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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 118, NO. 23 JUNE 10, 1946

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TECHNICAL

FEATURES

MARKETS

NEXT WEEK...

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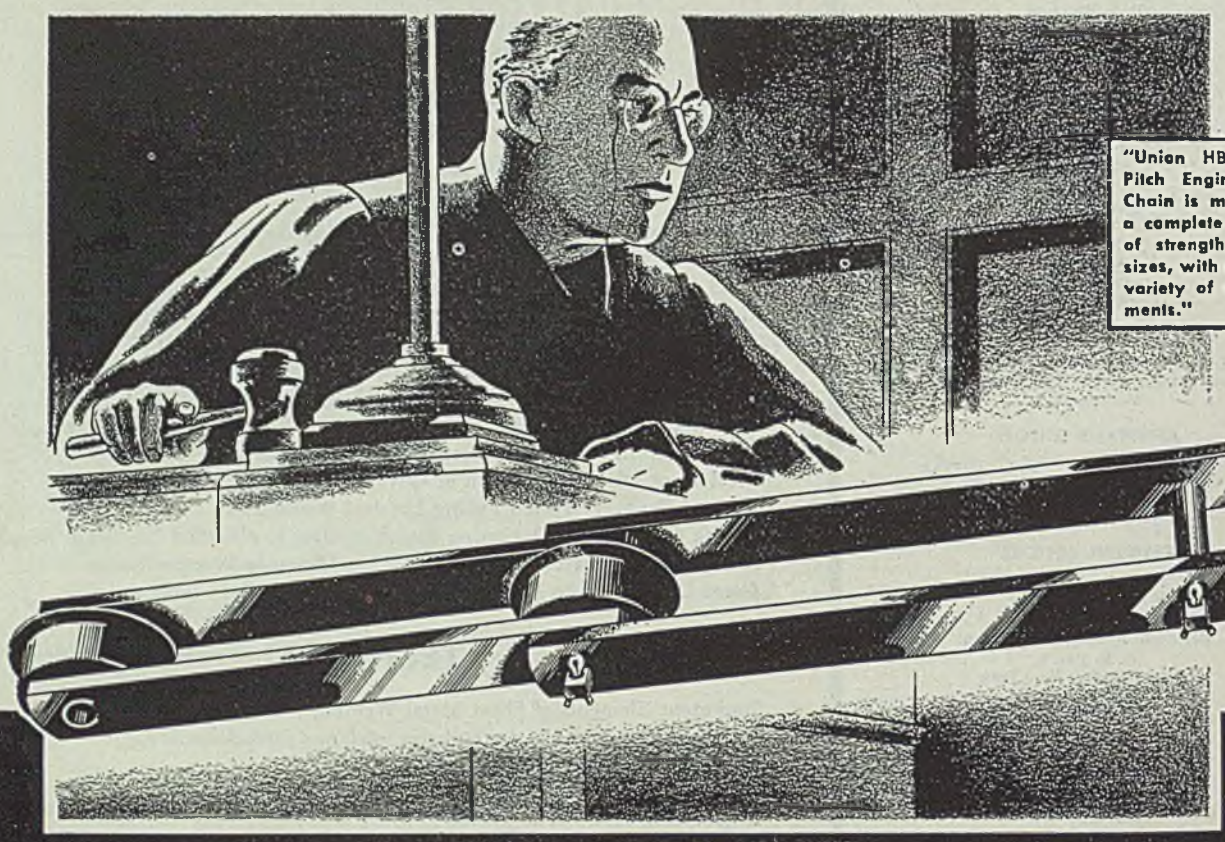
Effect of Undissolved Carbides on Hardenability

Production and Precision Provided by Honing

Powder Metallurgy and Refractory Metal Processes

Relation of Coal to Blast Furnace Fuel Economy



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As the EDITOR VIEWS the NEWS

Industrial Fire Losses

Whereas many of the war-torn cities of Europe reflect punishment largely inflicted by demolition bombs, the larger cities of Japan show damage caused chiefly by incendiary bombs. Tokyo, Kawasaki, Yokahoma and other heavily bombed cities afford interesting testimony as to the resistance of various types of building construction to fires caused by incendiary missiles.

Most sections where the homes and shops were of light construction were swept clear. Aside from safes, some sheet metal roofing and a small amount of rubble, there is little to show where a building had stood. This is not surprising, as the structures in these areas were of light wood framing, with flimsy bamboo walls daubed with plaster or stucco. Almost all of the furnishings were of wood.

In the downtown sections, most of the larger buildings of steel or reinforced concrete construction are intact. The interiors of a few were badly gutted by fire and occasionally one sees a fairly substantial building that was damaged by demolition bombs. However, in the main, the buildings of modern construction came through in good shape.

In the industrial sections, the importance of fire-resistant construction is demonstrated even more convincingly. Few of the larger or more modern manufacturing establishments were damaged severely by incendiaries. Often when the exterior of a large factory or of a steelworks or rolling mill building appears to be damaged seriously, a close inspection of the interior shows that the important equipment has suffered only superficial injury. In the main, production in the larger industrial units in Japan was curtailed more by the bomb injury to transportation and to workers' homes than by the direct effect of incendiaries.

However, in thousands of small manufacturing shops and in a few of the older large shops, damage from fire was severe. This was because the buildings were largely of wood. Often a plant with steel columns for crane runways was gutted badly because all other structural members were of wood. In areas where small or old factories are numerous, it is not uncommon to see acres upon acres of rusty bending brakes, drop hammers, drill presses, lathes and other items of machinery standing amid a thin layer of rubble. There is practically nothing left of the structures which housed the machines.

Japan's experience with incendiary bombs should lend new emphasis to the advantages of fireproof construction. American industry can profit from this experience, because its fire losses in recent years have been far too high.

STEEL
June 10, 1946

EVERYBODY LOST: If manufacturers gave a sigh of relief last week their elation was understandable. Ending of the bituminous coal strike signaled the go-ahead for production. For 64 days they had been caught in a position in which they were helpless to extricate themselves, being compelled to stand idly by while their furnaces grew cold and the wheels of industry gradually slowed to a snail's pace for lack of fuel.

Reconversion now can be resumed, but the scars of the Lewis strike will remain for a long time. The mine stoppage was one of the most costly in the nation's history. Everybody lost, including the 400,000 striking miners, ostensibly the victors through an 18½ cents per hour wage increase, and a 5 cents per ton welfare fund "tax" on production, equivalent to about 3 cents per hour in wages. But the miners' victory was a hollow one for they lost millions in wages which it will take them many months to recoup.

Strike settlement was on terms which the mine operators had little, if any, direct say in negotiating.

(OVER)

Their seized properties still are held by government bureaucracy and will not be returned until the owners accept the settlement terms. The cost in lost production will never be made up.

As for the public, as usual, it will have to foot the bill in higher coal prices, variously estimated at 25 to 75 cents per ton. The inflationary spiral has been given another sharp fillip as the economy heads towards dizzy heights. And still more distressing is the sanctioning by government of a dangerous principle in labor relations in approving a welfare fund "tax" on production. Other unions now can be expected to press for like treatment in future disputes. —p. 57

* * *

NOT SO EASY: Recent rejection of bids for the government-owned steel plant at South Chicago directs attention to the fact disposal of war-born facilities of such magnitude is not going to be a simple matter.

In the case of the South Chicago works, operated by Republic Steel Corp., only three bids were submitted and one of these subsequently was withdrawn. Henry Kaiser had been expected to make an offer but failed to do so. The War Assets Administration in rejecting the remaining offers held acceptance of either bid would not obtain for the government the fair value of the property.

Whether WAA will meet with any greater success in asking for new bids is questionable. Surely there are only a limited number of prospective buyers for a property of such size, and especially one, which, to be adapted for certain important civilian production, may necessitate expenditure of millions of dollars for additional facilities. As in the case of the Geneva steelworks, it certainly would seem just as difficult to attract more than a few bidders for the South Chicago plant who can meet the rigid qualifications of the Surplus Property Act. —p. 66

* * *

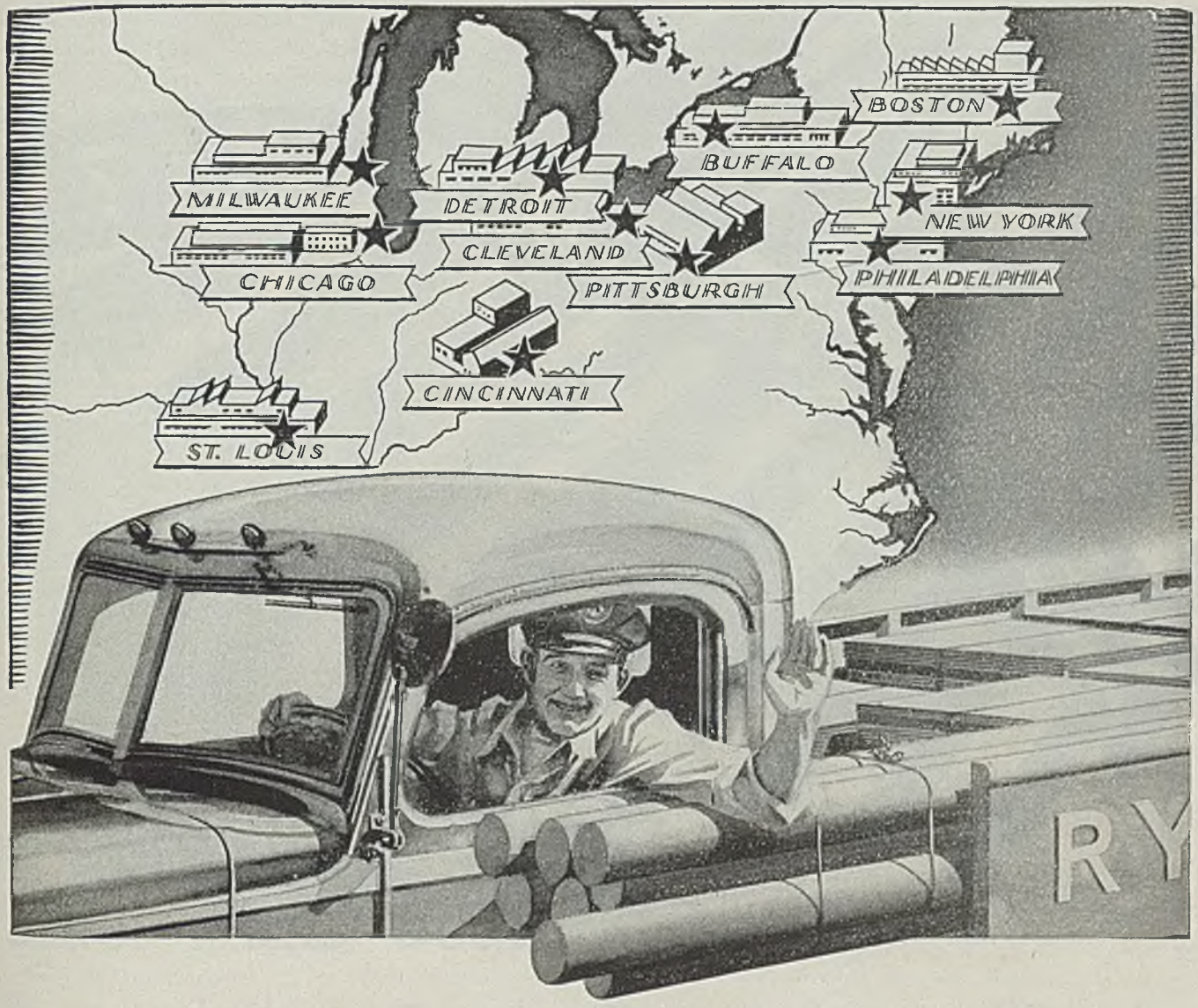
SHEET METAL WELDING: The modern sheet metal shop pays closer attention to fit of parts and joints, welding technique, and welding jigs because of their greater influence on the economics of joining light gage metals. Machine, appliance and instrument housings, cabinets and other welded assemblies reach the market with jackets thin as are compatible with conditions of service. The trend toward thinner gages entails special problems of fabrication.

Good fit up and joint design go hand in hand with fixtures for accuracy and both are closely related to welding position and speed of the operation. In this high-cost low-margin era, an up-to-date review of proper welding conditions may help welding engineer or superintendent to fully exploit cost-saving possibilities. —p. 86

SIGNS OF THE TIMES: Long awaited reshuffling of top General Motors administrative personnel (p. 73) proves less startling than had been rumored. Purposes of somewhat complicated shifts is to strengthen general executive staff for expanding responsibilities. . . . Scientific research rates top billing in all phases of American life these days. Latest manufacturer to announce an expanded research program is Ford Motor which plans (p. 74) an elaborate $50 million research and engineering center that will require eight years to complete. . . . Japanese industry has operated at only a small fraction of capacity since the end of the war (p. 68), the country suffering from a combination of ailments common to a vanquished nation. . . . Reoriented program for intensifying research on problems bearing on maintenance of high employment, production and distribution (p. 76) launched by Committee for Economic Development. Fifty-three new members added to board of trustees as first step in program. . . . Performance of special silver brazing alloys in joining metals during the war was so outstanding in ordnance (p. 94) it would be well to take another backward look at the process for possible industrial applications. . . . One boron atom to 25,000 atoms of iron and steel (p. 98) is capable of forming a characteristic precipitate when the metal is specially heat-treated, lowering the rate of grain boundary nucleation and increasing hardenability. . . . In recent months talk has been heard about dwindling high-grade iron ore supplies at the head of the lakes which eventually will force steelmakers to import large tonnages of ore. In line with this is announcement M. A. Hanna Co. plans exploration of large, undeveloped deposits of ore in Brazil (p. 77), geologists now on the property estimating about a year of intensive work will be required to determine whether operation will justify large capital expenditures for equipment. . . . Large industrial and commercial building program (p. 78) getting under way in the eight western states. Total building started since mid-April, or scheduled to get under way when materials are available, estimated at $275 million. . . . Increases in nonferrous metal prices (p. 60) are expected to spur settlement of current wage disputes in the industry but production is seen slow to respond to point current shortages will be relieved. . . . Farm equipment output (p. 61) continues to lag as result of work stoppages and materials shortages.

E. C. Shane

EDITOR-IN-CHIEF



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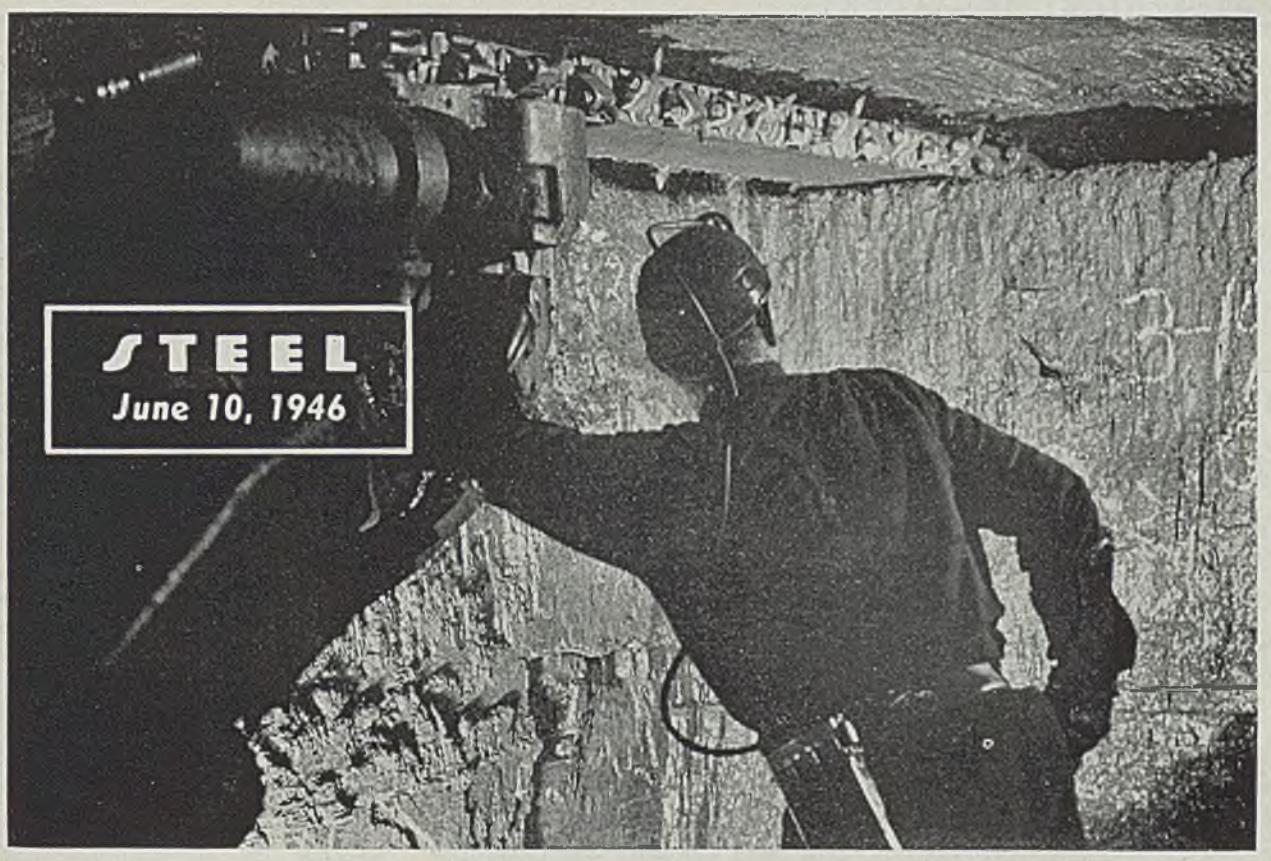


Mechanized coal mining is expected to be further emphasized by the increased costs of labor resulting from the recent coal wage settlement. This photo shows a universal cutting machine which slices nine feet deep in the Leisenring No. 2 mine of the H. C. Frick Coke Co. near Uniontown, Pa.

Steel Mills Begin Recovery; Costs Raised by Coal, Ore Wage Boosts

Mills seen forced to seek higher prices to compensate for increases in raw materials and probable higher freight rates. Ingot production gains 12 points to 55 per cent in first week of coal peace. Month to be required to reach prestrike level

NEW increases in the costs of producing pig iron and steel resulting from the settlements in the soft coal, iron ore and railroad strikes likely will force further upward adjustments in the prices of iron and steel.

Although no definite move for obtaining higher ceilings had been taken by producers late last week, the fact that the increase in pig iron making costs will amount to $1 a ton or more left little doubt that application for upward revision must come soon.

Before the recent steel wage increase, it was figured by OPA steel producers were entitled to a $2 a ton increase to compensate for costs absorbed during the war. The steel wage increase is estimated as costing $3.70 a ton, giving producers an actual increase of $1.30 a ton, out of the $5 price increase.

While the cost of the coal wage increase is debatable—with government spokesmen estimating the cost at 25 to 35 cents and the operators claiming 75 cents— the figures indicate the actual increase in cost of coal at the mines may be around 43-45 cents. The direct wage increase will cost approximately $225 million a year, assuming the six-day week is continued, the welfare fund levy will cost about $30 million, and the added vacation allowances will cost about $10 million, a total of around $265 million annually. On the basis of 600 million tons annual production, this would amount to a little less than 45 cents a ton at the mine. When probable freight rate increases are taken into consideration, the cost of coal delivered at consumers' sidings probably will be about 60 cents more.

Twenty-five hundred pounds of coal are required to produce 1800 pounds of coke, the amount generally required to make a ton of pig iron. On this basis, the coal cost increase would add 75 cents a ton to the cost of making pig iron.

Settlement of the dispute in the iron ore mines, which resulted in granting the miners an 18½-cent an hour increase, will increase the cost of mining ore from 12 to 55 cents a ton, the wide variation arising from differences in mining open pit and underground ore, in beneficiating, washing, etc.

Generally, from 1½ to 2 tons of ore are required to produce a ton of pig

iron. Thus the cost of ore required per ton of iron would be increased from a minimum of 18 cents to a possible maximum of more than $1.

Ore mining interests say that unless price relief is granted on iron ore, working of some high-cost underground mines may have to be abandoned. An application for such relief on ore prices has been pending before OPA for some time.

Coal Flows To Mills After Long Stoppage

WITH coal again flowing to coke plants and blast furnaces, the nation's steel mills are beginning another climb toward normal operations. Ingot production in the first week after the mine strike was settled climbed 12 points to 55 per cent of capacity.

At least a month will be required before steel operations regain their prestrike level, although many mills may pass the 80 per cent mark within two weeks. Finishing mills will require a little longer to reach normal operations.

Coal piles of most steel mills were depleted during the 9-week strike by the coal miners and some time will be required to rebuild them to a working level.

Scrap also is short and a critical situation in this material is expected to develop as the mills reach the higher operating level. During the coal strike, steel mills have been restricted on hot metal and have used scrap more heavily. Metal fabricating plants have not generated a large flow, due to their curtailed operations.

Supplies of other raw materials, particularly iron ore and limestone, are adequate.

Attainment of reasonably full steel production will not mean immediate relief for many steel consumers. Stocks of steel-using companies generally are out of balance and probably will remain more or less uneven for months. Particularly, shortages of silicon sheets, copper, spring wire, and some other items remain critical.

Overall outlook for materials as they affect the manufacturing level, however, is more encouraging, with prospects pointing to July 1 as the date when a concerted improvement can be realized.

The situation in leading industrial centers, as reported by STEEL's editors:

NEW YORK—Eastern steel operations will make sharp gains percentagewise over the next two or three weeks, but it will be a month to six weeks before they will be back to normal.

Meanwhile, steel consumption will expand on a limited basis, although perhaps not at a rate comparable to the increase in steel ingot production, for the reason that steel stocks are now unbalanced.

From the standpoint of metal, many fabricators are being handicapped particularly by the lack of silicon sheets, small wire rod products, small carbon bars and perhaps most of all by lack of copper wire.

Many metal fabricators are operating almost on a day-to-day basis, their stocks having become so badly unbalanced. Improved steel production will undoubtedly help as time goes on as there is such a stringency in various directions that some are planning to suspend operations entirely for periods of anywhere from a week to a month. They claim the outlook is too spotty for them to continue on the present hand-to-mouth basis and that it would be more economical for them to suspend entirely for at least a certain length of time.

CHICAGO—At least a month will be required for steelmakers in this district to restore production to a level approximating that prevailing before the coal strike. Highest operating rate achieved this year was 92 per cent in the week ended April 6—first week of the strike.

Rapidity of recovery depends chiefly upon speed with which coal moves from mines to plants and working inventory can be built up, although some hold-down influence may result from inadequate supply of scrap. Stocks of iron ore and limestone are fully adequate for full production.

Restricted as to hot metal supply, steel plants have used scrap heavily to maintain steelmaking at the highest possible level. Scrap now is getting desperately short and may be inadequate to match higher operating levels. The situation should improve in a few weeks, however, for production scrap will rise as manufacturing plants receive new steel.

SAN FRANCISCO—Primary steel producers in this area were unaffected by the coal and rail strikes and operated without letdown. While raw materials are not plentiful, they appear adequate to maintain operations at current level of slightly more than 81 per cent of capacity. Finished steel supplies of manufacturers are low. Warehouse stocks were depleted during the strikes and replenishment must await recovery by eastern steel mills.

BUFFALO — Bethlehem Lackawanna plant is operating at 80 per cent of capacity. This is as high as the works can go until additional coal supplies become available. Coal and coke shortages appear to be the most serious, as mills have comfortable supplies of other materials.

YOUNGSTOWN—Steel operations here rose to 30 per cent of capacity, compared with 15 per cent in the last week of the coal strike. Mills expect to receive fairly good supplies of coal this week and ingot operations will improve as the fuel supply begins to flow in more normal volume.

BIRMINGHAM—Coal miners have returned and fuel is flowing to steel mills which have started a slow climb toward normal operations, which, however, will not be attained until the end of June or later. Finishing mills will require about two weeks longer.

DETROIT—While coal supplies are reported rolling to blast furnaces, the supply situation on pig iron and coke as of last week continued touch-and-go. It will require from two to three weeks for restoration of something like a normal pattern of production in these commodities.

The materials picture in automotive plants continues highly unbalanced, principally because of recurrent strikes in suppliers' plants. These spring from efforts of the UAW-CIO to force a general acceptance of the 18½ cents an hour wage increase pattern in all plants where it holds contracts, regardless of any increases in wages granted over the past year. Final settlements in the hundreds of strikes among suppliers likely will be delayed for weeks.

Further complicating the outlook is the matter of almost indeterminate costs resulting from retroactive price increases being allowed by the OPA, along with adjustable prices on some commodities, and more increases to come in others. Result is that no one can figure costs, since nearly every contract for materials or parts carries an escalator clause permitting later readjustments upward. Typical is the case of electric motors which were increased 16½ per cent as of May 13, but retroactive to any motors shipped subsequent to April 15. Even this change might be subject to revision in view of the substantial increases granted recently in nonferrous metals. The only sane solution to a situation which is steadily growing more bewildering appears to be the dropping of all forms of price control on manufactured goods and materials.

BOSTON—Being primarily a consuming rather than producing area for most steel products, New England fabricators are with few exceptions operating with low inventories and many will be short of steel before shipments are resumed in volume after mills reach approximate normal production. All factors considered, metalworking industry has operated up to now at a higher rate than might have been expected but shortages during next 30 days will be serious for many users of steel and copper. A surprising number of purchasing executives in New England, it now appears, placed orders in volume last fall, sometimes with several producers, and although curbed by mill quotas to a considerable degree, have up to now made

possible shop production at fair level.

PITTSBURGH — Coal output in western Pennsylvania last week was back to near prestrike level of 300,000 tons daily and iron and steel plants were resuming operations as rapidly as possible. Twenty-one blast furnaces have resumed, making a total of 35 out of 54 active.

This district's proximity to the coal fields is expected to aid the mills in getting back into fairly full production early. The leading producer expects to reach normal output before the end of the month.

The loss due to the steel and coal strikes generally is estimated as equivalent to three months' production.

CLEVELAND — Immediate increase in employment was noted following resumption of coal shipments. Survey indicates that the increase will be close to 10,000 for the month, lifting total employment to the highest level since V-J Day.

The iron and steel and foundry industries were hardest hit by the coal strike but these made steady gains in production last week. Present schedules call for full production of steel here by mid-June. The metalworking machinery and the electrical machinery industry maintained steady employment in their plants during May and June.

Government Subsidizes Sheet Bar Purchase by 5 Small Sheetmakers

FIVE nonintegrated sheet steel producers have been given temporary government subsidy assistance on their semi-finished steel supply problem by means of a purchase arrangement negotiated by the Reconstruction Finance Corp. with Jones & Laughlin Steel Corp., Pittsburgh.

The program involves 12,500 tons of sheet bars of which 2500 tons each are to go to Apollo Steel Co., Apollo, Pa.; Superior Sheet Steel Co., Canton, O.; Mahoning Valley Steel Co., Niles, O.; Reeves Steel & Mfg. Co., Dover, O.; and Parkersburg Steel Co., Parkersburg, W. Va. June delivery is specified.

RFC will pay Jones & Laughlin Steel Corp. $45.84 a ton for the sheet bars at Pittsburgh, and sell to the nonintegrated companies for $38, delivered. Including freight charges, this subsidy arrangement will cost RFC $10.34 a ton, or about $129,500.

At the request of the Civilian Production Administration which desires to keep the nonintegrated mills operating, RFC instituted the subsidy from the unclassified ("and other materials") subsidy funds which Congress gave it for the fiscal year ending June 30. Unless Congress extends the subsidy program for metals or provides some unclassified subsidy funds in the OPA extension law now befor the Senate, the sheet bar subsidy, the first ever granted in the purchase of steel, will stop at the end of June. It might stop anyway, depending on what CPA decided it wanted done.

The argument for subsidies is that price increases have to be passed on through all the manufacturing cycle.

Four of the nonintegrated companies—all except the Parkersburg firm — are negotiating with RFC for a loan, amount still undetermined, to purchase jointly the Sharon Steel Corp.'s Lowellville, O., plant. Decision is said to hinge on discussions in progress covering acquisition of essential equipment. The Lowellville plant has annual pig iron capacity of 173,600 tons; 600,000 tons of basic open-hearth steel and 36,000 tons of electric furnace ingots. Blooming mill capacity is rated at 470,000 tons and sheet bar and billet capacity at 463,300.

Follansbee Steel Corp., Pittsburgh, has under consideration a request from Parkersburg Steel Co. to take over that company's sheet mill operations.

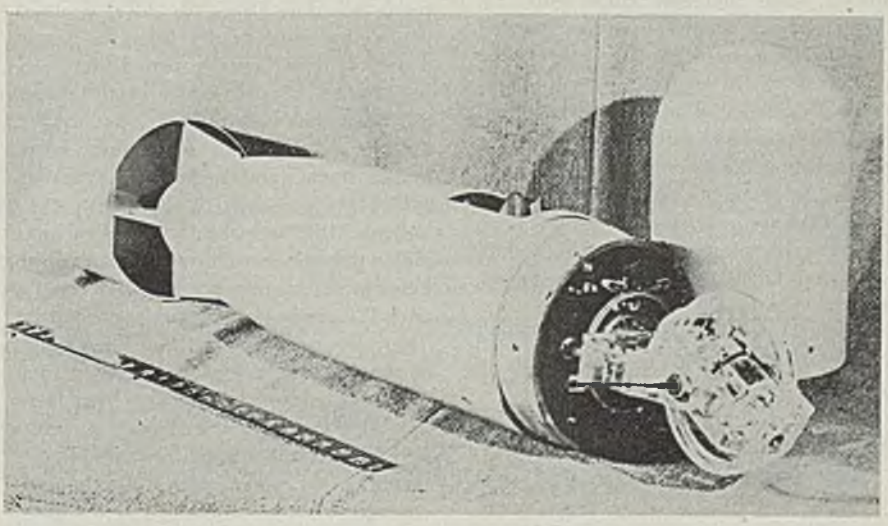
Navy's Airborne Detector Speeds Prospecting for Iron Ore, Oil

THE Navy's hitherto secret magnetic airborne detector, which was developed during the war to locate submarines lying too far beneath the sea's surface to be observed visually, has been converted to peacetime use.

The detector, more informally known as the "aerial doodle bug," now is being used to locate hidden deposits of iron ore and other magnetic minerals and to prospect for oil-bearing areas far beneath the earth's surface. Already 40,000 square miles of land in the United States and Alaska have been surveyed with the device.

The device was developed by Bell Telephone Laboratories in co-operation with the Naval Ordnance Laboratory, the Gulf Research & Development Co. and Columbia University. During the war it was credited with bottling up the German submarine fleet in the Mediterranean. Detector-equipped planes patrolling the Straits of Gibralter were able to spot and bomb deep running submarines and provided an effective blockade for the channel.

The detector, shown in accompanying photo, is a small streamlined cylinder with guiding tail fins. It is trailed from



an airplane at the end of a cable to minimize the magnetic influence of the steel and other metals in the plane.

For peacetime use, the detector has been combined with Shoran, a radar-mapping device, and with special mapping cameras. It permits reconnaissance surveys of large and inaccessible tracts and provides a quicker and more accurate survey of the geological formation than is possible with land magnetic surveys.

During the war the detector was used to survey Iron County, Michigan, for iron ore for war use, and will be employed to explore the Navy's Petroleum Reserve No. 4 in Alaska. The device does not detect the presence of oil but charts the geographical structures in which oil generally is found.

Prices Raised, but Shortage Continues

Higher ceilings expected to hasten settlement of labor disputes and stimulate production, but copper, lead will be critical for weeks

CONSUMERS of copper, brass, lead and other nonferrous metals, on which ceiling prices were raised June 3, generally are agreeable to the OPA action, but they hold little hope that the long overdue action means an early solution to their shortage problems. In the long run, the price boosts will be beneficial to the supply situation, but immediate effects are negligible.

The shortage situation, especially in copper, is too deep-seated to be amenable at once to the price increase. In time, the higher levels will stimulate mining, smelting, fabricating of finshed product and turnover of scrap.

Meanwhile the shortage continues acute and is limiting the output of many industrial and civilian items.

Increases in price ceilings for copper, lead, and other nonferrous items, all effective June 3, have been allowed by OPA. Base copper prices were raised 2.37½ cents a pound for metal received from mines which have granted approved wage increases since Feb. 14, 1946. Mines which have not granted approved wage increases are held to the old price of 12 cents a pound, Connecticut Valley. Some copper producers already have granted approved 18½-cent hourly wage increases.

Subsidy payments under the Premium Price Plan, which has been used since 1942 to encourage maximum production from high-cost marginal producers, will be continued.

Lead prices were advanced 1.75 cents a pound, from 6.50 to 8.25 cents a pound for primary lead, New York.

OPA also granted the following increases for other nonferrous items:

Brass and Bronze Ingots: Producers of brass and bronze alloy ingots were granted an increase averaging 15.52 per cent over former ceiling on ingots. Increases per pound for the principal grades in the various alloy groups are as follows: 85-5-5-5 group, 2.25 cents; 88-10-2 group, 2 cents; 80-10-10 group, 2.25 cents; yellow group, 2.25 cents; miscellaneous group, 1.25 cents.

Copper and Alloy Scrap: Ceiling prices for copper scrap, copper alloy scrap and brass mill scrap were increased to keep the same relationship between the base price of copper and these products. The increases are as follows: For most grades of copper and copper-alloy scrap listed in groups 1 and 2 of OPA's price schedule No. 20, 1.75 cents a pound; for most grades listed in groups 3 and 4, 1.25 cents a pound; for copper, tinned copper, commercial bronze, red brass and best quality brass grades, 1.75 cents a pound; for yellow brass, muntz metal, and nickel silver grades, 1.25 cents a pound.

Rains add to tribulations. Eastern industrial areas already hard hit by strikes were further hampered last week by heavy rains which flooded out some operations. Above is shown the Baltimore & Ohio freight yard at Philadelphia inundated by the overflowing Schuylkill river. NEA photo

Brass Mill Products: Producers of brass mill products may increase their maximum prices to reflect the 2.37½ cents a pound increase in the price of copper. They are permitted to add the amount of the increase in copper prices to their maximum prices for copper products. For alloy products, the increase in prices will be determined by multiplying the increases in copper prices by the percentage of copper contained in the alloy.

Copper Wire and Cable: Manufacturers of copper wire and cable and copper-alloy and copper-clad wire and cable have been provided with formulas by which they may automatically adjust their ceiling prices to cover their increased costs.

Two procedures are provided for reflecting the copper costs increases. One procedure is provided for copper, copper-alloy, or copper-clad wire and cable where priced at certain amounts per unit of weight. Specified dollar-and-cent increases are provided for the various types of wire listed in the form of additions per pound in the net price for the finished products for each one cent increase per pound in the price of electrolytic copper. The other procedure provides similar increases in the price of wire and cable where it is sold on a per unit of length basis. Provision is made also for proportionate adjustment of the increases provided when the increase in the price of copper is more or less than one cent a pound.

Copper Base Hardeners and Deoxidizers: Producers of copper base hardeners and deoxidizers may raise their freeze prices 2.375c for each pound of copper contained in these products.

Lead Scrap: Because of increased smelting costs, the lead scrap prices were increased only 1.55c a pound instead of the full amount of 1.75c. The difference, 0.20c a pound, will compensate smelters for the increased cost of processing lead scrap and the increase of 1.55c should cause more intensive collection of scrap materials, OPA said.

Prices of battery lead scrap will be increased to reflect higher costs.

Lead Products: Producers of lead products made from lead or lead alloys may increase their base period "freeze" prices 1.75c a pound of lead contained.

Farm Equipment Production Held Back by Strikes

Materials and components shortages also contributing to relatively low output. April figures show little change

MATERIALS shortages and strikes, including several within the industry, are preventing any substantial improvement in production of farm machinery and equipment.

April production, latest available figures, was little changed from the relatively low output of March and prospects are not promising for the immediate future with expectations manufacturing will continue restricted the next several months because of continued shortages of raw materials and essential components.

April production of $48,591,534 was virtually unchanged from the March figure of $48,591,809, but there were wide variations from the previous month in production of individual items. The April production figure was 12.6 per cent below the total of $55,611,865, in April, 1945.

Greatest drop was recorded in wheel-type tractors which decreased 20.5 per cent to $7,947,090 from $9,999,120 in March. Unit production of tractors declined to 11,825 units compared with 14,901 in March, 12,503 in February, and 22,342 in January, 1946.

Other major decreases were reported in planting, seeding and fertilizing equipment, which dropped to $1,132,039, decrease of 23.4 per cent from the $1,477,801 March total, while the production of repair parts decreased 3.3 per cent to $11,305,693 from the March total of $11,694,507.

Increases in heavy types of farm machinery included an 18.9 per cent upturn in harvesting machinery, a 57.8 per cent gain in haying machinery and a 42.1 per cent jump in machines for preparing crops for market or use.

Production of lighter farm equipment items has continued the uptrend of the past few months.

Packers' General Line Can Prices Raised 9 Per Cent

Prices on packers' cans, condensed milk cans, and general line cans were increased 9 per cent last week by the Office of Price Administration. The regulation became effective on June 4.

The increase for packers' cans and condensed milk cans applies to the dollar-and-cent prices fixed in maximum price regulation 350; for general line cans, it applies to producers' March, 1942, "freeze" level prices.

OPA said it found existing maximum prices will not permit the industry to earn, during the next 12 months, the rate of return on net worth (10.7 per cent) which it enjoyed during the base period. Necessary adjustments were based on expectations average production for 1940 and 1941 approximates that which is likely to prevail the next year. Material and labor costs were corrected on the same basis. These calculations alone indicated adjustment of 5 per cent in prices was needed to restore rate of return to the base level. An additional 4 per cent was allowed to cover wage increases.

Increase since fourth quarter, 1945, in material costs (other than tin mill products) and other expenses were found to equal 1 per cent of sales. This factor was balanced by savings resulting from lower costs for tin mill products and an anticipated rise in labor efficiency.

Since Jan. 1, steel producers have added new tin mill product basing points and have modified the methods of pricing black plate, resulting in a net saving to canmakers. Steel mills on domestic sales have not charged the higher prices, recently allowed by OPA, because of existing contracts.

Present, Past and Pending

■ FORD MOTOR OF CANADA TO RESUME JUNE 11
DETROIT—Ford Motor Co. of Canada Ltd., which closed down its assembly lines on May 28 because of material shortages, will resume operations June 11.

■ CHICAGO PNEUMATIC TOOL STRIKE SETTLED
CLEVELAND—A 104-day strike of 1200 AFL workers at the Chicago Pneumatic Tool Co. plant here was settled and production resumed last week.

■ NORTHERN RHODESIAN COPPER MINE SHUTDOWN SEEN
LONDON (by cable)—Critically short world copper supply may be accentuated as wage demands by skilled workers in Northern Rhodesia threaten to close down this major producing field. Open-pit mine of Chile Copper Co., reputedly largest single copper producer, has been closed by labor troubles for two weeks.

■ REYNOLDS METALS GETTING SHIPMENTS BY WATER
LOUISVILLE, KY.—Reynolds Metals Co. has received 1,016,500 pounds of aluminum via Tennessee and Ohio river route from Listerhill, Ala. This was the first shipment completed by the company by the water route.

■ WORK EXPECTED TO BE RESUMED ON ROD MILL
ALTON, ILL.—Laclede Steel Co. plans to resume construction of rod mill which was started about six months ago but which has been delayed by strikes and material shortages.

■ NATIONAL TUBE CO. PURCHASES GOVERNMENT FACILITY
GARY, IND.—National Tube Co., U. S. Steel subsidiary, has purchased for $4,775,000 from Reconstruction Finance Corp. a portion of the facilities acquired and installed for the government by the Tubular Alloy Steel Corp. in its plant here.

■ INGALLS IRON WORKS STRIKE ENDS: PRODUCTION STARTS
BIRMINGHAM—Two-months old strike at Ingalls Iron Works Co. and Birmingham Tank Co. was settled last week and production was resumed immediately.

■ RED ORE MINING SUSPENDED BY TENNESSEE CO.
BIRMINGHAM—All red ore mining operations of the Tennessee Coal, Iron & Railroad Co. here were suspended last week due to a large accumulation of ore as a result of idle facilities during the coal strike. Vacations are being worked into the period where possible.

■ NEW STANDARD ISSUED FOR HOT-ROLLED STEEL BARS
WASHINGTON—Simplified practice recommendation for hot-rolled carbon steel bars and bar-size shapes (produced from billets or blooms) has been approved for promulgation by the National Bureau of Standards. It is identified as "R222-46" and is effective June 30.

■ SCRAP SHORTAGE THREATENS ADVANCE IN STEEL RATE
COATESVILLE, PA.—Grave shortage of scrap threatens to thwart the steel industry's attempts to regain high production levels, R. W. Wolcott, president, Lukens Steel Co., said last week, holding that unless everyone co-operates to start scrap flowing promptly many consumers may find steel difficult to obtain for months.

Nation Loses Over $2 Billion in Vital Output Because of Strikes

Consumer goods volume reached record levels in April before full impact of the coal strike was felt. Value of manufacturers' shipments in that month were double the 1939 rate. Steel to continue tight for year

CONSUMER goods production reached record levels in April before the full impact of the coal strike was felt, according to John D. Small, administrator, Civilian Production Administration. Manufacturers' shipments dollar-wise, were double the 1939 rate and physically were at least 50 per cent greater.

Strikes set back some production as much as three months and cost the country close to $2 billion in production, said Mr. Small. Industries which suffered most included steel, railroads, utilities, nonferrous metals, automobiles, farm machinery, and building materials.

Highlights of the report for April include: Unemployment declined for the first time since V-J Day; construction activity continued the sharp upward movement under way since the end of the war; all-time highs for monthly production were reached in: Vacuum cleaners, 175,000; electric irons, 382,000; washing machines, 177,000.

Postwar peaks were reached in: Automobiles, 150,000; trucks, 81,000; sewing machines, 28,000; domestic mechanical refrigerators, 143,000; electric ranges, 23,000; gas ranges, 152,000; and radio sets, nearly 1 million.

Shortages of some products have been aggravated by the coal strike. Steel (particularly wire products, sheet and strip) is expected to continue tight for the next 12 months. A large deficit exists in production of nails and bale ties. Demand for steel sheet and strip is far ahead of supply. Shortage of galvanized sheets is menacing the housing program.

Tin plate producers have been directed to concentrate on tin mill products suitable for use in making cans and closures. CPA will continue allocation of pig tin under order M-43, which also restricts tin content of various products. Production of pig tin from secondary sources declined 22 per cent in 1945 from the 1944 level.

