least two stages removed from direct consumer demand, will involve a tremendous amount of analysis," said Mr. Latimer. "It is clear also that, in the past at least, the demand for steel has, even apart from wartime demand, had tremendous variations. It seems improbable that a satisfactory study of this situation could be completed during 1946, both because of the character of the demand and because of the tremendous ramifications of the steel industry in every segment of the economy."

Steel Wage Study Debated

While the board admits the validity of Mr. Latimer's argument that a guaranteed wage study in the steel industry would have to include many factors and perhaps require a long time, some of its members feel these obstacles should encourage rather than discourage action. A sound solution to the guaranteed wage problem in the steel industry, they believe, would go a long way in finding solutions for all other industries. There is an even chance the steel industry may serve as guinea pig. A decision probably will not be made until fall.

Meanwhile the study, launched as a result of a request by the late President Roosevelt on March 20, 1945, is concerned with unearthing information of a basic character. It is going on in three different places. The Bureau of Labor Statistics is studying the guaranteed wage plans now in existence. The Social Security Board is trying to ascertain the cost of maintenance of existing guaranteed wage plans. The OWMR Guaranteed Wage Study Staff is studying the effects on the overall economy that could be expected to result from the adoption, both generally and on a limited scale, of guaranteed wage plans of different types.

The BLS study has progressed to the point of revealing "a total of 275 plans (some of them covering a number of establishments) . . . as coming within the definition of a guaranteed wage plan employed in the study, namely an advance agreement between an employer and some or all of his non-executive employees which assures wages or employment for a period of not less than three months."

Of these 275 plans, it was shown, about half are in the retail and wholesale trade, and one-fifth in the food manufacturing industry. The other 30 per cent are distributed over the textile, apparel, printing and publishing, chemicals, paper, transportation, light and power and communications industries.

85 Plans To Be Studied

The BLS culled out 85 of these 275 plans as justifying further detailed study, and field workers have investigated the records of the companies using these plans. The particular angles of interest are labor turnover, relating production to sales, the level of earnings as compared with neighboring plants and the attitude of labor and why guaranteed wage plans were discontinued at certain plants.

In seeking data on costs, the Social Security Board ran into a snag because its records do not show the fulltime annual wages of individuals, and thus it is impossible to determine the relationship between wages at full time and the payments under a guaranteed wage system. The board now is studying the relationship between its records and some actual payrolls in industry. It hopes to build up a formula which will enable it to make fairly accurate hypothetical comparisons between full-time pay at regular wages and the compensations paid under guaranteed wage systems.

One of the preliminary conclusions reached by the Guaranteed Wage Study Staff is that seasonal industries need not necessarily be eliminated from the list of guaranteed wage prospects. Seasonality, it has found, affects only the distribution of pay throughout the year—not the annual level as a rule.

"For example," says one of Mr. Latimer's preliminary reports, "no one will contend that the guaranteeing of wages in the building industry would be a simple matter. However, in the electrical contracting trade, to give only one example, a joint committee, including representatives of the electrical contractors as well as the International Brotherhood of Electrical Workers, has explored the problem, accumulated material, and worked out a plan."

DAVID A. MORSE

Former general counsel of the National Labor Relations Board, Mr. Morse has been nominated by President Truman to one of the newly-created posts of assistant Secretary of Labor. NEA photo

Blanket Permits Banned

Blanket arrangement under which special export licenses had been granted in connection with the construction and operation of many plants in various parts of the world which were built to aid the war effort of the United Nations was discontinued by the Office of International Trade June 14. Under the former arrangement many of these plants were being gradually brought to completion. Further work on some of them now will be abandoned.

Special licenses in connection with such plants abroad will be granted hereafter only when:

1—The license covers a project which contributes to the attainment of the policy objectives of the United States government.

2—The licensed exportation furthers the production abroad of critical com-

modities needed for United States consumption, or for essential consumption in foreign countries.

3—The license covers construction or operation of facilities necessary to the minimum essential civilian economy of the country of destination.

4—The license covers a project which will lead to increased international trade with the United States in the future.

Individual scrutiny will be applied in each case where an export license is sought.

Pricing Policy Awaited

Despite meetings with industry advisory groups, the War Assets Administration has not yet determined on a pricing formula to apply to machine tools and other industrial equipment sold to rebuilders. Several months ago, WAA officials decided in principle that government-owned machinery should be disposed of to authorized rebuilders, and strictly for rebuilding and resale, "at a price which is determined . . . . upon factors other than the Clayton formula." The policy was incorporated in May in a new directive known as Regulation 13, Order 1, but this was never executed due to absence of a decision as to the prices to be quoted to rebuilders. It is the intention of WAA officials to issue this regulation "in the near future," as soon as a satisfactory price formula has been set.

Form Prefabrication Branch

Organization of the Prefabrication Production Branch of the National Housing Agency has been completed with the appointment, by Director James L. Pease, of the following:

Carroll A. Towne, director of the Qualifications Division; Warren B. Shipway, director of the Materials Division; William J. Renn Jr., director of the Production Division; and Earl E. Raymond, consultant in charge of the program calling for 50,000 house trailers this year.

Mr. Towne, whose chief task is to approve prefabricators and trailer manufacturers for priorities and other assistance, had charge of the prefabricated housing program of the Tennessee Valley Authority, and after the war was a member of a government mission which studied prefabricated housing developments in England and Germany.

Mr. Shipway, whose function is to facilitate flow of materials to qualified manufacturers, has spent 26 years in the construction and mortgage loan business. Mr. Renn has spent most of his life in the plywood business. Mr. Raymond is on leave from a trailer-building company of which he is president.

The NHA program calls for a start on 250,000 prefabricated housing units this year. So far the program has involved principally wood and plywood as building materials. But in the past month the NHA has intensified its interest in encouraging the use of steel and aluminum in prefabricated housing, and indications now are that these metals will be involved to an increasing extent in the program.

Arbitration Fees

Whereas arbitrators appointed by the U. S. Conciliation Service heretofore have served without cost to the parties in dispute, a new policy provides that they hereafter will charge for their services, according to Director Edgar L. Warren.

The fees to be charged by arbitrators appointed by the Conciliation Service will be subject to agreement between the arbitrator and the parties. To insure that excessive charges will be avoided, however, the service has ruled that it will expect its arbitrators to charge fees "ranging from $50 to not more than $100 a day plus actual expenses for travel." The $100 fee is to be charged only "in cases involving important issues of great complexity;" where the hearings extend over a considerable number of days the daily charge is to be lowered progressively.

Excepted are cases where existing contracts call for the appointment of arbitrators by the Conciliation Service without cost to the parties.

Professors Under Attack

Newly formed Kefauver subcommittee of the House Small Business Committee in drawing up plans for "an investigation of the effects of monopolies on the competitive position of small business," has received a suggestion from an undisclosed source that it turn its guns on college and university professors. Professors long have enjoyed a high status with Congress in general and this is the first time that their supposed disinterestedness has come up for scrutiny.

"It has been suggested," a subcommittee release reads, "that the subcommittee investigate the close tie-ups between certain prominent professors of business schools and large business organizations. Many of these professors, it is reported, supplement their income with substantial consulting fees. Their public pronouncements, it is claimed, are supposed to be made with academic objectiveness, but most always favor the chains and large organizations."

Ordnance Chief Predicts Metallic Jet Will Outmode Many Standard Bullets, Projectiles

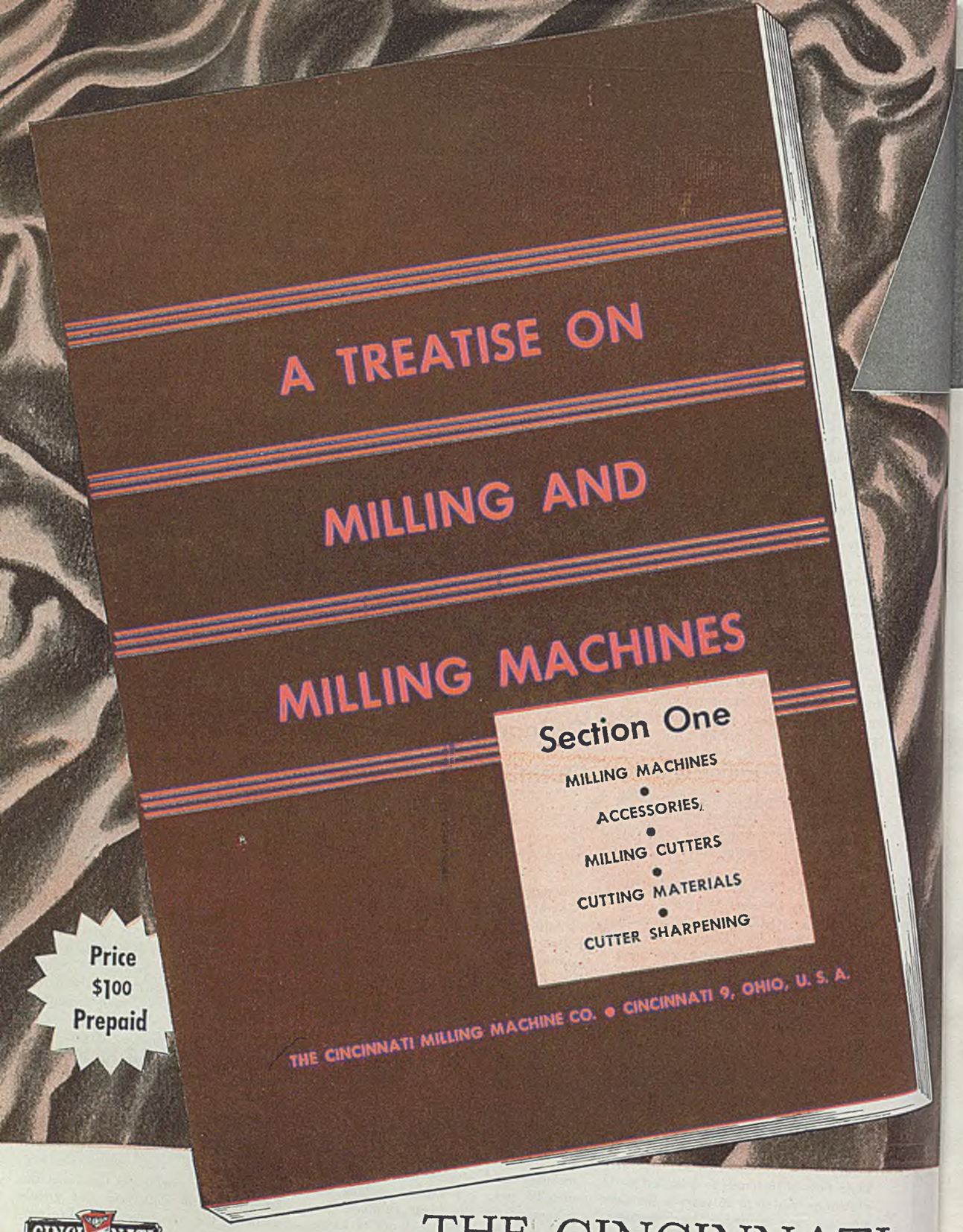
SOME of the standard weapons which contractors produced in large volume during World War II are being outmoded as a result of postwar research and development activity, according to Major General Everett S. Hughes, the new chief of Army Ordnance. The high explosive bullets and projectiles that fighter pilots pumped into enemy aircraft in World War II probably will be replaced "in a few years," he says, by "a high-speed metallic jet, traveling at an initial velocity of 25,000 feet per second." Hollow-charged antiaircraft guided missiles, he said, will be sufficiently powerful to penetrate armor and destroy atomic or explosive rockets in flight.

Like the Navy Bureau of Ordnance, which recently announced the new ram jet, the Army Ordnance Department is making rapid strides with high-speed metallic jets, and expects striking developments in the "near future." The work is largely in the hands of Col. Leslie E. Simon, director of the Ordnance Department's Ballistic Laboratories at Aberdeen Proving Ground, Aberdeen, Md.

"With further understanding of shaped charge phenomena, and with larger models," said Colonel Simon, "it may be possible to overcome what now appear to be formidable difficulties in the attack of heavily armored guided missiles and high speed aircraft.

"It would appear that these attacks would consist of two sorts: One may be the projection of a number of shaped charge missiles which are penetrating explosive and incendiary, from an antiaircraft missile or guided missile at an armored guided missile target.

"The second method would be the projection of a high-speed jet from a fighter aircraft in lieu of conventional bullets or projectiles. The jet from a shaped charge is known at present to have an initial velocity of about 25,000 feet per second. This velocity is so high that it greatly ameliorates the difficulties associated with deflection and greatly simplifies the requirements for fire control predicting devices. Work is in progress to determine the range and effectiveness of such a metallic jet."



A New Book
ON MILLING MACHINES AND MODERN MILLING PROCEDURE

● This new book is cram full of information for those who want to keep abreast of recent developments in metal cutting by the process of milling. ¶ "Treatise on Milling and Milling Machines," Section I of a series, is devoted largely to standard milling machines, accessories and cutters. It contains 178 pages of useful data together with 176 photographs and drawings, and many tables and mathematical formulas to clarify the text and to help solve cutter problems. ¶ This new book may be used profitably by your shop supervisors . . . milling machine foremen, setup men, cutter sharpening foremen . . . and by time-study and methods engineers, tool designers, students and apprentices. Prepared by the engineers of The Cincinnati Milling Machine Co. who are backed by sixty years of milling know-how, it's devoid of advertising and written in simple, understandable language. The illustration on the opposite page shows actual size of book. Write for a copy of Section I today! The cost is only $1—postpaid anywhere. Section II of "Treatise on Milling and Milling Machines" will be published later.

●

Typical pages of Section I of "Treatise on Milling and Milling Machines." This book contains definitions of milling machines and their accessories, and detailed data on cutters, cutter materials and cutter sharpening practice.

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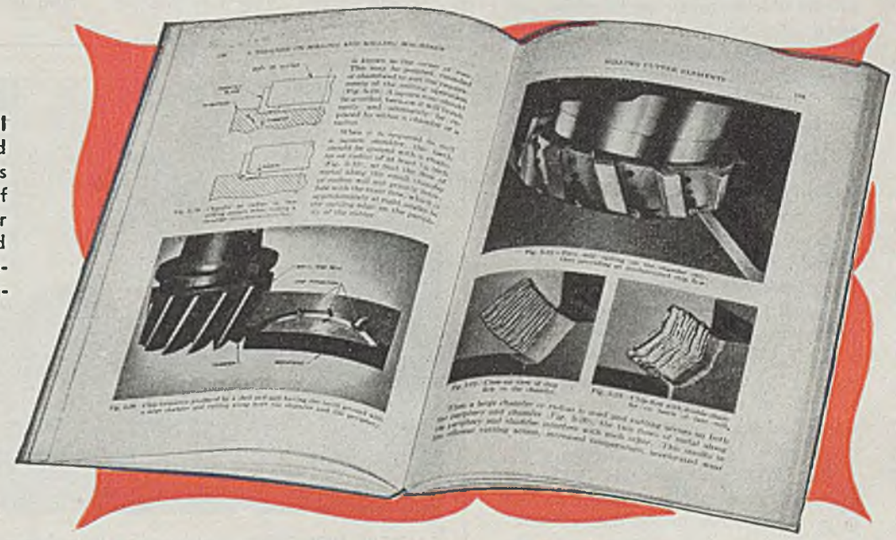


CINCINNATI

THE CINCINNATI MILLING MACHINE CO. CINCINNATI 9, OHIO, U. S. A.

MILLING MACHINES • BROACHING MACHINES • CUTTER SHARPENING MACHINES

WAA Scheduling 938 "Site Sales" To Speed Disposal of Surpluses

Regional offices prepared to advise prospective buyers where sales will be held and type of goods to be offered. Agency also plans to organize "Product Locater" staff to assist purchasers find wanted equipment

A SERIES of "site sales" will be conducted by the War Assets Administration over the next four months to move surplus government goods more quickly into the hands of customers. A number of site sales now are under way and final arrangements will have been made before the end of June for an additional 161 to begin in July. Altogether WAA Administrator Edmund B. Gregory and his staff contemplate holding 938 site sales—546 involving military installations, 222 industrial plants and 170 warehouses.

In the great majority of the cases the goods to be sold are all sorts of consumers' goods. In many cases machine tools and other industrial equipment are involved. The WAA has set up the following arrangement in order to enable prospective buyers to know when and where these sales will be held, and what items will be on sale at each site:

Each of the WAA's 33 regional offices will have a "Regional Sales Desk," to which prospective buyers should address inquiries. These Regional Sales Desks will be able to advise as to where and when sales will be held, and about the items to be offered to buyers at these sales. In addition, the WAA will advertise the sales extensively in local newspapers and also in business papers.

"Products Locater" Planned

In addition, WAA is planning to organize a "Products Locater" staff with representatives in each regional office and a central clearing house in Washington. Prospective buyers can send an inquiry for needed machines and other items to the Products Locater in the nearest WAA regional office, and the latter, by forwarding the inquiry to Washington, will be able to tell the prospective buyer where and when he will be able to purchase what he wants.

The WAA will have to stretch out each sale for a month or more in order to give preference to the different classes of buyers as is mandatory under the Surplus Property Act. An example of this is the sale of machine tools and industrial equipment—over $4,000,000 worth— at the Eclipse Machine Division, Bendix Aviation Corp., Elmira, N. Y. The schedule splits the sale up as follows: Federal agencies June 10-14; veterans June 17-25; RFC Small Business June 26-28; state and local governments July 1-5; nonprofit institutions July 8-12; commercial buyers July 15 and later.

While a good many of the 938 site sales will involve machine tools and industrial equipment WAA headquarters at Washington so far does not know which they will be. This information can be obtained in part now, and in more complete detail later on, from the Regional Sales Desks in the WAA regional offices.

The plan is to sell at these site sales all goods except plants and other real property, veterans' set-aside goods, aircraft and a number of items in which there are individual sales programs. The idea behind the site sales is that they are to be devoid of red ape; prospective buyers will appear at the sale, pick out what they want, whereupon the purchase is crated and shipped to destination.

Recently WAA started a move to enlist the help of "private concerns of proven ability" in carrying on these site sales. No tangible action along this line yet has developed. The personnel problem will be terrific; it is estimated that as many as 35,000 people will be needed to conduct the 938 site sales many of which will be going on simultaneously in all parts of the country.

Farmers To Build

Prospects for farm construction, normally about 5 per cent of all construction, are the best in 25 years, according to a report by Frank J. Hallauer, United States Forest Service, prepared at the request of the Senate Small Business Committee. He estimates that expenditures for new farm construction and repairs should average close to $1 billion annually for the next five years. This compares with $585 million annually in 1940-1945, $350 million annually in 1930-1939 and $600 million yearly in 1920-1929.

Increases in farmer income have not been offset by the usual cash outlays, largely because of curtailment of production of consumer goods and equipment during the war. Hence the farmer is in a fine cash position. By the end of 1944 farmers had accumulated over $11.6 billion in bank deposits and currency, probably $3.9 billion in United States savings bonds and over $600,000,000 in warehouse receipts. Further, farm-mortgage debt at the beginning of 1945 was $5,271,000,000, compared with $6,586,000,000 in 1940.

Mr. Hallauer bases his assessments of farm construction prospects on the as-

FAIRLESS HONORED: Secretary of War Robert P. Patterson, left, presents the Medal of Merit to Benjamin F. Fairless, president, United States Steel Corp., while Chief of Staff Dwight D. Eisenhower looks on. The Medal of Merit is the highest honor awarded civilians by the President and was conferred on Mr. Fairless for his services as adviser to the Chief of Ordnance during the war. NEA photo

sumption that for several years farm income will remain high, and that industrial reconversion from now on will be expedited, with a period of prosperity generally ahead. He warns, however, that the forces of inflation have not yet run their course, and postwar readjustments are yet to be made; if there is unemployment and depression ahead, farm construction prospects would taper off accordingly. "When times are bad," he recalls, "a farmer may only patch the roof on a barn that would be replaced if times were good."

The report contains considerable information of value to manufacturers interested in selling to the farm population of the country. Entitled "Farm Construction," copies may be had from the Senate Special Committee on Small Business, Senate Office Building, Washington 25, D. C.

Industry Group Honors Government OCS Officials

National Association of Manufacturers' Contract Termination Advisory group presented 15 government contract settlement officials last week with certificates commending them for developing policies that have expedited settlement of terminated war contracts with a cancelled commitment value of more than $64 billion. Since 1943 when the meeting between the advisory group and representatives of the government began the group has discussed with contract settlement officials' policies and procedures that in some degree have affected a majority of the 312,000 prime contracts terminated to date. The advisory group expressed, in particular, its appreciation of the speed attained by settlement officials in reaching fair settlement of the terminated contracts.

Incentive Committee Named

An Incentive Advisory Committee has been appointed by Commerce Secretary Henry A. Wallace to assist the Incentive Division Department of Commerce, in its studies of wage incentives. Members of the committee are leaders in management engineering. They had a wide knowledge of the use of wage incentives as rewards to workers for their contribution to increasing production and controlling costs, it was said.

Members of Incentive Advisory Committee are: Alvin E. Dodd, president, American Management Association; J. Keith Louden, vice president, Society for the Advancement of Management, and production manager, Glass & Closure Production, Armstrong Cork Co.; Phil Carroll, Jr., vice president, Society for the Advancement of Management, and professional engineer; John W. Nickerson of Bigelow, Kent, Willard & Co., management engineers; James H. Eddy, industrial engineer, Yale & Towne Mfg. Co.

Mr. Nickerson and Mr. Eddy headed the Management Consultant Division, War Production Board, during the war. This Division was instrumental in installing wage incentives in war product plants and contributed to increased production of war materials.

The Incentive Division was established by Secretary Wallace in March of this year to study and report on bonus, profit-sharing and other incentive systems which are being used or could be used to promote greater production, distribution and consumption of goods.

Surplus Property Disposals Rise Over 100% in May

Disposal of surplus property by the War Assets Administration increased more than 100 per cent during May to a new high of $808 million in reported cost compared with $391 million in April. Sales for May came to $717 million in reported cost with the cash return amounting to $233 million. Consumer goods disposals were 15 per cent above April with $200 million worth going back into the national economy as against $174 million for April. Disposals of capital and producer goods were $150 million compared with $135 million for April.

WAA acquisitions for May fell off slightly to $1032 million from $1247 million in April. The drop in acquisitions combined with the sharp increase in disposals resulted in a rise of only two per cent in inventory, by far the smallest increase since the end of the war. At the end of May, inventory was $13,729 million. Property on lease was $713 million, leaving $13,016 million available for disposal.

Navy Men Make First Plant Visit Under New Program

First of a series of industrial plant visitations by Navy officers under a program sponsored by the Navy Industrial Association was made recently when 25 Navy men inspected facilities of E. I. du Pont de Nemours & Co. Inc., Wilmington, Del. The visitors saw recent commercial developments likely to find Navy applications. Demonstrations explained by talks by technical and production men were given in each plant department.

The program is a two-way matter, with reciprocal visits by industrialists at Navy establishments at sea and ashore.

The Navy Industrial Association, through its Washington office, 1420 New York Avenue N. W., has invited other manufacturers to indicate a desire of opening their plants to inspection by delegations of Navy officers.

Seeks to Channel Copper Wire Bars to Wire Makers

Copper Wire and Cable Mill Industry Advisory Committee has recommended that, with a few stated exceptions, all copper wire bars should be sold only to wire manufacturers, the Civilian Production Administration said recently. CPA had previously estimated that with all facilities operating domestic production would be about 70,000 tons per month, with the demand greatly in excess of this amount. Consequently the public purchase program instituted in the first half of 1946 must be continued during the last half of the year. Metals Reserve stocks of copper are now deficient in the particular shapes, such as wire bars, which are in greatest demand.

Former WPB Steel Division Men Organize Social Group

Organization of a social group consisting of former members of the Steel Division, War Production Board, was formed by 111 members meeting in Cleveland recently. Purposes of the group, known as the Steel Division, are to promote reunions, perpetuate friendships, and preserve the experience gained during the war.

Hiland G. Batcheller, president, Allegheny Ludlum Steel Corp., Brackenridge, Pa., was elected director of the organization.

Steel Pipe, Casing and Spikes Offered by WAA

Steel pipe, well casing and railroad spikes will be offered by the War Assets Administration in a sealed bid sale on July 3, G. G. Yule, Pittsburgh district manager, has announced.

The material, representing approximately $150,000, is located at the Pennsylvania Railroad yards at Latrobe, Pa.

This surplus consists of 250,921 feet of steel pipe grooved for victaulic couplings; 2340 feet of threaded steel casing, eight inches in diameter, in ten foot lengths; and 440 kegs of railroad spikes packed in original kegs.

Bids will be opened at 10:00 AM, July 3, at WAA offices in Room 508, Victory Bldg., Pittsburgh.

mirrors of MOTORDOM

By A. H. ALLEN *Detroit Editor, STEEL*

Suspension of price controls on automotive parts denied by OPA, despite fact production is more than double 1941 volume. Price control enthusiasts backed by union leaders. Week's automobile assemblies reach new postwar high

DETROIT

WHILE it may be of only passing significance by the time this appears in print, pending the week-end fate of the OPA, the six-month argument between the price control agency and the automobile parts manufacturing industry bears some examination if only because of the light it throws on the strange ideologies reflected in statements of OPA Administrators — first Bowles and then Porter. The industry has been asking suspension of price controls on automotive replacement parts in the interests of maintaining production of vitally needed parts at somewhere near a profitable basis. After weeks of badgering, however, the OPA finally was convinced it should make its position clear, so early this month the suspension was denied because it was alleged to be "contrary to the best interests of the stabilization program."

It has long been a publicly-stated position of the OPA that price controls should be suspended once supply meets demand. That is a vague and perhaps unattainable balance in any industry, since supply is always either behind or ahead of demand in the American scheme of things, but beyond that the OPA has proved in more instances than one that many other factors bear on the retention of price controls. Thus, in the oil industry supply has run well ahead of demand, yet price controls continue in effect.

In the automotive replacement parts industry, sales for the year 1945 were more than double those for 1941, and in the first four months of this year have run at an annual rate of 234 per cent of 1941. Still the OPA remains adamant for holding on to price control.

C. C. Carlton, chairman of the Automotive Parts Industry Advisory Committee, has carried the fight for decontrol for many months, and it has been a rousing one. In a recent letter to Paul Porter of the OPA he comes right to the point with the observation: "Under your contention that production does not yet supply the demand, price control would remain indefinitely, until such time as production exceeded demand and then a depression might be on the way. Do you argue that OPA should continue, and all price controls should remain until it can be proved that the supply is equal to or greater than the demand on each individual part? If so, you are arguing for an indefinite continuance of OPA to which we are definitely opposed.

"We are in complete agreement with your statement that suspension of ceilings on replacement parts will result in some immediate price increases at both factory and retail levels, but we still contend that prices will not rise appreciably above the levels which OPA would otherwise set, if each one of the approximately 800 manufacturers were granted a price increase. The removal of all price ceilings means about the same thing as would otherwise be attained, if each one of these 800 manufacturers, after weeks of preparation, submitted a formal request for price increase."

Mr. Carlton's letter was in reply to an earlier letter from Mr. Porter in which, among other things, the Price Administrator said: "I am somewhat disturbed at reports that certain manufacturers are considering diversion of production and the discontinuance of low-end items . . . . I should appreciate the committee's assurance that balanced production will be maintained." To this Mr. Carlton then logically replied: "Of course your committee can make no such assurance. Each individual manufacturer will and must determine his own course of action and it is ridiculous to assume that this committee has any control of the production or lack of production of replacement parts."

It is not too difficult to read behind the entire program of the OPA an insidious effort to establish a new and complete un-American system of regulation for the nation's economy. They would throw out the normal processes of competition, would control prices, production, distribution and every other phase of a bureaucratically managed economy, all under the guise of wartime emergency powers. As a matter of fact, the Washington bureaucracy has been operating under almost identical powers ever since 1933, the intervening 13 years being one continuous emergency.

Program Has Union Support

In this nefarious activity, the OPA has naturally had the enthusiastic if not frenzied support of union leaders and all the left-wing elements of the country who would see individual initiative and enterprise stifled in the interests of government regulation. To characterize the program as prolabor is incorrect. It is pro-union only, since union leaders, however powerful at the moment, do not speak for American labor —just a small segment of it. Last week's demonstration in Washington was no spontaneous demonstration by the American public. It was carefully engineered by union and left-wing leaders, and it may even be that some union treasuries stood the cost of bus fares to Washington and return for the demonstrators. The distinction between prolabor and pro-union is an important one, all too often overlooked in public utterances.

The question was asked John F. Gordon, new general manager of Cadillac, last week whether any price increases would be made in Cadillac cars if all OPA controls should be removed. He

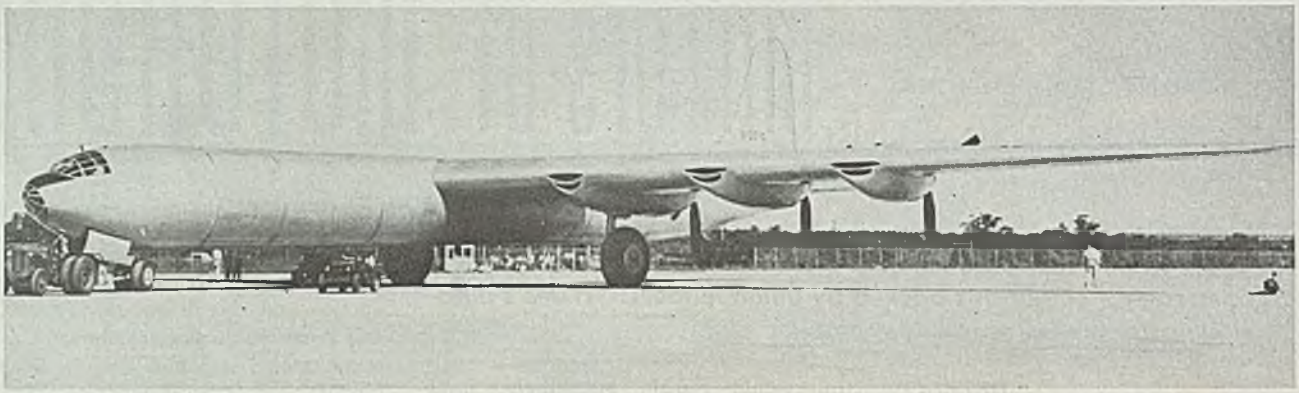
Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Tabulated by Ward's Automotive Reports

	1946	1941
January	121,861	524,073
February	83,841	509,332
March	140,777	533,878
April	248,318	489,856
May	247,620	545,321
June	220,000°	546,278
Week ended:		
June 8	43,175°	133,645
June 15	50,206°	134,682
June 22	53,930°	133,565
June 29	72,000°	127,926

°Preliminary



BIG BOMBER: Pictured on the ramp at Consolidated Vultee aircraft plant in Ft. Worth, Tex., is the XB-36, the Army's newest and largest land-based bomber. A pusher type aircraft powered by six Pratt & Whitney 3000-horsepower engines, the huge bomber has a wing spread of 230 feet and fuselage length of 163 feet

replied that no further increases would be made, despite the fact operations thus far since V-J Day have been well into the red ink. The same answers probably would be forthcoming from other motor car manufacturers who, despite rising labor and material costs, must keep a watchful eye on the price of their product lest they see their markets go a-glimmering. George Christopher of Packard said not so long ago, in effect, that no one in the automobile industry is fool enough to price himself out of business in 18 months.

Last week saw assemblies of automobiles lift into new postwar high ground, all plants being back in the picture for the first time in months. The air is filled with more optimism than Detroit has heard any time this year, with expectations that weekly totals for July can be pushed beyond the 100,000 mark. Definite improvement in the supply situation is the principal explanation, this in return resulting from the gradual dissolution of strikes in vendors' plants.

Latest check made by George Romney and his staff of the Automobile Manufacturers Association shows passenger car production 1,680,000 units behind schedule in the first half of this year, involving an estimated loss in sales of $1.5 billion. Schedules detailed last year called for 2,320,000 cars by the end of June, but deliveries totaled only 654,000.

Willys-Overland last week celebrated completion of jeep No. 30,000, since the start of civilian production, current production continuing at a pace of 360 daily. Distribution of output thus far is 5960 for export, 8414 for farmers, 10,337 for industrial buyers, and 5289 for miscellaneous customers. Looking to the future of the jeep in this country, it is likely a reduction in price will have to be effected to hold onto a mass market, once passenger and commercial cars become plentiful. Either that or the jeep will have to be made more attractive and more comfortable as a passenger vehicle. The former doubtless will be the road taken, since Willys is now working on a new passenger car, not on the jeep chassis.

In this connection, the election of W. S. Knudsen as a director of Hupp Motor Car Corp. has interesting connotations. Hupp is planning to machine and assemble a new 6-cylinder engine for the Willys passenger car, and General Knudsen has long been hinted as having close connections with future plans of the Fisher brothers in Detroit. On the face of it, particularly in view of recent personnel change, the Fishers could have more than casual interest in the future of Willys-Overland. Put all these odds and ends together and at least you might come up with some speculation to take your mind off the hot weather.

For the first time, General Motors has released for publication detailed figures on car and truck production at its various divisions. Totals from Jan. 1 through June 22 follow: Chevrolet, 70,558 passenger cars and 72,882 trucks, Pontiac 25,765, Buick 23,781, Oldsmobile 21,076, Cadillac 6799, GM truck 4635 and GM of Canada 12,091—a grand total of 237,587. Total number of suppliers' strikes now affecting GM production is 100, down four from a week ago.

Prospects for any general introduction of 1947 models this year are growing fainter. Packard will not try it, according to official word from President Christopher last week who said a shutdown of six weeks to two months for retooling cannot be justified in the light of current restricted production. Ford has already gone on record as deferring any more new models until after the first of the year. General Motors Divisions will act in concert on the matter and as far as is known now have made no definite decisions but probably will go along with the rest of the industry. It has been generally felt Chrysler would make no move in the direction of a model change this year, because tool and die shops are not earmarking any time for Chrysler programs, nor is there much work now in process for this producer. Thus it would appear tooling activity over the balance of this year may be pretty slim.

Enroute to "Mad Man" Muntz, West Coast distributor for Kaiser-Frazer in Los Angeles who made a fortune in the used car business and is now spending a good part of it fixing up an elaborate display and service building on Figueroa street, was a railroad car carrying the first "shipment" of Kaiser and Frazer automobiles to the West. The shipment was understood to be one model of each, these probably hand built. An appropriate label on the car proclaimed the contents to train-watchers along the trek to the coast. This Saturday, the cars will be "premiered" to a breathless Los Angeles public, doubtlesss with all the fanfare attending the opening of the latest Lana Turner picture.

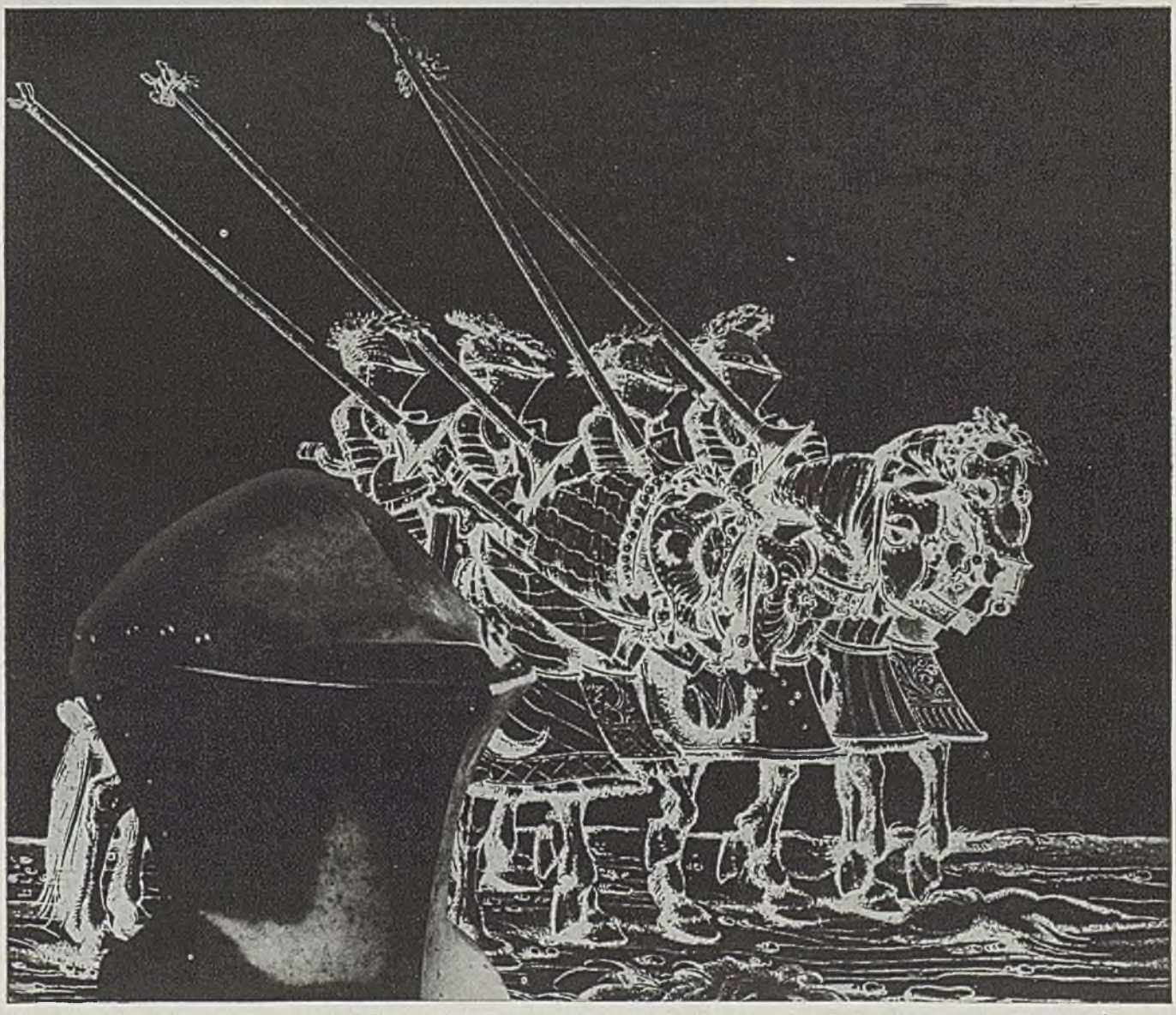
M. E. Coyle, executive vice president of General Motors Corp., was elected a director of the Automobile Manufacturers Association at the annual association meeting last week. He succeeds Albert Bradley, also of General Motors, and will serve as secretary of the board of directors of the AMA, a post likewise held by Mr. Bradley.

Three directors were re-elected—K. T. Keller of Chrysler, C. W. Nash of Nash-Kelvinator and A. E. Barit of Hudson. Present officers of the association were re-elected, including George Romney, general manager, apparently dispelling rumors of impending administrative changes.

MATERIALS MAKE PERFORMANCE

Several centuries ago the Chevalier de Roye swept the tournaments until a broken saddle girth made him non-operational. A promising career was ruined by a material weakness missed by routine inspection.

Temper brittleness in steel is a modern material weakness that is easily overlooked, and likely to be fatal to product performance and sales. The adoption of temper-brittle-free molybdenum steels will eliminate this risk . . . and they will do the job well and economically.



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CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

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MOLY

Philco Planning Huge Expansion Of Facilities

Program involves addition to refrigerator and freezer, radio and television, and lumbering facilities

AN EXPANSION program costing approximately $10,350,000 is now under way, Philco Corp., Philadelphia, has disclosed.

The program includes an additional plant for production of refrigerators and home freezers, estimated to cost approximately $6,000,000; new plant estimated to cost $2,250,000 for manufacture of radio, radio phonographs and television receivers; plant for manufacture of radio, television and other electronic tubes to cost approximately $1,400,000; and timber land and logging and saw mill facilities in North and South Carolina costing about $700,000.

To finance this construction, Philco has filed with the Securities & Exchange Commission a statement covering issuance of 100,000 shares of preferred stock, $100 par value.

Before the war Philco sold 17,500,000 radio sets, including 4,185,000 automobile receivers, and its refrigerator business which was begun in 1938 accounted for 23 per cent of total domestic sales in 1941.

Freight Car Builders Form Car Exporting Association

Railway Car Export Corp. of America, an association formed by freight car manufacturers and exporters, has filed papers under the Export Trade Act with the Federal Trade Commission for exporting freight cars having a capacity of 10 or more metric tons, and component parts.

Officers of the association are: C. W. Wright, president and director; R. A. Williams and Walter J. Curley, vice presidents and directors; L. C. Haigh, secretary treasurer and director; Harry Odle, F. A. Livingston and K. C. Gardner, directors. Members are American Car & Foundry Export Co., New York; Magor Car Export Corp., New York; Pullman-Standard Car Export Corp., Washington; General American Transportation Corp., Chicago; Greenville Steel Car Co., Greenville, Pa.; Pressed Steel Car Co. Inc., Pittsburgh; and F. A. Livingston, Ralston Steel Car Co., Columbus, O.

OLD TIMERS: These men have served the foundry industry for more than 60 years. Snapped at a recent meeting of the Old Timers of the Northeastern Ohio chapter of the American Foundrymen's Association, they are, left to right, standing: Sam Seay, Forest City Foundries Co.; Charles Moraveck, National Malleable & Steel Castings Co.; Ben Feller, Whitehead Bros. Co., and Barney Birnbaum, American Crucible Co. Seated: John Kownacki, Fulton Foundry & Machine Co. Inc; Paul Zvolenic, Fulton Foundry & Machine Co. Inc.; Jack Horning, Ohio Foundry Co., and Gus Zimmerman, Eberhard Mfg. Div., Eastern Malleable Iron Co.

BRIEFS . . .

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

Cushman Chuck Co., Hartford, Conn., has bought the chuck business of Manufacturers Equipment Co., Milwaukee. Operations of the business will continue temporarily at Milwaukee but will be moved to Hartford as soon as possible.

—o—

General Electric Co., Schenectady, N. Y., has purchased the Lowell, Mass., factory which it has leased since 1944 and will use the facility to manufacture electric cords, lampholders and metal parts.

—o—

Monroe Tool Mfg. Co., Monroe, Mich., has appointed Voss Machinery Co., Pittsburgh, as distributor for western Pennsylvania, West Virginia, eastern Ohio and western Maryland.

—o—

Federal Supply Co., Pittsburgh, a subsidiary of Pittsburgh Consolidation Coal Co., has changed its name to Champion Stores Inc.

—o—

Commander Air Lines of Willis-Rose Airlines Inc., New York, a contract cargo transport company, has ordered six twin-engined, all cargo, 202 model planes from Glenn L. Martin Co., Baltimore.

—o—

Westinghouse Electric Corp., Pittsburgh, has published a 36-page booklet describing electrical equipment for all phases of the petroleum industry.

—o—

Central Radio Mfg. Works, Shanghai, China, has placed large orders with Philco Corp., Philadelphia, for radio receivers and refrigerators for distribution through its branches in Tientsin, Chungking, Kunming, Hankow, Canton and Nanking.

—o—

Lakeside Melting & Refining Co., Chicago, has purchased the abandoned plant of Wanner Malleable Castings Co. at Hammond, Ind. The recently organized Lakeside company will reclaim nonferrous metals.

—o—

Titusville Iron Works Division, Titusville, Pa., Struthers Wells Corp., has developed a miniature version of its standard Scotch Marine boiler which is said to retain all the practical advantages of construction, economy, efficiency, instal-

lation and maintenance of larger size power boilers. The Wee-Scot boiler is made with working pressures of 100, 125 and 150 pounds.

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Twin Coach Co., Kent, O., has plans to transfer its large stamping and tool designing and building operations to its Buffalo plant.

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Ampco Metal Inc., Milwaukee, has formed a Process Industry Division.

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Aireon Mfg. Corp., Kansas City, Mo., has announced that Cinaudagraph Speakers Inc., a subsidiary, has transferred its activities from Chicago to Slater, Mo.

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Lerio Patent Cup Co., Mobile, Ala., sheet metal manfacturer, has changed its name to Lerio Corp.

—o—

Gilman Engineering & Mfg. Corp., Janesville, Wis., has moved from 214 N. East St. to 305 W. Eastern Ave., Janesville.

—o—

Manufacturers Belt Hook Co., Chicago, has changed its name to American Rivet Co.

—o—

Crown Cork & Seal Co., Baltimore, has begun construction of a machine shop at O'Donnell, Newkirk and Boston Sts., that city. When the building is completed, the company's machinery division will increase employment 25-30 per cent.

—o—

Reynolds Research Corp., Reynolds Metals Co., Louisville, has taken over the special film plant of the metal company at Gary, Ind.

—o—

Hammond Iron Works, Warren, Pa., has appointed Pump & Tank Co. Inc., Richmond, Va., as its Richmond district representative.

—o—

Lovejoy Flexible Coupling Co., Chicago, has acquired the manufacturing and sales facilities of the mechanical power transmission department of Ideal Industries, Sycamore, Ill.

—o—

Hewitt Rubber Corp., Buffalo, has begun work on a new brick building in that city to house its expanded molded goods department. The new building is adjacent to the company's main plant.

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Bound Brook Oil-Less Bearing Co., Bound Brook, N. J., has appointed Ritchie Engineering Co., Minneapolis, as sales representative for Minnesota and northwestern Wisconsin.

—o—

Carboloy Co. Inc., Detroit, has appointed the following as distributors: Brierly, Lombard & Co. Inc., Worcester, Mass., for the central Massachusetts area; C. W. Marwedel, 1235 Mission St., San Francisco 3, for the San Francisco bay area; and Providence Mill Supply Co., Providence 1, R. I., for Rhode Island, eastern Connecticut and southeastern Massachusetts.

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L. A. Crowl Machine Co., Brooklyn, N. Y., has begun construction of a concrete block building to replace its former wooden structure.

—o—

H. & B. Mfg. Co., Baltimore, has opened a branch plant at 10 East Wheeling St., that city, where it will manufacture metal home bars and stools.

HARMONY: William L. Batt, right, president, SKF Industries Inc., Philadelphia, invited company foremen and shop stewards to a dinner recently in celebration of the signing of a new labor contract affecting 3000 SKF employees. Shown with Mr. Batt at the dinner is Clinton S. Golden, vice president of the United Steelworkers of America

Helicopter To Be Used in Mineral Survey in Canada

A helicopter equipped with magnetic aerial exploration devices will be used by Lundberg-Ryan Air Exploration Co., Toronto, Ont., in its survey of hitherto impenetrable mining fields. Tests are being conducted with the helicopter over mineral areas in Sudbury, Ont., preparatory to embarking on an exploratory expedition to northern Canada.

Hans Lundberg, vice president of the exploration company has announced that Lawrence D. Bell, president, Bell Aircraft Corp., Buffalo, has placed a coupe-type helicopter at the disposal of the expedition and provided it with pilots, crews and a machine shop-equipped truck.

The nature of the instruments which the helicopter will carry has not been disclosed. Use of the helicopter in prospecting with magnetic devices is thought by Mr. Lundberg to be an improvement over conventional air surveys because of its greater maneuverability and ability to hang in midair above ground points which show interesting instrument readings.

Milcor Steel Absorbs J.M. & L.A. Osborn Co.

J. M. & L. A. Osborn Co., sheet metal manufacturer, and warehouse operator, has changed its name to Milcor Steel Co. The Osborn company, located at Cleveland with branch warehouses in Buffalo, Detroit and Cincinnati, was acquired by Milcor in December, 1944, and has been operated since then as a division under its own name. With the change in name, the Osborn organization became a part of Milcor with home offices in Milwaukee.

In addition to the former Osborn branches, Milcor has its main plant in Milwaukee and branch warehouses in Baltimore, Chicago, Kansas City, Mo., Los Angeles and Rochester, N. Y.

Spokane Sees Prosperous Future As Aluminum Plants Are Reopened

Trentwood and Mead works leased to Permanente Metals Corp. and soon will be producing at capacity. Mining, agriculture and lumbering prospects good. City's population, increased 27.3 per cent during war, will hold gain

SPOKANE, WASH.

RESUMPTION of operations in two large government-owned aluminum plants here under private operation has confirmed hopes of business leaders that Washington will hold a portion of its war-created industry. The Trentwood Works and the Mead reduction works have been leased by Permanente Metals Corp., a Henry J. Kaiser company, and soon will be in operation.

First ingots were poured last week and started through the Trentwood plant since Permanente took over the works. The continuous strip mill will be permanently in production from this time. Later it is expected additional facilities will be installed to permit rolling of shapes. While output is primarily to be used in Kaiser's automobile operations, serving of other markets is anticipated. This will include prefabricated housing, lightweight garage doors and other items for which aluminum is easily adapted.

At the Mead reduction works preparations are being made for scheduled reopening on July 15. The silver bus bars, installed and owned by the government, have been removed and replaced by copper bars. The Trentwood plant can absorb more than Mead can produce and additional supplies will have to be obtained from outside sources. Raw bauxite is being shipped from the Alabama holdings recently leased to Kaiser interests. An engineer has been sent to the Dutch East Indies to investigate possibilities of obtaining additional raw materials from that area.

The two local plants are situated about 15 miles outside Spokane and when in full operation will employ 4000 workers. It is expected maximum capacity will be reached within three months.

When Trentwood and Mead were closed last August, following V-J Day, the future of the plants was uncertain. Many workers left for other jobs. However, the foremen, in co-operation with the CIO, formed worker's clubs maintaining lists of skilled men in the expectation the shutdown would be brief. Meanwhile these employees accepted what employment they could find in this area. By this method a close-knit organization of skilled workers was maintained. Consequently when Kaiser surveyed the possibilities of the local plants, one of the deciding factors, it is stated, was the immediate availability of 1000 workers specialized in production of aluminum. This nucleus will be augmented by whatever additional labor is required.

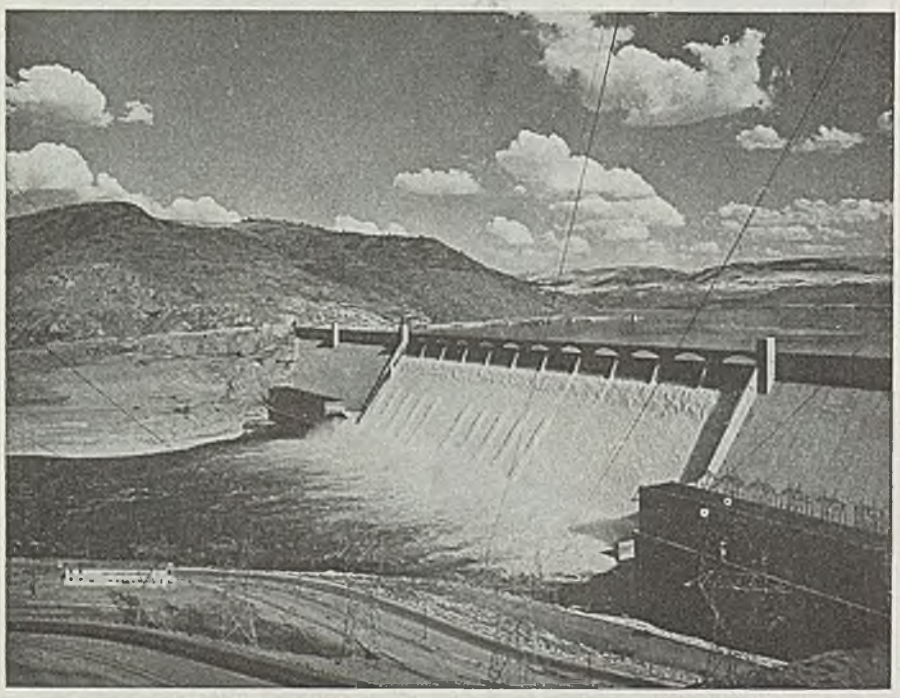
Research with the objective of removing alumina from clay has been conducted at the Washington State College, Pullman, during the last two years but it has not yet been commercially successful. Proper proportions of temperature and pressures have not been discovered to separate alumina from other elements. Iron and silicon are precipitated with alumina and scientists are still engaged in search of the process that will segregate these elements and separate alumina. Until this problem is solved it will be necessary to import bauxite.