Alloy Steel Production in April Shows Slight Drop

Production of alloy steel in April totaled 528,050 net tons, compared with 531,176 tons in March, according to the American Iron & Steel Institute. The April total included 363,131 tons of open-hearth steel and 164,919 tons of electric and crucible steel. For four months total alloy steel output was 1,516,535 tons.

Hot-topped carbon ingot production in April was 776,713 tons, of which 753,483 tons were from open-hearth furnaces and 23,230 tons from electric and crucible furnaces. For four months this year output of hot-topped carbon ingots was 2,392,366 tons, of which 2,338,423 tons were from open-hearth furnaces and 53,943 tons from electric and crucible furnaces.

Bulk Freight Tonnage on Great Lakes, 1924-1945

Net Tons

YEAR	(CARGO ONLY) BITUMINOUS COAL	ANTHRACITE COAL	ORE		STONE	GRAIN	TOTAL
			GROSS TONS	NET TONS			
1945	53,670,837	1,575,360	75,714,750	84,800,520	16,318,193	18,717,773	175,082,683
1944	58,747,203	1,416,127	81,170,538	90,911,003	16,856,279	16,228,880	184,159,492
1943	51,120,475	848,984	84,404,852	94,533,434	17,339,675	11,810,116	175,652,684
1942	51,623,848	909,949	92,076,781	103,125,995	18,570,048	8,501,586	182,731,426
1941	52,566,163	969,202	80,116,360	89,730,323	17,633,448	11,387,480	172,286,616
1940	48,517,632	801,972	63,712,982	71,358,540	14,893,316	9,644,950	145,216,410
1939	39,836,786	531,335	45,072,724	50,481,451	12,208,205	11,172,079	114,229,856
1938	34,172,963	450,324	19,263,011	21,574,572	8,240,768	10,679,125	75,117,752
1937	43,644,991	673,768	62,598,836	70,110,696	14,429,379	5,829,399	134,688,239
1936	44,010,585	688,858	44,822,023	50,200,666	12,080,672	7,433,967	114,414,748
1935	34,730,099	559,036	28,362,368	31,765,852	9,082,155	6,750,261	82,887,403
1934	34,869,536	607,039	22,249,600	24,919,552	7,392,218	7,951,145	75,739,490
1933	31,351,353	425,301	21,623,898	24,218,766	6,664,629	8,713,127	71,373,176
1932	24,563,391	293,978	3,567,985	3,996,142	3,928,840	8,890,409	41,672,761
1931	30,415,291	761,068	23,467,786	26,283,920	7,208,946	9,479,640	74,148,865
1930	36,839,923	1,232,137	46,582,982	52,172,940	12,432,628	9,851,229	112,528,857
1929	37,933,249	1,321,329	65,204,600	73,029,152	16,269,612	10,021,099	138,574,441
1928	33,402,121	1,420,881	53,980,874	60,458,579	15,677,511	16,372,116	127,331,248
1927	32,851,681	1,918,392	51,107,136	57,239,992	14,033,376	14,692,536	120,735,977
1926	28,159,076	2,857,917	58,537,855	65,562,398	12,628,244	12,087,316	121,294,951
1925	26,330,843	1,792,516	54,081,278	60,571,054	11,351,948	13,320,346	113,367,707
1924	23,157,051	3,094,088	42,623,572	47,738,401	9,225,624	15,222,787	98,437,951

The M. A. Hanna Company, Agents - May 15, 1946
Coal figures from 1940 corrected to include Lake Michigan and Lake Ontario movement.

Steel Made for Sale in March Shows Decline

AMERICAN IRON AND STEEL INSTITUTE
CAPACITY, PRODUCTION AND SHIPMENTS

Period MARCH - 1946

Steel Products	Number companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month: Production Net Tons	Current Month: Production Per cent of capacity	Current Month: Shipments (Net Tons) Total	Current Month: Shipments (Net Tons) To members of the industry for conversion into further finished products	To Date This Year: Production Net Tons *	To Date This Year: Production Per cent of capacity	To Date This Year: Shipments (Net Tons) Total *	To Date This Year: Shipments (Net Tons) To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	37	1	x x x x	x x x x	x x x	356,610	178,262	x x x x	x x x	722,465	354,128
Structural shapes (heavy)	12	2	9,421,550	334,290	43.5	326,787	x x x x	584,998	26.3	604,388	x x x x
Steel piling	4	3		14,230		11,972	x x x x	25,681		21,283	x x x x
Plates (sheared and universal)	27	4	17,080,770	430,113	29.6	396,538	25,862	793,034	18.8	767,639	56,073
Skelp	5	5	x x x x	x x x x	x x x	49,965	22,378	x x x x	x x x	82,557	31,912
Rails—Standard (over 60 lbs.)	4	6	3,657,000	179,591	57.8	167,889	x x x x	307,082	34.0	301,538	x x x x
—All other	5	7	392,000	10,036	30.1	9,310	x x x x	26,835	27.8	24,882	x x x x
Splice bars and tie plates	12	8	1,745,960	61,683	41.6	67,449	x x x x	113,899	26.4	123,846	x x x x
Track spikes	10	9	349,400	12,029	40.5	13,791	x x x x	24,446	29.5	27,755	x x x x
Hot Rolled Bars—Carbon	33	10	x x x x	666,081	x x x	530,207	76,225	1,269,453	x x x	1,050,787	144,173
—Reinforcing—New billet	14	11	x x x x	83,432	x x x	90,182	x x x x	156,365	x x x	176,959	x x x x
—Rerolled	12	12	x x x x	14,558	x x x	13,814	x x x x	27,803	x x x	27,619	x x x x
—Alloy	22	13	x x x x	129,777	x x x	99,650	10,914	268,645	x x x	217,286	22,432
—Total	39	14	21,906,660	893,848	48.0	733,853	87,139	1,722,266	31.9	1,472,651	166,605
Cold Finished Bars—Carbon	24	15	x x x x	113,717	x x x	110,877	x x x x	246,022	x x x	246,282	x x x x
—Alloy	23	16	x x x x	17,301	x x x	15,466	x x x x	39,036	x x x	34,189	x x x x
—Total	31	17	2,841,510	131,018	54.3	126,343	x x x x	285,058	40.7	280,471	x x x x
Tool steel bars	18	18	255,010	10,421	48.1	9,067	x x x x	22,026	35.0	21,346	x x x x
Pipe & Tubes—Butt weld	14	19	2,176,520	128,538	69.5	106,582	x x x x	245,378	45.7	240,905	x x x x
—Lap weld	9	20	730,200	27,833	44.9	26,841	x x x x	47,378	26.3	54,971	x x x x
—Electric weld	10	21	1,536,900	50,247	38.5	39,302	x x x x	128,091	33.8	108,743	x x x x
—Seamless	13	22	3,169,600	224,675	83.4	214,011	x x x x	380,390	48.7	347,208	x x x x
—Conduit (cap. & prod. incl. above)	5	23	x x x x	x x x x	x x x	6,724	x x x x	x x x x	x x x	15,908	x x x x
—Mech. tubing (cap. & prod. incl. above)	11	24	x x x x	x x x x	x x x	24,491	x x x x	x x x x	x x x	73,205	x x x x
Wire rods	25	25	7,293,670	393,858	63.6	99,194	33,402	783,781	43.6	203,009	74,361
Wire—Drawn	39	26	5,708,890	294,877	60.8	164,285	12,587	608,846	43.2	348,767	24,454
—Nails and staples	18	27	1,260,360	50,049	46.7	48,523	x x x x	101,378	32.6	99,416	x x x x
—Barbed and twisted	15	28	543,610	19,621	42.5	18,943	x x x x	40,742	30.4	39,292	x x x x
—Woven wire fence	15	29	1,121,860	34,711	36.4	35,125	x x x x	76,380	27.6	76,196	x x x x
—Bale ties	12	30	149,700	6,563	51.6	6,833	x x x x	13,485	36.5	14,866	x x x x
Black Plate—Ordinary	9	31	x x x x	x x x x	x x x	69,372	231	x x x x	x x x	164,471	561
—Chemically treated	8	32	465,000	14,240	36.0	13,186	x x x x	30,852	26.9	28,574	x x x x
Tin and Terne Plate—Hot dipped	9	33	3,758,850	161,558	50.6	178,605	x x x x	314,307	33.9	361,079	x x x x
—Electrolytic	9	34	2,231,850	72,861	38.4	70,315	x x x x	142,732	25.9	154,775	x x x x
Sheets—Hot rolled	30	35	19,353,320	1,210,885	73.6	530,865	47,295	2,445,824	51.2	1,058,292	81,772
—Cold rolled	13	36	7,127,460	435,117	71.9	311,685	x x x x	1,000,464	56.9	711,017	x x x x
—Galvanized	16	37	2,924,130	132,235	53.2	128,696	x x x x	278,863	38.7	280,767	x x x x
Strip—Hot rolled	25	38	7,180,030	228,925	37.5	141,314	23,919	448,256	25.3	301,640	46,171
—Cold rolled	34	39	3,067,510	108,333	41.6	105,892	x x x x	237,910	31.4	241,441	x x x x
Wheels (car, rolled steel)	5	40	315,400	22,261	83.1	21,695	x x x x	45,896	59.0	45,664	x x x x
Axles	6	41	398,170	12,522	37.0	12,505	x x x x	22,923	23.3	21,481	x x x x
All other	3	42	169,510	4,225	29.3	430	x x x x	9,422	22.5	3,780	x x x x
TOTAL STEEL PRODUCTS	140	43	x x x x	x x x x	x x x	4,644,988	431,075	x x x x	x x x	9,446,288	836,037
Effective steel finishing capacity	140	44	64,059,000	x x x x	x x x	x x x x	x x x x	x x x x	x x x	x x x x	x x x x
Percent of shipments to effective finishing capacity	140	45	x x x x	x x x x	x x x	77.4 %	x x x x	x x x x	x x x	54.5 %	x x x x

April Pig Iron Production Drop Reflects Effect of Coal Strike

PIG IRON production totaled 3,613,560 net tons during April, down sharply from March output of 4,423,916 tons. The drop reflected blast furnace shutdowns because of the coal strike. In April, 1945, pig iron production totaled 4,785,659 net tons.

Production in April was at 65.2 per cent of capacity, against 77.3 per cent in March and 86.4 per cent in April last year, the American Iron & Steel Institute reports.

Cumulative production for four months this year is 11,829,592 tons, at 53.4 per cent of capacity, compared with 19,521,211 tons, at 88.2 per cent capacity, in the comparable period last year.

Production of ferromanganese and spiegeleisen in April was 45,422 tons, compared with 39,859 tons in March and 73,312 tons in April, 1945. Cumulative output of ferromanganese and spiegeleisen for the first four months this year is 110,366 tons. Production details for April and for four months are shown in the table below.

Blast Furnace Capacity and Production—Net Tons

APRIL - 1946

	Number of companies	Annual blast furnace capacity	Production: Pig Iron Current month	Production: Pig Iron Year to date	Production: Ferro manganese and spiegel Current Month	Production: Ferro manganese and spiegel Year to date	Total Current month	Total Year to date	Percent of capacity: Current month	Percent of capacity: Year to date
DISTRIBUTION BY DISTRICTS:										
Eastern	12	12,988,970	787,663	2,163,297	22,827	50,947	810,490	2,214,244	75.8	51.8
Pittsburgh-Youngstown	15	25,939,940	1,325,967	4,568,447	11,137	30,540	1,337,104	4,598,987	62.6	53.9
Cleveland-Detroit	7	6,557,500	411,117	1,294,541	-	-	411,117	1,294,541	76.2	60.0
Chicago	7	14,093,510	720,964	2,490,990	-	-	720,964	2,490,990	62.2	53.7
Southern	9	4,924,670	239,157	886,734	11,458	28,879	250,615	915,613	61.9	56.5
Western	5	2,836,000	83,270	315,217	-	-	83,270	315,217	35.7	33.8
TOTAL	36	67,340,590	3,568,138	11,719,226	45,422	110,366	3,613,560	11,829,592	65.2	53.4

THOMAS J. BANNAN

JOHN O. ALMEN

RAYMOND B. TRIPP

Gearmakers Discuss Rising Costs

"Commercial Forum" at meeting of American Gear Manufacturers Association develops view price relief urgently needed to meet higher wage and materials costs. Several technical papers presented. Thomas J. Bannan named president for 1946-47 term

By GUY HUBBARD
Machine Tool Editor, STEEL

AFTER a lapse during which a national meeting could not be held on account of wartime travel restrictions, over 200 members and guests of the American Gear Manufacturers Association gathered at The Homestead, Hot Springs, Va., June 2-5.

This was the thirtieth annual meeting of an association which has gained widespread recognition for the high caliber of its engineering and business sessions, and for its important work in standardization and promotion of advanced techniques in design and manufacture.

Indicative of its national character and indicative also of the importance of the West Coast metalworking industries, was the election of a well-known West Coast industrialist as 1946-47 president of the association. Thomas J. Bannan, long a constructive force in AGMA affairs, is president of Western Gear Works, Seattle, and of its associated organization, Pacific Gear & Tool Works, San Francisco.

Raymond B. Tripp, vice president and sales manager, Ohio Forge & Machine Corp., Cleveland, was elected vice president.

New members of the executive committee are: Chester B. Hamilton Jr., president, Hamilton Gear & Machine Co., Toronto, Ont.; Fred H. Hoge, president, W. A. Jones, Foundry & Machine Co., Chicago; Walter W. Trout, vice president and general manager, Lufkin Foundry & Machine Co., Lufkin, Tex.; and Fred W. Walker, vice president, Philadelphia Gear Works Inc., Philadelphia. Newbold C. Goin continues as executive secretary.

A unique feature of this meeting was the inclusion of a "Commercial Forum" set up after the pattern of the "Information Please" radio program. Thomas Bannan, Louis Botsai, Howard Dingle, J. Harper Jackson, Roger Salinger and Walter Schneider were the experts who answered questions, previously submitted and also raised from the floor. A roundup of these would indicate further price relief under OPA will be necessary in many cases to meet rising costs of labor and materials and tightened manufacturing limits. The consensus of opinion was that the gear industry generally is selling too cheaply the very high type of engineering service which it furnishes to its customers.

Highlights on the engineering side of the meeting was the paper by T. H. Wickenden, G. R. Brophy and A. J. Miller of International Nickel Co. Inc., dealing with operating tests for evaluation of surface durability of gears, and a discussion led by Louis Martin of Eastman Kodak Co., on practical shop methods of comparing and matching surface finishes on gear teeth with standards of such surfaces. While it is too early to enter into a complete discussion of this subject, suffice it to say that it now is possible to take impressions of the curved surfaces of the teeth and to compare these impressions with duly evaluated master plaques of approved finishes—this without elaborate equipment.

Another engineering presentation which aroused great interest was a moving picture presented by George Sanbord, Fellows-Gear Shaper Co., in which the theory of gear tooth design and action was illustrated by use of plastic models. Some of these pictures were taken under polarized light.

A feature of the annual dinner of the association this year was the presentation of the Edward P. Connell Award to John O. Almen, head of Mechanical Engineering Department No. 1, General Motors Research Laboratories, Detroit.

Components Lack Hampers Tool Production

Material relief in supply situation not expected before July as pipelines must be refilled at end of work stoppages

SHORTAGES of components are restricting production of machine tools and these shortages will become more critical later this month. Plants of many suppliers were forced to slow down or halt operations recently due to work stoppages, including the coal strike, and generally will not be able to materially increase the flow of components until July at earliest.

Practically the entire industry has been hampered in stepping up operations by the difficulty in obtaining electrical equipment and iron and steel castings, especially malleable.

According to government officials, it will take from two to six months after settlement of current strikes in mines and refineries to refill pipelines and re-establish the flow of goods dependent upon copper and copper products. Shortages of copper wire bars and cakes means curtailed production of magnet wire, coils, switches and connectors and ultimately longer waits for every machine tool that has an electric motor or wire.

The machine tool industry does not expect a normal supply of components for at least 12 months. One of the phases of the present critical supply situation is that often an entire production line is slowed down or halted due to the lack of one component, although supply of other components may be adequate for current requirements. Many producers are operating on a hand-to-mouth basis so far as components are concerned.

Despite the unusually difficult production situation, the industry has not raised prices within the broad category of advances authorized by the Office of Price Administration as of April 19. In some instances, moderate price increases have been made on certain items due to special circumstances. However, in view of the recent increases in production costs, consensus of leaders in the industry is that higher prices will have to be posted during the third quarter.

A smaller volume of new business is being received than earlier in the year but the industry welcomes this development as giving them an opportunity to check the steady rise in unfilled orders which had risen to over $180 million by the end of April. This dip in demand is due to several factors, including the fact that the automobile manufacturers have completed their retooling for present lines and are generally hesitant in placing orders for retooling for next model. They will postpone this business, the trade believes, until the material and labor situations are clarified. Other prospective buyers are also staying out of the machine tool market until conditions become more settled.

Sales of government-owned surplus tools are cutting into the manufacturers' business. It is estimated about one-half the machine tools now being sold are surplus equipment, mainly for replacement of older machines. Bearing manufacturers are among the most active buyers of tools at present, this class of buyer generally being unable to use surplus equipment.

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

Scrap: Railroad steel scrap prepared by a dealer or passing through a dealer's yard may be sold, effective June 5, at railroad scrap maximum prices if the seller warrants that the scrap sold is railroad scrap and names the railroad from which the scrap originated. (MPR-4; OPA-T-4577)

Pig Iron: Pig iron may be sold now on an adjustable pricing basis. Producers are permitted to charge and collect the present ceiling prices on deliveries after May 29, subject to the condition that the purchaser agrees to pay also the amount of any ceiling price increase that may be granted later by OPA.

Copper and Copper Products: Effective June 3, following price increases have been authorized: 2.37½c for copper received from mines which have granted approved wage increases since Feb. 14, making base carlot price 14.37c a pound, delivered Connecticut; copper scrap, copper alloy scrap and brass mill scrap prices increased proportionately; brass mill product prices also increased proportionately; copper wire and cable and copper-alloy and copper-clad wire and cable prices may be adjusted upward under specified formula. (MPR-12, 15, 20, 82; OPA-6534, 6532)

Brass and Bronze Ingots: Effective June 3, maximum prices for brass and bronze ingots increased as follows: 85-5-5-5, 2.25c; 88-10-2, 2c; 80-10-10, 2.25c; yellow, 2.25c; and miscellaneous group, 1.25c. (MPR-202; OPA-6533)

Lead: Effective June, prices increased 1.75c a pound for primary and secondary lead and primary and secondary antimonial lead; 1.55c for lead scrap; lead products, 1.75c a pound for contained lead. (MPR-69, 70, and SR-14G; OPA-6534)

Metal Culverts: Reconverting manufacturers of metal culverts granted profit factor of 2 per cent which may be used in calculating reconversion ceiling prices, effective June 5. Manufacturers may calculate their ceiling prices by adjusting their total 1941 costs to reflect increases in cost of materials and labor rates experienced since that time, then adding 2 per cent to the resulting figure. If any firm doing business amounting to less than $200,000 a year can show that its own base period profits were greater than 2 per cent over costs, it may use its own base period average instead of the 2 per cent profit factor in calculating its ceiling prices. (SO-118, 119; OPA-T-4581)

Woodworking, Timberworking Machinery: Manufacturers of woodworking and timberworking machinery granted an interim price increase of 10 per cent over base date maximum prices. (MPR-136; OPA-T-4561)

Power Driven Tools: Manufacturers granted an interim increase of 12 per cent in ceiling prices for portable pneumatic power driven tools, effective June 1. (MPR-136; OPA-T-4562)

Price Control Exemptions: Eighteen consumer items have been exempted from price control, effective May 29, including the following: Pliers specially designed for optical use; advertising signs that contain clocks; electric curling irons and hair straightening combs; perfume atomizers and cocktail mixers; baby swings, baby seats and beds designed for use in automobiles. (SO-126; OPA-6525)

Transportation: Price control suspended, effective May 29, over transportation charges of contract carriers by water, such as on the Mississippi, Gulf of Mexico, Atlantic inland waterways or between United States ports. Price control will continue on all coal shipments and on water transportation within a single harbor, between contiguous harbors, and on the Great Lakes. (GMPR; OPA-T-4551)

Boxsprings: Manufacturers of boxsprings and hand-tied boxspringing constructions granted reconversion price increase of 16 per cent, effective May 30. (MPR-188; OPA-6514)

Copper, Copper-Base Castings: Effective at the same time that producers' metal costs are increased, maximum prices of copper and copper-base castings increased in cents per pound as follows: 97 per cent or more copper, 2½; 85-5-5-5, 80-10-10, and yellow brass groups, 2½; 88-10-2 group, 2¼; nickel alloy group, 1½; aluminum bronze group and silicon bronze groups, 2; manganese bronze group, 1. Allowance was made for a metal loss of 10 per cent and the use of 80 per cent ingot in granting these increases. (MPR-125; OPA-T-4588)

Wire and Cable: Manufacturers of braided building wire and nonmetallic sheathed cable are permitted to continue to sell these products to the same chain stores at zone B ceiling prices, regardless of where stores are located, if they did so on the base date, Oct. 15, 1941. (MPR-82, OPA-T-4582)

Printing Trades Machinery: The 12 per cent increase in ceiling prices for printing trades machinery and equipment granted on Jan. 9 has been replaced by a 20 per cent interim increase, effective June 8. The increase is applicable to printing machinery, mechanical accessories including repair and replacement parts, interchangeable parts, jigs, fixtures, work-holding and position devices and rests, and mechanical printing equipment. It also applies to sales to all users. (MPR-136; OPA-6545)

CIVILIAN PRODUCTION ADMINISTRATION

Lead Oxide: Allocation controls on lead oxide will become effective July 1 because of the acute lead supply situation. Lead content of the oxide in batteries limited to 50 per cent of the total lead content of the battery. Use of lead foil in components for ammunition is now permitted, as well as use of lead in plumbing waste and vents. (M-38; CPA-392)

Construction: CPA issues additional lists of types of buildings which either come within the cost allowances of the Veterans' Housing Program Order 1 or are excluded from the controls of the order. (VHP-1; CPA-389)

Steel Plant Disposal Program of Government Running into Snags

Bid of United States Steel Corp. for Geneva works yet to be acted upon with opposition to sale reported developing in Congress. Bids for purchase or lease of Chicago steelworks rejected by Price Review Board

DISPOSAL of major government-owned surplus steel plants is proving more difficult than had been expected some months back.

Although the United States Steel Corp.'s bid for the Geneva, Utah, steel plant is acceptable to the War Assets Administration there is no certainty yet that U. S. Steel will be awarded this property. As a matter of fact, rumors the past week were to the effect the Department of Justice views with a skeptical eye the proposal to sell the plant to the Steel corporation.

Justice Department approval is necessary before the transaction can be completed. A decision is expected within the next week or so since U. S. Steel stipulated in its offer that in event its bid were not accepted prior to the close of business June 15, it reserved the right to withdraw its offer.

Western industry as a general thing appears to favor awarding the plant to U. S. Steel. However, opposition to such action has developed in Congress with the suggestion being made that new bids be taken.

All bids for purchase or lease of the government-owned South Chicago steel plant, operated by Republic Steel Corp., have been rejected by the Price Review Board, War Assets Administration.

Rejection was based primarily on the fact that acceptance of either the offer to lease the plant by Republic Steel Corp. or the offer to purchase by C. A. Depue of Clinton, Iowa, would not obtain for the government the fair value of the plant to meet the objectives of the Surplus Property Act. One bid received by the WAA was subsequently withdrawn.

WAA is now offering for sale or lease two large steelworks, Homestead at Munlall, Pa., and Duquesne at Duquesne, Pa., representing combined federal investment of $100 million. The facilities in each plant cannot be utilized in an independent economic operation because they are related to the overall production facilities of the Carnegie-Illinois Steel Corp., the wartime lessee.

The two plants were built for the production of open-hearth ingots, slabs, plates, forgings for battleship armor, ship shafting turbine rotors and other large and heavy forgings, as well as electric furnace alloy steel ingots and products. Both properties are being operated on an interim lease basis by Carnegie-Illinois and are expected to be declared surplus in the immediate future.

Production capacity at Homestead is 1,700,000 net tons of steel ingots per year, 1,352,000 net tons of rolled slabs and 600,000 net tons of rolled plate. The Duquesne plant has an annual capacity of 165,000 net tons of alloy steel ingots per year.

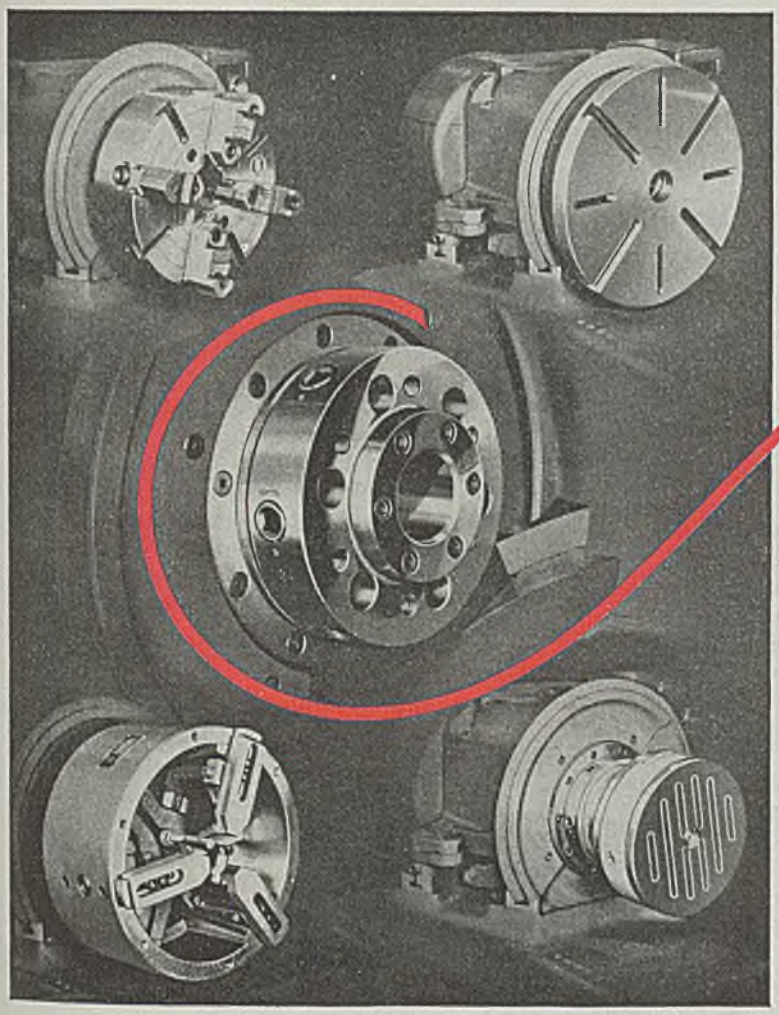
SURPLUS TO CHINA: In a formal contract signing in Shanghai, $5 million of U. S. Navy surplus shipyard equipment was sold to China for installation in shipyards at Shanghai, Tsingtao and Amoy. Sale was made through Foreign Liquidation Commission. Participating in the signing were, left to right, seated: Vice Adm. Charles M. Cooke Jr., commander of the 7th fleet; Rear Adm. H. C. Chow, deputy director of the Department of Naval Affairs; Brig. Gen. B. A. Johnson, field commissioner of FLC; and Rear Adm. P. T. Mar, manager of the Kiangnan dockyards, Shanghai. Standing: Capt. S. T. Mar, executive director of the Division of Ship Construction & Repair; Capt. W. Hibbs; Rear Adm. S. S. Murray; and Capt. F. J. Bell. U. S. Navy photo from NEA

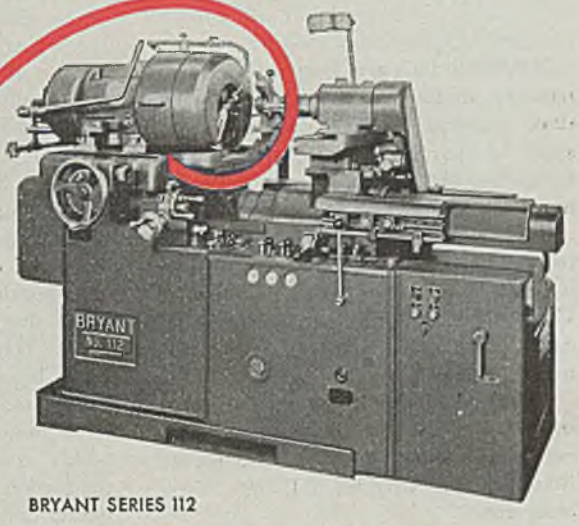
Construction Authorizations Must Be Reduced Two-Thirds

To bring construction authorizations into balance with supply of building materials, the Civilian Production Administration has ordered its field offices to reduce dollar value of authorization by two-thirds, for at least the next 45 days. In the absence of unusual circumstances involving exceedingly severe hardship, only projects which fall within the following conditions may be approved: Necessary to public health and safety; will increase production of critical products listed on schedule of priorities regulation 28; essential to increased food production or preservation; will provide minimum community facilities absolutely necessary for new residential areas developed as part of the veterans' housing program; will provide urgently needed veterans' educational facilities; essential and nondeferrable maintenance and repairs; will have no impact whatsoever on the housing program.

John D. Small, CPA administrator, predicted that "even with this temporary slow-down on construction authorizations" nonhousing construction during the next two years will be at the highest level in the history of American industry.

While building materials production is on the upswing, demand is increasing at an even more rapid rate. As a result, the gap between supply and demand is widening. Cast iron radiation production has increased 147 per cent since V-J Day. March lumber production of 2.6 billion board feet rose 24 per cent above February, which is more than double the normal seasonal increase.





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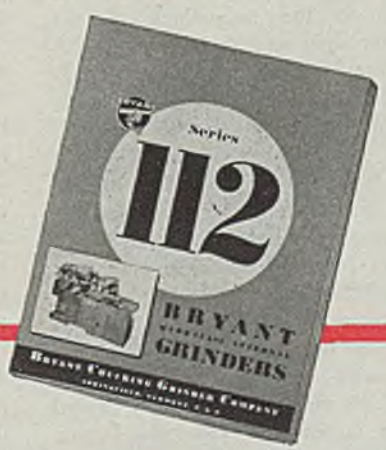

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Rugged Recovery Period Facing Land of Rising Sun

Defeated nation's industries operating at only fraction of capacity. Extreme shortages of commodities, labor, transportation, fuel, capital equipment and raw materials exist. People dazed by sweeping changes. Future is uncertain

JAPAN is facing a long and arduous recovery to its prewar status. Industry since the war has operated at only a small fraction of capacity, shortages of necessities are acute, and the future is uncertain to the people.

These observations are backed by the reports of SCAP (Supreme Commander for the Allied Powers, headed by Gen. Douglas MacArthur), the United States Army organization in charge of our former enemy.

The land of the Rising Sun is suffering from a combination of ailments — not unexpected for a vanquished nation. Roughly, her troubles fall into three categories:

1—There are crippling shortages of practically everything. These occur in labor, food, housing, transportation, fuel, capital equipment, and all forms of raw materials. Even water is short in some areas.

By way of illustration, production of pig iron and steel ingots was a little better than 2 per cent of capacity in January. This was the rate five months after the Japanese surrender, and represented a substantial improvement over the complete prostration that set in at the time of the surrender.

2—The Japanese are dazed by the sweeping changes that are going on—changes ranging from complete reorganization of the government to a basic alteration in the psychology of the Japanese people and their way of life. Just a few highspots are: The elimination of the big four holding companies that controlled most of the Japanese economy, the legalization for the first time in Japan's history of labor unions, and the encouragement of free speech, free thought and free enterprise.

3—The Japanese businessman cannot plan intelligently because of grave uncertainties as to what lies ahead. The government has not yet provided for the payment of war damage claims. There is talk about levying heavy capital taxes on industry in the near future. There are difficult problems of recovering vital equipment moved out of plants during the war. And, most discouraging of all, Japanese businessmen have no idea at all as to what treatment they will receive under reparations policies still to be determined.

In the reports covering individual industries, SCAP reveals how grim is life in Japan today. They show that the industries that produce the necessities and comforts of humanity are not in a position to do their job. They indicate that years of hard work lie ahead of the Japanese before life for them again becomes enjoyable.

Pig iron production in January was at an annual rate of 115,000 metric tons, which compared with a peak annual production rate of about 5,200,000 metric tons in 1942. January production was 9562 tons, compared with 9036 tons in December and 7688 tons in November. The February production schedule called for about 16,000 tons on the basis of an allocation to the iron and steel industry of 4 per cent of the expected February coal output.

Steel Production Small

Steel ingot production in January was at an annual rate of 175,000 metric tons, which compared with a peak production rate of about 7,800,000 metric tons in 1942. January ingot production was 14,535 metric tons, compared with 8770 in December and 9603 in November. The February production schedule called for about 19,000 metric tons of ingots.

Rolled steel production in January was at an annual rate of 160,000 metric tons, which compares with production ranging between 5,000,000 and 6,000,000 metric tons in each of the seven years 1937-1943 inclusive. Rolled steel output was 13,388 metric tons in January, 9495 in December and 6894 in November. The February production schedule called for rolled steel output of about 17,000 metric tons.

In view of this small output, iron and steel shortages hamper almost every segment of the Japanese economy. For instance, wire rope is a critical item restricting coal output. January production of wire rope was only 417 metric tons.

Shortage of nails is a factor, next to the labor shortage, in holding up work on a Japanese government plan to construct 540,000 buildings. Another factor is the lumber shortage which, again, results from steel shortages. The sawmills of Japan need only 1330 metric tons of saw steel and 550 tons of bearings, but only a small portion of these needs so far has been met.

Lack of steel is a factor in slowing up food production. It is one reason why in January only 37 of Japan's 310 canneries were operating—producing 675 metric tons of canned food in that month as compared with capacity of 25,395 metric tons.

Shortage of steel hampers production of badly needed food by the fishing industry. There is not enough steel to build and repair fishing vessels.

Special emphasis has been placed on coal production, and February output was 1,346,000 metric tons—not as great as the expected 1,491,000 metric tons, but 159,000 tons over the January figure.

Aluminum production, which reached a peak of 114,000 metric tons in 1943, amounted to only 125 metric tons in January. This industry sustained some damage during the war but could still operate at a high percentage of capacity if it could again be set in motion. In the meantime, stockpiles accummulated during the war contain 160,170 metric tons of aluminum and aluminum alloys in the form or ingots, finished products and scrap. No magnesium was produced in January, but the magnesium stockpile came to 4573 metric tons. Of 83 light metal rolling mills in Japan, 38 operated in January and produced 868 metric tons of aluminum sheet, 17 tons of aluminum pipe, 15 tons of aluminum rods and bars, 6 tons of aluminum wire, and 25 tons of tinfoil. Of 178 aluminum casting plants in Japan, 168 were in operation during January, producing 803 metric tons of castings, compared with monthly capacity of about 1560 metric tons.

Eight of Japan's 14 copper smelters were in operation in January and produced 620 metric tons of copper, or approximately 50 per cent of Japan's capacity. Three of Japan's 12 copper refineries produced 775 tons of electrolytic copper, approximately 8 per cent of the country's capacity. Stockpiles left over from the war held 82,027 metric tons of copper in various forms, 53,831 metric tons of brass and 2447 of bronze.

Four of Japan's eight zinc refineries operated during January, producing 775 metric tons of zinc, approximately 11 per cent of capacity. Stockpiles of zinc in various forms held 53,387 metric tons. January production of zinc plate was 160 metric tons.

Production of refined lead in January was 164 metric tons, or approximately 5 per cent of capacity. Production of lead pipe was 187 metric tons, and of lead plate 143 tons. Stockpiles of lead contained 56,086 metric tons in the form of ingots, semifinished material and scrap.

Japan's tin, nickel and antimony refineries continued inactive during January. Refinery capacities of these metals were estimated at 600, 3850 and 840 metric tons, respectively. Stockpiles held 13,830 metric tons of tin, 570 tons of nickel, 1935 of antimony, 54 of cobalt, 651 of mercury and 32 of cadmium.

Of Japan's 99 ferroalloy manufacturing plants, 26 were active in January but production was slight because of poor grade of ores available and small demand for the products.

Production of coke during January was 84,000 metric tons, a decrease of 21 per cent from December. Reason for the drop was a slump in the gas industry due to the shortage of coal.

While 75 of the 162 plants comprising Japan's refractories manufacturing industry operated in January, production was only 11 per cent of capacity, including the following: Fire-clay 10,660 metric tons, silica 2079, chrome 114, magnesia 329, Corhart 13, high alumina 186—a total of 13,381 metric tons.

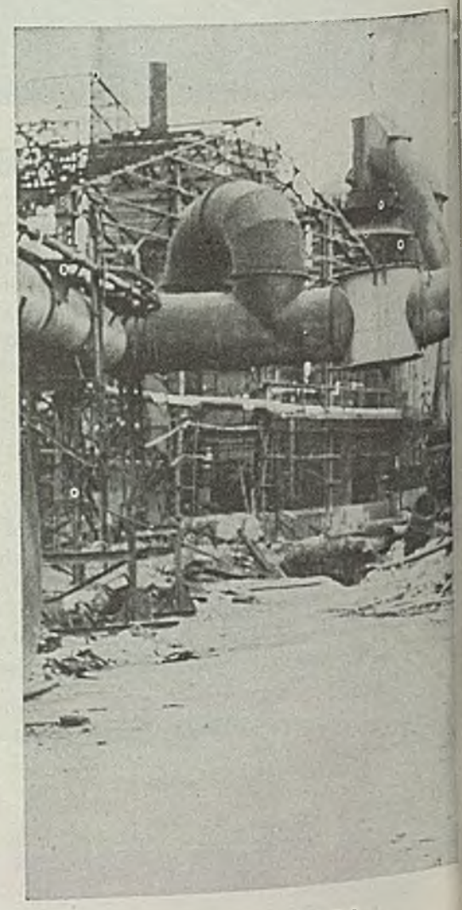
Maintenance Emphasized

In regard to Japanese machinery, the principal concern of SCAP has been to encourage adequate maintenance and repairs. Japanese government and industrial officials have been aware of this situation but it has been difficult to devise remedial measures because of a number of factors: 1—Fear of future heavy capital taxes; 2—failure of the government to arrive at or announce a plan for payment of war damages; 3—widespread dispersal program carried out during the war; 4—shortages of oils, greases and fuels, and labor; 5—postwar apathy.

Machine tool manufacturers in January were devoting their effort to repair work and completion of partly finished machines. The Japanese Machine Tool Control Association reported that 2100 partly finished machine tools were finished during the month and that 4100 tools had been pushed to more than 50 per cent of completion.

Principal plants in the aircraft and munitions industries were taken into custody on Jan. 20 and were physically occupied by guards. The Eighth U. S. Army created reviewing boards to pass on reconversion permits previously granted to these plants.

January production of railroad rolling



Ryozo Asano, a Harvard University graduate and president of the Nippon Steel Tube Co., and other officials of the company inspect damage caused by American air raids on the company's blast furnace plant. The plant was first hit by General Doolittle's raiders and later was more seriously damaged by B-29s. NEA photo

stock included 10 steam and two electric locomotives, three passenger cars and 22 freight cars, all for the government. Between 13,000 and 14,000 cars and locomotives were awaiting repair.

SCAP reports that early repeal is in store for the Major Industries Organization Ordinance of 1941. As a result, such bodies as the Coal Control Association, Mining Control Association, Machine Tool Control Association, Rubber Control Union, and Iron & Steel Council will be reorganized so that the controls will be in new hands. Small producers in many industries felt that the controls were not operated in their interest. For instance, small coal mine owners felt that the large producers had almost complete control over the large subsidies which still are paid to encourage production.

In the field of heavy-current machinery the picture is as follows for the month of December: Tokyo Shibaura Denki Co., with capacity for 4 electric locomotives and 150 large motors, produced 1 locomotive and 100 motors; Mitsubishi Denki Co., with capacity for 500 transformers and mercury rectifiers, produced 200 units; Hitachi-Seisakusho Co., with capacity of about 100 units of large electric equipment, produced 20 units; Meiden-Sha Co., with capacity for 50 large units, produced 10.

Production of low-horsepower induction motors in December was 4763 units as compared with capacity for 9200.

Production of motor vehicles during January was carried on from a rapidly depleting stock of available parts. But, although vehicles are critically needed, new vehicles were being withheld from the market by manufacturers pending a review of proposed price increases by the Japanese Ministry of Commerce & Industry. January production of commercial trucks was 415 units. Production of three-wheel motor cars was 70 units. Production of electric automobiles was 15. Production of tractors was 45. A partially completed survey of the Ministry of Transportation's Automobile Bureau indicated a 1946 demand for some 94,556 trucks, busses, taxis and passenger cars.

Some progress is reported by SCAP in the field of scientific activity—as research in mineralogy, metallurgy and geology. Many laboratories were burned out during the war, personnel scattered and more important items of equipment removed to safe places. Gradually this equipment is being returned and reassembled and research work is being revived.

Deals with Reparations Problems

The instruction whereby the Japanese government has taken aircraft plants and arsenals and associated laboratories into custody, as noted above, is one of the moves preliminary to formulating policies involving war damage reparations by Japan. On Feb. 1, SCAP organized a Reparations Branch to deal with problems incident to removal of industrial equipment as reparations. One of the purposes of this step was to set up means for dealing with labor unions, political organizations, community groups and municipal authorities who are eager to prevent undue damage to their economies by removal of equipment needed for maintenance of production and employment.

This fear of the effect of reparations is a real deterrent to postwar progress in Japan.

"Plant owners," says a SCAP report, "displayed reluctance to invest their capital in reconstruction or new buildings and machinery. A part of this tendency was a natural outgrowth of unstable financial and economic conditions, but an additional factor was uncertainty as to which factories or other facilities might be taken for reparations."

Labor unions on March 1, 1946, obtained legal status for the first time in Japanese history, SCAP reports. Pending approval by SCAP, interim mediation boards have been established in 28 prefectures. Up to Feb. 20, 675 unions with a total membership of 495,912 had registered with the Ministry of Health and Welfare. Labor disputes in January were common, but strikes resulting in work stoppages were few and of short duration. Some of these disputes were characterized by assumption of production management by the workers.

"Production management by workers has become a recognized form of strike action," reports SCAP. The legality and limitations of this form of strike action were studied and discussed in its press and on the radio by union, employer, government and academic circles throughout the country.