Spokane is the center of a large agricultural, lumbering and mining area, the latter covering northern Washington and Idaho. Its population has increased from 122,001 in 1940 to 155,775 in 1946, 27.3 per cent, about the average shown by other war centers throughout the country. While some of the war-employed newcomers have left for their former homes or employment elsewhere, the majority has remained. The housing shortage is acute and business property is in similar demand. With the reopening of the aluminum plants, enlarged mining operations and promising agricultural returns, this city anticipates continued growth and importance. Except for Trentwood and Mead, industrial reconversion problems have been minor. Small plants, temporarily engaged in war work, have quickly returned to normal operations. The Union Iron Works is the major steel plant here, specializing in lumber, logging and mining machinery.

Spokane is a major railroad center and the supply source for the Columbia Basin project, one of the largest government undertakings since Coulee dam. Silver producers are reported to be planning a large fabricating plant here; the War Department has granted private airlines the use of Geiger Field and plans are in the making for the industrial use of Farragut, the adjacent Navy center in the near-by Idaho.

The labor situation is spotty. Unemployment figures are dropping and some industries are still in need of help.

In the mining districts, operations which continued during the war pro-



Cheap and abundant power from the Grand Coulee dam is one of the assets favoring Spokane's chance of holding its wartime industrial gains. Above is a recent general view of the dam. NEA photo

ducing essential minerals, have had no reconversion problems but have been able to resume peacetime levels easily. Labor shortages are rather acute in this field. Many veterans have postponed returning to work while others prefer seasonal outside work. In the Metaline district, mining is active, mostly zinc, with some lead and silver being produced. Northwest Magnesite Co. in Stevens county is reported near capacity. The Colville area, producing lead and zinc, is at two-thirds capacity. The Howe Sound Co., Chelan county, which produced copper through the war period, is back to peacetime with both copper and gold. In the Republic district are several gold properties. However, gold producers are not enthusiastic about the future. At $35 an ounce, operators see only a small profit due to the high cost of labor and equipment.

Spokane businessmen view the future with extreme optimism and the city prides itself on being one of the fastest growing communities in the country. A large influx of population is expected into the Columbia Basin district following completion of the great system of irrigation canals which will take water from the Columbia river and transform a desert area into a flourishing farm region. At least four years will be required to finish this project which is one of the most important on the government's present program. In conjunction with ample and cheap power from Coulee dam, Spokane visualizes a prosperous future.

U. S. Steel Takes Title to Geneva Steel Plant, Steps Up Operations

Full operations expected to be reached in August. Will produce plates for high-pressure pipelines. Structurals in heavy demand for construction purposes. New finishing facilities planned for Geneva and Pittsburg, Calif.

SAN FRANCISCO

ROLLING mill operations at the Geneva steel plant in Utah are being revived slowly and activity is expected to be stepped up gradually during the next six weeks or until such time as full working crews can be recruited. It is hoped to reach full operations some time in August.

Following confirmation of sale of the plant to U. S. Steel Corp., Columbia Steel Co., West Coast subsidiary, immediately began putting into effect plans for increased production at the Utah mill. U. S. Steel took title to the plant June 9.

Revival of operations is being hastened, of course, by the desperate need of coast fabricating mills for steel. Until necessary modification of the plant is completed, Geneva will turn out plates and structurals, the materials which it made during the war. Although lack of shipbuilding has reduced the need for plates, it is expected that plate output will be diverted to manufacture of heavy welded pipe for high pressure gas lines.

At present, the biggest plate requirement is in connection with 60,000 tons of 30-inch pipeline steel which will be needed for the new Texas-California line. Other utilities also are expected to be in the market for heavy pipe.

Structural items also are in heavy demand for construction projects which have been held up by shortages of material. These demands, it is believed, will permit Geneva to operate at a high level until construction of new rolling mill units at the plant is completed.

No timetable has been set for work on the new expansion. It is likely that none will be finished this year, but it is hoped that the new operations will begin sometime in 1947.

This work will depend largely on availability of materials and labor.

U. S. Steel proposes to spend $18,600,000 for additional facilities at Geneva, including capacity for the annual production of 386,000 tons of hot-rolled coils. It also proposes to spend $25 million on a new cold reduction mill at Pittsburg, Calif., which would produce 325,000 tons of cold-reduced thin sheets and tin plate to use the 386,000 tons of hot-rolled coils from Geneva.

New Plant To Cost $25 Million

The new plant at Pittsburg now is in the initial stages of construction. The structure itself will cost $10 million and the remaining $15 million will go into new equipment. American Bridge Co., another U. S. Steel subsidiary, will fabricate and build the superstructure and general contractors are Bechtel Bros.-McCone & Co., J. H. Pomeroy & Co. and M. & K. Corp. (MacDonald & Kahn).

Since the war ended, Geneva's operations have been reduced to one of the three blast furnaces and one coking battery. It is estimated that 2,000 men are needed to put the plant in full operation on its present capacity basis. It also is calculated that when all improvements are completed at Geneva and Pittsburg, jobs will be created for an additional 5,000 persons.

Increased operations at Geneva will involve increasing production at the coal and iron ore mines in Utah and will increase employment at these mines as well as at the plant.

Lack of Skill Keeps Many Job Seekers Unemployed in Southern California

LOS ANGELES

RAYMOND KRAH, state director of the USES, says unemployment in this area has decreased from 228,500 in May to 225,700 in June. Out of jobs are 15.5 per cent of all nonagricultural workers.

Job applications on file at USES offices in the area were reported to be near 200,000 by Mr. Krah, with 31 per cent of applicants women and 40 per cent veterans.

According to Mr. Krah, the major difficulty in getting available workers placed on suitable jobs is a lack of balance between the applicant's declared skills and the employer's job specifications. This, he admitted, is another way of saying that most job seekers list the highest skills as personal assets while most employers offer jobs that demand skills considered to be beneath the worker's self-estimated standard.

Topping most help-wanted lists, Mr. Krah's figures showed, are bench, floor and squeeze molders, pattern makers and job setters for foundries, detailers, layout men and engineers for steel fabricating plants and skilled workers of all kinds in other industrial fields.

"Prewar industry in this area did not require many of these types of workers," Mr. Krah explained, "and few were trained during the war years."

As to the area's future employment prospects, Mr. Krah said that 384 establishments reporting to the USES in May estimated future needs by July as about 2 per cent over present needs. This was a general estimate. Iron and steel employment is expected to increase 6 per cent by July. As a separate category, automobile manufacture will rise about 47 per cent.

MEN of industry

Frank M. Hawley has been promoted to president, and **Ray P. Johnson** to first vice president and assistant general manager, Morse Chain Co., Ithaca, N. Y., and Detroit, a subsidiary of Borg-Warner Corp., Chicago. Mr. Hawley also continues as general manager of the Morse company. He had been vice president of the company, having joined it in 1916. In his new position, he succeeds **D. B. Perry**, who remains with the organization as vice president. Mr. Johnson has been with Borg-Warner since 1930, serving as a director since 1936.

—o—

Harry K. Collins has been appointed manager, Resin & Insulation Materials Division, General Electric Co., Schenectady, N. Y. Mr. Collins had been manufacturing manager of the division since November, 1945. He has been with the company 20 years.

—o—

Edward F. Rossiter has been appointed superintendent, mechanical goods plant, Sydney, Australia, Goodyear Tire & Rubber Co., Akron. He succeeds **C. H. Maxwell**, who held the post since 1930. Mr. Maxwell will return to the company's Akron organization for reassignment. Mr. Rossiter joined the company in 1927. He has held several posts in the firm's Mechanical Goods Division.

—o—

J. C. Billings has been appointed supervisor of tire distribution, Replacemen Tire Sales Division, B. F. Goodrich Co., Akron, succeeding **R. R. Huston** who died recently. Mr. Billings, with the company 20 years, had been sales manager of industrial tires for the last two years.

—o—

W. Frank Kelly has been appointed general superintendent of foundries, American Manganese Steel Division, American Brake Shoe Co., New York. His headquarters are in Chicago Heights, Ill. Mr. Kelly, who was formerly works manager of the Amsco plant in New Castle, Del., has been associated with the division since 1925.

—o—

Thomas P. Riley has been appointed general superintendent, Johnstown-Lorain works, Johnstown, Pa., Carnegie-Illinois Steel Corp., Pittsburgh, subsidiary of United States Steel Corp. Mr. Riley began with United States Steel in 1908. In 1946, he became assistant to the manager of operations of the Pittsburgh district, holding that position until his present appointment.

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Richard C. Baker has been appointed an executive assistant, Timken Roller Bearing Co., Canton, O. He was formerly manager, Canton office, Ernst & Ernst, public accountants.

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Charles E. Gibson has been appointed assistant manager, claim department, Republic Steel Corp., Cleveland. He was chief clerk in the department for the last 18 years.

—o—

William J. Charlton, investment counsel of Philadelphia, has been elected to the board of directors, Lukens Steel Co., Coatesville, Pa., to fill a vacancy created by the resignation of **Norman R. Entrekin**. **Herbert G. Austin** has been named district manager of sales, Boston office, Lukens Steel Co. and subsidiaries, By-Products Steel Corp. and Lukenweld Inc. Mr. Austin has been assistant manager of sales of the Boston office of the Lukens organization since 1927.

—o—

Bert Dingley, president, Marmon-Herrington Co. Inc., Indianapolis, has retired. He joined the company in 1932, a few months after its founding, as vice president. He was elected president in 1942. Mr. Dingley has been succeeded by **David M. Klausmeyer**, who was plant manager, Chevrolet Commercial Body Division, Indianapolis, General Motors Corp.

—o—

Alfons Alven has been elected president, Bearings Co. of America, Lancaster, Pa., succeeding **Henry W. Jackson** who resigned recently. Mr. Alven joined the company in 1932 when he was appointed district manager of the Chicago office. In the early spring of 1946, he was elected a director.

—o—

J. M. Fenner has been appointed division superintendent, Stainless Steel, Waukegan, Ill., works, American Steel & Wire Co., Cleveland, subsidiary of United States Steel Corp. Mr. Fenner has been with the company since 1933, and was supervisor, research laboratory,

NORMAN B. OBBARD

Cleveland, since 1940. He will be succeeded in this position by **Ronald E. Griffiths** who joined the company in 1937. Mr. Griffiths was made a research engineer in 1944.

—o—

Eugene H. Heald, vice president in charge of sales and a director, American Bridge Co., Pittsburgh, subsidiary of United States Steel Corp., has retired. He had been with the company 44 years, and was elected vice president in 1932. Mr. Heald has been succeeded by **Norman B. Obbard**, who, during the war, managed the company's Ambridge, Pa., shipyard. Mr. Obbard joined American Bridge Co. in 1926. He became assistant to the vice president in charge of sales in 1940. Two years later he became manager of the Ambridge shipyard. He returned as assistant to the vice president last December.

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Ben Coplan, formerly in charge of the Chicago office, Construction Sales Co. Inc., is now associated with Max Schlossberg Co., Chicago, scrap broker.

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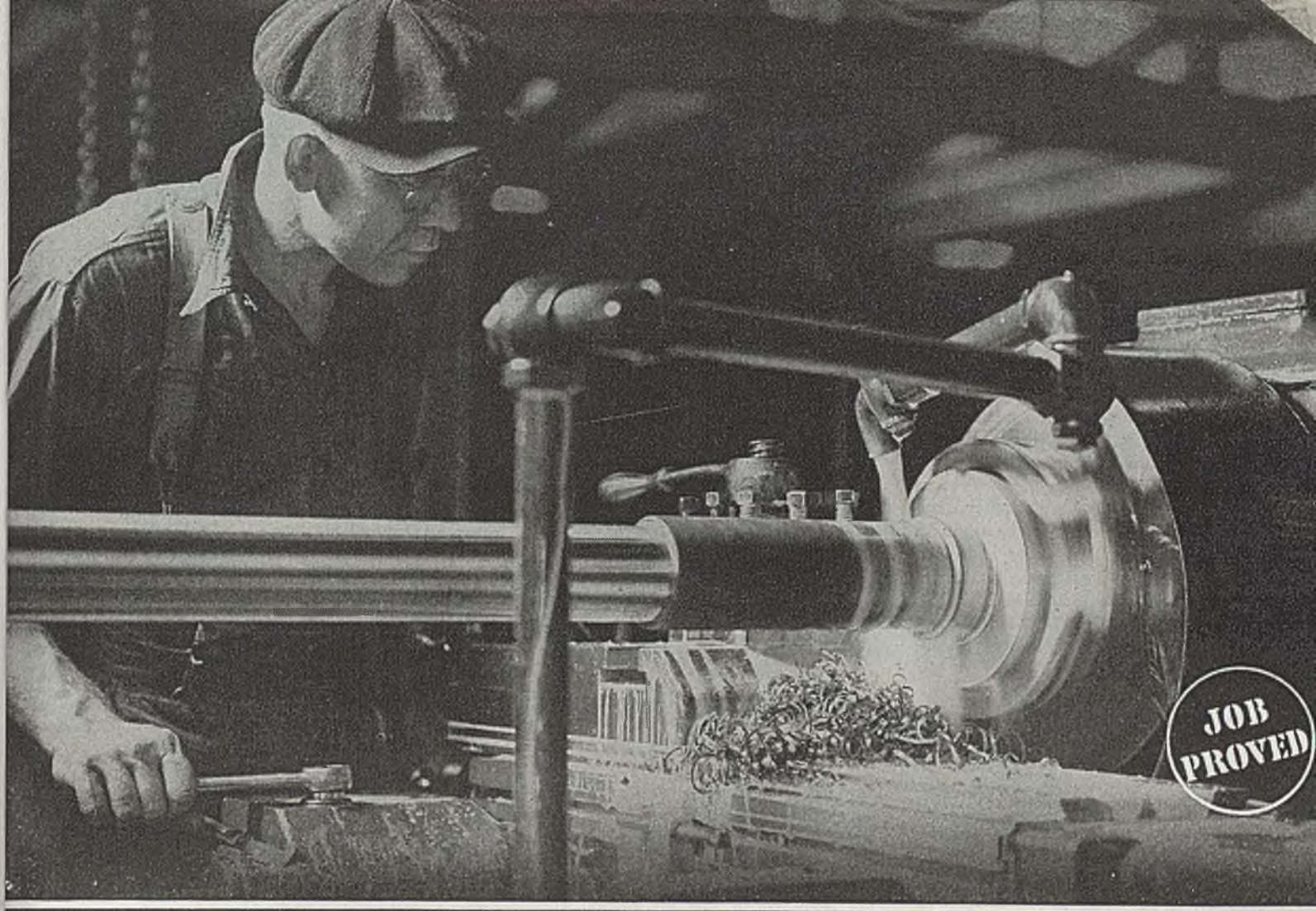
Carl Wadsworth has been appointed district traffic manager, southern California district, Bethlehem Pacific Coast Steel Corp. His headquarters are at Bethlehem's Los Angeles plant in Vernon, Calif.

—o—

Leon A. Paddock, president, American Bridge Co., Pittsburgh, and Virginia Bridge Co., Roanoke, Va., both subsidiaries of United States Steel Corp., has retired, effective July 1. Mr. Paddock began his career 42 years ago, with Canadian Bridge Co. Ltd., Walkerville, Ont. He became president of that company in 1924 and held the position until joining American Bridge as vice president in 1927. He was also president of Essex Terminal Railway Co., Walkersville, from 1924 to 1927. He was elected president of American Bridge in 1931,



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and Virginia Bridge in 1936. Mr. Paddock is a director of the executive committee of United States Steel Corp. of Delaware, and a director of United States Steel and Carnegie Pension funds.

—o—

P. G. Buchanan has been promoted from chief clerk, treasury department, Tennessee Coal, Iron & Railroad Co., Birmingham, to the newly created position of staff assistant in the office of the secretary and treasurer.

—o—

Carl E. Bolte has been appointed executive secretary, National Lubricating Grease Institute, to begin his new duties July 1. Mr. Bolte will be the first executive secretary of the organization, and will set up temporary headquarters in Kansas City, Mo. Mr. Bolte had been president and general manager, Slater Mill & Elevator Co., Slater, Mo. He also served as president, Missouri Millers' Association, and director, Millers National Federation.

—o—

Saul Belilove has joined the sales department, Diesel Engine Division, Enterprise Engine & Foundry Co., San Francisco.

—o—

Charles A. Simmons Sr., president, Simmons Machine Tool Corp., Albany, New York, has left the United States for a period of six weeks to two months on a trip to Europe to survey the machine tool requirements among leading industries in several countries, including France, Belgium, Switzerland and Sweden.

—o—

Manufacturing Chemists Association of the United States, Washington, has elected the following officers: President, **Charles S. Munson**, chairman, executive committee, U. S. Industrial Chemicals Inc., New York, succeeding **H. L. Derby**, president, American Cyanamid and Chemical Corp., New York; vice presidents, **Leonard T. Beale**, president, Pennsylvania Salt Mfg. Co., Philadelphia, and **H. O. C. Ingraham**, vice president, General Chemical Co, New York; treasurer, **J. W. McLaughlin**, Carbide & Carbon Chemicals Corp., New York; and secretary, **Warren N. Watson**, Washington.

—o—

William B. Keen has been appointed superintendent of farm equipment production, Graham-Paige Motors Corp., Willow Run, Mich. Mr. Keen had been with the Dodge Division, Chrysler Corp., Detroit, for 13 years.

—o—

C. K. Sherk has been appointed purchasing agent, Merchandising Division, National Supply Co., Pittsburgh. He succeeds **John Kirby** who has been with the company 51 years. Mr. Kirby will remain with the firm in an advisory capacity for some time and then retire.

—o—

Frank A. Robbins Jr., general manager, Steelton, Pa., plant, Bethlehem Steel Co., Bethlehem, Pa., since 1918, will retire, effective July 1. He has been with the plant 44 years. Mr. Robbins will be succeeded by **C. E. Clarke**, who has been assistant general manager of the company's Sparrows Point plant for the last 18 years. **W. E. Grainger** has been named assistant general manager of the Sparrows Point plant, to succeed Mr. Clarke. Mr Grainger has been superintendent of the coke ovens department of that plant.

—o—

Eugene W. O'Brien, vice president, W.R.C. Smith Publishing Co., Atlanta, has been nominated as next president of American Society of Mechanical Engineers. Five regional vice presidents representing various sections of the country also were nominated. Elections of the nominees will be held by letter ballot of the entire society membership this fall. Regional vice presidents nominated are the following: **Alton C. Chick**, assistant vice president, Manufacturers Mutual Fire Insurance Co., Providence, R. I., renominated from region 1 to serve one year; **A. R. Mumford**, development engineer, Combustion Engineering Co., New York, newly elected from region 2 for two years; **E. E. Williams**, general superintendent of steam plants, Duke Power Co. Inc., Charlotte, N. C., renominated from region 4 for two years; **T. S. McEwan**, vice president, McClure, Hadden and Ortman Inc., Chicago, renominated from region 6 for two years; and **Linn Helander**, professor and head of the department of mechanical engineering, Kansas State College, Manhattan, Kans., renominated from region 8 for two years.

—o—

Arthur P. Schulze, recently released from the Army, has been appointed public relations director, Taber Instrument Corp., North Tonawanda, N. Y. He succeeds **L. S. Barker**, vice president, who has relinquished his public relations duties to concentrate solely on sales management and customer service development work.

—o—

David M. Meeker, Revlon Products Corp., New York, has been elected president, Purchasing Agents Association of New York. He succeeds **H. W. Macintosh**, L. O. Koven & Bro. Inc., Jersey City, N. J. Other officers elected are as follows: **Harold G. Butterfield**, National Union Radio Corp., Newark, N. J., and **Donald H. Lyons**, Johns-Manville Corp., New York, vice presidents; and **Edward B. Fielis**, treasurer.

—o—

Robert E. Dobson, recently released from the Marine Corps, has been appointed merchandise manager for vacuum cleaners, Westinghouse Electric Ap-

CHARLES A. SIMMONS SR.

FRANK A. ROBBINS JR.

C. E. CLARKE

More New Fluorine Compounds by General Chemical

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DR. W. M. FIEDLER

ELMER A. SCHWARTZ

A. L. CARLSON

pliance Division, Westinghouse Electric Corp., Pittsburgh. **Mrs. Ollyne Jeffries** has been appointed district home economist, southwestern district, Westinghouse Electric Appliance Division. **Earl L. Charles** has been named manager of the wholesale electrical supply branch of the Barnes & Brass Electric Co., Clarksburg, W. Va., purchased recently by Westinghouse Electric Supply Co., New York. Mr. Charles had been employed by the Clarksburg firm for the last 16 years He will now report to **D. B. Williams**, manager of WESCO's central district, with headquarters in Pittsburgh.

—o—

Dr. W. M. Fiedler has been appointed assistant chief geologist, Inter-State Iron Co., and Jones & Laughlin Ore Co., both subsidiaries of Jones & Laughlin Steel Corp., Pittsburgh. Since 1944, he has been geologist at the Benson Mines in New York state, Jones & Laughlin Ore Co.

—o—

Ray C. Kivley has been appointed factory superintendent, Buffalo plant, Western Electric Co., New York.

—o—

The Western New York chapter, American Foundrymen's Association, has elected the following officers: Chairman, **Henry C. Winte**, Worthington Pump & Machinery Corp., East Harrison, N. J.; vice chairman, **Elliott R. Jones**, Lumen Bearing Co., Buffalo; secretary, **Leo A. Merryman**, Tonawanda Iron Corp., North Tonawanda, N. Y.; and treasurer, **Martin W. Pohlman**, Pohlman Foundry Co. Inc., Buffalo.

—o—

Alfred Lindley Boegehold, head of the metallurgy department, Research Laboratories Division, General Motors Corp., Detroit, has been nominated for president of the American Society for Metals. **Francis B. Foley**, superintendent of research, Midvale Co., Philadelphia, has been nominated for vice president. **William H. Eisenman** has been nominated for another term as secretary.

—o—

Elmer A. Schwartz, recently named president of the Portsmouth Steel Corp., Portsmouth, O., (STEEL, June 24, p. 68) had been assistant manager, Youngstown district, Republic Steel Corp., Cleveland, since 1943. Mr. Schwartz has been associated with the steel industry for 27 years. He is a member of American Iron & Steel Institute, and American Institute of Mining and Metallurgical Engineers.

—o—

General William S. Knudsen has been elected to the board of directors, Hupp Motor Car Corp., Detroit. The name of the corporation has been changed to Hupp Corp., effective July 1, and it will not re-enter automobile field. General Knudsen is a former president of General Motors Corp., Dtroit.

—o—

Edwin T. Syvertsen has been named general manager, Service Division, Thompson Products Inc., Cleveland, succeeding **Tom O. Duggan**, retired. Mr. Syvertsen has been with the company 25 years, the last ten as sales manager of the Service Division.

—o—

Dr. James Norman Goodier, head of the department of mechanics, Cornell University, Ithaca, N. Y., has been presented the first annual George Westinhouse Award in Engineering Education, for distinguished contribution to the teaching of engineering students.

—o—

David M. White, executive vice president, Lester Engineering Co., Cleveland, is visiting England in response to requests from British users of his company's injection molding and die-casting machines. Mr. White will discuss production problems with them, as well as compare data on new developments in both the plastic and die-casting industries. Mr. White will also confer with Dowding & Doll Ltd., London, British agents for Lester products for the last ten years.

—o—

A. L. Carlson has been named sales manager, Warren City Mfg. Co., Warren, O. **Jack F. Anschuetz** has been appointed assistant sales manager of the company, and **Albert Clements**, chief engineer. Mr. Carlson was with Wilson Brown Co., New York, and Mr. Anschuetz, prior to joining the Warren organization, had been with the Reconstruction Finance Corp., handling sales of surplus machine tools. Mr. Clements was chief engineer, Verson Allsteel Press Co., Chicago.

—o—

American Rolling Mill Co., Middletown, O., has announced the advancement of three members of its Ashland, Ky., Division. **K. C. McCutcheon** has been appointed assistant to the vice president in charge of operations. He joined the organization in 1922, and was general superintendent of the Ashland Division since 1939. He will be succeeded as general superintendent by **J. M. Lobaugh**, who was assistant to manager of the division since 1943. He was originally employed by Armco in 1926, at the Butler, Pa., Division. **George Yost Jr.** succeeds Mr. Lobaugh as assistant to manager of the company's Ashland Division. He joined the organization in 1925.

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J. P. Elkann, general export manager, Titan Metal Mfg. Co., Bellefonte, Pa., has left for Europe to visit representatives and customers for the company's brass and copper products. He will visit London, Stockholm, Copenhagen, Ams-

JOHN G. MAPES

Named a partner in the public relations firm, Hill & Knowlton, New York, noted in STEEL, June 24 issue, p. 89.

ROBERT H. McCRACKEN

Manager of sales, Cleveland office, Lukens Steel Co., Coatesville, Pa., and subsidiary, By-Products Steel Corp., STEEL, June 24, p. 84

terdam, Brussels, Paris, and Zurich. He will return to New York, headquarters for the company's export department, in August.

—o—

Fred E. Amon has relinquished his position as general sales manager, Parker Appliance Co., Cleveland, to spend his full time as manager of aircraft sales of the company. **Dan W. Holmes** has been appointed general sales manager of the organization. He had been with the Weatherhead Co., Cleveland.

—o—

Albert W. Lohn has been promoted to vice president, Ducommun Metals & Supply Co., Los Angeles. Mr. Lohn will continue to serve as general manager of the company, a position he has held for the last seven years. He has been with the firm 35 years.

—o—

Herbert E. Cragin Jr. has been appointed High Bridge plant superintendent, Taylor-Wharton Iron & Steel Co., High Bridge, N. J., reporting to **L. E. MacFadyen,** works manager. Mr. Cragin, recently released from the Navy, was originally employed by the Taylor-Wharton company in 1934. **Robert McEldowney Jr.,** recently released from the Marine Corps, has been appointed assistant to the company's High Bridge plant superintendent. He first joined the firm in 1941.

—o—

Walter F. Schneid has been named vice president in charge of operations, Eastern Stainless Steel Corp., Baltimore. Mr. Schneid had been superintendent, Syracuse, N. Y., plant, Crucible Steel Co. of America, New York.

—o—

Clifford T. Butler has been appointed superintendent, Hercules, Calif., plant, Hercules Powder Co., Wilmington, Del., succeeding **Leroy P. Hall** who has resigned. Mr. Butler, now superintendent of the company's plant at Bessemer, Ala., will transfer to California July 1. His place at Bessemer will be taken by **Eustace St. P. Bellinger,** who has been manager of the Hercules-operated Allegheny Ballistics Laboratory, Cumberland, Md., since his return from service last February.

—o—

George R. Atherton has been elected president, Springfield Boiler Co., Springfield, Ill., succeeding **Owsley M. Brown,** retired.

—o—

A. E. Ashcraft, vice president in charge of manufacturing, Fairbanks, Morse & Co., Chicago, has retired after 44 years with the company. He has been succeeded by **C. H. Morse III. A. C. Howard** has resigned, after 30 years with the firm. He has been succeeded, as general manager of the company's Beloit works, by **Henry Haase.**

—o—

Virgil C. Sullivan has been elected a director of F. H. McGraw & Co., Hartford, Conn.

—o—

Dr. Roman Smoluchowski has been appointed associate professor of metallurgy, and member of the staff of the Metals Research Laboratory, Carnegie Institute of Technology, Pittsburgh. Dr. Smoluchowski was a research physicist, General Electric Co., Schenectady, N. Y.

—o—

Henry K. Watson has been placed in charge of foreign and domestic sales, Special Coatings Division, Watson-Standard Co., Pittsburgh. Mr. Watson, recently released from the army, is a director of the company.

—o—

B. R. Teree has been named project engineer in charge of aircraft development, Weatherhead Co., Cleveland. Mr. Teree was with the Airplane Division, Buffalo, Curtiss-Wright Corp., for 15 years.

OBITUARIES . . .

A. D. Sperry, 81, president, Rock Island Stove Co., Rock Island, Ill., until its liquidation a year ago, died recently in Davenport, Iowa

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Charles A. Corrigan, Rockford Machine Tool Co., Rockford, Ill., died recently.

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Charles R. Young, for 22 years representative, northern Ohio area, Pittsburgh-Erie Saw Corp., Pittsburgh, died recently.

—o—

William W. Dashner, 61, vice president in charge of production, Essex Wire Corp., Ft. Wayne, Ind., from 1931 to 1938, and former co-owner of R-B-M Mfg. Co., Ft. Wayne, a subsidiary company, died in Logansport, Ind., June 20.

—o—

Joseph M. Grossmith, 69, secretary, Arnold Schwinn & Co., Chicago, died in that city recently.

—o—

James T. Harahan Jr., 73, who retired in 1931 as special representative, railroad department, Inland Steel Co., Chicago, died in that city, June 18. He had occupied his post with the company for 10 years.

—o—

C. M. Sutton, vice president, McCrosky Tool Corp., Meadville, Pa., died recently at his home in Detroit. Mr. Sutton joined the company in 1911, and in 1919 went to Detroit as manager of its sales office there. He continued in active management of that office up to the time of his death. He was also a director of Midwest Tool & Mfg. Co., Detroit.

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W. Robert Shimer Sr., 63, retired metallurgist, Bethlehem Steel Co., Bethlehem, Pa., died in New York, June 22. Mr. Shimer joined the company in 1907, and was chairman of its metallurgical committee for 20 years.

—o—

Leathem D. Smith, 59, president, Leathem D. Smith Shipbuilding Co., Sturgeon Bay, Wis., was drowned in Green bay, June 23, when his racing sloop was swamped during a squall.

DEEP DRAWING and "BULGING" Stainless Steel

Highly developed deep drawing and bulging technique used to fabricate dairy equipment where unusual requirements of surface finish must be met. Scrap is reduced from 10 to less than 1 per cent

By J. E. OBERNESSER
General Superintendent
International Harvester Co. Inc.
Milwaukee

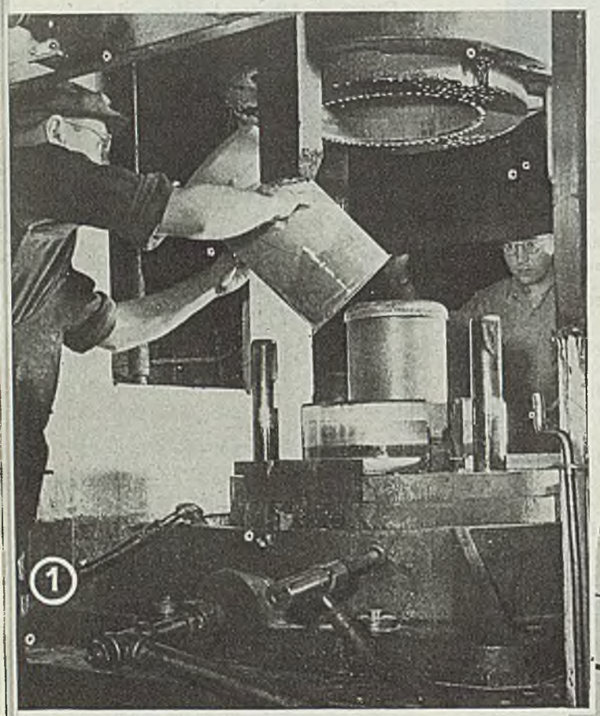


Fig. 1—Deep drawn shell to be formed into a 50-lb capacity milker pail has already gone through four draws, a form flange and a trim flange operation on this hydraulic press. Here it is being loaded onto the "bulging" dies where hydraulic fluid under 3000 psi will expand pail against die cavity to produce shape that is desired

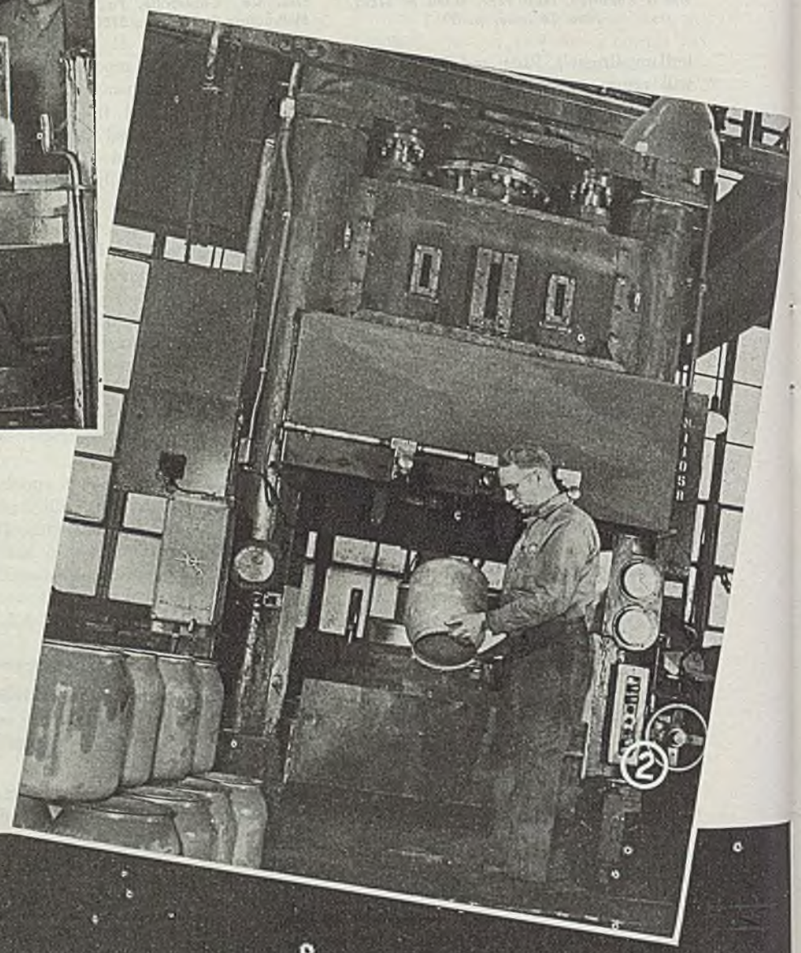


Fig. 2—McCormick-Deering 50-lb stainless steel milker pail after bulging in special HPM 750 ton press. Photos from International Harvester, by G. F. Zimmermann

Fig. 3—Samples showing various stages in production of the stainless steel top disk of International Harvester's model S cream separator: (1) Blank; (2) draw; (3) first taper; (4) second taper; (5) third taper; (6) fourth taper; (7) fifth taper; (8) sixth taper (cone walls form 90° angle); (9) semi-size operation; (10) trim and pierce; (11) final size. The shoulder is critical point

MANUFACTURING stainless steel dairy equipment requires unusual care because of the rigid sanitary specifications on all equipment handling milk. No ridges, pits, cracks or folded seams where milk or dirt particles could lodge are permitted. A high surface finish is necessary in order to facilitate cleaning. It is also absolutely necessary that surface finish of material received from the mills be of high caliber, free from all surface defects such as wrinkles, scratches, grinding marks and all ink trade symbols.

Production of such equipment becomes somewhat involved when these requirements are combined with the need for maintaining metal thickness in order to afford the necessary strength for the part. For instance, milker pails operate under a considerable vacuum (13 lb) so they must be fabricated in such a manner as to avoid the need for extensive grinding and polishing operations in finishing them as this would reduce the metal thickness to a point where the part would flex, causing early fatigue failure. Thus, forming operations must leave no die marks. And thorough cleaning must precede each anneal in order to prevent any foreign material from being burned into the surface to cause defects. It is important also to prevent any stretcher strains since these cannot be polished out. In addition, pickling must be carefully controlled to prevent excessive etching action. The aim is to obtain a very fine finish with no pits or surface defects whatever.

To illustrate the various production problems and how they are handled at the Milwaukee plant of International Harvester, we will follow through the various steps in making milker pails for milking machines, and three parts for the milk separator, namely, supply cans, top disks and regulating covers. All of these parts are of 18-8 stainless steel.

Milker Pail Production: Milker pails are made in two sizes—holding 50 and 70 lb of milk respectively. Both have the top opening 9 in. in diameter. The smaller pail is about 12 in. in diameter and 13½ in. high. The large pail is 13 in. in diameter, and 6¾ in. high. They are made from flat disks by deep drawing and bulging to get the shape desired. The larger pail (70 lb) is made from stock 0.048-in. thick, with 0.040-in. stock for the 50 lb size.

All deep drawing and bulging operations are done on the special 750-ton HPM hydraulic press shown in Figs. 1 and 2. This unit is specially designed to get the shut height and length of stroke required for this work. Distance

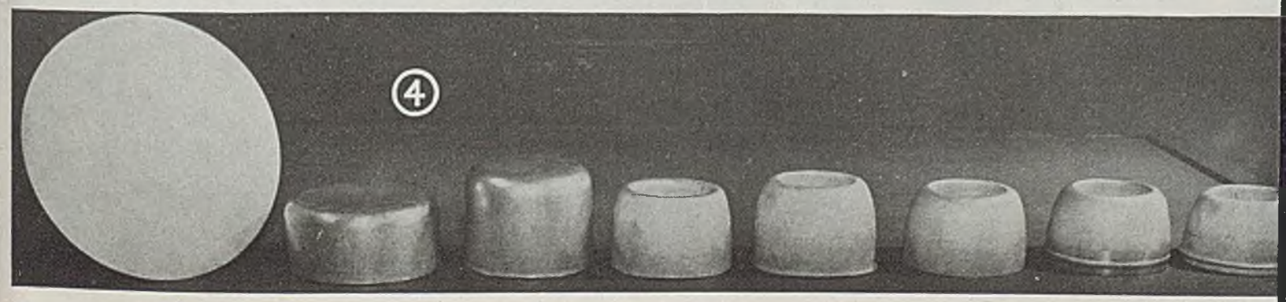


Fig. 4—Samples showing stages in producing exceptionally difficult reverse draw required for regulating cover of model S cream separators. Operations are: (1) Blank; (2) first draw; (3) re-draw; (4) reverse draw; (5) size and pierce, turn down flange; (6) trim bottom; (7) roll bead; (8) crimp

from the ram to the bed (or bottom of the opening) is 66-in. Working opening in press is 48 in. wide by 36 in. long. Press is used double acting; that is, with a blank holder. Ram has a 38 in. stroke.

Starting with a 31 in. diameter blank, the work is given five successive draws to get the deep cup shape shown in Fig. 1. Material is washed, annealed at 1950°F and pickled after each draw as will be detailed later. These draws are made at a production of 85-110 pieces per hour. Fig. 4, 8 and 9, show operations and die clearances involved here.

Next the flange is formed to 15° from the vertical, followed by trimming the flange. Work is now ready for the first bulging operation wherein the neck is clamped tightly and hydraulic fluid (water plus soluble oil) forced into the piece to expand it against the die, causing it to take the shape required.

Bulging to Shape: Since stainless steel work hardens easily, drawing and bulging has to be done in stages with annealing between. Fig. 8 shows die set for bulging the supply can, which is a large bowl-shaped unit. Bulging dies for the milker pail operate in a similar manner. As ram descends on deep drawn form for the pail, shown being placed in an inverted position over the bulging dies in Fig. 1, cam surfaces on the upper die engage segments on the lower die, moving these segments radially in around the work. They move radially outward by springs to permit the dies to clear the work when loading and unloading the press. As dies fully engage, they operate a sealing ring around mouth of the drawn part. See Fig. 8.

Then ram pressure is allowed to build up to about 2200 psi on the gage, about 300 tons on the work. This seals the mouth of the pail securely in the dies so that as hydraulic fluid is allowed to flow into inside of the pail, it fills out the work by forcing it against the dies. A pressure of 3000 psi is employed for this operation.

The 70 lb pail is again washed, annealed and pickled before a second bulging operation to obtain final shape. The 50 lb pail does not require a second bulging operation.

Finishing operations involve polishing inside of pails by loading them with a charge of water and of limestone—1½-2 in. in diameter — filling them half to two-thirds

Fig. 5—Loading regulator covers onto conveyor of 75-ft washing machine which takes work through hot alkali wash, rinse and drier at 6 fpm

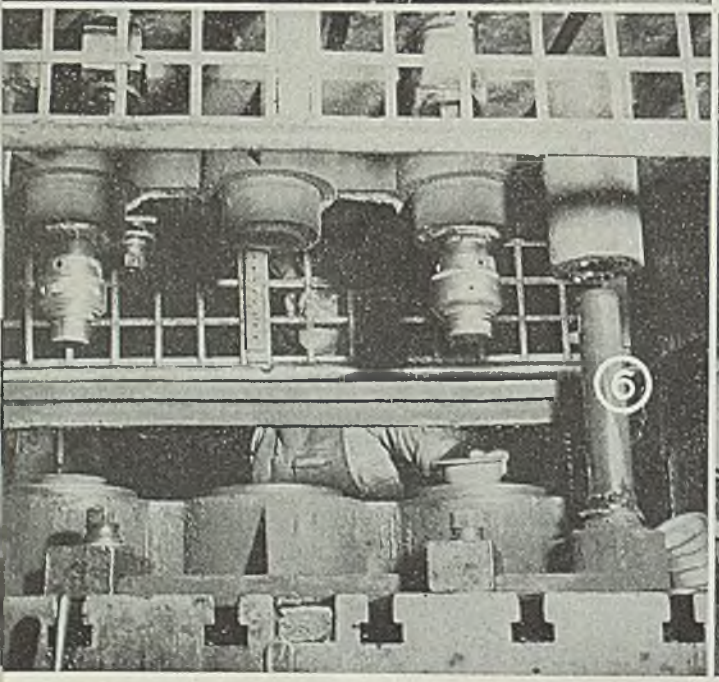


Fig. 6—In fabricating the top disk, two different tapering operations are accomplished with a single stroke of press by using two die sets. Right is first taper die, left is second taper die in sequence shown in Fig. 3

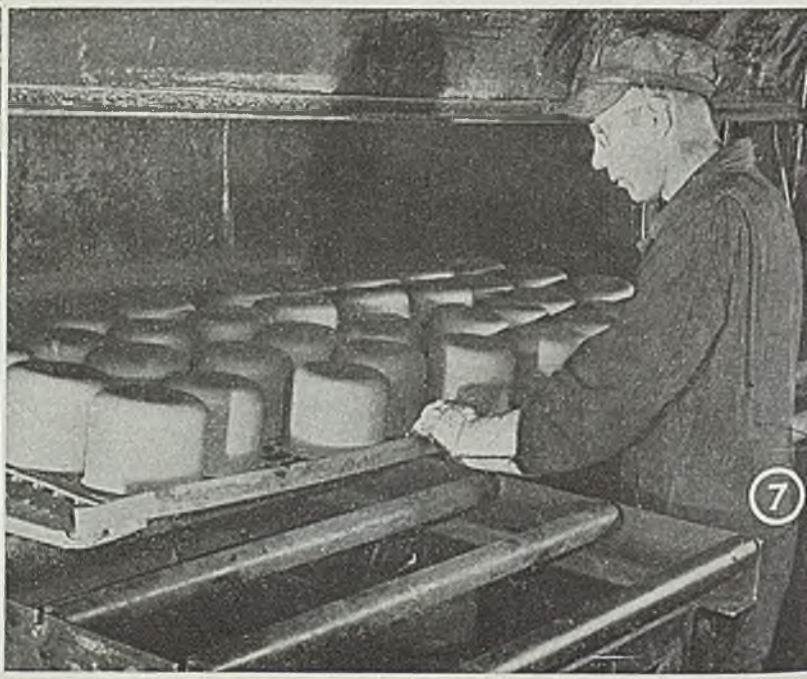


Fig. 7—Regulating covers on trays being withdrawn from the annealing furnace

full and then rotating the pail in a horizontal position at 150 rpm for 24 hours. Then comes the final outside polishing, attaching the bail, and assembling to foundation skirt by soldering.

Producing the Supply Can: This is the wide mouthed container at top of the separator into which the raw milk to be separated is poured. It is first blanked from 18-8 or 302 stainless, 20 gage stock. The 27½ in. diameter circle is then drawn in one operation into a can 18½ in. in diameter and 7½ in. deep. After cleaning, annealing at 1950°F and pickling, it is given a second draw to give a 15 in. diameter, 9¾ in. deep. Then the flange is formed and trimmed, and the unit is ready for the bulging operation. Dies are shown in Fig. 8, operation is same as described for the milker pail.

Coming from the bulging dies, can is 8¼ in. deep and 18 in. in diameter over the bulged sides. Finishing operations involve polishing, spinning the flange down, punching the faucet hole and assembling the faucet to the can by soldering.

Top Disk Production: One of the first parts of the separator to be made of stainless steel (all parts are now stainless) was the top disk. This is one of the most difficult drawing jobs in production of the separator. Fig. 8 shows a series of parts revealing the various stages in the production of this item. It is a tough job because the finished part must show absolutely no die, wrinkle or draw marks after receiving only a light finish polishing. Since these disks revolve at 7000 rpm, the removal of any appreciable amount of metal in finishing them is not permitted.

Sequence of operations here, illustrated left to right, (Fig. 3) is as follows: Starting with 20-gage 18-8 or 302 stainless, a circle 6⅝ in. in diameter is first blanked out. First draw produces a cup 3¾ in. outside diameter, 1⅝ in. deep. Now six tapering operations follow, finishing up

(Please turn to Page 114)

Fig. 8 — Section through bulging die showing segments in base that move radially through cam action to allow insertion and removal of work. Note special seal around mouth of supply can, inverted in dies. This holds 3000 psi hydraulic pressure applied internally to expand work against die cavity

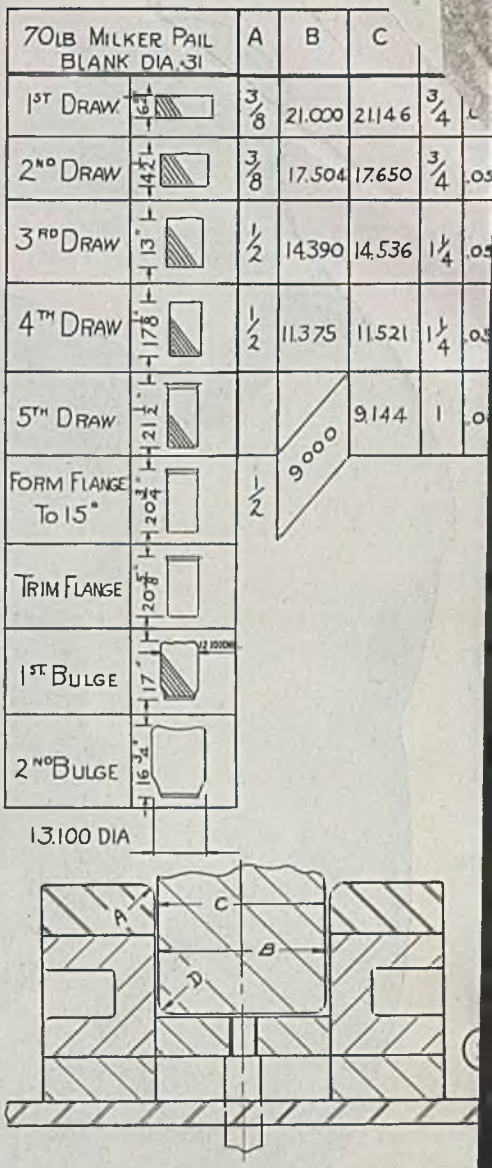
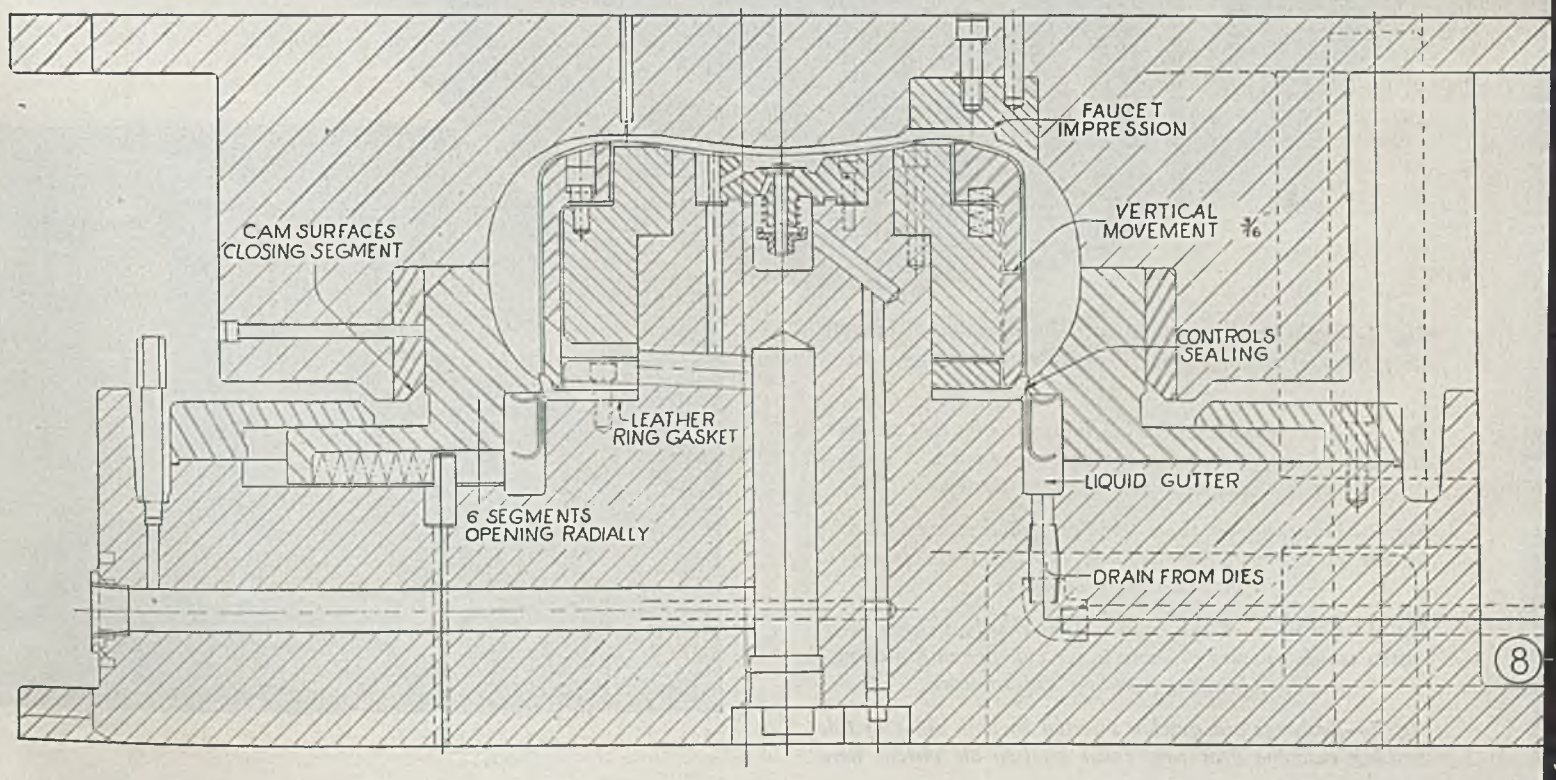


Fig. 9—Chart showing operations sequence with dimensions of punch and die cavity for the various drawing stages in production of 70-lb milker pail



AIR-POWERED *Assembly Tools*

Domestic appliances are turned out by Apex with aid of numerous compressed air devices, on both production and assembly lines. Methods reduce rejects caused by inaccuracy and operator fatigue

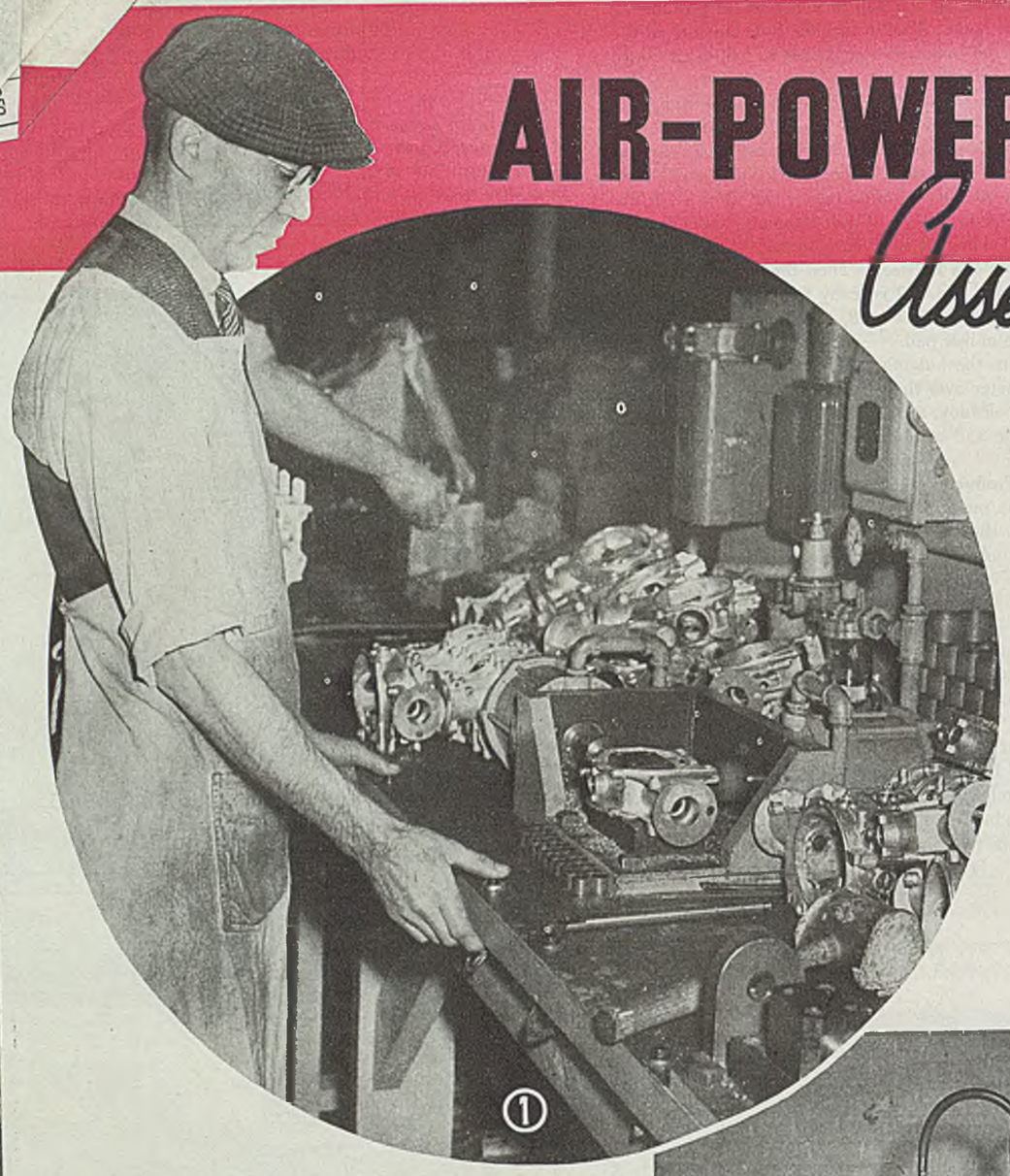


Fig. 1—Both hands must be used by operator to operate air pistons of this jig which presses two bushings into a wringer head

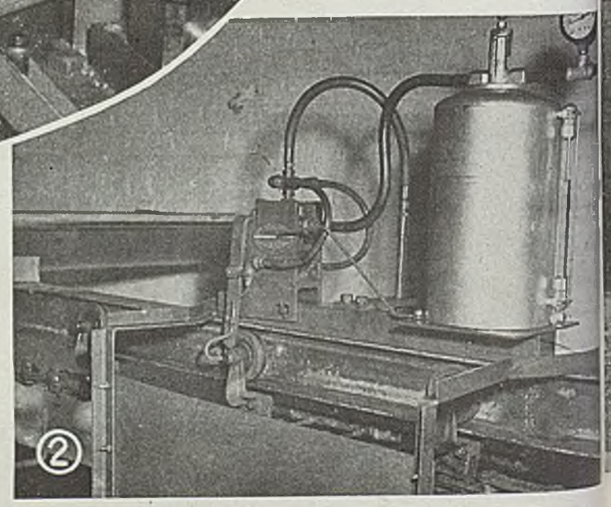


Fig. 2—Each conveyor wheel is lubricated by this air-operated device, after leaving a hot enameling oven. A number of jets on the other side spray the chain

Fig. 3—Pressure from these three air cylinders automatically locates gear covers for drilling, holding them firmly in position during operation

Fig. 4—Operator of this spot welder simply touches floor button which releases pressure in air cylinder at top of machine, bringing welding rod to work

Fig. 5—Bushings are quickly inserted in both sides of this washing machine gear case cover by two air pistons here

WASHING machines at the Cleveland plant of Apex Electrical Mfg. Co., roll off the assembly line at a high rate, in part because the factory is making the most of compressed-air operated devices, devices that dovetail naturally into the manufacturing operations parts required for assembling washers.