"Widespread recognition of the extreme shortage of goods and services in Japan has led to a tendency to consider production management by workers legal, since such an action is less extreme than a legal walkout or lockout which halts production entirely. The period of control of production by the workers is strictly limited by the stock of raw materials or fuel available in the plant.

"Whether or not a labor dispute has involved production management by workers, the final settlement has usually provided for a measure of regular participation in management by the union."

Details of foreign trade relations developed into more tangible form during February meetings between SCAP and the Japanese government. The Japanese government foreign trade fund has been set at 50,000,000 yen, which may be increased by loans from other gov-

Imperial Iron & Steel Works at Yawata, Kyushu, said to produce more than 20 per cent of Japan's steel, was severely damaged by B-29 raids by American airmen. NEA photo

Strikes come to Japan. Pictured above are representatives of more than 2000 Japanese strikers who staged a five-hour sitdown late in May, demanding more food. The strikers gave up after Gen. Douglas MacArthur issued a stern warning against such demonstrations. NEA photo

ernment funds repayable by the end of the following fiscal year. It is a revolving fund from which the Japanese government will pay exporters the yen value of all exports plus expenses and any claims connected therewith, and into which will be paid the yen value of all imports. Such payments and deposits will be made regardless of destination or source of merchandise, and regardless of whether foreign currency settlements or reciprocal exchanges of commodities are to be made. Hence foreign trade can take place without the establishment of a rate of exchange.

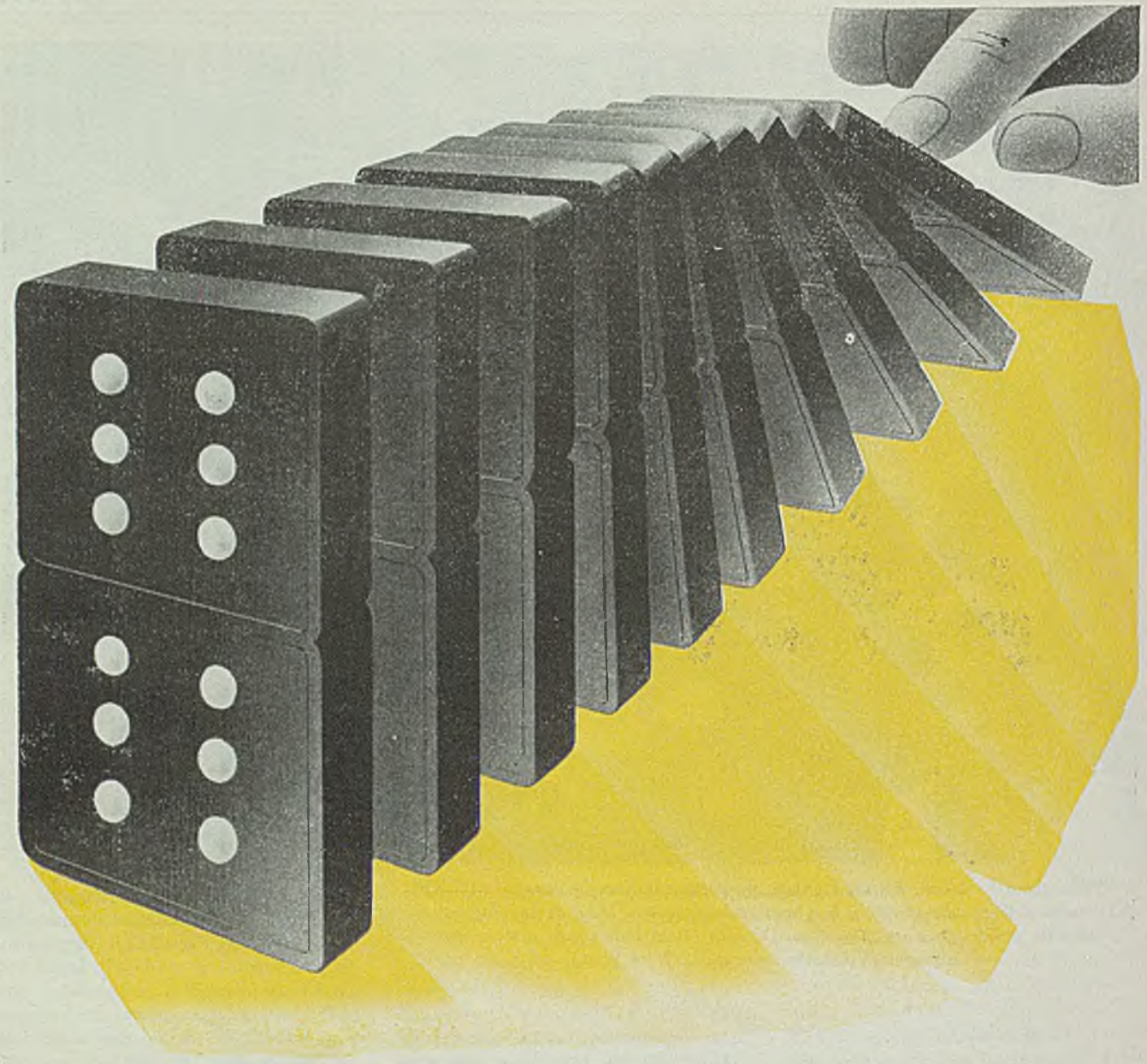
"Funds obtained as proceeds of Japanese exports," says the SCAP report, "will be available to the Supreme Commander and foreign governments concerned and may be used in payments for imports. The Supreme Commander will make all reasonable efforts to protect Japanese interests in exported goods and in merchandise purchased for shipment to Japan. Under this system no foreign assets arising from foreign trade will come under the control of the Japanese government or its nationals."

SCAP reveals interesting details as to how Japan was able to support a wartime pig iron production beyond the ability of her own home mining industry. Iron ore imports reached a peak in 1942 when the iron content of ores imported mainly from China, Korea and Manchuria was in the neighborhood of 4,000,000 metric tons. As the Japanese shipping shortage grew, home production was stepped up, and the iron content of home ore reached a peak annual rate in the first half of 1944 of about 1,800,000 metric tons.

Principal sources of iron ore at home were the Kamaishi mine in Iwate prefecture and the Kuchan mine near Sapporo on Hokkaido. These two mines have produced more than 500,000 metric tons of iron ore per year since 1935. Most of the other mines in Japan are marginal ones, brought into production during the war by subsidy payments. True reserves of the Kamaishi and Kuchan mines are not yet known but these two mines probably hold the main reserve of ore that can be beneficiated to a satisfactory grade; if they prove to be inadequate, says SCAP, Japan will be largely dependent on imported ore.

Production of manganese ore in Japan rose from 27,359 metric tons in 1932 to 67,753 in 1936 to 162,947 in 1940 to 400,679 in 1944. Average manganese content from some 1300 mines on Hokkaido and Honshu and Kyushu was 35.1 per cent in 1942, 32.6 in 1943 and 32.8 in 1944.

Another interesting point brought out by SCAP is the extent to which Japan relied on her submarginal nickeliferous iron ores to relieve her shortage of nickel during the war. The ores used contained 0.3 to 0.6 per cent nickel and 20 to 35 per cent iron; production was 150,056 metric tons in 1940, 378,924 in 1941, 265,151 in 1942, 390,869 in 1943, 428,284 in 1944 and 158,282 in 1945. The ore was charged into electric furnaces and rotary kilns and converted into pig iron containing around 2 per cent of nickel. "Recovery of nickel from these ores was expensive and would not be economical in normal times," says SCAP. "At present none of this ore is being mined, and no production is being contemplated. Other sources of nickel in Japan are very limited."



ONE DOWN . . . ALL DOWN

When you hook up a factory-full of machines into one continuous production line . . . a million dollars worth of machines working as one machine . . . and you start it going, IT'S GOT TO GO. Sometimes, as in the textile, paper and paint industries, it's got to keep going for as long as 8000 hours a year. That puts it up to every single machine to keep going because one down, for repairs or maintenance, means all down.

Which puts a lot up to the bearings. That's the reason so many concerns in continuous process industries put their bearing problems up to Fafnir. In the textile industry, for instance, Fafnir designed ball bearing units for sixty or more different types of machines . . . units that slip right in place of hard-to-maintain plain bearings. And such units as the cartridge type ball bearing where completely housed units are needed. When the production runs are long, machines need every bit of the precision manufacturing and testing that Fafnir Ball Bearings get. And they need the Fafnir lubrication seals . . . to keep the lubrication where it's needed and away from products like textiles and paper where a single drop can cause costly spoilage.

Of course it takes more than one or two features to account for the preference of machine designers and users for Fafnir Ball Bearings. It takes the Fafnir way of looking at ball bearings from the machine end of the job. The Fafnir Bearing Company, New Britain, Connecticut.

MOST COMPLETE LINE IN AMERICA

FAFNIR BALL BEARINGS

mirrors of MOTORDOM

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

Golden Jubilee pronounced success, auto industry returns to serious problem of producing cars. General Motors top command reshuffled, with C. E. Wilson assuming chief executive post. Ford unfolds plans for new research and engineering center

DETROIT

WITH the curtain slowly descending on its whopping Golden Jubilee celebration, judged a tremendous success by the million or more who witnessed the goings-on, the automotive industry is settling back to pay the million dollars or more worth of bills involved in the event and to a little sober belt-tightening and planning for the future. The fun is over now; it is hoped the industry and its community are better unified. There are still a lot of automobiles to be built and if the current welter of confusion and bewilderment over materials and supply problems can ever be subdued, assembly lines are set to go for all they are worth.

A typical note on today's troubles is the wistful comment of L. W. Slack, head of Packard sales, who told his Missouri dealers last week, "I don't wish to cast stones at any one person, or any individual government agency. But something obviously is wrong somewhere, with so many little things slowing or stopping production. I think it is high time we find out what and where they are—and try to do something about them." His suggested corrective is a realistic inventory of governmental regulations.

1947 Outlook Brighter

Auto executives never have been ones to cry too lengthily in their beer, however. Perhaps 1946 must be written off as pretty much of a bust, with production falling short of 3,000,000 cars and trucks. Still there are better things coming, for no matter how pessimistic the economist or sales chartist, it is difficult to come up with much less than 15 million unsatisfied automobile buyers ready to plunk down their cash over the next three years. J. W. Davis of Ford said last week his experts had been forced to revise their predictions downward a little, but they still look good—4,750,000 for 1947 and 6,000,000 for 1948—even taking into consideration higher prices and probable limits on ability of suppliers to come through with materials and parts. The 7,000,000-car year, talked of as an imminent possibility a year or two ago, now seems at least three years away, if indeed it can ever be realized.

The long-awaited reshuffling of top General Motors administrative personnel broke last week, and it was not as startling as the rumor hounds were touting. Chairman Alfred P. Sloan Jr., who took over as chief executive officer during the war years, has turned over the reins to President C. E. Wilson and subsequently will confine himself to direction of the bonus and salary committee, succeeding Lammot S. du Pont who has retired from corporation councils after 25 years of valuable service.

The GM policy committee has been divided into two sections, one dealing with financial matters, the other with operating policy. The latter now becomes the real directing force of the corporation, with Mr. Wilson as head and including T. P. Archer, Albert Bradley, H. H. Curtice, Fred G. Donner, R. K. Evans, L. C. Goad, O. E. Hunt and M. E. Coyle. Messrs. Coyle and Curtice have been general managers, respectively, of the Chevrolet and Buick divisions, Mr. Archer of Fisher Body; Mr. Coyle leaves the Chevrolet post to become an executive vice president, and to be succeeded by Nicholas Dreystadt, formerly general manager of Cadillac, who in turn is succeeded by his chief engineer, John F. Gordon. Messrs. Hunt and Bradley also are executive vice presidents.

Purposes of the rather complicated shifts are threefold—to strengthen the general executive staff in view of expanding responsibilities, to concentrate administration of operational affairs of the corporation in Detroit, and to advance executives who have distinguished themselves during recent years.

Donaldson Brown, active with GM since 1921 as director and finance committee chairman, has relinquished executive responsibilities but will continue as director and member of the finance committee. Mr. Bradley will take over as chairman of the group.

Speculation over the impending changes had been heard around Detroit for several months and added credence was given them by the failure of Mr. Sloan to appear on the occasion of the special tribute to 14 automotive pioneers, of which he was one, on May 31. His award was presented, not for his statesmanlike leadership of General Motors, but for his pioneering since 1895 in the production of roller bearings at the Hyatt Roller Bearing Co. Mr. Sloan asked H. O. K. Meister, general manager of Hyatt, to accept the award for him.

New Ford Center Unveiled

First mentioned in these columns (STEEL, July 23, 1945, p. 94), the elaborate $50 million Ford research and engineering center was unfolded for the public eye last week. The project will require eight years to complete and will be located on a 500-acre tract west of Dearborn Inn and across from the Ford airport. It comprises a primary group of eight buildings and will bring into close geographical relationship all research, development and engineering activities for the company's three divisions (four when the low-price car unit becomes active). The eight buildings will be grouped around an artificial lake 800 feet long and 350 feet wide, somewhat suggestive of the General Motors technical center, details of which were announced last summer. Buildings will be of modern design, featuring steel and concrete con-

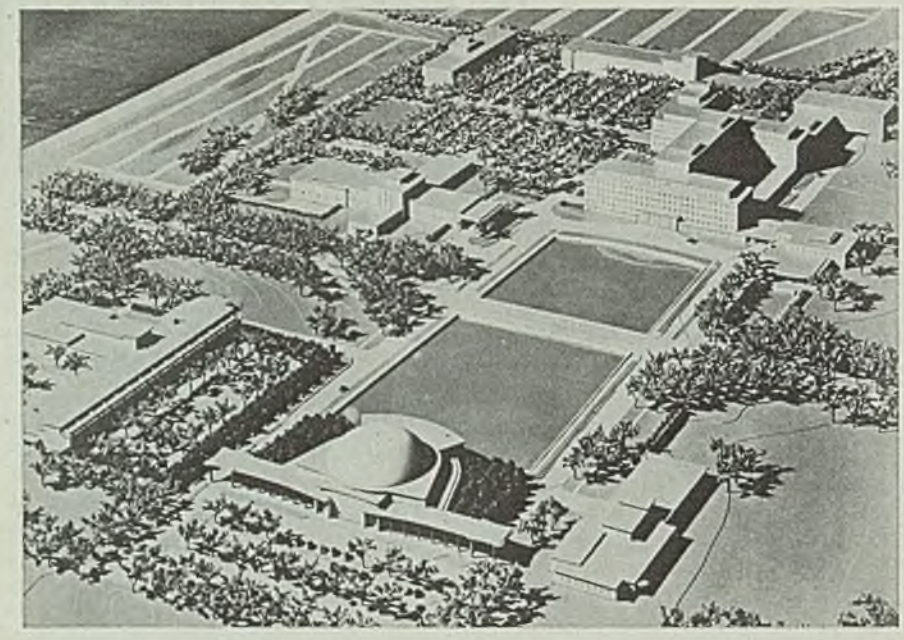
Automobile Production

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	243,000°	545,321
Week ended:		
May 18	48,565°	127,255
May 25	53,020°	133,560
June 1	32,480°	106,395
June 8	36,000°	133,645

°Preliminary.



General view of the new Ford Research & Engineering Center. Dome-shaped structure in foreground is the engineering exhibit building; the school is at the right and the styling building at the left. The distinctive cross-shaped structure, top left, is the engine test building. Administration and main engineering building is opposite the domed structure

struction and with limestone facings.

Three considerations motivated the planning for the new engineering center —the company's unceasing quest for better methods and materials, requiring concentration and co-ordination of present facilities; prospects for the most intensively competitive market in automotive history, implying the dependence of a ranking position in the industry upon technological advances; and the need for "human engineering" or scientific research into the relationships not only among the various groups in the industrial family but also into human preferences and requirements of consumer groups.

The latter is a distinctive feature of the new Ford project and one which is particularly stressed by the younger Henry Ford. So a laboratory for human engineering will be one of the buildings to be erected eventually. Here, probably under the direction of John S. Bugas, industrial relations head, will come up for detailed study such matters as bear on the human factor in mass production. Still somewhat nebulous as to proper solution, at least the problems are understood by the Ford management, and concerted efforts will be made to lick them.

Other units in the center include a seven-story administration and engineering building, largest of the group, styling building, dynamometer building, engineering exhibit building, electrical and chemical laboratory, two other major structures and a number of lesser buildings. First units will be the body styling and dynamometer buildings, but the start of construction is dependent upon government approval at the present time. Hence the completion of the dynamometer building, for example, is considered to be at least 16 months away. It will house 32 soundproof dynamometer cells, each of 200-horsepower capacity, plus two additional cells of 500-horsepower capacity. The smaller units will be of the double-end type and will be equal to around 50 conventional dynamometers. Building housing the test equipment and related laboratories is designed in the shape of a cross, dimensions 440 x 440 feet.

The body styling building will be 500 feet long and will have ten individual styling studios, all facing north and opening onto a landscaped yard.

Third unit on the construction program is the engineering exhibit building, designed as the focal point of the project's "humanistic" group. It will be surmounted by a large dome and will include large auditorium, movie, radio and television facilities, and an operating exhibit of hundreds of new automotive developments for the edification of visitors.

Administration and engineering building will be the nerve center of the entire project and will house complete engineering staffs and facilities for all company divisions, to be moved from their present scattered locations when the structure is completed. Expansion of the Ford engineering staff has been moving ahead rapidly. For example, in 1940 the personnel engaged in strictly automotive engineering, exclusive of plant engineering, and chemical and metallurgical studies, numbered about 1000. By 1944, during the war years, this staff had dwindled to 550. At the present time it has been rebuilt to 1800, and planning calls for an eventual 3000 when the new engineering center is occupied.

Stymied since May 15, Ford assemblies are scheduled to resume in most of the 14 assembly branches about June 24, with manufacturing operations taking up a week to ten days in advance of this date. During the 40-day hiatus, it has been possible to build up a more balanced float of materials and parts, but schedules are still some distance from present capacity of 5400 cars and trucks daily. Even should it be possible to accelerate to the peak level, Mr. Ford told newsmen last week the company would be unable to break even financially, considering the low level of labor productivity, higher costs of parts and what he termed "inequitable" ceiling prices.

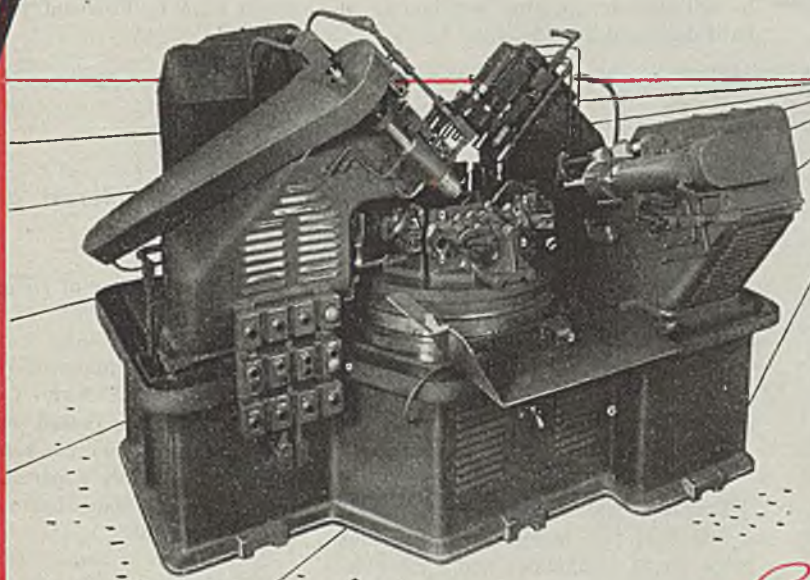
A. J. Browning, new Ford purchasing director, observed at the same time that the company must buy about half its materials and parts on the outside and is finding costs up as much as 30 per cent in some cases. Beyond that are the familiar "escalator" clauses in most contracts today which provide for additional billings on shipments in the event of further price rises.

Ford dealer order books are crammed with 1,150,000 names, 65 per cent of them booked more than six months ago. How many of these will ultimately prove to be buyers is one of the questions all autobuilders are asking these days. Some guesses are as low as one in four.

Hydraulic Drive Developed

Possibilities of the full hydraulic drive with infinitely variable ratio between engine speed and wheel speed, has been a favorite topic at forward-looking automotive engineers' cracker-barrel sessions. An experimental step in these directions was shown last week by Superdraulic Corp. in the form of a 40-horsepower hydraulic pump and motor combination installed in an old 1937 Plymouth chassis, which worked reasonably well for an embryonic development. The pump and motor were standard industrial types, placed on the market by Superdraulic a few months ago (STEEL, March 4, p. 134).The automotive application demonstrated last week was delayed several weeks before proper gear ratios could be installed in differential and in the engine-to-pump drive. Once these are changed it is believed car speed will be more than doubled, as well as engine torque available to drive the pump.

HY-MAC



Emblematic OF NEW HORIZONS

Another "HYMAC" special purpose machine simplifies a series of operations on an automobile part . . . a four stage machine for drilling, spotfacing, counterboring and tapping of the vacuum holes in intake manifold . . . Cycle of Operation is entirely automatic except for loading and unloading (1) Part manually loaded and clamped into position (2) Upon closing safety door—electric contact is made and the machine automatically indexes to position—all of the heads moving forward and completing their operation (during the cycling time of the heads, another part is loaded). (3) Part is unloaded. Production Rate: 120 manifolds per hour. Machine is hydraulically operated and electrically controlled . . . Send us a print of a part that is to be processed, together with the production requirement and our engineering department will make recommendations and preliminary proposal without obligation.

Also send for eight page brochure which completely outlines our facilities.

HYDRAULIC MACHINERY, INC.

12825 FORD ROAD Dearborn, Michigan

HYDRAULIC MACHINERY—Western Division Glendale, California

CED Enlarges Board Under New Program

53 trustees added as initial step in intensifying research on problems in maintenance of high level employment

FIFTY-THREE new members have been added to the board of trustees of the Committee for Economic Development, New York, as a first step in the reoriented CED program, which calls for intensifying and accelerating research on problems bearing on maintenance of high levels of production, distribution and employment. The present 26 trustees will continue in office.

The new board, which is still in the process of formation, will meet for the first time on July 12.

Commenting on the work facing CED, Paul G. Hoffman, chairman, said: "For the three years prior to V-J Day, CED, operating as a private, nonprofit, nonpolitical organization financed by contributions from business, had two objectives. The first was to help individual businessmen to plan during the war for quick reconversion and expanded operations after victory, and the second was to help create an economic climate favorable to the attainment and maintenance of high productive employment."

For the second objective, a Research Division was created. Up to the present time its studies have been concerned largely with transitional problems. It has just begun to tackle such long-range subjects as the special problems of small business, problems of wage-price policy and those of co-ordinating government fiscal and monetary policies. Its most ambitious prospective undertaking, Mr. Hoffman pointed out, is an effort to determine what can and should a government of a free people do to promote national prosperity.

A Research and Policy Committee of businessmen, responsible for this program, will be enlarged. To make available the findings of this committee, a new national CED Information Committee is being formed under chairmanship of Walter D. Fuller, president, Curtis Publishing Co., Philadelphia.

Follansbee Stockholders Will Vote on Merger Plan

Stockholders of Follansbee Steel Corp., Pittsburgh, on June 26 will vote upon a proposal to merge into that corporation its wholly owned subsidiary, Sheet Metal Specialty Co., Pittsburgh. The surviving company would be known as Follansbee Steel Corp.

Merger of the subsidiary to effect economies of operation has been under consideration for some time. Operations of Sheet Metal Specialty Co. are carried on in Follansbee, W. Va., immediately adjacent to the Follansbee Steel Corp.'s mills.

Follansbee Steel Corp. operates plants at Follansbee, W. Va., and Toronto, O., for manufacture of cold-reduced sheets and strip, silicon sheet steel and seamless roll roofing ternes. It employs 1250. In addition it operates warehouses at Pittsburgh and at Rochester, N. Y.

The Sheet Metal Specialty Co. has operated as a steel fabricator, manufacturing contract stampings, stovepipe, dairy industry supplies and hardware.

Improvements Incorporated In New Fruehauf Trailers

Fruehauf Trailer Co., Detroit, is expanding facilities for production of stainless steel trailers. The new model trailer is basically the same as the prewar unit, but has several important improvements. Bodies for the trailers are fabricated by the shotweld process by Edward G. Budd Mfg. Co. and are shipped in knocked down form to Fruehauf plants for final assembly.

BRIEFS . . . .

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

Security Valve Division of Security Engineering Co. Inc., Whittier, Calif., a member of Dresser Industries Inc., Cleveland, has been acquired by Kerotest Mfg. Co., Pittsburgh, which has also formed Kerotest Pacific Co. with offices in Los Angeles.

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Bendix Home Appliances Inc., South Bend, Ind., has increased the working space for its engineering and service departments to meet requirements of a product expansion program this summer.

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Electro-Motive Division, La Grange, Ill., General Motors Corp., has leased the Pullman airplane wing plant in Chicago from the War Assets Administration and will use the facilities to increase production of diesel locomotives.

—o—

Link-Belt Co., Chicago, has opened three new sales offices. They are located at 1608 Fifth Ave., Moline, Ill., 730 Temple Bar Bldg., Cincinnati 2, and 823 Comer Bldg., Birmingham 3.

—o—

Borg-Warner Corp., Chicago, has bought the former A. O. Smith propeller plant at Milwaukee from the War Assets Administration for $1.5 million. Detroit Gear Division of Borg-Warner will operate the plant which will be used to produce a new type of automatic transmission for cars and trucks.

—o—

Compressed Air Products, Newark, N. J., and Alex. M. Sneddon & Associates, New York, have merged and will operate as Compressed Air Products with headquarters in Newark. The company carries a complete line of air and hydraulic equipment.

—o—

Nottingham Equipment Works, Cleveland, General Electric Co., has announced that it ceased operations on V-J Day. The contract termination department, the only department functioning since that date, has recently been discontinued also.

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Westinghouse Electric Corp., Pittsburgh, has plans to spend $1.5 million on remodeling the former Curtiss-Wright plant at Cheektowaga, N. Y.

—o—

International Harvester Co., Chicago, has taken possession of its new Louisville, Ky., works and will begin expansion of the facility in the near future.

—o—

Carboloy Co. Inc., Detroit, has appointed Industrial Supply Corp., Richmond, Va., as an authorized distributor.

—o—

Fry, Lawson & Co., Chicago, management engineers, have incorporated and changed name to George Fry & Associates. Officers are: George Fry, chairman; Thomas A. Harwood, president; William J. Biehl, Robert F. Dick, and George N. Saum, vice presidents; and A. Werner Lawson, secretary-treasurer.

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Cutler-Hammer Inc., Milwaukee, has opened an office at 1404 North Main St., Rockford, Ill.

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Simplex Machine Tool Division, Stokerunit Corp., Milwaukee, has appointed State Machinery Co. Inc., Indianapolis,

and George D. Miller Co., Cleveland, as representatives for the Indiana and Toledo areas, respectively.

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Ryan Metal Products Division, Ryan Aeronautical Co., San Diego, Calif., has established eastern headquarters at 516 Bond Bldg., Washington.

—o—

Hammond Iron Works, Warren, Pa., has appointed Midwest Equipment Co., Detroit, as its Detroit district representative.

—o—

Trico Products Corp., Buffalo, has begun an $8.5 million expansion program to increase production of windshield wipers and washers and an automatic window lift.

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Paragon Electric Co., Two Rivers, Wis., has consolidated its main office, formerly in Chicago, with its factory at Two Rivers, which is being enlarged to allow a three-fold production increase.

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Onsrud Cutter Mfg. Co., Libertyville, Ill., has been organized for the production of all types of cutters required in shaping, routing and related operations.

—o—

Baker Industrial Truck Division, Baker-Raulang Co., Cleveland, has appointed J. K. Mahaffey & Son, Pittsburgh, as representative in the Pittsburgh area.

—o—

McNally Pittsburg Mfg. Corp., Pittsburg, Kans., has acquired Morrow Mfg. Co., Wellston, O., and will operate it as a subsidiary.

—o—

Engineering Division, American Car & Foundry Co., New York, has been expanded and revamped by addition of a sleeping car section which will prepare designs to fill orders placed by several railroads.

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O. K. Stamping Corp., Ft. Wayne, Ind., has been organized to do contract work in metal stamping. The company has purchased the building previously owned by Morco Mfg. Co., Ft. Wayne.

—o—

Cornell-Dubilier Electric Corp., South Plainfield, N. J., manufacturer of capacitors, has purchased the 8-story building in Worcester, Mass., part of which it used during the war to produce condensers for the proximity fuze. The company plans also to purchase the plant's machinery and equipment, most of which is owned by the Navy.

—o—

Shafer Bearing Corp., Chicago, has acquired the Oliver Machine Tool Co. factory and property in Downers Grove, Ill., and will use the plant for the production of bearings.

—o—

Sam Tour & Co. Inc., New York, has added a department of mechanical engineering to its other engineering facilities. The department is specializing in the design of tools, dies, presses, special equipment, plant expansions, and pilot plants.

—o—

Blaw-Knox Co., Pittsburgh, has appointed Ross Builders Supplies Inc., Greenville, S. C., as representative for steel grating in South Carolina.

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B. F. Goodrich Chemical Co., Cleveland, has expanded its testing facilities by taking space in the Sloan building adjacent to the company's headquarters. The company's engineering department, formerly adjoining the general offices, has been moved to the seventh floor of the Rose building, Cleveland.

—o—

Peterson Steels Inc., New York, has purchased the inventory, machinery, furniture and fixtures of SKF Steels Inc., New York, which has discontinued business.

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Pemco Corp., Baltimore, has completed its fifth wholly continuous smelter unit. This addition coupled with the improvements which have been made on the other four units is expected to increase the company's capacity by more than 50 per cent.

Two Firms Sold To Luria Steel & Trading Corp.

Luria expands operations by purchasing Philip W. Frieder Co. of Cleveland and Erman Howell & Co. Inc. of Chicago

LURIA Steel & Trading Corp., New York, has acquired the scrap brokerage concerns of Philip W. Frieder Co., Cleveland, and Erman Howell & Co. Inc., Chicago. The acquired corporations will function as divisions of Luria Steel with no change in officers and personnel.

Philip W. Frieder and Walter Erman have been elected vice presidents and directors of Luria Steel and will be in charge of Cleveland and Chicago operations, respectively.

C. H. R. MacKenzie, district manager, Detroit, has been elected vice president and director of Luria Steel and will remain in charge of Detroit operations.

Luria Steel & Trading Corp. will operate offices in New York, Philadelphia, Norfolk, Pittsburgh, Detroit, Cleveland, Chicago and Birmingham, as well as London, England.

The Pittsburgh office recently was established at 324 Fourth Ave., with E. N. Dittig in charge as district manager.

Hanna Co. Granted Option on Brazilian Ore Deposit; Exploration To Begin Soon

Plans for exploring large and hitherto undeveloped deposits of high grade iron ore in the Brazilian territory of Amapa have been announced by M. A. Hanna Co., Cleveland, through its subsidiary, Hanna Exploration Co.

The announcement followed the action of Capt. Janary Gentil Nunes, governor of Amapa, who recently granted the Hanna company an option for a long-term lease to mine the Amapa ore and to build a 75-mile railroad from the ore deposits, located north of the Amazon river near Macapa.

Hanna officials said that the venture will depend upon the results of exploratory drilling which will be undertaken immediately under the direction of three Hanna geologists who are already at the property. George M. Humphrey, president of M. A. Hanna Co., said that about a year of intensive work will be required before the company can decide whether the operation will justify the large capital expenditures required for installing mining equipment and railroad and dockage facilities at Macapa. If the project is approved, the Hanna Exploration Co. will organize a Brazilian company to do the construction work, Mr. Humphrey said.

The ore deposits, which geologists believe may contain large tonnages of high quality ore recoverable by open pit mining, lie in the district of Santa Maria, and the ore can be delivered to deep water with a relatively short rail haul.

It is believed that exportation of the Amapa ore would place no hardship on Brazil's steel industry, as ore deposits sufficient for Brazil's domestic requirements for centuries are being worked in the state of Minas Gerais.

Industrial, Commercial Building Backlog Heavy in Western States

Total of $275 million started since mid-April or awaiting availability of materials. Hundreds of other applications held up by restrictions. Latest CPA order seen channeling materials into homes and food processing plants

SAN FRANCISCO

INDUSTRIAL and commercial building in eight far western states totaling $275 million has been started since mid-April, or is scheduled to be started when materials become available.

These figures, issued by Civilian Production Administration regional offices in San Francisco and Los Angeles, indicate the potential size of postwar construction being planned for the western United States. That a much greater increase is in store when all restrictions from building finally are removed is shown by the hundreds of permits denied by the CPA because the projects involved were held to be nonessential under present government regulations. About five projects have been denied for every six approved.

During the next six weeks, of course, construction applications will be affected by the temporary tightening of CPA regulations designed to force more materials into housing. However, it is believed that once this control is removed, an even larger flood of projects will pour down on the CPA regional offices.

Before issuance of the new regulation, applications for CPA building permits were being approved by the San Francisco and Los Angeles offices at the rate of about 600 a week, and value of work involved ran to about $20 million a week. In addition, a number of large projects were sent directly to CPA offices in Washington.

Of the total of $275 million now in the building backlog, approximately $245 million has been scheduled for construction in California. The remainder is scattered in the states of Oregon, Washington, Arizona, Nevada, Idaho, Wyoming, and Montana.

Although many approved projects are relatively small, about $32,000 on the average, there is a liberal sprinkling of large scale construction.

For example, the largest project in the Los Angeles area is for an $8,462,700 plant expansion by Bethlehem Steel Corp. At San Francisco, Standard Oil Co. of California has applied for a $4,370,000 wharf development at its Richmond, Calif., refinery and Shell Development Co. is seeking approval of a $4,650,000 laboratory at Emeryville, Calif. Tide Water Associated Oil Co. is planning $2,170,000 expansion at its Avon refinery near San Francisco. O'Connor, Moffatt & Co., San Francisco department store, recently acquired by R. H. Macy & Co. of New York, has filed for a $2 million expansion of its store. Bullock's Inc. also plans to spend $1 million in rehousing its I. Magnin store in San Francisco, and Western Union Telegraph Co. is planning $1 million for a new building in Oakland.

During the six-weeks restrictive period, most industrial construction in California is likely to be concentrated on food processing plants in order to bring about their completion before the crop season progresses too far. Their essentiality is based on an effort to avoid food losses.

California Mills Burn Oil, Weather Coal Strike

LOS ANGELES

Steel industrial leaders in southern California are pointing to the recent coal strike as a demonstration of what they say will become regional strength in the years ahead.

Compared with the paralytic effects of the walkout in the East and in most areas of the West where lack of coal caused shutdowns of open hearths, southern California mills of Bethlehem Steel Co. and Columbia Steel Co. were little affected because petroleum is the basic fuel. To an almost equal degree the Kaiser Co. mill at Fontana weathered the reduction in supplies, although there the situation was the most critical of any area in the district.

For this reason present steel stocks in southern California are but little changed as far as results of local production extend. Eastern mill orders, of course, are another matter. Diminishing stocks due to backlogs of unfilled orders are actualities in California as they are in any eastern steel consuming area.

Based upon the above reasoning, however, the expected fully integrated and broadly based western steel industry of the future will become as economically sound as near-by and readily accessible fuel can make any industry, it is believed.

California Employment Above Prewar Levels

SAN FRANCISCO

Recent report of the California director of industrial relations shows employment in the state now is approximately 3,123,000, a total which is about 623,000 above the prewar level.

Compared with the peak of wartime production in 1943, however, the state's manufacturing industries have shown a decline of about 50 per cent—from 1,209,000 at the high to about 594,000 at present. On the other hand, when aircraft and shipbuilding industries are excluded, the decline from the wartime peak is reduced to about 75,000.

Pacific Coast Companies Plan To Enter Philippines as Islands Gain Independence

SAN FRANCISCO

WITH independence of the Philippines scheduled to become effective July 4, a number of West Coast companies are planning to enter the islands or renew their prewar activities there.

For years to come, the Philippines will be occupied with rebuilding and rehabilitating the cities and factories destroyed in wartime. Large amounts of materials, equipment, capital and especially American know-how will be needed for this task.

As a result, western engineering firms and equipment manufacturers have been taking an active part in setting up outlets for their businesses in the islands.

For example, Industrial Equipment Co., a large industrial and construction equipment firm affiliated with W. A. Bechtel Co., has established a subsidiary in Manila. The firm will handle engineering and construction work of all kinds, sell industrial equipment and machinery and service all types of equipment.

Bechtel Bros., McCone Co. also has set up an engineering firm in the islands.

In addition a number of western food processing companies, cordage firms, merchandising organizations, shipping lines, etc., have either established branches in the islands or are preparing to do so.

Revival of foreign trade with the Philippines also will increase the port traffic of San Francisco and Los Angeles and have a favorable effect on railroads, in-

TALKING STRIKE: Maritime Union workers gather at a noon dock-side meeting on San Francisco's waterfront to build up enthusiasm for their strike scheduled to start June 15. J. M. Robertson, first vice president of the International Longshoremen's & Warehousemen's Union-CIO, termed President Truman "the No. 1 strikebreaker in all history," and said the Chief Executive had declared war on the entire trade labor movement. NEA photo

surance firms, importers, etc., on the mainland.

Although the Philippines may not reach full productive capacity for at least five years, it is believed that eventually annual commerce between the U. S. and the islands will exceed the prewar yearly $200 million of imports and exports.

British To Manufacture Road Machinery Under License

British plants are acquiring licenses to manufacture American road construction equipment similar to types used in England during the war for construction of airfields and heavy road work. These American machines include high-powered track-laying scrapers, tractor drawn; large capacity rubber-tired tractors; portable and semiportable asphalt mixing plants; high-powered graders; elevating graders; concrete mixers; portable and fixed trench excavators; pulverizers; rippers; and power shovels.

Russia Plans Expansion of Auto Production in the Urals

Expansion of automobile manufacture in the Urals of the Soviet to five or six times the present size is contemplated in that country, according to Russian sources. This would mean a goal of 90,000 to 100,000 cars per year at the end of 1950, it is said.

Further experiments in truck manufacture are under way in the Soviet, according to American advices.

Among developments are a truck using a peat gas generator, claimed to operate 24 hours without interruption for cleaning, on the basis of a 1000 kilometer test, and another truck also designed to operate on peat. The Russians are showing interest in such local fuels for various types of internal combustion engines.

German Plant in U. S. Zone Makes Bessemer Steel

The first basic bessemer steel manufactured in Germany since May, 1945, was produced recently in the American zone of occupation, according to a military government report. The report stated no plants for production or repair of railroad equipment may be removed from the U. S. zone.

Hungary Gets U. S. Credit for Use in Buying Surplus Goods

The United States has granted a $10 million credit to the Hungarian government with which to purchase U. S.-owned surplus property overseas.

Previously, similar credits were granted to Poland, $50 million and to others $39 million. Explanation of this policy runs that a dollar shortage in these countries is an obstacle to disposal of overseas surplus, and it is desirable to sell certain goods as a rehabilitation measure. The Foreign Liquidation Commission pointed out that the credit grants are the top-limit amounts and not necessarily a gauge to the amount of goods that will be bought by the countries concerned.

British Iron, Steel Imports Decline, but Remain Large

United Kingdom iron and steel exports in 1945 were only about one-third of those for prewar 1938. The kingdom's most important 1945 shipments included 100,523 tons of plates and sheets, 84,508 tons of railway material, 78,349 tons of iron and steel tubes, 46,714 tons of angles, shapes and sections, 32,758 tons of ferroalloys, 27,169 tons of tinned plates, and 26,076 tons of girders, beams, joists and pillars.

Imports dropped during 1945 to 313,454 tons of iron and steel, compared to 1,764,152 tons in 1944. Pig iron was the most important ferrous metal import, with blooms, totaling 79,694 tons, next in importance. Ferroalloys imported totaled 46,871 tons, and other steels, 36,417 tons.

FOREIGN NOTES...

Companies developing an extensive hydroelectric program in Portugal have sent representatives to this country in connection with purchases of concrete machinery, construction contracts and cement supplies, American consular officials have notified the Department of Commerce.

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Panama plans to spend more than $500,000 on an electrification project, largely transmission lines, according to a consular report from that country. The system will service 19 towns.

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Coal shortages crippled Italy's pig iron production last year, according to a report from American consular sources and the 1946 outlook is no better. Iron ore production in 1945 was 49,256 tons, only 5 per cent of prewar 1939; pig iron totaled 65,838 tons, 7.6 per cent of 1939; and steel, 420,635 tons, or 18.2 per cent.

—o—

Extensive orders for railway equipment have been placed by Belgian authorities in an effort to restore efficient operation to that country's railroads, the Department of Commerce has been advised. An order for 300 locomotives has been placed in the United States and Canada and orders for 113 more have been placed in Belgium.

MEN of industry

DON SMITH

RAYMOND J. SMITH

JACK YAUGER

Don Smith has been named vice president and director of sales, Milwaukee Hydraulic Corp., Milwaukee. Mr. Smith, who had been associated with the excavating industry for twenty years, was sales manager, General Excavator Co., Marion, O., since 1937.

—o—

C. V. Gregory has been appointed district manager in Pittsburgh, Reliance Electric & Engineering Co., Cleveland, succeeding **Bon J. Ballard** who has been named assistant to the sales vice president. **L. J. Carr** has joined the company's staff in Pittsburgh. Prior to service with the Navy, he was a sales engineer in the Chicago office.

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Raymond J. Smith has been promoted to general sales manager, American Steel Band Co., Pittsburgh. He succeeds **Carl R. Mirth**, who has been appointed sales representative for the company in San Francisco and Los Angeles. Mr. Smith has been with the company for 15 years.

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C. J. Gaspar has been appointed sales manager, manufacturers wire, Nichols Wire & Steel Co., Davenport, Iowa. Mr. Gaspar was employed by the company in 1945, following his release from the Navy. Prior to entering the service he had been assistant sales manager, stainless steel department, Pittsburgh Steel Co., Pittsburgh.

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Stephen D. Bechtel, San Francisco, has been named a member of the national advisory council, Associated General Contractors of America, Washington.

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Jack Yauger, executive vice president, Birmingham District Industrial Development Corp., Birmingham, has resigned to establish an engineering agency with his own offices in that city.