Bushings, brackets and other parts to be closely fitted in assembly led the company to adapt air pistons to such work wherever possible, designing many of the air devices itself to cut down on rejects and eliminate many manual operations.

Apex started to apply compressed air to work positioning and assembly about 2 years before the war. First experiences caused the manufacturer to expand applications rapidly. Turning to war production, the company applied compressed air to entirely new operations. In the process of peacetime reconversion, many new air applications were worked out, and others are still being developed toward lowering production costs.

In assemblying bushings in wringer heads at Apex, bushings are placed over two air pistons and the wringer is placed in a jig as shown in Fig. 1. Operator then uses both hands to push the two buttons on the bench which release the pistons to push the bushings into place. Solenoid valves actuated by the buttons work the air valve. The bushing assembly device is one of those developed at the plant. Another fixture so originated is shown in Fig. 6. Here a jig positions the brackets, and the air cylinder presses wringer column through brackets and into place.

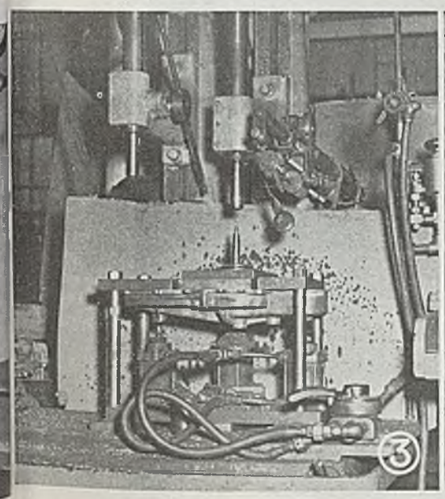
The gain is not only in substantial amount of time saved over hand fitting, but also in accuracy and fewer parts spoiled. Positive air pressure keeps the work straight. Causes for worker fatigue are largely removed by the application of air power rather than manpower. The jig arrangement also permits placing two brackets on the wringer column simultaneously where only one was placed before. A similar jig is on the other side of the bench for another fitting operation.

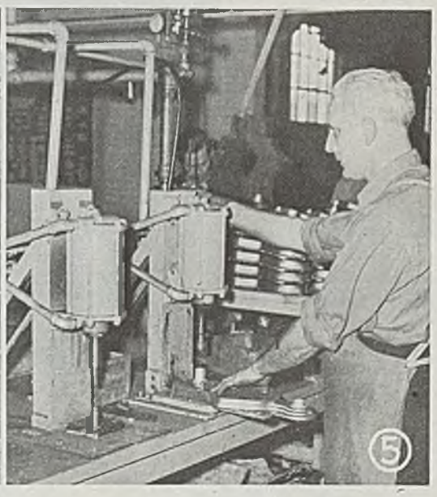
The air cylinder and piston have been adapted to a large number of operations. Some of them are for pressing a pin on the agitator link, for holding a washing machine section firmly in place while the legs are crimped, for thrusting pins on pinion gears and for cutting crating bands to exact length. A typical application is shown in Fig. 5. Here operator inserts a bushing on one side of a gear case cover simply by touching a foot pedal to release air. He then turns the cover to put a bushing in the other side at the adjacent press.

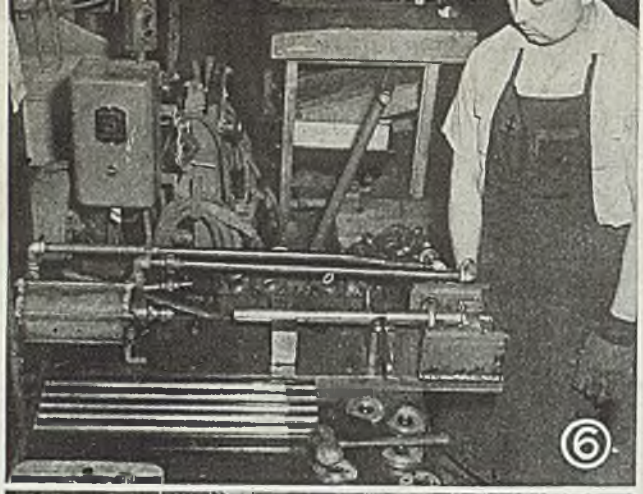
Five air cylinders on one press are shown in Fig. 7. The cylinders all work together to hold skirt band of a washing machine in place until stamped on the press. Stamping press was fitted with this supplementary air equipment by Apex because of its successful experience in applying compressed air to many other operations.

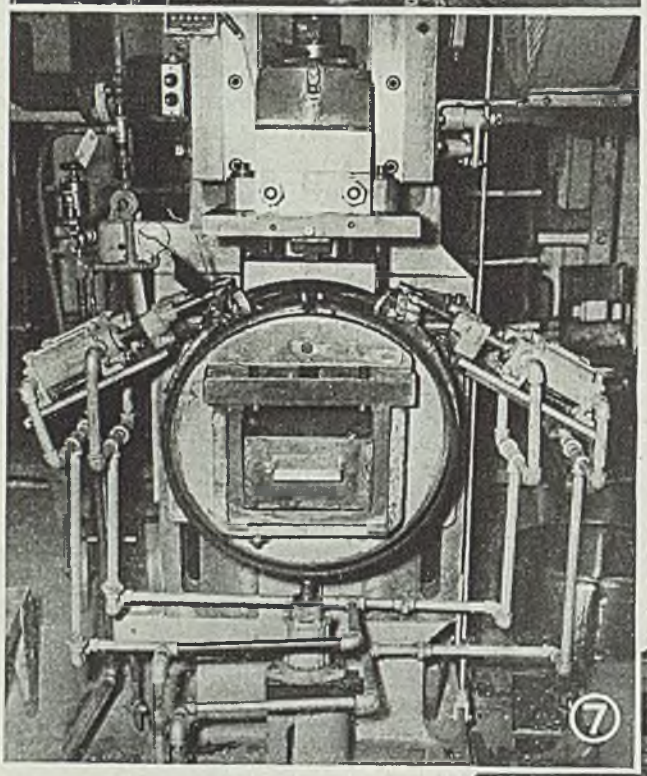
Another application of air cylinders to a standard drilling machine is illustrated in Fig. 3. An air motor to bring the drill quickly to the work and return is part of the machine. The three air cylinders which may be seen under the work, were installed by Apex engineers. The pistons locate gear covers for drilling. The feed and quick, positive positioning of the work is automatic. Excess worker energy at the opening of the day does not burn drills, nor does fatigue at the close of the day slow down production.

The number of ways in which air pistons are used to position work at this plant are too numerous to permit a









complete listing, but one more should be mentioned because of the marked improvement made in both production and worker attitude toward the job. This is in the application of compressed air on a dozen spot welding machines to bring the rod down, instead of doing it by foot pressure. In Fig. 4, the operator simply touches a pedal which releases compressed air to push the rod to the work for a set time and then returns it.

On the assembly lines, compressed air may be seen at work in other ways. Fig. 8 shows washing machines on their way out of the factory to dealers. All along the line air-operated wrenches are being used. Air is the power for all such hand tools throughout the factory because it gives ample power with light weight. Overheating or stalling is not a problem, and if an air tool is left on the moving assembly line, it simply disconnects itself and can be easily connected again.

Production lines at the earlier stages of manufacture are similarly equipped with air tools. Another interesting application on one of these lines is the air-operated device that automatically measures a pint of oil into each assembly coming down the line.

Another automatic lubricating device, shown in Fig. 2, jets oil in the conveyor wheel on one side while other jets cool the chain on the other side. This is to replace the oil lost after the chain has traveled through the enamel finishing oven. Compressed air pressure which squirts the oil is released automatically as each conveyor wheel approaches the lubricator.

Air chucks are used on lathes and other machine tools

(*Please turn to Page* 148)

Fig. 6 — Here two brackets are in the jig at right, wringer column is placed in position shown and air cylinder, left, presses column through brackets

Fig. 7—Washing machine skirt band on this stamping press is held in place by two pistons from air cylinders on either side at the top and one seen holding the band in position at the bottom

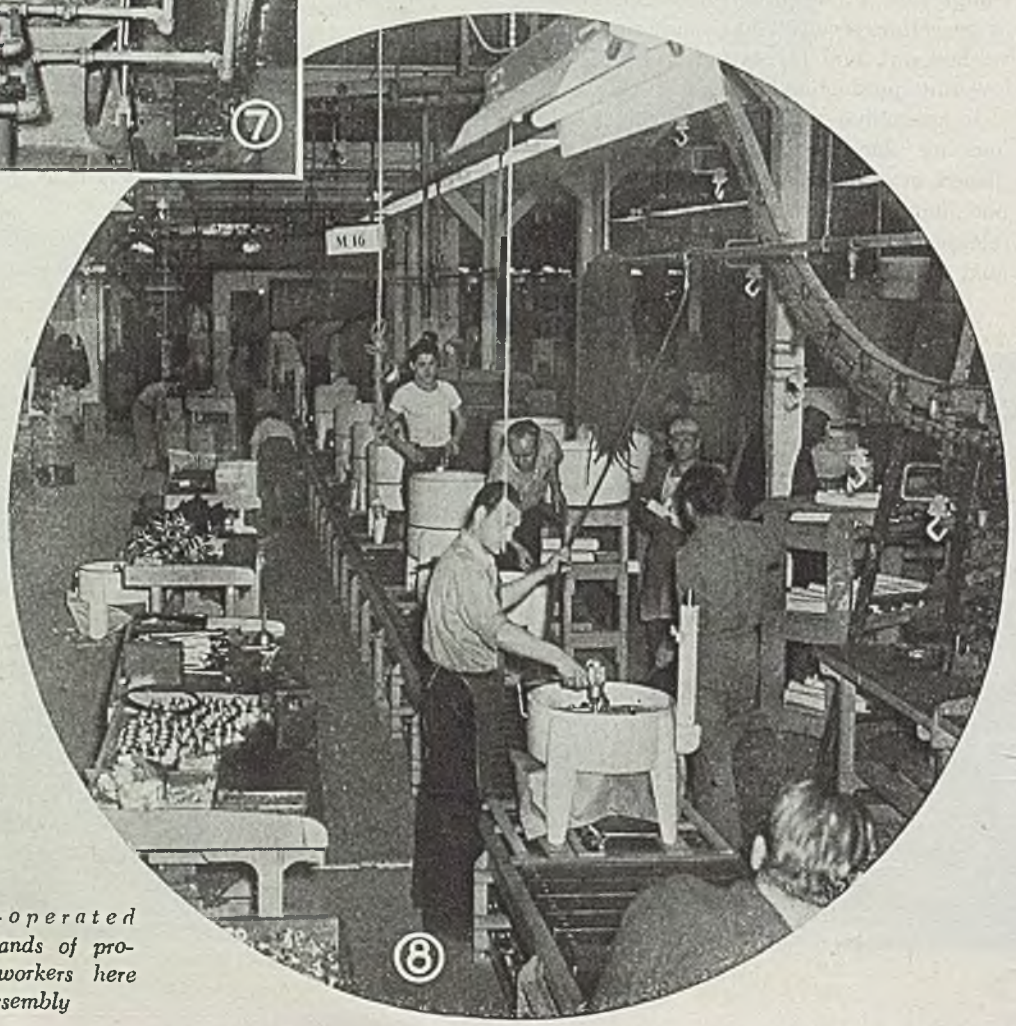
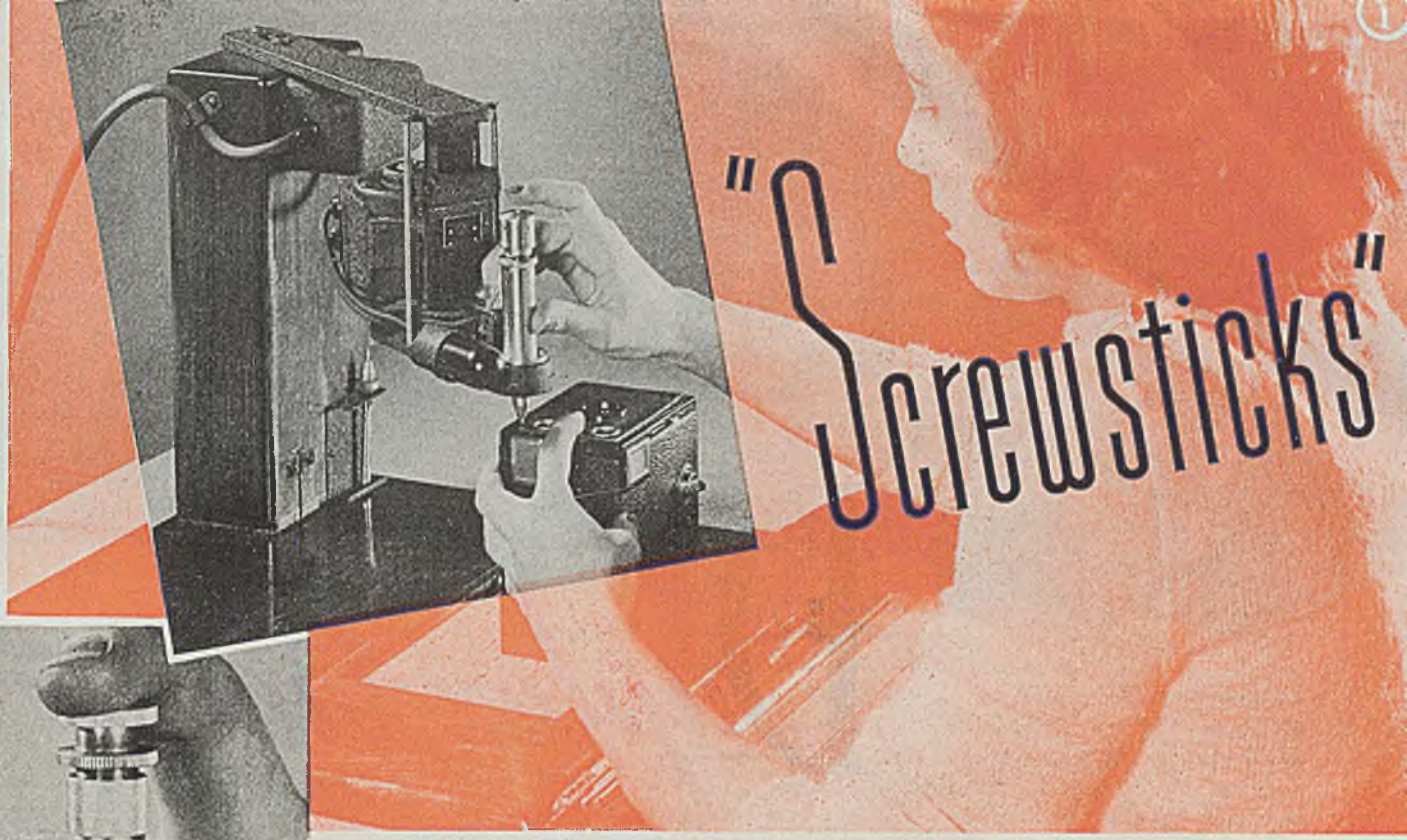
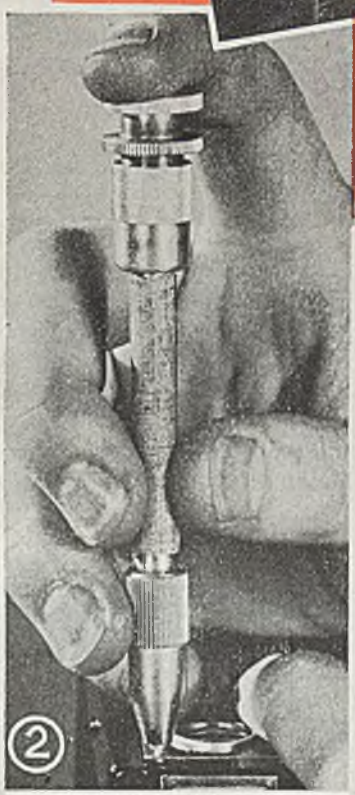


Fig 8—Air-operated wrenches in hands of production line workers here speed assembly

"Screwsticks"





ELIMINATION of the drudgery and eye-strain inherent in usual methods of screw assembling in camera and instrument manufacture has yielded a large increase in productiveness of the workers at Eastman Kodak Co., Rochester, N. Y.

By a simple device, developed by Kodak engineers and called a "screwstick", the handling of individual screws is eliminated; automatic control of screw tightness is provided; distortion of delicate parts is prevented and thread stripping is made a rare occurrence. In the device's initial application to Brownie cameras just prior to the war, a four-fold production increase resulted from its use.

As its name suggests, the screwstick is a stick of screws, made in one piece, of any reasonable size and number. Each of the component screws is joined to

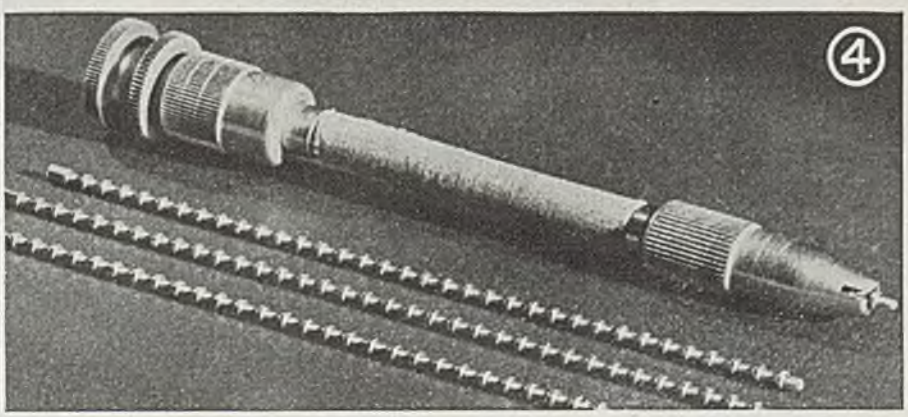
(*Please turn to Page* 151)

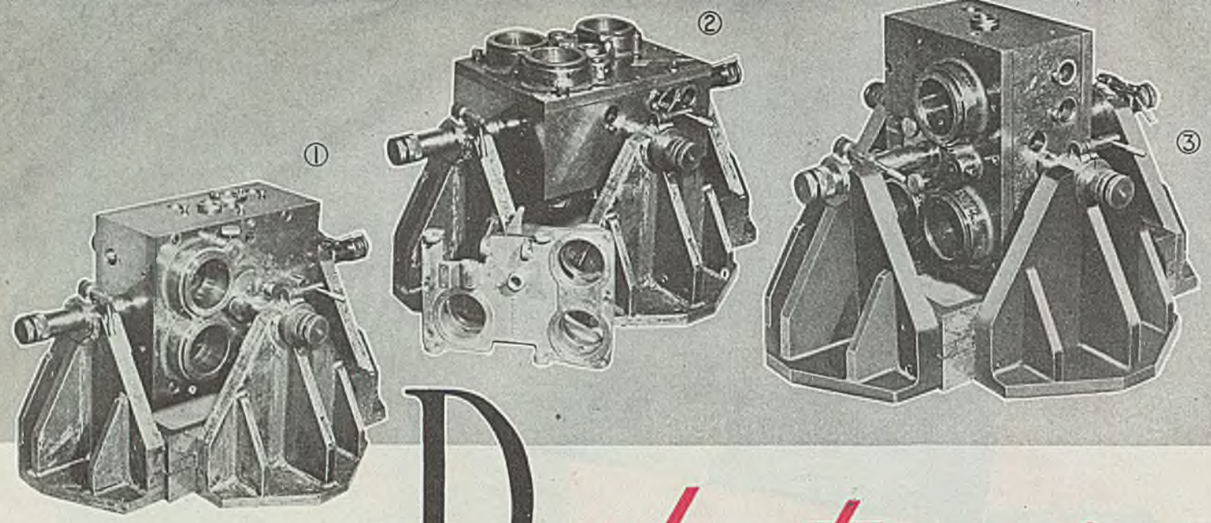
Fig. 1—An electric screwstick driver greatly reduces eye-strain and fatigue while increasing productivity. Screws for the electric driver come in the same stick form as they do for the hand driver. Operator is fastening four small screws in a Brownie camera

Fig. 2—Using a hand screwstick driver, an assembler feeds the screwstick with the forefinger. Screw entering the work is not engaged directly by the driver but receives support and torque through a necked connection. Strength of this neck pre-determines screw tightness and reduces the necessary skill

Fig. 3—Loading a hand driver with a screwstick of 36 screws requires very little time or effort on the part of the operator

Fig. 4—Screwsticks and hand driver for No. 0 machine screws are but 4½-in. long. The sticks in this instance are made of 3/32-in. hexagonal stock





Duplex trunnion fixtures

Extreme precision in multiple drilling, boring and hole machining operations is achieved by unusual fixtures which permit working all six faces of part in single setup. Tolerances of a few 10,000ths are easily handled in regular production

A VISIT to the Mechanical Division of General Mills Inc., Minneapolis, reveals an unusually complete and effective organization for designing, tooling and production of precision equipment. Starting to build special packaging and processing machines for General Mills food products, with only a designer and five men in a small shop in 1926, this division has developed into a well balanced staff of scientists, tool engineers, product engineers and skilled mechanics. In recent years, they made a remarkable record for handling highly complex and exacting work such as radar and fire control equipment, computing gun sights, torpedo directors, etc., and this concentration of know-how of late has been brought to bear upon less lethal subjects.

Successful manufacture of complex items requires extremely high precision. Machine tools must perform to exceptional repetitive accuracy. To do this without special machines and with shop personnel not always of the skilled type requires unusually effective tooling.

Perhaps typical of how such precision can be obtained by proper tooling is the torpedo indicator frame shown in foreground Fig. 1 and the fixture for working the holes in this case, Figs. 1, 2 and 3. This is called a double trunnion fixture because four trunnion pins engaging close-fitting bushings in the fixture permit the fixture to be rotated on any one of two different axes. Since these two axes intersect at a common point and are precisely 90° apart in space, they permit the fixture to be revolved so that any one of its six sides can be positioned on top.

One Setup, All Holes: This, in turn, permits working holes in the part being machined from any one of its six sides. The most important advantage resulting is a great inherent increase in the accuracy obtained, since the relationship between all holes in the piece is then definitely established by the fixture itself. This allows unskilled operators to work ordinary machine tools to meet total tolerance limits of 0.0002-in. in regular production work.

In addition to this assured precision, the actual machining operations are accomplished faster because the work does not have to be moved from one setup to another before the hole machining is completed. Cutter bars carrying different tools are changed, that is all.

Universal-Joint Drive: Equally important, no special machines are required to obtain the accuracy required because the fixture alone determines the resulting precision. To be sure that the radial drill used to drive the boring bar does not affect the accuracy, the drill is not depended upon to *guide* the bar but merely to *drive* it. Bars are positioned entirely by close-fitting bushings in the fixture. The bar carrying the cutters is connected to the drill spindle through a double universal joint. This type of drive does not allow any "crowding" or tendency to move the cutters from correct position such as might occur were the cutter bar rigidly connected to the drill spindle.

Typical Application of System: Such a system is used in machining the indicator frame, shown alongside the fixture in Fig. 2. Frame is first enclosed in the fixture

(*Please turn to Page* 119)

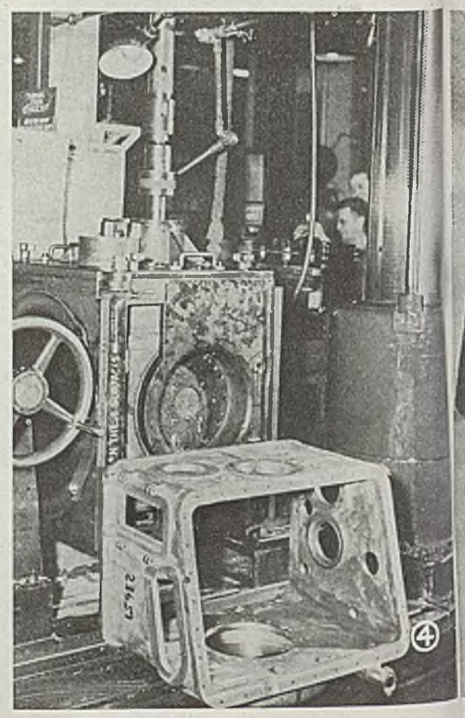
Fig. 1—Duplex or double trunnion fixture for precision hole machining work from all six sides. Work is clamped inside fixture which is placed on bed of radial press, bars carrying cutting tools being guided by bushings in fixture and driven by the radial drill

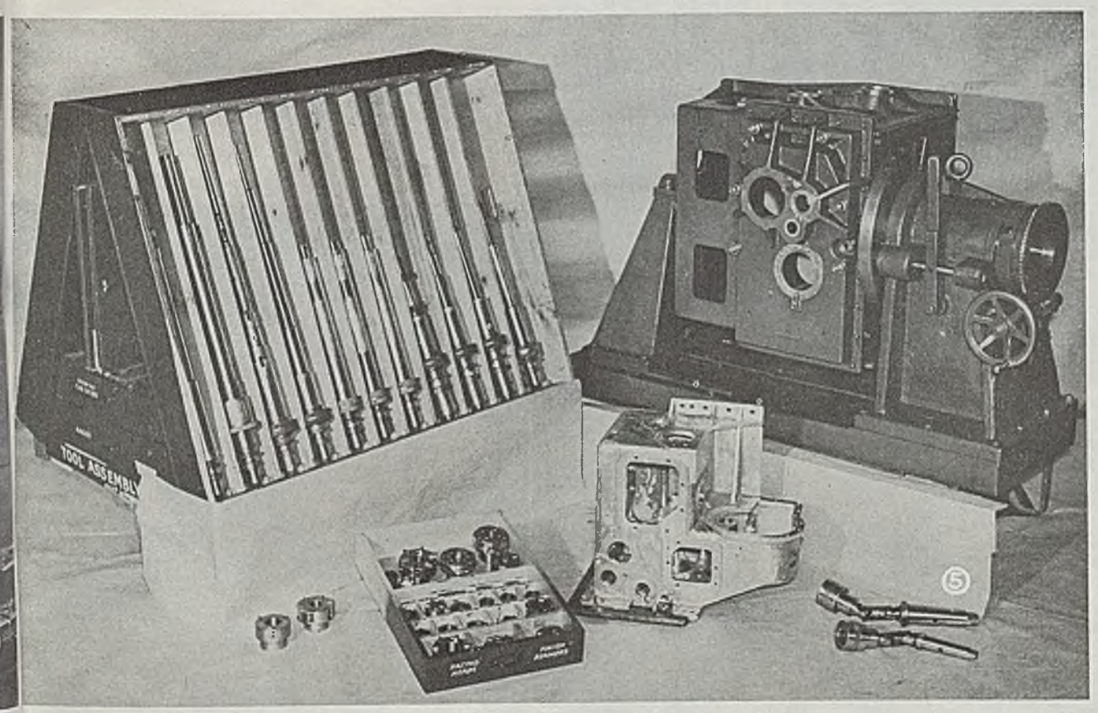
Fig. 2—Same fixture as Fig. 1, but here the right hand front and left hand rear pins have been disengaged to allow rotation of fixture about axis of other two pins, thereby presenting another surface to be worked by radial drill from overhead. Four sides of work are machined by revolving fixture around this axis. Part handled here is the indicator frame, shown leaning against fixture

Fig. 3—The two remaining after the four sides have been worked are reached by releasing the left hand front and right hand rear pins and revolving fixture around other axis as shown here. Same fixture as Figs. 1 and 2

Fig. 4—Radial drill working frame shown in foreground in a single trunnion fixture. Note double universal joint for driving bars holding cutters. This prevents drill spindle from "crowding" the tools which are guided entirely by bushing in fixture. Thus, fixture alone determines accuracy of work, permitting exceptionally close tolerances

Fig. 5—Typical tooling as issued by toolroom for a job includes trunnion fixture at right, case of cutter bars at left, case of facing heads and finish reamers in left foreground, universal joint driving connections in right foreground. Work handled by this equipment is the instrument case in center foreground. General Mills' photographs





Saving STEEL

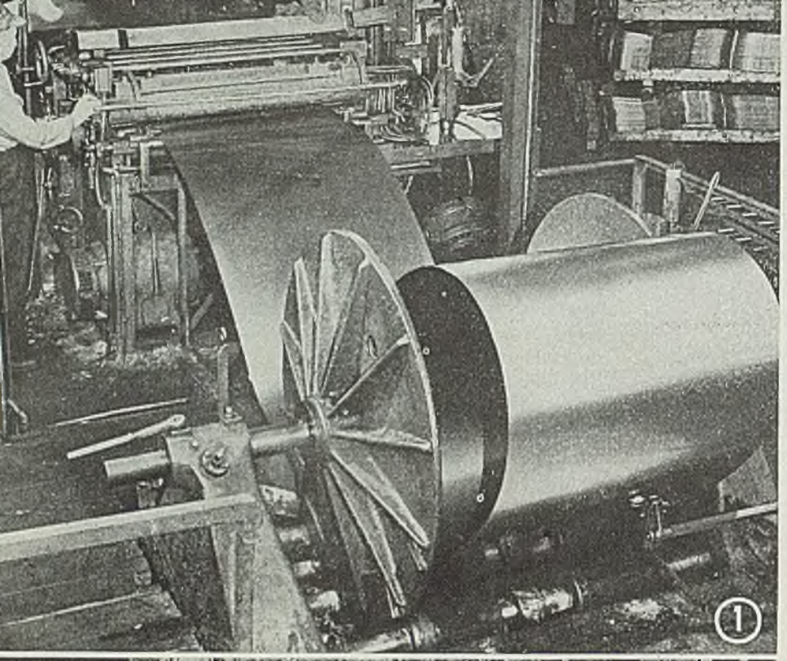


Fig. 1—Cold rolled strip is passed through roller-leveler preparatory to the blanking operation which is performed on the press in background. In this particular operation the steel is blanked for fender stampings of the 1946 Dodge automobile

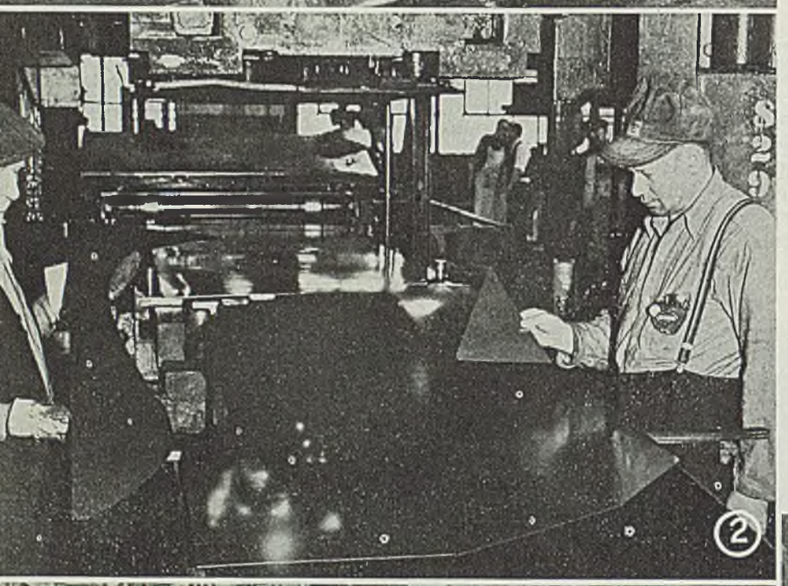


Fig. 2—All flat scrap pieces from fender blanks are saved and sorted to be drawn into smaller parts

Fig. 3—Flat scrap pieces too small for use by themselves are stitched together in a spot welder (left) and trimmed (right) into blanks for drawing into internal structural body parts

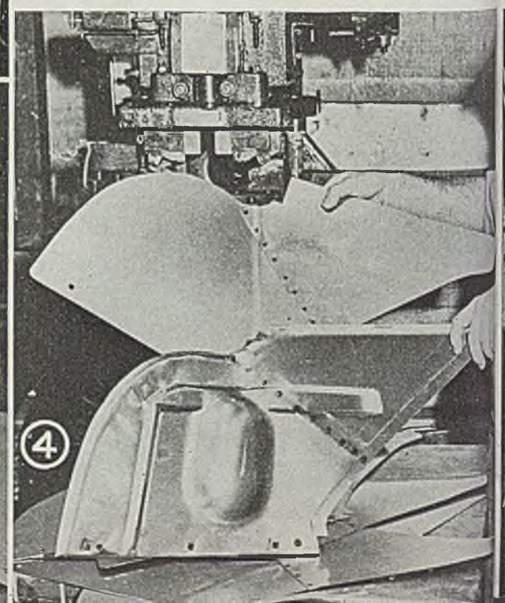


Fig. 4—Steel blank made by spotwelding two small pieces of scrap together is drawn into this fender guard

SCRAP SEGMENTS

Pressed steel department at Chrysler Corp.'s Dodge Division each week saves 300 tons of small pieces normally sold as scrap. To maintain production in spite of steel shortages, this material is channeled into immediate use. Illustrations on these pages show how it is done

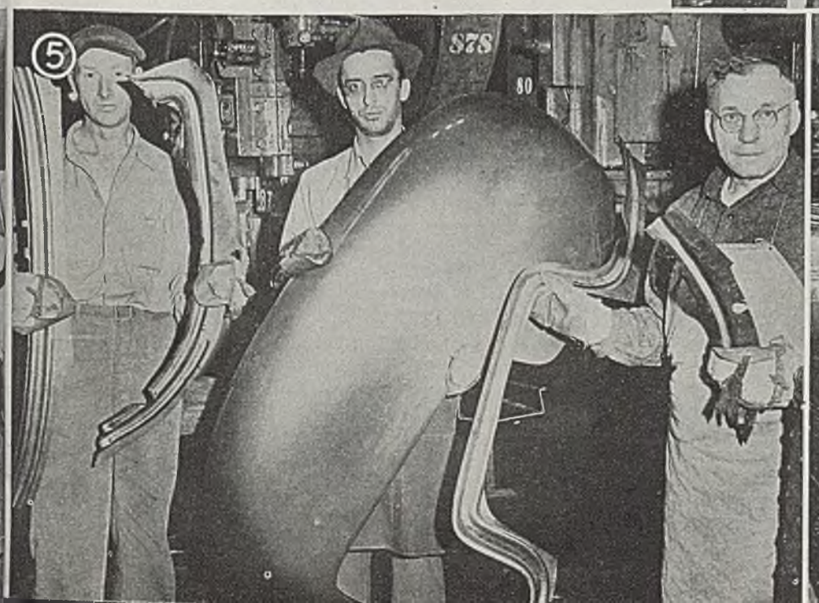


Fig. 5—After the deep drawing process that forms the rear fender, the four irregular flash pieces held by workers at left and right are trimmed from the edges and used to form other body parts

Fig. 6—Flash piece trimmed from the rear fender blank is rolled flat (left), trimmed into a new blank (center), and then drawn to form a seat back (right)

Fig. 7—Still smaller pieces from the edge of a fender blank are spotwelded and cut into the new blank (below) that is then drawn to form the engine dust shield (above)

Fig. 8—At the end of pressed steel processing, the little remaining scrap is baled and carried on conveyors to the adjoining foundry where it goes into cupolas

ENGINEERING NEWS *at a glance*

IN Germany, aircraft fasteners with the shank of the bolt or stud turned under size to root diameter of the thread were turned out on an ultra high-speed lathe running from 1500 to 5000 rpm, according to a report from the Department of Commerce, Washington. Live center of the lathe used is a matrix formed to receive the bold head—or a chuck, in the case of studs. The dead-center is formed to receive the pointed end and is mounted on ball bearings, free to revolve with the work. It is held in position by hydraulic or air pressure. Tool is tipped with tungsten carbide, and whole lathe design is such that full cutting speeds of tungsten carbide are used. Tool slide is held up to the work but follows a cam which determines length of full diameter and length of "waisted" reduced area to be cut away. Directly opposite the tool tip is a steady rest, also movable in and out, so that if the reduced section is long, a separate profile or cam determines the position of the rest and steadies the work.

VALUABLE engineering data on the proper application of diamond tools, and instructions on standard grinding wheel dressers are included in a publication prepared by Precision Diamond Tool Co. The Elgin, Ill. company's compilation also provides the grinding wheel user with latest facts on how to do a good grinding job in the shortest time, along with proper speed in surface feet per minute suitable for various materials.

ACTIVE cell portion of the Davis-Hebler thermal conductivity cell developed by Davis Emergency Equipment Co. Inc., Newark, N. J., contains four filaments, ¾-in. square by ⅝-in. high, providing an intimate relationship of all four filaments. Each filament of a cell contains about 20 ohms resistance, compared with former cell construction that measured a resistance of 1 ohm to a maximum of 5 to 6 ohms. According to F. R. Davis Sr., president of the company, the development will analyze any one gas in a vapor or any gas in its relation to any other gas. Along with electronic recorders, it will analyze the proportion of any gas to any other or any one gas which can be reacted or absorbed out of a complex mixture.

SPEED and precision in mass production drilling is achieved far beyond present practices with the use of a jet drill and director being produced by Republic Drill & Tool Co., Chicago. Method of drilling, described as "Hyper-drilling" drilled in 5 sec a ⅜-in. hole 4 in. deep in a recent laboratory test.

LIFE of shanks, milling cutters and reamers is extended three to six times after being resized by a forging operation developed by Abrasive Engineering Corp., Spring Lake, Mich. Tooth thickness of the particular tool being resized determines success of the process. Re sizing is done by forging the teeth to displace sufficient metal from the back to the top of each tooth, increasing the total diameter to the required dimension. The company reports that in processing thousands of tools in the past 4 years by this method, its entire loss was less than 3 per cent.

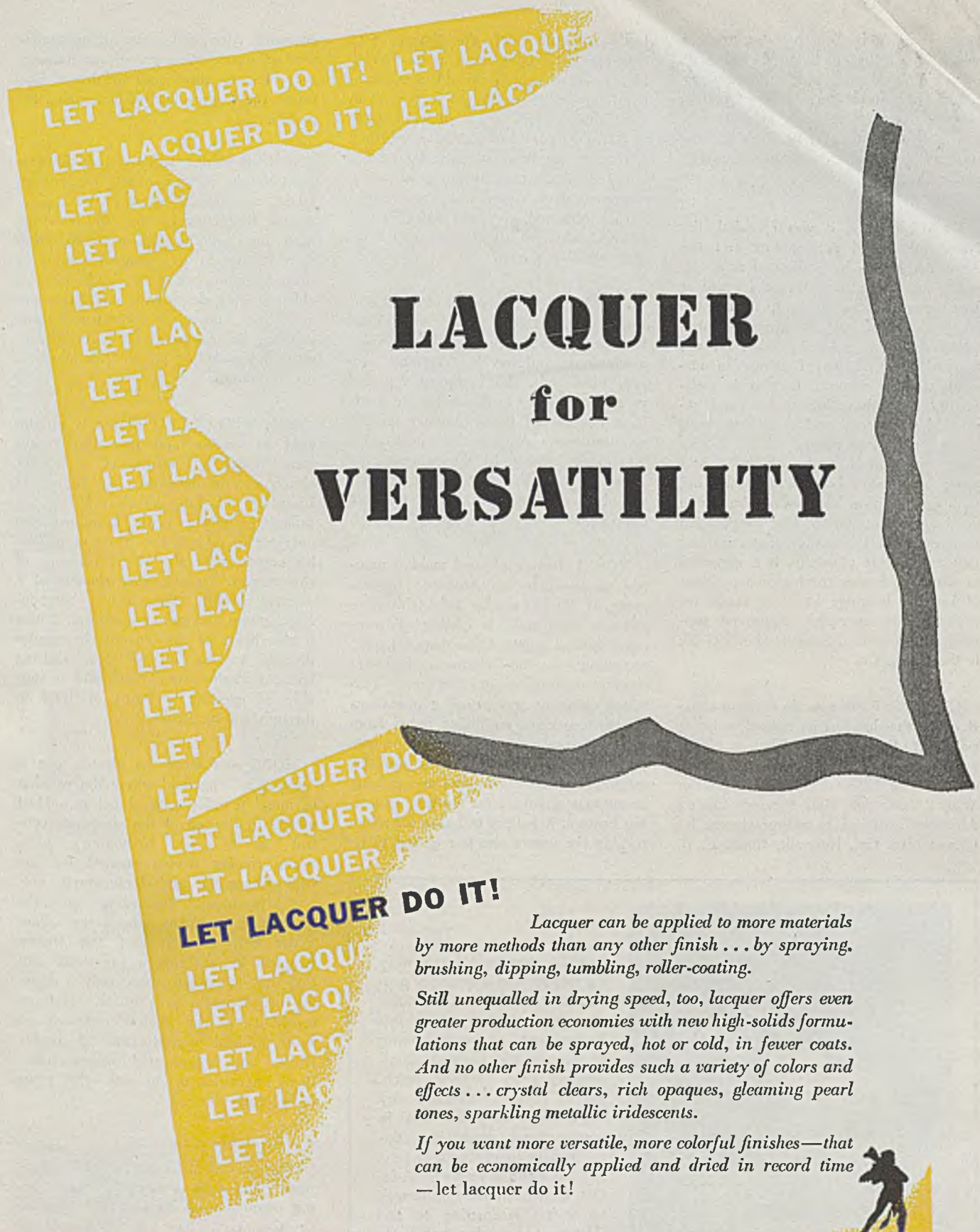
BEFORE products are adopted on a factory-wide basis at Timken Roller Bearing Co., Canton, O., they are tested on a real production scale in a pilot plant in Zoarville, O. Only a year old, the tiny experimental plant, staffed by eight women and ten men under the supervision of Eugene G. Weber, works in conjunction with Timken's new division of research and development which was organized to replace the old experimental department. Activities of the research division are controlled by a committee headed by Henry Timken Jr. Its objective is to increase the quality and lower cost of Timken products. All work here is fully tested as to productivity, tolerance, production rates etc., then given a final check at the Zoarville pilot plant.

VARIETY of grinding setups are possible on the Hager carbide tool grinder in grinding milling cutters, spiral reamers etc., with the use of the specially designed attachments developed recently by the manufacturer, E. F. Hager & Son, Queens Village, N. Y. The company reports the new attachments assure constant, fixed control of tools throughout grinding operations, enabling operators to work out innumerable arrangements to suit their individual requirements. Attachments eliminate all free-hand grinding, readily providing a keen, straight cutting face on tools.

LARGE loss fires, those exceeding $50 thousand, skyrocketed 48 per cent in the early part of the year in the United States and Canada. According to a regular quarterly survey of the National Fire Protection Association, Boston, 329 fires, totalling $48,800,000 were reported from Dec. 7, 1945 to March 6 of this year, compared with 158 in the preceding three months. These 329 fires represent 32 per cent of the estimated $151,045,000 loss for the approximate 175,000 fires occurring in the quarter ending March 1, Forty-seven fires hit manufacturing plants, 30 warehouses. Loss of manufacturing plants amounted to $7,761,800, that of the warehouses totaled $5,416,-260.

MOLTEN sodium is finding increasing use as a heat-transfer medium. According to Arthur D. Little Inc., Cambridge, Mass., the sodium valve is called the greatest single step toward improved aircraft engine performance. The hollow interior of a steel valve is partly filled with metallic sodium which melts when the engine is warm. The sodium, agitated by the valve's movement, carries the heat through the valve stem to the cooling system. Practically all aircraft engines of 300 hp or more have sodium-cooled exhaust valves. In America, sodium-cooled intake valves are used in high-output engines; they were employed in German and Italian aircraft motors.

LATEST information from General Electric at Schenectady, N. Y., reveals that the permanent magnet material known to the trade as "modified alnico 5" alias "alnico 5 plus titanium" now carries the new name of "alnico 6". Characteristics of the material make it useful in such machines as electric



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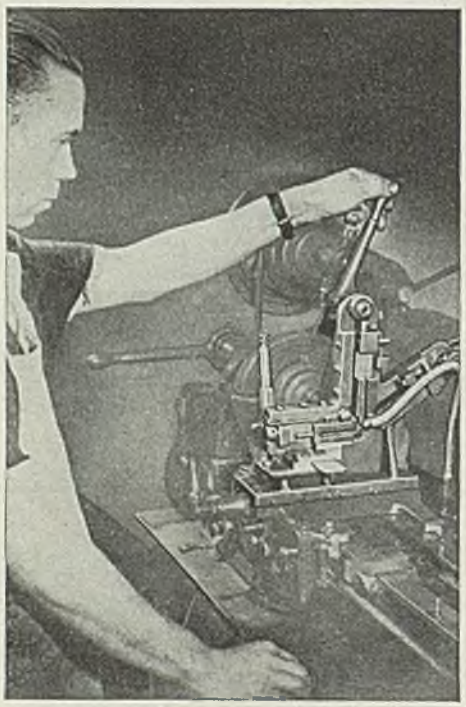
generators, voltage and power output of which must be maintained following demagnetizing effects of voltage. Composed of aluminum, nickel, cobalt, copper, titanium and iron, the material has a high resistance to demagnetization and high values of external energy and residual induction.

IN Washington, it was revealed, the Navy Bureau of Aeronautics and the Army Air Forces have adopted as standard a new lubricating grease for use at low temperatures. Developed by the Naval Research Lab, the grease—a non-petroleum product—is intended for use in sealed antifriction bearings in aircraft control systems. It also is satisfactory for lubricating motors and reduction gears employed to actuate flaps, landing gear, fuel pumps and for lubricating mechanical parts of radio and radar equipment, bombsights and other units operating on low power. The grease combines exceptionally low evaporation with excellent lubrication properties and low-temperature plasticity. It is expected to eliminate former troublesome problem of keeping bearings free and ready for instantaneous operation. Approved supplier of the grease, designated AN-G-25, is the Texas Co.

CHEAPEST thing to do with an abrasive belt that has lost its critical moisture point is to throw it away. That, in effect, is the advice included in a bulletin called "The Effect of Moisture on the Work Value of Glue-Bonded Coated Abrasives" offered to manufacturers by Clover Mfg. Co., Norwalk, Conn. E. B. Gallaher, author of the advice, says abrasive belts hung in a room having 18 per cent moisture (critical low moisture point is considered 25 per cent) will, in a few hours, show a loss in work value of 80 to 90 per cent. Furthermore, they can never be brought back by adding moisture. According to the publication, maximum work value from coated abrasives is obtained when the latter "work" in an atmosphere having a relative humidity of 50 per cent.

POSTWAR Jetcote series of black finishes incorporating latest war-proved technical advances is now being made available to industry by Watson-Standard, Pittsburgh, the company reported recently. Finishes in the series are made in a number of types to meet specific requirements. Among the heat resistant blacks offered by the company are some particularly suitable for stoves and heaters that operate at elevated temperatures.

NOVEL feature of steel making practice observed by an American investigator at the Deutsche Edelstahlwerke, German steel mill, is casting of truncated conical ingots. Cone-shaped ingots, according to the Germans, facilitate subsequent machine turning, and eliminates chipping and grinding operations usually necessary on billets rolled from ingots. Annealing is required for ingots that are to be machine turned. For this purpose, the Edelstahlwerke uses a long, continuous gas-fired car bottom annealing furnace. A battery of lathes for rough turning the ingots also is required to be on hand. After being turned, ingots are worked either in a press and hammer shop, bar or sheet mill or drawn into tubes, the Department of Commerce reported.



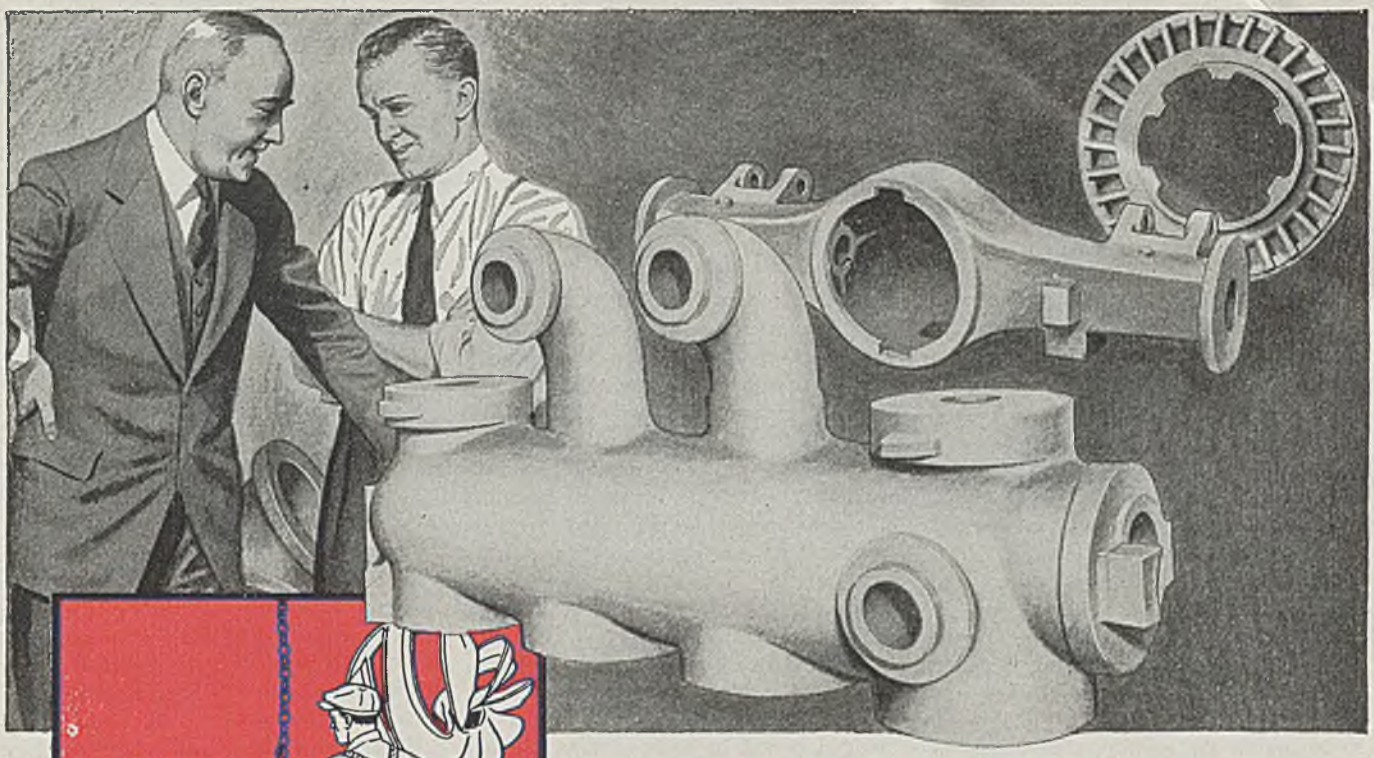
ANY standard lathe may be turned into a quantity production machine for multi-diameter parts using this Swiss type converter being produced by Oxford Engineering Inc., Oxford, Mich. Tested and perfected by more than 3 years' use in war-contract work, the development produces any part from a needle point to ½-in. OD, and from ½-in. in length to 6 ft. According to the manufacturer, the converter works fast and accurately on any kind of cold-finished stock, including stainless steel, brass, aluminum and other materials.

FINISH exhibit recently held in New York by the Aluminum Co. of America placed considerable stress on chromium-plated aluminum for use by both the auto and building industries. Materials were shown in five general classes of finishes—paint, lacquer and enamel, electroplating electrolytic oxide, mechanical and chemical. Electro-chemical coloring on several of these finishes indicated broadening possibilities of coloring aluminum.

UNCONTROLLED power is eliminated in marine and industrial power installations by means of a booster clutch control developed by Ellinwood Industries of Los Angeles. When installed in power boats it allows the operator to reverse the gears of a 350-hp engine with the slight pressure of two fingers. Development consists of a master control, filler valve, compensator, pump and power cyclinder. Latter is the heart of the system. It couples directly to the reverse gear shifting lever in marine installations and is capable of exerting a thrust of 1000 lb through a 6-in. stroke.

MORE and more the electric eye is "cutting in" the field where the wooden or metal templet reigned before. Most recent application of the electronic control is in Air Reduction's electronic tracing device created for use with Oxygraph and Travograph cutting machines. According to the New York company, the tracer eliminates cost of preparing and storing templets by enabling a gas metal cutting unit to operate using only a drawing or silhouette as a guide. Delicate sensitivity of the photo-electric-cell assures faithful reproduction of angles, curves and complicated shapes sometimes impossible to cut with other types of guiding devices.

COOLANT for 36 grinding machines is kept constantly clean in the Schick razor plant with a cleaning system being manufactured by Gale Oil Separator Co. Inc., New York. Constantly cleansing of coolant is an important factor in producing very sharp edges on razor blades. The cleaning unit operates without manual attention, gravitation doing the separation work—removing grit and metal fines. In addition, the system eliminates necessity of shutting down the grinders constantly to keep them clean.



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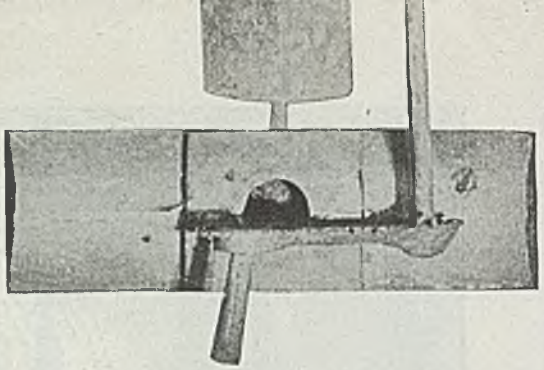


Fig. 1—Steel castings with small openings to feeder head, such as shown here, are made possible by use of the compound which, through its heat generation, keeps metal hot and allows metal to flow through a small juncture. Head removal also is facilitated

AN EXOTHERMICALLY reactive material consisting of a composition that generates heat through oxidation of a metal or metals promises to institute a radical change in the feeding method for both ferrous and nonferrous castings. The material, known as Thermotomic, is said to eliminate porosity and piping and provides a reduction in cost of cleaning castings.

Heat generation is by one or more oxides modified to control the rate of heat release. The temperature of the metal is actually increased as it passes from the head into the mold, thus permitting a better metal flow into mold.

Piping in the casting is prevented as is fracturing and cracking caused by secondary shrinkage, because the passage through which the metal flows is reduced and the metal both below and above the neck is heated. Because of the small passage through which the metal flows local annealing is said to be eliminated. Casting grain structure is reported to be uniform throughout.

The compound, developed by Peter Soffel, president of Pittsburgh Metals Purifying Co., Pittsburgh, has as one of its objects providing a self-sustaining material which can be shaped for use as inserts in risers, hot tops and in other portions of metal castings where it is desired to maintain a high degree of fluidity of metal or retard its solidification during the feeding.

Once the compound is burned, it changes from a heat generating agent to a refractory of any given shape, having a heat resistant factor of 3475° F. This reaction is not violent, as in the case of the normal thermit reaction, as it is slowed down by the admixture of several elements in conjunction with a refractory binder. Thus the intense heat of the material is controllable to any period desired, ranging from 15 min to 4 or 5 hours, constantly retaining the temperature of the metal in risers or localized to desired portions of the casting.

Among the many uses for this new compound are core rings to be used under the riser, or as a localized facing for molds where it is desirable to retain metal in a liquid state for an extended period of time; at light sections integral to heavy sections to equalize solidification of metal; and in gate and strainer cores to increase temperature of metal entering the mold or to decrease size of gate at juncture of casting.

The new material is said to be past the experimental stage in many applications, over 20 foundries using the compound as standard practice in making steel rolls and various other ferrous and nonferrous castings. A leading steel roll manufacturer is using the compound successfully in casting wobblers on each end of the roll, as shown in Fig. 2. Reduction in machining cost per roll resulting from this new method is obvious; it also incerases the yield from 60 per cent to 75 per cent. Experiments are being conducted in the application of this method in the pouring of ingots, with interesting results in yield.

Thermotomic permits use of compact heads and feeders of very small dimensions, thus eliminating considerable casting cleaning. These heads either fall off in removing the casting from the mold or can be knocked off very easily. Dressing may be accomplished easily with a minimum of grinding after removal. One foundry was able to reduce riser removal and machining time to ¼-hour by the use of a Thermotomic insert in the riser, where the time required to remove and machine conventional type risers from the aluminum-bronze castings was 8 hours.

Fig. 1 shows a steel casting with small opening to feeder head. Metal is kept hot by compound which permits feeding through this small juncture. Removal of heat is facilitated by use of Thermotomic.

A normal 6 in. diameter head is reduced to 1½ in., opening a juncture with the casting, a ring of the exothermit material being inserted in the mold at the base of the riser throat. Freedom from porosity or piping under the head was obvious in the cross sectioning of the casting after pouring and cooling.

Patents have been applied for covering the basic applications and formulas of this material in its use in casting of ferrous and nonferrous metals. Mr. Soffel and his associate, Earl R. Pierce, formerly connected with National Roll & Foundry Co., Avonmore, Pa., have registered special patents covering the method of casting the cope for machining. Additional patents have been applied for on the redesign of ingot molds and hot tops and also on the procedure of using an insert in conventional ingot molds.

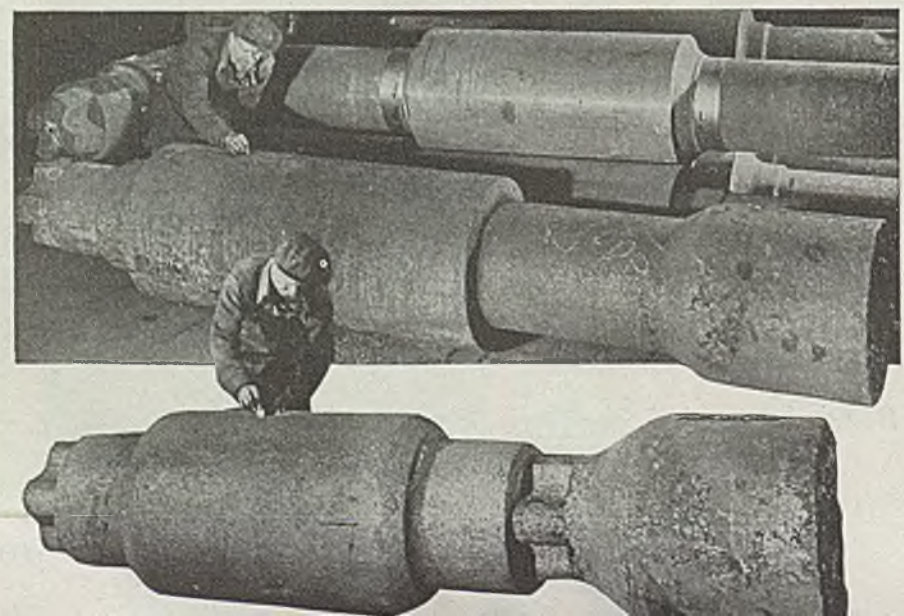
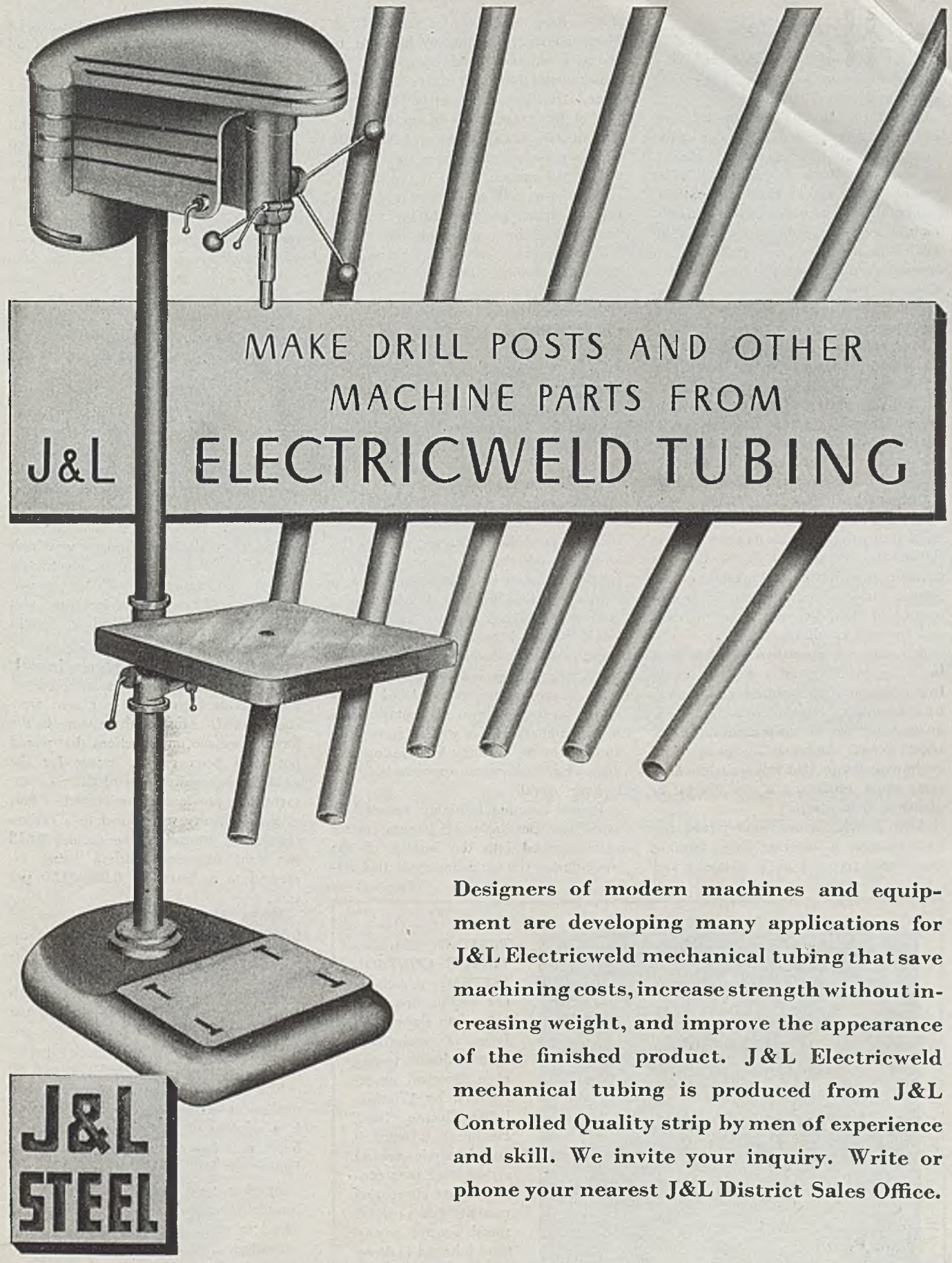


Fig. 2—These steel rolls with wobblers cast on cope end were made with Thermotomic compound rammed against cope neck and wobbler. Yield was increased 60 to 75 per cent and machining cost payroll was greatly reduced by use of compound



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(*Continued from Page* 99)

with a semi-sizing operation, a trim and pierce, and a final sizing stage.

One of the difficult features involved here is production of the shoulder at the point where the taper meets the cylindrical section. Work is annealed after second, fifth and seventh operations. The eighth and ninth operations, involving the semi-size, trim and pierce false hole (⅝ in. diameter), are handled in two dies mounted together on a single press. Many of the operations are done in tandem in this manner. See Fig. 5 for a typical press set-up of this type.

First operation is handled on a No. 8 Consolidated Meck C-type press. All others are done on 620 E Type Niagara straight side presses of 250 tons capacity, or similar units. Most of the work is handled at a press speed of 18 strokes per minute. Final sizing operation is done on a No. 87 Bliss 125-ton unit at 16 strokes per minute.

Making the Regulating Cover: Production of this unit, with its reverse draw shown stage by stage in Fig. 4, involves difficulty in avoiding wrinkle marks on the outside surface. The answer is in careful control of dies, keeping them polished and in good condition.

Sequence of operations on this part begin by blanking out a 12⅝ in. circle from 20-gage 302 stainless steel stock. First draw, Fig. 4, produces a cup 7¾ in. in diameter, 3⅜ in. deep done on a No. 168½ Toledo double-acting press. The re-draw operation that follows is done on same press, producing a cup 6⅜ in. in diameter, 5 in. deep.

After a wash, anneal, and pickle, the part receives a reverse draw, forming cup-shaped recess 4 in. in diameter and 2⅛ in. deep in the top of the part. A blank holder grips the work down to about 3 in. above the base; then the punch comes down and makes the reverse draw. The open mouth at bottom of the part at this stage is 6⅜ in. in diameter. This operation is also done on a No. 168½ Toledo press, operating at a speed of 16 strokes per minute.

As shown in Fig. 4, other operations include sizing, piercing, turning out or flanging the center hole on a 620 Niagara press, and squaring up the corners; trimming, burring, rolling the bead and crimping.

In making the reverse bend, the critical stage here, dies are given exceptional care, being polished often. All clearances are maintained exactly. It is only by this attention to the dies that wrinkle marks are avoided. However, the job has been worked out to a point where rejects are remarkably low considering the difficulties involved.

Continuous Washer: After each press operation, drawing fluids are removed in a Blakeslee-Niagara washer using a 30-in. wide mesh belt conveyor to carry the work through the unit at a speed of 6 fpm. First stage consists of a hot wash with an alkaline solution, followed by a cold water rinse sprayed against the work, followed by a hot water rinse. Fourth stage is a drying section, operating at 250°F. A gap and a baffle separate each of the four sections. Work is inverted on the conveyor and sprays strike it from underneath as well as from sides and top in the washing and rinsing sections. Unit measures approximately 75 ft long overall.

Proper cleaning is highly essential to avoid any possibility of foreign matter being burned into the surface of the work during the annealing cycle that follows. It is essential that the rinse be very thorough in order to remove all carbonates and silicates.

Annealing Cycle: Since the stainless steel work hardens readily, it must be annealed between each draw. This work is done in a 5-zone pull-type unit. Work is loaded on Nichrome wire mesh trays, each about 2½ ft wide, 6 ft long.

Work goes through the furnace on trays and is advanced a distance of one tray length each push. This is done with tray in each zone. After each push, a new tray is started and the discharged tray unloaded and sent by roller conveyor round to the loading zone. Push schedule varies for the many different parts.

Five zones of the furnace include two preheat sections; a high heat or holding zone, followed by two cooling sections. First cooling zone is water cooled as it is essential to bring down the stainless rapidly from the high temperature. In fact, the work is brought down from 1950 to less than 700° F in less than 1½ min. Furnace was built by Electric Furnace Co., is electrically heated and equipped with a propane cracking unit and a refrigerating unit to remove water vapor and so furnish controlled atmosphere.

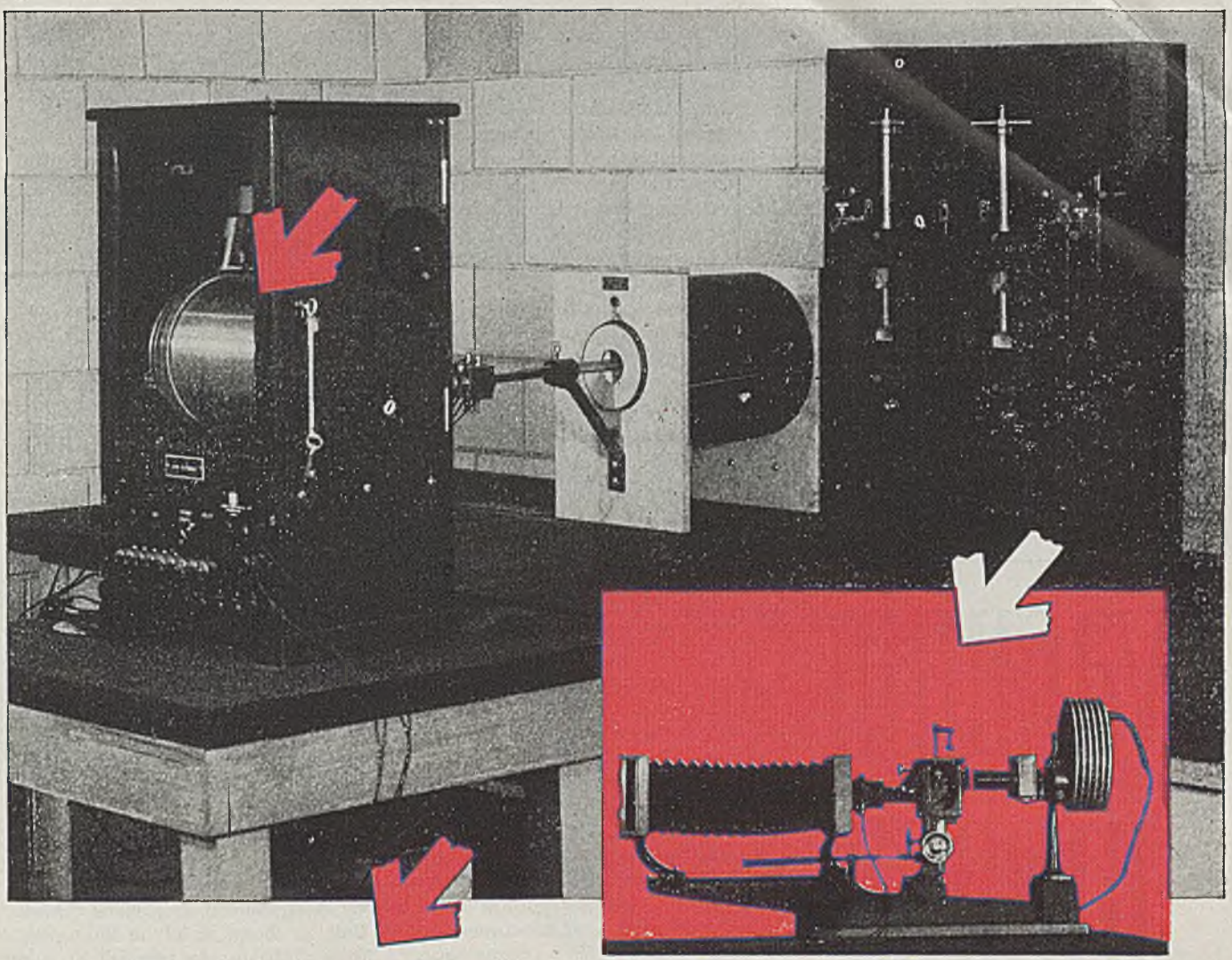
No "Controlled" Atmospheres: In early work with stainless parts described here, rejections as high as 10 per cent were encountered. Most of them were in the form of surface imperfections that would not have been serious except for the rigid finish requirements of dairy equipment as previously mentioned. Part of this difficulty was traced to a carbon buildup in annealing, the normal 0.013 per cent maximum carbon being increased to as much as 0.040-0.050 per cent.

While the buildup may not exceed 0.0001 to 0.002-in. below the surface, it was deep enough to cause undesirable etching of these stainless parts. Amazingly enough, doing away with the "controlled" atmosphere avoided the difficulty completely. So now the annealing is done without special provision for atmosphere control.

The scaling that results from the annealing is easily removed by pickling in a solution of 10 per cent nitric acid, 5 per cent hydrofluoric acid with no inhibitor at 150° F.

Another type of defect that caused trouble at one time was "orange peel" found to result from improper cleaning, carburization or carbide precipitation. Since the latter is due to slow cooling through critical range, it is prevented by going to a fast "quench" from the high heat temperature. In fact, some work has been done using water sprays

TESTING ELECTRONIC CONTROL SYSTEM: A cathode ray oscilloscope here is used to show wave form of motor-load current during testing of a Mototrol manufactured by Westinghouse Electric Corp., Pittsburgh. Latter is an electronic control system that uses convenient alternating current, yet provides speed control advantages inherent in direct current motor as well as automatic regulation features



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IS CORRECT

The whole story of a steel section is bound up in the tiny, individual grains of the steel—their size, nature, position, and relationship, one with another. That's why it is important to you that PSF has and *uses* in its constant laboratory testing, such equipment as the Critical Range Apparatus for determining transformation points of steel, illustrated above, and the Photo-Microscope shown in the inset. They're part of the reasons why castings by PSF, aside from dimensional accuracy, have the clean soundness and strength needed to realize your best hopes for *your* product.

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or vapor or gas to cool the work quickly through the critical zone.

Polishing Stainless: In addition to the above mentioned methods of polishing milker pails with limestone and water, several other methods were tried and used as follows: Pickle polishing, superseded by sand polishing where the parts are spun in a mixture of sand and water. Then electrolytic polishing was tried but trouble with nonuniformity of results led to a return to the sand polishing method.

Experiments with vapor blast have been found too slow for this work; sand blasting is also being experimented with at this time.

Lubrication, Die Maintenance: Dies are lubricated with No. 32 drawing compound supplied by L. R. Kerns Co. This is a water soluble material used in the proportion of three parts water to one part of compound. Dies are very carefully maintained because it is absolutely essential to avoid marking the work in any manner. To this end, dies are polished after every 10-100 pieces, the thought being that it is much more economical and effective to spend time and money polishing dies than in polishing the parts produced.

Dies are kept spotlessly clean as an aid in preventing the appearance of reduction rings on the work. The parts are washed between each operation to control dirt. Containers holding parts in process are carefully covered to prevent any dust or dirt from settling on the parts in process. This care produces beautiful work. Parts come out of this drawing sequence with a minimum of marks. The difficulty is to do press work that will not show up marks after polishing.

Die clearances for stainless steel are from 0.008 to 0.009-in. as this material work hardens so rapidly it will not flow.

—o—

Chart containing the AWS-ASTM classification of bronze electrodes and grade numbers of arc-welding rods produced by fifteen manufacturers is being distributed by Ampco Metal Inc., Milwaukee.

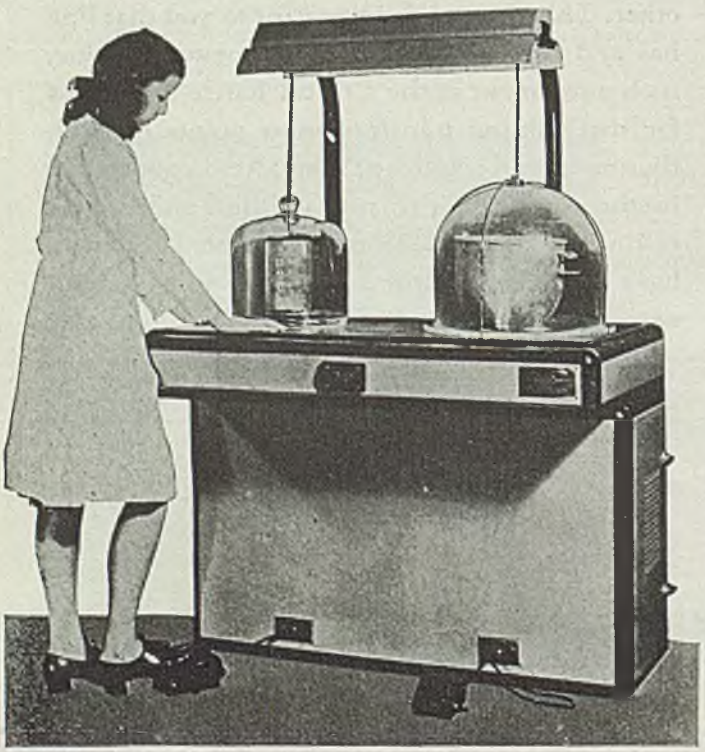
Identification trade names and numbers are listed in the chart, permitting the user to select type of rod to meet his requirements.

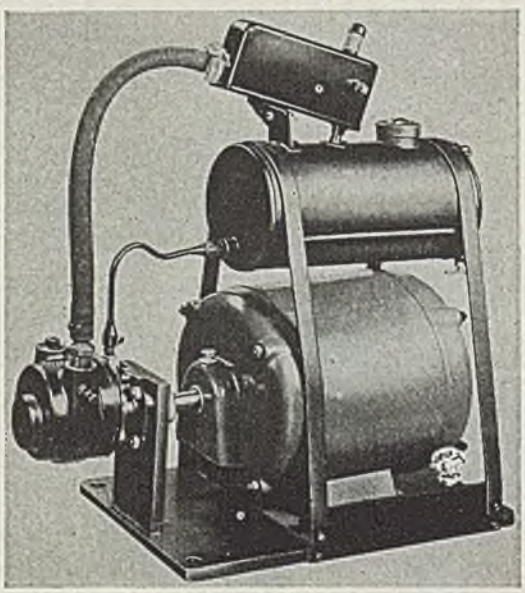
vacuum pumps

VACUUM pumps, developed by Kerr Dental Mfg. Co., Detroit, for evacuating refractory materials used in its process of precision casting, now are available for general industrial use.

Among pumps released is a "single" Vacumatic water-cooled model, an air-cooled model of the same design and a "double" model. Powered by single-end motors of ¾ to 1½ hp, single model will pull a vacuum reading of 29.8 in. on a mercury manometer in 5 to 6 sec, holding the reading indefinitely. Rate of this portable unit is 15 cfm. Pump unit is embodied in a metal cabinet equipped with spring-supported "jiggle" table, or is manufactured as a bench model. Shown at right in the accompanying illustration is the pump unit.

Double model pulls 15 cfm at two stations simultaneously or 30 cfm at a single outlet with a 2 hp double-end motor. It is enclosed by a metal cabinet top of which is a rubber-covered table. Unit, as shown at left in illustration, also is equipped with a counter-balanced lifting mechanism for two bell jars and solenoid operated vacuum foot valves. Pump blades in all models are of Nitriloy. These operate in nitri-cast iron sleeves. Both metals resist wear at high temperatures and speeds.





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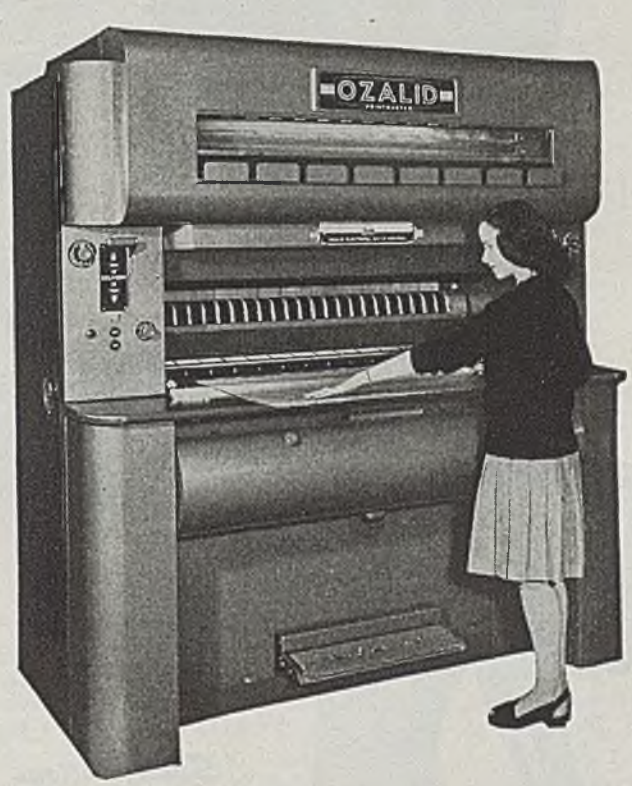

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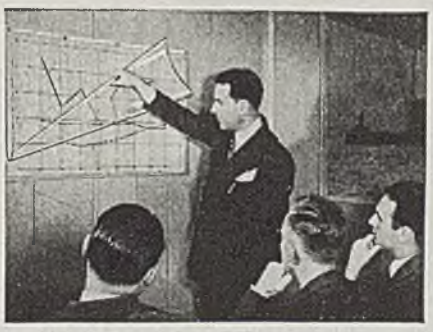

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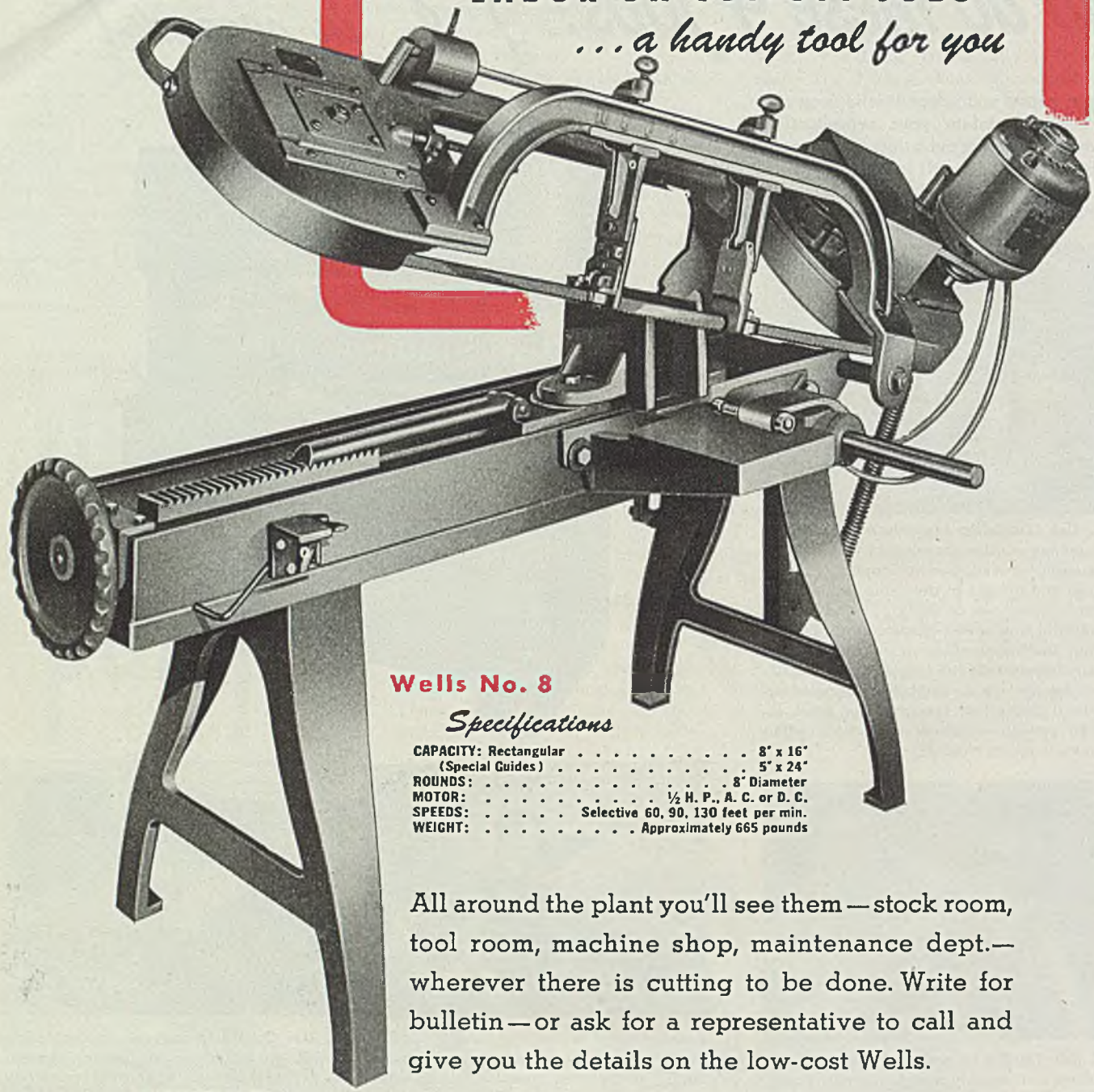

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ROUNDS:	8" Diameter
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SPEEDS:	Selective 60, 90, 130 feet per min.
WEIGHT:	Approximately 665 pounds

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Duplex Trunnion Fixtures

(*Continued from Page* 105)

which then is mounted in the trunnion pins in a position such as shown in Fig. 1. Trunnion pins closely fit the bushings in the fixture and are tapered slightly so there is no possibility of movement of the fixture after pins have been engaged.

Pins, in turn, are supported by heavy fabricated pedestals secured to a substantial base. Bushings in these pedestals are split at top and are fitted with a screw clamping arrangement. After fixture has been positioned in the plane desired and pins engaged, pins are securely locked by turning up these clamps, taking up the clearance required for movement of the pins in the pedestal bushings and affording a rigid support for the fixture during machining.

Frame for the indicator requires three large holes for mounting Selsyn driving motors and 12 smaller holes for various shafts. Hole machining operations involve rough boring three 3.45-in. clearance holes and three 3.625-in. motor holes. These latter are held within 3.613-3.616-in. at this stage. Then 10 shaft holes are drilled ¾-in. in diameter. Subsequent operations include finish boring the three 3.625-in. holes, rough boring 12 shaft holes, finish boring these same holes, etc. These operations are handled one at a time with individual bars and cutters.

For instance, the fixture with work in place may first be positioned as shown in Fig. 1. All holes to be worked from that side are then machined. Then the right hand front, and the left hand rear pins are released and the fixture turned 90° by swinging the top forward to bring it to the position shown in Fig. 2, revolving the fixture about the axis through the left hand front and right hand rear pins which are left engaged in their bushings. Now the first two pins are re-engaged in the fixture and locked, holding the work securely in position, Fig. 2, for machining all holes to be worked from that side.

In a similar manner, the work is further rotated about this same axis till four sides have been reached. Then the left hand front and right hand rear pins are released and the work revolved about the axis of the other two pins to reach the remaining two sides (or ends) of the work. Thus all six sides are machined in the same fixture and in the same setup.

Correct relationship of all holes is automatically assured by the fixture since the work is not removed from the fixture until all holes have been machined. There is no chance for a location error here.

This contrasts greatly with the conventional method of working such a piece where six individual jigs or fixtures might be employed for holding the work in the six separate positions. It would be very easy for an error to occur in re-positioning the work in such a setup. Too, it would be difficult to keep the jig take-off points, or common locating points, exactly correct.

Great Versatility: Double trunnion fixtures such as those in Figs. 1, 2 and 3 are used with up to 40 bars for a single fixture. The most exacting tolerances are met in regular production without difficulty. For instance, many of the holes in the indicator frame are held to plus 0.0002-in., minus zero.

It is usual practice to hold tolerances of the fixture itself to less than half of the blueprint tolerances allowed for the part; or where dimensions are subsequently to be gaged, fixture tolerances are held to less than one-tenth those of the part.

Not all parts require working holes from six sides. Often a single trunnion fixture which provides access to four sides of the work will be sufficient. Fig. 4 shows a fixture of this type with the work mounted under a radial drill.

Fig. 5 shows another unit of this latter type. In this fixture, work can be done at various angles other than on axes 90° apart, for this fixture includes a worm and gear which permits tilting the work at any angle desired. A pin on the supporting pedestal engages holes in the disk fastened to the revolving fixture to afford a positive lock at any position desired. In such a setup, holes can be machined regardless of their angular relation to one another, yet precise repetitive reproduction of the exact positions is assured.

Expert Tooling: Major portion of war production work in this plant was on fire control devices where tolerances greater than 0.0002-in. are seldom allowed. To maintain such precision through heavy production schedules has called for flawless equipment along with jigs and fixtures that are built accurately, yet simply.

Here expert toolcraft has cut re-tooling shutdowns to a minimum. Sound engineering of these jigs and fixtures provides facilities that can be loaded quickly and surely to get the most in accuracy and speed to be had from the machines for which they are built.

Illustrative of advanced tooling practice is the equipment in Fig. 5. Central foreground shows the periscope box in which finished dimensions on diameters and locations of bores as well as flatness of critical surfaces are held to tolerances as close as 0.0002-in. This unit, as well as the fire control instrument of which it is a part, was completely engineered and manufactured by General Mills' Mechanical Division with tools, jigs and fixtures designed and built by engineers at that plant.

Hole machining operations are handled by the trunnion fixture shown at the right. Tools for use in this fixture are also shown in Fig. 5. Cutter bars and cutters are shown in their cases. Universal joint connectors for driving them are at lower right.

When this job goes into production, the tools and fixture are issued by the

NEW LITERATURE

FINISHING WHEEL
By Manhattan Rubber Division of Raybestos-Manhattan Inc., Passaic, N. J. Bulletin No. 6881-A available from Abrasive Wheel Department.

PROTECTIVE MAINTENANCE PAINT
By Peninsular Chemical Products Co., 6795 East Nine Mile road, Van Dyke, Mich. A 4-page illustrated folder, or bulletin, on "Pen-Kote 500".

CUTTING TOOLS
By Delloy Metal Corp., Philadelphia. Illustrated catalog lists sizes, types and prices.

STACK-O-METER—CO_2 INDICATOR
By Davis Emergency Equipment Co. Inc., 45 Halleck street, Newark 4, N. J. Circular on portable instrument, giving specifications, etc.

INTERNAL GEAR FINISHER FOR SPUR AND HELICAL GEARS
By Michigan Tool Co., 7171 East McNichols road, Detroit 12. Technical illustrated bulletin No. 860-C-45.

CAMS AND TOOLS
By The Stites Tool Co., 1426 West Third street, Cleveland 13. A 4-page illustrated bulletin describing circular form tools and their uses.

METAL CLEANING AND FINISHING
By Howard Engineering & Mfg. Co., 2275 Buck street, Cincinnati 14. A 48-page illustrated book.

SPEED INDICATORS
By Chicago Electric Tachometer Co., 800 North Clark street, Chicago 10. A 4-page illustrated bulletin No. 12, showing units for permanent and portable installations with list prices.

BAROMETRIC CONDENSERS
By Ross Heater & Mfg. Co., Inc., 1431 West avenue, Buffalo 13. A 4-page illustrated bulletin No. 4609.

WET SEAL GAS HOLDERS
By Stacey Bros. Gas Construction Co., 5535 Vine street, P. O. E, Cincinnati 16. Bulletin No. W-45 describes design and construction.

ARC WELDING HANDBOOK
By Hobart Bros., Hobart square, Troy, O. A 516-page handbook with 512 illustrations. Cost $2.00 plus postage.

toolroom to the worker as a unit. This keeping of all tools and fixtures in the form of tool assemblies for a particular job is standard practice here. It helps assure use of proper tooling for each job, avoids misplacing units and speeds the entire operation.

Standard Machines; There are no special purpose machine tools in this plant. Instead it employs a widely diversified assortment of the most modern standard machine tools available. No unit is more than 4 years old. Here short-run work, experimental jobs and ever-recurring product improvements and changes would never justify the use of single-purpose machines—that is, units built to perform one operation.

However, extremely ingenious tooling such as the double trunnion units shown here have permitted these standard machines to be adapted to large scale production while maintaining an accuracy that is uncanny.

For example, precision gears are made on a mass production basis with such a high degree of accuracy that a train of 50 or more of these gears has practically no backlash when set up in a control box—a real achievement in exacting production.

Thus experience gained in designing and producing special packaging and processing machinery for General Mills own plants has developed one of the finest precision machine shops to be found anywhere. So perhaps it is not such a long jump from cereals to computing gun sights, after all.

Photographic REPRODUCTION

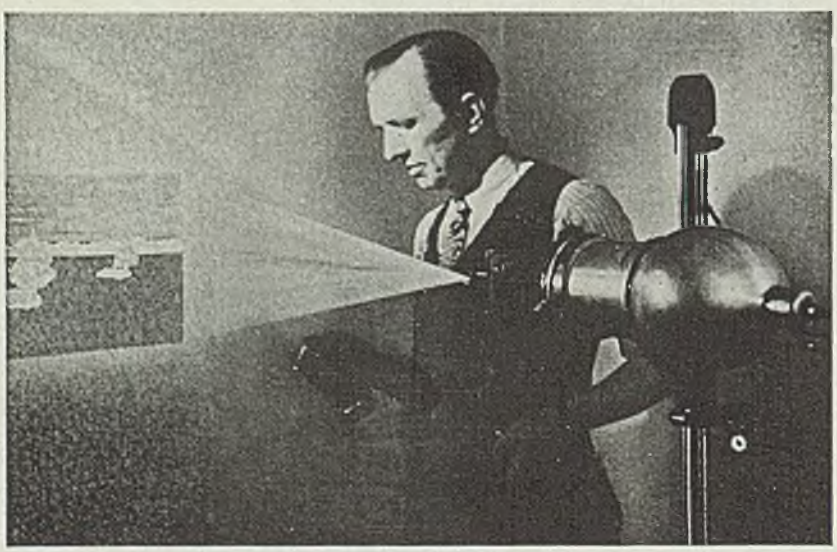
. . . now possible on metal, wood, cloth, leather or plastic surfaces by conditioning with special sensitizing emulsion

PROCESS by which metal, wood, cloth, leather, plastics or almost any other surface can be made usable for photographic reproduction is based on an emulsion which can be spread on many kinds of materials, sensitizing them for photographic print use.

It was developed at Glenn L. Martin Co., Baltimore, shortly before the war and during the conflict it speeded aircraft production by permitting engineers to work in full scale. Drawings were projected rapidly and in number directly on metal and other surfaces. These then were used for reference, fill-in, tooling (tools could be built directly on the templates), inspection tools and for cutting out pieces for experimental aircraft directly from the drawings projected on the rigid surfaces. Considerable savings thus were effected in aircraft engineering and production and the system was widely used in that industry.

After printing, the metal, wood or plastic prints are developed in the same manner as any commercial photo paper. Either line drawings or continuous tone negatives can be printed by projection or contact.

Through use of the emulsion, it is possible to print photo murals directly on walls, as shown in accompanying illustration. Photographic plates can be printed on book covers, names printed on personal articles such as wallets and key rings and signs of various sizes are made easily.



In industry the process is expected to find use in reproduction of drawings for manufactured products or machinery. Such drawings can be either to full scale for ease in reading and checking during manufacturing process, or can be reduced if prints to carry are desired. Proportions remain, of course, exact and the need for redrawing to a different size, with possibility of error, is eliminated. Same negative can print to any size desired.

In its normal state, the emulsion is a thin jelly-like substance which, when heated to a temperature of 125° F, becomes a liquid which may be applied to the desired surface with a camel's hair brush, a soft sponge or rag. Allowed to dry, the negative then is printed on the sensitized surface and development proceeds normally as if were a commercial paper. All operations are carried out under darkroom conditions, using ruby lights. Emulsion may be heated any number of times without affecting its efficiency or printing qualities. Where it is desirable to make prints larger than standard paper sizes, or make non-tearing pictures, one can brush the emulsion on large sheets or metal, wood or plastic. Prints on metal or wood can be proofed against weather by a lacquer or varnish finish. Many of the signs made by this process at Martin plants have stood the ravages of weather for 5 years or more.

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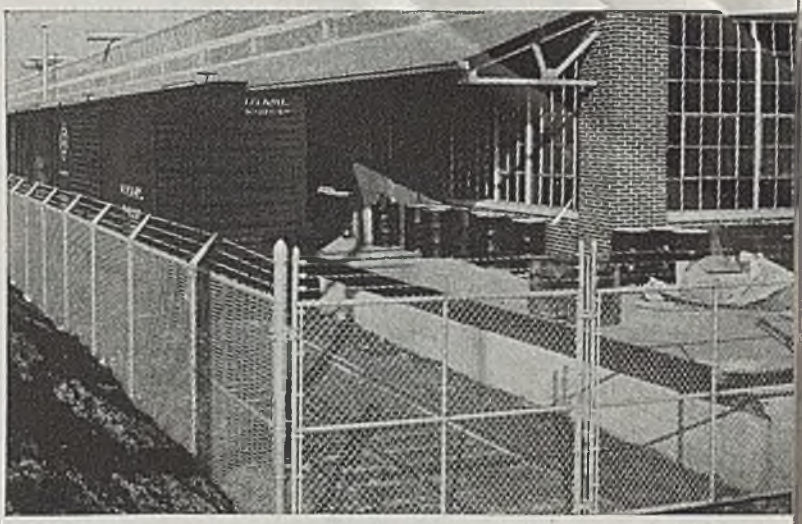

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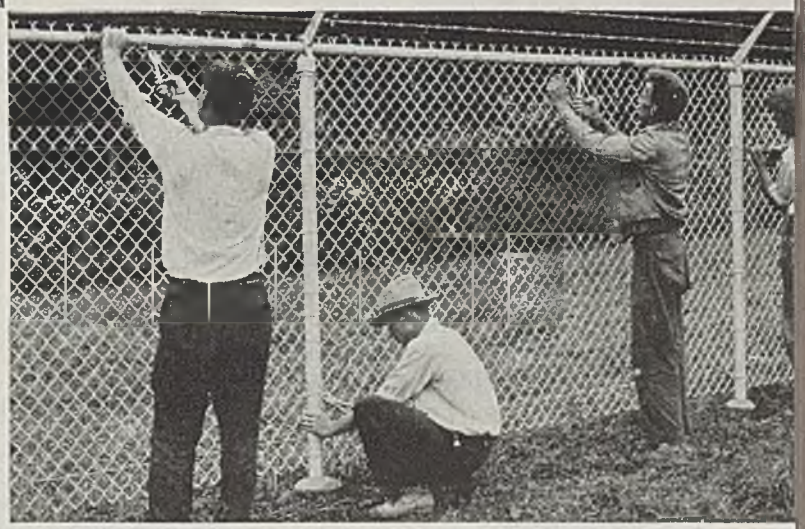
Correct and economical construction can be done by trained erection crews. When local labor is to be used, Continental can supply a competent foreman and inspection service. Write today for FREE fence manual.