—o—

George P. Lehmann has been appointed to the newly created post of assistant manager, General Electric Plastics Divisions, Pittsfield, Mass., General Electric Co. Since his release from the Army last fall, Mr. Lehmann has been staff assistant to the manager of the company's Plastics divisions. **Guy M. Stone** has been named manager, Coshocton, O., plant, General Electric Plastics Divisions. He has been serving as manager of the Lynn works of the divisions. **David FitzGerald** has been appointed manager of employee relations of the Plastics divisions. He had been assistant to the manager of the divisions since 1940. **Charles T. Haist Jr.** has joined the electronics department, General Electric Co., Schenectady, N. Y. He will be located in San Francisco.

—o—

Edward M. Wies has been appointed personnel director, Conlon Corp., Cicero, Ill. He had been an industrial field representative, United States Department of Labor.

—o—

Sales activity of the New Orleans branch, Pennsylvania Flexible Metallic Tubing Co., Philadelphia, has been taken over by offices in Houston. **Paul H. Lynch** has been appointed sales manager of the Houston office, and **A. L. Wimberley**, formerly head of the New Orleans office, has been named assistant to Mr. Lynch.

—o—

J. V. Houston has been appointed vice president, Ramapo Ajax Division, American Brake Shoe Co., New York. Mr. Houston will have headquarters in Chicago. He joined the company in 1910.

—o—

Frank K. Metzger has been named manager of railroad sales, Midvale Co., Philadelphia.

—o—

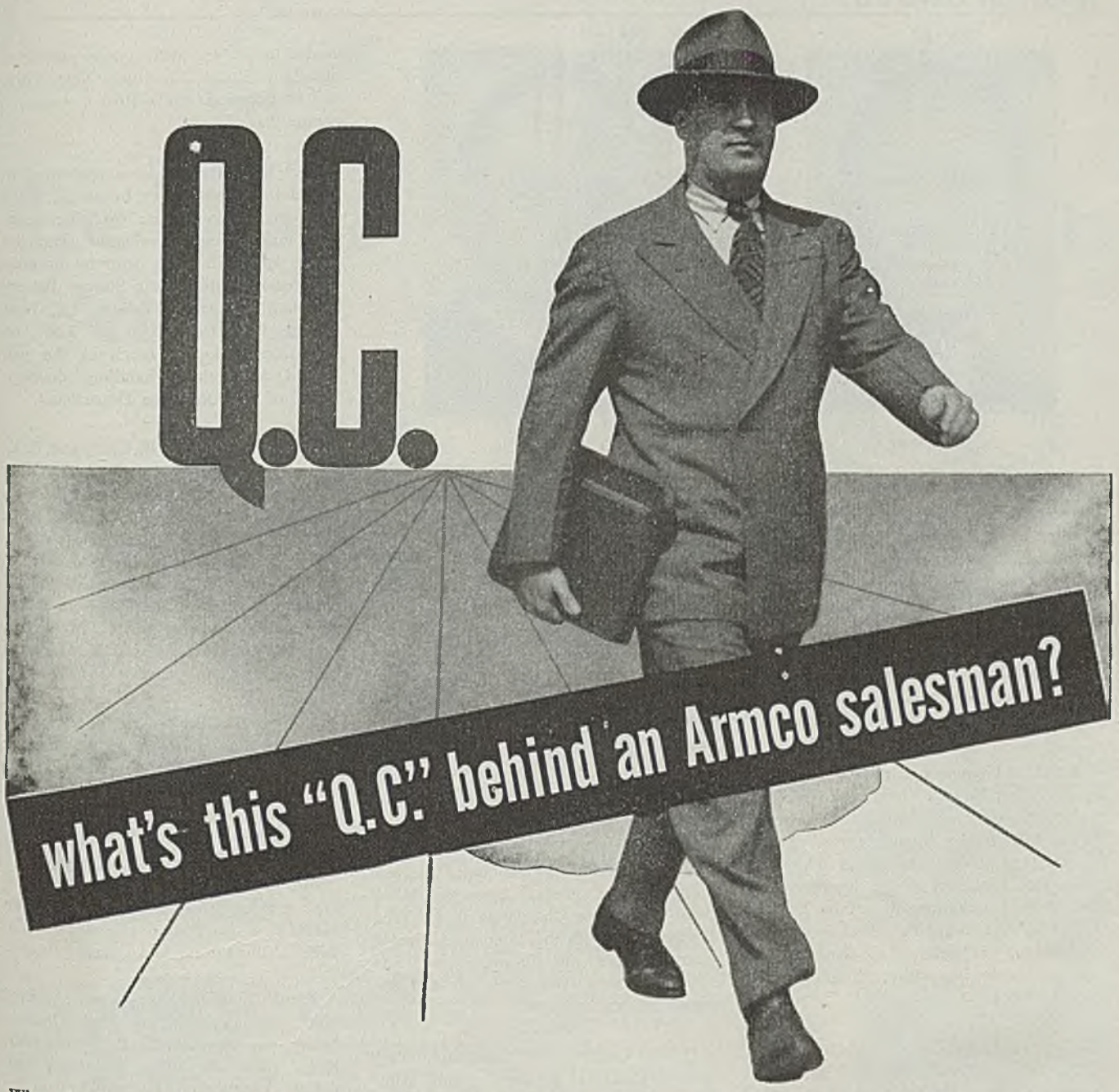
Charles E. Oestmann, assistant to the vice president in charge of operations, Youngstown Sheet & Tube Co., Youngstown, has retired after 39 years in the steel business. He has been succeeded by **Harry S. Anderson**, former manager of the company's claim department. **Herbert H. Hottel**, who was assistant manager of the claim department, has succeeded Mr. Anderson as manager.

—o—

Harold L. Geiger, head of Chicago technical section, Development & Research Division, International Nickel Co. Inc., New York, has been elected chairman, Chicago chapter, American Society for Metals, for the year beginning September, 1946. During the last year Mr. Geiger served as vice chairman of the Chicago chapter.

—o—

Claude A. Crusoe has been named manager of the purchasing department and general purchasing agent, Willys-Overland Motors Inc., Toledo, O. For the last 15 years, he had been director of purchases, Fisher Body Division, General Motors Corp., Detroit. **George Bancroft** has been appointed special as-



When the Armco salesman sends your order for special-purpose sheet steels to the Armco mills, he sets in motion a chain of "Quality Controls."

For more than 20 years supervisors at Armco have referred to these special prescriptions as "Q. C."

Summed up quickly, this is what Armco "Q. C." means to you: You get the *one right steel* for the products and equipment you make.

STARTS WITH SALESMAN

The salesman indicates the kind of steel you want—for what purpose it will be used and how it will be fabricated. Frequently he will ask for blueprints and other information about your application.

This is the reason: Back of him metallurgical and operating supervisors are ready with the "follow-through" to help insure Quality Control for the special-purpose sheets you buy. They weigh and sift requirements—determine the correct temper, annealing and the sequence of operations that will give your sheet steels the properties they need. Previous orders and similar applications are studied too.

All these data go on a routing card. From open-hearth to shipping department, this individual card accompanies your order. It is your assurance of a high "Q. C." in the Armco special-purpose steels that go into the products bearing your name. The American Rolling Mill Company, 3081 Curtis Street, Middletown, Ohio.

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SPECIAL PURPOSE ★ ARMCO ★ SHEET STEELS

THE AMERICAN ROLLING MILL COMPANY

TED DIMKE

G. E. GUDE JR.

sistant to Mr. Crusoe. Mr. Bancroft is manager of purchases for the Willys company.

—o—

Ted Dimke has been elected president, Dayton Association of Purchasing Agents, Dayton, O. Mr. Dimke is affiliated with George H. Leland Development Co., Dayton, and prior to joining that company was purchasing agent for Leland Electric Co. in the same city.

—o—

R. H. Thompson, traffic manager, Maytag Co., Newton, Iowa, who served before the war as chairman, American Washer & Ironer Manufacturers' Association, traffic committee, and who has been vice chairman in the interval, has resumed the chairmanship. **John J. McConville,** Westinghouse Electric Corp., Pittsburgh, has resigned as chairman of the committee, but will continue to serve as a member.

—o—

Emil H. Lang has been elected president, Erie Forge Co., and Erie Forge & Steel Co., Erie, Pa., succeeding the late **Robert F. Devine Jr.** The following were also elected officers for both companies: **G. W. J. Stout,** vice president; **Craig Devine,** treasurer; and **F. E. Wuenschel,** secretary.

—o—

A. P. Rankin, first vice president, Manitowoc Ship Building Corp., Manitowoc, Wis., is resigning, effective June 30, from active business with the company. He will continue as a member of the board of directors. Well known as a shipbuilder on the Great Lakes, he became associated with the Manitowoc corporation in 1913, having been with American Shipbuilding Co., Cleveland. His early training was in Scotland.

—o—

J. Edward Schipper, recently resigned as president, Schipper Associates, Detroit, has been appointed manager, Detroit office, Arthur Kudner Inc., New York.

—o—

Kay L. Johnson, physicist, has joined the staff of Battelle Memorial Institute, Columbus, O., where he will be engaged in research in industrial physics.

—o—

G. E. Gude Jr., for the last 10 years manager of sales, Wyatt Metal & Boiler Works, Houston, Tex., has been appointed vice president of the company and elected to the board of directors. He will continue his position as manager of sales.

—o—

A. C. Kieckhafer has been elected president and general manager, West Bend Aluminum Co., West Bend, Wis. He has been with the company for more than 30 years, and for many years has been a director, vice president and assistant general manager.

—o—

C. H. Vaughan has been appointed district manager at Birmingham, Allegheny Ludlum Steel Corp., Brackenridge, Pa. **C. H. Nesbitt** has been named assistant district manager. Mr. Vaughan was formerly Detroit tool steel manager for the company.

—o—

C. R. Mabley Jr., John Mitchell and **Charles J. Surdy** have been appointed to the technical advisory board, Bituminous Coal Research Inc., Pittsburgh. Mr. Mabley, recently released from the Army, is general manager of industrial sales, Island Creek Coal Co., Huntington, W. Va. He will serve on the industrial utilization and residential stoker subcommittees of the technical advisory board. Mr. Mitchell is a gas engineer, representing Koppers Coal Division, Eastern Gas & Fuel Associates, Boston. He, too, will serve on the residential stoker subcommittee, as well as with the gasification and carbonization subcommittee. Mr. Surdy, vice president, Standard Stoker Co. Inc., New York, will be active on the motive power subcommittee.

—o—

Carl R. Tufts has been appointed to the Detroit staff, Baker Industrial Truck Division, Baker-Raulang Co., Cleveland. Mr. Tufts, recently released from the Army, spent 16 years prior to his military service with Edison Storage Battery Division, Thomas A. Edison Inc., West Orange, N. J. While in the Army, he was responsible for much of the palletized ammunition handling developments of the Ordnance Department.

—o—

M. J. Parykaza, L. R. Clark and **C. C. Wiley** have been named district sales engineers in charge of three new sales offices of Link-Belt Co., Chicago. Mr. Parykaza, who has been with the company since 1922, heads the new office at Moline, Ill. Mr. Clark, who started his career with the firm in 1927, is in charge of the new Cincinnati office. Mr. Wiley, with the company since 1926, heads the new Birmingham office.

—o—

Gordon E. Brown has been transferred to the Hartford, Conn., district, Ampco Metal Inc., Milwaukee, as field engineer. Recently released from the Army, Mr. Brown had been assigned to the company's main office in Milwaukee.

—o—

Milton Kutz, since 1933 assistant general manager, electrochemicals department, E. I. du Pont de Nemours & Co. Inc., Wilmington, Del., has retired.

—o—

Frank J. Wood has been appointed chief engineer, Rolling Mill Division, Loewy Construction Co. Inc., New York. Since 1936 Mr. Wood has been with Goodman Mfg. Co. Inc., Chicago.

—o—

Frederick C. Esser has been appointed purchasing agent, Westinghouse Lamp Division, Bloomfield, N. J., Westinghouse Electric Corp. Mr. Esser was purchasing agent for Bryant Electric Co., Bridgeport, Conn., subsidiary of the Westinghouse corporation. **T. Addison Clohosey** has been named purchasing consultant, Westinghouse Lamp Division. He had been purchasing agent for the division for 37 years. **Harry D. Hanafus,** who has been a section supervisor in the division's purchasing department since October, 1944, was named assistant purchasing agent.

—o—

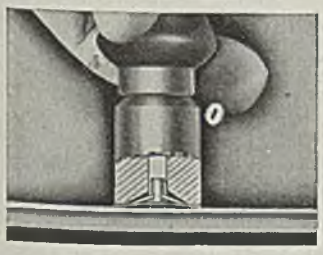
Thomas A. Murphy has been named manager of a newly established Western Division of Aluminum Sales, Reynolds Metals Co., Louisville. He will have headquarters in Los Angeles, and

No Inserts *No Tapping* *No Machining*

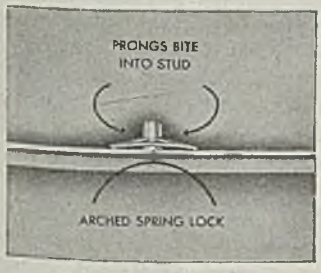
For Plastic or Diecast Products with Push-on SPEED NUTS

—THE FASTER SPEED NUT WAY!

Start Speed Nut with thumb and finger.



Push down over stud with countersunk tool.

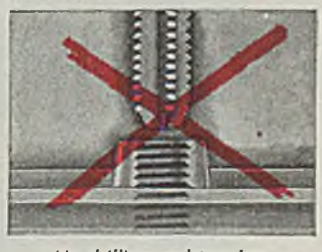


Prongs lock securely.

THESE COSTLY OPERATIONS ELIMINATED!

No more inserts in plastics.

No more tapped holes in plastics.



No drilling and tapping in die castings.

If you assemble plastic or die cast parts, the use of Push-on *Speed Nuts* will enable you to eliminate expensive inserts, tapping and threading operations. Just zipping a Push-on *Speed Nut* over an unthreaded, integrally molded stud will give you a vibration-proof fastening with a spring steel bite that stays put. • Use Push-on *Speed Nuts* for fastening plastic or metal name plates, knobs, handles, trim strips, medallions, dials, bezels, grilles and scores of other parts that must be fastened quickly and inexpensively. Holds equally well over rivets, wires, nails and tubing. • You can do it faster, better and cheaper with a *Speed Nut* or *Speed Clip* Give us your assembly details today and we will send you samples to fit *your job*. A cost analysis doing it the *Speed Nut* way will amaze you.

TINNERMAN PRODUCTS, INC.
2039 FULTON ROAD • CLEVELAND 13, OHIO

In Canada: Wallace Barnes Co., Ltd., Hamilton, Ontario
In England: Simmonds Aerocessories, Ltd., London
In France: Aerocessoires Simmonds, S. A., Paris
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Speed Nuts* PATENTED

MORE THAN 3000 SHAPES AND SIZES

*Trade Mark Reg. U. S. Pat. Off.

F A S T E S T T H I N G I N F A S T E N I N G S

his territory will include the West Coast, Rocky Mountain states and Texas. Recently released from the Army, Mr. Murphy joined the Reynolds company in 1945 as aviation industry manager.

—o—

Robert B. Wilkinson has been appointed assistant treasurer, Graybar Electric Co., New York. Mr. Wilkinson had been Allegheny district credit manager for the company since 1935, with offices in Pittsburgh. His new headquarters will be in New York.

—o—

David M. Salsbury has been named executive vice president, Westinghouse Electric Supply Co., New York, succeeding **Walter Williamson** who has retired. Mr. Salsbury was formerly vice president and general manager of the company.

—o—

Ward Keener has been elected vice president for employee relations, B. F. Goodrich Co., Akron. Mr. Keener joined the Goodrich company in 1937, and since 1945, has been assistant to the president.

—o—

Gerald G. Lipke, recently released from the Army, has been named district field engineer in the Denver area, Hagan Corp., Pittsburgh. He will assist in industrial water conditioning work. Mr. Lipke joined the company in 1936.

—o—

H. W. Tuttle has resigned as president, H. W. Tuttle & Co. Inc., Adrian, Mich., and has joined the newly organized St. Clair Electric Products Co., Marysville, Mich., as vice president and general manager. He is in direct charge of sales and engineering for the company. President of the new organization is **Richard H. Asam**, president, Swiss Automatic Co., Detroit, and Asam Mfg. Co., Detroit. **R. H. Davis**, formerly with the Tuttle company, is factory superintendent of the new company. **John D. Scofield** has been named secretary, and **Fred E. Birtch** member of the board of directors of the St. Clair company.

—o—

Albert Bauer, assistant general manager, Oregon Shipbuilding Corp., Portland, Oreg., has been appointed general manager of all interests in the Portland area for Kaiser Co. Inc. **Russell Hoffman** has been named general superintendent, Swan Island ship repair for the company, as well as general superintendent, Oregon Shipbuilding Corp.

—o—

Jay Thomas Ford has been appointed chief chemist, Adrian Division, Adrian, Mich., Gerity-Michigan Die Casting Co. For the last 21 years, Mr. Ford had been chief chemist, A. C. Spark Plug Division, General Motors Corp., Detroit.

—o—

Wilbur R. Varney has joined the staff of Quaker Chemical Products Corp., Conshohocken, Pa. He will act as liaison engineer between the company's field engineers, the laboratory, and consumers. During the war, Mr. Varney served as metallurgical and manufacturing officer, U. S. Naval Ordnance Plant, Center Line, Mich.

—o—

Four men have been added to the sales department, Eaton Reliance Division, Massillon, O., Eaton Mfg. Co. **Ralph O. Amsden Jr.** will have headquarters in the company's Detroit office, and **John S. Kerr** in the Cleveland office. **John L. Knott**, prior to the war a sales representative for Miller Lock Works, Philadelphia, will have headquarters in the Eaton company's New York office. **Clifford A. Esinhart**, with Firestone Tire & Rubber Co., Akron, before the war, has been appointed western railroad representative, with headquarters in the company's Chicago office. All four men are recently discharged veterans.

—o—

Carroll E. Gray, president, Doyle Machine & Tool Corp., Syracuse, N. Y., and chairman, Pittsburgh Metallurgical Co. Inc., Niagara Falls, N. Y., has been elected chairman, Sterling Engine Co., Buffalo. **George M. Ebert**, formerly in charge of accounting and finance for two divisions of Curtiss-Wright Corp., Buffalo, has been appointed controller of Sterling. **James D. Miller** was elected a director of the company.

—o—

William Balderston has been elected executive vice president, Philco Corp., Philadelphia. Mr. Balderston joined the company in 1930, and two years ago was named vice president in charge of operations. All other officers of the company were re-elected.

—o—

J. N. McClure has been named manager, Petroleum Division, with headquarters in Houston, Tex., Elliott Co., Jeannette, Pa. Mr. McClure has been with the company since 1923 and was manager of the Kansas City office for the last five years. **C. F. McGinnis**, with the company since 1936, is now Kansas City district manager. **J. E. Walsh** has been appointed manager of the Houston, Tex., district office.

—o—

William A. Faragher has been named advertising director, Marco Co. Inc., Wilmington, Del. Mr. Faragher, prior to service with the Army, was with McGraw-Hill Publishing Co. Inc., New York, and Aircraft-Marine Products Inc., Harrisburg, Pa.

—o—

J. A. Gulick has been appointed sales representative for Oklahoma, Arkansas, and northwestern Texas, for Titan Metal Mfg. Co., Bellefonte, Pa. He will have offices in Tulsa, Okla.

—o—

Garfield Jenkins has joined James Flett Organization Inc., Chicago. He will assist **Michael Lyava**, manager of the company's Cleveland branch office, in the merchandising of scrap materials. Mr. Jenkins was formerly with Jones & Laughlin Steel Corp., Pittsburgh.

—o—

Alfred H. Roth has been appointed advertising and sales promotion manager, and **Edward Southworth** district sales representative for northwestern Ohio, with headquarters in Toledo, O., Towmotor Corp., Cleveland. Mr. Roth, recently released from the Army, was associated with Talon Inc., Meadville, Pa., before the war. Mr. Southworth

W. K. FITCH

Who has been elected chairman of the board of directors, Dravo Corp., Pittsburgh, noted in STEEL, May 20 issue, p. 81.

WILLIAM A. COOK

Who has been named general manager of sales, Phoenix Iron Co., Phoenixville, Pa., noted in STEEL, Apr. 22 issue, p. 76.

EMMETT C. HARTLEY

Who is manager, Special Products Division, Parker Appliance Co., Cleveland, noted in STEEL, June 3 issue, p. 101.

R. B. HAMMOND

Recently appointed general manager, secretary and treasurer, Bellevue Industrial Furnace Co., Detroit, STEEL, June 3 issue, p. 100.

H. H. WUNDERLICH

Who has been appointed an assistant controller, Jones & Laughlin Steel Corp., Pittsburgh, noted in the June 3 issue of STEEL, p. 100.

formerly held Mr. Roth's newly acquired post of advertising and sales promotion manager.

—o—

Henry M. Reese has been appointed special field sales application engineer, Parker Appliance Co., Cleveland, with headquarters in that city. Mr. Reese was formerly superintendent of the company's Valve & Bender Division.

—o—

Eugene C. Bauer, recently released from the Army, has returned to the Kensington Steel Co., Chicago.

—o—

C. R. Standen has been appointed advertising manager, Ladish Drop Forge Co., Cudahy, Wis. Prior to service with the Army, Mr. Standen was associated with RCA Victor Division, Camden, N. J., Radio Corp. of America.

—o—

Harold C. Hickock has been named central district manager, B. F. Sturtevant Co. Division, Westinghouse Electric Corp., Pittsburgh. Mr. Hickock joined the Westinghouse corporation in 1918. When the Westinghouse Elevator Co. became a part of the parent company last year, he was appointed central district manager, Westinghouse Elevator Division. **Dallas W. Norris** has assumed this post vacated by Mr. Hickock. Mr. Norris, who joined the Westinghouse corporation in 1923, had been manager, St. Louis district, Elevator and Air Conditioning Divisions.

—o—

W. H. Waters has been appointed assistant vice president, American Car & Foundry Export Co., New York. Mr. Waters had been connected since 1940 with the company's purchasing department as liaison man between the company and the U. S. Ordnance Department.

—o—

Henry Martyn Chance II has been elected assistant to the president, United Engineers & Constructors Inc., Philadelphia. Mr. Chance has been associated with the company since 1936. He has been in the chemical department since 1937.

—o—

Jasper E. Crane has retired as a vice president and member of the executive committee, E. I. du Pont de Nemours & Co., Wilmington, Del. **Dr. Crawford H. Greenewalt,** assistant general manager of the company's pigments department, has been named to succeed him. **Walter J. Beadle,** first assistant treasurer, has been named successor to **James B. Eliason** who is retiring as vice president and treasurer. **T. C. Davis** has been appointed first assistant treasurer

—o—

J. L. Klein has been appointed director of research, Jessop Steel Co., Washington, Pa. He joined the company in 1943 as metallurgical research engineer, and in 1944 became head research metallurgist.

—o—

George L. Best has been elected vice president, Western Electric Co. Inc., New York. He had been assistant vice president, American Telephone & Telegraph Co., New York.

—o—

David M. Hallier has been appointed sales manager, National Tool Co., Cleveland. Since 1943, he served as assistant sales manager for the company.

—o—

Arthur G. Buterbaugh has been named sales manager, Detroit district, Washington Steel Corp., Washington, Pa. He joined the company's sales division May 1.

OBITUARIES . . .

Roy H. Crane, sales promotion manager, Liquid Carbonic Corp., Chicago, died recently. Mr. Crane joined the corporation in 1926, and was sales promotion manager since 1942.

—o—

W. A. Givens, 60, executive vice president and director, Allegheny Ludlum Steel Corp., Brackenridge, Pa., died May 29 in Tarentum, Pa. He had been with the company since 1925. In 1938, he was elected to the board of directors. He became executive vice president in 1944.

—o—

William J. Cleary, 63, purchasing director, Briggs Mfg. Co., Detroit, died in that city June 1. He was associated with the company since 1928.

—o—

Karl B. Mickey, 54, author and public relations expert, died recently in Chicago. He had been associated with the public relations department, International Harvester Co., Chicago, for six years.

—o—

Noel H. Hick, 62, Austin Co., Cleveland, died in that city recently. He joined the company in 1934.

—o—

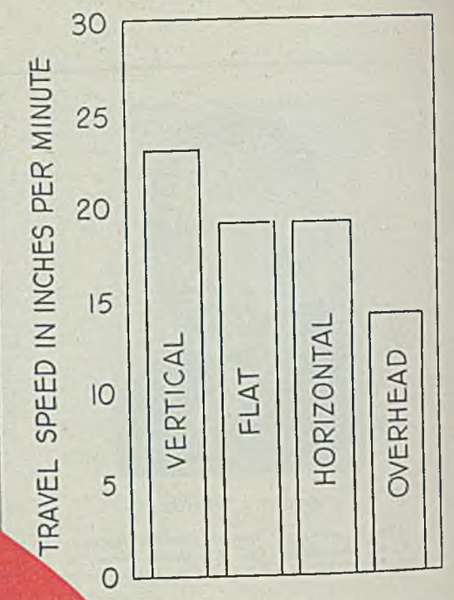
William M. Cooper, 58, chief engineer, Detroit Aluminum & Brass Corp., Detroit, died recently.

—o—

Robert W. Hilton, president, Morris Chemical Co., Morris, Pa., died recently at his home in Bradford, Pa.

Cost reductions, says the author, may be gained by stressing welding fundamentals—fit up and joint design, position, electrodes, jigs and fixtures—because of their greater influence in joining light-gage metals

Important Elements of SHEET METAL WELDING



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By ORVILLE T. BARNETT
Production Engineer
Welding Division, Metal & Thermit Corp.
New York

AS EXPECTED from thin metals encountered in sheet metal fabrication by welding, worthwhile cost reductions may be achieved by paying strict attention to certain fundamental considerations. Unquestionably, four points may be applied to all welding efforts because fit up and joint design, welding positions, current, electrodes and technique, and jigs and fixtures are not topics applicable to sheet metal welding alone. But the real point to be made is the greater influence of the above factors when related to light-gage joints.

Before considering actual welding practices, agreement should be reached on gages involved in sheet metal work. Steels as thin as 24 gage and as thick as 1/4-in. have all been classified as sheet metals by some authorities. This discussion, however, will be restricted to the range from 18 gage, about 3/64-in. to 10 gage, somewhat over 1/8-in. There are several ways of reporting the decimal equivalents of sheets metal gages ,those listed in the accompanying table enjoying popularity.

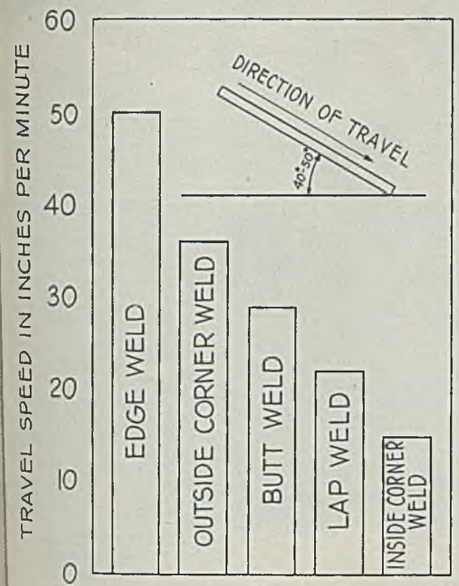
Fit Up and Joints: In sheet metal welding fit up and types of joints become intimately related. As shown in Fig. 3, six joint designs have been adopted as standards for sheet metal welding. All of them afford a ready means of attaining good fit up with the exception of F, the butt weld.

Gapped joints always penalize speed that may be achieved during welding. Sometimes, as in the case with a V-pipe welding, a gap is specified to insure 100 per cent penetration when welding from one side only. But, as a general rule, gaps are to be avoided to save labor.

Gaps in sheet metal detract from an already limited heat capacity. Not only must the welder slow down, but reduction of welding current is mandatory to prevent burning through the thin metal. If, as a result of misguided zeal, the welder attempts to maintain current and speed in face of uneven fit up, a burn-through is almost inevitable. Patching becomes necessary, a time consuming job, which leaves an ugly weld that necessitates grinding and dressing to match appearance of the rest of the seam. In addition, quality of weld at such a location is often below par.

Sheet metal welders of proved ability are recognized by the number of tack welds they use. When sheet metal joints are welded without aid of jigs and fixtures, tack welds may be spaced as close together as every 3 in. In case of doubt, or until sheet metal practices become well established, too many tack welds are preferred to too few. Because thin metals are more prone to warp, tack welds guarantee correct alignment of joint throughout welding operation.

As Fig. 3 demonstrates, joint design has an influence on



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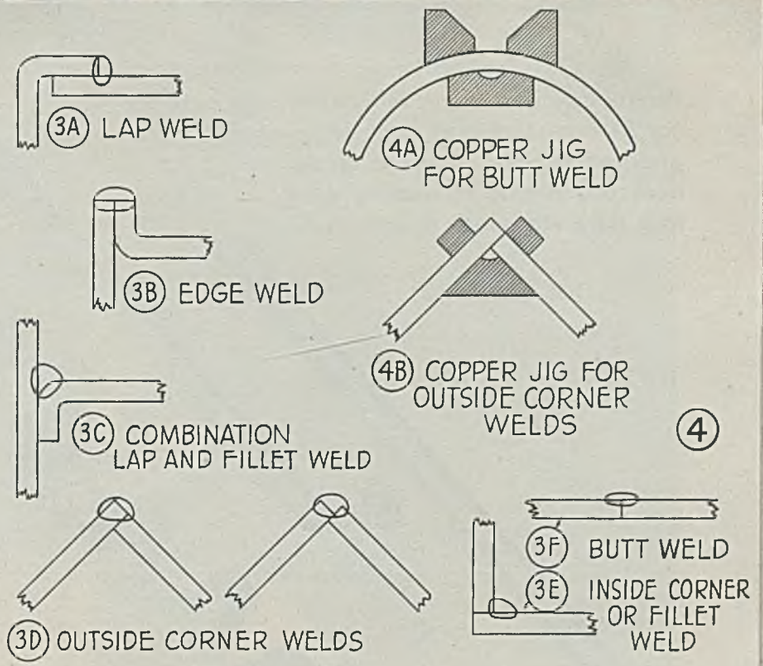


3 4

Fig. 1—Influence of welding position on travel speed for lap weld in 14-gage sheet

Fig. 2—Influence of joint design on travel speed in 14-gage sheet welding

Fig. 3—Typical joints for sheet metal welding

Fig. 4—Copper jigs for sheet metal welding

fit up. Wherever a flange occurs, as in A, the lap weld, B, the edge weld and C, the combination lap and fillet weld, the designer has provided a means for improving fit up. The welder uses his ball pein hammer to snug the joint ahead of him after deposition of metal from each electrode or half electrode. Corner welds, either outside as D or inside as E, are less easily fitted. In these designs, face of one sheet is pounded tightly against edge of the other. Buttweld as in F is the most difficult to fit. Best results are dependent upon careful plate edge preparation before bringing the edges together. Thus joint design provides a means of allowing the welder to maintain good fit up. Inter-relationship between designer and welder provides the former with a method of contribution toward lower fabricating costs.

Welding Positions: Sheet metal welding positions are not the same as those selected for normal work in heavier sections. Of course, positioning leads to economical welding in light metals as well as in heavy metals. But the flat position is not the best for light metal. Fig. 1 shows effect of welding position on travel speed. The novice will be surprised to find the vertical position rated as the best.

Observations in better sheet metal shops quickly disclose an overlapping of welding positions. That is, some consider the flat position as anything from a 45° to a zero slope, with the vertical position anything more steeply sloped than 45°. In heavy fabrication, the flat position is restricted to a maximum slope of 15°.

Every discussion of quality welding in the vertical position seems to emphasize desirability of welding from the bottom up. Although there are exceptions in heavier structures, the rule is observed most of the time. Sheet metal construction reverses the welding direction. Welding downhill becomes the accepted method of joining thin sections. Speed is increased, and the resultant bead is smaller and neater.

The strictly flat position is seldom used, and the overhead position should be avoided. Vertical down or flat welding with a pronounced down hill slope yields the best and least expensive welds.

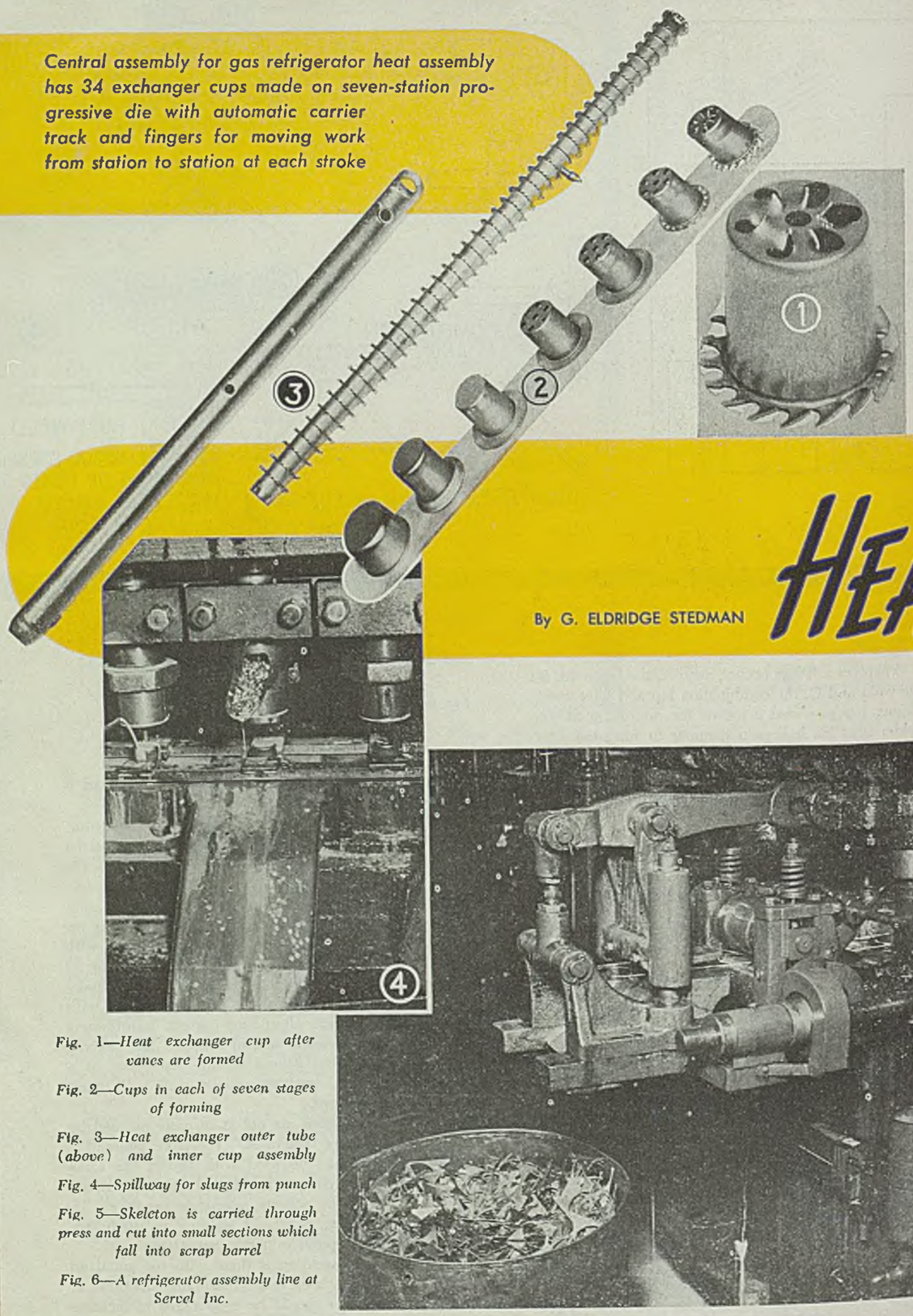
Current, Electrodes and Technique: Either alternating or direct current may be used with equally satisfactory results. All sheet metal welding may be accomplished with one electrode, the E6013 type introduced some 8 to 10 years ago. Although the E6013 electrode was originally intended to serve two functions—to give good results with low open-circuit voltage alternating-current transformers and weld-thin sections—the second function has become more important. It has gained a wide reputation as a sheet metal electrode, working equally well with alternating and direct current.

Sheet metal applications are not as severely plagued by arc blow as are thicker structures. Therefore alternating and direct current may be used with almost the same facility. When direct current is selected, most joints are completed with straight polarity, electrode negative. If, in spite of all warning, overhead welding is attempted, reverse polarity will provide better penetration.

Much sheet metal welding is done with too small an electrode using too low a current. Assuming that good fit up prevails, the welder should be encouraged to increase his current and travel speed until he reaches a maximum.

(*Please turn to Page* 114)

Central assembly for gas refrigerator heat assembly has 34 exchanger cups made on seven-station progressive die with automatic carrier track and fingers for moving work from station to station at each stroke



HEAT EXCHANGER

By G. ELDRIDGE STEDMAN

Fig. 1—Heat exchanger cup after vanes are formed

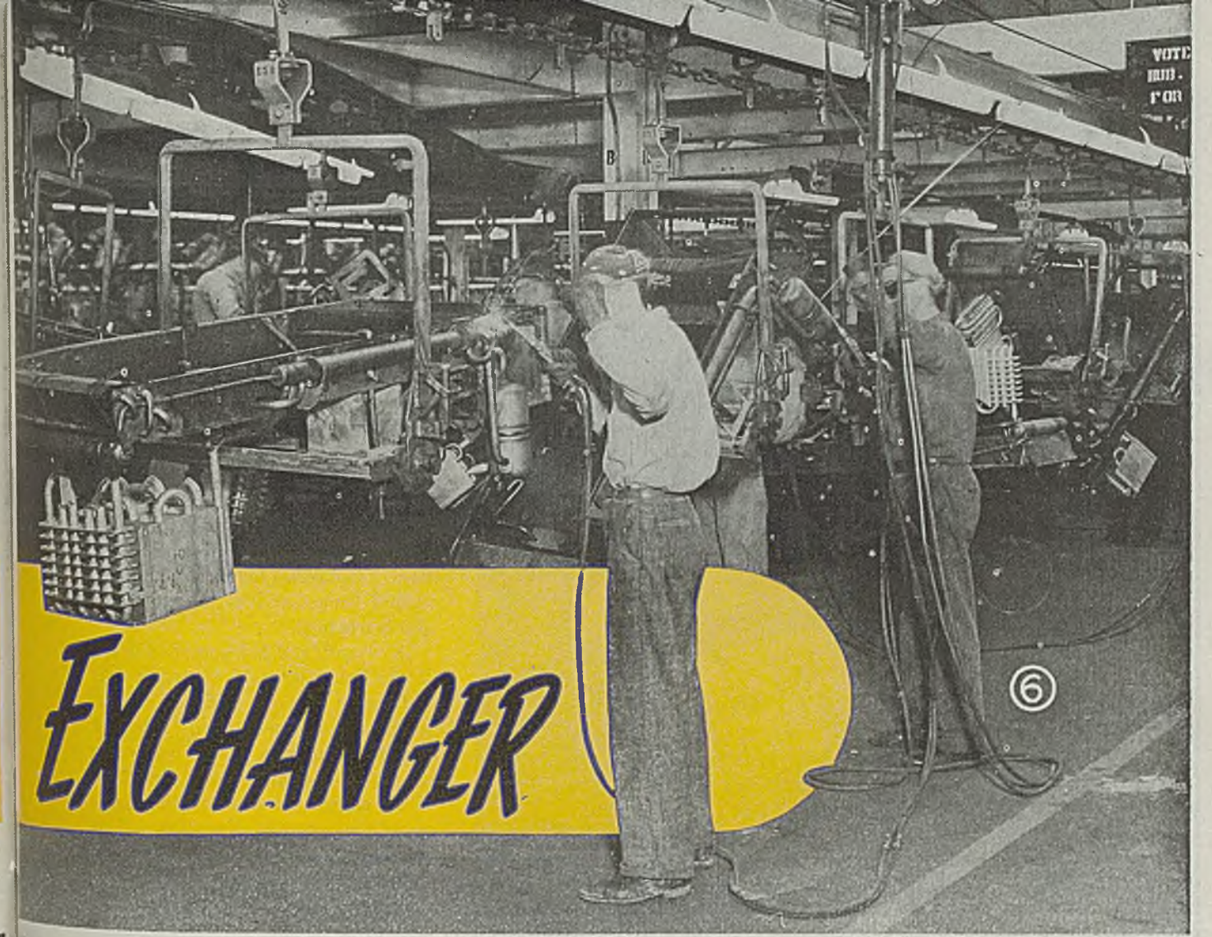
Fig. 2—Cups in each of seven stages of forming

Fig. 3—Heat exchanger outer tube (above) and inner cup assembly

Fig. 4—Spillway for slugs from punch

Fig. 5—Skelcton is carried through press and cut into small sections which fall into scrap barrel

Fig. 6—A refrigerator assembly line at Servel Inc.



RECONVERSION at Servel Inc., Evansville, Ind., has been rapid. Production of the Electrolux gas refrigerator is approaching its prewar peak. Other lines, such as automatic water heaters, air conditioning equipment, and a new "supermetic" electrical compressor also are either being tooled or are in production. Over 7500 tools, dies and fixtures are used in these operations. An engineering staff of 185 is housed in its own building, and there are 250 designers and toolmakers in its tool division.

Special production techniques are required for many of the company's products. One interesting operation is the fabrication of the gas refrigerator heat exchanger cup and its assembly, with related parts.

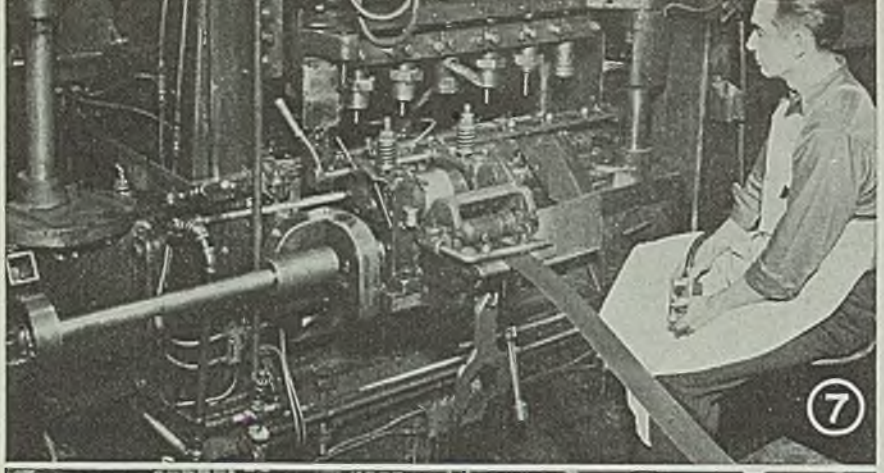
Gas refrigerator employs the absorption process, and has an intricate system of tubes and heat exchanger, absorption and condensing components. Its basic principle is the transfer of a cool, heavy mixture of hydrogen gas and ammonia vapor from cabinet evaporator coil downward through central chamber of gas heat exchanger where it comes in thermal contact with warm, light hydrogen gas from absorber. Warm, light gas rising upward in external chamber of gas heat exchanger effects heat exchange which eventually results in extraction of heat, or cooling.