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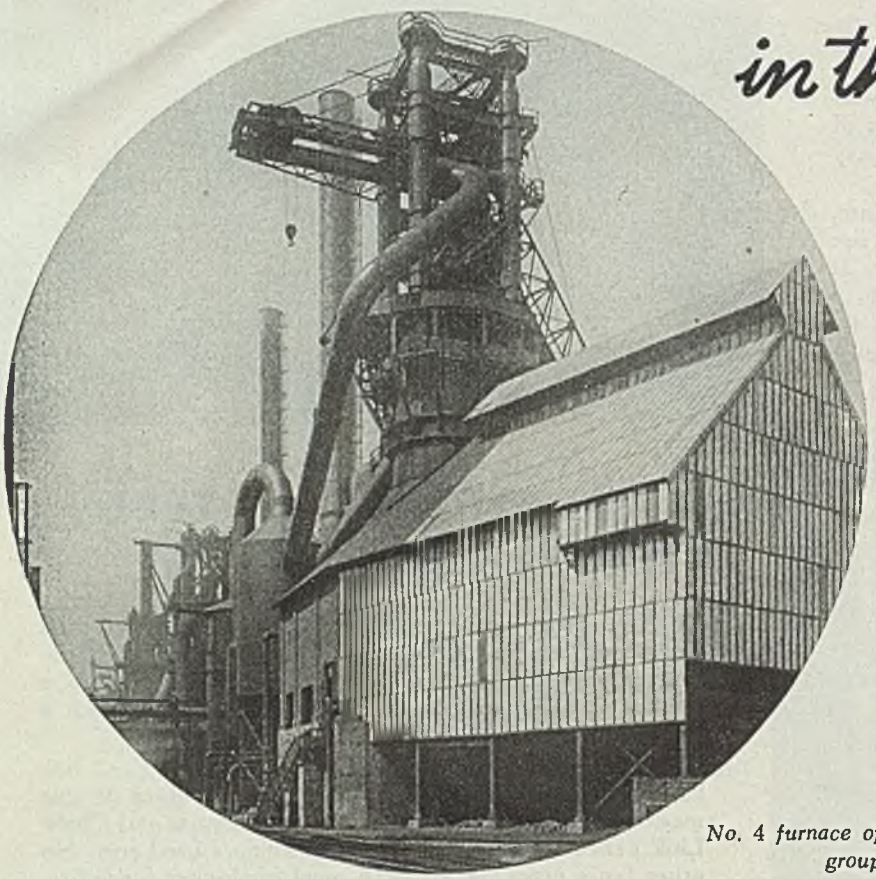
USE OF SCRAP in the blast furnace



No. 4 furnace of the Inland group

Method of charging borings and turnings is described. Procedure for avoiding periodical upsets of furnace is considered. Campaigns in which borings and turnings were put on and taken off furnace are analyzed

By KURT NEUSTAETTER
Blast Furnace Engineer
Inland Steel Co.
Indiana Harbor, Ind.

MOST blast furnace plants use some scrap in the furnaces. If there is no outside scrap they have to use at least their own scrap. As a rule the percentage of scrap charged in the burden is not high. This paper will deal with amounts up to 10 per cent of the total burden.

Scarcity of literature on the subject undoubtedly is due to a great extent to a certain reluctance to reveal the tricks of scrap practice and its economy. At the same time conditions at most plants vary constantly and results often appear inconsistent. The problem of how and where to charge scrap in order to derive the maximum benefit from its use is discussed in this paper.

Main grades of scrap used at the Inland steel plant are:

1. Furnace Scrap. (a) Light furnace scrap: as runner scrap, skulls, mixer scrap. (b) Heavy furnace scrap: scrap recovered from cinder runners.
2. Borings and Turnings.

Methods of Charging Scrap: In the old days scrap was usually charged in large amounts of 20,000, 30,000 or even 50,000 lb at a time at regular intervals with an appropiate amount of coke added. This somewhat haphazard method was abandoned at Inland around 1928. It was not possible to discover the exact reasons for this, but undoubtedly the same reasons prevailed which caused the change in the charging method for recovered scrap which will be described later. A large amount of scrap charged at one time completely disrupts the make-up of the stock column and leads to serious disturbances in a furnace operating smoothly on top wind. After 1928 the scrap was integrated into the regular filling order. This has worked satisfactorily in the main.

The standard filling order at Inland is: Ore, stone, coke, dump big bell; ore, coke, coke, dump big bell, or as expressed in the conventional code OSC/OCC/. Slight variations of this are made in order to influence the gas flow through the furnace and thus furnace operation. Also, on the third charge an empty skip, an extra ore, or an extra coke has to be charged in order to prevent the same kind of material from going up in the same skip all the time. Most frequently an extra ore is charged making the filling order OSC/OCC/, 1/3 Extra Load OSC/OCC/. The extra load is an ore of equal or less weight than the rest of the ores.

All filling is done in a 3-charge cycle. This means that not all charges are alike, but that there are three different charges alternating; each material goes into the furnace at least once every three charges. Thus a larger variety of materials can be used without charging too small amounts at a time, which would cause weighing errors and too many stops at the bins.

The skips at the different furnaces hold 3000 to 5750 lb of coke and 3 or 3 1/3 skips of coke per charge, we obtain ore burdens of 22,000 to 40,000 lb per charge. Scrap, when used, is a part of this burden and at no time does it exceed 10 per cent of this burden; 1000 and 1500 lb per charge are the most commonly used amounts. This means

(*Please turn to Page* 136)

From a paper presented before the Blast Furnace and Coke Association of the Chicago District, Del Prado Hotel, Chicago, March 26. It was awarded second prize in the blast furnace section of the fifth annual technical papers contest sponsored by the association.

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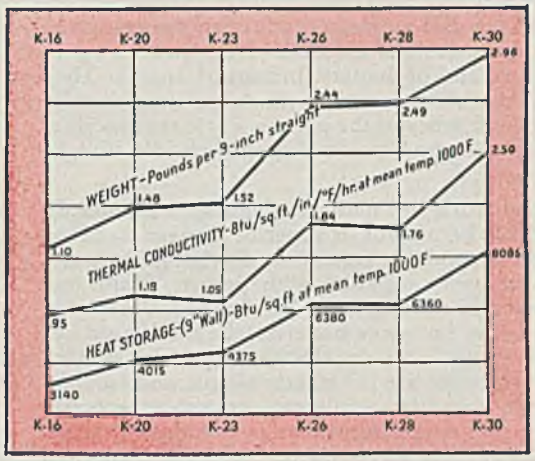

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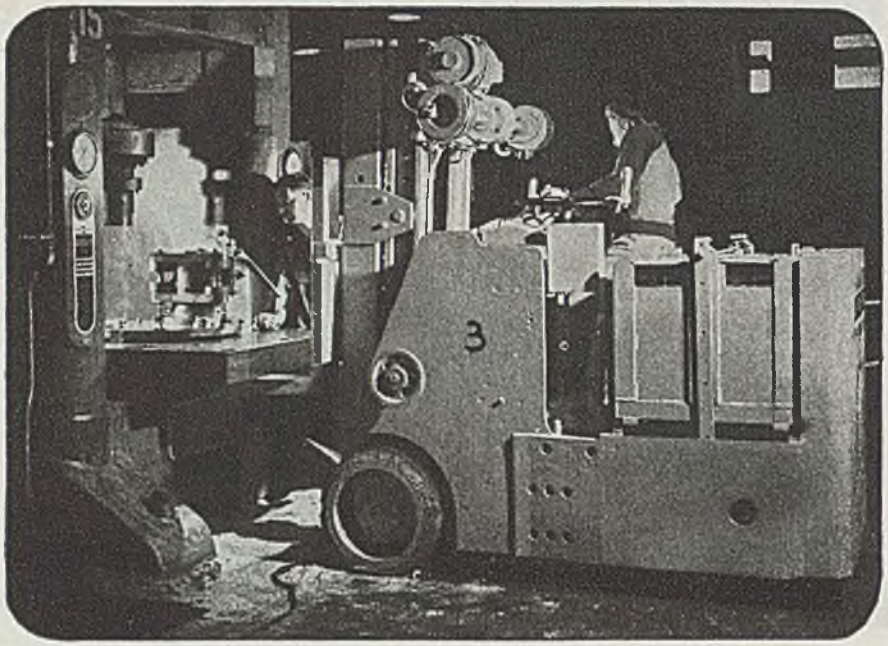

Changing the punch on the ram of this press is simplified by use of a fork-lift truck. New developments in handling methods appear regularly in STORAGE BATTERY POWER. Write for a sample copy if you do not already receive it.

...ALKALINE BATTERIES for 24-Hour Power

In Industrial Trucks, Alkaline Batteries Give You These Important Advantages

- They are **durable mechanically;** grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.
- They can be **charged rapidly;** gassing cannot dislodge the active materials.
- They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling.
- They are **foolproof electrically;** are not injured by short circuiting, reverse charging or similar accidents.
- They can **stand idle indefinitely** without injury. Merely discharge, short-circuit, and store in a clean, dry place.
- They are **simple and easy to maintain.**

CHANGING large, heavy dies on huge production presses is one of the many handling operations that are being speeded up in numerous plants by means of battery industrial trucks. They enable one man to do the job of several in much less time, thereby increasing production efficiency of the presses. Further economies are effected by using the same trucks for storing idle dies in space-saving tiered racks.

A battery industrial truck has natural advantages for simplifying such handling jobs because of its superior maneuverability, high availability and dependable operation. Exchange batteries keep the truck continuously supplied with power. While one battery operates the truck, another is being charged. Except for the few minutes needed to exchange batteries, the truck need not stop for servicing its power unit. Its electric motor drives have a minimum of wearing parts; are inherently simple and trouble-free. The truck starts instantly; accelerates smoothly; operates quickly; gives off no fumes; consumes no power during stops. Not only does it make efficient use of power but the current used for battery charging is the lowest-cost power available.

Altogether, the battery industrial truck is one of the most dependable and economical types of handling equipment—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.*

Edison
ALKALINE BATTERIES

Aluminum pallet

Increases Flexibility, Lowers Handling Cost

Lighter weight unit developed by Reynolds Metals saves as much as 80 cents per unit on shipping costs; increases handling flexibility by allowing fork trucks to approach unit load from any angle

By T. O. PALMER
Industrial Manager
Materials Handling & Container Division
Reynolds Metals Co. Inc.
Louisville, Ky.

IMPORTANT savings possible in shipping and handling large quantities of materials in unit loads on pallets was demonstrated by wartime experience of the Army and Navy. Suppliers then were asked to make shipments to the armed forces on standardized pallets to facilitate movement of goods from manufacturing plants to supply depots and other distributing points.

Throughout these movements, goods were handled on pallets in unit loads by means of power-driven industrial trucks. Savings in moving a shipment of 100 tons amount to 479 manhours, according to estimates of Navy handling experts. Moving loose cargo would require 682 manhours as against 203 for the same cargo palletized. Approximately 77 pallet loads accommodate the same amount of materials that require 4080 separate packages when shipped loosely.

Savings such as the above are made possible because, in palletized shipping, materials are handled "in bulk" —each package consisting of a pallet with its load, later handled as a single unit through all moving operations. Such loads usually are handled easily by industrial fork trucks. Naturally, other mechanical handling equipment also can be brought into play in working with pallets.

Palletizing was used successfully by the armed forces to handle ammunition, clothing, food and all types of supplies. Records of performances by the Navy show loading and unloading of palletized shipments in as little as 0.5 manhour per freight car under ideal conditions. Records over a period of time, however, show a normal expectancy for loading and unloading palletized shipments, including removal from or placement into storage, running from 8 to 15 tons of goods per manhour.

From the cost angle, plants of all types have come to realize the fact that 20 to 50 per cent of the total cost of producing many items, lies in the expense of moving the work about in the plant. Many plant managers have done something about this, with the result, where materials are to be handled in large enough quantities, fork-truck-pallet handling and storage are widely used.

Obviously, to obtain full benefits of unit-load movement, the right type of pallet is essential—both to reduce loading and unloading costs and to shorten turn-around time for freight cars and highway trucks.

Another factor which definitely has a bearing on shipping costs is the weight of the pallet itself. Obviously, if a lighter weight pallet could be used to carry the same pay load as one of a heavier type, shipping cost per unit load could be trimmed down.

One of the recent developments in pallets by Reynolds Metals Co., Louisville, Ky., is designed to do just that—trim down the cost per unit load. The standardized 40 x 48-in. aluminum pallet developed here weighs 36 lb against 100 lb for a wooden unit of the same size. Thus shipping materials on aluminum pallets save freight charges on 64 lb per unit, not taking into consideration the savings they offer in maintenance as no painting or upkeep is involved.

In a typical cost comparison, cost of sending a certain type of palletized materials from Detroit to Louisville, a rail movement of 400 miles, is $1 per 100 lb or 1 cent per lb. Thus a saving of 64 cents per pallet is obtained on the outgoing shipment, using the aluminum pallet.

Return shipment of the standard pallet is at rate of $0.36 per 100 lb. A freight car holding 540 pallets, either wood or aluminum, means a carload of wood units weighing 54,000 lb would cost $194.40, or 36 cents per pallet. On the other hand, a carload of the aluminum units would weigh only 19,400 lb. But minimum carload weight is 30,000 lb, so the freight charge would be based on that weight, which would mean a cost of $108 per car, or 20 cents per pallet. Each aluminum pallet thus saves 64 cents going out, plus 16 cents on the return trip, or

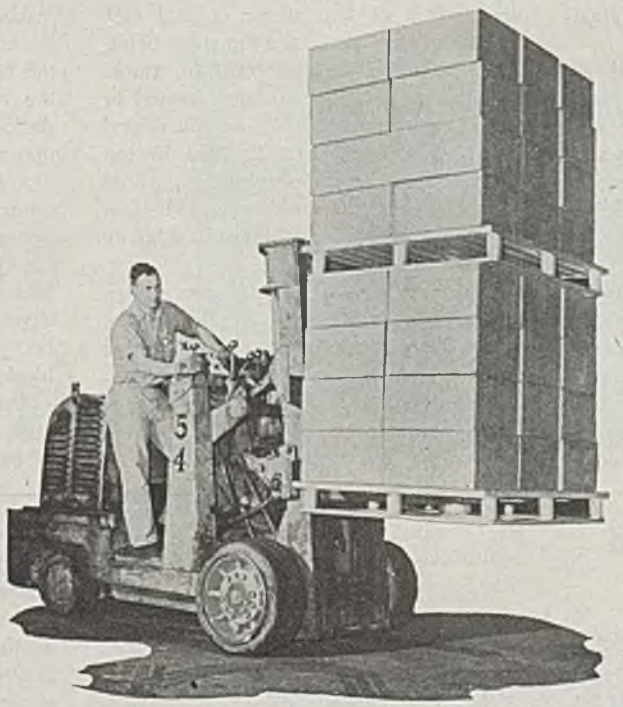

Fig. 1—When moving stock to temporary storage, double pallet loads can be carried easily by an industrial fork truck. Note possible angles from which truck can approach pallet

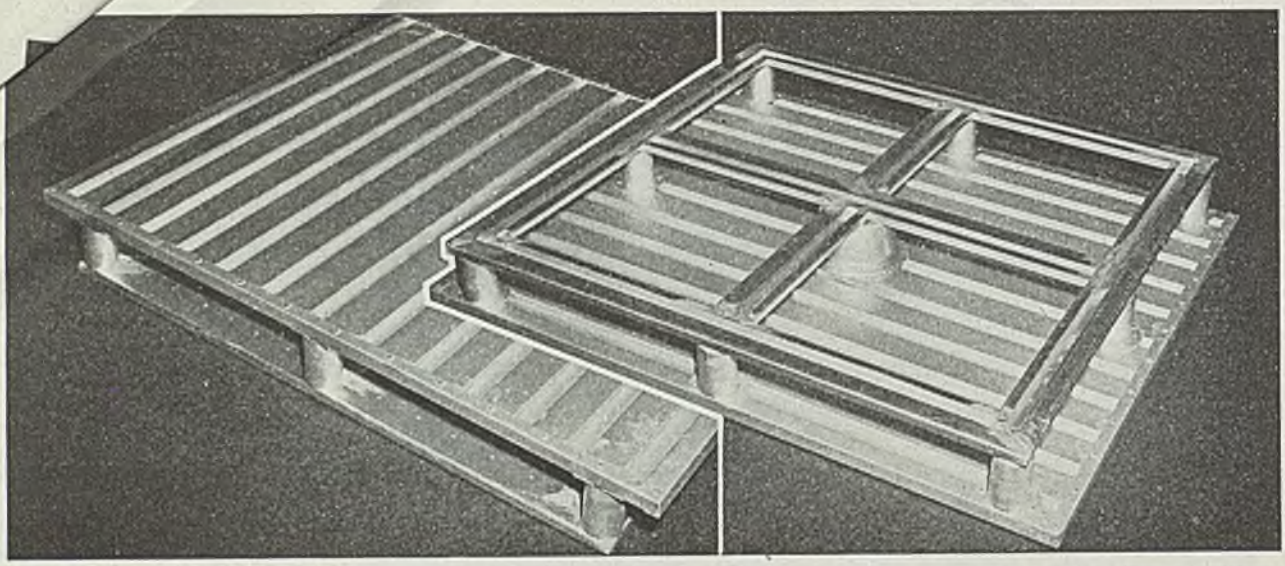

Fig. 2—View of pallet showing upper deck with corrugated surface. Overhang of upper deck at each end allows use of safety bar slings in swinging loads aboard all types of ships

Fig. 3—View of bottom of all-aluminum pallet. Tubular members separate upper and lower decks, and stringers provide ample bearing area. Corners of upper deck are reinforced with solid blocks of aluminum

80 cents saving on the entire trip.

On the basis of 13 round trips per year, the saving on each pallet would be $10.40 yearly. Cost of the aluminum pallet runs $26 compared to $3.50 for a wood unit—a difference of $22.50. But in a little over 2 years the aluminum unit would begin to pay out, and from there on the yearly saving on each unit would run $10.40, a return of roughly 45 per cent on the investment. Based on conservative service life of 20 years, savings possible with the aluminum unit would amount to $208 less the original cost of $22.50.

The Reynolds pallet is designed so forks of the industrial truck may enter it from any one of four sides, or any one of its four corners. This allows a pallet to be set down from one direction and picked up from another, adding flexibility in stowing and removing materials. Note Fig. 1. In addition, less space is required for maneuvering the truck since it need make only a 45° turn from an aisle to enter the pallet corner. Pallet construction also allows steel straps to be used lengthwise and crosswise on the unit to strengthen its load. Being non-sparking and non-combustible, it also adds to the safety factor. Furthermore, even when badly worn, no splinters or sharp edges are formed to present a hazard for men handling it.

The development withstands loads up to 26,000 lb without damage, using in its construction newly-developed high strength aluminum alloys. In construction, its one-piece welded lower deck is rigidly riveted to the upper deck through tubular load-carrying members.

Typical aluminum pallet employs an upper deck of two sheets of 52S ¾H aluminum alloy stock, the top sheet being 0.051-in. thick, bottom 0.040-in. thick. Both sheets carry square ribs formed in them, each rib being 0.5-in. deep and 1 in. wide. Note Fig. 2. Ribs in top sheet, Fig. 3, are crosswise from those in the lower sheet. Top and bottom sheets are joined by spot welds at many points.

Lower deck or bottom stringers, shown in Fig. 3, are 52S ½H alloy, 0.064-in. thick formed into channels for added strength, with corners forming the framework joined by 45° butt welds. Stringers 4 in. wide provide adequate bearing surface for tiering almost any load. A 3¾-in. clearance between upper and lower deck is provided by drawn aluminum cups which act as structural columns to form a strong assembly. Eight 2½-in. diameter cups of 52S ¾H alloy 0.051-in. thick are used as spacers at corners and midpoints as also shown in Fig. 2. A 6 in. diameter cup of the same alloy but 0.064-in. thick is used as the central column. Curved surface of spacers also helps guide the forks of industrial trucks into place when engaging the pallet.

Above elements are assembled to form the completed pallet by building up from the lower deck. Explosive rivets through the bottom of the cups into the lower deck securely join those parts. Then upper deck is riveted to flanges around top of cups. A 1½-in. square piece of aluminum bar stock, 1-in. thick, is used between top and bottom sheets of the upper deck at the corners to provide added reinforcement at those points. Rivets here go entirely through top and bottom sheets as well as the reinforcing block.

Upper deck overhangs the lower at both ends by 2½ in. for attaching a safety bar sling for shipboard handling.

X-Ray Metallography and Its Broadening Field

Introduction to X-Ray Metallography, by A. Taylor: 400 pages, 6 x 9½ inches; published by John Wiley & Sons Inc., 440 Fourth Ave., New York, for $7.50.

Physical examination of metals now employs x-ray analysis to an important degree. Until recently the technique was in the hands of a few specialists who served their apprenticeships in university research departments and research institutions.

Stress of war suddenly accentuated increasing demand for physicists and metallurgists with knowledge of x-ray crystallography and for crystallographers skilled on metallurgy. Few have had experience in both fields. This volume is designed to fill the need for an introductory book which affords a guide to the literature of the science and the same time possesses the character of a book of reference. It is designed to be of service to the student working for a degree and the research worker.

It discusses thoroughly such problems as the choice of an x-ray tube, identification of the spectra on the powder photograph, calculation of inter-atomic distances, crystal structures of metals, examination of ternary alloy systems by x-ray, application of x-rays to depth of cold working, fibre structure and radiography of welds.

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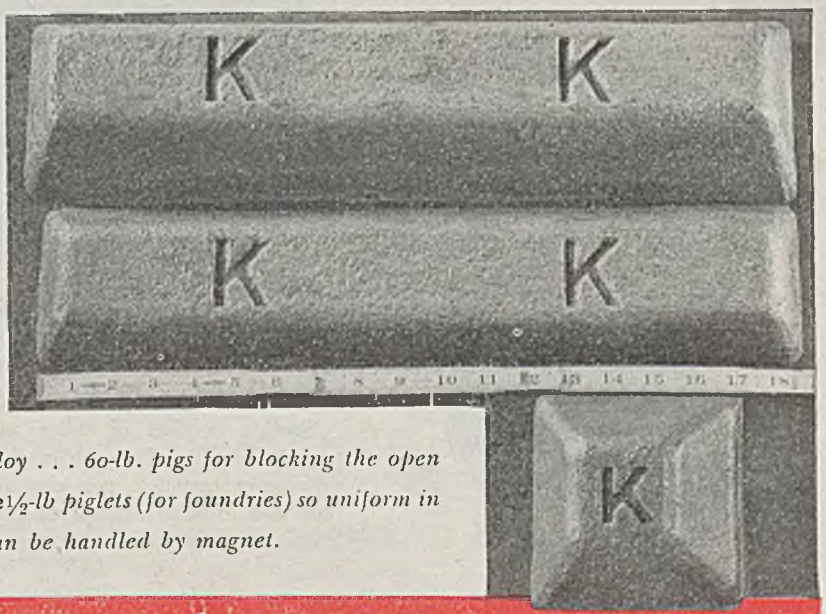

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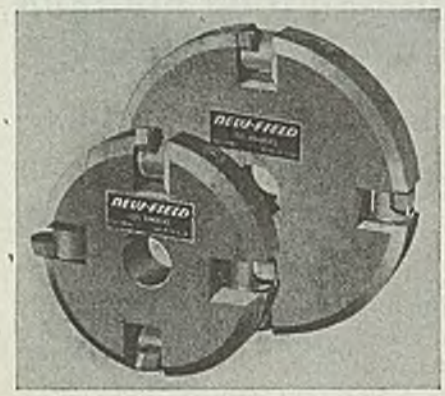
INDUSTRIAL EQUIPMENT

Fly Cutters

Two new models of universal cutters, designed especially for application on shell end mill arbors, are announced by New-Field Machined Parts Co., 549 West Randolph street, Chicago. They are 1⅝-in. thick, 6 and 8 in. in diameter, allowing ample strength for machining driving slots

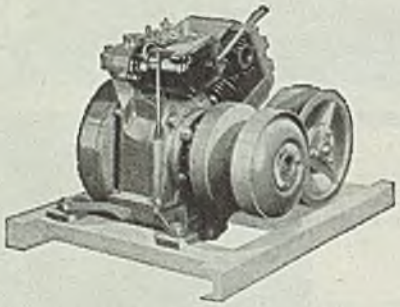


and counterbores. Using four removable high-speed steel or carbide bits, they provide stock milling cutters with a wide variety of applications without the necessity of having special cutters. They are offered in standard arbor sizes which can be machined to fit any arbor.

Steel 7/1/46; *Item No.* 9234

Automatic Transmission

Salsbury Motors Inc., 4464 District boulevard, Los Angeles, is manufacturing for the low horsepower field an automatic driving unit, the Power Package, in which drive ratios are controlled by the driven unit and clutch engage-



ment is controlled by engine speed. Consisting of a variable diameter drive pulley, variable diameter driven pulley and a v-belt, these units form an assembly which gives variable ratios over a 4 to 1 range.

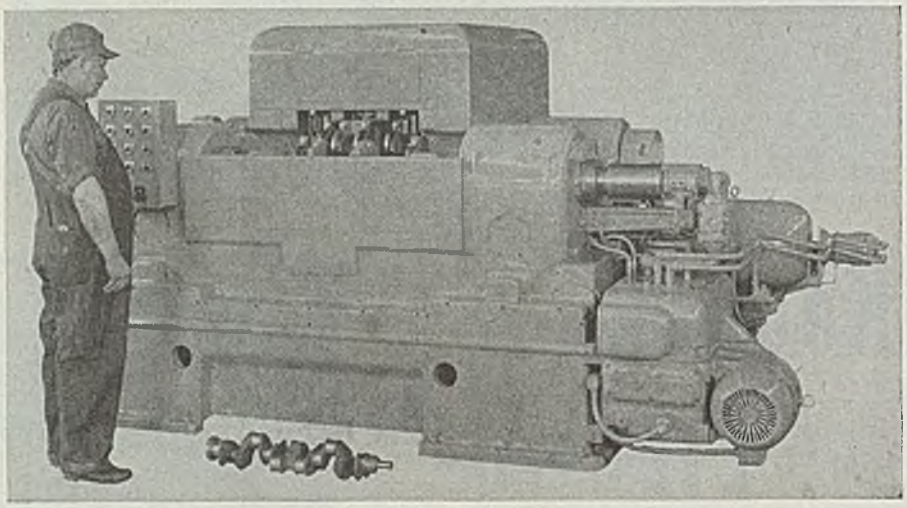
Drive ratio is controlled as a function of driven shaft speed. Reductions may range from 4 to 1 to 1 to 1 for light duty, high speed units and from 200 to 1 to 50 to 1 for heavy duty, low speed requirements. Change of ratio within these limits is accomplished automatically.

Built in drive pulley is an automatic centrifugally-operated, opposed shoe type clutch which provides engagement and disengagement with acceleration or deceleration of engine. Engine is a single-cylinder, air-cooled type, developing 6.5 hp at 3200 rpm.

Steel 7/1/46; *Item No.* 9499

Crankpin Turning Lathe

Wickes Bros., Saginaw, Mich., recently developed an automatic multiple crankpin turning lathe of single spindle type for either cheeking and rough turn-



ing or finish turning, spacing and filleting all crankpins simultaneously on multiple throw crankshafts having any number of crankpins.

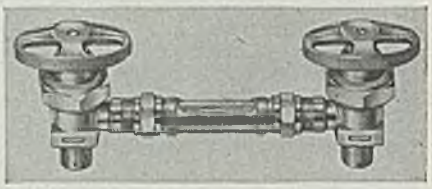
Tooling consists of roller supported type tool holders for each crankpin, hydraulically operated pot checks which hold and drive crankshaft, and hydraulically-operated steady rests for supporting crankshaft. Tool feed is hydraulic and operation is automatic. Cam-operated synchronized variable speed and feed mechanism maintain both lineal cutting speed and feed per revolution at maximum permissible during entire machining cycle. Transfer switch for manual operation enables operator to jog spindle around or jog carriage in and out for setup.

Steel 7/1/46; *Item No.* 9519

Valve Gage Set

Henry Valve Co., 3260 West Grand avenue, Chicago, announces a new gage glass set featuring diaphragm packless valves. It is recommended for installation on accumulators, liquid receivers, oil reservoirs, etc. where surging or splashing within the vessel is a problem.

Packless valve construction eliminates valve stem packing. A safety ball check in each valve keeps liquid from escaping,



and maintains pressure in the vessel if glass should be broken while valve is open.

Valve bodies and fittings are of forged brass. Tubing is rated at 500 psi (cold) for lengths up to 10 in. and 340 psi for 21-24 in. lengths. Horizontal valve outlets are 15 in. center-to-center. Standard tubing length is 12 in.; exposed length, 10 in.

Steel 7/1/46; *Item No.* 9347

Solids Interceptor

A solids interceptor designed to intercept particles of plaster, plastics, metal, glass and other solids which clog drains in industrial plants is announced by J. A. Zurn Mfg. Co., Erie, Pa.

Intercepting function is accomplished by two perforated metal strainers which intercept solids in waste water as it passes through interceptor body. Other metal strainers serve as baffles to quiet

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 134)

MUREX TYPE HTS

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The complete facilities of our welding laboratory are available to help users of Murex electrodes achieve superior welds at lower costs. More detailed information on Type HTS or other widely-used Murex rods is available on request.

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of water, permitting solids to drop readily to bottom of container. Cover of unit may be removed to provide access to sediment container which is readily lifted out for cleaning. Water seal in interceptor allows it to serve as a trap required by plumbing codes.

Steel 7/1/46; *Item No.* 9306

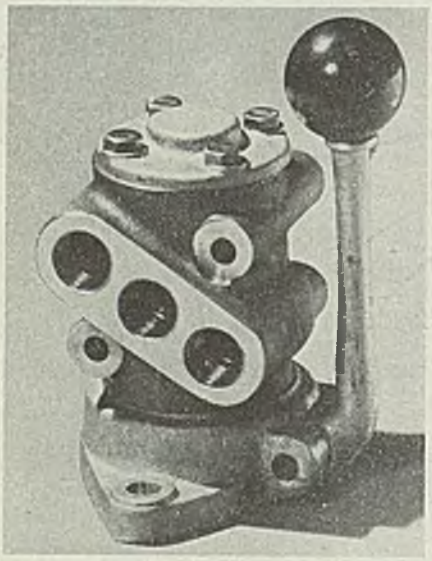
Metal Washer

Industrial Washing Machine Corp., New Brunswick, N. J., announces a new cabinet type industrial washing machine. Model RBM, adaptable to a variety of metal washing purposes. It automatically washes and rinses gears, tools and parts up to 36 in. diameter and 30 in. high.

Steel 7/1/46; *Item No.* 9316

Handle-Grip Control

A new ½-in., 4-way handle-grip air control is offered by Pneumatics Inc., Plymouth, Ind. It contains a detention



spring which permits the control to be fixed in either position.

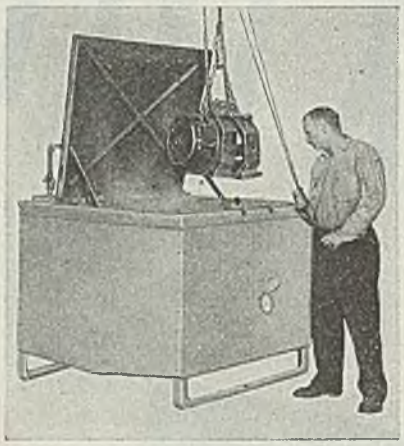
The compact valve is slightly over 5 in. tall, 4 in. deep and 3 in. wide. It has full, unrestricted ports and is exceedingly fast in operation.

Steel 7/1/46; *Item No.* 9273

Cleaning Tank

Motor block cleaning tanks designed for degreasing of diesel motors, truck, tractors and similar larger motor blocks are being produced in two models by Aeroil Products Co., West New York, N. J. Both models are used in connection with the hot dip alkali cleaning process. Units are insulated and heated from inside by removable immersion tube system with burner in a well within the tank. Equipment includes built-in thermometer, removable grilles, scum gutter, sludge drain, draw-off cock and hinged covers.

Provision is also made for thermostatic temperature regulation from 100 to 550°



F. Equipment may be heated by city gas, manufactured gas, liquefied petroleum gas or kerosene. Thermostats are electrically operated from any lighting circuit.

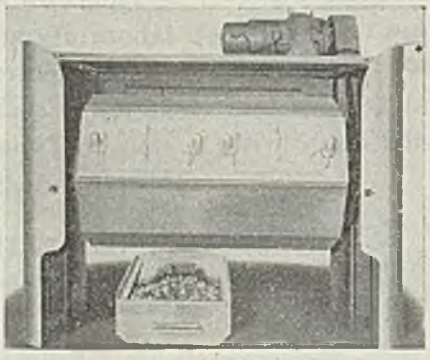
Model 25T features a capacity of 270 gal with a dipping space 30 x 34 x 38 in. Inner shell of this tank is manufactured of 14 gage steel. Model 34T features a dipping space of 36 x 38 x 60 in. deep with a capacity of 355 gal.

Steel 7/1/46; *Item No.* 9531

Finishing Machine

As many as five different size products can be processed simultaneously in a new mechanical finishing machine announced by Sturgis Products Co., Sturgis, Mich. Designated as the model 60, the machine uses the Roto-finish wet process, employing predetermined combinations of chips and compounds to finish and deburr at the same time, in its operation.

Feature of the unit is a cam lock



which enables operator to remove the door easily to load and unload with minimum time. A spring feature in the door lock permits gases to escape.

wise might build up in the cylinder. Also lining of the machine's octagonal cylinder is removable for relining.

Steel 7/1/46; *Item No.* 9173

Blind Rivet Gun

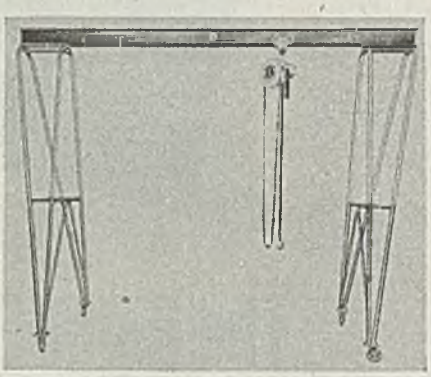
A one hand, plierlike tool, the Cherry Jr. riveter, is announced by Cherry Rivet Co., 231 Winston street, Los Angeles. This light-duty gun installs new blind, tight-clinching, pull through hollow type rivet with a simple pull motion.

Steel 7/1/46; *Item No.* 9579

Load-Handling Device

A mobile load-handling device of 2000 lb capacity which provides a complete load-handling unit on the floor is now being offered by Shaw-Box Crane & Hoist Divisions of Manning, Maxwell & Moore Inc., Muskegon, Mich. Called the Budgit gantry A frame, the handling unit is designed so the I-beam may be mounted on top of the gantry legs, as shown in the illustration, or suspended from them.

Legs of the assembly are of steel pipe welded into rigid one-piece units, and mounted on heavy industrial casters.



Latter are equipped with antifriction bearings and ball-bearing thrusts to insure easy movement and free swiveling.

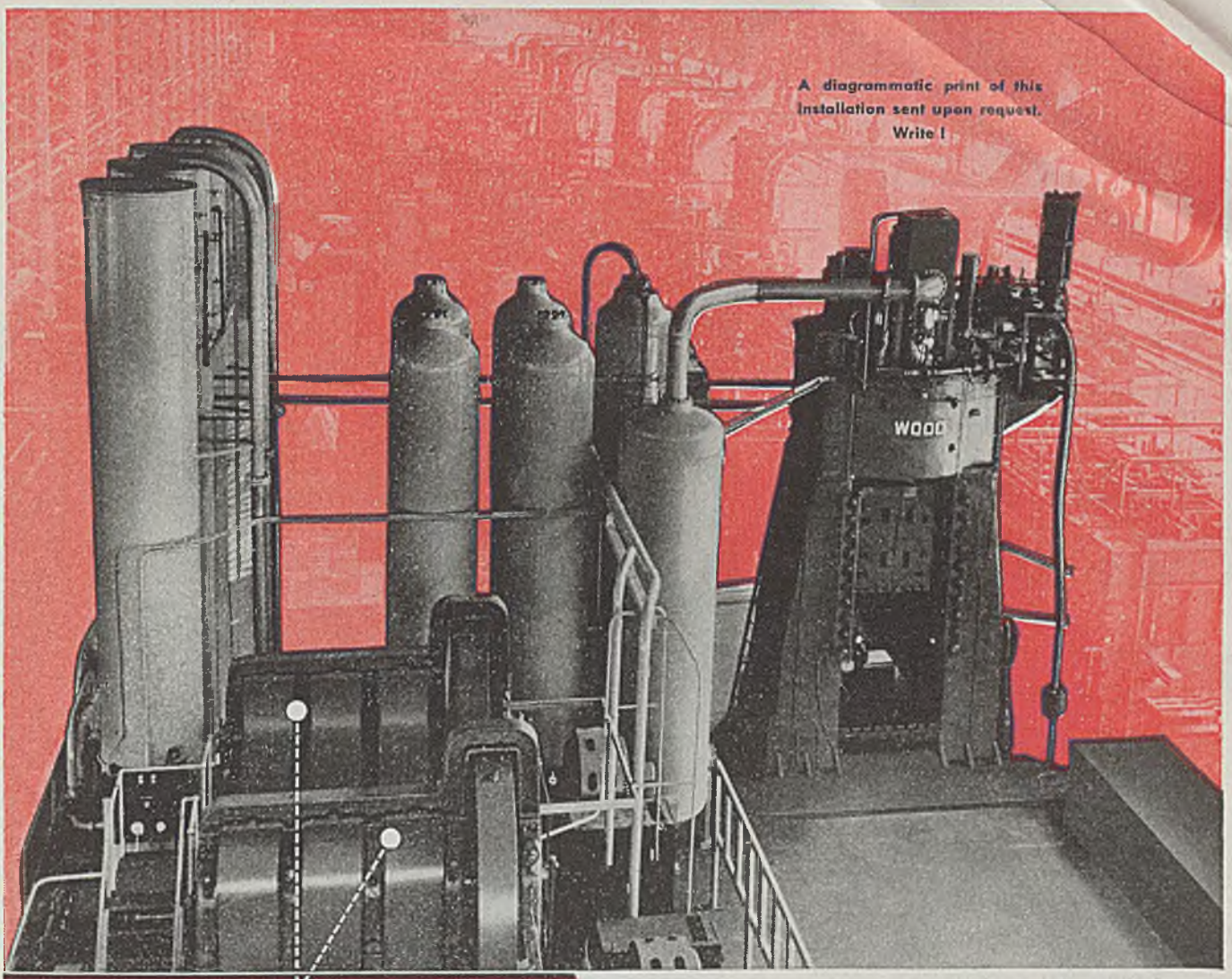
Entire space between gantry legs may be used. The frame with I-beam mounted on top of the legs has an overall height of 10 ft. Either a chain block or electric hoist suspended from the I-beam trolley may be employed as the hoisting unit.

Steel 7/1/46; *Item No.* 9176

Hydraulic Rubber Press

Hydraulic Press Mfg. Co., Mount Gilead, O., announces a new automatic cycle machine for production-molding of both natural and synthetic rubber. A self-contained unit, its base contains pumps and valves for controlling all hydraulic actions. Only connections required to put the HPM Turbojector in

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 134)



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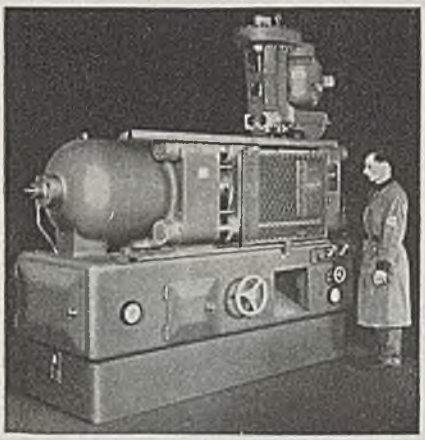
operation are electric power and cooling water.

Machine molds a variety of mechanical parts, such as "O" ring gaskets, rubber bushings and automobile motor mountings. Due to elimination of flash, finishing operations are reduced to a minimum.

Driving mechanism of injection unit consists of a 10 hp, 4-speed electric motor and train of gears, directly con-



nected to injection screw. Rubber in strip, pellets, ribbon or rod form is fed into injection cylinder by feed screw. Action of screw and baffle gears forces rubber into nozzle, and frictional heat produced in injection chamber raises temperature of rubber as high as 300° F. Additional heat is gained at nozzle by employing an electrical resistance band heater.

Maximum nozzle contact pressure during injection is approximately 6000 psi permitting injection pressures as high as 18,000 psi on material to be molded.
Steel 7/1/46; *Item No.* 9344

Flexible Tubing

A new noncollapsible flexible tubing is announced by Warner Bros. Co., Bridgeport, Conn., for portable or semi-permanent ventilation use or handling pressurized air, gases or light solids. Its feature is a spring-steel helix core which causes it to spring out like a jack-in-the-box, to its fully extended length, staying

in this position regardless of whether it is working with pressure or suction.

Construction of tubing is such that inside surface is free of wire ridges. It can be bent sharply without restricting air flow and without use of elbows or special fittings. Standard tube is of long-fiber duck, having a bursting strength of 170 psi. Fabric is fire-resistant and covered with tough, durable thermoplastic. It is furnished in standard diameters from 3 to 16 in. and in lengths of 10, 15 and 25 ft.
Steel 7/1/46; *Item No.* 9367

Pressure Gages

United States Gage Division, American Machine & Metals Inc., 14 Wall street, New York, offers a new line of pressure gages which provides better readability and greater durability. Lines of neutral gray case are heightened by striking ivory dial with contrasting red and black graduations.

Steel 7/1/46; *Item No.* 9242

Hobbing Machine

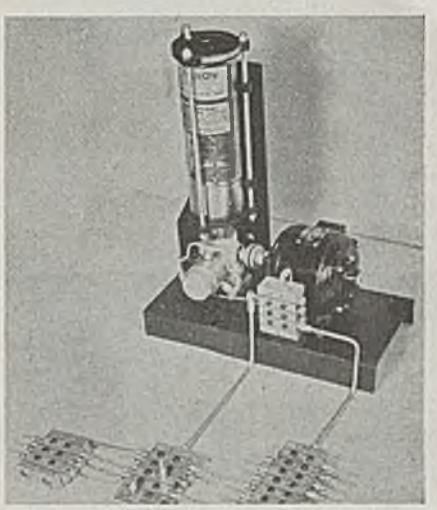
Type A hobbing machine manufactured by Barber-Colman Co., Rockford, Ill., incorporates design changes such as heavy duty work slides, making possible operation at higher feeds and speeds. Heavy duty drive shafts and gears provide minimum torsional deflection and better accuracy in finish.

The index worm in worm-gear case includes top and bottom ball bearings which support worm entirely independent of main index drive shaft, permitting the drive shaft to float.

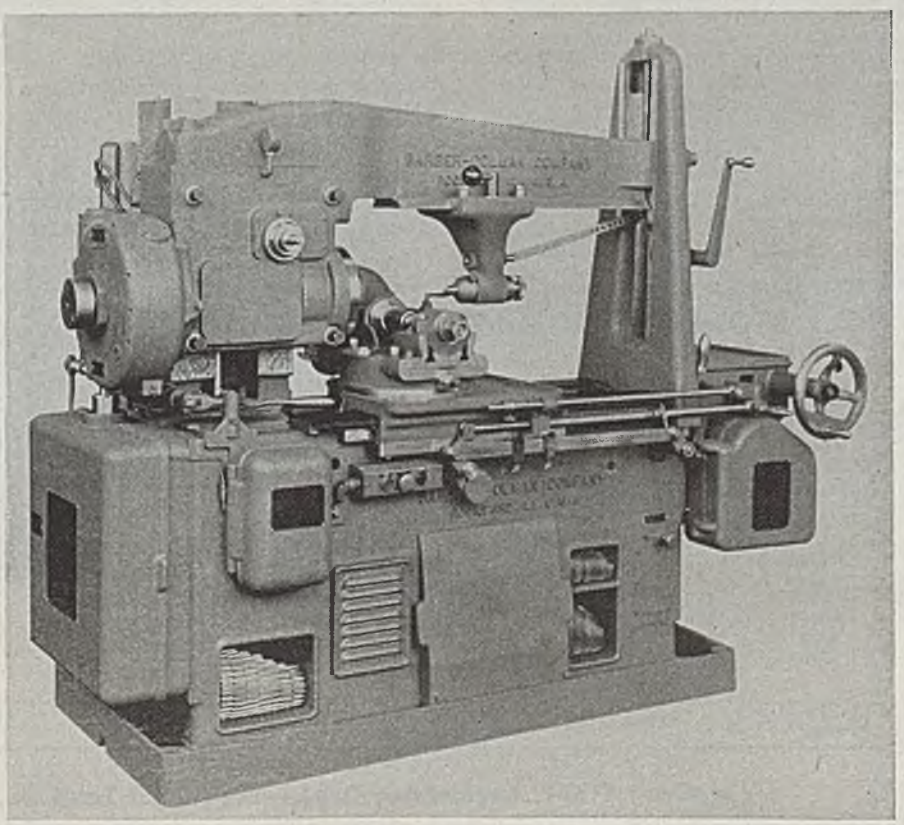
Additional features are simplified coolant system driven by an independent drive motor, and additional of a panel to centralize operation.
Steel 7/1/46; *Item No.* 9328

Lubricating System

A new centralized lubricating system by which bearings on one or several machines may be lubricated manually or automatically from one central pumping point is announced by Trabon En-



gineering Corp., 1814 East 40th street, Cleveland. A master feeder measures and distributes lubricant to subsidiary feeders located at convenient points on machinery. Each subsidiary feeder measures and distributes its flow to bearings it serves. Under-lubrication is impossible as each piston operates progressively



(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 134)

INDU

...mplete its full stroke before ... of grease can proceed to next ...aring piston. From two to 22 bearings can be served by a single feeder, each bearing having a measuring piston.

Widely varying bearing sizes may be serviced through a wide variety of feeder section sizes. System is effective for continuous oil feed or intermittent grease or oil lubrication.

Steel 7/1/46; *Item No.* 9388

Chemical Extinguisher

A new chemical extinguisher designed to protect the user's equipment installations is announced by Pressurelube Inc., 609 West 134th street, New York. Called All-Out, it performs effectively under all

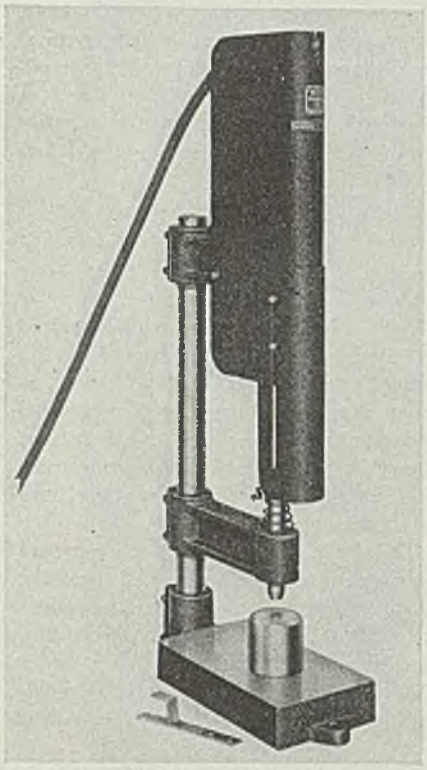
climatic conditions, in extreme temperatures and in presence of winds or drafts.

The dry chemical is ejected, under pressure, in a flat stream that separates flame from burning material, instantly forming a dense, fire-smothering cloud over flaming area to a distance of 18 ft. On hot metal surfaces the chemical forms an insulating film, guarding against reflash.

Steel 7/1/46 *Item No.* 9263

Impact Air Hammer

Mead Specialties Co., 4114 North Knox avenue, Chicago, announces a new air-power impact hammer capable of performing a wide variety of operations. An outstanding application is multiple piercing of large metal sheets, either before or after forming.



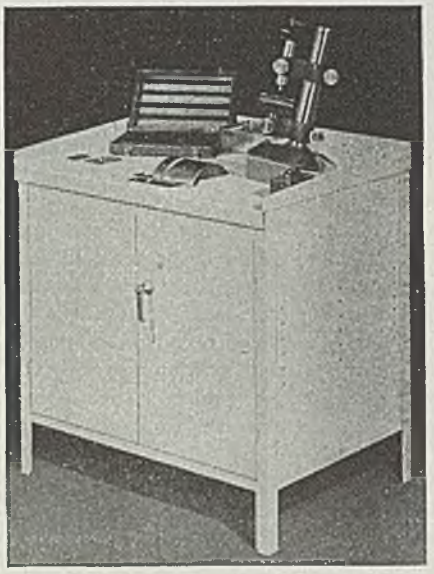
There is no specific limit to size of sheet or number of holes that can be pierced in one operation, as various size tables and multiple machine mountings are possible. Machine may be operated in any position. Ram delivers a blow equivalent to 4000 lb pressure, but can be adjusted to only a few ounces.

With attachments, hammer is adaptable to up-setting rivets, blanking out soft materials with knife dies, light coining and forging, and stamping letters on plastics and brass, bronze, aluminum, and steel.

Steel 7/1/46; *Item No.* 9293

Lapping Machine

Model 100 centerless lapping machine announced by Size Control Co., Chicago 44, makes possible finishing of less than 2 microinches. Requiring no setups,



machine has a vibrationless drive from a ½ hp, 110 alternating current motor. Cabinet is equipped with coolant tray and lock.

Steel 7/1/46; *Item No.* 9437

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

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

9234	9273	9242
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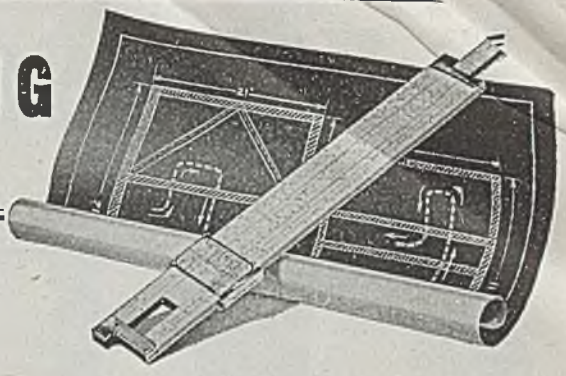
OVEN ENGINEERING NEWS



Safety IS First In All IOE Installations

Absolute Safety, secondary only to production

The Industrial Oven Engineering Company believes that production can reach its maximum only when the safety of personnel and equipment parallels in importance, any production objective.

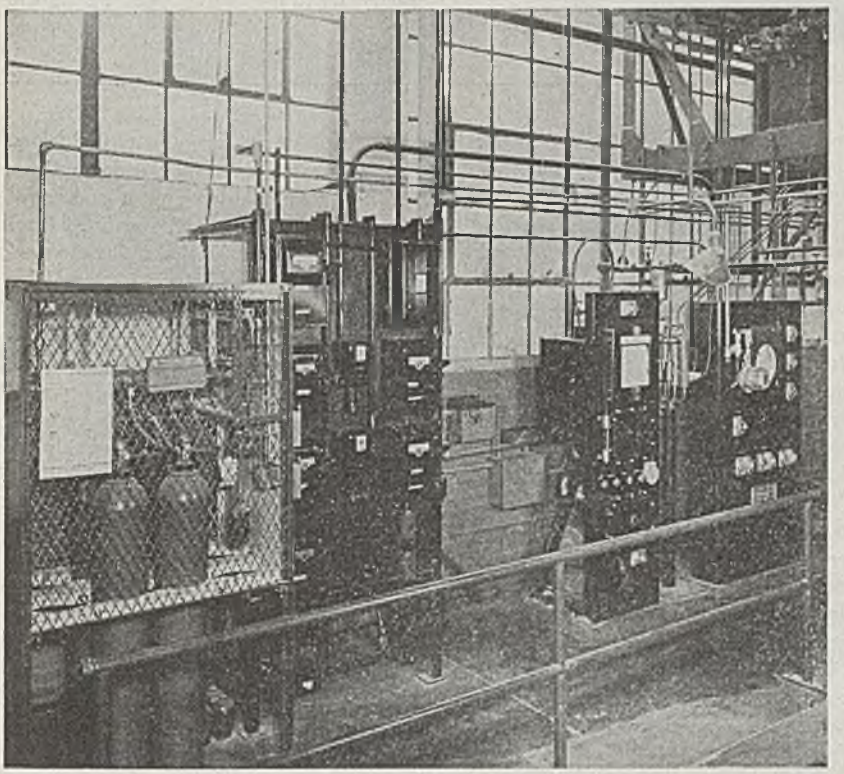
Here is an illustration of a four-panel group of safety devices. Although the illustration covers a coated fabric system, the same basic engineering considerations are typical of all **IOE** explosive installations. Here's how they work; here's how they protect men and machines.

Starting from your left, the first wire cage panel is a Carbon Dioxide fire control unit in case of a quick temperature increase, which produces a sudden discharge of CO_2 into the enclosed oven volume work space, and along the paths of material travel.

The equipment consists of fully automatic, heat-actuated releases positioned in strategic locations in the dryer equipment. Fire is almost immediately smothered out before it has a chance to do damage.

Panel No. 2, second to the right, is an AC service panel. On this panel are all the motor controls, disconnecting switches, voltage protectors, and other equipment essential to the control of the electric power system.

Panel No. 3 is a "tattletale" unit giving visible, continuous record of the concentrations of the explosive mixtures and vapors at multiple points throughout the drying system. Explosive gas samples are thermally appraised for explosive content, and the results are continuously recorded for absolute operational evidence. The continuous analyzer—as this unit is called—is interlocked into the system and is equipped with audible and visible danger enunciators.



Panel No. 4, last in line to the right, is the explosion-proof temperature and main operating panel; combining all the operating stations necessary to give single station operating control to the unit. It consists essentially of recording temperature control at several places throughout the drying oven. In addition to this multi-point control, panel-type enunciator lights give visible notification of the operating condition of the unit. Push-button control of all motors, valves, accuators, and relays, incidental to the system's safe operation are incorporated in this board.

Yes, safety is essential. Without it production lags. All Industrial Oven Engineering installations are designed to eliminate the hazards of explosion and mechanical failure.

WE MAKE: Cord Coating, and Cable Lacquering Systems • Complete Fabric Cementing Systems • Continuous Takeup and Payoff Stands • Dip Tanks • Drying Ovens • Creel Rooms • Constant Speed, Constant Tension, Extrusion Takeup Machines for Plastic Resin Hose, and Coated Cords • Rubber Tubing, V-Belt Cord and other continuous Materials

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(This is Number 26 of a series. Reprints of previous advertisements sent on request.)

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EYE SAFETY *Campaign*

A CAMPAIGN designed to make factory employees safety conscious by showing them visually what it means to be blind is being inaugurated by Willson Products Inc., Reading, Pa. Stating that eye accidents cost employers an average of $2175 each, the costliest of all industrial accidents, the company is expanding its eye safety campaign program to include all types of manufacturing and industrial plants.

Employee education is by means of a new poster program featuring Kodachrome color pictures signifying "what *you* see" and a large black space for "what a blind man sees." A handy pocket mirror is also furnished by Willson. Looking in one side employees see their own image. When they look in the opposite side, they see a black space — exactly what the blind "see" all of the time.

Use of Scrap

(*Continued from Page* 122)

3000 or 4500 lb are used every third charge.

Scrap frequently is charged on the extra load. This is due partly to the fact that the extra load often is lighter than the rest of the loads and it is more convenient to line up a filling sequence this way. Another reason for this is the undesirability of blowing borings and turnings out of the furnace top together with the flue dust. Fine turnings in the flue dust are extremely annoying. The percentage of turnings charged, which is eventually carried out of the furnace with the flue dust, is much lower than the percentage of ore lost in the flue dust.

Nevertheless turnings clog up dust-catcher discharges and gas washers, form the starting point for build-ups in water flumes and are particularly destructive at the filters of Dorr thickeners. By charging borings and turnings on the extra load in a filling order Extra Load OSC/, some ore is dumped on top of the turnings which holds them down; the same can be achieved in a somewhat less effective manner by split skips, the ore on the bottom, the turnings on top. This has proved to be helpful especially when the ore is sticky, though it is not 100 per cent effective. The frequently employed method of charging scrap on stone can be used without harm for furnace scrap (runner scrap, stickers, mixer scrap etc). These materials are not light enough to enter the flue dust.

Another annoying feature especially of cast iron borings is that they frequently contain copper. There have been cases where the iron made from a burden of less than 10 per cent borings contained 0.150 per cent copper. This is far above what the open-hearth department is willing to accept. Magnetic separation of the copper has been tried but has been proven unnecessary as long as the borings are handled over a large enough stockpile. No copper contents of over 0.040 per cent have been experienced when unloading and spreading all borings and turnings over a large stockpile.

Must Guard Against Fire

The stockpile of borings and turnings must always be watched for fire. Spontaneous combustion frequently takes place in a pile of oily borings or turnings. Extinguishing the fire is a risky affair and usually is not practiced. The hot spots should be dug out and the material spread over a wide area where the fires can burn themselves out. The wide area usually will be an ore pile to avoid loss.

A few years ago when the demand for iron was particularly high a successful attempt was made to recover iron from the cinder runners. The iron is recovered in depressions in the bottom of the cinder runners. The same are up to 8 ft long and have a slope of about 45° at the inlet and 70° at the outlet. They are about 18 in. deep. The recovered iron pigs weigh up to 150 lb. The iron thus recovered is considerably higher in silicon and sulphur than the regularly tapped iron: Silicon 3 to 4 per cent and sulphur 0.100 per cent. The iron is not suitable for open-hearth use but can be recharged to the blast furnace. It is kept in the same bins with runner and mixer scrap.

Recovered scrap was originally charged the same way as other furnace scrap. Whenever a sufficient amount was accumulated borings and turnings were taken off one furnace and furnace scrap was charged instead for a few days, at the rate of 1000 lb per charge or whatever the amount of borings had been. This used to work excellently.

When recovered scrap was first used the furnace in question ran cold periodically. No explanation for this was found and it was several months before the recovered scrap was suspected. A study of operation during the summer of 1941

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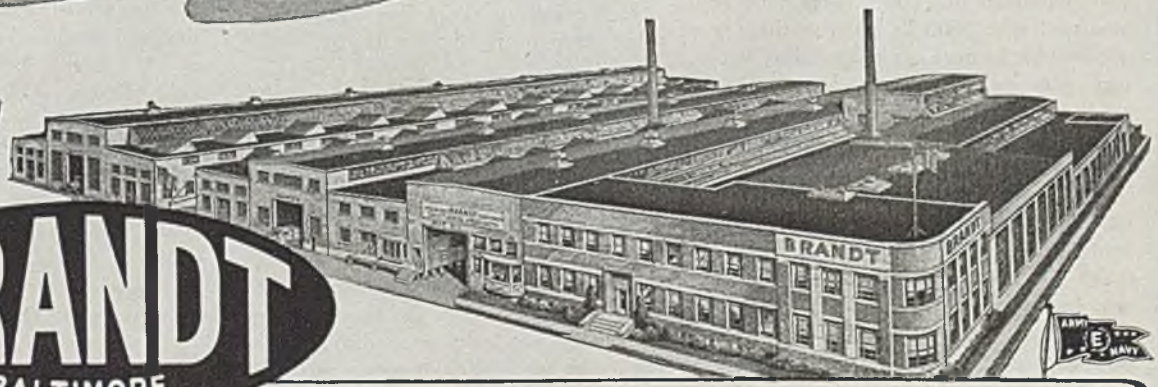
**Our capacity to serve you now is of course dependent upon prevailing unsettled conditions.*



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however made the detrimental effect of the recovered scrap evident.

On June 17 and 18, 2000 lb of furnace scrap were used instead of borings. Average iron analysis for June 17 was: 1.04 per cent Si, 0.027 S; on June 18, it dropped to 0.66 Si, 0.030 per cent S.

On June 25 and 26 the same change was repeated. On June 26, there were casts with 0.77 per cent Si, 0.035 S and 0.70 Si and 0.034 Si. Furnace scrap was again charged on July 18 and 19, and the sulphur again came up to 0.034 per cent. More cases of a similar nature occurred during the following three months. In seven out of nine cases when recovered scrap was used a cold furnace resulted.

Three possible reasons for this were advanced:

1. The fact that slag adheres to the recovered scrap. This is unlikely as a cause since considerable amounts of sand adhering to runner scrap do no harm.
2. That the big lumps upset an orderly gas flow.
3. That the big lumps chill the hearth of the furnace.

A combination of the last two is probably the true reason.

In order to avoid the periodical upsets of the furnace the following procedure was adopted: 3600 lb of furnace scrap (recovered scrap, runner scrap, and mixer scrap all in the same bin) are charged with every twelfth charge. This amounts to 300 lb per charge which should be kept on the furnace steady. This is less than one third of the previously charged minimum amount of 1000 lb per charge. It coincides with the average amount of furnace scrap available. In case there is too much scrap it has to be put on some other furnace. The amount on any one furnace is never increased over 3600 lb. In case there is not enough furnace scrap available, borings can be substituted, but borings never can be replaced with furnace scrap. This procedure was violated once by a relief stockhouse foreman who replaced borings with furnace scrap. Twelve hours later the furnace was cold: the iron analysis was 0.660 per cent silicon and 0.040 per cent sulphur. This was the only instance of a cold furnace due to the use of recovered scrap since the above procedure was worked out.

When and on Which Furnace Should Scrap be Charged?: Standard procedure for adding and subtracting scrap for many years has been ± 500 lb of scrap, ± 200 lb of ore, or some multiple of these amounts. This has been successfully applied to all Inland furnaces and scrap-ore changes using this method have always been smooth, that is, the furnaces did not heat up or go cold on this change.

This implies the following:

1. We replace 200 lb of ore with an average iron content of 50 per cent, i.e. 100 lb Fe in form of ore, with 500 lb of scrap, i.e. 500 lb Fe in form of scrap. The coke charged remains the same, therefore it takes five times as much coke to produce 1 ton of pig iron from ore than it takes to produce 1 ton of pig iron from scrap. Or, if it takes 1600 lb of coke for 1 ton of pig iron on 100 per cent ore practice and the coke needed to melt a ton of scrap is 320 lb, it should take 1472 lb of coke per ton of pig iron when using 10 per cent scrap on the burden.
2. Since 1 ton of scrap replaces 0.4-ton of ore of 50 per cent Fe content we should produce for each ton of scrap taking the place of ore 0.8-ton of iron in addition to the iron produced on straight ore practice, that is, the tonnage increase is 80 per cent of the scrap used in place of ore.

It has also been assumed throughout the years that for each ton of scrap charged ½-ton of iron would be produced over and above iron produced with straight ore practice. This does not check with statement 2 just developed. Several possible explanations for this discrepancy follow:

1. The assumption of getting additional iron at the rate of 50 per cent of the amount of scrap charged in place of ore which was based originally on a comprehensive test run in 1929 and 1930, may not be correct in all cases or conditions may have changed in some way in the meantime.
2. The difference may be explained by increased flue dust production when using scrap.
3. We may average less wind when using scrap.

It must also be considered that when making burden changes only small amounts of material are involved so that a theoretically wrong method of making the changes may remain undiscovered and work well.

It will now be attempted to examine the various and seemingly inconsistent cases in which borings and turnings were used in the last few years and to discover the reason why different results were obtained on the several occasions. Furnace scrap is not included in this part of the study since small amounts only were used and it therefore could not have any appreciable effect on pig iron production or coke consumption.

Results of the test referred to above were as follows:

Date	Production, nt/day	Scrap, tons/day	Coke, lb/ton iron
Without Scrap			
Nov. 1929	793	...	1714
Dec. 1929	783	...	1696
Jan. 1930	797	...	1694
Feb. 1930	792	...	1709
Average	791	...	1703
With Scrap			
Mar. 1930	858	129	1511
Apr. 1930	850	115	1488
May 1930	869	128	1497
June 1930	836	116	1585
Average	853	122	1520

This was an increase of 62 tons of iron on 122 tons of scrap. Average wind without scrap was 50,032 cfm. Average wind with scrap was 49,241 cfm.

At present 54,000 cfm. wind is considered full wind for the furnace in question. At the time of the test, the coke screening system had not been installed, and it is therefore permissible to assume that the amount of wind blown was full wind or close to that. This is indicated by the fact that there was somewhat less wind with scrap and that the flue dust production was 225 lb/ton of pig with scrap and 220 lb/ton of pig without scrap, in spite of the lower wind. The coke ash was 8.65 and 8.75 per cent during these periods which means that the physical qualities of the coke probably were not too good; this is another indication that the furnace probably operated with full wind, but without special pushing.

Assuming that in both cases it took 1703 lb of coke to convert the ore to iron, the coke requirement for melting 1 ton of scrap would have been 532 lb.

When iron demand in 1940, became greater due to the war, the question of the use of borings and turnings was re-examined. Data for two furnaces, Nos. 4 and 5, were considered.

No. 4 furnace did not use turnings during September, 1939, and produced 913 tons per day. During October, 1939, the furnace used 67 tons of turnings per day and produced 945 tons, an increase of 32 tons, which is close to the 50 per cent figure. Coke consumption was 1536 and 1452 lb respectively. The wind was 54,774 cfm in September, 54,790 cfm in October. This is just a little below full wind (56,000 cfm). No appreciable differences in flue dust production was noticed. Calculated coke consumption to melt the scrap was 351 lb.

At the same time No. 5 furnace's performance for the period from January to April, 1940, was considered. During this period borings and turnings repeatedly were put on and taken off the furnace. For the four months the furnace averaged 1147 tons per day without scrap

DATA SHOWING BEHAVIOR OF NO. 6 FURNACE

Date, 1945	Production, nt/day	Scrap, tons/day	Coke, lb/ton iron	Dry Dust, nt/day	Wind, cfm
6/1-6/19	1202	123	1490	54	67,023
6/20-7/11	1189	60	1545	52	67,742
7/12-7/31	1204	0	1565	37	67,930

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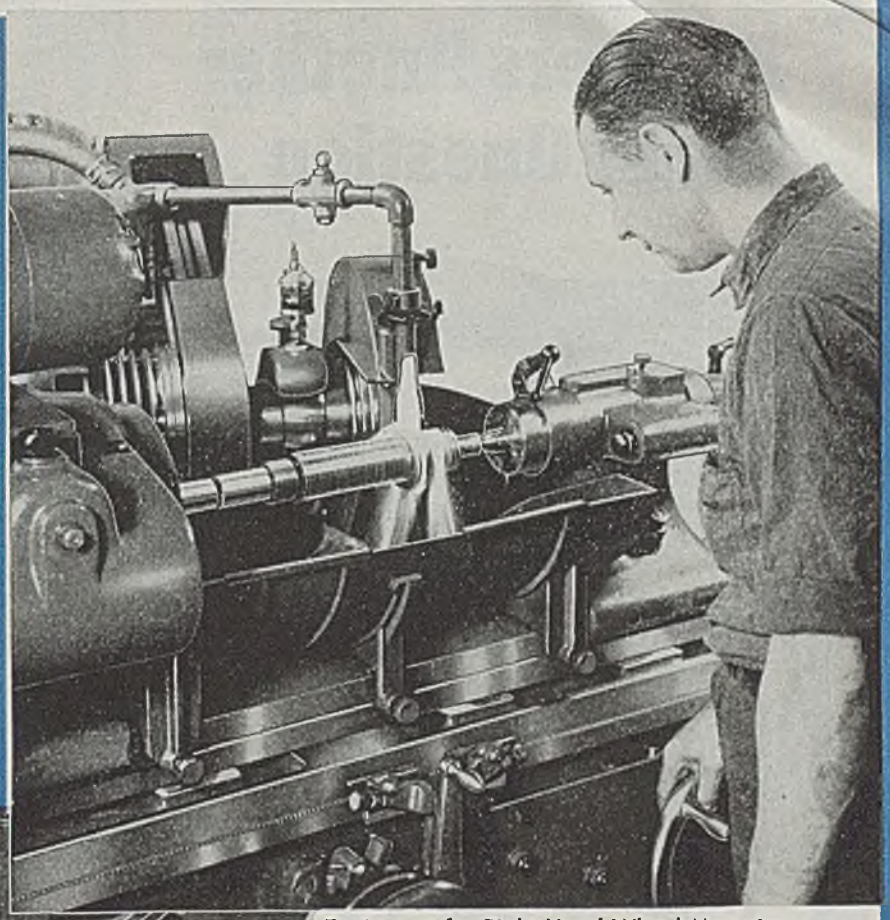

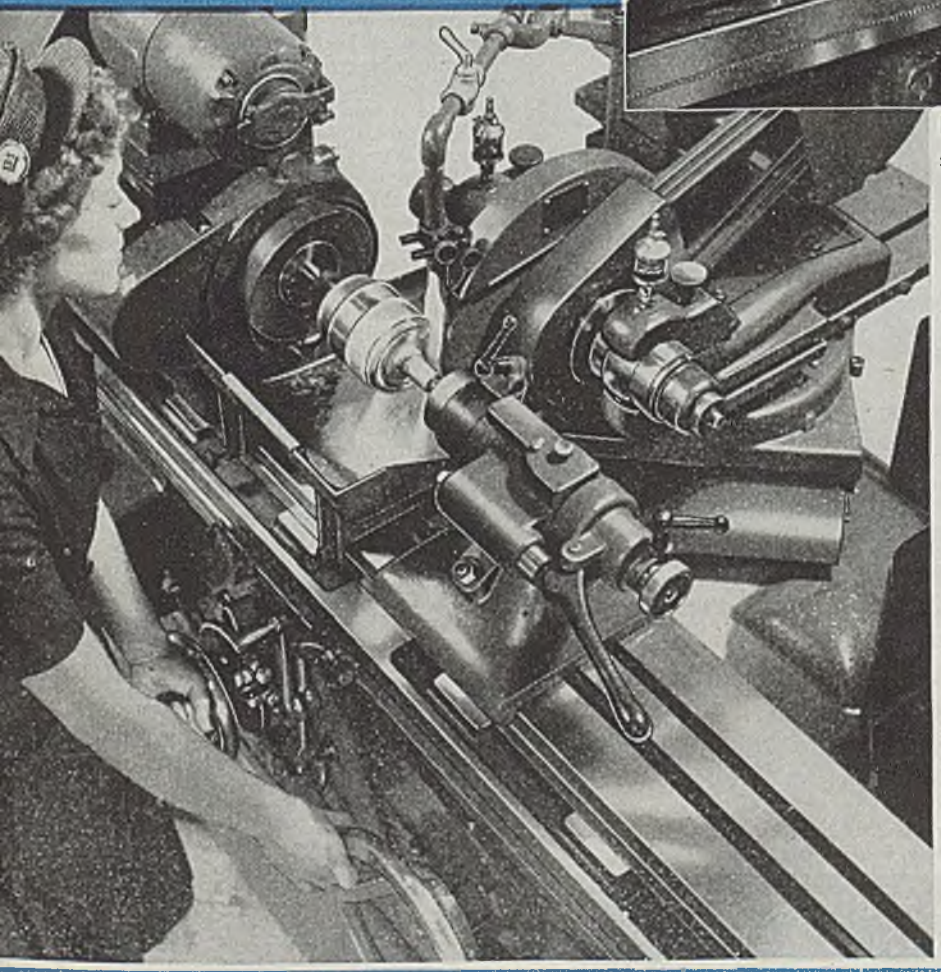

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and 1213 tons with 94 tons of scrap per day. This means that the 94 tons of scrap increased production by 66 tons per day, or 70 per cent of the scrap charged in place of ore showed up as extra iron produced. The calculated coke consumption for melting the scrap was 570 lb (1486 lb of coke with scrap). The wind throughout the period was between 62,000 and 63,000 cfm which is far below full; 69,000 cfm have been blown repeatedly without trouble. Flue dust production was low throughout the period. The coke ash during the last two periods was around 5.60 per cent.

During the peak production of 1942 and 1943 borings and turnings were used all the time and no special tests were conducted. Results with varying amounts of turnings in the burden fit well into the picture, and are follows:

No. 1 furnace produced 951 tons on 0 to 40 tons of turnings per day, 970 tons on 41 to 80 tons per day, and 989 tons on over 80 tons per day, or an increase of a little less than 50 per cent of the scrap charged.

No. 2 furnace did not use scrap. The reason for this will be discussed later.

No. 3 furnace used scrap successfully. The results however are not comparable, since the amount of domestic coke charged varied considerably.

No. 4 furnace produced 919 tons on 0 to 40 tons of turnings per day, 933 tons on 41 to 80 tons per day, and 949 tons on over 80 tons per day, or an increase of less than 50 per cent of the scrap charged.

No. 5 furnace had prolonged kicking spells and it was hard to keep full wind on the furnace. She produced 1243 tons with 0 to 40 tons of scrap per day and 1255 tons of over 80 tons per day. No comparable figures for between 41 and 80 tons of turnings per day are available. The tonnage increase was far below 50 per cent of the scrap charged.

No. 6 furnace did not use any appreciable amount of borings and turnings during this time.

All furnaces were blown full wind. This was done without too much difficulty everywhere except on No. 5 furnace where the above mentioned kicking spells occurred and the tonnage was irregular. The furnace was over efficient, had too low a coke consumption, too few open voids, and could not take the wind. Removing scrap helped[1].

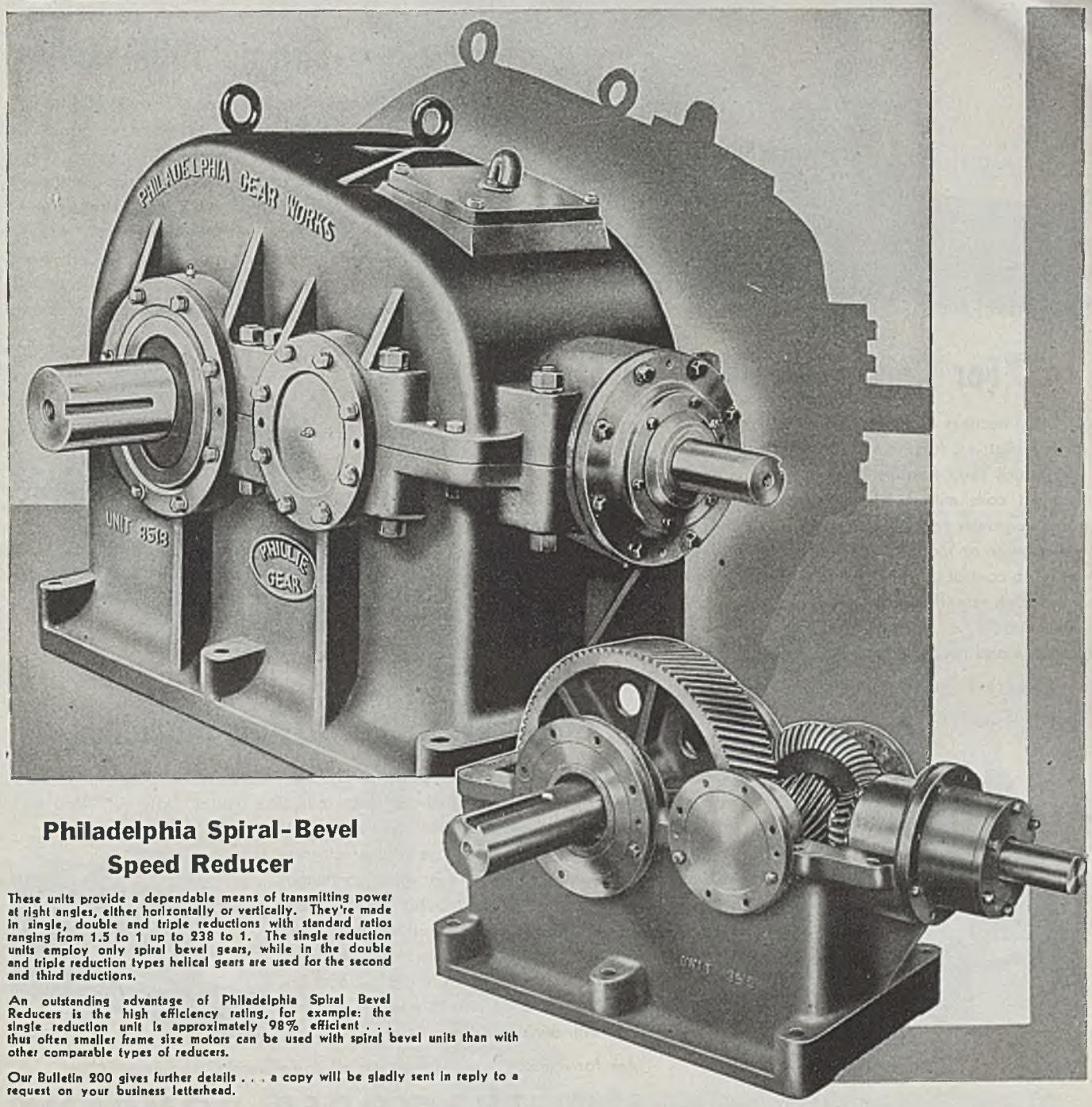
The operators were alarmed by this failure on No. 5 furnace and therefore a test was conducted on No. 1 furnace during December 1943 and January 1944. The results were as follows:

Date	Production, nt/day	Scrap, tons/day	Coke, lb/ton iron	Wind, cfm
12/14-12/27 ..	969	156	1468	53,585
12/28-1/10 ...	888	0	1643	53,942
1/11-1/31	961	107	1501	54,685

Comparing the first period with the

[1] "Observations on Gas Flow and Coke Consumption", STEEL, Aug. 20, 1945.

A Right-angle drive with a VERY HIGH EFFICIENCY



Philadelphia Spiral-Bevel Speed Reducer

These units provide a dependable means of transmitting power at right angles, either horizontally or vertically. They're made in single, double and triple reductions with standard ratios ranging from 1.5 to 1 up to 238 to 1. The single reduction units employ only spiral bevel gears, while in the double and triple reduction types helical gears are used for the second and third reductions.

An outstanding advantage of Philadelphia Spiral Bevel Reducers is the high efficiency rating, for example: the single reduction unit is approximately 98% efficient . . . thus often smaller frame size motors can be used with spiral bevel units than with other comparable types of reducers.

Our Bulletin 200 gives further details . . . a copy will be gladly sent in reply to a request on your business letterhead.

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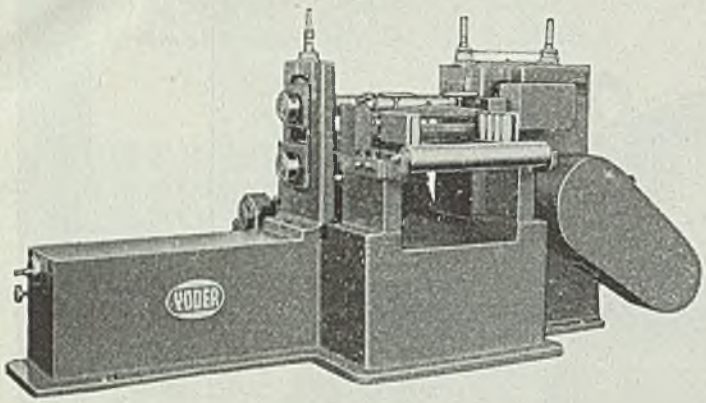
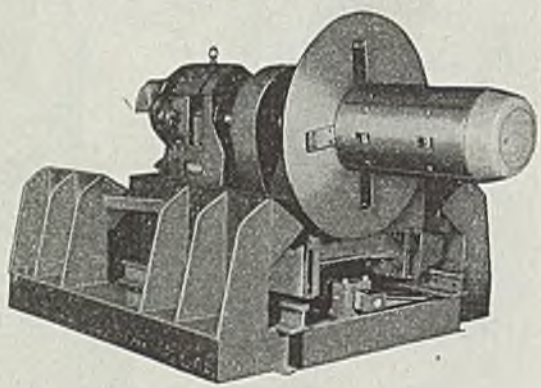


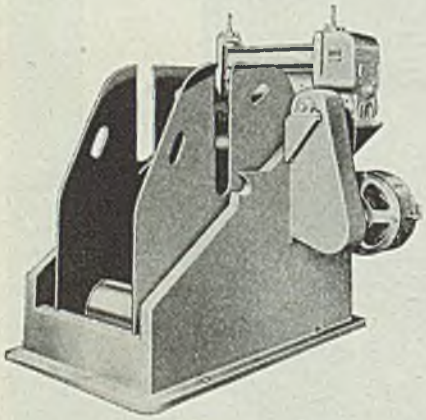
*For Gang-Slitting Mill Widths

YODER metal slitting equipment converts mill widths 12" to 120" into thousands of production sizes, handling shim stock or heavy gauges with equal efficiency. Easy loading, precision slitting throughout the run, convenient recoiling and unloading of slit stock, high speed, one-man control and other features make this the most widely used and best liked equipment in the industry. Coil, sheet or combination slitters, edge trimmers or complete slitting lines available to fit every slitting or trimming requirement.

*For Coiling or Uncoiling Strip

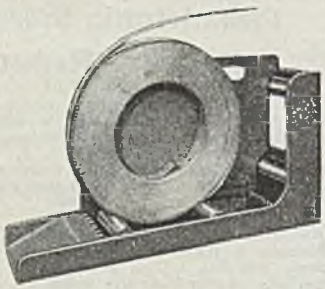
YODER uncoilers and recoilers virtually set a standard in the metal handling industries, for the very practical reason of the ease and efficiency with which they handle any type of metal from the extreme light to heaviest coils milled. Sturdy roller bearings assure smooth feed and minimum power requirement in all sizes. Expanding drum types available with power or manual expansion. Pull-out types have adjustable drag brake to control unwind. Wide variety of powered types include a patented high speed double drum recoiler. Swivel mounting of drums permits unloading of finished coils while machine is winding next load. Yoder uncoilers and recoilers are designed for single or gang coiling.





*For Coil-Feeding Processing Machines

YODER coil boxes, too, are widely popular wherever coils are handled. Large sizes may be had with power driven pull-out pinch-rolls. The Yoder "idle roll" coil box affords the simplest and in many cases the best mounting of coils for automatic feeding in such production as blanking, stamping roll forming or other continuous processing. The coil rides on tubular steel rollers, mounted in sealed, grease packed ball bearings. (See view at right). Nine sizes with adjustable sides provide strip capacities from one inch to 38", 2,300 lbs. to four ton capacity. All feed smoothly to the end, are easy to reload with minimum down time.



Ask for Bulletin G-451 describing all Yoder special machinery.

THE YODER COMPANY

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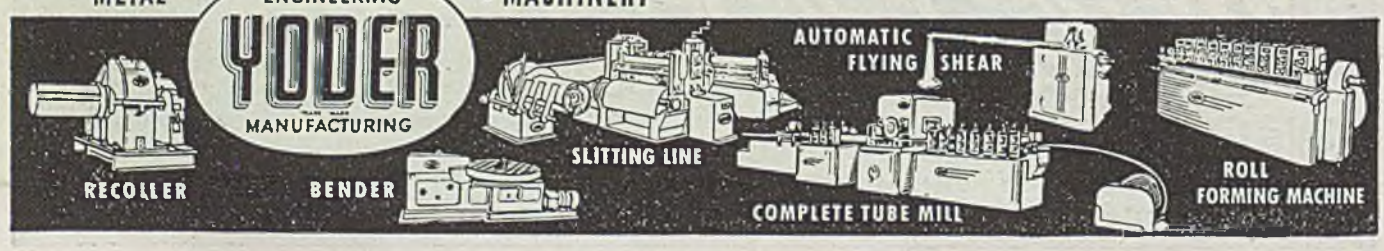


period when no scrap was charged there was 81 tons more production on 156 tons of scrap than there was when no scrap was charged, or an increase of 52 per cent of the scrap. In the third period the increase was 73 tons on 107 tons of scrap or 68 per cent. The coke consumption for melting the scrap can be calculated at 556 lb and 368 lb, respectively. This was not full wind; the coke ash was around 6.7 per cent. Full wind on No. 1 furnace is 57,000 cfm.

During 1944 and 1945 the linings of the Inland furnaces became old and also the coke ash climbed fast, stability and hardness of the coke were going down. This led to serious difficulties in keeping up full wind. The furnaces had to be pushed, and kicking was more frequent than during the year immediately preceding.

Behavior of Nos. 6 and 3 furnaces during June and July, 1945, is an excellent illustration of the use of scrap under the changed conditions. Data covering the behavior of No. 6 furnace is shown in the table on page 138.

In this case there was actually less iron produced with scrap than without scrap. The furnace was restless, was kicking and the wind had to be curtailed. Comparing the first period with scrap with the period without scrap, it took 830 lb of coke to melt the scrap; in the second period it took 1169 lb of coke. These amounts are exorbitant. We have here an illustration of coke being necessary primarily for the creation of voids rather than for melting or reducing purposes.

Practice Was Improved

During the first period the low coke consumption, partly caused by the use of scrap, held down the wind and resulted in high flue dust production. Later this was improved by gradually removing the scrap. The wind ordered throughout the two months in question was 68,000 cfm. During the first period the furnace was an average of 977 cfm short, in the second period 258 cfm and in the third period only 70 cfm. This means that with 1545 lb coke consumption four times as many wind cuts and with 1490 lb coke consumption 14 times as many wind cuts were necessary than there were with 1565 lb.

During the same period the performance of No. 3 furnace differed markedly from the performance of No. 6 furnace.

No. 3 furnace was relined and was blown-in again on June 6, 1945. She is a 17 ft 3 in. hearth diameter furnace and during July, 1945, her first full month of operation, she averaged 824 tons per day, just under her all-time record. Borings and turnings used were 98 tons/day. However, the coke consumption was high

at 1629 lb per ton of iron, and so was the flue dust production. Yet, there was no kicking and the operation was extremely smooth on top wind.

Unfortunately this outstanding operation cannot be compared with the following months because various interruptions of operations occurred and also because it became necessary to use various amounts of domestic and foreign coke. The performance in July was so excellent that a beneficial influence of the borings and turnings cannot be denied.

The contrast with No. 6 furnace is striking and it is obvious what was different, namely the coke consumption.

It is believed that this last instance can be considered as the final proof for the picture which gradually became apparent during the years.

The theoretical extra tonnage to be produced when charging scrap in place of ore is 80 per cent of the amount of scrap charged. Use of scrap usually results in increased flue dust production and some curtailment of wind, cutting down this recovery. However, in cases of low wind up to 70 per cent actually have been recovered. In case of full wind—provided the furnace takes the wind without much force and provided there is no kicking—the recovery is around 50 per cent. In case of forced operation the recovery is lower and there are actually cases where scrap becomes detrimental.

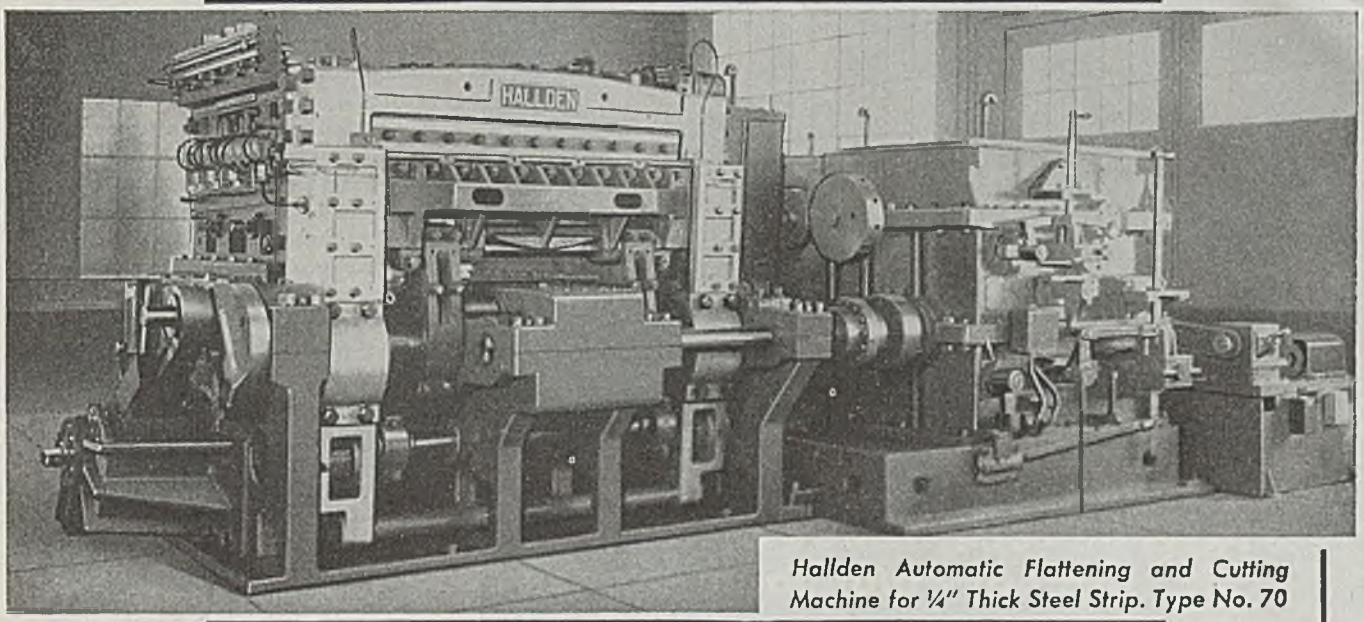
Difference Is Negligible

The difference in coke consumption for melting the scrap in the cases considered was negligible: 446 lb/ton for 50 per cent recovery, 469 lb/ton for high recovery. For low recovery the coke rates are extremely high.

These results are no surprise to the blast furnace operator aware of the problems of gas flow. The blast furnaces using Lake Superior ore usually have just enough voids in their stock to carry full wind. Anything tending to cut the voids such as domestic coke or a drop in consumption of the void-forming furnace coke will bring about difficulties in blowing wind, increased kicking and increased flue dust production. Bringing down the coke consumption by the use of scrap is one way to upset the furnace. On the other hand, when a furnace operates smoothly no matter whether this is caused by high coke consumption, low wind rate or anything else, the scrap recovery will be excellent.

No. 2 furnace at Inland for many years has refused to operate with turnings. In 1934 a detailed report was prepared discussing the fact that the furnace, in contrast to all other furnaces, starts to kick violently as soon as turnings are charged. Another attempt to use turnings on this stack was made in 1941, but it also ended

Automatic shears.... by HALLDEN



Hallden Automatic Flattening and Cutting Machine for ¼" Thick Steel Strip. Type No. 70

Here's a machine that takes the strip metal from coil, hot bed or trimmer, flattens it, cuts it accurately into pieces of pre-determined length, and piles the pieces neatly upon a conveyor, table or truck. It is a triumph of Hallden engineering.

Consisting of two units, a flattener and a flying shear, it is driven in combination and so timed that during the period of cutting off, the shear moves forward with the exact speed of the metal. The flying shear is a rocker type guillotine design, constructed of a special alloy welded steel. Shear knives are standard type. Each blade has four cutting edges; top and bottom blades are interchangeable, and both blades always move in a mutual plane.

The flattener consists of a 10-roll flattener with two pairs of feed rolls, each roll driven through a coupling. Flattening rolls are constructed of an alloy chrome steel, hardened and ground to a sclero-scope of 90. All rolls are easily removed for grinding.

The machine is designed to cut the metal lengths to an accuracy of 1 64 of an inch. Heavy and rugged, with a low center of gravity, it stands up under continuous service without any attention other than oiling. Simple, rugged and entirely automatic, it is very compact and requires little space.

THE HALLDEN MACHINE CO.

THOMASTON, CONNECTICUT

SALES REPRESENTATIVES:
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in failure; the wind had to be cut so low that, as in the case at No. 6 furnace, less iron was produced when using turnings, than when not using them. No. 2 furnace always has been a kicking furnace which is seemingly inconsistent with the fact that she also has been a high coke consumer.

It is believed that Owen Rice's paper[2] explains this discrepancy. Rice, who tabulated operating data from a large number of blast furnace plants, found that the coke consumption of a blast furnace is the higher the smaller the ratio of working volume over effective hearth area. This seems logical in the light of the statements just made. If this ratio is low there has to be a constriction of the gas stream going up through the furnace at some level. On this level the stock undoubtedly will be short of voids. Kicking will result. One way by which the furnace may remedy this condition is the use of much coke.

No. 2 furnace at Inland has a ratio of working volume over effective hearth area far lower than any of the other Inland furnaces. It may be assumed therefore, that even with high coke consumption this furnace is working on the edge all the time and consequently scrap will upset her completely.

The foregoing findings indicate where to use borings and turnings if increased tonnage is desired. The answer is simple: On the smoothest operating furnace. The best risk naturally will be a furnace on which the wind has been cut deliberately. Borings and turnings definitely should be kept away from a furnace which does not take her normal top wind.

Whether it is economically sound to use borings and turnings can easily be calculated when the cost of all necessary raw materials, the amounts of iron produced in each case and the value of the pig iron are considered. The results will vary with different conditions but invariably the highest prices can be paid for borings and turnings where the extra iron production due to their use is the highest.

[2] "Three Blast Furnace Questions", *Blast Furnace and Steel Plant*, Dec. 1945.

Neoprene Impregnated Canvas Glove Offered

A new canvas work glove, impregnated with oil and acid resistant neoprene, is claimed to offer better protection and extra long wear on wet jobs by its maker, Pioneer Rubber Co., Williard, O. As neoprene is joined in permanent bond with canvas, glove is said to give a non-slip grip with its rough adhesive surface. It is manufactured in both a knit and gauntlet wrist and is offered in one standard size.

Berkeley Continuous
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Automatic Longitudinal Seam Welders

If your product is pre-formed of tubular shape, (round, square, regular or irregular) and has a constant cross-section . . . if it's made from 16 gauge sheet steel to 5/16" plate . . . if it's 5" to 36" in diameter and requires a welded longitudinal seam, it will pay you to investigate the "Berkeley" method of application of the flux submerged electric-arc.

Here's what you get with the "Berkeley"

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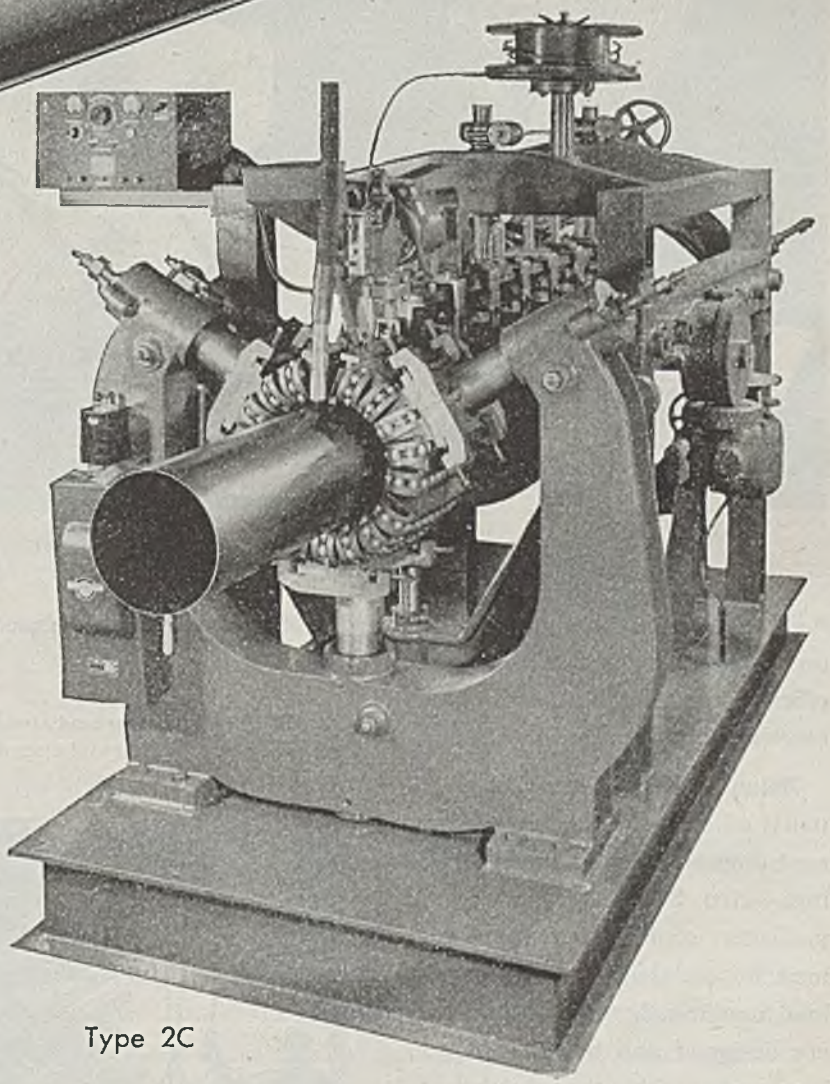
- **A uniform product . . . continuously**
- **Rugged construction for high production and versatile enough for the job shop**

Write us, we will suggest the best type for your requirements.



Type 2C

PENN TOOL & MACHINE CO.
DANVILLE, ILLINOIS

Air-Powered Assembly Tools

(*Concluded from Page* 102)

for much the same reasons as for the air cylinder and piston devices. There is no variation in tightening the work. This results in more uniform accuracy, production is faster, and there is less scrap. The company's punch presses are equipped with compressed air for blank blowers in the interest of safety and, in addition, to better production.

Extensive as the applications are in this factory, requirements for compressed air are fully satisfied by the two air compressors. Each are of 352 c/f capacity, and normal needs are supplied with but one compressor in operation.

Data and photos courtesy Compressed Air & Gas Institute, Cleveland.

Slide-Rule Calculator Aids Boiler Operators

Slide-rule calculator for determining fuel loss, of particular interest to boiler room operators, is offered by Hays Corp., Michigan City, Ind. It is used after the amount of carbon dioxide in the flue gas, temperature of flue gas and room temperature have been determined.

Calculator is based on several fuels of different analyses and a wide range of flue gas temperatures, making it practical for most boiler rooms. Figures on calculator reveal per cent of total heat loss in flue gas. Instructions accompanying calculator show how heat loss can be converted into fuel loss. Calculator is being distributed without cost.

How To Evaluate Jobs

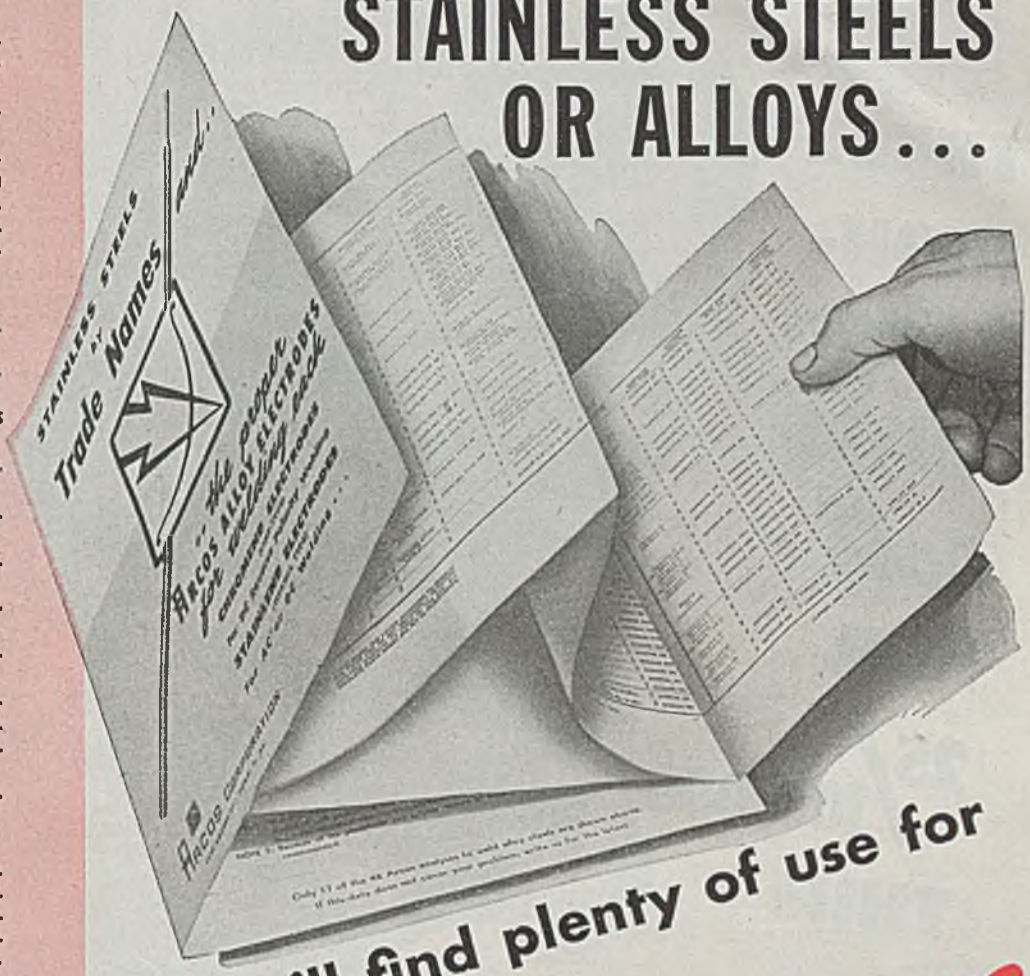
Job Evaluation Methods, by Charles Walter Lytle; cloth, 329 pages, 6 x 9 inches; published by Ronald Press Co., 15 East 26th St., New York, for $6.

In both operating and industrial relations programs of modern plants job evaluation occupies an important place. In this book an endeavor has been made to answer important questions relating to this subject so that the reader may know how to apply this knowledge to get results.

This volume offers a new analytic method of approaching job evaluation. Instead of presenting leading plans separately the procedure has been to separate the whole subject into functional steps. This makes it possible to compare and select methods to fit any set of conditions.

Throughout the book the author has kept in mind the user who wants to explore the field throughly, learning first the principles and fundamentals and then in detail exact ways to devise, set up and successfully operate a plan.

If you weld STAINLESS STEELS OR ALLOYS...



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Here are the trade names of 519 high alloy steels made by 25 alloy steel producers, and the proper Arcos Electrode to weld each.