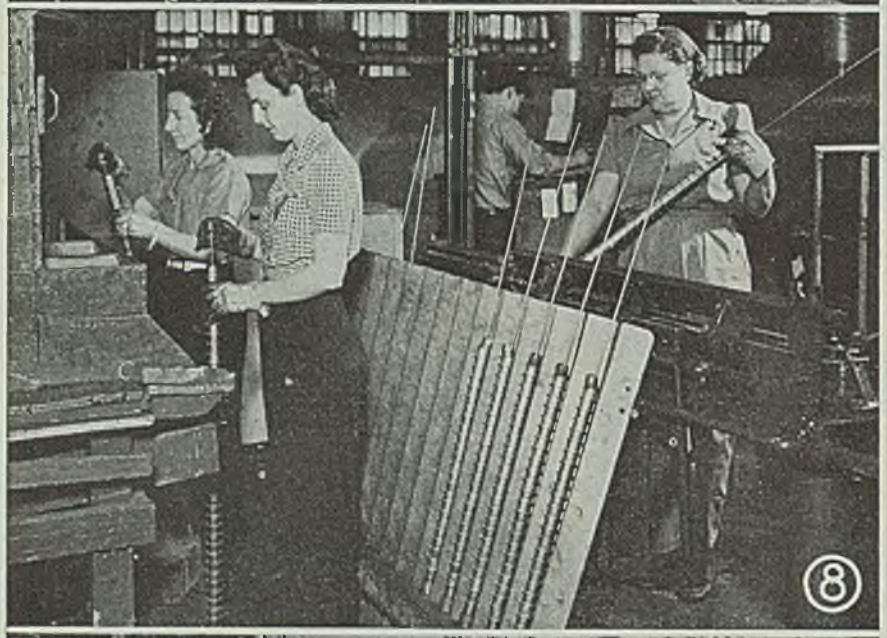
Refrigeration unit being assembled in Fig. 6 has a total of 1149 parts and uses 54 separate pieces of tubing, with many angles, compound bends and irregular contours. There is a total of over 108 ft of tubing in the unit.

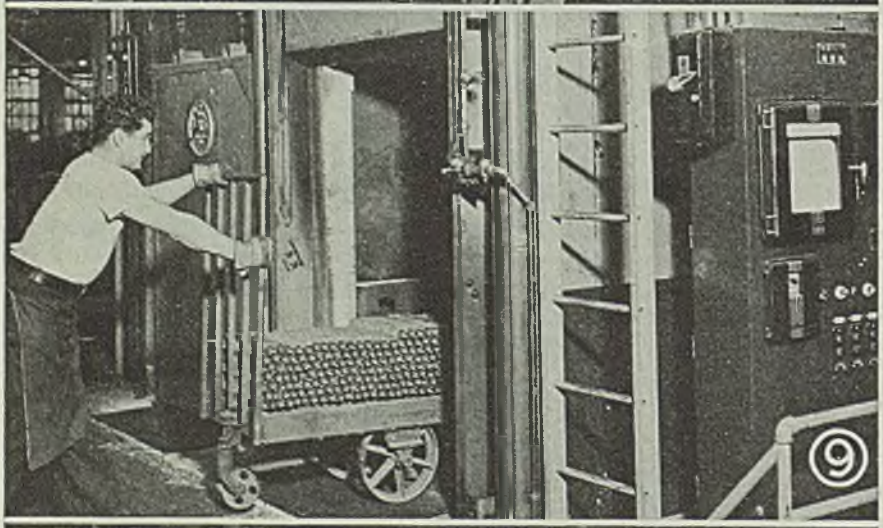
Heat exchanger consists of an inner tube encased in an outer tubular shell. Inner gas exchange tube has an asembly of fabricated cups (Fig. 1) squeezed into an intricate section that forms a serrated pathway of angled flanges which give a balanced whirl to gas. Inner cup assembly and tubular shell appear in Fig. 3.

Exchanger cups, 34 of which make up the central or inner gas heat exchanger, are made in seven operations as in Fig. 2. Tolerances are held to less than 0.003-in. Flanges impart necessary swirl to downward passage of hydrogen gas and ammonia vapors. Cup is drawn from coiled stock of 0.020-in. dull finish, mill-edge steel 3⅝ in. wide. Dull finish facilitates lubrication in drawing operations. It is fabricated on either a 60 T Bliss or a 50-4-60 Minster press, using a seven-station progressive die of special Servel design having a carrier track and fingers which automatically carry work from one station to another at each press stroke, feeding from right to left. Production is 35,000 per day with one operator handling the press.

First drawing operation blanks and draws the cup to 1¾ in. diameter and 1 in. depth. Cup is redrawn in a second operation to 1¼ in. diameter and 1 5/16 in. depth. This draw also flanges bottom section of exchanger cup into a bell shape. Third operation is a final draw to







1 5/16 in. diameter and 1¼ in. depth. Draw also restrikes flange to a perfectly flat 90 degree angle.

Seven holes then are pierced into cup bottom as shown in closeup, Fig. 1. Slugs from this piercing travel up through the punch and slide from a trough into a scrap skirt tray running full length of press in front of die on operator's side (Fig. 4).

Fifth operation restrikes the seven bottom holes and sizes them to close limits. Tolerance here is 0.002 to 0.003-in. When these cups are mated (as in Fig. 3) in the central heat exchanger section, the seven holes form a direct passage for ammonia vapor.

Sixth operation prepares cup for intricate fin or vane fabrication to follow. Eighteen holes are pierced around flange, and outside of flange also is trimmed.

In seventh and last operation, a cut of the holes forms 18 vanes on skirt end flange of cup, while six fins or vanes are formed from holes of closed end of cup. Skirt end vanes are set at 30-degree angles and those of the closed end at 45 degrees, positioned in opposite direction. This vaning supplies the whirl to gas.

There are really eight operations at each press stroke, as scrap from operations is carried to end of press where it drops into scrap box (Fig. 5). Trimmings other than lugs fall into trough in front of operator as previously described. Scrap from blanked coil of first operation passes through the press to receptacle at opposite side.

Seven-station die measures 5 ft by 20 in. Each station is removable. A cam at press end is driven from crankshaft to operate finger positioning movement (Fig. 7). Slide which actuates the fingers travels the distance of a station and then returns. Fingers take work ejected at each station, move it forward to locate and hold at the next station, and return to recycle their function. Slide thus has seven sets of clamping fingers that move

(*Please turn to Page* 134)

Fig. 7—Cam-operated fingers move work forward through the seven die stations

Fig. 8—Cups are nested on rods before going to hydraulic press

Fig. 9—Load of cup assemblies being pushed into gas-fired furnace

Fig. 10—Inner cup assembly and outer tube are pressed together

ENGINEERING NEWS *at a glance*

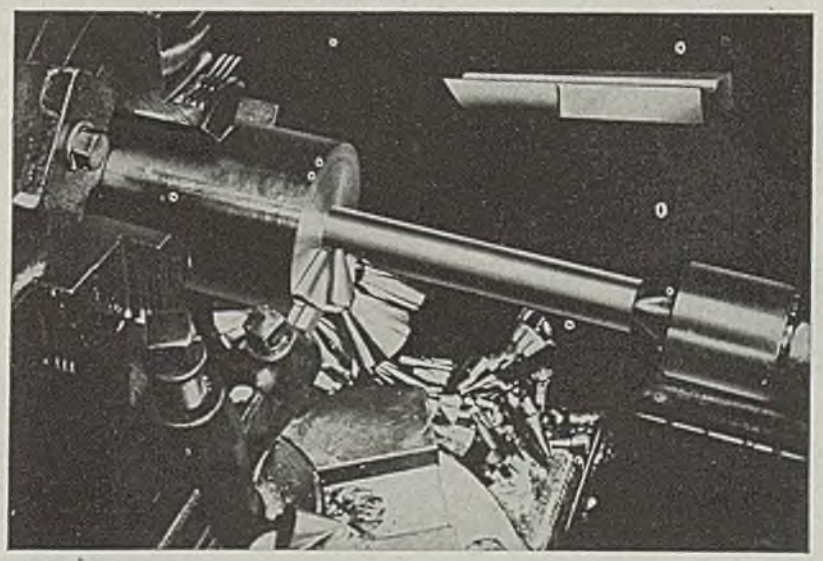
AN industrial plastic that withstands acids which dissolve gold and platinum and retains its strength and form at high temperatures, is being used in connection with jet engines, E. I. Du Pont De Nemours & Co., Wilmington, Del., announced. The development, called Teflon, is being produced in limited amounts in form of sheets, rods, tubes, coated wire, tape and fabricated sections for experimental purposes. Dr. Malcom M. Renfrew of Du Pont, who announced the development before the American Chemical Society recently, predicts industry will use the plastic where unusual resistance to solvents and corrosive agents is demanded, and where insulation against high electrical frequencies is needed.

FROM New York, Carbide & Carbon Chemicals Corp. reports the development of a new condensation product which undergoes the hydrolysis and subsequent dehydration characteristic of pure tetraethyl orthosilicate. The polymer is a light brown, mild-odored liquid which offers a convenient source of adhesive silica for use as a refractory particle binder, and for formulating special heat-resistant surface coatings, it is said. It also is useful for gelling such liquids as acetone, ethanol and isopropanol to make "solid fuels."

IMPROVEMENTS in gaskets for drying and baking ovens may be expected by the use of silicone rubber, according to General Electric Co. engineers. These are said to be due to the heat resisting qualities and flexibility of the material at both high and low temperatures. Tests reveal the hardness of silicone rubber increases slightly after a year's heating at 300° F with considerable flexibility retained. The resiliency of the material after long exposures to high temperatures will help maintain standard uniform conditions by preventing entrance of cold air or leakage of hot air from ovens kept under vacuum or pressure.

SURFACE officials directing operations following mine disasters, and rescue crews working underground, now can communicate with each other instantly by means of a portable, batteryless telephone developed by F. E. Griffith, former Bureau of Mines engineer and inventor. Members of mine rescue crews cannot talk through an ordinary telephone mouthpiece while wearing oxygen-breathing apparatus. The new phone is equipped with a transmitter which is fastened to the underground crewman's throat and operated by vibrations from words or sounds produced by the larynx. The batteryless feature of the equipment along with the absence of sparks, makes it safe to use in mines where explosive gas is present, it is said.

EXTENSIVE investigation conducted by the mechanical division of the Association of American Railroads resulted in redesigning all passenger and tender axles, according to H. Malcolm Priest, manager, Railroad Research Bureau, U. S. Steel Corp. of Delaware. In a paper presented before the Railway Club of Pittsburgh recently, he said fatigue failures were reduced to a minimum by removal of the collar back of the wheel seat, and by increasing diameter of the wheel seat. Adoption and application of standard designs for axles was the main effort of the manufacturer and railroad user. The association standardized all roller bearing axles, and one type can be used for all designs of roller bearings, Mr. Priest said.



TRUE molecular cleavage and a shearcutting action in the machining of metals is achieved by a tool bit developed by Fearless Tool Co. The Los Angeles concern reports the faster cutting speeds and lack of heat usually generated by such cutting action reduces production time as much as 50 per cent. It also is said to lower power consumption 70 per cent, reduce regrinding operations more than 50 per cent, and increase tool life between regrindings 200 to 300 per cent. New Shearcutter tool features a scientifically presharpened cutting edge and chip pressure channel which insures true knife-like action. It holds precision tolerances, often eliminating finishing cuts on both ferrous and nonferrous metals. Inset in illustration shows bit. Also shown is a ⅜-in. bit taking a 1⅛-in. cut under power feed in cold-rolled steel. Note flow of chips.

Increasing Production

With Carbide

CARBIDE GRADES FOR CUTTING VARIOUS MATERIALS

MATERIAL AND KIND OF CUT	WEMCO GRADE	RECOMMENDED GRADE OF CARBIDE FIRTHITE (1)	CARBOLOY (2)	KENNAMETAL (3)	VASCOLOY (4)
CAST IRON, CONTINUOUS	(WA)	HA	883		2A3
CAST IRON, INTERRUPTED	(WB)	HC	44A		2A3
BRASS, BRONZE, COPPER, ALUMINUM, MAGNESIUM, MICARTA, MICALEX, ETC.	(WA)	HA	883		2A5
STEEL, HEAVY CUT, CONTINOUS	(WN)	T89	78B	KH	EM
STEEL, LIGHT CUT, CONTINUOUS	(WF)	T16	78B	K3H	EM
STEEL, MED. CUT, CONTINUOUS	(WK)	TA	78	K3H	E
STEEL, INTERRUPTED CUT	(WE)	T-04	78C	KM	EE

FIRM NO.	TRADE NAME	COMPANY
1	FIRTHITE	FIRTH STERLING STEEL CO
2	CARBOLOY	CARBOLOY COMPANY INC
3	KENNAMETAL	MC KENNA METALS CO
4	VASCOLOY	VASCOLOY-RAMET CORP

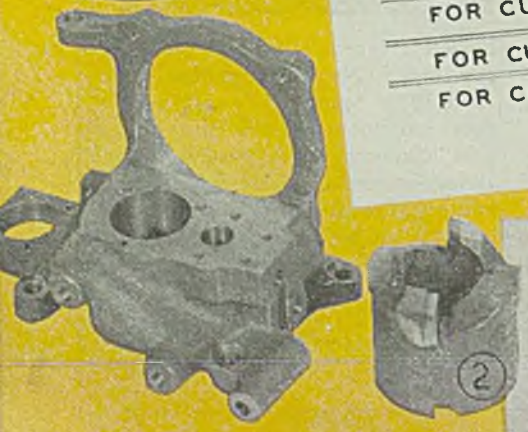
WESTINGHOUSE GRADE AND FIRM NO. MUST BE STAMPED ON CARBIDE TOOLS

NATURE AND PROPERTIES	RECOMMENDED FIELD OF USE
(WA) = HARDEST MOST WEAR RESISTANT GRADE FOR NON-FERROUS & NON-METALLIC MATERIALS MAINTAINS SIZE ON LONG TURNING AND BORING JOBS	USE FOR TURNING, BORING, REAMING, FACING & SAWING HARD & CHILLED IRONS & EXTREMELY ABRASIVE MAT'LS UNINTERRUPTED CUTS ONLY ON RIGID MACHINES.
(WB) = STRONGEST TUNGSTEN CARBIDE WITHSTANDS IMPACT VIBRATION AND ABUSE. CANNOT BE EASILY BROKEN OR CHIPPED	USE FOR SEVERE INTERRUPTED CUTS, COARSE FEEDS ON SOFT MATERIALS IN OLD MACHINES AT SPEEDS THAT ARE RELATIVELY SLOW
(WN) = FAIRLY STRONG STEEL CUTTING CARBIDE ALLOYS PROVIDE HEAT WEAR AND CHIP CRATER RESISTANCE. HARDER THAN (WE) STRONGER THAN (WK)	WIDE APPLICATION, USE FOR ROUGH TURNING HEAVY CUTS. WILL STAND SHOCK AND JUMP CUTS
(WF) = VERY HARD AND WEAR RESISTANT. LIMITED STRENGTH. EXCEPTIONAL HEAT & CHIP CRATER RESISTANCE. HARDER THAN (WK)	LIGHT RAPID FINISHING OF HARDER STEELS RIGID MACHINES WELL SUPPORTED WORK AND TOOLS. NO INTERRUPTED CUTS
(WK) = WEAR AND CRATER RESISTANT. STRONGER AND TOUGHER THAN (WE) HARDER AND MORE WEAR RESISTANT THAN (WN)	USE FOR ALL TYPES OF STEEL LIMITED TO LIGHT INTERRUPTED CUTS, FOR OPERATIONS REQUIRING HIGHER SPEEDS BUT LIGHTER CUTS & FEEDS THAN (WN)
(WE) = STRONGEST STEEL CUTTING GRADE. WITHSTANDS IMPACT AND VIBRATION AS WELL AS CONSIDERABLE ABUSE. TOUGH AND MODERATELY WEAR RESISTANT. REMARKABLE UNIFORMITY AND VERSATILITY OF PERFORMANCE. CAN BE GROUND TO STEEP RAKES AND CLEARANCES WITH DEEP CHIP CURLING GROOVES.	USE FOR SEVERE INTERRUPTED CUTS, COARSE FEEDS AND DEEP CUTS IN ROUGHING SOFTER STEELS AT RELATIVELY LOW SPEEDS IN OLDER MACHINES. CLOSEST APPROACH TO UNIVERSAL GRADE. USE ON LARGE TOOLS AND IN CASES OF LIMITED TOOL SUPPORT.

FOR CUTTING CAST IRON USE TOOLS MARKED (WA) OR (WB)

FOR CUTTING BRASS ALUM.* ETC. USE TOOLS MARKED (WA)

FOR CUTTING STEEL USE TOOLS MARKED (WN) (WF) (WK) OR (WE)



By R. J. ROUSSEAU
Tool Analyst
Electric Appliance Division
Westinghouse Electric Corp.
East Springfield, Mass.

Tool Inserts

Use of carbide tipped tools by East Springfield Westinghouse plant ups tool life 1000 per cent

ALTHOUGH carbide inserts have in the past been used chiefly on single point tools, there are other uses in the shop to which they can be applied with excellent results —as inserts on milling cutters, draw dies, and spring winding guides, and for form tools.

The main advantage in using carbide inserts on single and multiple-point cutting tools is the increased production due to higher cutting speeds, and a longer tool life. Form tools require less regrinding due to less wear, as is also the case with draw dies. In addition, the latter do not need to be hand polished to remove scratches that might cause a defective end product.

At the beginning of a program to bring carbides into general use in the East Springfield plant, standard sheets were made up showing various grades and their application; code letters were also established to cover equivalent grades of carbide from the four largest suppliers. Style numbers were assigned to the ten different styles of carbide tools carried in stock and the standard sheets on carbide grades and standard tool styles were posted in prominent places throughout the plant. See Fig. 3.

Standard tools are carried in two grades: A strong steel cutting grade for general purpose use, identified with the symbol $\frac{W}{-}$, and a hard abrasion-resistant grade for cast iron, brass, aluminum, micarta, etc. This grade is identified with the symbol $\frac{W}{-}$.
E A

To complete the program, a series of educational films describing the carbide grades, their recommended field of use, and the proper applications were shown to groups of machine operators and key personnel throughout the plant. The film showing was followed by a question period where examples were discussed and analyzed.

Many special tools are obtained much faster by drawing a standard tool from stock and altering it to suit. In many cases, standard tools can be purchased and altered at a lower cost than making a special tool. Innumerable hours of tool designing time are saved. Standard tools may be purchased from any of the suppliers who are mass producing them, in most cases at a lower cost than they could be made for in the average plant.

Milling: The milling of hard cast iron valve bodies shown in Fig. 2 was a slow operation with high speed steel shell end mills; cutting speed was 98 fpm and the time necessary to make the cut was 5 min 35 sec. A four tooth carbide tipped shell end mill reduced this time to 1 min 35 sec and increased cutting speed from 98 to 400 fpm. Moreover, the number of pieces produced between grinds of the cutter went from 10 with the high-speed steel mill to 100 with the carbide tipped mill. A

(*Please turn to Page* 137)

Fig. 1—Carbide die and male half of insecticide dispenser. Die is expected to make 10 million shells before maximum wear of 0.005-in. is reached

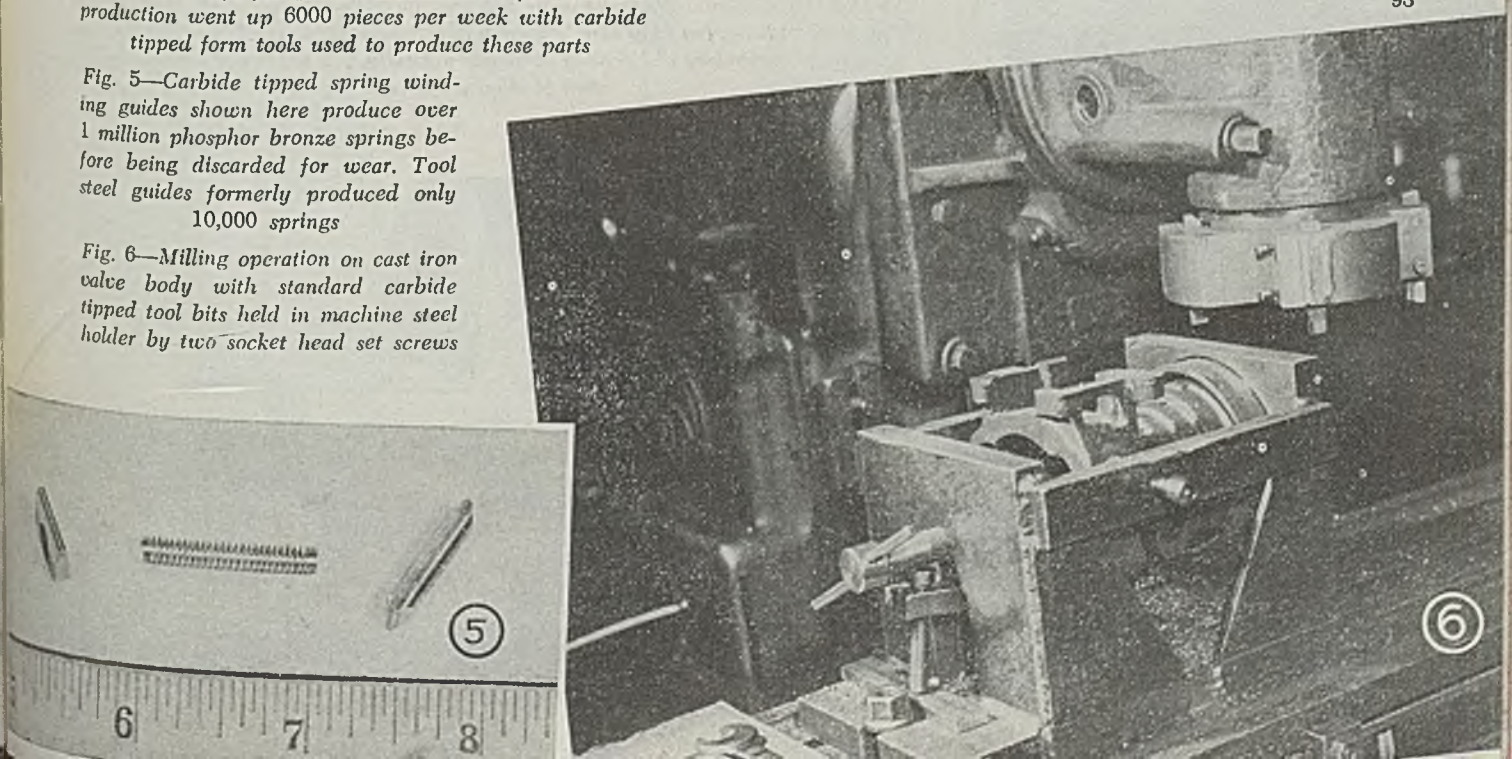
Fig. 2—Cast iron valve body on which machining time was cut by 4 min to 1 min 35 sec by use of carbide tipped shell end mills, one of which is shown

Fig. 3—Chart used by Westinghouse to show carbide grades for cutting various materials

Fig. 4—Tool life per grind increased 1000 per cent and production went up 6000 pieces per week with carbide tipped form tools used to produce these parts

Fig. 5—Carbide tipped spring winding guides shown here produce over 1 million phosphor bronze springs before being discarded for wear. Tool steel guides formerly produced only 10,000 springs

Fig. 6—Milling operation on cast iron valve body with standard carbide tipped tool bits held in machine steel holder by two socket head set screws



Another Backward Look at a Process with a Future

Silver Alloy Brazing

BECAUSE methods of assembly perfected under the aegis of Army Ordnance are sure and safe—tested and proved time and again in the field—the manufacturer who is now using or will use joining techniques to put together his product might do well to cast an eye in retrospect at silver alloy brazing and what it accomplished for armament. Joints so made for the services had to be solid, leakproof, and in every way trustworthy.

In all ordnance items, from fuses to heavy artillery, certain fundamental requirements were (and still are) identical throughout. These include accuracy of dimensions; strength; resistance to wear; resistance to corrosion; and, in general, perfect operation and ability to stand up under the most severe conditions short of actual demolition. At least five of these requirements, singly or together, are to be found in specifications written for industry's peacetime products.

As in all mechanical and engineering problems, there is no one best method for all conditions. The design of the part, the conditions under which it operates, the service required—all are factors to be considered when deciding whether to weld, braze or soft solder.

It is noteworthy therefore that a process which is comparatively new to the industrial field for joining metal parts has found hundreds of applications in products as critical as ordnance. Special silver brazing alloys which melt at temperatures from 1175 to 1300°F have been found eminently satisfactory for making joints between many metals and alloys.

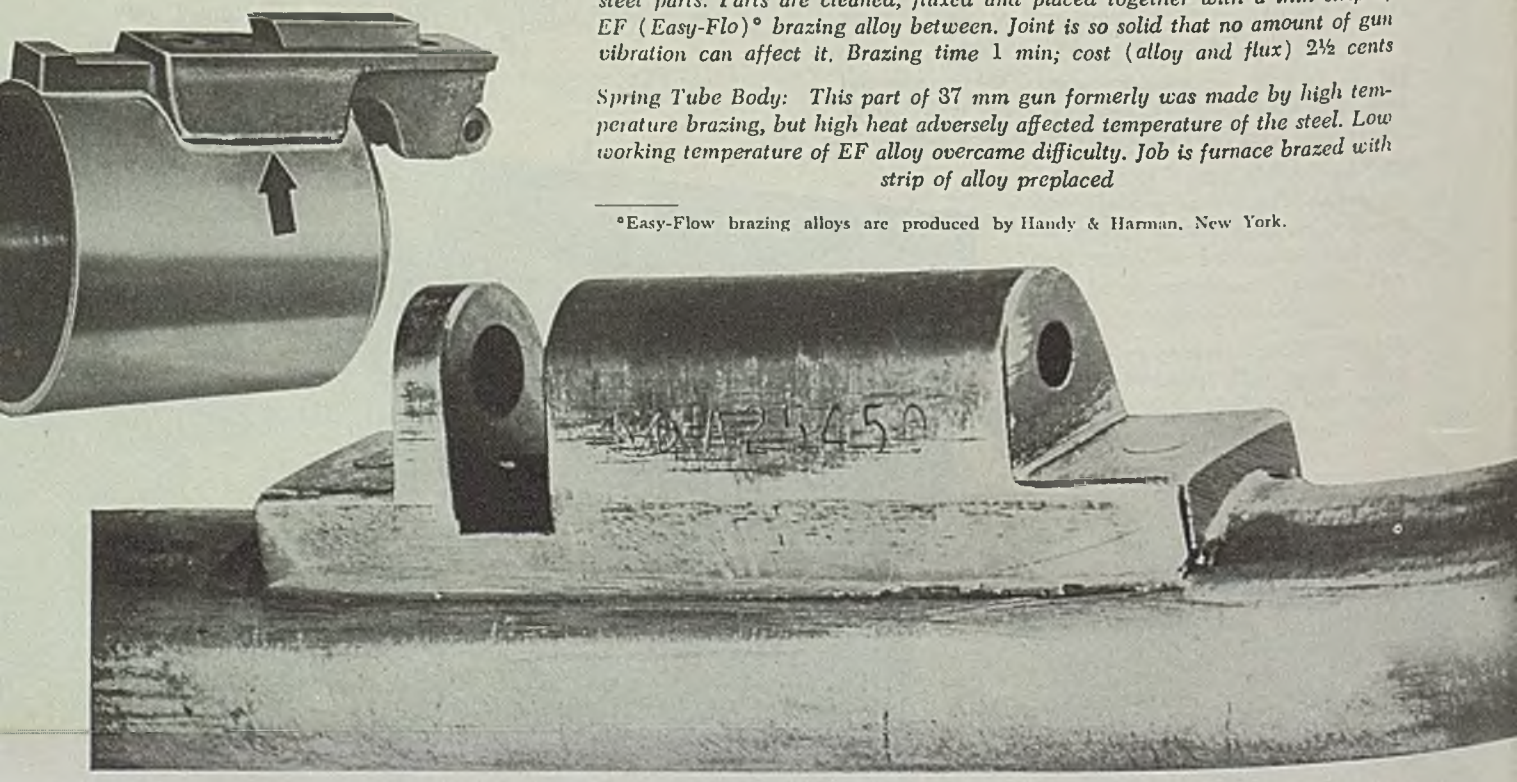
Silver brazing alloys used in ordnance equipment listed in following paragraphs are covered by Federal Specification QQS-561 d (U. S. Ordnance Department), U. S. Navy Specification 47S-13 (1NT); and U. S. Army Chemical Warfare Service Specification 196-131-80. The flux used in conjunction with the silver brazing alloys is covered by Ordnance Department Tentative Specification AXS-500; U. S. Navy Specification 51F4a. The degree of confidence reposed in the brazing method and alloys used will be clear from a glance at this list and by studying accompanying illustrations.

Aerial Bombs: Joining the steel nosepiece to the body and tubular members of the burster casing of 30 lb (M 46) and 100 lb (M 47) aerial bombs.

Four-Pound Fire Bombs: The steel tube assembly, to the hexagonal nosepiece.

Bazooka Projectiles: The steel tube is brazed to the fuse body with a preplaced ring of silver brazing alloy.

(*Please turn to Page* 143)

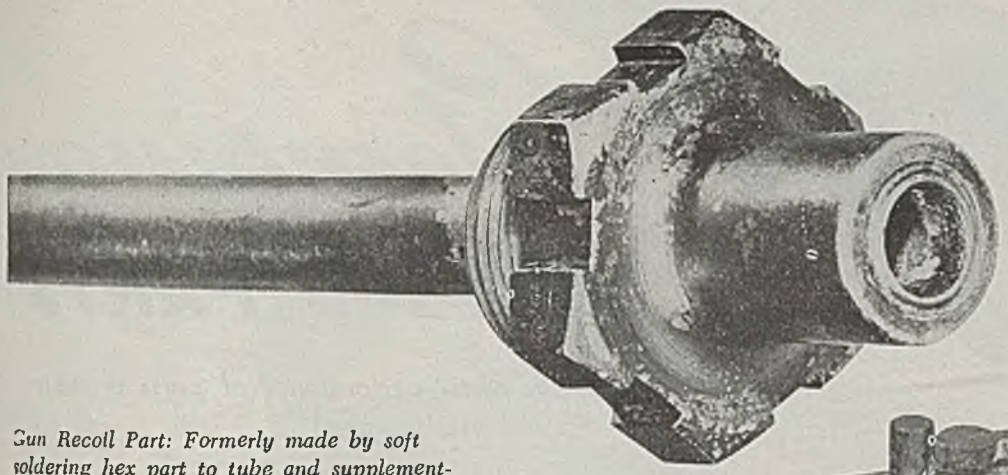


Solenoid Housing: Part of a tank gun, housing at left is made up of two steel parts. Parts are cleaned, fluxed and placed together with a thin strip of EF (Easy-Flo)° brazing alloy between. Joint is so solid that no amount of gun vibration can affect it. Brazing time 1 min; cost (alloy and flux) 2½ cents

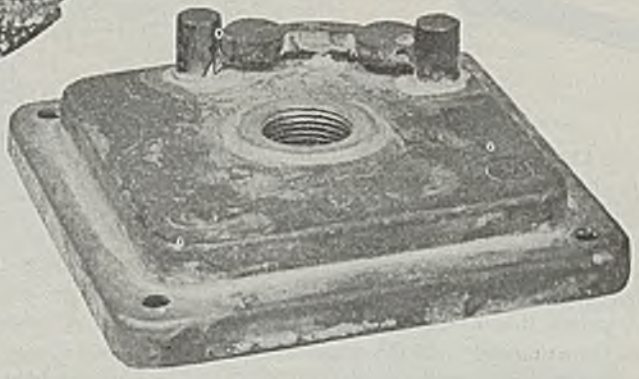
Spring Tube Body: This part of 37 mm gun formerly was made by high temperature brazing, but high heat adversely affected temperature of the steel. Low working temperature of EF alloy overcame difficulty. Job is furnace brazed with strip of alloy preplaced

°Easy-Flow brazing alloys are produced by Handy & Harman, New York.

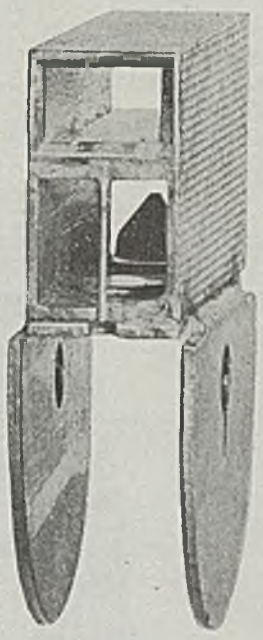
By ADOLPH BREGMAN
Consulting Engineer
New York



Gun Recoil Part: Formerly made by soft soldering hex part to tube and supplementing with set screw, but fittings came loose under pressure of recoil spring. Parts now assembled with ⅛-in. EF wire ring preplaced at tube end of fitting. Heating is with two-flame acetylene torch. Note penetration, elimination of set-screw. Production time 2 per min

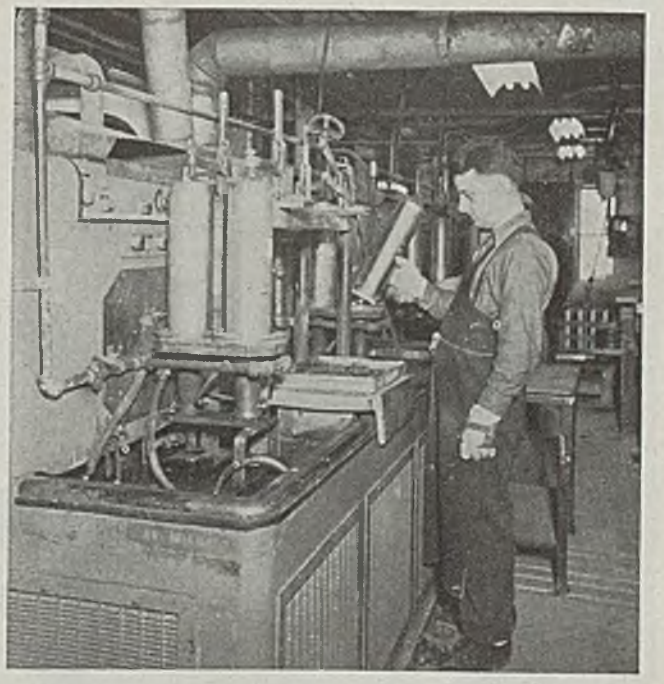


Gun-Fire Control Switch-Box Cover: EF alloy is preplaced on all seven joints (two on underside) and all are brazed simultaneously by induction heating. Many types of electrical enclosures and boxes made by this method



Gun Sight: Made of two rectangular tubes and mounting bracket, brazed together at 1175° F. Sighting wire in lower tube also brazed with EF silver alloy. Time 40 sights per hour

Gun Mount Part: Fabricated by brazing steel sprocket to heavy steel tube. Ring of 3/64-in. alloy is preplaced above sprocket, followed by fast induction heating. Penetration is complete



Setup for Induction Brazing: Shell bases and bodies are heated two at a time in this Tocco induction heating machine while another two-unit station is loaded. Clamps on top of shell apply just enough pressure to insure base settling accurately in place when brazing alloy melts and flows. Note ventilating facilities for removing fumes. Brazing time 49 sec per shell

Stamping CLUTCH LEVER PARTS

Production method cuts costs; performance of parts in their end use improved

By LEROY BARRETT
Chief Engineer
Farm Equipment Division
Ellinwood Industries
Los Angeles

STAMPING of the two parts of a clutch lever has brought about an economy in material and production costs at the farm equipment division of Ellinwood Industries, Los Angeles. The new lever, shown in Fig. 1, was conceived by Anton Braun, research technician in the experimental and development department, and consisted of two steel stampings assembled with a steel pin that is staked after assembly.

The clutch, used on the "Cat" line of garden tractors, is disengaged by raising lever until a spring loaded latch on lever engages with a dog on the handle. Engaging is by raising lever, releasing latch with forefinger and lowering lever. Tests have shown that operator fatigue is reduced and operation with greater ease is accomplished with the redesigned clutch lever.

Original design consisted of a stamped lever arc welded to a machined plate which was bolted to handle of tractor. To engage clutch it was necessary to squeeze lever against handle and lock it in position by slipping a ring, attached to the handle, over end of lever. This was extremely awkward and source of much trouble.

In fabricating the newly designed lever, stock of the same thickness was used for both lever and latch. The latch is blanked out in same operation as lever, of stock that would have been scrap, as shown in Fig. 4. Material used is 16 gage (0.063-in.) hot-rolled sheet steel.

Mr. Braun also worked out procedure

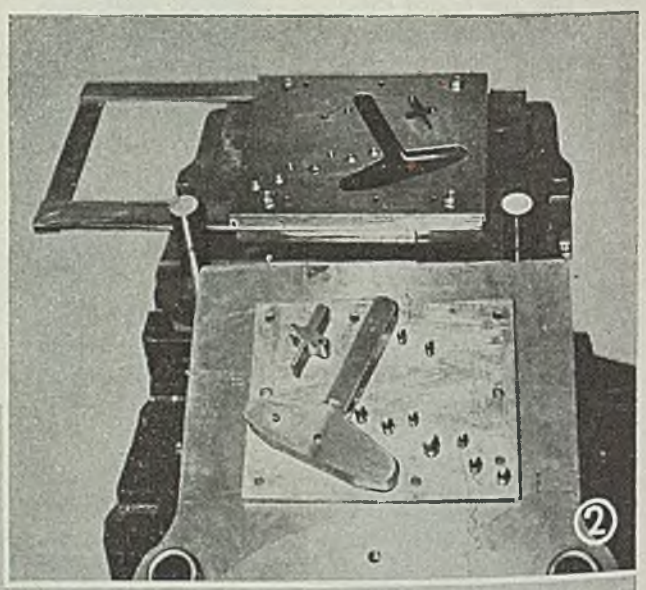
(*Please turn to Page* 145)

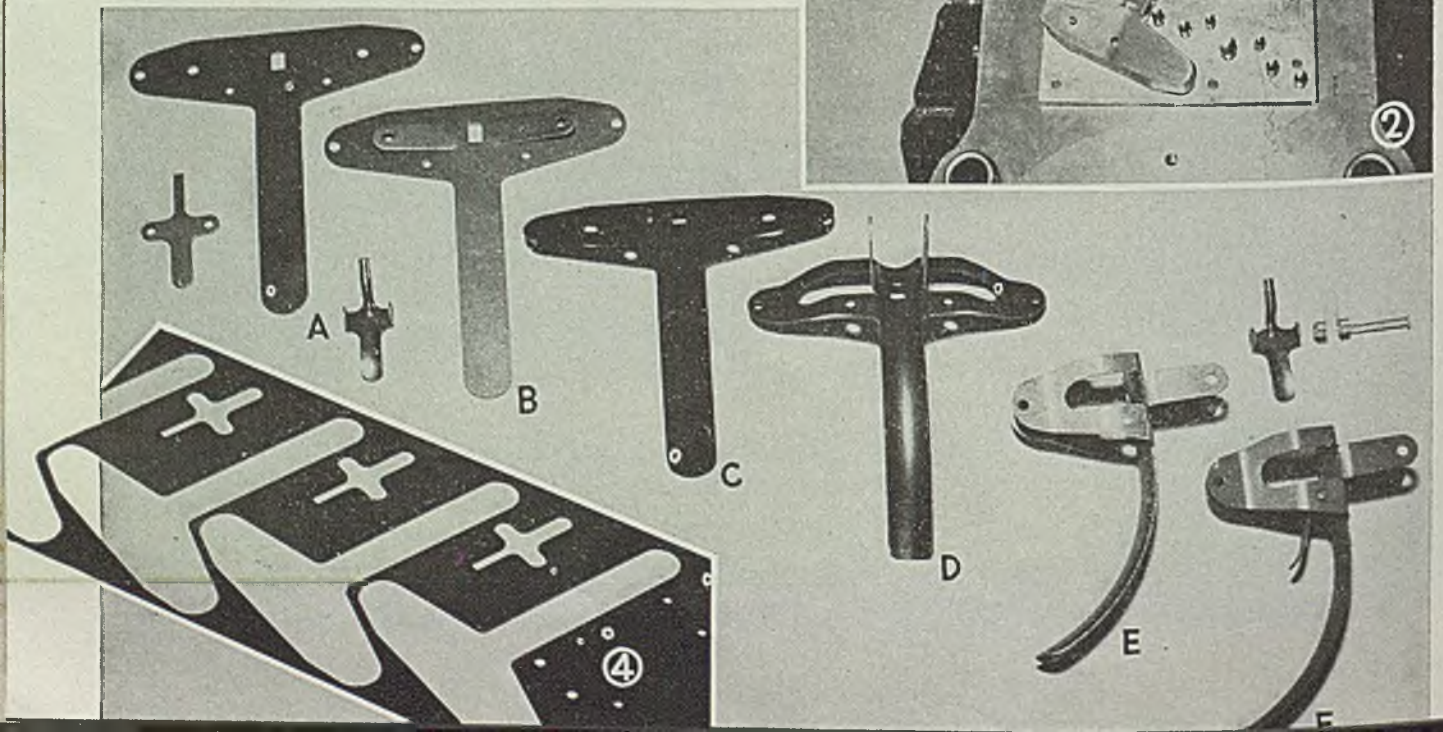
Fig. 1—Redesigned tractor handle showing detail of steel stampings used in forming handle and latch

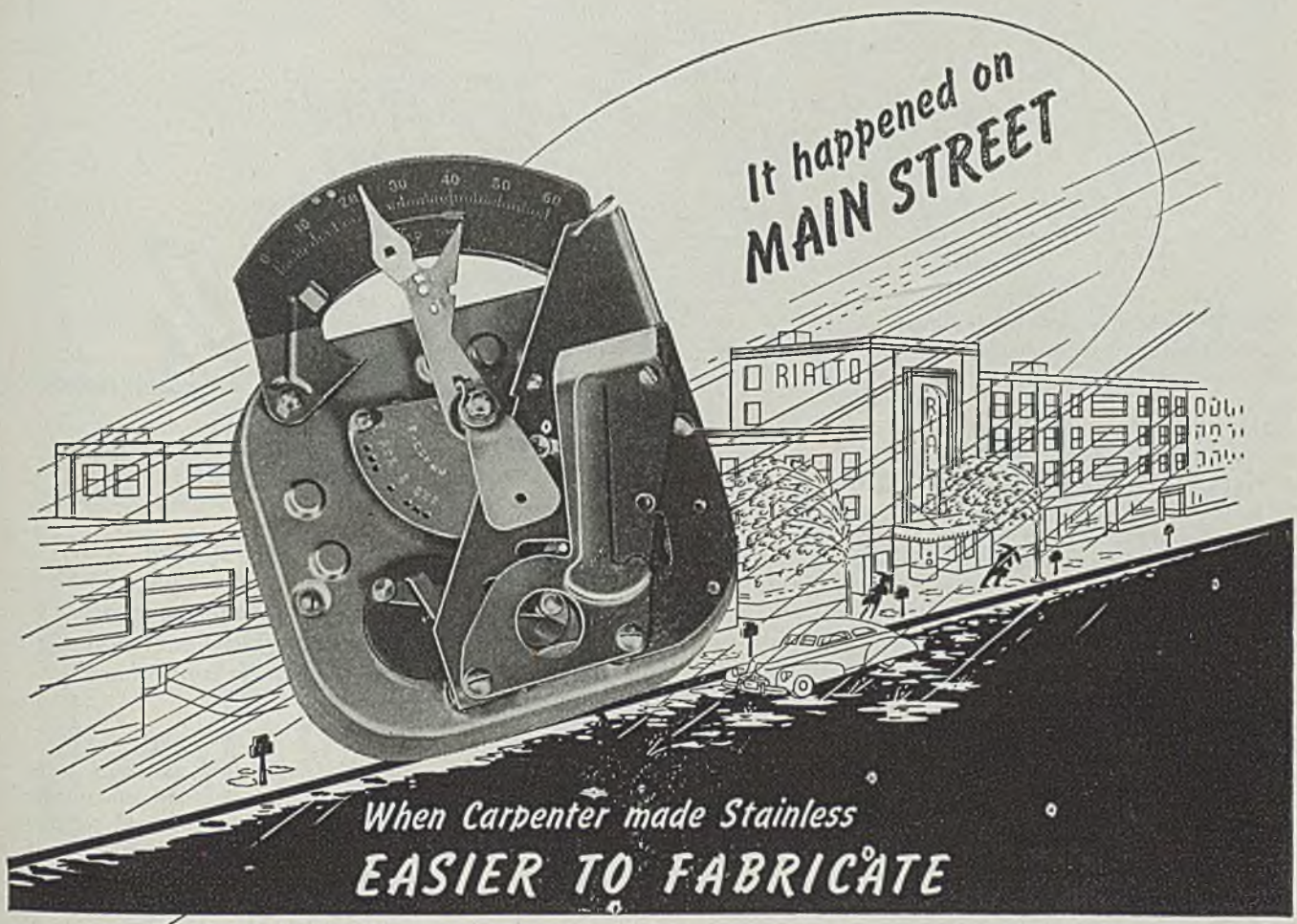
Fig. 2—Blanking punch and die set which blanks out lever and latch complete with holes

Fig. 3—Progressive stages of latch and lever as described in text

Fig. 4—Sheet stock after blanking showing layout of parts







After a blustering New England hurricane, hundreds of the best parking meters ever installed on Main Street were found to have been rendered useless "overnight" by corrosion. The parking meter manufacturer found his reputation at stake—so he turned to Stainless for weather-proof meter parts that could lick hurricanes along with everyday usage.