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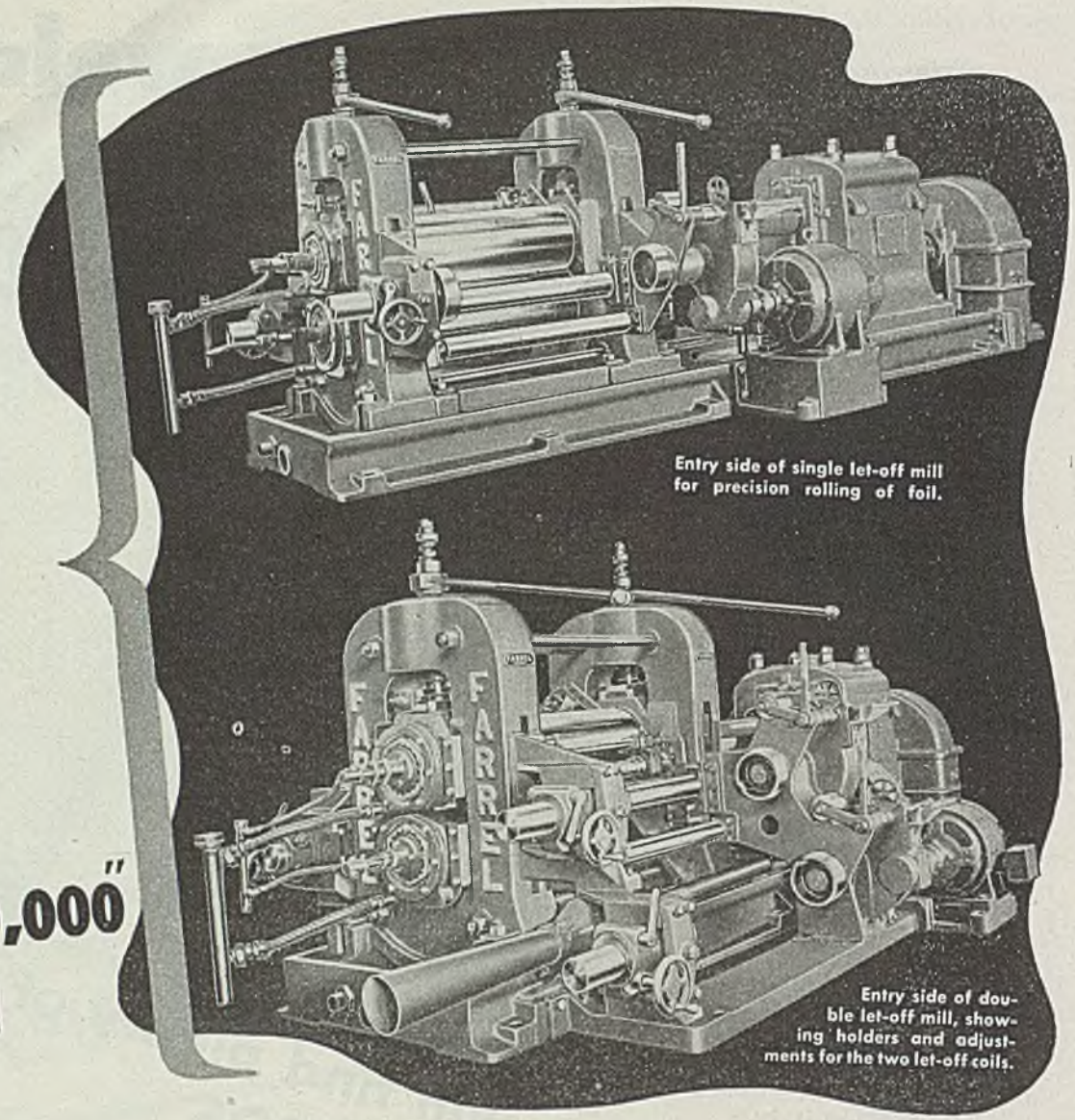
THESE HIGH-SPEED MILLS *roll* FOIL 25/100,000" THIN



Entry side of single let-off mill for precision rolling of foil.

Entry side of double let-off mill, showing holders and adjustments for the two let-off coils.

A good example of Farrel *designed-for-the-job* equipment are these two rolling mills, part of an installation of twelve mills built especially for precision rolling of foil to finished gauges ranging from .0005" to .00025".

Mills with single let-off reduce the thickness of strip by a series of passes, each pass making about fifty per cent reduction in gauge until the foil is approximately .001". The double let-off mills then roll a doubled strip to finished gauge.

Handling such delicate material successfully at speeds of from 400 to 1000 feet per minute emphasizes the skilled engineering and careful workmanship that go into Farrel rolling mill equipment.

LET-OFF AND WIND-UP SYNCHRONIZED WITH MILL SPEED

To maintain uniform tension of the strip on both sides of the rolls, the surface speeds of let-offs and wind-ups are synchronized with that of the mill rolls by electrical control devices. As the let-off coils decrease in diameter, the speed is automatically increased. Conversely, wind-up coil speed is constantly decreased as the diameter of the strip coil increases.

Other features of these mills include hard forged steel rolls, precision ground and crowned, bored for cooling water circulation . . . flood-lubricated, precision sleeve bearings . . . heavy Meehanite housings and bedplate . . . fully enclosed reduction drive and pinion stand with Farrel-Sykes continuous tooth herringbone gears and pinions . . . universal spindles connecting rolls and pinions . . . compact assembly for minimum floor space.

Farrel will design and build rolling mills and other rolling mill equipment to fit your special requirements. Consultation with our engineers involves no obligation.

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FB-286

Farrel-Birmingham

"Screwsticks"

(*Continued from Page* 103)

its neighbor by a neck, slightly weaker than itself, by which it is supported and may be driven. To make a screw fastening, use is made of the screw at the end of the stick and torque is applied with a driver engaging the adjacent screw. The driver is turned until the neck twists apart, liberating the tightened screw from the screwstick at a pre-determined torque.

Thus, the tightness of the screw does not depend upon the skill, or judgment, of the operator but upon the strength of the driving neck, and is independent of driving speed. The burr formed on the head of the seated screw is barely perceptible because it is produced by twisting the material. Momentarily continued rotation of the screwstick while the surfaces are in contact further smooths the screw head by burnishing.

Screwsticks are now used in sizes No. 0, 1, and 2. Smaller and larger sizes will be produced to meet additional assembly requirements. Approximately one million screws of this form will be produced monthly to meet the company's initial requirements.

They are adequately stiff and rugged for ordinary handling and are produced with less material and screw machine time than equal numbers of common screws. Most popular stock is hexagonal screw stock of aluminum, brass, or nickel silver. Steel screws may be hardened, and aluminum ones anodized, for self-tapping use.

Drivers have a bore conforming to the shape of screw stock employed and are either of the hand, or power driven types. A manual feed moves the screwstick endwise to position successive screws and furnishes an advance indication of need to reload. Loading consists of placing a screwstick in the driver bore as shown in Fig. 3 and requires but a momentary pause in assembly operations.

Hand drivers, such as the one shown in Fig. 2, are used when power drivers are not adaptable to the work. They differ little in size, or appearance, from conventional slotted-head screw drivers. Their use has been found to halve the screw assembly time and to reduce operator fatigue through elimination of the tedious pick-up, transport and alignment operations of common screws. Work damage from driver slippage also is greatly reduced.

Power drivers, Fig. 1, install screws so rapidly that the assembly seems instantaneous. Running at speeds of 1500 rpm and more for small screws, they start and stop automatically in response to end thrust upon the screwstick. Fouled holes present no problem since the drive of the screw being seated is interrupted auto-

matically at a safe stress by the neck through which torque is transmitted. Likewise, removal of fouled screws is not difficult because the head of the fouled screw remains intact and serves in its withdrawal from the hole.

Replacement of feed and driving mechanism in a power driver requires little more time than loading. Thus, should the driver become inoperative through jamming, wear or other usual causes, interruption of production is not noticeable.

The screwstick, screwstick drivers and the method of driving and burnishing screws are inventions of Miller R. Hutchison Jr., of Kodak's camera works. The technique of manufacturing screwsticks was invented by William H. Ure of the company's screw machine department. Further improvements have been made and manufacturing standards established by the exclusive patent licensee, the American Screw Co., and its sublicensees, Milford Rivet and Machine Co. and Scoville Mfg. Co.

General usefulness of screwsticks is expected to be increased by the availability of driving equipment, both electric-powered and air-driven, now under development. Eventual possibilities of the device, and of the application of its principles, appear most promising. The screwstick principle may even be applied to such large scale production tasks as capping cylinders — in which a giant multiple power driver might automatically screw cylinder heads in place on gasoline engines.

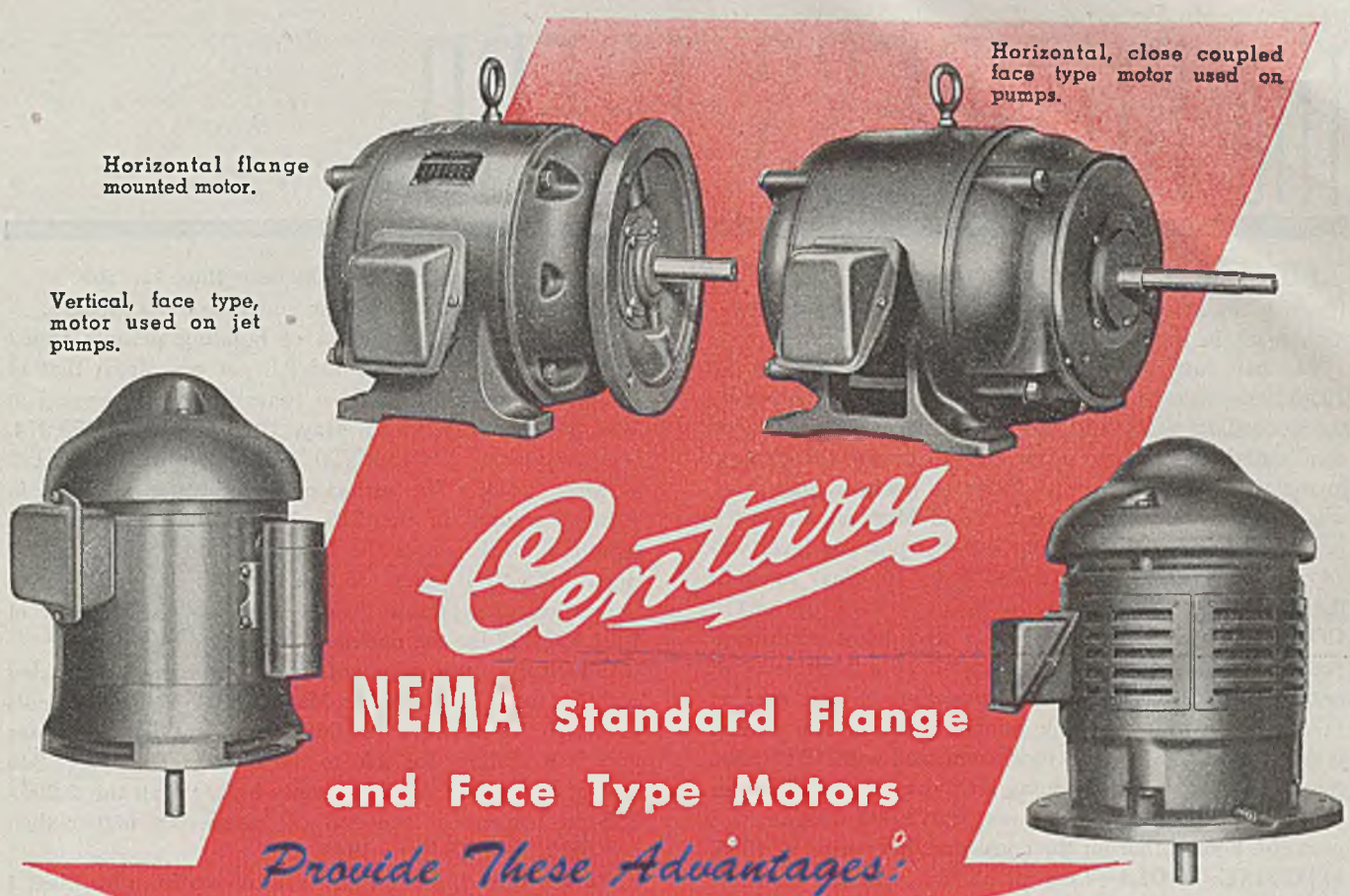
Report on Alloys for Gas Turbine Use Offered

A new 143-page report covering findings on composition and treatment of certain alloys for use in gas turbines operating at 1500 deg F is available from Office of Publication Board, Department of Commerce. Product of three years of research at Massachusetts Institute of Technology for Bureau of Ships, the report covers testing of many materials, describing the experimental work, discussing test results and giving relevant tables and figures.

Copies of report may be obtained from board, Washington. Carrying publication No. PB-16135, photostat copies cost $11 and microfilm copies $2.

—o—

When chemical analysis and thickness of steel to be welded are known, preheat and interpass welding temperatures of high carbon and alloy steels can be easily determined on simple cardboard calculator designed by Lincoln Electric Co., Cleveland. Operation of device is based on effect of various alloys on hardenability of steel.



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- **Simplified Service Problems**
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Many designers are taking advantage of the benefits of motor standardization, especially motors for flange and face type motor mountings.

Century motors with standard face type brackets are used where the motor is fastened from the driven machine side and the flange type bracket is used where the motor is fastened to the machine from the motor side.

Flange and face type Century motors are supplied in single phase, three phase and direct current types, for vertical or horizontal mounting.

Other Century motors are made in a wide range of types and sizes from 1/20 to 600 horsepower. To assure top performance Century motors are engineered to the functional characteristics of the machines they drive. Select Century motors for all your electrically powered equipment.

Century C MOTORS

463

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the BUSINESS TREND

INDUSTRIAL ACTIVITY, stimulated by substantial recovery in steel ingot production, hit a new postwar high mark in the week ended June 22.

The new high level, 135 per cent (preliminary) of the 1936-1939 average, represented a gain of 7 points over the preceding week and 41 points over the bituminous coal strike period low mark of 94 per cent registered in the week ended June 1. Previous postwar high mark was 132 per cent in the week ended Mar. 30, the week before the coal strike started. Lowest postwar level was 74 per cent in the week ended Feb. 16, final week of the steel strike.

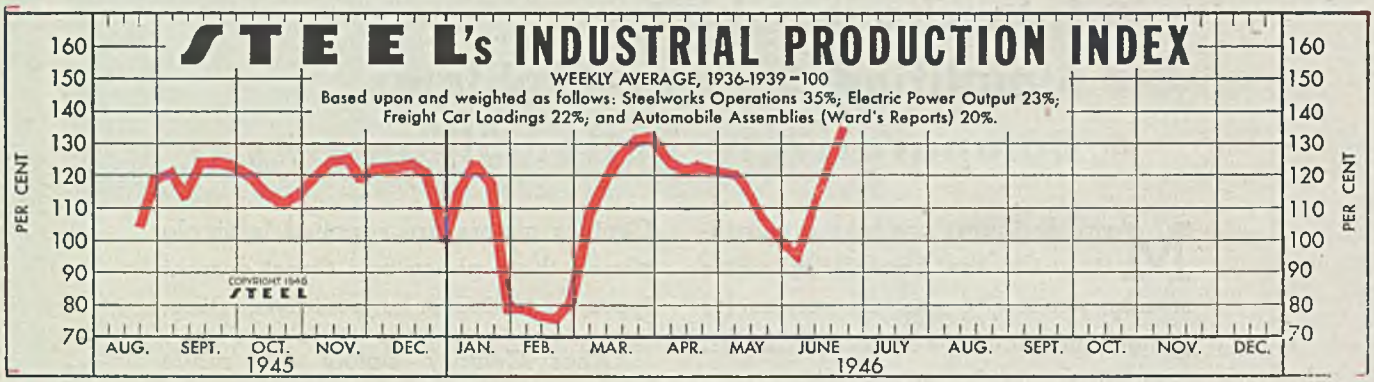
COAL—Making rapid recovery in steel ingot production possible has been speedy resumption of a high level of output of bituminous coal. Production of soft coal in the second week after the miners returned from strike is estimated at 12,135,000 tons, compared with 12,650,000 tons in the first week of mining after the strike. However, production through June 15 was 63,774,000 tons, or 23.3 per cent, behind that for the corresponding period of 1945.

MACHINE TOOLS—Low point this year for machine tool shipments was reached in May when shipments of the industry were estimated at $26,580,000, compared with $28,108,000 in April and $26,949,000 in February, the previous low mark. High mark for the year was $30,263,000 in January. Unfilled orders at the end of May totaled $182,888,583, highest thus far this year. Backlog at the end of April amounted to $180,605,915.

BUILDING—Total valuation of building permits issued in 215 cities in May declined 6.8 per cent from that of April but rose to about three times the sum recorded in May, 1945. Valuation in May, 1946, was $224,259,274, compared with $240,548,790 in April and $75,397,122 in May, 1945. The estimated expenditure involved in permits granted in the 215 cities during the first five months of this year is the largest for any similar period since 1929. Totaling $1,294,498,295, the cumulative figure was four times greater than last year's sum of $321,527,392 for the corresponding period.

CASTINGS—April shipments of gray iron castings totaled 856,678 tons, highest since May, 1945. Total shipments in March, 1946, were 796,068 tons. Unfilled orders for gray iron castings for sale to the trade totaled 2,378,348 tons at the end of April, not only higher than the 2,265,336-ton backlog at the end of March but higher than any backlog in 1946 or 1945.

RAILROADS—Based on advance reports from 86 Class 1 railroads, whose revenues represent 80.2 per cent of total operating revenues, estimated railroad operating revenues in May decreased 34.8 per cent under May, 1945. Estimated freight revenues in May, 1946, were less than in May, 1945, by 36.1 per cent.



The Index (see chart above): Latest Week (preliminary) 135 Previous Week 128 Month Ago 101

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)‡	85	75	45	90
Electric Power Distributed (million kilowatt hours)	4,129	4,030	3,942	4,358
Bituminous Coal Production (daily av.—1000 tons)	2,022	2,108	1,550	1,958
Petroleum Production (daily av.—1000 bbls.)	4,949.5	4,961	4,759	4,898
Construction Volume (ENR—Unit $1,000,000)	$105.8	$138.9	$104.2	$41.9
Automobile and Truck Output (Ward's—number units)	53,309	50,206	53,020	19,490

*Dates on request. ‡1946 weekly capacity is 1,762,381 net tons. 1945 weekly capacity was 1,831,636 net tons.

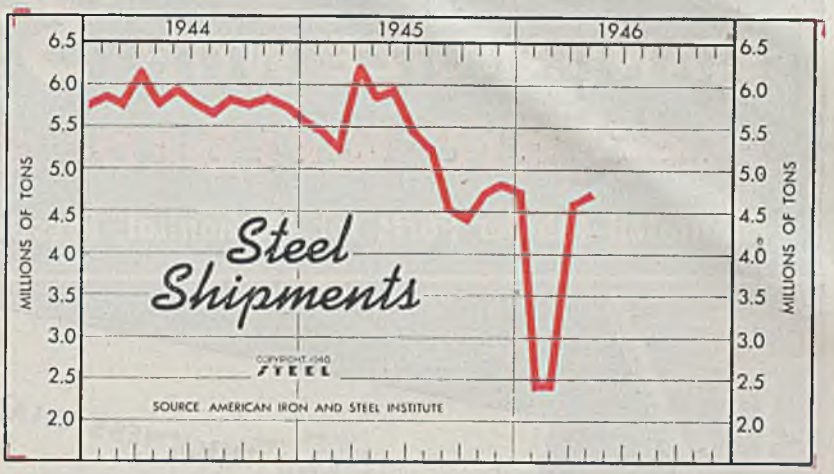
TRADE				
Freight Carloadings (unit—1000 cars)	860†	868	572	876
Business Failures (Dun & Bradstreet, number)	25	12	21	17
Money in Circulation (in millions of dollars)‡	$28,116	$28,128	$27,961	$26,536
Department Store Sales (change from like week a year ago)‡	+37%	+39%	+38%	+19%

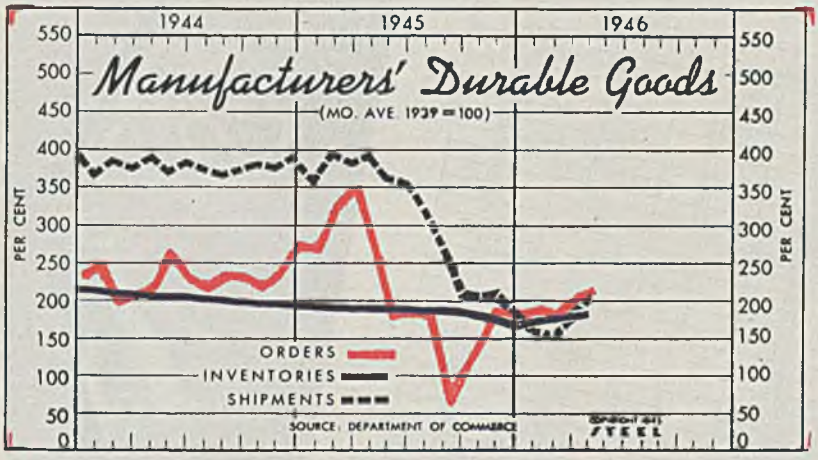
†Preliminary. ‡Federal Reserve Board.

Steel Shipments
(Net Tons)

	1946	1945	1944
Jan.	2,391,850°	5,435,647	5,767,687
Feb.	2,391,849°	5,184,498	5,700,673
Mar.	4,644,988	6,179,452	6,146,595
Apr.	4,698,081	5,769,786	5,744,177
May	.....	5,938,055	5,859,786
June	.....	5,437,206	5,703,314
July	.....	5,214,074	5,597,631
Aug.	.....	4,512,637	5,837,328
Sept.	.....	4,391,143	5,743,437
Oct.	.....	4,660,237	5,752,147
Nov.	.....	4,779,628	5,686,527
Dec.	.....	4,729,561	5,458,133

° Figures for January and February, 1946, are merely averages derived from a report that combined shipments for those two strike-affected months into a total of 4,783,699 tons.



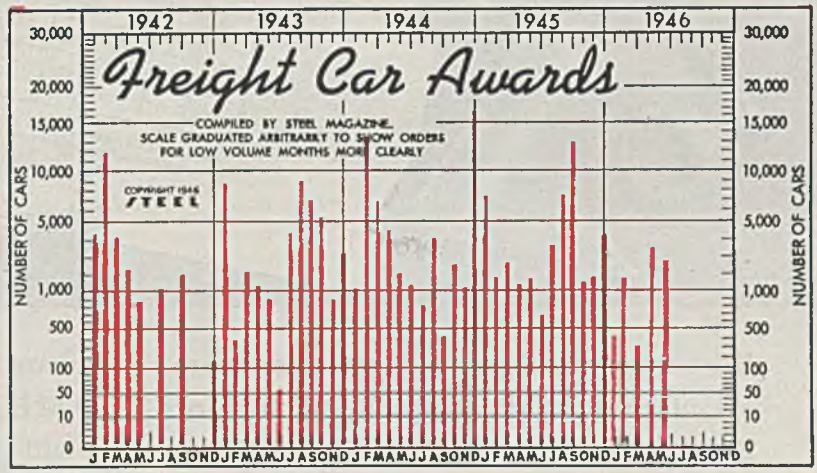


Index of Manufacturers' Durable Goods
(Mo. Ave. 1939 = 100)

	Orders		Shipments		Inventories	
	1946	1945	1946	1945	1946	1945
January	180	267	166	354	172	190
February	179	326	153	394	174	189
March	204	351	184	382	181	189
April	214	267	205	389	181	189
May	...	177	...	361	...	189
June	...	182	...	356	...	189
July	...	179	...	320	...	187
August	...	53	...	262	...	185
September	...	121	...	216	...	185
October	...	160	...	203	...	182
November	...	171	...	200	...	177
December	...	172	...	199	...	171
Average	...	202	...	303	...	185

Freight Car Awards

	1946	1945	1944	1943
Jan.	420	7,200	1,020	8,365
Feb.	1,795	1,750	13,240	350
Mar.	300	2,500	6,510	1,935
Apr.	3,405	1,120	4,519	1,000
May	2,975	1,526	1,952	870
June	....	670	1,150	50
July	....	3,500	795	4,190
Aug.	....	7,240	3,900	8,747
Sept.	....	12,840	400	6,820
Oct.	....	1,320	2,425	5,258
Nov.	....	1,650	1,065	870
Dec.	....	4,116	16,245	2,919
Total	....	45,432	53,221	41,374



FINANCE

	Latest Period°	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$13,997	$11,395	$11,838	$15,061
Federal Gross Debt (billions)	$269.3	$271.2	$273.0	$250.4
Bond Volume, NYSE (millions)	$21.4	$25.3	$19.7	$56.3
Stocks Sales, NYSE (thousands)	5,834	5,192	6,338	10,088
Loans and Investments (billions)†	$62.9	$63.3	$64.1	$58.9
United States Gov't. Obligations Held (millions)†	$45,716	$45,222	$45,871	$43,676

†Member banks, Federal Reserve System.

PRICES

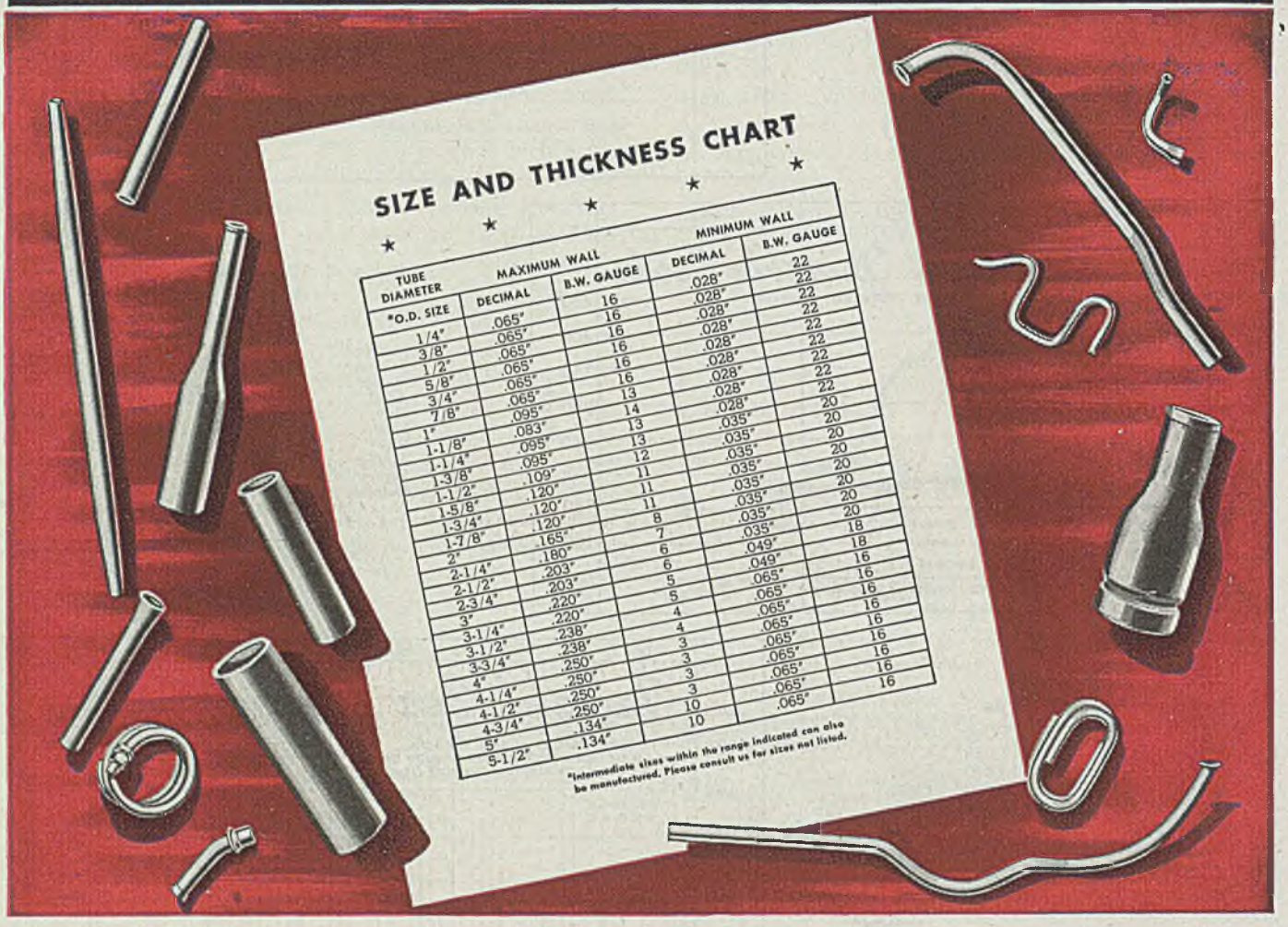
STEEL's composite finished steel price average	$64.45	$64.45	$63.54	$58.27
All Commodities†	111.8	111.5	110.9	106.0
Industrial Raw Materials†	125.8	125.5	124.6	119.0
Manufactured Products†	106.8	106.6	106.1	102.0

†Bureau of Labor Statistics Index, 1926 = 100.

STANDARDIZE WITH "Standard"

ELECTRIC WELDED STEEL TUBING

Fabricated Tubular Parts for Mechanical, Pressure and Structural Applications



TUBE DIAMETER *O.D. SIZE	MAXIMUM WALL DECIMAL	MAXIMUM WALL B.W. GAUGE	MINIMUM WALL DECIMAL	MINIMUM WALL B.W. GAUGE
1/4"	.065"	16	.028"	22
3/8"	.065"	16	.028"	22
1/2"	.065"	16	.028"	22
5/8"	.065"	16	.028"	22
3/4"	.065"	16	.028"	22
7/8"	.095"	13	.028"	22
1"	.083"	14	.028"	22
1-1/8"	.095"	13	.035"	20
1-1/4"	.095"	13	.035"	20
1-3/8"	.109"	12	.035"	20
1-1/2"	.120"	11	.035"	20
1-5/8"	.120"	11	.035"	20
1-3/4"	.120"	11	.035"	20
1-7/8"	.165"	8	.035"	20
2"	.180"	7	.035"	18
2-1/4"	.203"	6	.049"	18
2-1/2"	.203"	6	.049"	16
2-3/4"	.220"	5	.065"	16
3"	.220"	5	.065"	16
3-1/4"	.238"	4	.065"	16
3-1/2"	.238"	4	.065"	16
3-3/4"	.250"	3	.065"	16
4"	.250"	3	.065"	16
4-1/4"	.250"	3	.065"	16
4-1/2"	.250"	3	.065"	16
4-3/4"	.134"	10	.065"	16
5"	.134"	10		
5-1/2"				

*Intermediate sizes within the range indicated can also be manufactured. Please consult us for sizes not listed.

With every year that passes, more and more manufacturers of products calling for ELECTRIC WELDED STEEL TUBING are discovering the advantages of specifying the "Standard" brand. They find that our wide variety of shapes and sizes, plus our facilities for high speed production afford them the means of getting the kind of tubing they want—when they want it. And they find that our interested and willing cooperation in the solving of special tubing problems helps them make their products quicker and at lower cost. These same advantages are available to you. If you are looking for a source of high quality ELECTRIC WELDED STEEL TUBING it will pay you to investigate our experience and facilities.

THE STANDARD TUBE CO.

Detroit 3, Michigan

STANDARD

Welded Tubing — Steel Forgings

★ *Complete Tube Stocks Maintained by* ★

STANDARD TUBE SALES CORP., One Admiral Ave., Maspeth, L.I., N.Y.
LAPHAM-HICKEY COMPANY, 3333 W. 47th Place, Chicago 32, Ill.
UNION HARDWARE & METAL CO., 411 E. First St., Los Angeles 54, Cal.

Steel Mill Carryover To Take First Quarter Output

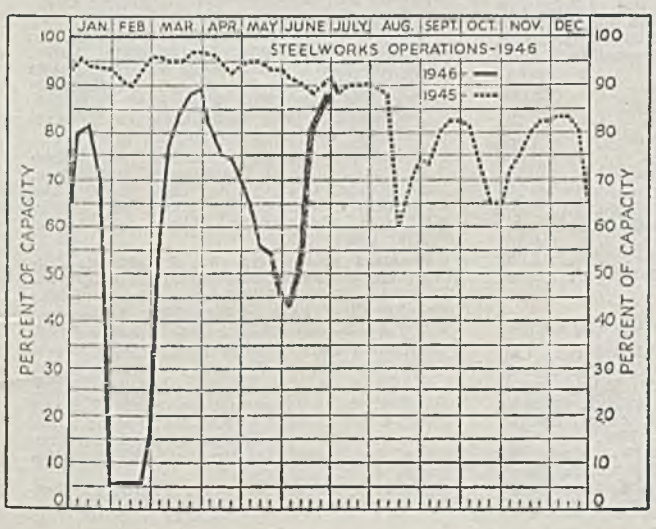
Even at high production little chance of catching up . . . Lake ore prices advanced, pig iron and coke expected to follow

WITH steel mills only recently able to resume anything like full production, most are entering third quarter with a carryover of at least three months, steel scheduled to have been delivered in second quarter. On an average sheet and strip producers are three months behind on commitments, though some are not quite that badly delayed on hot and cold-rolled sheets, but well behind on these and on some specialties, notably galvanized sheets, they are even further behind.

That these mills are not in even worse position, considering especially heavy pressure for these products, may be ascribed to the fact that during the recent coal strike many diverted steel to light flat-rolled items, including tin plate, at the expense of other products. Thus, bars, shapes and plates lost ground, with arrearages in some cases and on some sizes now more than three months, despite relatively somewhat less demand compared with light flat products. Certain types of wire and pipe are as stringent as ever.

Going into third quarter with capacity generally covered for the remainder of the year on the basis of order commitments and quota obligations, some loosening of order books for 1947 is expected, and while there has been no formal opening of books, some producers are accepting limited tonnages of plates for next year, with a little in some other lines. Leading trade interests expect no sweeping action along that line for some time. One large producer does not expect to open books for next year until about the beginning of fourth quarter. Most producers are too far behind at present to plan for 1947.

Many sellers believe that on the basis of commitments originally made for this year they will have a substantial carryover for 1947, a number believing it will be close to three months, indicating they expect to gain little ground during last half.



DISTRICT STEEL RATES

(Percentage of Ingot Capacity Engaged in Leading Districts)

	Week Ended June 29	Change	Same 1945	Week 1944
Pittsburgh	93.5	+7.5	88	90
Chicago	88	+3	95.5	99
Eastern Pa.	85	—1	90	94
Youngstown	86	+8	90	95
Wheeling	85.5	+5	90.5	97
Cleveland	90.5	+2.5	93	92.5
Buffalo	88.5	+2.5	93	90.5
Birmingham	99	+4	95	95
New England	85	+5	84	89
Cincinnati	86	—5	89	72
St. Louis	54.5	None	75	79.5
Detroit	89	—1	83	83
Estimated national rate	88	+3	92	96

Based on weekly steelmaking capacities of 1,762,381 net tons for 1946; 1,831,636 tons for 1945; 1,791,287 tons for 1944.

New orders booked now probably would fall mainly in second quarter next year.

Some producers have technically blocked out arrearages, now shipping in July tonnage originally promised for April. However, strong obligations remain and likely will be a factor at the end of the year.

Higher prices for pig iron and coke appeared last week to be in the making, rumor being that southern pig iron ceiling might be raised $4 per ton and northern $1.50 to $2. By-product coke increase was expected to be about $1.35 per ton, to cover added cost of coal and other factors. Dissatisfaction with present steel ceilings is causing pressure for higher ceilings in that market.

Scrap interests continue to press for higher ceilings as a means to bring out more material, some scrap interests believing an advance of $2 per ton will be necessary to bring out tonnage. A concentrated scrap drive over the next 90 days is planned to comb out hidden supplies.

Office of Price Administration has increased prices of all grades of Lake Superior iron ore 50 cents per ton, effective June 24. This covers Mesabi and Old Range bessemer and nonbessemer, high phosphorus, special and lump ores. The advance was allowed because of reduced volume of operation and a wage increase of 18½ cents per hour, which raised labor costs an average of 11 cents per ton. OPA allowed an increase of 10 cents on Mesabi and 20 cents on Old Range ores at the end of 1945, retroactive for the entire 1945 season. This was the first advance in Lake Superior ore prices since fixing of prewar prices in 1940.

Steelmaking continues its advance, though at slower tempo as capacity activity is more nearly approached, last week advancing 3 points to an estimated 88 per cent. This compares with 89.5 per cent as the high point reached after the steel strike. Pittsburgh advanced 7½ points to 93½ per cent, Chicago 3 points to 88, Youngstown 8 points to 86, Wheeling 5 points to 85½, Birmingham 4 points to 99, Cleveland 2½ points to 90½, Buffalo 2½ points to 88½, and New England 5 points to 85. Cincinnati lost 5 points to 86, Detroit 1 point to 89 and eastern Pennsylvania 1 point to 85. Operations on the West Coast were unchanged at 84 per cent and at St. Louis at 54½.

COMPOSITE MARKET AVERAGES

	June 29	June 22	June 15	One Month Ago May, 1946	Three Months Ago March, 1946	One Year Ago June, 1945	Five Years Ago June, 1941
Finished Steel	$64.45	$64.45	$64.45	$63.54	$63.54	$58.27	$56.73
Semifinished Steel	40.60	40.60	40.60	40.60	40.60	37.80	36.00
Steelmaking Pig Iron	25.50	25.50	25.50	25.50	25.125	24.00	23.00
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.07	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. **Semifinished Steel Composite:**—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. **Steelmaking Pig Iron Composite:**—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. **Steelworks Scrap Composite:**—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material and wire rods, cents per lb; coke, dollars per net ton; others dollars per gross ton.

Finished Material

	June 29, 1946	May, 1946	Mar., 1946	June, 1945
Steel bars, Pittsburgh	2.50c	2.50c	2.50c	2.25c
Steel bars, Philadelphia	2.82	2.82	2.82	2.57
Steel bars, Chicago	2.50	2.50	2.50	2.25
Shapes, Pittsburgh	2.35	2.35	2.35	2.10
Shapes, Philadelphia	2.465	2.465	2.465	2.215
Shapes, Chicago	2.35	2.35	2.35	2.10
Plates, Pittsburgh	2.50	2.50	2.50	2.25
Plates, Philadelphia	2.55	2.55	2.55	2.30
Plates, Chicago	2.50	2.50	2.50	2.25
Sheets, hot-rolled, Pittsburgh	2.425	2.425	2.425	2.20
Sheets, cold-rolled, Pittsburgh	3.275	3.275	3.275	3.05
Sheets, No. 24 galv., Pittsburgh	4.05	4.05	4.05	3.70
Sheets, hot-rolled, Gary	2.425	2.425	2.425	2.20
Sheets, cold-rolled, Gary	3.275	3.275	3.275	3.05
Sheets, No. 24 galv., Gary	4.05	4.05	4.05	3.70
Hot-rolled strip, over 6 to 12-in., Pitts.	2.35	2.35	2.35	2.10
Cold-rolled strip, Pittsburgh	3.05	3.05	3.05	2.80
Bright basic, bess. wire, Pittsburgh	3.05	3.05	3.05	2.75
Wire nails, Pittsburgh	3.75	3.25	3.25	2.90
Tin plate, per base box, Pittsburgh	$5.25	$5.25	$5.25	$5.00

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$38.00	$38.00	$38.00	$36.00
Slabs, Pittsburgh, Chicago	39.00	39.00	39.00	36.00
Rerolling billets, Pittsburgh	39.00	39.00	39.00	36.00
Wire rods, No. 5 to ⅜-inch, Pitts.	2.30c	2.30c	2.30c	2.15c

Pig Iron

	June 29, 1946	May, 1946	Mar., 1946	June, 1945
Bessemer del. Pittsburgh	$27.69	$27.69	$27.315	$26.19
Basic, Valley	26.00	26.00	25.625	24.50
Basic, eastern del. Philadelphia	27.84	27.84	27.465	26.34
No. 2 fdry., del. Pgh. N. & S. sides	27.19	27.19	26.815	25.69
No. 2 foundry, Chicago	26.50	26.50	26.125	25.00
Southern No. 2, Birmingham	22.88	22.88	22.505	21.38
Southern No. 2 del. Cincinnati	26.94	26.94	26.565	25.44
No. 2 fdry., del. Philadelphia	28.34	28.34	27.965	26.84
Malleable, Valley	26.50	26.50	26.125	25.00
Malleable, Chicago	26.50	26.50	26.125	25.00
Charcoal, low phos., fob Lyles, Tenn.	33.00	33.00	33.000	33.00
Gray forge, del. Pittsburgh	26.69	26.69	26.315	25.19
Ferromanganese, del. Pittsburgh	140.00	140.00	140.000	140.33

Scrap

Heavy melting steel, No. 1, Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.45
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke

Connellsville, furnace ovens	$7.50	$7.50	$7.50	$7.50
Connellsville, foundry ovens	8.25	8.25	8.25	8.25
Chicago, by-product fdry., del.	13.75	13.75	13.75	13.35

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA schedules, except those for stainless steels which are now exempt from price control. Price schedule No. 6 covers semifinished and finished iron and steel products; by-product foundry coke, No. 29; relaying rails, No. 46; beehive oven coke, No. 77; bolts, nuts and rivets, No. 147; coke by-products, GMPR, except sulphate of ammonia, No. 205. Finished steel quoted in cents per pound and semifinished steel in dollars per gross ton, except as otherwise noted. Pricing on rails was changed to net ton basis as of Feb. 15, 1946.

Semifinished Steel

Carbon Steel Ingots: Fob mill base, rerolling quality, standard analysis, $33.

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop, $48.69.

Rerolling, Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $39; Detroit, del., $41; Duluth (billets), $41; Pac. ports (billets), $51. (Andrews Steel Co., carbon slabs, $41; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co. $58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $47; Detroit, del., $49; Duluth, billets, $49; forging billets fob Pac. ports, $59.

(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 fob Toronto, O. Geneva Steel Co. $64.64, Pacific ports.)

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $58.43; del. Detroit $60.43; eastern Mich. $61.43.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $38. (Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, fob mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb, 2.05c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—⅜ in. inclusive, per 100 lb, $2.30. Do., over ⅜—41/64-in., incl., $2.45; Galveston, base, $2.40 and $2.55, respectively. Worcester add $0.10; Pacific ports $0.50.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham base, 20 tons one size, 2.50c; Duluth, base, 2.60c; Detroit, del., 2.60c; eastern Mich., 2.65c; New York, del., 2.84c; Phila., del., 2.82c; Gulf ports, dock, 2.85c; Pac. ports, dock, 3.15c. (Sheffield Steel Corp., 2.75c, fob St. Louis) Joslyn Mfg. & Supply Co., may quote 2.55c, fob Chicago.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.921c; Detroit, del., 3.021c. (Texas Steel Co. may use Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.108	4300	$1.839
2300	1.839	4600	1.298
2500	2.759	4800	2.326
3000	0.541	5100	0.379
3100	0.920	5130 or 5152	0.494
3200	1.461	6120 or 6152	1.028
		6145 or 6150	1.298
3400	3.462	8612	0.703
4000	0.487	8720	0.757
4100 (.15-.25 Mo)	0.757	9830	1.407
(.20-.30 Mo)	0.812		

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.10c; Detroit, 3.15c; Toledo, 3.25c.
Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 3.625c; Detroit, del., 3.725c, eastern Mich., 3.755c.
Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.35c; Detroit, del., 2.45c; eastern Mich. and Toledo, 2.50c; Gulf ports, dock, 2.70c; Pacific ports, dock, 2.75c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.35c; Detroit, del., 2.45c; eastern Mich. and Toledo, del., 2.50c; Gulf ports, dock, 2.70c.

Iron Bars: Single refined, Pitts., 4.76c; double refined, 5.84c; Pittsburgh, staybolt, 6.22c; Terre Haute, single ref., 5.42c; double ref., 6.76c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base, 2.425c; Granite City, base, 2.525c; Detroit, del., 2.525c; eastern Mich. del., 2.575c; Phila., del., 2.595c; New York, del., 2.665c; Pacific ports, 2.975c. (Andrews Steel Co. may quote hot-rolled sheets for shipment to the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.60c on hot carbon sheets, nearest eastern basing point.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.275c; Granite City, base, 3.375c; Detroit, del., 3.375c; eastern Mich., del. 3.425c; New York, del., 3.615c; Phila., del., 3.595c; Pacific ports, 3.925c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 4.05c; Granite City, base, 4.15c; New York, del., 4.29c; Phila., del., 4.22c; Pacific ports, 4.60c.

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29-gage, per square, 3.73c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16-gage not corrugated, copper alloy, 4.15c; Granite City, 4.25c; Pacific ports, 4.60c; copper iron, 4.50c; pure iron, 4.50c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.60c.

Aluminized Sheets, 20 gage: Pittsburgh, hot-dipped, coils or cut to lengths, 9.00c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.20c; Granite City, base 3.30c; Detroit, del., 3.30c; eastern Mich., 3.35c; Pacific ports, 3.85c; 20-gage: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.80c; Detroit, del., 3.90c; eastern Mich., 3.95c; Pacific ports, 4.45c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.90c	4.65c	4.00c
Armature	4.25c	5.00c	4.35c
Electrical	4.75c	5.50c	4.85c
Motor	5.425c	6.175c	5.525c
Dynamo	6.125c	6.875c	6.225c
Transformer			
72	6.625c	7.375c	.....
65	7.625c	8.375c	.....
58	8.125c	8.875c	.....
52	8.925c	9.675c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, 6-in. and narrower: Base, 2.45c; Detroit, del., 2.55c; eastern Mich., del., 2.60c; Pacific ports, 3.10c. (Superior Steel Corp. may quote 3.30c, Pitts.)

Over 6-in.: Base, 2.35c; Detroit, del., 2.45c; eastern Mich., del., 2.50c; Pacific ports, 3.00c. (Superior Steel Corp. may quote 3.20c, Pitts.)

Cold-Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less, 3.05c; Chicago, base, 3.15c; Detroit, del., 3.15c; eastern Mich., del., 3.20c; Worcester, base, 3.25c. (Superior Steel Corp. may quote 4.70c, Pitts.)

Cold-Finished Spring Steel: Pittsburgh, Cleveland base, 0.26-0.50 carbon, 3.03c. Add 0.20c for Worcester.

Tin, Terne Plate

(OPA ceiling prices announced March 1, 1946.)

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb base box, $5.25; Granite City, Birmingham, Sparrows Point, $5.35.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb base box, 0.25 lb tin, $4.60; 0.50 lb tin, $4.75; 0.75 lb tin, $4.90; Granite City, Birmingham, Sparrows Point, $4.70, $4.85, $5.00, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29-gage and lighter, 3.30c; Granite City, Birmingham, Sparrows Point, 3.40c; Pacific ports, boxed, 4.30c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted, 4.05c; Pacific ports, 4.80c.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-base box, $4.55; Granite City, Birmingham, Sparrows Point; $4.65.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I. C. 8-lb $12.50; 20-lb $15.50 (nom.); 40-lb $20.00 (nom.).

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.50c; New York, del., 2.69c; Phila., del., 2.55c; St. Louis, 2.74c; Boston, del., 2.82-3.07c; Pacific ports, 3.05c; Gulf ports, 2.85c.

(Granite City Steel Co. may quote carbon plates 2.65c fob D.P.C. mill; Geneva Steel Co., Provo, Utah, 3.20c fob Pac. ports; Central Iron & Steel Co., Harrisburg, Pa., 2.80c, basing points; Lukens Steel Co., Coatesville, Pa., 2.75c, base; Worth Steel Co., Claymont, Del., 2.60c, base; Alan Wood Steel Co., Conshohocken, Pa., 2.75c base.)

Floor Plates: Pittsburgh, Chicago, 3.75c; Pacific ports, 4.40c; Gulf ports, 4.10c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.787c; Gulf ports, 4.273c; Pacific ports, 4.49c.

Clad Steel Plates: Coatesville, 10% cladding: nickel-clad, 18.72c; inconel-clad, 26.00c; monel-clad, 24.96c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.35c; New York, del., 2.52c; Phila., del., 2.465c; Pacific ports, 3.00c; Gulf ports, 2.70c.

(Phoenix Iron Co., Phoenixville, Pa., may quote the equivalent of 2.60c, Bethlehem, Pa., on the general range and 2.70c on beams and channels from 4 to 10 inches.)

Steel Piling: Pittsburgh, Chicago, Buffalo, 2.65c; Pacific ports, 3.20c.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham, per 100 pounds)

Wire to Manufacturers in carloads

Bright basic or bessemer	*$3.05
Spring (except Birmingham)	*$4.00

Wire Products to Trade

Nails and staples

Standard and cement-coated	†$3.75
Galvanized	††$3.40

Wire, Merchant Quality

Annealed	§$3.50
Galvanized	§$3.85

(Fob Pittsburgh, Chicago, Cleveland, Birmingham, per base column)

Woven fence, 15½ gage and heavier	72
Barbed wire, 80-rod spool	79
Barbless wire, twisted	79
Fence posts	74
Bale ties, single loop	72½

*Add $0.10 for Worcester, $0.05 for Duluth and $0.50 for Pacific ports.

†Add $0.30 for Worcester. $0.50 for Pacific ports. Nichols Wire & Steel may quote $4.25.

††Add $0.50 for Pacific ports.

§Add $0.10 for Worcester, $0.70 for Pacific ports.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	53	30	½	21	0½
¼ & ⅜	56	37½	¾	27	7
½	60½	48	1-1¼	31	13
¾	63½	52	1½	35	15½
1-3	65½	54½	2	34½	15

Boiler Tubes: Net base prices per 100 feet fob Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Elec. Weld— Hot Rolled	Cold Rolled
1"	13	.....	$9.90	$9.36	$9.65
1¼"	13	.....	11.73	9.63	11.43
1½"	13	$10.91	12.96	10.63	12.64
1¾"	13	12.41	14.75	12.10	14.37
2"	13	13.90	16.52	13.53	16.19
2¼"	13	15.50	18.42	15.06	18.03
2½"	12	17.07	20.28	16.57	19.83
2¼"	12	18.70	22.21	18.11	21.68
2¾"	12	19.82	23.54	19.17	22.95
3"	12	20.79	24.71	20.05	24.02
3½"	11	26.24	31.18	25.30	30.29
4"	10	32.56	38.68	31.32	37.52
4½"	9	43.16	51.29	.....	.....
5"	9	49.96	59.36	.....	.....
6"	7	76.71	91.14	.....	.....

Pipe, Cast Iron: Class B, 6-in. and over, $54 per net ton, Birmingham; $59, Burlington, N. J.; $62.80, del., Chicago; 4-in. pipe, $5 higher, Class A pipe, $3 a ton over class B.

Rails, Supplies

Standard rails, over 60-lb, fob mill, net ton, $43.40. Light rails (billet), Pittsburgh, Chicago, Birmingham, net ton, $49.18.

*Relaying rails, 35 lb and over, fob railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates $51 net ton, base, Standard spikes, 3.65c.

*Fixed by OPA Schedule 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; Reg. carbon 15.15c; extra carbon 19.48c; special carbon 23.80c; oil-hardening 25.97c; high carbon-chromium 46.53c.

W.	Cr.	V.	Mo.	Base, per lb.
18.00	4	1	...	72.49c
1.5	4	1	8.5	58.43c
...	4	2	3	58.43c
6.40	4.15	1.90	5	62.22c
5.50	4.50	4	4.50	75.74c

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago. Additional discounts: 5 for carloads; 10 for full containers, except tire, step and plow bolts.

(Ceiling prices advanced 7 per cent, effective Apr. 1, 1946; discounts remain unchanged.)

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅝ and ⅝ x 6-in. and shorter	63½ off
Do., ¾ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages, nuts separate, 71-10 off, nuts attached, 71 off; bulk, 80 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hex	U.S.S.	S.A.E.
⅛-in. and smaller	..	64
½-in. and smaller	62	..
½-in.-1-in.	..	60
⅝-in.-1-in.	59	..
1⅛-in.-1½-in.	57	58
1⅝-in. and larger	56	..