Now parking meter mechanisms are made of this Stainless, long ago made easier-to-machine, and more ductile to form, by Carpenter. And you can get that same kind of product dependability—with lower fabricating costs—by using Carpenter Stainless Steels.

Whenever you have a special problem involving resistance to corrosion, heat, wear, etc. —get in touch with Carpenter. When you want to reduce the cost of machining Stainless parts, specify *Carpenter* on your orders for Free-Machining Stainless bar stock.

FOR SHORT CUTS to making finer products at less cost, ask for your copy of "Working Data for Carpenter Stainless Steels". A note on your company letterhead is all that's necessary. Drop us a line today.

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BORON TREATED Steels

One boron atom to twenty-five thousand atoms of iron nearly doubles the hardenable size of a section under certain conditions. This minute proportion, capable of forming a characteristic precipitate in boron-treated steels specially heat treated, lowers the rate of grain boundary nucleation and thereby increases hardenability

By R. A. GRANGE
and T. M. GARVEY
Research Laboratory
United States Steel Corp.
Kearny, N. J.

FACTORS affecting hardenability and related properties of boron treated steels were determined by selecting for study four commercial open hearth heats containing: (A) 0.40 per cent, (B) 0.52 per cent, (C) 0.63 per cent, (D) 0.75 per cent carbon. In each case, a sample from an untreated ingot was compared with that from one or more adjacent ingots to which grainal or ferroboron had been added in the mold after the steel had been killed by aluminum.[1]

First of these four steels is not, strictly speaking, a plain carbon steel since it contains 1.25 per cent manganese; the other three are plain carbon steels with manganese on the high side of the usual specification range. In series A, boron was added in the form of either "10-79" or "10-80" grainal, each kind being added in each of three different amounts to provide the six ingots of different boron content ranging from 0.0004 per cent to 0.0016 per cent.

Series B, an 0.52 per cent carbon steel, compromised bars from eight ingots each treated with one of four experimental grades of grainal, the amount being either 2.5 or 5 lb per ton. Steel B-1, having no grainal addition, served as the standard for determining the effect of the grainal addition to the others while B-2 and B-3 had grainal but no boron.

Hardenability was determined by means of the standard end-quench (Jominy) test in accordance with ASTM specifications. Hardenability comparison was based upon a point on the end-quenched bar where the structure was 50 per cent martensite and also upon a point where the structure was 99.9 per cent martensite; the conclusions were the same because the hardenability index on the latter basis for each end-quenched bar was quite consistently ¾ of that determined on the 50 per cent martensite basis.

Steel from a boron-treated ingot had greater hardenability than steel from an untreated ingot of the same heat. Increase in hardenability was not always consistent with the boron content (nor with the amount of boron added) even among different ingots of the same heat; furthermore, among different carbon grades boron was more effective with lower carbon contents.

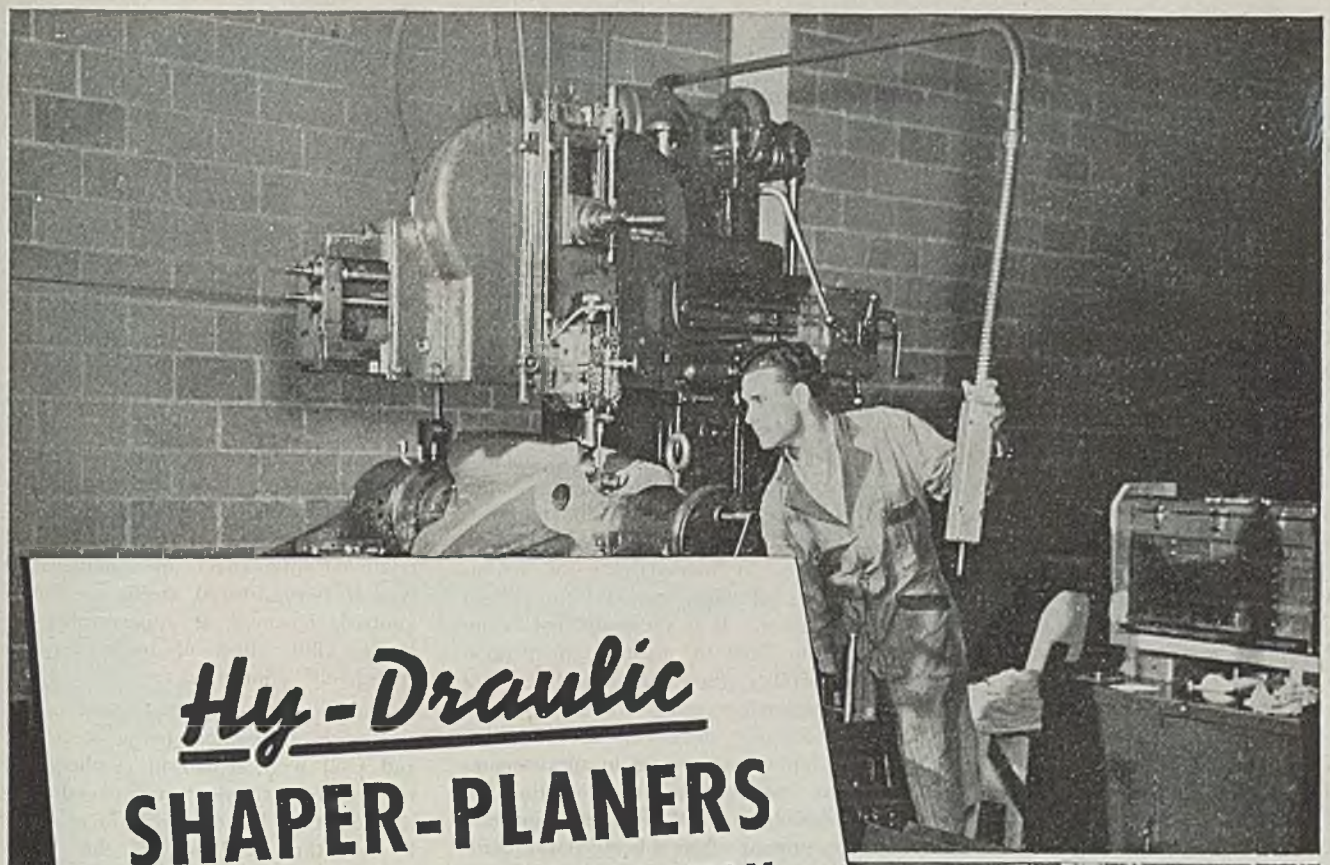
Increase in hardenability produced by the addition of boron-bearing grainal to the 0.40 per cent carbon heat ("A" series) was relatively consistent with the boron content of the steel and amounted to nominally 75 per cent when about 0.001 per cent or more of boron was present. In the case of the 0.52 per cent carbon heat ("B" series) the addition of grainal containing no boron produced a significant hardenability increase; thus steel B-2 which had 2.5 lb of grainal per ton had a 5 to 7 per cent greater hardenability than the untreated ingot, and steel B-3 (5 lb of grainal per ton), 10 to 14 per cent greater hardenability. Hardenability of the 0.63 per cent carbon heat ("C" series) was increased only about one-third by the presence of 0.0018 per cent boron; that of the 0.75 per cent heat ("D" series), only about one-eighth by 0.0029 per cent boron.

Boron was most effective in the lowest carbon grade and least effective in the highest carbon grade. Assuming that boron increases hardenability uniformly as amounts up to 0.001 per cent are added, and that additional boron causes no further increase (others have found this to be the case and our data suggest this to be the case, but are not sufficiently numerous to make certain of it), each of the four carbon grades seems to differ in the maximum hardenability increase obtainable from boron additions.

There is some question as to whether the 0.63 per cent carbon, and particularly the 0.75 per cent carbon steel, may not be, despite their high boron content, low in hardenability as compared to other boron-treated steels of these grades, especially those to which boron has been added in some form other than ferroboron. Despite these considerations, it seems logical to conclude that boron is decidedly less effective in higher carbon steels; presumably this trend is also present in low-alloy steels of different carbon content. Data indicate that boron was at least twice as effective in increasing the hardenability in the 0.40 per cent carbon steel as in the 0.63 per cent carbon steel; furthermore, it appears that above about 0.87 per cent carbon, boron has no effect upon hardenability.

A metallographic test for boron involves the microscopic examination of a small sample heated to about 2100° F, followed by rapid cooling from 2000° F to below the A_3 temperature, and thereafter transforming to a structure which will permit detection of small, dark-etching dots in the austenite grain boundaries. The prevalence of the dots was assumed to be an indication of the amount of boron present, there being

[1] Condensation of paper Factors Affecting the Hardenability and Related Properties of Boron Treated Steels prepared for annual convention of ASM, Cleveland, Feb. 4, 1946.



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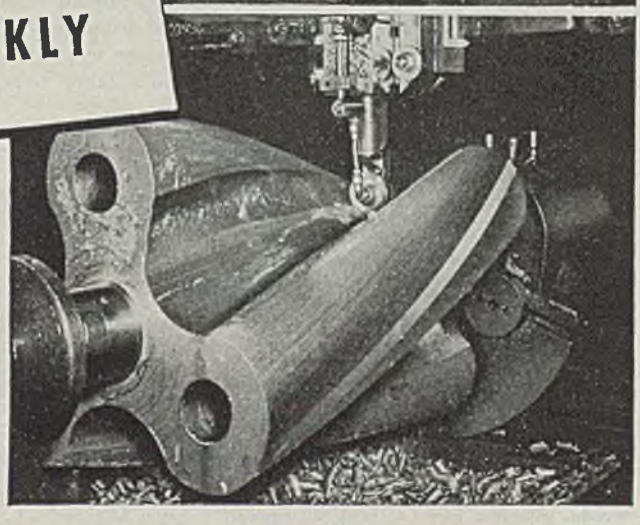

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no such dots in a steel without boron.

In general it appeared that neither a determination of the amount of boron actually present in a steel, nor the metallographic test to see how much boron constituent is made visible, is an adequate basis for predicting the hardenability of a boron-treated steel; of the two, the metallographic test (if carried out to develop as much boron constituent as the steel is capable of forming) seems to be the better indicator of the hardenability increase. The amount of boron constituent, like the hardenability of these steels, seems to be influenced by carbon content.

In order to illustrate precisely how austenitizing temperature may influence hardenability, a steel was selected in which this effect was particularly marked, this being a low-alloy steel containing 0.25 per cent carbon. Pairs of samples were prepared, one from an ingot to which boron had been added as ferroboron in the mold, the other from an adjacent boron-free ingot. Each pair of corresponding samples was austenitized simultaneously at one of a series of temperatures in the range 1450°F—2000° F for a constant time of 15 min and then cooled in still air (normalized). Since this low-alloy steel was air hardening to some extent at all austenitizing temperatures, the hardness of these normalized samples is a measure of hardenability; that is, the structure consisted in part of martensite, which varied in accordance with the hardenability as is reflected in the normalized hardness.

Boron Hardenability Increases

Results affirmed the belief that the steel without boron increases slightly and uniformly in hardenability as austenitizing temperature increases; the boron-treated steel, on the other hand, has its maximum hardenability at 1550° F and decreases in hardenability at higher austenitizing temperatures, having lower hardenability than the no-boron steel above 1800° F. At the moment, no explanation is offered for the anomalous loss in hardenability of boron-treated steel when cooled from a high temperature. It is fortunate that boron seems to have its greatest effect upon hardenability when austenitized at about the temperature range customarily used for hardening steel. In the low-alloy steel, boron was present in approximately the optimum amount and the full hardenability effect of boron appeared to be present when this steel was hardened from 1550-1600° F; that this was the case was confirmed by end-quenched hardenability tests. In any steel, the austenitizing temperature affects the hardenability; in boron steel, this factor is of relatively greater importance, and its effect cannot be predicted from the behavior of the steel without boron. Apparently, austenitizing temperature is a factor of great importance in determining the hardenability of boron-treated steel; the hardenability may be decreased, not increased as in the case of other steels, by austenitizing a boron-treated steel at a higher temperature than normally used.

Heating any steel at a temperature well above 2000° F for a period of many hours or days has the effect of eliminating the segregation to as "homogenization." In most steels homogenization has been found to have relatively little effect upon hardenability. If boron-treated steels are homogenized, however, it appears that the hardenability effect of boron may be completely eliminated.

Samples of the 0.63 per cent carbon steel with and without boron (steels C-1 and C-2) were sealed in a silica tube to prevent oxidation and decarburization and then heated for 24 hr at 2350° F. At the conclusion of this homogenization treatment they were air cooled to room temperature. A small piece of these homogenized samples, together with similar samples of the 0.63 per cent carbon steel in the "as rolled" condition were (1) austenitized simultaneously at 1500° F, (2) quenched into a lead bath at 1000°F, (3) held for 5 sec at 1000°F and then (4) brine quenched to room temperature. The amount of transformation that occurred during the 5 sec at 1000° F indicates the speed of transformation at approximately the temperature where it is greatest ("knee" of the I-T curve) and is consequently a measure of hardenability. The unhomogenized samples without boron and both homogenized samples transferred to approximately the same extent; the unhomogenized boron-treated steel had much less transformation product than the other three. This indicates that the effect of boron upon hardenability was eliminated by the homogenization treatment.

Homogenization did not change the chemical composition, yet it did reduce the hardenability of the boron-treated steel so that it transformed as rapidly as the steel without boron. Apparently, the boron must have been in some way converted into an ineffective form, although the same values were obtained for soluble and insoluble boron after homogenization as before. There appears, therefore, to be little practical significance in reporting boron as "soluble" and "insoluble." The total boron is of principal interest, but seemingly

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Cleaning Compound — Fuzee removes stubborn carbon, engine varnish and is useful in cleaning pistons, fuel pumps, carburetors, etc. Turco Products Inc., 6135 South Central avenue, Los Angeles 1.

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Micceroloid—Compound used for plating equipment, structural steel, factory walls and floors, pipe lines, etc. Michigan Chrome & Chemical Co., 6340 East Jefferson avenue, Detroit 7.

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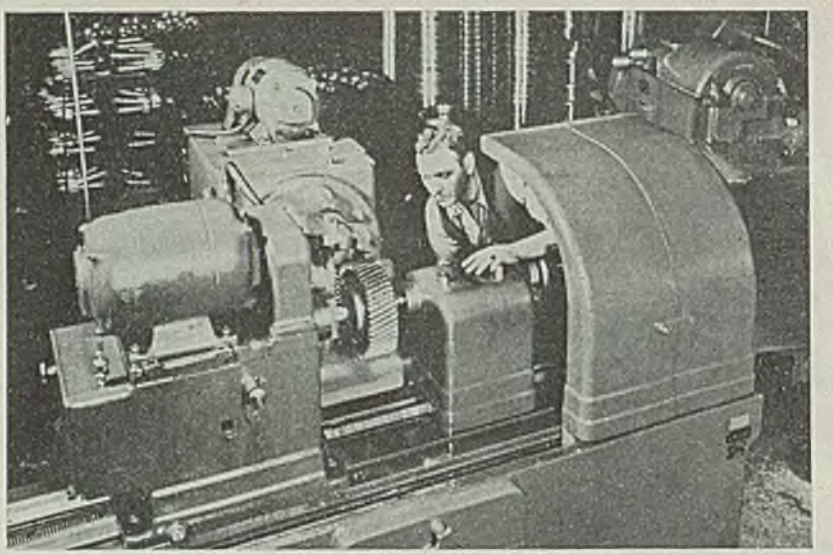


VERSATILE GEAR FINISHER: Gears up to 24 in. OD are handled by this Michigan Tool Co. rotary gear finisher which is making it possible to precision finish gears in job lots at the plant of Fairfield Mfg. Co., Lafayette, Ind. Machine finishes most of the spur and helical gears eventually going into tractors, buses and industrial machinery. Approximately 2500 different items are routed by the company over its production lines in a nomal year

the mere presence of boron is not always a guarantee of increased hardenability.

It appears that boron-treated steels, at least when boron is added as ferroboron, may suffer a permanent loss in hardenability if heated for a long period at high temperature. There is a possibility that in some cases hardenability would be reduced merely by soaking the ingot or billet preparatory to rolling; this phase of the subject, however, requires further investigation. Although the data on the effect of soaking a boron-treated steel at high temperature are at present limited to these few steels, it is interesting to speculate how boron-treated steels in general, may respond to high temperature treatments. It has been noted that a short heating at a temperature in the vicinity of 2000° F destroyed the boron effect in a normalized sample; in this case the boron was restored by reheating at an ordinary austenitizing temperature. In the homogenized sample, however, the boron effect appeared to have been permanently destroyed.

All other things being equal, a boron-treated steel has generally been found to have larger austenite grains than a comparably austenitized steel without boron. This is of no great practical significance since the grain-coarsening effect of boron can be sufficiently overcome by deoxidation with aluminum.

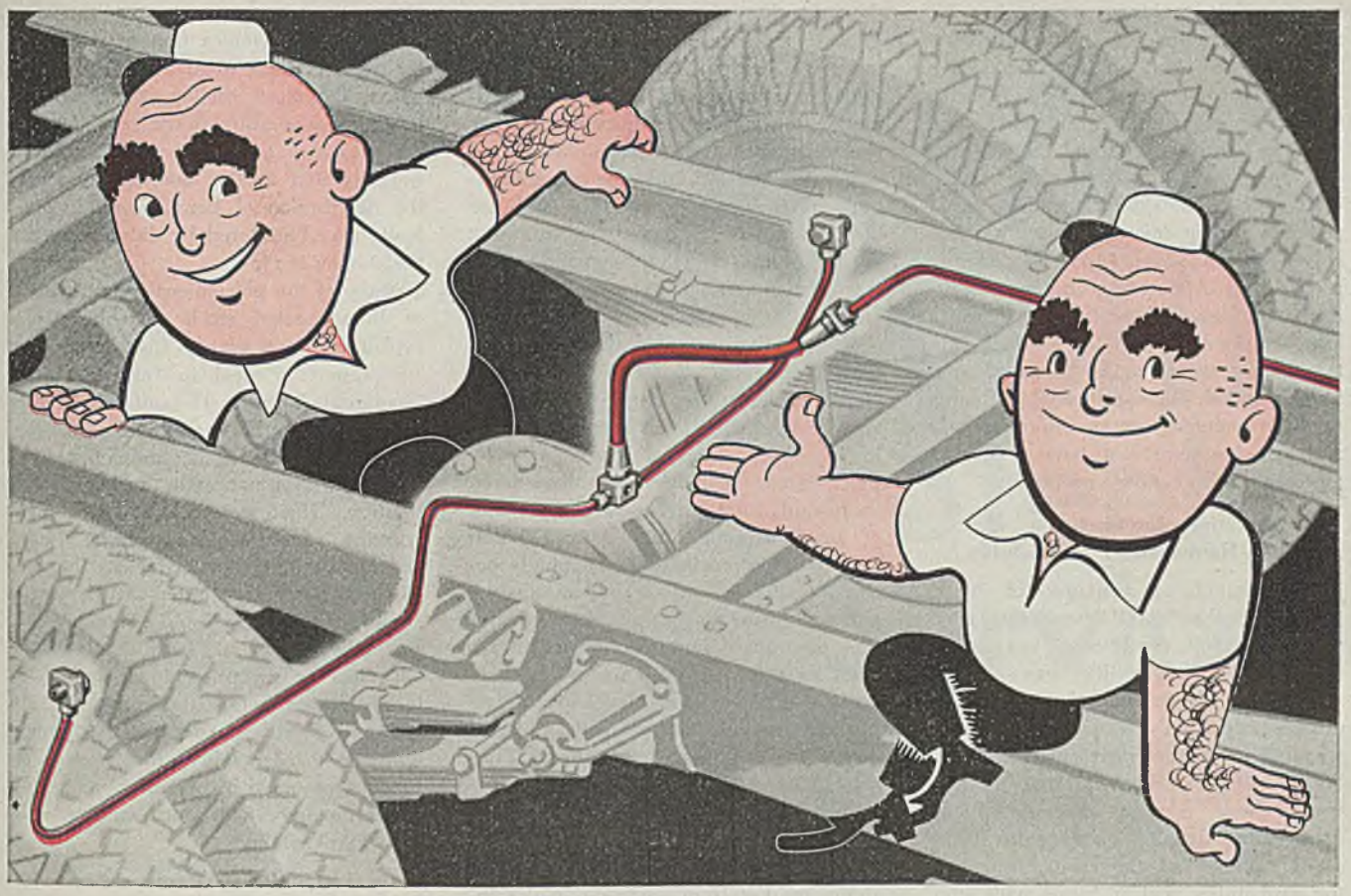
Temperature at which a few coarse grains first appear is of practical significance, since the austenitizing treatment is limited to a lower temperature if a uniform fine-grained austenite (which is generally desired) is to be obtained. At a given temperature, grainal-treated steels had a slightly larger grain size than untreated steel; in general this difference was greater the more boron the steel contained. The difference in grain size between treated and untreated steel was never great enough at the austenitizing temperature that would ordinarily be used for hardening to be of any great practical significance. Conclusion is that boron, as well as certain of the other elements in grainal, reduces the effectiveness of aluminum in inhibiting grain growth in steel to which the optimum amount of aluminum for this purpose has been independently added. Since ability of aluminum to prevent grain growth at an austenitizing temperature below the coarsening temperature is usually attributed to the presence of tiny particles of aluminum (Al_2O_3), it is possible that boron and elements in grainal such as zirconium and titanium, may decrease the resistance to grain growth by uniting with some of the oxygen, thus decreasing the number of alumina particles.

Microscopic examination of end-quenched hardenability bars revealed a difference in the martensite-plus-pearlite zone of boron and no-boron steel. In each steel without boron, the austenite grains were quite well delineated by dark-etching transformation product in this region; in the boron-treated steels, particularly those containing a relatively large amount of boron, this was not the case. In addition, at a comparable location in this region of transformation to mixed structures, the individual patches of dark-etching transformation product were noticeably larger in average size and fewer in number in boron steel than in the same steel without boron. This trend was clearly evident in all samples and was sufficient to permit us to recognize bars which contained boron. This decreased tendency for transformation product to outline austenite grains, and for the individual patches to be larger in boron-treated steel, has been previously observed in isothermally transformed samples. Thus it appears that boron inhibits nucleation at the austenite grain boundaries.

Constituent Identifies Boron Steel

When boron steel is austenitized at a high temperature and then cooled rapidly to below A_s, a constituent forms which is not found in steel without boron; this constituent, whose precise nature is unknown at present, is the basis for distinguishing boron steel from steel without boron by means of the metallographic test mentioned earlier. It appears as an alignment of small dark-etching dots in the austenite grain boundaries and is probably a compound of boron with carbon and possibly with other alloying elements also, although it has not been conclusively established that this constituent necessarily contains boron. This constituent presumably will be present in any boron steel suitably austenitized and cooled, but it will be visible only when it exists in a light-etching matrix; in pearlite, for example, the tiny dots will obviously not ordinarily be visible. In plain carbon and low-alloy steel containing less than about 0.50 per cent carbon the presence of boron is readily detected, and since ferrite forms around austenite grain boundaries all of the constituent is revealed because it occurs in a light-etching matrix.

With higher carbon, ferrite may not form in all austenite grain boundaries, and that portion of the constituent formed within pearlite patches will be invisible. In a steel of eutectoid or hypereutectoid composition no free ferrite forms, and hence no boron constituent will be visible when the steel is completely transformed at elevated temperatures. Therefore, eutectoid or high carbon steels must be transformed at lower temperature so that light-etching martensite may serve as a background for the dots; this may be done by quenching at a predetermined temperature. The temperature selected



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for the short holding period may be room temperature. A temperature selected for the short holding period may be any one between A_1 and Ar, but should be such that considerable time elapses before isothermal transformation begins.

In view of the significant effect boron may have upon microstructure, it probably has some effect upon engineering properties. Apparently, boron constituent may form without benefit of "trick" heat treatment, especially in steel containing somewhat more boron than is usually added; this constituent, although small in volume, occurs intergranularly and may consequently have a disproportionate effect upon properties.

Tentative Interpretation of Boron-Hardenability Relationship

Very minute percentages of boron (not more than 0.001 per cent) may, under certain conditions, just about double the hardenability size of section. The observation that even this minute proportion of boron is capable of forming a characteristic precipitate in boron-treated steels heat treated in a special way suggests that the boron atoms must dissolve in austenite. The small diameter of the boron atom and the probability that it forms with iron, an interstitial solid solution, imply a very high mobility (or diffusion rate) for boron in steel.

Since the precipitated boron constituent always appears in austenite grain boundaries, it is reasonable to suppose that most, if not all, of the boron atoms are located in the autstenite grain boundaries just prior to transformation. Their presence there lowers the rate of grain boundary nucleation, which is the controlling factor in the upper region of rapid transformation, and thus increases hardenability. Therefore, a minute percentage of boron is surprisingly effective as compared to other elements because the boron atoms are principally located, prior to transformation, in the grain boundaries and are not randomly distributed in austenite as are atoms of other common alloying elements which increase hardenability.

It is further assumed that, owing to the preferential location of boron atoms at the austenite grain boundaries and the relatively low solubility of boron in austenite, atoms of boron may be precipitated, probably as some boron compound, from what is in effect a film of austenite supersaturated with boron atoms. This precipitation seemingly occurs rapidly and in advance of the usual transformation of austenite to ferrite; only those boron atoms which remain in solid solution are effective in decreasing the rate of nucleation of ferrite and hence in increasing the time required for austenite to transform. Thus a small amount of boron only sufficient to saturate a grain-boudary film of austenite is as effective as a larger amount in increasing hardenability, since extra boron atoms are lost from austenite solid solution by rapid precipitation.

Similarly, coarsening the austenite grains decreases the volume of this grain boundary "film" and thereby produces supersaturation and ultimate precipitation of boron atoms at a lower overall boron content in the steel. This may explain why a high austenitizing temperature, which inevitably coarsens austenite grains, is necessary for the formation of boron constituent in steel containing less than about 0.003 per cent boron. The very puzzling circumstance that in steel containing less than about 0.003 per cent boron, the rapid cooling from the high heating temperature down to about the Ac_1 necessary to form boron constituent suggests that in this temperature range the distribution of boron atoms in austenite may be altered by diffusion unless the cooling is rapid.

Many of the phenomena characteristics of boron-treated steels may be partly explained if we assume that boron may be present in steel in "effective" and "ineffective" form. The effective boron is assumed to be capable of dissolving in austenite, while the ineffective form probably does not enter austenite solid solution. Heating steel at high temperature for a long time, may, on this basis, convert effective into ineffective boron; the latter may be some stable chemical compound of boron which gradually forms at high temperature. Chemical or spectroscopic analysis fails to distinguish between effective and ineffective forms; since only the former increases hardenability, the amount of boron determined by chemical or spectroscopic analysis does not correlate well with hardenability.

Test Indicates Hardenability

On the other hand, the metallographic test for boron seems to involve only the effective boron and is, therefore, a better indicator of hardenability than chemical determination of total boron. It appears that not more than 0.001 per cent effective boron is required for the full hardenability effect of boron; any amount in excess of 0.001 per cent may, therefore, be considered as a reserve supply. Most commercial boron-treated steels contain more than 0.001 per cent effective boron and can withstand some high temperature soaking without loss of hardenability because they contain such a reserve supply; on this basis, it is presumed that no loss of hardenability need occur until the heating is sufficiently prolonged to convert the reserve into the ineffective form; thereafter further heating gradually reduces the effective boron below 0.001 per cent and ultimately renders all ineffective, as appears to have happened in our homogenized low-alloy steel.

On the basis of present knowledge, the hardenability of a boron-treated steel for a given application can be safely estimated only from the results of a hardenability test in which the test sample is austenitized at the temperature to be used in hardening the final product.

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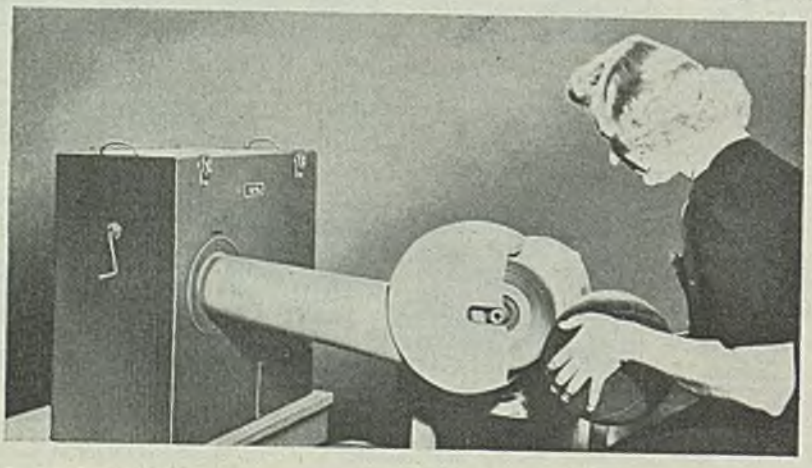

DUCTLESS DUST COLLECTING: Manufacturer of sports equipment solved dust problem on this buffing-finishing operation on leather goods by utilizing standard Dustkop dust collector made by Aget-Detroit Co., Ann Arbor, Mich., and hood and connecting pipe shown above. Installation is said to have been completed in a few minutes

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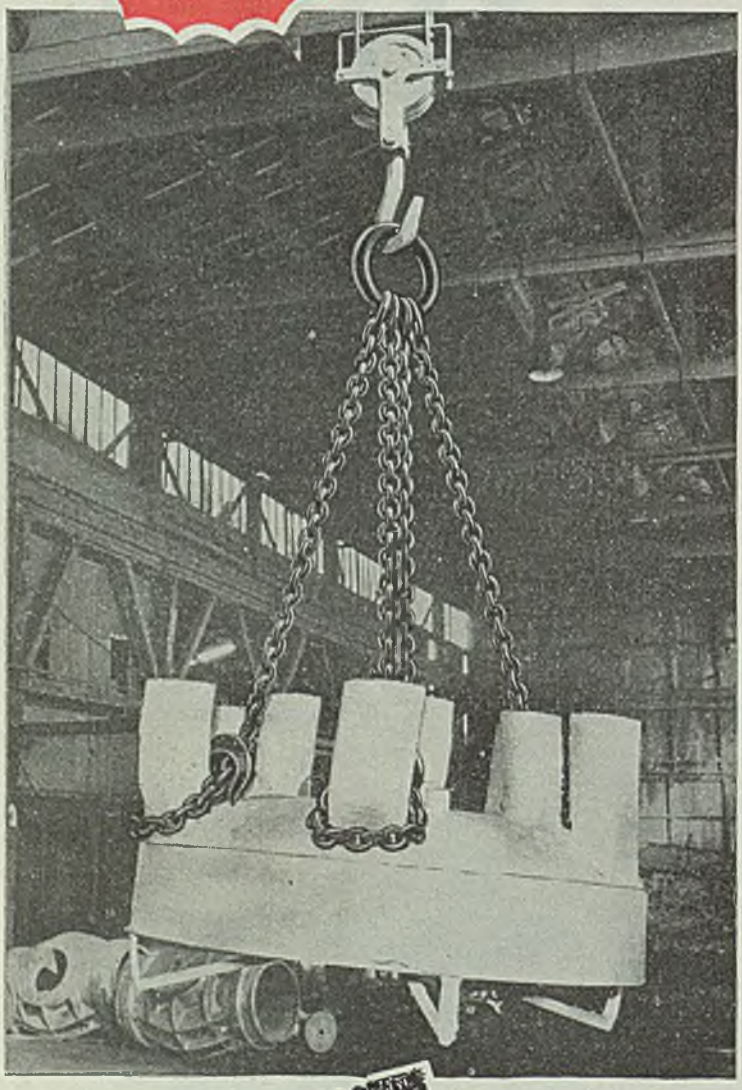

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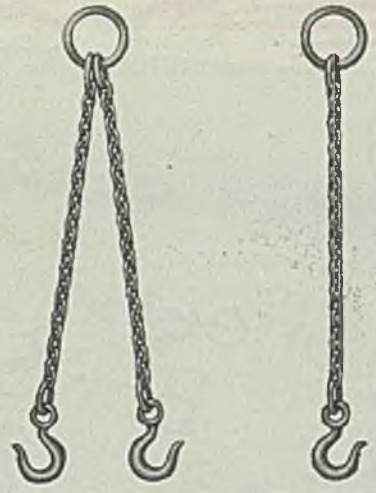

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Steel Erection Method

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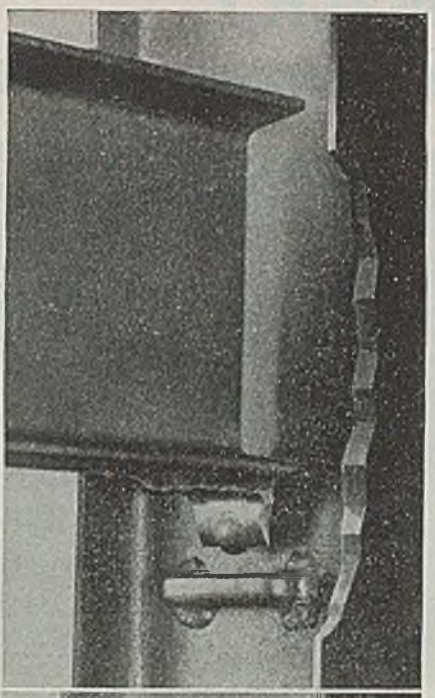
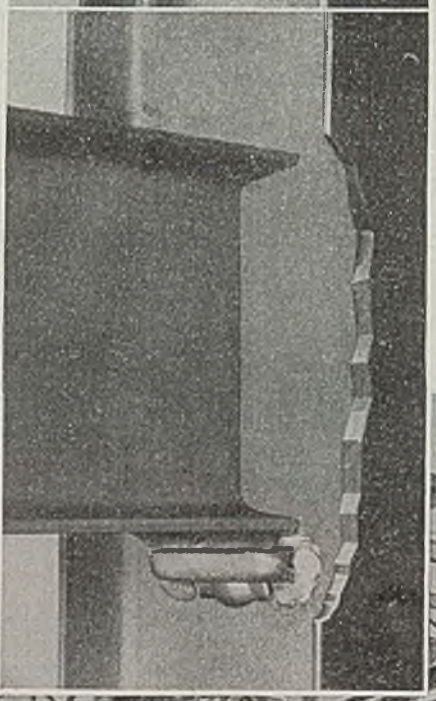
AN economical method for locating and holding structural steel parts to be field welded not only simplifies welded construction, but also lowers fabricating costs, according to J. H. Williams & Co., Buffalo, makers of the component parts involved in the system. The method, known as Saxe welded erection system, consists of using two simple drop-forged steel parts—an erection seat which is shop welded to the steel column and an erection clip, also shop welded to the under side of the beam as shown in photo at top right.

When structural members are to be erected, clip is fitted into seat (see center illustration), and field welding of beam to column takes place. Temporary field fastening to hold steel in place during welding is eliminated, effecting a substantial savings in time and fabrication as holes do not have to be punched.

No special equipment is required for use of the system other than welding equipment. Repeated tests and applications also have shown it to be safe. It provides a means of greatly reducing number of operations involved in both fabrication and erection. The system is adaptable to any assembly where structural steel parts must be located and held.

In fabrication all columns are milled to exact length prior to installation of seats and clips. Beams can be ordered to exact length or ordered to usual practice of plus or minus ⅜-in.



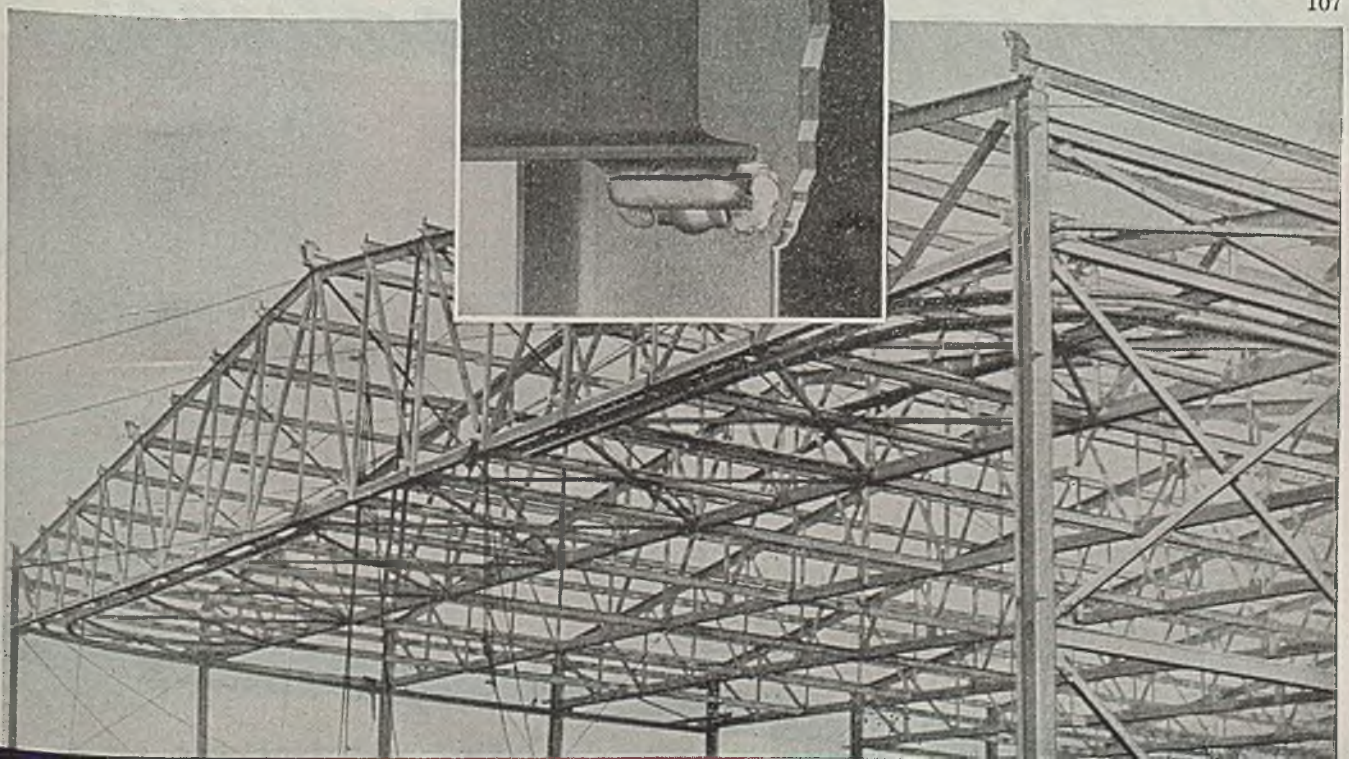


Welding of seats and clips to columns and beams may be done in the shop before erection, using a 5/32-in. heavy-coated welding rod. Field erection is done in same manner as other structural frame work. Columns are erected a tier at a time, and the beams are placed in position on seats between columns or other beams. With average care in shop work it is found that structure will be normally plumb. Top clip does not project all the way into seat preventing it from developing full wedge contact —a helpful feature in allowing a column to be plumbed. If shop errors have placed seat or clip in wrong place, it can be burned off and placed in the proper location quickly.

Each rest, once in place, is capable of supporting a working load of 20,000 lb; for greater loads two seats may be welded side by side.

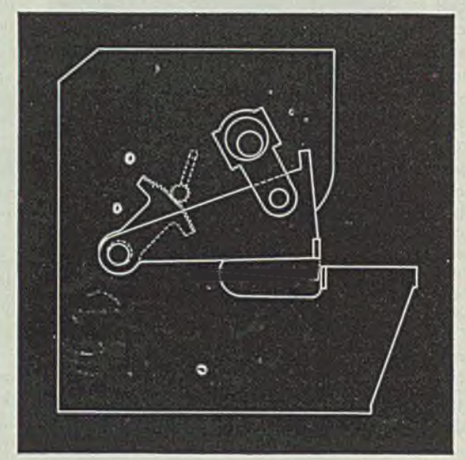
In building the Maryland National Guard hangar at municipal airport in Baltimore, 221 tons of welded steel were erected using this system. Illustration at bottom of page shows this 129 by 243 ft building in process of erection. Welded design effected a savings of 60

(*Please turn to Page* 144)



STEELWELD ANNOUNCES...

A SHEAR OF REVOLUTIONARY PIVOTED BLADE DESIGN!



After more than 10 years of engineering and development work Cleveland Crane has perfected and is now offering a line of power-driven metal-cutting shears that are new and radically different from all other shears now on the market.

A revolutionary pivoted-blade principle is employed that makes possible several outstanding advantages and overcomes certain handicaps of present-day guillotine type shears. There are no slides and guides to wear out of true and cause inaccuracies. The upper blade operates on two heavy pivot pins secured to the end housings and travels in a circular path.

The knife clearance is easily adjusted to suit the plate thickness by turning a convenient hand crank. A large dial indicator shows the thickness that may be cut for any knife setting.

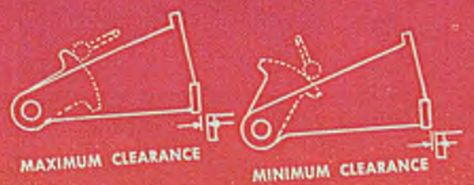
A complete line of Steelweld Shears has been developed for cutting plate of all thicknesses from 12 gauge to 1¼ inch and for lengths of 6 feet to 18 feet. They may be arranged for squaring, slitting and notching. Speeds range from 60 strokes per minute on the smaller sizes to 25 strokes per minute on the largest shear.

3 Outstanding Features

1 UPPER KNIFE TRAVELS IN CIRCULAR PATH

Blade turns on pivot pins. No guides and slides, as in guillotine-type shears, to wear and cause inaccuracies. Upper knife swings away from lower one, increasing distance "A" from back gauge to stationary knife, thereby permitting sheared pieces to drop freely without binding.

2 FAST KNIFE ADJUSTMENT



Knife clearance easily and quickly made to suit every plate thickness. No bolts to loosen, no parts to move. It is only a matter of turning a crank and watching the indicator which indicates the clearance in thousandths of an inch and also shows the plate thickness that may be cut for any knife setting.

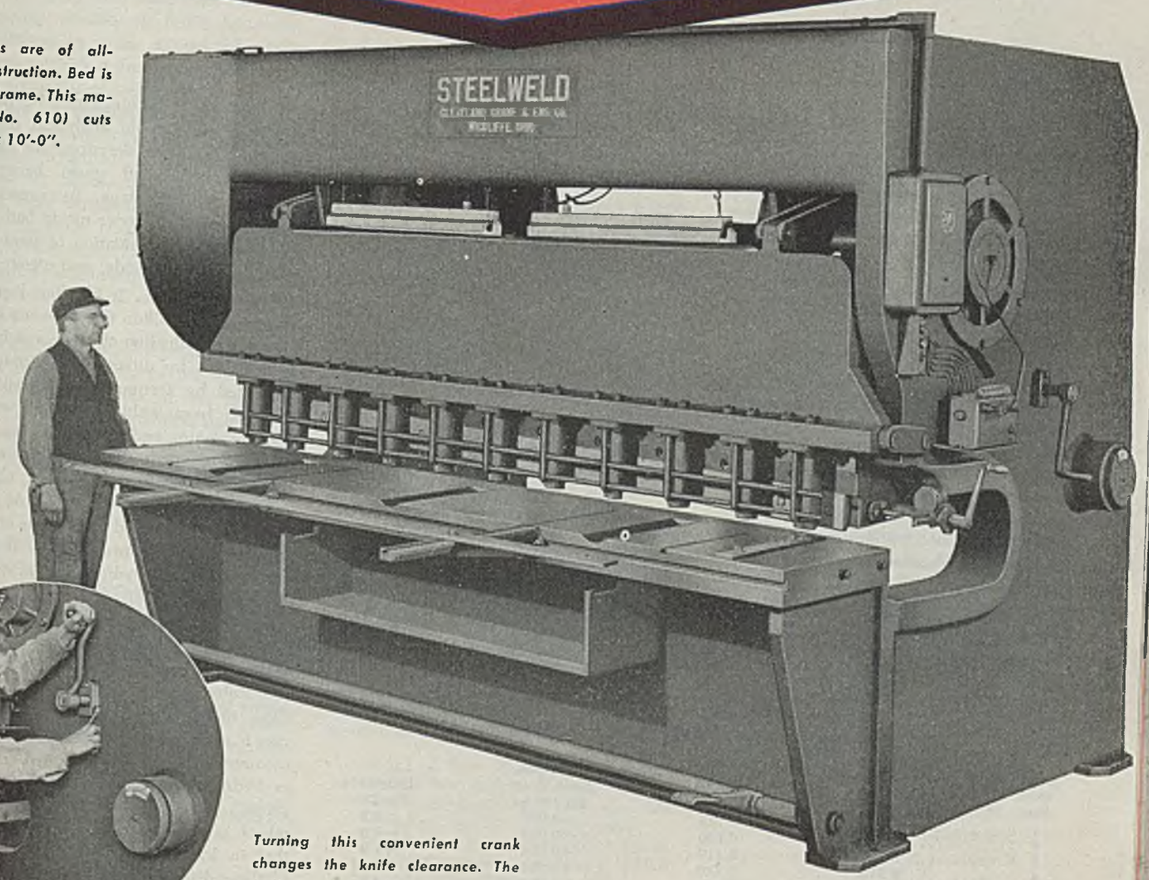
3 COUNTERACTING SHEAR PRESSURE

The shearing force is so applied that its horizontal component "A" will approximately equal and counteract pressure "B" that develops in the lower die during shearing, tending to spring them apart. This reduces the load on the blade pivot pins to a negligible amount and assures long trouble-free life at these points.

16 IMPORTANT ADVANTAGES

1. [illegible] clearance easily adjusted to [illegible] plate thickness.
2. Smooth, clean cuts.
3. Accurate, straight and true edges.
4. Easy and simple to operate.
5. Fast cutting and high production.
6. Minimum maintenance.
7. No slides or guides to wear.
8. Trouble-free mechanical hold-downs.
9. Easily arranged for squaring, slitting or notching.
10. Convenient back gauge.
11. Negligible twist, camber and bow in cut pieces.
12. Quiet operating.
13. Designed for safety throughout.
14. Long knife wear between grindings.
15. Knives easily removed or replaced.
16. All-welded one-piece frame with bed integral.

Steelweld Shears are of all-welded steel construction. Bed is integral part of frame. This machine (Model No. 610) cuts plate up to ¾" x 10'-0".



Turning this convenient crank changes the knife clearance. The indicator shows plate thickness that may be cut for any knife setting.

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STEELWELD PIVOTED BLADE SHEARS

THE CLEVELAND CRANE & ENGINEERING COMPANY

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Testing, an important phase in control of stainless steel pickling solutions, has been expedited by rapid methods of analysis, reducing need for bath replacement and saving much time

Controlling Hydrofluoric-Nitric Pickling baths

ANALYTICAL procedures suitable for plant control of stainless steel pickling solutions of the hydrofluoric-nitric acid type have been needed for some time. Testing of conventional types of pickling solutions has long been recognized as an important part of pickling procedure. In processing iron and steel products, it insures economical and efficient operation. Although there are methods for analysis of conventional sulphuric and hydrochloric pickles used for most regular steels, satisfactory analytical procedures have not been generally available for control of hydrofluoric-nitric type stainless steel pickling solutions. Need for a rapid control method of analysis to determine factors influencing both efficiency and concentrations of components has been emphasized because of erratic bath performance sometimes observed.

Acceptable analytical procedures are valuable for providing an understanding of what takes place in such pickling solutions and how they may be fortified to continue most efficient use of the bath. Undoubtedly many hydrofluoric-nitric type pickling baths have been dropped with a considerable concentration of unspent acid because of lack of methods for analysis. Thus establishment of satisfactory control methods for hydrofluoric-nitric pickle is definitely a step in the right direction for processing stainless steels. Analytical procedures suitable for plant use have been described by W. A. McKee and W. F. Hamilton.[1]

Hydrofluoric-nitric pickle bath is finding increasing use in pickling of various stainless steels and is especially valuable for cleaning siliceous welding flux residue and scale from stainless steel parts after welding or annealing. Pickle bath as made up contains approximately 1 per cent anhydrous hydrofluoric acid and 12 per cent anhydrous nitric acid by weight. These concentrations may vary somewhat as bath is replenished; unnecessary additions and tank drainings can be largely eliminated if suitable analytical procedures such as those described by McKee and Hamilton (and given here) are used to full advantage. By experiment it was found that proper pickle bath control required determination of total acid, as well as iron, fluoride, and nitrate ions.

Basic Principles: It is pointed out by McKee and Hamilton that separate quantitative determination of nitric and hydrofluoric acids by direct alkali titration is prevented by accumulation of siliceous materials from welding flux as well as iron, chromium, and nickel from dissolved steel. During neutralization of pickle solution, metallic hydroxides of iron, chromium, and nickel are precipitated. At pH 8, practically all iron and most of the chromium and nickel are precipitated. In addition, nitric and hydrofluoric acids also are completely neutralized when this pH value is reached.

Total pickle bath acidity can be arbitrarily considered as the sum of all acidic constitutents which are titrated by an alkali to a pH of 8, provided this titration is corrected for the amount of alkali consumed in precipitating metallic ions as hydroxides. This value usually is expressed as equivalents of acid per 100 ml of sample. As titration curves show that in hydrofluoric-nitric acid solutions of these dissolved metals the greatest inflection occurs at pH 8, it is possible to titrate to this pH, thus neutralizing all strong and weak acids, and to calculate their concentrations by applying a correction factor for alkali used by the metals. This correction factor is obtained by separating the hydroxides and measuring volume of precipitate in graduated centrifuge cones under definite conditions. When similar conditions of acidity and identical conditions of centrifuging are maintained a satisfactory constant relation is obtained between volume of precipitate and amount of base required

TABLE I
DETERMINATION OF TOTAL ACIDITY IN KNOWN SAMPLES

Experiment No.	Total Acid Added, Equivalents per 100 ml	Total Acid Found, Equivalents per 100 ml	Difference, Equivalents per 100 ml	Difference Per Cent
1	0.154	0.149	—0.005	—3.2
2	0.154	0.150	—0.004	—2.6
3	0.215	0.219	+0.004	+1.9
4	0.215	0.216	+0.001	+0.46
5	0.215	0.205	—0.010	—4.7
6	0.277	0.268	—0.009	—3.2
7	0.277	0.283	+0.006	+2.2
8	0.307	0.314	+0.007	+2.3

TABLE II
DETERMINATION OF TOTAL FLUORIDE IN KNOWN SAMPLES

Experiment No.	Total Fluoride Added G./100 ml	Total Fluoride Found G./100ml	Difference G./100 ml	Difference Per Cent
1	0.905	0.902	—0.003	—0.33
2	0.905	0.925	+0.02	+2.2
3	1.36	1.33	—0.03	—2.2
4	1.36	1.39	+0.03	+2.2
5	1.42	1.46	+0.04	+2.8
6	1.81	1.85	+0.04	+2.2
7	2.72	2.67	—0.05	—1.9
8	2.84	2.89	+0.05	+1.8

to produce precipitate, even though concentrations of iron, chromium, and nickel in solution may vary over a wide range. In practice, amount of dissolved iron always is several times greater than that of chromium and nickel.

In analytical procedures developed by McKee and Hamilton, a slightly modified form of the Rowley-Churchill determination is found to be sufficiently rapid and accurate for fluoride determination.[3] By this procedure fluorides are separated from interfering metals by distillation as fluosilicic acid and titrated in a buffered solution with thorium nitrate, using Alizarine Red S as an indicator. A rapid method for iron was based on its estimation in graduated centrifuge cones by comparing volume of ferric hydroxide precipitated from an aliquot of pickle solution with that from known samples, using an excess of sodium hydroxide and ammonia to dissolve bulky nickel and chromic hydroxides which co-precipitate with ferric hydroxide. In analysis of pickle solution for nitrate ion, most consistent results were obtained using the ferrous sulphate method of Bowman and Scott.[4] Titration was carried out in concentrated sulphuric acid. Fluoride, trivalent chromium, nickel, and iron were found not to interfere.

Specific Procedures: As many manufacturers and fabricators of stainless steel have expressed interest in this practical method for control of stainless steel pickle baths, specific analytical procedures proposed by McKee and Hamilton are as follows:

Reagents Required

Standardized base, 0.5 N sodium hydroxide.

Standardized nitric acid, 1.5 N.

Standard sodium fluoride, 0.750 N. Dry c. p. sodium fluoride for 2 hr at 110° to 120° C., dissolve 3.150 grams of the dry salt in distilled water, and dilute to exactly 100 ml.

Stock stainless steel solution, 130 grams of ferric nitrate nonahydrate, 35 grams of chromic nitrate nonahydrate, and 16 grams of nickel nitrate hexahydrate in 1 liter of distilled water.

Buffer solution, 9.4 grams of monochloroacetic acid and 2.0 grams of sodium hydroxide in 100 ml of distilled water.

Indicator, 0.5 gram of Alizarine (Red) S (monosodium alizarin sulphonate) in 100 ml of distilled water.

Standardized thorium nitrate, 0.07 N. Dissolve 9.2 grams of c.p. thorium nitrate tetrahydrate in 1000 ml of distilled water and standardize against standard sodium fluoride.

Standard iron solution, 0.010-gram per ml. Dissolve 1.00 gram of pure iron wire in 25 ml of 6 N nitric acid, boil a few moments, and dilute to exactly 100 ml.

Procedure

Total Acidity—Correction Factor

The correction factor for metallic impurities is determined as follows:

A solution of 10.0 ml of standard sodium fluoride and 10.0 ml of standard nitric acid are added to approximately 20 ml of water and titrated to a pH of 8.0 with the aid of a pH meter. A solution of 10.0 ml of standard sodium fluoride, 10.0 ml of standard nitric acid, and 5.0 ml of stock stainless steel solution are added to approximately 15.0 ml of water and the mixture is titrated to a pH of 8.0. The titration should be made slowly near the end point. If the final volume exceeds 100 ml, the precipitate is allowed to settle and some of the supernatant liquid is poured off. The precipitate then is stirred up into the remaining liquid and the suspension is distributed between two graduated 50-ml centrifuge cones. The cones are filled to the 50-ml mark, balanced by adding water, and centrifuged for at least 3 min. The time interval during centrifuging is accurately noted. The total volume of precipitate in the two cones is recorded.

The correction factor for metallic impurities is calculated as follows:

A = ml of base to titrate 10.0 ml of standard sodium fluoride, 10.0 ml of standard nitric acid, and 5.0 ml of stainless steel solution;
B = ml of base to titrate 10.0 ml of standard sodium fluoride and 10.0 ml of standard nitric acid;
C = ml of hydroxide precipitate;
W = correction factor or ml of base per ml of precipitate;

$$W = \frac{A - B}{C}.$$

Total Acidity Determination: An aliquot of 5.0 ml of pickling solution is added to approximately 35 ml of water and titrated to a pH of 8.0. The amount of precipitate is determined as indicated above, using the same centrifuging time and speed. The total acidity is calculated as follows:

D = ml of base required to titrate 5.0 ml of sample;
E = ml of hydroxides precipitated from 5.0 ml of sample;
W = correction factor;
N = normality of base;
X = total acidity as equivalents of acid per 100 ml of pickle solution

$$X = \frac{(D - EW)N}{50} = \text{total acidity.}$$

TABLE III

DETERMINATION OF NITRATE IN KNOWN SAMPLES

Experiment No.	Nitrate Added G./100 ml	Nitrate Found G./100ml	Difference G./100 ml	Difference Per Cent
1	3.72	3.74	+0.02	+0.56
2	9.33	9.23	—0.10	—1.1
3	9.53	9.53	0.00	0.0
4	11.2	11.1	—0.1	—0.89
5	13.1	12.7	—0.4	—3.6
6	15.3	15.2	—0.1	—0.65
7	16.8	16.8	0.0	0.0
8	19.1	18.9	—0.2	—1.0

TABLE IV

COMPARISON OF IRON DETERMINATIONS BY GRAVIMETRIC AND PRESENT METHODS

Experiment No.	Gravimetric Method G./100 ml	Present Rapid Method G./100ml	Difference G./100 ml	Difference Per Cent
1	0.925	0.931	+0.006	+0.65
2	1.10	1.20	+0.10	+9.1
3	1.20	1.19	—0.01	—0.83
4	1.33	1.28	—0.05	—3.8
5	1.12	1.14	+0.02	+1.8
6	1.31	1.39	+0.08	+6.1
7	2.19	2.29	+0.10	+4.6
8	3.50	3.33	—0.17	—4.9

Iron Content: Any standard gravimetric method for the determination of iron in the presence of chromium and nickel may be used. However, the following rapid method is recommended.

Standardization—From 1.0 to 10.0 ml of standard ferric iron solution are added to a solution of about 5.0 ml of standard sodium fluoride and 5.0 ml of standard nitric acid and diluted to about 40 ml. The solution is titrated to a pH of 8.0, 20 ml of concentrated ammonia and 4 grams of sodium hydroxide are added, and the suspension is stirred until the sodium hydroxide has dissolved. The precipitate is centrifuged and measured under exactly the same conditions as used for the unknown sample. The volume-weight relation is found from the observed volume of the precipitated ferric hydroxide and the grams of iron required to produce it.

Determination: A 5.0-ml portion of sample is added to approximately 35 ml of water and titrated to a pH of 8.0; 20 ml of concentrated ammonia and 4 grams of sodium hydroxide are added, and stirred until the sodium hydroxide has been dissolved.

The suspension of hydroxides is centrifuged in graduated cones as in the total acidity procedure. The volume of precipitate is measured and compared with a standard prepared from the standard iron solution. For most accurate results, equal amounts of precipitate should be used in

comparing known amounts of iron, as against unknown amounts of pickle solution.

The iron content is calculated as follows:

G = grams of iron taken for standardization;
H = ml of precipitate obtained from known amount of iron taken for standardization;
J = ml of precipitate from 5.0 ml of sample;
Y = grams of ferric iron per 100 ml of sample;

$$Y = \frac{20GJ}{H}.$$

Nitrate Determination: A 2.0-ml portion of sample is delivered beneath the surface of 100 ml of nitrate-free concentrated sulphuric acid. The concentrated sulphuric acid should be stirred while the sample is being delivered. The grams of nitrate ion per 100 ml of pickle solution are calculated from the ferrous sulphate consumed. Bowman and Scotts' correction factor also is applied.

Total Fluoride Content: A 125-ml distilling flask connected to a water-cooled condenser is fitted with a 2-hole rubber stopper; a thermometer is extended down into the liquid and a dropping funnel arranged so that water can be added during the distillation. The distillate is collected conveniently in a 100-ml volumetric flask.

A few glass beads and approximately 0.1 gram of sodium silicate are placed in the distilling flask, and 6 ml of 70 per cent perchloric acid and 20 ml of water are added. A 2.0-ml sample is pipetted carefully into the flask. The distilling flask is heated, and the temperature of boiling solution is maintained at 115° to 125° C by careful addition of water from the dropping funnel. The temperature finally should be allowed to reach 140° C. Approximately 60 to 75 ml of distillate are collected in a 100-ml flask and diluted to the mark with water. Once or twice during the distillation, the burner should be removed and the thermometer and stopper washed down with water. After the distillation is completed, any condensate is washed from the flask's arm and condenser into the volumetric flask and diluted to volume with distilled water.

A 25-ml aliquot of the distillate is pipetted into a tall beaker and diluted to 100 ml, three drops of Alizarine Red S indicator are added. Sodium hydroxide, 0.5 N, is added until the solution is permanently pink. The color is discharged by adding diluted hydrochloric acid (1 to 200) until the solution is just light yellow, then 2 ml of the buffer solution are added. The solution is titrated over a white background with thorium nitrate until the appearance of a light pink color, which lasts for 3 to 4 min. The thorium nitrate is added slowly while the solution is stirred continuously. There is some pink color formed during the titration because of the absorption of the dye on the thorium fluoride precipitate. However, the sudden increase in pink color at the end point is easily discernible.

The normality of the thorium nitrate is determined in exactly the same manner by titrating against sodium fluoride, except that the distillation is omitted. Ten milliliters of the standard sodium fluoride solution are pipetted into a 100-ml volumetric flask and diluted to the mark, and 10 ml of this diluted solution are titrated as above. The weight of fluoride ion per 100 ml of pickle solution is calculated as follows:

M = ml of thorium nitrate required to titrate a 25-ml aliquot of the distillate;
P = normality of thorium nitrate solution;
R = atomic weight of fluorine;
Z = grams of fluoride ion per 100 ml of pickle solution;

$$Z = \frac{MPR}{5}.$$

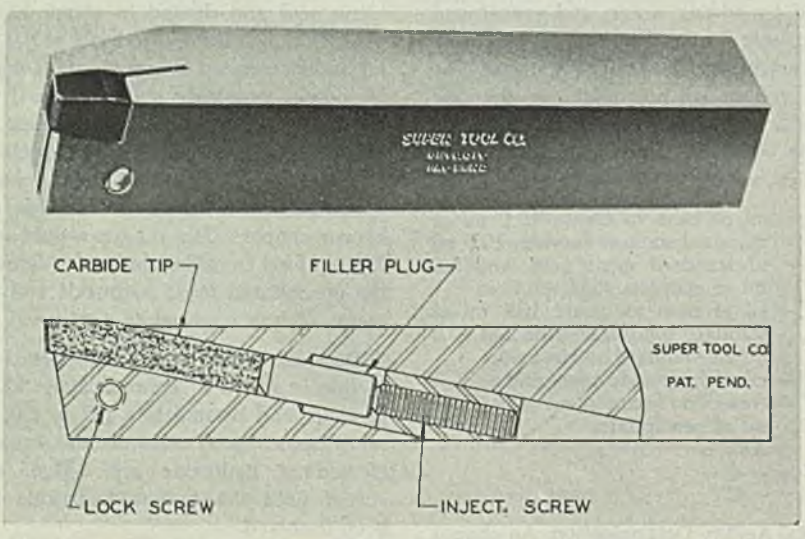
Factors To Be Controlled in Practice: Results of analyses of a large number of hydrofluoric-nitric acid pickling solutions have shown that for room temperature operation of the bath the following conditions should be maintained:

Total Acid—0.15 to 0.35 equivalent
Nitrate Ion—7.5 to 20.0 grams/100 ml of sample
Molar Ratio Fluoride to Iron—about 6 to 1

Total acid and nitrate ion concentrations are not critical if kept approximately within the above limits. Absolute amounts of iron and fluoride present in pickle bath also are not critical up to at least 3 grams of iron and 6 grams of fluoride per 100 ml of sample, even though ratio of concentration has some effect on pickling rate. For most rapid pickling action, ratio of fluoride to iron should be maintained at above value. If the ratio falls below 3 to 1, the pickling rate becomes slower. Minimum ratio which can be used in practice depends on annealing conditions and resulting oxide scale. Chromium and nickel content of bath do not appreciably affect pickling efficiency.

Accuracy: Because of the fairly wide range of allowable concentration, accuracy obtained by methods of analysis described here is more than sufficient. To check accuracy of their method, synthetic pickle solutions were analyzed by McKee and Hamilton. In each case, concentrations of iron, chromium, and nickel were varied. Data obtained are shown in Tables I to IV. Although procedures were designed for speed and practical convenience rather than for extreme accuracy, values obtained by this rapid method compare very favorably with known amounts in sample and gravimetric values.

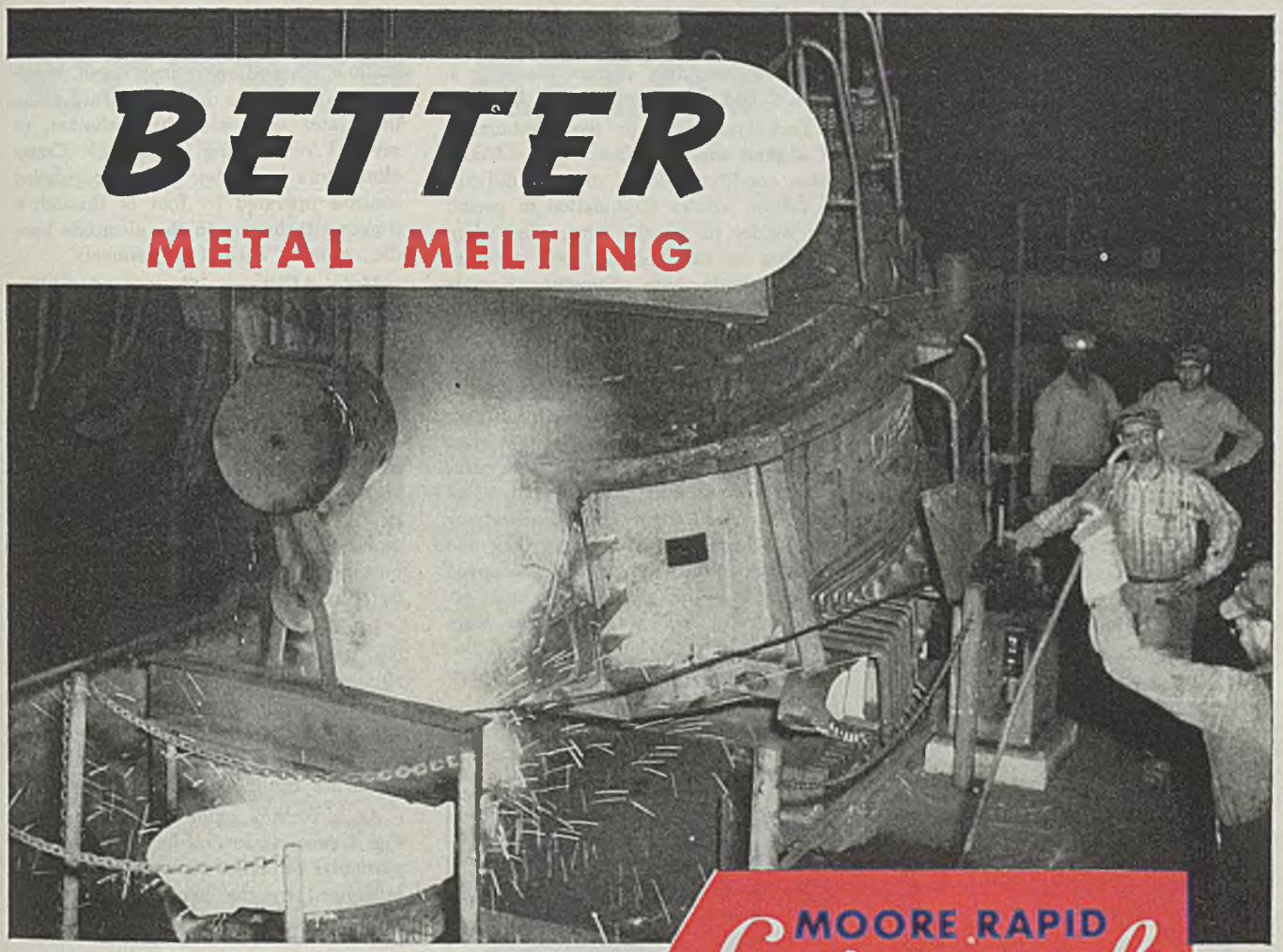
It is believed that this method is a worthwhile contribution to more efficient operation of stainless steel pickling solutions by practical analytical control.



EJECTOR TYPE CARBIDE TOOL: This tool bit designed recently by Super Tool Co., Detroit, eliminates outside holding mechanism which frequently interferes with flow of chips. Tool consists of holder which is supplied in standard sizes, and an easily replaced mechanically-held insert bit of solid carbide. Bits are large and can be ejected easily for regrinding; angle at which they are set enables user to sharpen tool with minimum loss of carbide

[1] Ind. Eng. Chem., Anal. Ed., 17, 310 (1945).
[2] Ind. Eng. Chem., Anal. Ed., 9, 551-2 (1937).
[3] Ind. Eng. Chem., Anal. Ed., 7, 766 (1915).

BETTER
METAL MELTING



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Sheet Metal Welding

(*Concluded from Page 87*)

The right combination of electrode diameter and current will treble, and quadruple welding speeds over what the newcomer may have selected originally. Most popular electrode diameter in the gages under discussion is 5/32-in. followed by 1/8 and 3/16-in. with 3/32-in. trailing. Normally, it might be expected that the 1/16 and 5/64-in. diameters would be the most popular, but such is not the case.

About two-thirds of all sheet metal welding is done with E6013 electrodes. The remaining third is accomplished with E6010 and E6011 types. Latter are almost exclusively restricted, either to good fit ups or joints with greater heat capacity.

Following electrode characteristics should be considered:

Welds must be sound and free from cracks, surface holes and other irrgularities. Spatter should be slight and easily cleaned away. Slag must be readily removable when cold. Fusion should be complete at rapid travel rates. Fillet welds should be free of undercut. The electrode, assuming correct diameter is used, should weld all gages from 10 to 18.

Technique demands the combination of a short arc with fast travel. Under these conditions, joints may be difficult to follow. Extra illumination to permit the welder to see the joint, even when the arc is extinguished, will increase welding productivity. Sometimes a guide line or strip is used to aid the welder in following the seam.

Drawback Eliminated

Joints such as C and E in Fig. 2 may be used on the inside of a unit that must be painted on the outside. If right combination of electrode, current and travel speed is employed, the sag or drawback will be limited. Otherwise, when too low a current, and too slow a travel speed are selected, the sag may become excessive. The hollow looks even more pronounced after painting. Sag or drawback will be under 10 per cent when right conditions prevail.

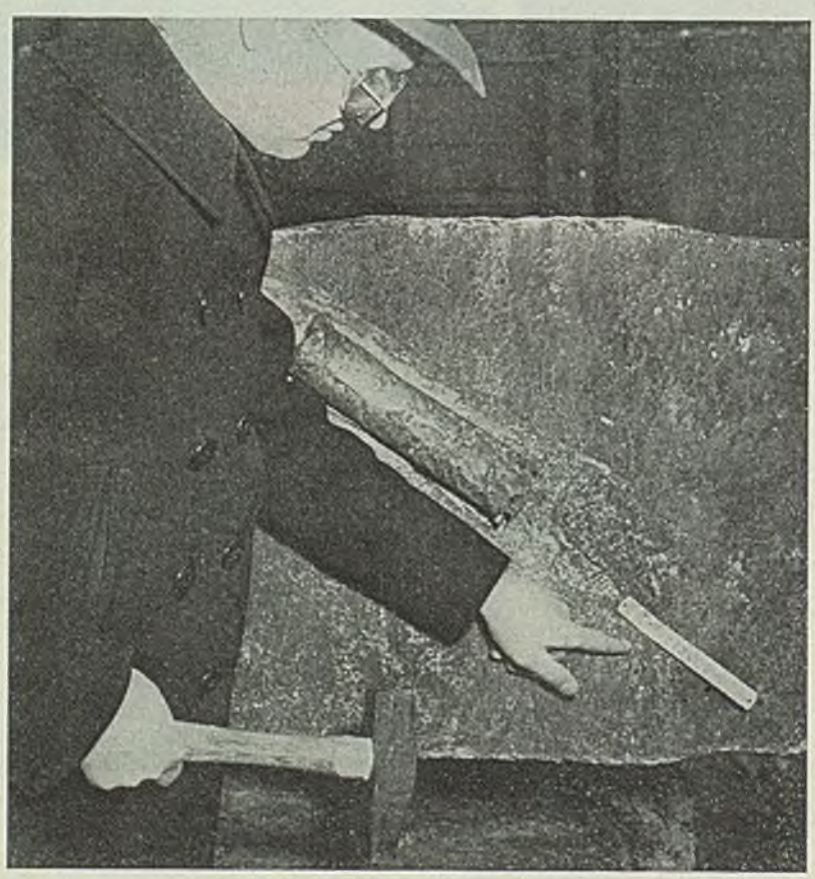
Breaking the arc is another question that comes under the heading of technique. Unless correctly accomplished, a shallow, cracked crater may result. Manipulation should be directed toward filling the crater with a slight hesitation, or reversal of welding direction. Crater eliminators and other current regulating controls operated by foot or through a trigger attachment on the electrode handle, provide current adjustments.

Jigs and Fixtures: Sheet metal welding is so rapid that a crew should be provided to make set ups for the welders. Otherwise, the operation will be completed so quickly the welder will have to stand around waiting for something to do. This is especially true of repetitive production work involving the use of jigs and fixtures such as those shown in Fig. 4. Copper, or copper-faced jigs increase heat capacity of the joint, permitting still higher currents and even faster rates of progression.

In addition to speeding rate of welding, jigs and fixtures hold joints in good alignment with few tack welds. Usually jigs are quite substantial, with enough strength to act as strongbacks to prevent warpage while welds and heat-affected zones are cooling.

As a further guide to the designer, Fig. 2 presents several joint designs with particular reference to welding speed as influenced by the joint. Speed differences are largely accounted for by heat capacity. If the designer has the option of several points, he can take advantage of lower fabricating costs by choosing the design that allows fastest welding.

Good fit up and joint design provide a competitive advantage of considerable importance to the sheet metal shop. This type of work is generally quite dependent on low cost and high quality fabrication. The vertical position coupled with downhill welding leads to most rapid welding. E6013 electrodes of the largest possible diameter at the highest practical current spell out the best results. Jigs and fixtures quickly pay for themselves wherever the number of joints to be made warrants handling devices. A quick review of sheet metal shop welding conditions may well repay the welding engineer or shop superintendent, on the offchance his foremen or welders are not exploiting every cost-saving possibility in the work they are doing.



DOG TAGS FOR INGOTS: Metal tag bearing heat number is shown here being literally nailed to cold steel ingot with one blow at South Chicago Works of Carnegie-Illinois Steel Corp. A 2¾-lb hammer with simple spring attachment holds specially heat-treated ¼-in. nail made by American Steel & Wire Co., and tag. Development enables ingots enroute to rolling mills from steel-making furnaces to be identified speedily and permanently

DECIMAL EQUIVALENTS OF GAGE NUMBERS

Gage No.	U. S. Standard Gage	Birmingham Wire Gage
10	0.1379	0.134
12	0.1072	0.109
14	0.0766	0.083
16	0.0613	0.065
18	0.0490	0.049

Advertisement JUNE, 1946

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Bridgeport's Technical Service Department

Renders Valuable Assistance To Users Of Brass Mill Products

A basic factor in the solution of many problems confronting the manufacturers of metal products and equipment is the evaluation and selection of suitable materials. The successful operation of an otherwise excellent product may be jeopardized because a vital part is made from a material which under certain conditions of operation is subject to unnecessary failure. Metal specifications must be modernized to meet more severe requirements and possibly new and different manufacturing processes. In many cases it may be difficult for manufacturers to keep abreast of new alloys, improvements in existing ones, new applications for standard alloys and the latest developments in non-ferrous metallurgy and corrosion research. Yet, such information is vital if manufacturers are to make a careful study of materials and methods in their determination to improve quality, modernize production methods, and generally hold their places in the competitive picture.

Technical Service Department Works Closely With Customers

Bridgeport's Technical Service Department, composed of an experienced group of practical men, is helping customers study the possibilities of the newer copper-base engineering alloys as applied to their products. In some cases the solution to metal specification problems may already be available in our mills or research laboratory, and in such instances, the Technical Service Department correlates all available information bearing on the problem and works closely with the customer until a solution is reached.

A Problem of Dezincification

Frequently, customers are aided in improving their products through a change in metal specifications which results in longer life, better performance, more favorable price or a combination of all three. For example, a manufacturer of metal bellows was using a brass composed of 80% copper, remainder zinc. This alloy could be readily drawn and formed, but dezincification was causing premature failure of the part under certain conditions.

After taking into consideration various factors such as governmental limitations on certain materials, the customer's competitive price situation and necessary physical properties, an alloy composed of 81.0% copper, 1.1% tin, remainder zinc was suggested. This alloy formed satisfactorily, possessed sufficient spring properties, fulfilled price and governmental requirements, and most important of all did not fail through dezincification as had the previous alloy.

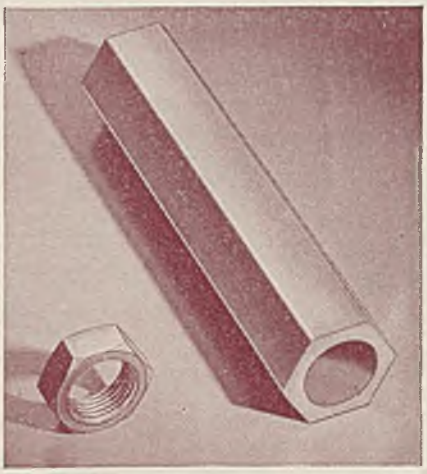
A Stronger Alloy for Connector Bolts

In another case which came to the attention of our Technical Service Department a customer had been using copper strip for the manufacture of pressure pads for electrical split bolt connectors. Malleability and corrosion resistance were satisfactory, but more strength was required. A change in metal specifications was indicated, and an alloy made up of 2.75% aluminum, 0.35% silicon, remainder copper was recommended. This alloy, almost as malleable as copper, possessed fine corrosion resistance and the ability to attain exceptionally high strength by cold working.

Varied Problems Are Handled

In some cases an alloy suggested by our Technical Service Department has resulted in a complete change in manufacturing procedure by the customer resulting in a product with better physical properties. In the case of a manufacturer making large cast nuts, an aluminum bronze heavy walled tube, hexagonal outside, was developed. Nuts machined from this tubing are superior in physical properties to those made from castings.

Another type of problem was that of a manufacturer who required a copper-base alloy which could be seam and spot welded and also would be practical for deep drawing operations. A yellow brass alloyed with a small percentage of silicon was tried out and found satisfactory for the purpose. This alloy can readily be formed and also possesses sufficiently low thermal and electrical conductivities to make it suitable for resistance welding.

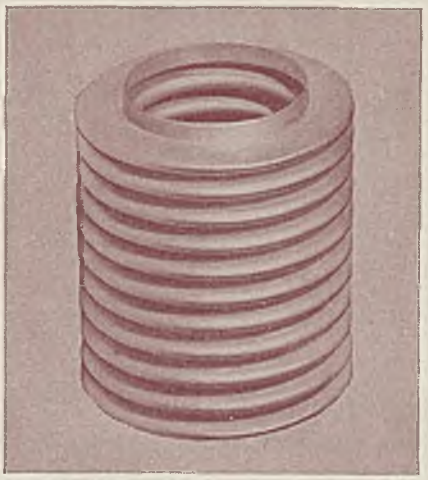


Silicon Aluminum Bronze special tubing, and hexagonal nut made from it.

A New Spring Material

With the scarcity of tin, and government conservation orders limiting the applications for which phosphor bronze can be used, many of our customers required a material with suitable spring characteristics and other properties, which could be substituted for phosphor bronze in certain applications. As an answer to this need Bridgeport's research laboratory developed an aluminum bronze which has been used successfully for diaphragms, spring contacts, bellows, spring type bearings and similar applications.

One interesting application, developed through the Technical Service Department, is a spider for self-centering bearings. The alloy was found to possess the necessary strength, spring properties and satisfactory formability for this application. Other every-day types of applications for the alloy are the cap grips and clips for modern fountain pens and clutches that grip the lead of automatic pencils.



Metal bellows used for temperature and pressure controls. Must have satisfactory spring properties and good corrosion resistance.

Cupro Nickel Recommended

A different sort of problem was put up to the Technical Service Department by the manufacturer of a small immersion heater made from chromium plated copper tubing. Unfortunately, the chromium pealed off after very little use thus allowing the tubing to become badly discolored. Cupro nickel has replaced the chromium plated copper and gives very satisfactory results.

Condenser and Heat Exchanger Tubing

Bridgeport's Technical Service Department also works with users and manufac-

(*Continued on page 2, column 2*)

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, research chemist of the Bridgeport Brass Company.

EFFECT OF STRESS ON CORROSION

Vibrating or Cyclic Stresses Accelerate Cracking

Almost a century has passed since August Wohler conducted his experimental study of the strength of materials under repeated stress. This led to the establishment of his critical value of stress below which cracking failures will not take place even after an enormous number of cycles of stress. This critical value which is now called "endurance limit" or "fatigue limit" is probably the most important index of the fatigue strength of a metal. This subject is of increasing importance because of the more wide spread use of high speed machinery where numerous cycles of stress occur in a very short period of time.

Nature of Fatigue Cracking

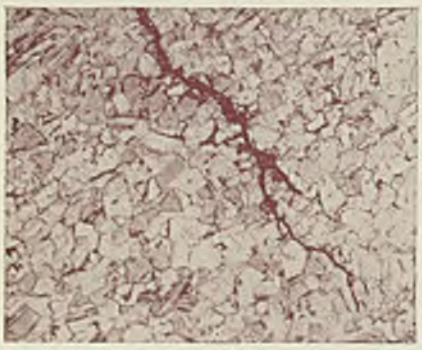
Subsequent work by other investigators indicated that under alternating stresses, repeated slippage along the microscopic crystal planes of the metal may lead to the formation of minute cracks. These minute cracks grow and weaken the metal until cracking failure suddenly occurs. The final fracture usually has the following characteristics:

(1) shows very little if any reduction in cross-sectional area.