Additional discount of 10 for full kegs.

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset 1-in. and smaller	71 off
Headless, ¼-in. and larger	60 off
No. 10 and smaller	70 off

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $2.75-$3.00 off

Stainless Steels

(Open market prices. OPA price control suspended Oct. 11, 1945.)

Base, Cents per lb

CHROMIUM NICKEL STEELS

	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
302	25.96c	29.21c	36.79c	23.93c	30.30c
303	28.13	31.38	38.95	29.21	35.71
304	27.05	31.38	38.95	25.45	32.46
308	31.38	36.79	44.36	30.84	37.87
309	38.95	43.28	50.85	40.03	50.85
310	53.02	56.26	57.35	52.74	60.59
312	38.95	43.28	53.02	.....	.....
*316	43.28	47.61	51.94	43.28	51.94
§321	31.38	36.79	44.36	31.65	41.12
‡347	35.71	41.12	48.69	35.71	45.44
431	20.56	23.80	31.38	18.94	24.35

STRAIGHT CHROMIUM STEEL

403	23.93	26.51	31.92	22.99	29.21
**410	20.02	23.93	28.67	18.39	23.80
416	20.56	23.80	29.21	19.75	25.45
††420	25.96	30.84	36.25	25.70	39.49
430	20.56	23.80	31.38	18.94	24.35
††430F.	21.10	24.35	31.92	20.29	26.51
440A.	25.96	30.84	36.25	25 70	39.49
442	24.35	27.59	35.17	25.96	34.62
443	24.35	27.59	35.17	25.96	34.62
446	29.76	33.00	39.49	37.87	56.26
501	8.66	12.98	17.04	12.98	18.39
502	9.74	14.07	18.12	14.07	19.48

STAINLESS CLAD STEEL (20%)

(Fob Pittsburgh and Washington, Pa., plate prices include annealing and pickling.)

304	....	19.48	20.56	....	....
410	....	17.31	18.39	....	....
430	....	17.85	18.94	....	....
446	....	19.48	20.56	....	....

* With 2-3% molybdenum. § With titanium. † With columbium. ** Plus machining agent. †† High carbon. ‡‡ Free machining.

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
Milwaukee, ovens	13.75

*Operators of hand-drawn ovens using trucked coal may charge $8.00; effective May 26, 1945.

Coke By-Products

Spot, gal, freight allowed east of Omaha	
Pure and 90% benzol	15.00c
Toluol, two degree	27.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c
Per pound fob works	
Phenol (car lots, returnable drums)	10.50c
Do., less than carlots	11.25c
Do., tank cars	9.50c
Eastern plants, per pound	
Naphthalene flakes, balls, bbls, to jobbers	8.00c
Per ton, bulk, fob port	
Sulphate of ammonia	$29.20

Adjustments Pend

Delivered prices quoted on these pages are subject to upward revision in line with the Interstate Commerce Commission's order authorizing an increase in railroad freight rates, effective as of July 1. The order authorized a general 6 per cent increase with certain exceptions. For further details, see page 71.

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras. Quotations based on OPA mill prices announced March 1, 1946.

	Hot-rolled bars	Structural shapes	Plates	Floor plates	Hot-rolled sheets (10-gage base)	Hot-rolled strip (14-gage and lighter, 6-in and narrower)	Hot-rolled strip (12-gage and heavier wider than 6-inch)	Galvanized flat sheets (24-gage base)	Cold-rolled sheets (17-gage base)	Cold finished bars	Cold-rolled strip
Boston	4.294[1]	4.162[1]	4.162[1]	5.977[1]	3.999[1]	5.456[1]	4.356[1]	5.674[14]	4.969[14]	4.594[13]	4.965
New York	4.103[1]	4.008[1]	4.018[1]	5.824[1]	3.815[1]	4.324[1]	4.224[1]	5.460[13]	4.838[14]	4.553[21]	5.024
Jersey City	4.103[1]	3.997[1]	4.018[1]	5.824[1]	3.815[1]	4.324[1]	4.224[1]	5.460[13]	4.838[14]	4.553[21]	5.024
Philadelphia	4.072[1]	3.916[1]	3.855[1]	3.768[1]	3.743[1]	4.622[1]	4.522[1]	5.468[13]	5.097[13]	4.022[21]	5.022
Baltimore	4.052[1]	4.009[1]	3.844[1]	5.502[1]	3.619[1]	4.252[1]	4.152[1]	5.344[1]	5.077[13]	4.502[21]	.....
Washington	4.191[1]	4.180[1]	4.046[1]	5.591[1]	3.821[1]	4.391[1]	4.291[1]	5.646[17]	5.066[24]	4.491[21]	.....
Norfolk, Va.	4.315[1]	4.252[1]	4.221[1]	5.715[1]	3.996[1]	4.865[1]	4.415[1]	5.821[17]	4.490[24]	4.615[21]	.....
Bethlehem, Pa.*	.....	3.70[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.70[1]	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.70[1]	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.60[1]	3.65[1]	3.88[1]	5.51[1]	3.575[1]	4.169[1]	4.069[1]	5.20[15]	4.625[16]	4.20[21]	4.919
Buffalo (country)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.475[1]	3.85[1]	3.750[1]	5.10[15]	4.525[16]	4.10[21]	4.60
Pittsburgh (city)	3.60[1]	3.65[1]	3.65[1]	5.25[1]	3.575[1]	3.95[1]	3.850[1]	5.327[11]	4.625[24]	4.20[21]	4.70
Pittsburgh (country)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.475[1]	3.85[1]	3.750[1]	5.10[11]	4.525[24]	4.10[21]	4.60
Cleveland (city)	3.60[1]	3.838[1]	3.65[1]	5.488[1]	3.575[1]	3.95[1]	3.850[1]	5.327[13]	4.625[24]	4.20[21]	4.70
Cleveland (country)	3.50[1]	.....	3.55[1]	.....	3.475[1]	3.85[1]	3.750[1]	.....	4.525[24]	4.10[21]	4.60
Detroit	3.70[1]	3.911[1]	3.859[1]	5.531[1]	3.675[1]	4.050[1]	3.950[1]	5.450[13]	4.725[24]	4.25[13]	4.909
Omaha (city, del.)	4.293[1]	4.343[1]	4.343[1]	5.943[1]	4.018[1]	4.493[1]	4.393[1]	5.965[13]	5.668[24]	4.893[21]	.....
Omaha (country)	4.193[1]	4.243[1]	4.243[1]	5.843[1]	3.918[1]	4.393[1]	4.293[1]	5.865[13]	.....	.....	.....
Cincinnati	3.861[1]	3.941[1]	3.911[1]	5.541[1]	3.650[1]	4.025[1]	3.925[1]	5.275[13]	4.700[24]	4.461[21]	4.961
Youngstown*	.....	.....	.....	.....	.....	.....	.....	4.85[13]	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.475[1]	3.85[1]	3.750[1]	5.10[13]	.....	.....	.....
Chicago (city)	3.75[1]	3.80[1]	3.80[1]	5.40[1]	3.475[1]	3.95[1]	3.850[1]	†5.40[13]	4.425[24]	4.20[21]	4.90
Milwaukee	3.887[1]	3.937[1]	3.937[1]	5.537[1]	3.612[1]	4.087[1]	3.987[1]	5.722[13]	4.562[24]	4.337[21]	5.037
Indianapolis	3.83[1]	3.88[1]	3.88[1]	5.48[1]	3.743[1]	4.118[1]	4.018[1]	5.368[13]	4.793[24]	4.43[21]	5.080
St. Paul	4.072[2]	4.122[2]	4.122[2]	5.722[2]	3.797[2]	4.272[2]	4.172[2]	5.635[13]	4.747[24]	4.811[21]	5.352
St. Louis	3.897[1]	3.947[1]	3.947[1]	5.547[1]	3.622[1]	4.097[21]	3.997[1]	5.622[13]	4.572[24]	4.481[21]	5.181
Memphis, Tenn.	4.265[1]	4.315[1]	4.315[1]	6.03[1]	4.190[1]	4.565[1]	4.465[1]	5.715[13]	5.005[24]	4.78[21]	.....
Birmingham	3.75[1]	3.80[1]	3.80[1]	6.153[1]	3.675[1]	4.05[1]	4.05[1]	5.20[13]	5.077[24]	4.99[21]	5.465
New Orleans (city)	4.358[1]	4.408[1]	4.408[1]	6.329[1]	4.283[1]	4.658[1]	.....	5.808[13]	5.304[24]	5.079[21]	.....
Houston, Tex.	4.00[2]	4.50[1]	4.50[1]	5.75[9]	3.988[2]	4.663[2]	4.563[2]	5.763[26]	5.819[19]	4.10[23]	.....
Los Angeles	4.65[4]	4.90[4]	5.20[4]	7.45[4]	5.225[4]	5.30[4]	5.200[4]	6.55[13]	7.425[4]	6.033[21]	5.863
San Francisco	4.20[7]	4.15[7]	4.15[7]	5.85[7]	4.125[7]	5.35[7]	4.50[7]	6.35[13]	6.875[13]	5.783[21]	7.583
Portland, Oreg.	4.70[27]	4.70[27]	5.00[27]	6.75[27]	4.875[27]	6.65[27]	5.000[27]	6.20[13]	6.825[13]	5.983[13]	.....
Tacoma, Wash.	4.60[6]	4.70[6]	5.00[6]	6.75[6]	4.87[6]	5.80[6]	4.60[6]	6.40[13]	6.55[13]	6.23[21]	.....
Seattle	4.60[6]	4.70[6]	5.00[6]	6.75[6]	4.87[6]	5.80[6]	4.60[6]	6.40[13]	6.55[13]	6.23[21]	.....

* Basing point cities with quotations representing mill prices, plus warehouse spread; † open market price.
NOTE—Ceiling prices fixed by Office of Price Administration in Revised Price Schedule No. 49, as amended. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles.. [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]—300 to 4999 pounds.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.45
Mesabi nonbessemer	5.05
High phosphorus	5.05
Mesabi bessemer	5.20
Old range nonbessemer	5.30

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	18.00

Foreign Ore

Cents per unit, cif Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mn.	Nom.
N. African low phos.	Nom.
Swedish basic, 60 to 68%	Nom.
Spanish, N. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob 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 fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., 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	$39.75
48% 3:1	41.00
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	41.00

Domestic (seller's nearest rail)

48% 3:1	$43.50

less $7 freight allowance.

Manganese Ore

Sales prices of Office of Metals Reserve, cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended MPR No. 248, effective May 15, 1944. Price at basing points which are also points of discharge of imported manganese ore is fob cars, shipside, at dock most favorable to the buyer. Outside shipments direct to consumers at 10c per unit less than Metal Reserve prices.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Basic open-hearth Electric furnace

Designation	Carbon	Mn	Si	Cr	Ni	Mo	Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per GT
	Chemical Composition Limits, Per Cent									
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	$0.812	$16.230	$1.353	$27.050
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.812	16.230	1.353	27.050
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.866	17.312	1.407	28.132
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.703	14.066	1.244	24.886
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.298	25.968	1.677	33.542
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.298	25.968	1.677	33.542

Extras are in addition to a base price of 2.921c, per pound on finished products and $58.43 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Maximum prices per gross ton fixed by OPA schedule No. 20, last amended March 15, 1946; placed on adjustable pricing basis May 29, 1946. Producers may collect present ceiling prices on deliveries after that date, subject to condition that purchaser agrees to pay also amount of any increase that may be granted later by OPA. Federal tax on freight charges, effective Dec. 1, 1942, not included.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$27.50	$27.00	$28.50	$28.00
Newark, N. J., del.	29.03	28.53	30.03	29.53
Brooklyn, N. Y., del.	30.00	.....	.....	30.50
Birdsboro, Pa., base	27.50	27.00	28.50	28.00
Birmingham, base	22.88	21.50	27.50	.....
Baltimore, del.	28.11	.....	.....	.....
Boston, del.	27.64	.....	.....	.....
Chicago, del.	26.72	.....	.....	.....
Cincinnati, del.	26.94	26.06	.....	.....
Cleveland, del.	26.62	25.74	.....	.....
Newark, N. J.	28.64	.....	.....	.....
Philadelphia, del.	27.96	27.46	.....	.....
St. Louis, del.	26.62	27.54	.....	.....
Buffalo, base	26.50	25.50	27.50	27.00
Boston, del.	28.00	27.00	29.00	28.50
Rochester, del.	28.03	.....	29.03	28.53
Syracuse, del.	28.58	.....	29.58	29.08
Chicago, base	26.50	26.00	27.00	26.50
Milwaukee, del.	27.60	27.10	28.10	27.60
Muskegon, Mich., del.	27.69	.....	.....	27.69
Cleveland, base	26.50	26.00	27.00	26.50
Akron, Canton, del.	27.89	27.39	28.39	27.89
Detroit, base	26.50	26.00	27.00	26.50
Saginaw, Mich., del.	28.81	28.31	29.31	28.81
Duluth, base	27.00	26.50	27.50	27.00
St. Paul, del.	29.13	28.63	29.63	29.13
Erie, Pa., base	26.50	26.00	27.50	27.00
Everett, Mass., base	27.50	27.00	28.50	28.00
Boston, del.	28.00	27.50	29.00	28.50
Granite City, Ill., base	26.50	26.00	27.00	26.50
St. Louis, del.	27.00	26.50	.....	27.00
Hamilton, O., base	26.50	26.00	.....	26.50
Cincinnati, del.	27.61	27.11	.....	27.61
Neville Island, Pa., base	26.50	26.00	27.00	26.50
*Pittsburgh, del. N. & S. sides	27.19	26.69	27.69	27.19
Provo, Utah, base	24.50	24.00	.....	.....
Sharpsville, Pa., base	26.50	26.00	27.00	26.50
Sparrows Point, base	27.50	27.00	.....	.....
Baltimore, del.	28.49	.....	.....	.....
Steelton, Pa., base	.....	27.00	.....	.....
Swedeland, Pa., base	27.50	27.00	28.50	28.00
Philadelphia, del.	28.34	27.84	.....	28.84
Toledo, O., base	26.50	26.00	27.00	26.50
Youngstown, O., base	26.50	26.00	27.00	26.50
Mansfield, O., del.	28.44	27.94	28.94	28.44

*To Neville Island base add: 55 cents for McKees Rocks, Pa.; 84 cents, Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97 cents (water), Monongahela; $1.11, Oakmont, Verona; $1.24, Brackenridge.

Exception to Ceiling Prices: Struthers Iron & Steel Co., Struthers, O., may charge 50 cents a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable pig iron.

High Silicon, Silvery

6.00-6.50 per cent (base) $32.00
6.51-7.00..$33.00 9.01- 9.50. 38.00
7.01-7.50.. 34.00 9.51-10.00. 39.00
7.51-8.00.. 35.00 10.01-10.50. 40.00
8.01-8.50.. 36.00 10.51-11.00. 41.00
8.51-9.00.. 37.00 11.01-11.50. 42.00

Fob Jackson county, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Electric Furnace Ferrosilicon: Si 14.01 to 14.50%, $48 Jackson co.; each additional 0.50% silicon up to and including 18% add $1; low impurities not exceeding 0.005 P, 0.40 Si, 1.0% C, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Semi-cold blast, low phosphorus.

Fob furnace, Lyles, Tenn., $33.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $26.00
Valley base 26.00

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo, N. Y., $32.00 base; $33.24, del. Philadelphia. Intermediate phosphorus, Central Furnace, Cleveland, $29.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge not to exceed 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge not to exceed 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Refractories

Per 1000, fob shipping point. Net prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky. $76.05

High Heat Duty

Pa., Ill., O., Md., Mo., Ky. 60.40
Ala., Ga. 60.40
N. J. 65.90

Intermediate Heat Duty

Ohio 50.60
Pa., Ill., Md., Mo., Ky. 54.80
Ala., Ga. 49.15
N. J. 57.65

Low Heat Duty

Pa., Md., Ohio 42.35

Malleable Bung Brick

All bases 70.45

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press 36.45
Wire Cut 34.15

Silica Brick

Pennsylvania 60.40
Joliet, E. Chicago 69.30
Birmingham, Ala. 60.40

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.
Bulk 22.00
Bags 26.00

Basic Brick

Net ton, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick 54.00
Chem. bonded chrome 54.00
Magnesite brick 78.00
Chem. bonded magnesite 65.00

Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net ton, carloads, effective CaF_2 content, 70% or more, $33; 65% to 70%, $32; 60% to 65%, $31; less than 60%, $30.

Ferroalloy Prices

Ferromanganese, standard: 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Rockdale or Rockwood, Tenn. (where Tennessee Products Co. is producer), Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140 fob cars, Pittsburgh (where Carnegie-Illinois Steel Corp. is producer); add $6 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: Special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.55c; regular, 21.05c; medium, 15.75c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Spiegeleisen: 19-21% carlot per gross ton, Palmerton, Pa., $36; Pittsburgh, $40.50; Chicago, $40.60.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

Chromium Metal: 97% min. chromium, max. 0.50% carbon, eastern zone, per lb contained chromium bulk, c.l., 79.50c, 2000 lb to c.l. 80c; central 81c and 82.50c; western 82.25c and 84.75c; fob 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 up 10 cents.

Ferrochrome: Contract, lump, packed; **high carbon,** eastern zone, c.l. 15.05c, ton lots 15.55c; central zone, add 0.40c and 0.65c; western zone, add 0.5c and 1.85c; **high carbon, high nitrogen,** add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c.

Low carbon, eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22c, 0.2% 21.50c, 0.5% 21c, 1% 20.50c, 2% 19.50c, add 1c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l., and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l., and 1.85c for 2000 lb to c.l.; carload packed differential 0.45c. Prices are per pound of contained Cr, fob shipping points. **Low carbon, high nitrogen:** Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

Special Foundry Ferrochrome (Cr 62-66%, C about 5-7%): Contract, lump, packed, eastern zone, freight allowed, c.l. 15.60c, ton lots 16.10c, less than ton 16.75c; central zone, add 0.40c for c.l. and 0.65c for smaller lots; western zone, add 0.5c for c.l. and 1.85c for smaller lots. Deduct 0.55c for bulk carlots.

S. M. Ferrochrome, high carbon (Cr 60-65%, Si, Mn and C 4-6% each): Contract, lump, packed, eastern zone, freight allowed, c.l. 16.15c, ton lots 16.65c, less ton 17.30c; central zone, add 0.40c for c.l. and 0.65c for smaller lots; western zone, add 0.5c for c.l. and 1.85c for smaller lots. Prices are per lb of contained chromium; spot prices 0.25c higher. Deduct 0.55c for bulk carlots.

S.M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 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, 20.50c, 20.95c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up 0.25c.

SMZ Alloy: (Si 60-55%, Mn 5-7%, Zr 5-7% and Fe 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 0.25c.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 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 0.25c.

Silvaz Alloy: (Si 35-40%, Va 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 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 0.25c.

CMSZ Alloy 4: (Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75% and C 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 0.25c.

CMSZ Alloy 5: (Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 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, 12.50c, 13.00c, central; 13.25c, 13.75c, 14.50c and 15.00c, western; spot up 0.25c.

Ferro-Boron: (B 17.50% min., Si 1.50% max., Al 0.50% max. and C 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: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 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: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance), per lb of alloy. Contract, 5 tons or more, $1.90, 1 ton to 8 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 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 and 5c to contracts in all cases.

Calcium metal; cast: Contract ton lots or more $1.35, less, $1.60, pound of metal; $1.36 and $1.61 central, $1.40 and $1.65, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 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 0.25c.

Calcium - Silicon: (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb of alloy. Contract, carlot, lump 13.00c, 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 0.25c.

Briquets Ferromanganese: (Weight approx. 3 lb and containing exactly 2 lb Mn) per lb of briquets. Contract, carlots, bulk 0.0605c, packed 0.063c, tons 0.0655c, less 0.068c, eastern, freight allowed; 0.063c, 0.0655c, 0.0755c and 0.078c, central; 0.066c, 0.0685c, 0.0855c and 0.088c, western; spot up 0.25c.

Briquets, Ferrochrome: Containing exactly 2 lb Cr, packed, eastern zone, c.l. 9.50c, ton lots 9.80c, less than ton 10.10c, central zone, add 0.3c for c.l. and 0.5c for smaller lots; western zone, add 0.70c for c.l. and 2c for smaller lots. Deduct 0.30c for bulk carlots. Prices per lb of briquets; spot prices 0.25c higher.

Silicomanganese, containing exactly 2 lb Mn and about ½ lb Si, eastern zone, bulk, c.l. 5.80c, ton lots 6.35c; central zone, add 0.25c for c.l. and 1c for ton lots; western, add 0.55c for c.l. and 0.20c for ton lots. **Ferrosilicon,** weighing about 5 lb and containing exactly 2 lb Si, or about 2½ lb and containing exactly 1 lb Si, packed, eastern zone, c.l. 3.90c, ton lots 4.15c, less ton lots 4.45c; central zone, add 0.15c for c.l. and 0.40c for smaller lots; western zone, add 0.30c for c.l. and 0.45c for smaller lots. Prices are f.o.b. shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.30c for bulk carlots.

Ferromolybdenum: 55-75% per lb contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 12.65c, ton lots 13.10c, smaller lots 13.50c; 80-90% c.l. 10.35c, ton lots 10.85c, smaller lots 11.35c; 75% c.l. 9.40c, ton lots 9.95c, smaller lots 10.45c; 50% c.l. 7.90c, ton lots 8.50c, smaller lots 9.10c. Prices are fob shipping point, freight allowed, per lb of contained Si. Spot prices 0.25c higher. Deduct 0.85c for bulk carlots.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

Silicon Metal: Min. 97% Si and max. 1% Fe, 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% Si and max. 2% Fe, 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, fob shipping point, freight allowed. Price per lb contained Si.

Manganese Metal: (Min. 96% Mn, max. 2% Fe), 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 10,000 lb or more, per lb contained W, $1.90; contract, $1.88; freight allowed as far west as St. Louis.

Tungsten Metal Powder: Spot, not less than 97%, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5c per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb contained Ti; ton lots $1.35; less-ton lots $1.40 eastern. Spot up 5c per lb.

High-Carbon Ferrotitanium: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C $142.50; 3-5% C $157.50.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Bortam: B 1.5-1.9%, ton lots, 45c lb; less-ton lots, 50c lb.

Ferrovanadium: Va 35-55%, contract basis, per lb contained Va, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Zirconium Alloys: Zr 12-15%, per lb of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads, bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot up $5 per ton.

Zirconium Alloy: Zr 35-40%, eastern, contract basis, carloads in bulk or package, per lb of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot up ¼c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) contract basis fob Niagara Falls, N. Y., lump per lb 5.88c; ton lots 6.38c; less 6.88c. Spot up ½c.

Siminal: (Approx. 20% each Si, Mn, Al) Contract, freight not exceeding St. Louis rate allowed, per lb alloy; carlots 8c; ton lots 8.75c; less-ton lots 9.25c.

Borosil: 3 to 4% B, 40 to 45% Si, $6.25 lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to maximum price regulation No. 4. 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

(Fob 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
Unstripped Motor Blocks	17.50
Stove Plate	19.00

BOSTON:

(Fob shipping points. Boston differential 99c higher, steelmaking grades; Providence, $1.09 higher)

No. 1 Heavy Melt. Steel	$14.06
No. 2 Heavy Melt. Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	14.06
No. 1 Busheling	14.06
Machine Shop Turnings	9.06
Mixed Borings, Turnings	9.06
Short Shovel Turnings	11.06
Chemical Borings	13.31
Low Phos. Clippings	16.56
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

BUFFALO:

(Delivered consumers' 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

PITTSBURGH:

(Delivered consumers' 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

* Shipping point.

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

VALLEY:

(Delivered consumer's plant)

No. 1 R.R. Heavy Melt.	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Cast Iron Borings	16.00
Machine Shop Turnings	15.00
Low Phos. Plate	22.50

MANSFIELD:

(Delivered consumer's plant)

Machine Shop Turnings	$15.00

CINCINNATI:

(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
Machine Turnings	10.50-11.00
Shoveling Turnings	12.50-13.00
Cast Iron Borings	11.50-12.00
Mixed Borings, Turnings	10.50-11.00
No. 1 Cupola Cast	20.00
Breakable Cast	16.50
Low Phosphorus	21.00-22.00
Scrap Rails	20.50-21.00
Stove Plate	18.50-19.00

DETROIT:

(Delivered consumer's plant)

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

CHICAGO:

(Delivered consumer's plant; cast grades fob shipping point; railroad grades fob tracks)

No. 1 R.R. Heavy Melt.	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dlr. Bundles	18.75
Baled Mach. Shop Turn.	18.75
No. 3 Galv. Bundles	16.75
Machine Turnings	13.75
Mix. Borings, Sht. Turn.	13.75
Short Shovel Turnings	15.75
Cast Iron Borings	14.75
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Rerolling Rails	22.25
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00

ST. LOUIS:

(Delivered consumer's plant; cast grades fob shipping point)

Heavy Melting	$17.50
No. 1 Locomotive Tires	21.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	10.50
Shoveling Turnings	12.50
Rerolling Rails	21.00
Street Car Axles	24.50
Steel Rails, 3 ft.	21.50
Steel Angle Bars	21.00
Cast Iron Wheels	20.00
No. 1 Machinery Cast	20.00
Railroad Malleable	22.00
Breakable Cast	16.50
Stove Plate	19.00
Grate Bars	15.25
Brake Shoes	15.25

BIRMINGHAM:

(Delivered consumer's plant)

Billet Forge Crops	$22.50
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	11.00
Cast Iron Borings	13.00
Iron Car Wheels	20.00

LOS ANGELES:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$14.00
No. 2 Heavy Melt. Steel	13.00
No. 1, 2 Dlr. Bundles	12.00
Machine Turnings	5.50
Mixed Borings, Turnings	5.50
No. 1 Cast	20.00

SAN FRANCISCO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$17.00
No. 2 Heavy Melt. Steel	17.00
No. 1 Busheling	17.00
No. 1, No. 2 Bundles	17.00
No. 3 Bundles	9.00
Machine Turnings	7.00
Billet, Forge Crops	15.50
Bar Crops, Plate	15.50
Cast Steel	15.50
Cut, Structural, Plate 1 ft and under	18.00
Alloy-free Turnings	7.00
Tin Can Bundles	14.50
No. 2 Steel Wheels	21.50
Iron, Steel Axles	24.00
No. 2 Cast Steel	20.50
Uncut Frogs, Switches	18.00
Scrap Rails	18.50
Locomotive Tires	20.50

SEATTLE:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$14.12
No. 2 Heavy Melt. Steel	14.12
Heavy Railroad Scrap	14.50

(Fob shipping point)

No. 1 Cupola Cast	20.00

USED and REBUILT EQUIPMENT
MATERIALS

FOR SALE

2—15 Ton ERIE O.H.T. CRANES
60' span. Built in 1942.
Excellent Condition.

For further particulars wire or phone

Glazer Steel Corporation

610 Chamberlain St. Phone 3-0738
Knoxville, Tenn.

FOR SALE
FLANGE STEEL

A considerable tonnage of 1/4" Flange Steel Corners of sufficient size to blank 10" to 8" diameter circles.

Subject to prior sale.

THE COMMERCIAL SHEARING & STAMPING CO.

P.O. Box 719
Youngstown 1, Ohio

FOR SALE
ALLOY STEEL
ROUND, HEX, SQUARE BARS

New York and Pittsburgh Warehouse Stocks

L. B. FOSTER CO.

9 Park Place, New York 7
Phone—Barclay 7-2111
P. O. Box 1647, Pittsburgh 30
Phone—Walnut 3300
Michigan Distributor
C. J. GLASGOW COMPANY
2309 Penkell Ave., Detroit 3
Phone—Townsend 8-1172

FOR SALE

1—Northern Engineering Co. 4 Ton 46' Span, 230 Volt, direct current 3 Motor CRANE with Steel Cab: Monorail horizontal travel: with 14 KW G. E. Motor Generator Set. Excellent condition, still installed, for immediate delivery.

Newberry Manufacturing Company

P. O. Box 295 Newberry, Mich.
Tel: Newberry 16

FOR SALE

USED CONTINUOUS WET DRAWING BENCH SUITABLE FOR PROCESS WIRE FROM .148 TO .0475. FIRST BLOCK DOUBLE DECK. DRAWING LIQUID TANKS. BLOCKS SUBMERGED. BELT DRIVEN. NO ELECTRICAL EQUIPMENT. TOTAL OF 8 BLOCKS, 16" DIAMETER. ADDRESS BOX 585, STEEL, PENTON BLDG., CLEVELAND 13, O.

OVERHEAD CRANES

200-Ton Alliance 100' Span
150-ton Whiting 30' Span
89-Ton "American" 40'6" Span
75-Ton Alliance 37' Span
75-Ton Alliance 78' Span
50-Ton Shaw 69'10" Span
40-Ton Alliance 82' Span
35-Ton Northern 22' Span
30-Ton Case 41' Span
30-Ton Morgan 77' Span
30-Ton Morgan 30' Span
30-Ton Niles 53'9" Span
30-Ton Reading 56' Span
25-Ton Bedford 50' Span
25-Ton Cleveland 106' Span
25-Ton P&H 70' Span
25-Ton Whiting 106' Span
25-Ton Whiting 82' Span
20-Ton Alliance 77' Span
20-Ton Cleveland 65' Span
20-Ton Morgan 77' Span
20-Ton Northern 60' Span
20-Ton P&H 51'4" Span
20-Ton P&H 39'6" Span
20-Ton Shaw 76'4" Span
20-Ton Shepard Niles 49'6" Span
15-Ton Alliance 50' Span
15-Ton Alliance 35' Span
15-Ton Cleveland 55'6" Span
15-Ton Cleveland 35' Span
15-Ton Morgan 77' Span
15-Ton Niles 32' Span
15-Ton Northern 53' Span
15-Ton Shaw 82' Span
15-Ton Shaw 77' Span
15-Ton Toledo 82' Span
15-Ton Whiting 74'8½" Span
12-Ton Morgan 56' Span
10-Ton Alliance 58'9" Span
10-Ton "American" 27' Span
10-Ton Case 31'9" Span
10-Ton Cleveland 38' Span
10-Ton Cleveland 50' Span
10-Ton Lane 50' Span
10-Ton Morgan 39'5" Span
10-Ton Morgan 77' Span
10-Ton P&H 57' Span
10-Ton Northern 34' Span
10-Ton P&H 37'4" Span
10-Ton P&H 48'10½" Span
10-Ton P&H 60' Span
10-Ton P&H 80' Span
10-Ton P&H 87'6" Span
10-Ton Toledo 36' Span
10-Ton Manually Operated
7½-Ton Erie 70' Span
7½-Ton P&H 30'6" Span
7½-Ton Shepard 36' Span
6-7-Ton Milwaukee 70' Span
6-Ton Shaw 23' Span
5-Ton "American" 10' Span
5-Ton Champion 37'6" Span
5-Ton Euclid
5-Ton Milwaukee 39'8" Span
5-Ton Milwaukee 63'9" Span
5-Ton Milwaukee 70' Span
5-Ton Northern 49'6" Span
5-Ton P&H 45' Span
5-Ton Shaw-Box 26' Span
5-Ton Shepard 40' Span
5-Ton Toledo 96' Span
5-Ton Whiting 80' Span
3-Ton P&H 46'4" Span
3-Ton Shaw 33' Span
3-Ton Whiting 57'3" Span
2-Ton Detroit 28' Span
2-Ton Louden 19'2" Span
2-Ton P&H 46'4" Span
2-Ton Shep. Niles 18' Span
2-Ton Shep. Niles 14' Span
1½-Ton Cleveland 25' Span
1½-Ton P&H 22'8" Span 34' Span
1-Ton Curtis 24' Span
½-Ton "American" 17' Span

Take advantage of the ECONOMY service by telephoning to us *collect,* which will enable us to discuss your requirements and present our suggestions.

In addition to overhead cranes we can supply all types of shovels, cranes, draglines, tractors, or practically everything in the equipment field. May we have your inquiries?

ECONOMY CO., Inc.

49 Vanderbilt Avenue, New York 17, N.Y.
Telephones: MUrrayhill 4-2294, 4-2393, 4-2295, 4-2844, 4-2296, 4-8292

FOR SALE
CORRUGATED ALUMINUM SHEETS—24ST

2-2/3" Corr.—1/2" Deep—Tonnage Available.

.036 x 34-1/2 x 72 .048 x 34-1/2 x 72
.036 x 45-1/2 x 96 .048 x 45-1/2 x 96

SEABOARD STEEL CO.

New Haven, Conn. Tel. 8-0929, 8-2034

FOR SALE

THREE BAYS STRUCTURAL STEEL BUILDINGS, 800 feet long each, 85 feet wide, with crane runways.

BENKART STEEL & SUPPLY CO.

2017 Preble Ave. Pittsburgh 12, Pa.
Cedar 4440

FOR SALE
WHITING CRANE

80' span, 30 ton with 10 ton auxiliary hoist. Main lift 44' 8", auxiliary 45' 1", 250 volts DC. New 1943. Will sell outright or will be interested in a trade whereby we can secure 40' span, 15 ton frame. No dealers. Location Eastern Pennsylvania. Address: Box 593, STEEL, Penton Bldg., Cleveland 13, O.

USED and REBUILT EQUIPMENT
MATERIALS

WANTED
BEAMS, ANGLES, CHANNELS, AND TEES
KLINE IRON & METAL WORKS
P.O. BOX 1013
COLUMBIA, SOUTH CAROLINA

WANTED
STEEL PIPE FOR GAS LINES

The Union Gas Company of Canada, Limited, Chatham, Ontario, Canada, requires steel pipe for gas lines, approximately 5 miles of 16" O.D. P.E., working pressure 350 lbs; 63 miles of 12¾" O.D. P.E., working pressure 600 lbs. Advise anything approximating these, quoting price per foot, F.O.B. cars at named loading point, and delivery, subject to inspection.

WANTED TO BUY

Complete or part of foundry mechanization for 30 squeeze molders on continuous pouring desired, to approximate following specifications:

1. Overhead Sand Belt Conveyor, 125 ft. centers, 24 inches wide.
2. Thirty (30) molders sand hoppers.
3. Sliding Chain Driven Mold Conveyor for average 12" x 18" x 7" molds with alternate on Overhead Chain Conveyor. Total length 650 feet.
4. Two (2) light duty 3" x 8" shake-outs for 220-3-60 current.
5. Ventilating and cooling hoods.

Address Box 596,
STEEL, Penton Bldg., Cleveland 13, O.

WANTED!!
STEEL STRUCTURE

Transferable to existing plant site in eastern area. Approximately 80' x 150' with high ceiling, possibly including 10 ton crane or crane rail.

Send full details to:

Box # S. M. 2037,
136 William St., N. Y. 7, N. Y.

WANTED
STEEL SHEETS

New or Used, Black or Galvanized. No objection to a few holes. Hot or Cold Rolled. State Hardness of Steel.

Width — 16" or Wider
Lengths — 96" or Longer
MUST NOT BE WARPED

ATLAS STEEL CONSTRUCTION CO.
Irvington, New York
New York Office: 43 Cedar Street

WANTED TO BUY

One or more 120 to 150 K.W. AJAX-WYATT ROLLING MILL TYPE MELTING FURNACE for yellow or red brass. Must be complete with tilting mechanism, electrical equipment, etc., and in good condition.

Also interested in buying reverberatory furnace, capacity up to 50,000 lbs. per day.

PIPE & TUBE PRODUCTS, INC.
Empire State Bldg. New York, N. Y.
Bryant 9-2685

WANTED
PRESS BRAKE

10' or larger for light sheet metal.
12' SQUARING SHEAR for No. 18 gauge.
The Cincinnati Sheet Metal & Roofing Co.
Cincinnati, Ohio

Wanted - SHEARINGS

Any Amount—All Sizes. Galvanized, Cold and Hot Rolled Aluminum—Stainless and Copper. 6" Minimum Width to 36" Minimum Length. Uniform Quantities. Gauges from 16 to 30 inclusive.

Write or Wire
Los Angeles Sheet Metal Mfg. Co.
901-903 E. 9th St., Los Angeles 21, Calif
TRinity 4713

EQUIPMENT . . . MATERIALS

FOR SALE
"STEWART"
GAS FIRED RECIRCULATING BOX TYPE FURNACES

Heat Chambers 20" x 20" x 20"—Max. heat range 1100° F—complete with temperature controls, blower and motor—excellent condition.

NATIONAL RIVET AND MFG. CO.
Waupun, Wisconsin

For Sale
2 - LARGE STEEL RETORTS

Each 76' long x 7'6" diameter, and weigh 30 tons. Cast iron dished ends, machine finished. Equipped with narrow gage railway track down center. Have certificate allowing 175 lbs. steam pressure and can be used under vacuum. Appraised at $5,000 each, but will sell for less.

CEREAL INDUSTRIES, Ltd.
Cannington, Ont.

FOR SALE
2000 TONS STEEL PLATES

72" x 5/8" x 40' 2".

Viking Manufacturing Co.
1905 S. First St., Milwaukee 1, Wis.
Tel.: Mitchell 4730

FOR SALE
WELDING RODS

100,000 lbs. Lincoln No. 5, 3/16" in original packing and excellent condition.

BREMAN STEEL CO.
329 Decatur St. Atlanta, Ga.
Walnut 3556

For Sale — Surplus Machinery

6—Sparks—Simplex Geared Head Quick Change Gear Lathes, 22" swing, 8' bed, completely hydraulic throughout with coolant pumps.

1—Thompson Surface Grinder 10 x 28, Serial No. B-222433, Hydraulic Pump complete with three motors, hydraulic pump spindle. Taft-Pierce Magnetic Chuck.

1—Press—Muller Radial Drill 3' Gear Box Drive.

For price and inspection, apply to:

NORWOOD MFG. ENGINEERING CO.
Florence, Mass.

FOR SALE
2 - 16" FLAT SCALPERS

Mfg. by Torrington. Good Operating Condition—Used in Brass Mill —Low Price for Quick Sale.

SEABOARD STEEL COMPANY
New Haven, Conn.
Telephone: 8-0929 - 8-2034

FOR SALE
Super Duty Alamo Cupola Blocks

3,000 36" x 48"—9-3/4" x 6"—6" x 4"

Address Box 598,
STEEL, Penton Bldg.,
Cleveland 13, O.

1—Henley Horizontal Type Hydraulic Lead Extrusion Press

3100 Ton Cap.—Complete with Gas Fired Melting Pot and all gages, etc.—No Pump New 1932—Serial No. 7317
Can be inspected at Plant where located.

SEABOARD STEEL CO. Tel. 8-0929
New Haven, Conn. 8-2034

RAILS NEW AND RELAYING
TRACK ACCESSORIES
from **5** *Warehouses*

- PROMPT SHIPMENTS
- FABRICATING FACILITIES
- TRACKAGE SPECIALISTS

EVERYTHING FROM ONE SOURCE

L. B. FOSTER COMPANY
PITTSBURGH CHICAGO
NEW YORK SAN FRANCISCO

FOR SALE
Hyster, Model 20, Lift Truck

2000 lb. capacity, year old, completely overhauled and repainted. Immediate delivery. $1600.00.

Address Box 583,
STEEL, Penton Bldg., Cleveland 13, O.

FOR SALE
1 U. S. Engineering Co.
F. N. 4 SHEAR

Capacity 2 3/4" Square with 20 H. P. D C. Motor

M. A. BELL COMPANY
St. Louis 2, Mo.

RAILWAY EQUIPMENT AND ACCESSORIES

We can furnish rails, spikes, bolts, angle bars, locomotives, cranes and other railway material.

Write, wire or phone for prices

SONKEN-GALAMBA CORP.
108 N. 2d St. Kansas City, Kansas

FOR SALE

APPROXIMATELY 1200 LBS.
COPPER STRIP
.068 x .111 perfect condition

Worcester Wire Novelty Co., Inc.
2635 Boston Street
Baltimore 24, Md

RELAYING RAIL
TRACK ACCESSORIES
MIDWEST STEEL CORP.

Gen'l Off. CHARLESTON, 21, W. VA.
Warehouses
CHARLESTON, W. VA.
KNOXVILLE, TENN. ● PORTSMOUTH, VA.

New and Used
RAIL & INDUSTRIAL EQUIPMENT CO.
30 Church St., New York 7, N. Y.
Telephone BArclay 7-9840

EQUIPMENT . . . MATERIALS

WANTED
FLAT STEEL BARS

5/8 x 1/4

Wire us any quantity available

Struthers Wells Corporation
Warren, Pa.

FOR SALE

2—13 cradle stranding machines and take-ups in excellent condition, ball-bearing cradles carry spools 10-1/2" dia. by 5" traverse with capacity for 70 pounds of wire; overall length 39 feet, width 33 inches.

138 cast steel spools 10-1-2" dia., 5" traverse

1—6 head spooler and reels for same

G. F. Wright Steel & Wire Co.
Worcester, Mass.

WANTED
STEEL SHEETS

Cold Rolled, also hot rolled primes. All sizes from 24" minimum width to 60" minimum length, in gages from No. 11 to 24 inclusive. For delivery either in Indiana or New Jersey. Contact P. A. Breeze Corporation, Inc., 41 South 6th Street, Newark 7, N. J. Tel. Mitchell 2-7161.

FOR SALE

1—Type "K" Radiac Cut-Off Machine

New; Motor Driven, 7 1/2 HP, 220 volt, 3 phase, 60 cycle motor. Offered for immediate sale.

INDIANAPOLIS DROP FORGING CO.
1300 Madison Ave., Indianapolis 7, Ind.

Help Wanted | Help Wanted | Help Wanted

WANTED
SALES MANAGER
HIGH GRADE ONLY

For large STRUCTURAL STEEL fabricating company. State engineering experience, education, age and references first letter.

Address Box 576
STEEL, Penton Bldg., Cleveland 13, O.

CHIEF ACCOUNTANT

We desire to obtain services of Cost Accountant and Auditor experienced on American steel plant costs and accounting for service with large integrated iron and steel concern in the Far East. Living conditions are excellent. Compensation will be adequate and commensurate with ability of individual. Give full information as to experience, age, salary expected, etc. All replies will be considered confidential.

Address Box 571,
STEEL, Penton Bldg., Cleveland 13, O.

FOUNDRY ENGINEER

Must be experienced in layout, foundry design, time and motion study, incentive systems and malleable iron operations. Experience with duplexing not pre-requisite, but helpful.

In replying, please send full information: education, experience, and salary expected.

All correspondence will be held in strict confidence. Our employees know of this advertisement.

Address Box 583,
STEEL, Penton Bldg., Cleveland 13, O.

Salesmen — Steel And Hardware

Warehouse established for eighty years has opening for two experienced men to travel Virginia, D. C., and Maryland. Submit experience; references.

Salary open.

Write
J. B. KENDALL CO.
1510 Eckington Place, N. E.
Washington, D. C.

WANTED
Industrial Furnace Designer

NATIONALLY KNOWN MANUFACTURER REQUIRES DESIGN ENGINEER WHO HAS HAD A MINIMUM OF FIVE YEARS INDUSTRIAL FURNACE DESIGN EXPERIENCE. MUST HAVE IMAGINATION AND CREATIVE ABILITY. QUALIFICATION BASED ON PATENTS ISSUED AS PART OF PREVIOUS EXPERIENCE. PERMANENT POSITION. GIVE FULL DETAILS IN LETTER. INTERVIEWS WILL BE ARRANGED IN NEW YORK, CLEVELAND AND CHICAGO.

ADDRESS BOX 582,
STEEL, Penton Bldg., Cleveland 13, O.

WORKS MANAGER WANTED FOR A STRIP steel and wire fabricating plant located in the Southwest. Must have good background in production, tool designing, wire forming, metal cutting and spot welding. Excellent opportunity for man with proper qualifications. Please give full information in first letter, including age and present salary. References held confidential if requested. Address: Box 589, STEEL, Penton Bldg., Cleveland 13, O.

SALES ENGINEER WANTED, PREFERABLY located in Cleveland area. Young man interested in selling metal cutting tools throughout Ohio and Pennsylvania territory. Experience advisable, but unnecessary. Good opportunity for the right man. Address Box 581, STEEL, Penton Bldg., Cleveland 13, O.

MECHANICAL DRAFTSMAN WANTED
Engineering education and at least five years experience in mechanical drafting. State age, experience and salary expected. Address Box 594, STEEL, Penton Bldg., Cleveland 13, O.

MELTER TO OPERATE 1½ TON MOORE Electric furnace making low alloy and carbon steel. State qualifications and salary. Address: Box 592, STEEL, Penton Bldg., Cleveland 13, O.

SALES ENGINEER WANTED: WE ARE INterested in securing the services of a good, reliable man for the sale of metals and alloys, principally to the major steel companies, but will only consider a man of experience and good record. Address Box 636, Niagara Falls, New York.

IF YOU HAVE AN OPPORTUNITY TO OFFER

Use the "Help Wanted" columns of STEEL. Your advertisement in STEEL will put you in touch with qualified, high-calibre men who have had wide training in the various branches of the Metal Producing and Metalworking industries.

Positions Wanted

EXECUTIVE: THOROUGHLY EXPERIENCED IN ALL SHEET METAL AND STEEL FABRICATION, MACHINING, WELDED ASSEMBLIES, FINISHES INCLUDING GALVANIZING AND PORCELAIN ENAMELING. EXPERT SYSTEMS INSTALLATION CAN TRAIN PERSONNEL. AVAILABLE FOR POSITION AS PLANT MANAGER OR ASSISTANT. ADDRESS: BOX 597, STEEL, PENTON BLDG., CLEVELAND 13, OHIO.

GRADUATE STRUCTURAL ENGINEER, AGE 36, for 17 years with one structural steel fabricating company as estimator and field engineer desires sales position requiring a technical background. For past six months has been selling special welding rods on commission basis. Available immediately. Address: Box 590, STEEL, Penton Bldg., Cleveland 13, O.

SALES DIVISION

Twenty-five years experience in Ferrous and Nonferrous Industries. Intimate knowledge, supervisory capacity, Operation, Engineering, and Sales. Carnegie Tech graduate. Desires connection in Sales with Foundry or Sales Representative organization. Age 48. References. Address: Box 587, STEEL, Penton Bldg., Cleveland 13, O.

EXPAND

YOUR REPRESENTATION . . .

An advertisement here puts you in touch with trained, efficient, reliable men looking for new lines. Write STEEL, Penton Bldg., Cleveland, O.

Representatives Wanted

DISTRIBUTOR
OR
FACTORY REPRESENTATIVE

To represent midwest manufacturer of quality blast cleaning and surface peening, STEEL SHOT AND GRIT, for use in foundries, drop forge, heat treat and misc. metal industries. No objection to other lines. Field cooperation and national advertising. Substantial commissions. Write for information. Address Box 588, STEEL, Penton Bldg., Cleveland 13, O.

Employment Service

SALARIED POSITIONS $2,500-$25,000. THIS thoroughly organized confidential service of 3(years' recognized standing and reputation car ries on preliminary negotiations for supervisory technical and executive positions of the calibr indicated through a procedure individualized t each client's requirements. Retaining fee protected by refund provision. Identity covered and present position protected. Send only name and address for details. R. W. BIXBY, INC., 110 Dun Bldg. Buffalo 2, N. Y.

OPPORTUNITIES AND PROFITS

are of equal interest to distributors and manufacturers—use an ad on this page next week to let manufacturers know you are interested in taking on new lines.

Opportunities

FOR SALE 60 TO 65% STOCK OWNERSHIP in a corporation, a metal fabricating business located in Western New York. Plant is now operating on production schedules estimated for sales of $1,500,000.00 a year. Have 120 factory employees. Can produce metal fabrication, excepting deep drawing, for products from 30 gauge light to 1" thick. Have Underwriters' service on oil and gasoline storage tanks and ASME service for High Pressure work. Now arranging production of a prewar standard product, direct fired home heating units. Reason for selling poor health. Address: Box 595, STEEL, Penton Bldg., Cleveland 13, O.

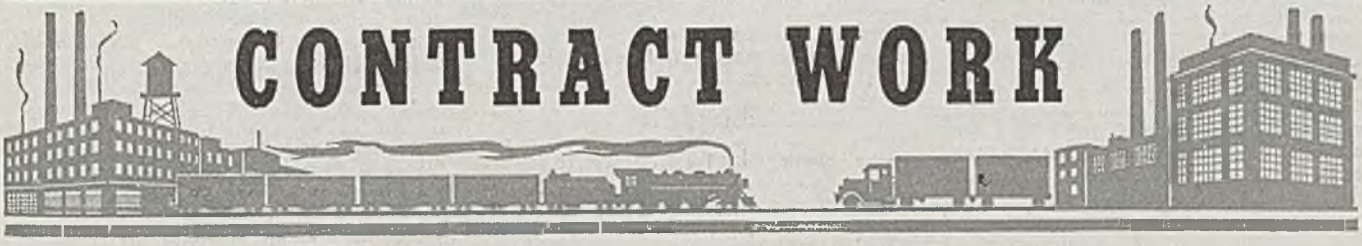
Accounts Wanted

SALES ENGINEER TWENTY YEARS EXPERIence, especially in introduction of new products, will act as manufacturers' agent. Prepared to give undivided attention account covering mechanical product, device or process. Located Los Angeles Metropolitan area. In East August and September. Make appointment for personal interview. Address: Box 591, STEEL, Penton Bldg., Cleveland

SALES ENGINEERING ORGANIZATION COVering the Middle Atlantic States out of Philadelphia, wants additional high grade account,—drop forgings, die castings, stampings, castings, etc. Straight commission, exclusive territory. Only first quality lines considered. Write Box 572, STEEL, Penton Bldg., Cleveland 13, O.

CLASSIFIED RATES

All classifications other than "Positions Wanted," set solid, minimum 50 words, 7.00, each additional word .14; all capitals, minimum 50 words 9.00, each additional word .18; all capitals leaded, minimum 50 words 11.00, each additional word .22. "Positions Wanted," set solid, minimum 25 words 1.75, each additional word .07; all capitals, minimum 25 words 2.25, each additional word .09; all capitals, leaded, minimum 25 words 2.75, each additional word .11. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request.
Address your copy and instructions to STEEL, Penton Bldg., Cleveland 13, Ohio.



Firm Bid Quotations on All Types of Design and Detailing - -
MECHANICAL, MACHINE AND STRUCTURAL OPEN TIME NOW.
THE FRANCIS COMPANY
Designers -- Engineers
1006 Fisher Bldg. Chicago

MACHINE SHOP
Complete Job Shop, Experienced Machinists, full work week. Independent Diesel Generating Power Plant, ample floor space and crane facilities. We invite inquiries regarding machine work of all kinds.
Elizabeth City Iron Works & Supply Co.
Riverside Ave. Tel. 1380
Elizabeth City, N. C

SPECIAL MANUFACTURERS TO INDUSTRY... *Since 1905*
Metal Specialties comprised of STAMPINGS, FORMING, WELDING, SPINNING, MACHINING. All Metal or Combined with Non-Metal Materials
Write for Folder
LARGE SCALE PRODUCTION
OR PARTS AND DEVELOPMENT ONLY
GERDING BROS.
SE THIRDVINE ST. ● CINCINNATI 2, OHIO

IF YOU HAVE CAPACITY OPEN,

why not line up sub-contract work through an advertisement in this section? For additional information or rates, write STEEL, Penton Bldg., Cleveland 13, O.

Send us your inquiries on
PRODUCTION PARTS AND ASSEMBLIES
Viking High Speed Tool Bits
Special Taps
Commercial Heat Treating
Electro Plating
AGERSTRAND CORPORATION
Muskegon, Michigan

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