(2) reveals the bright natural color of the metal.

(3) the fracture has a coarse crystalline appearance, especially in the area where the final fracture occurs, with the rest of the crack discolored and smoothed by rubbing of the sides of the crack during its growth.

(4) the crack is predominantly transcrystalline (see figure 1).



Photomicrograph of fatigue crack in silicon aluminum bronze developed in laboratory fatigue test after 10,000,000 cycles at a stress of 45,000 psi.

The crystalline appearance of the fracture, originally led to the erroneous impression that the metal had "crystallized". With the advent of the metallurgical microscope, it was shown that the crystalline appearance results from fatigue fracture starting in the cleavage plane or crystal boundaries of the metal.

Bridgeport's Technical

(*Continued from page 1*)

turers of condenser and heat exchanger equipment in power plants, petroleum refineries, petro-chemical plants and process industries. Many corrosion resistant condenser and heat exchanger alloys are available. For most practical results, engineers working with laboratory personnel, are in a position to try out various alloys and observe them under actual service conditions.

Wherever there are problems of severe double corrosion which may lead to premature shut-downs, or where there is the possibility of a metal or alloy contaminating the color or taste of a product, Duplex Tubing is worth investigating.

For example, in heat exchangers for the production or handling of certain acid solutions, formaldehyde, resins, sulphur compounds, paints, and varnishes, petroleum products, foods and beverages, Bridgeport Duplex Tubing, made up of a copper-base alloy to the circulating water side and aluminum to the product side, should be tested to avoid product contamination or withstand excessive corrosive attack.

In the handling and manufacture of ammonia and other nitrogen compounds Duplex Tubing with a copper-base alloy to the water or brine side and steel to the nitrogen compound side has resulted in longer life and improved heat transfer properties. Ammonia refrigeration systems furnish a very important application for Duplex Tubing with the above combination.

Many combinations are available, such as Bridgeport Admiralty, Arsenical Muntz*, Cupro Nickel, Cuzinal, Duronze IV** (aluminum bronze), or Copper with steel, stainless steel, monel, aluminum, or nickel.

The Technical Service Department can be contacted through your nearest Bridgeport office.

*Reg. U. S. Pat. No. 2118688
**U. S. Pat. No. 2093380

The Copper Alloy Bulletin has taken on a new appearance this month — different paper, different ink. It's part of our program to help paper manufacturers conserve facilities.

Readers who would like to receive the Copper Alloy Bulletin regularly should send their names and addresses to Bridgeport, requesting that their names be added to our mailing list.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

A New Type Fastening has been developed for application on access panels, inspection doors, and appliances requiring a means for quick opening and closing between two sheet-metal panels. The fastening consists of a metal base carrying a formed spring with cam surfaces and a stud that applies in a grommet. The base unit is secured to one of the two sheets to be held together. The stud and grommet apply in the other sheet. Turning stud through 90° applies it in the spring or releases it. **No. 690**

Metal Treating Liquid Material to black finish copper alloys without copper plating first. It has also been used to produce black finish on steel suitable for waxing, lacquering or as a bond for paint finishes. It is of porous character, prior to waxing, and anchors paint securely. **No. 691**

Two New Hydrogen Thyratron Tubes have been developed for timing welding operations, electronic heating, and electroplating. Also applicable to marine and aircraft radar and pulse communicating equipment. The two units measure 10 and 7" in overall length and can be installed in any position. Peak anode rating is 325 and 90 amp., 16 and 8 kv. **No. 692**

A New Power Driven Press designed for bending, straightening, forcing, push broaching, riveting, and staking. It can be employed to exert momentary or sustained pressure by use of a foot pedal. Standard stroke is maximum at 9". Special stroke to 12, 15, or 18" can be specified. It is driven by a 5-hp. motor. **No. 693**

Temperature-controlled Valve for application of a steam supply line determines pressure in steam delivered to a unit of process equipment in flow-through or dead-end service. Valve is furnished in temperature ranges from 70 to 170°F., 120 to 220° and 170 to 270°. Pressure range is 25 to 300 pounds. Operation can be adjusted to desired temperature and pressure within the ranges in which the valve is available. **No. 694**

New Electronic Equipment generates and employs supersonic waves on the order of 50 to 1000 kc to detect flaws in solid or laminated materials. It is said to be particularly suited for non-destructive testing of rolled and extruded materials made of steel, aluminum, bronze, copper, alloyed metals and plastics. It will detect and locate minute defects in the material or in joining surfaces between two materials. **No. 695**

INDUSTRIAL EQUIPMENT

Variable Speed Lathe

A small high-speed lathe for bench or table use is announced by Precise Products Co., Racine, Wis., to increase accuracy a d speed in grinding, finishing and polishing small products and parts made of steel, nonferrous metals, plastics, glass, wood and other materials.

Lathe embodies built-in speed control

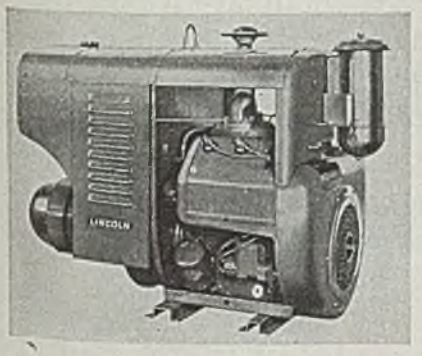
allowing a range of working speeds up to 40,000 rpm. Power unit can be detached and used separately as a hand tool for grinding, milling, deburring, finishing and polishing.

Lathe stand is cast of solid aluminum. Two large recessed compartments provide storage space for rotary tools. Adjustable safety glass shield protects operator while lamp on flexible arm illuminates operating field.

Steel 6/10/46; *Item No.* 9235

Engine-Driven Welder

New light weight gasoline engine-driven type portable welder is announced by Lincoln Electric Co., Cleveland. For welding applications in areas where electric power is not available, the welder,



know as Shield-Arc Jr., measures only 48 x 30 x 24 in. With current range of 40 to 250 amp, it can be used for welding of light or heavy gage metal, or repairing cast iron structures.

Generator controls of welder are mounted inside an enclosed cabinet above generator. Speed of the air cooled, 4 cylinder engine determines welding current which is controlled by adjusting engine speed between a maximum of 2100 rpm and 1500 rpm.

The unit is protected from falling objects by canopy which also affords weather protection. Two transverse mounting rails for bolting to floor or platform permit welder to be mounted on either shop or road trailer.

Steel 6/10/46; *Item No.* 9271

Pipe Elbows

A new line of noncorrosive antiacid bronze pipe elbows for mine drainage use is offered by Mosebach Electric & Supply Co., 1170 Arlington avenue, Pittsburgh. Having high lead composition, they are particularly resistant to mine acid water.

The cast elbows are made to any specifications. Reducers with inside diameters from 8 to 6 in. also are available.

Steel 6/10/46; *Item No.* 9137

Drilling, Tapping Machine

Milling, drilling and tapping operations are combined in 4-station indexing machine introduced by Davis & Thompson Co., Milwaukee. All operations are performed simultaneously when working on electric motor frames.

Machine design incorporates provisions for interchangeable fixture and drill plates, making it possible to change over from one size motor frame to another.

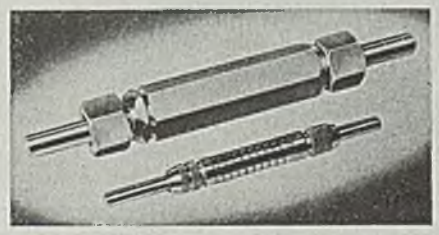
Hydraulic motor through worm and worm wheel index the table. Rapid traverse with charge to cutting speed is incorporated in milling head. Drill heads for mounting holes are equipped with change gears for correct spindle speed.

All heads are electrically interlocked and must be in the starting position before the cycle can begin. Drill heads are fed by hydraulic screw, and tapping heads are actuated by hydraulic cylinder for positioning and rapid return. Each cutter head is equipped with a 10-hp motor, drill heads with 7½-hp and 3-hp motor and tapping heads with three 3-hp motors.

Steel 6/10/46; *Item No.* 9341

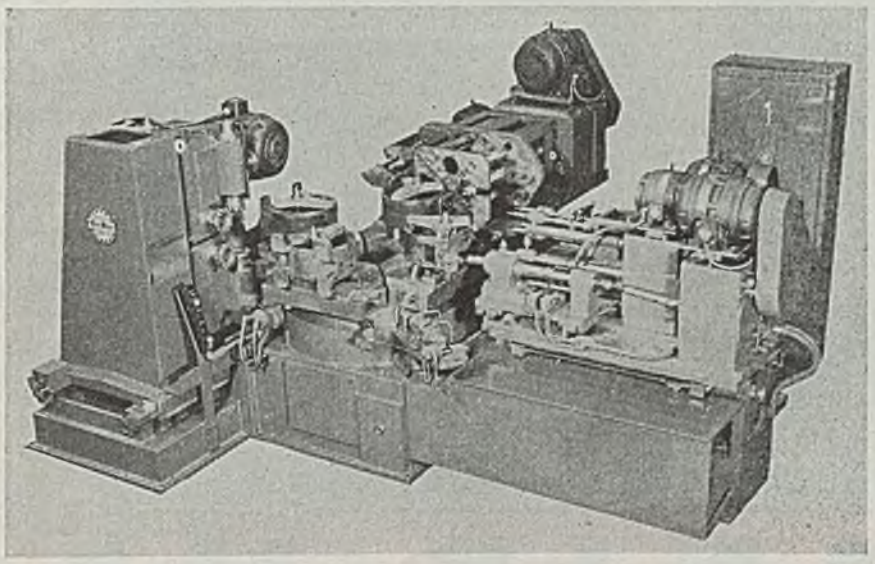
Plug Gages

Reversible wire plug gages utilizing Carboloy cemented-carbides are announced by Lincoln Park Industries, 1719 Ferris avenue, Lincoln Park, Mich. Gages are being manufactured in a size range

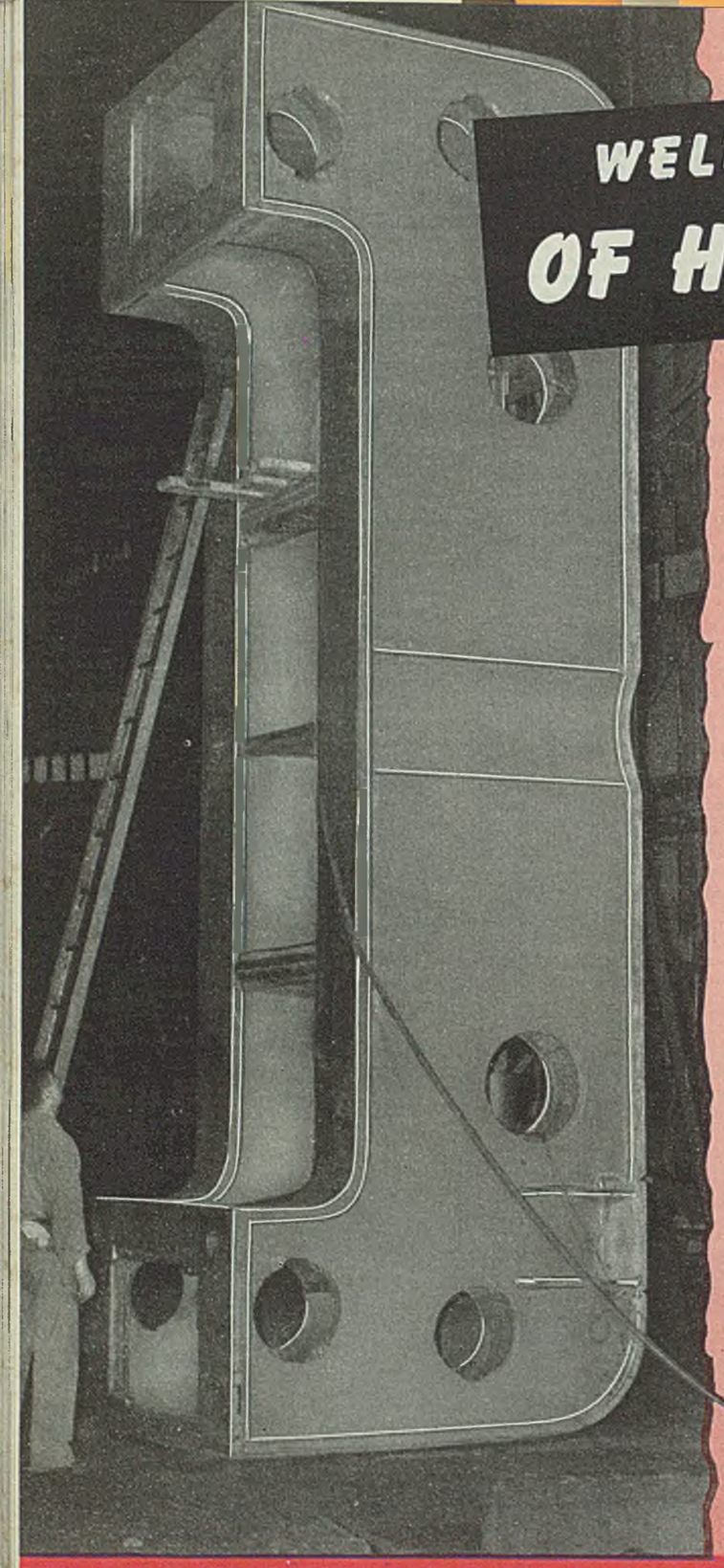


from 0.025 to 0.375-in. and are made to class XX and X tolerances. Use of cemented-carbide increases gage life. High elastic limit of cemented-carbides insures against bent and deformed wires, corrosion, rust and magnetism.

Two styles of handle, both of collet type, are supplied. Feature of gages is



(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 129.)



WELDING with an eye to MACHINING OF HEAVY PRESS WELDMENTS BY DANLY

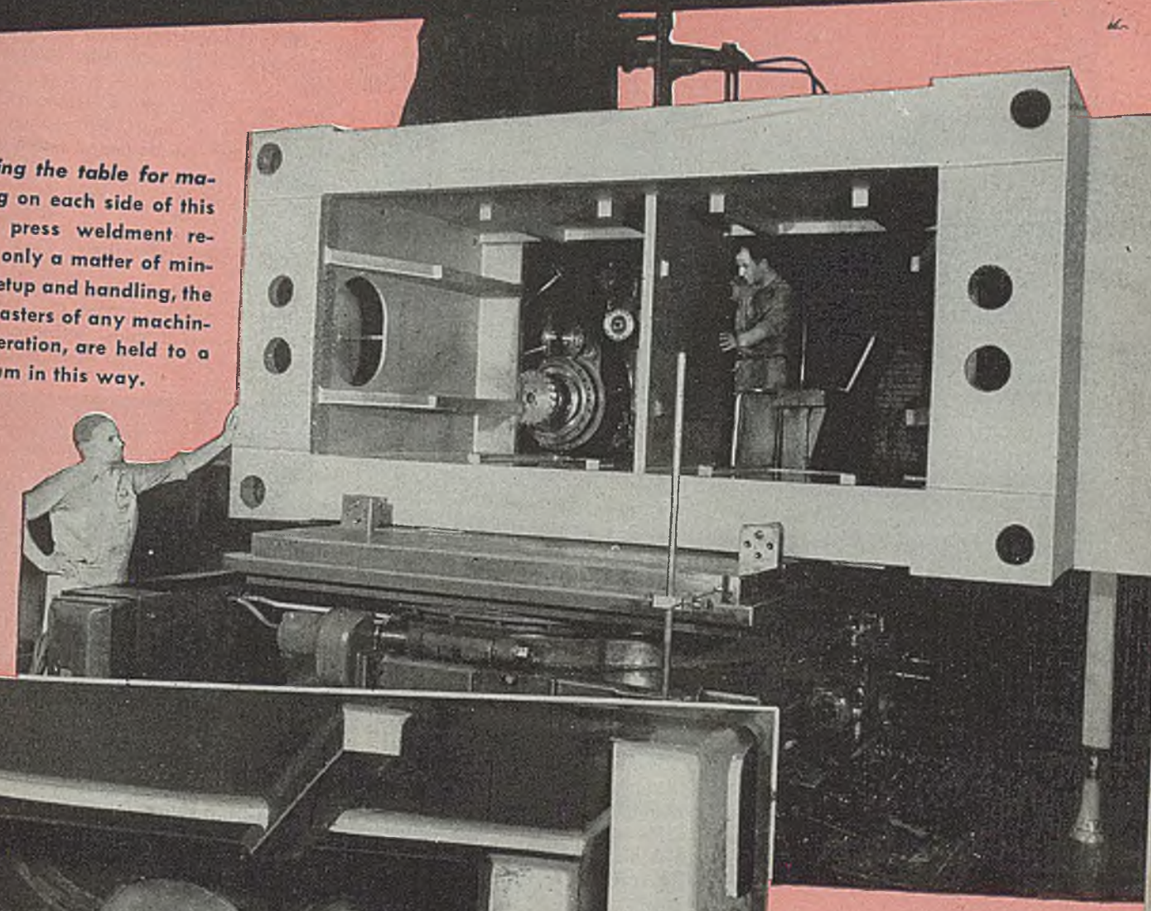
Up-to-date facilities and men trained to meet exacting standards of precision, make the fabricating and machining of large structure weldments standard production at Danly.

The mechanical press crown *left* brought no problem of size to Danly engineers and setup men. Sub-assembly construction permitted several crews to work on the components at the same time. This method cut much costly handling time—avoided inaccuracies in dimension and distortion which frequently occurs in welding of large structures.

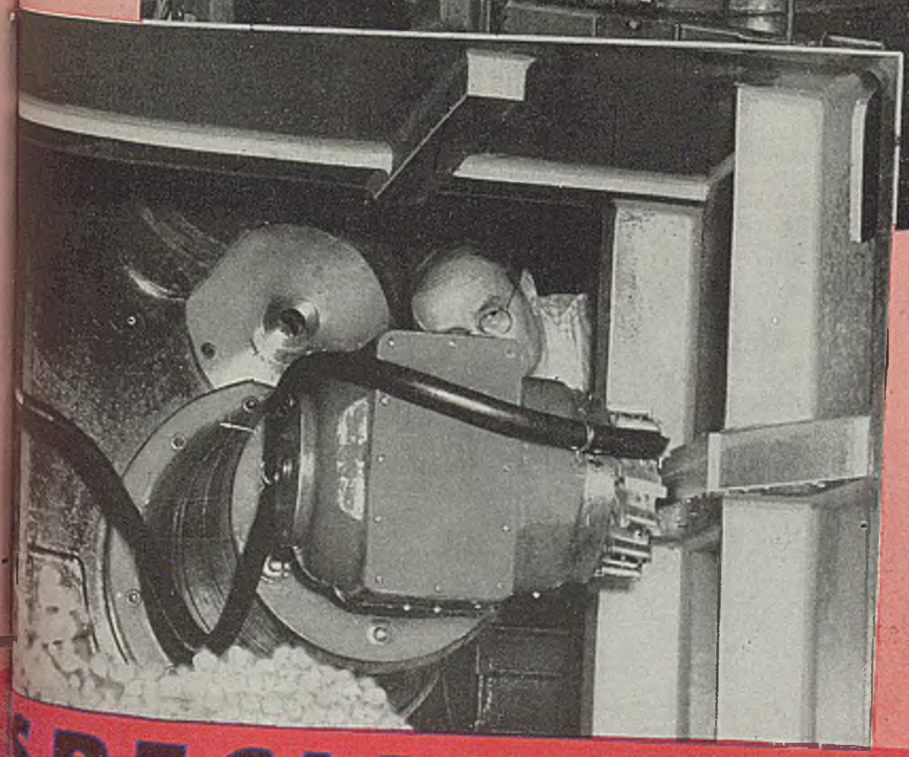
Floor type boring mills *like the one shown at right* simplify exacting machine work. The horizontal indexing table makes it possible to machine each side of the press bed with but a few minutes to index the table and resume work on the next surface. The right-angle boring head *inset* makes possible complete internal milling and boring at any angle through 360 degrees.

DANLYWELD

Welded and Machined at Lower Final Cost



Indexing the table for machining on each side of this heavy press weldment requires only a matter of minutes. Setup and handling, the time wasters of any machining operation, are held to a minimum in this way.



This right-angle boring head runs into deep wells and interiors for machining on surfaces like the side cushion guides on the press bed *shown here.* Complete internal milling at any angle is possible in one setup.

DANLY MACHINE SPECIALTIES, INC

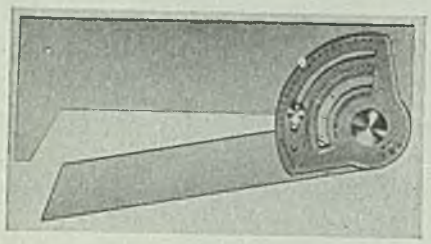
2100 SOUTH 52nd AVENUE

all-metal handles supplied in sizes up to 3/16-in. which reduces hazard of breakage of members due to accident or rough handling.

Steel 6/10/46; *Item No.* 9335

Drafting Tool

A new plastic adjustable drafting tool, called S&J quadrangle, is announced by Stewart-Jackson Instrument Co., A. C. Bartlett building, Los Angeles. Angles from 0 to 90 degrees, pitch scales from



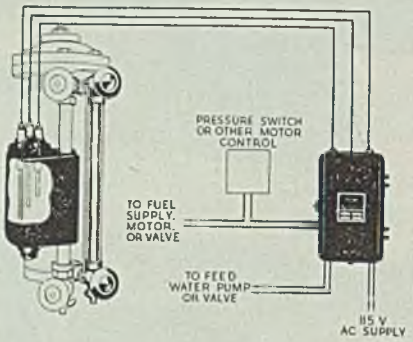
0 to 24/12, percentage slopes from 0 to 100 degrees and sine or cosine functions and tangents may be found with this instrument. It has eight drawing edges, is rectangular in shape, and may be used as a triangle. The overall size of tool is 11 x 4 in.

Steel 6/10/46; *Item No.* 9287

Boiler Feedwater Control

Boiler feedwater control, type B177 N, designed to provide automatic control for commercial and industrial boilers is announced by Combustion Control Corp., 77 Broadway, Cambridge, Mass. It maintains desired water level through valve or pump control, and instantly cuts off fuel supply and sounds alarm at predetermined dangerous low-water level.

The control operates without any moving mechanical elements. Its only contact with the boiler is through an auxiliary fitting containing metal probe rods which determine the control levels.



Probe fitting is mounted parallel to the water column and wired to the control. Current required is 115-230 v, 60 cycles ac.

Steel 6/10/46; *Item No.* 9156

Die-Casting Machines

Designed to produce large, heavy castings, two new die casting machines, illustrated one for zinc, tin and lead alloys, the other for aluminum, brass and magnesium are now offered by Lester-Phoenix Inc., 2711 Church avenue, Cleveland. Both feature a one-piece steel casting frame which achieves a high degree of rigidity. Weaving, wear and stress which occur at the joints of a fitted frame are eliminated. Locking pressure possible within this frame is rated at 600 tons.

The large central die support on each machine, and movable die plate with bearings on all four corners, eliminates deflection as die is closed. Die movement and die space have been increased 60 per cent.

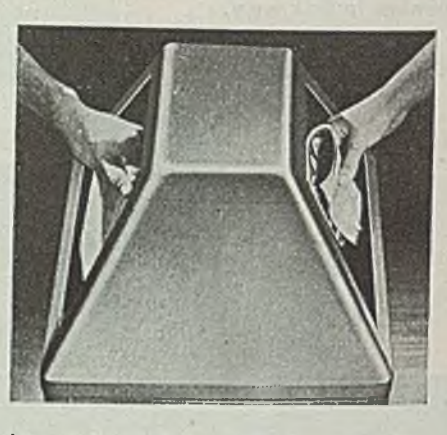
The aluminum casting machine is equipped with prefill injection system, which injects metal rapidly at controlled speed and then applies greatest pressure to metal as it chills in the die. Aluminum castings up to 14 lb each can be made on this machine.

Hot metal injection system of zinc machine has a one-piece cylinder and gooseneck of heat and corrosion resistant alloy semi-steel casting, with a highspeed cylinder liner and plunger. Zinc castings up to 19 lb each can be turned out on this unit.

Steel 6/10/46; *Item No.* 9252

Waste Receptacles

New line of steel waste receptacles is announced by Bennett Mfg. Co., Alden, N. Y., which feature unobstructable rounded corners. Two independently



hinged doors of the units permit opening of both simultaneously. Tension springs keep doors permanently closed when not in use, making them fireproof as well as sanitary. Six graduated sizes are offered. Larger sizes hold fabric bags to allow quick removal of waste.

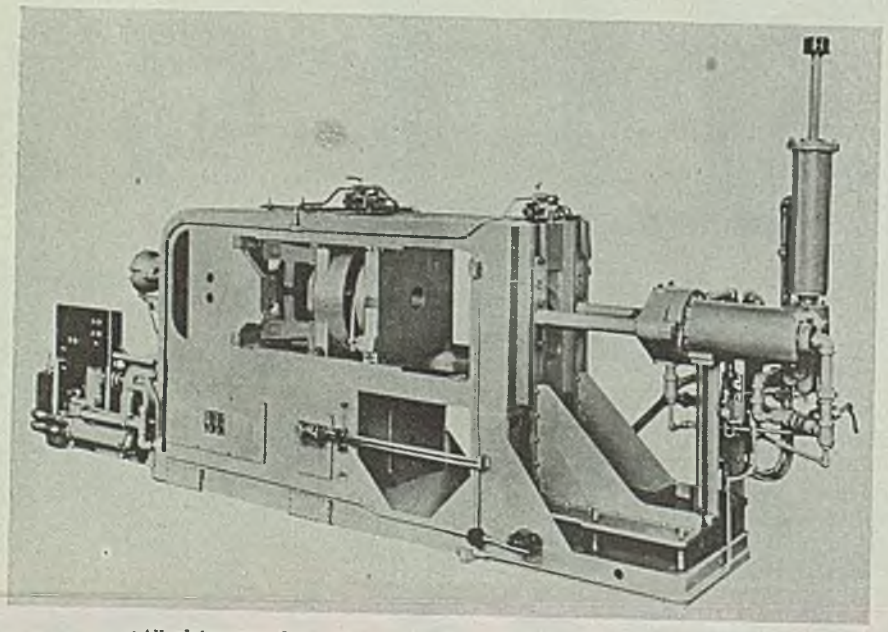
Steel 6/10/46; *Item No.* 9311

Wet Belt Surfacer

A wet abrasive surfacer which surfaces, grinds and removes stock is announced by Porter-Cable Machine Co., Syracuse, N. Y. called the model BG-8, it eliminates warpage, discoloration and burrs.

New surfacer is equipped with a large capacity recirculating tank. Coolant, applied to work and belt with a spray nozzle, maintains work in constantly cool condition.

Depth of machine is 48 in. and work table is 38 in. from floor. Automatic feed table assures a tolerance accuracy of 0.0005-in., controls in-feed pressure and speed, reduces operator fatigue by substituting mechanical pressure for hand pressure. A flat, hardened-steel platen is



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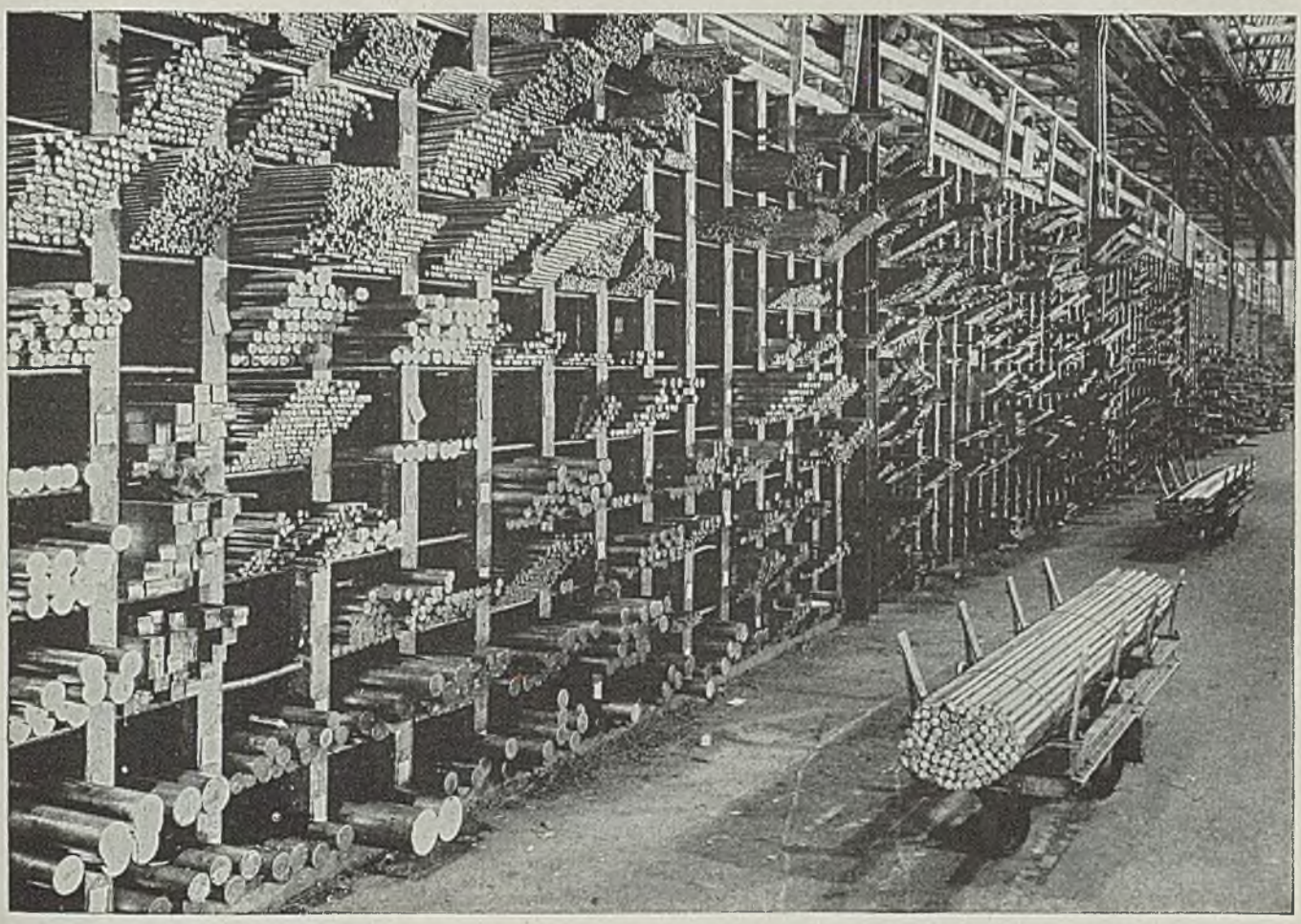

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GENSCO Specialized Steel Service is all that the expression implies—whether you are a large or small user of steel shipped from warehouse.

One of the outstanding features of GENSCO service is a special crew of workmen whose duty is to prepare stock for shipment. Being specialists in packaging, these men help assure the safe arrival of steel—steel that can be put in process the instant it is received by you.

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TO harden three small wearing areas on this transmission shaft by conventional methods requires many complicated operations . . . the heating of the whole piece . . . hours of time.

By the TOCCO Induction Process, you can confine the heating to the three local areas . . . harden all three in 20 seconds . . . each to any desired degree of hardness.

This high-speed surface-treatment does not affect the shaft core; hence there is no compromise between hardness and toughness. The wearing surfaces can have extreme hardness. The core remains strong and ductile. This localized treatment also minimizes warpage . . . eliminates straightening operations.

Because the machine is so compact, cool and clean, it can be located handy to related operations to reduce haulage. It improves working conditions. Automatically timed, it is simple for anyone to operate.

The TOCCO Engineer nearby will gladly help you produce *better products at lower cost* with TOCCO Induction Heating. Free bulletin on request.

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TOCCO

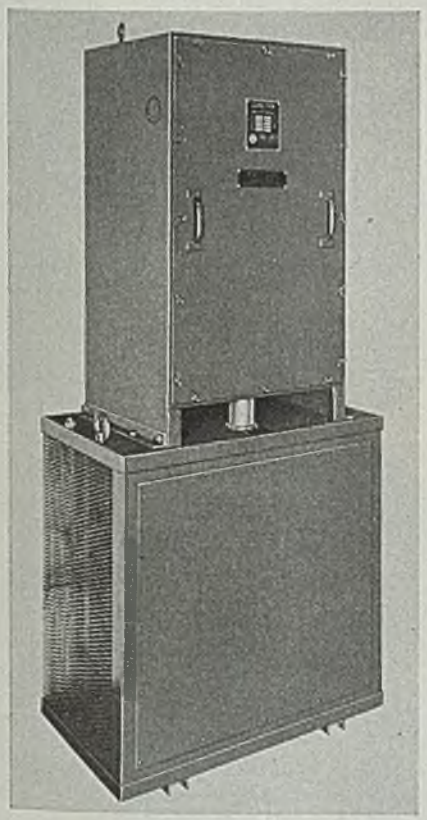
INDUCTION
HARDENING, BRAZING
ANNEALING, HEATING

used to back the belt during the grinding operation.

Steel 6/10/46; *Item No.* 9368

Power Factor Regulator

The Haug system power factor regulator is announced by Modern Control Equipment Co., 176 West Adams street, Chicago. Connected to lines of commercial power users, it will raise power factor



by taking the magnetizing current off line with a negligible cost in operation.

Advantages claimed are that it will reduce monthly power bill and increase low voltage to desired value where voltage was previously low due to poor power factor. Apparatus will function smoothly, resulting in uniform and efficient operation of all motors and machines, particularly welding machines. The unit has no moving parts and is small in size.

Steel 6/10/46; *Item No.* 9299

Electronic Counter

Dual predetermined electronic counter, introduced by Potter Instrument Co., 136 Roosevelt avenue, Flushing, N. Y., can be used in a number of different industries for counting small items usually packaged by a ratio weighing process or hand-operated scoops. A control embodied on the unit allows its use in rolling mills where counting of predetermined numbers of rapidly moving sheet stock is necessary.

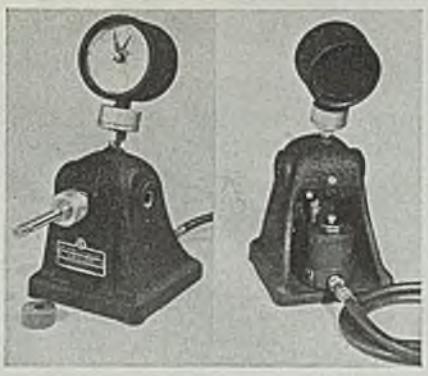
Instrument employs four 4-tube counter-decade circuits arranged to give two independent predetermining channels in

which any number from 0 to 10,000 may be initially setup by rotary switches mounted on front panel. Power for operation is obtained from a 110 v 60 cycle circuit.

Steel 6/10/46; *Item No.* 9258

Adjustable Compensator

An adjustable compensator to obtain higher magnification for the model B2 Air-O-Limit comparator is announced by



Pratt & Whitney Division of Niles-Bement-Pond Co., West Hartford, Conn.

The compensator allows full scale graduations of 0.0004, 0.0006, 0.0008 and 0.001-in. to replace the full scales of 0.002, 0.003 and 0.004-in. normally used. It offers further advantages of greater diametral clearance, better side compensation and greater speed at higher magnification.

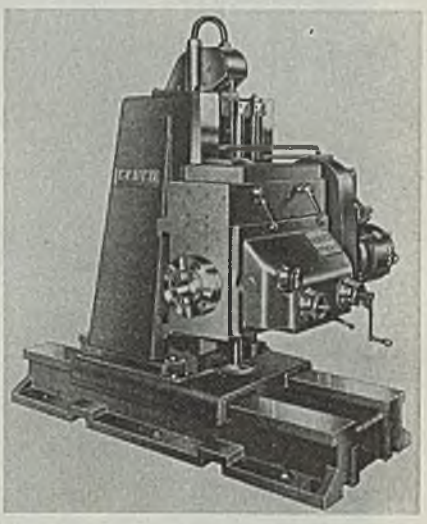
Steel 6/10/46; *Item No.* 9285

Facing Machine

General Engineering & Mfg. Co., St. Louis, announces a boring and facing machine for applications such as boring, facing, back facing, drilling and tapping operations.

A feature of the machine is unusual mounting of spindle housing, which provides rigidity. Entire housing, with its spindle nose of fixed position in relation to the bearing, is advanced toward work piece. This construction avoids long overhang, reduces vibration and assures machining to very close limts.

Machine may be used either as a stationary or portable machine. It can be modified and provided with automatic feed mechanism, to be used as a milling

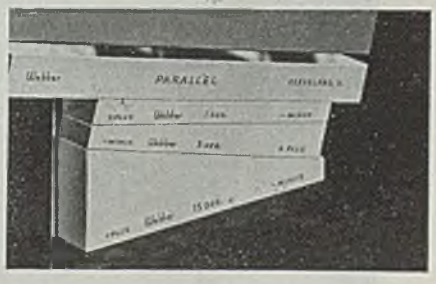


machine. For large boring or facing operations and back facing of flanges, a face plate with tool block slide may be mounted on head of work spindle.

Steel 6/10/46; *Item No.* 9312

Angle Gage Blocks

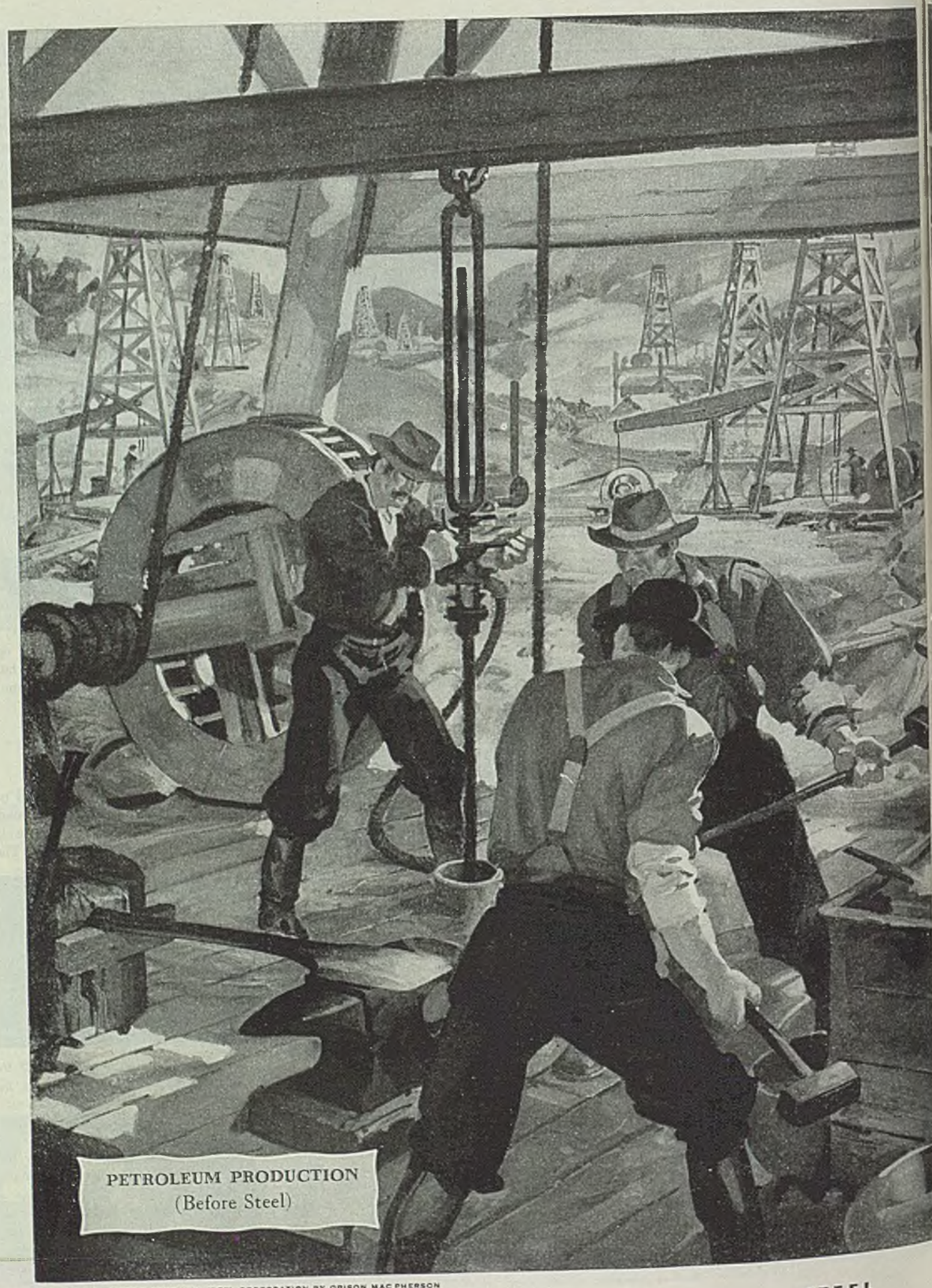
New angle gage blocks announced by Webber Gage Co., 12915 Triskett road, Cleveland, are guaranteed accurate to within 1/5,184,000 part of a circle. The



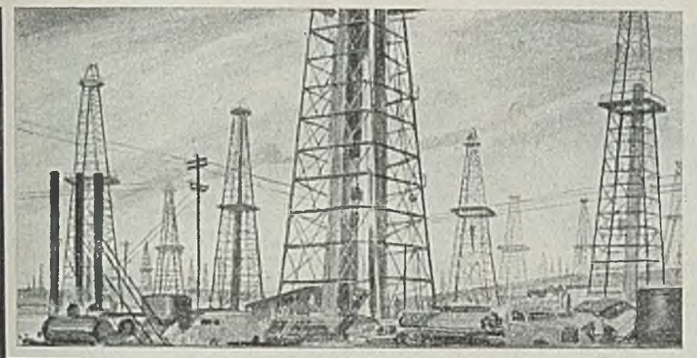
blocks will yield any angle from 0 to 103 degrees, a total of 370,800 angles, in steps of 1 sec of an arc. Working surfaces are optically flat and blocks wring together, adhering as ordinary gage blocks. Two or more angle gage blocks may be wrung together to produce any angle in degree.

Blocks are furnished individually or in three sets: 0 to 103 degrees in 1 sec steps; 0 to 103 degrees in 1 min steps, a total of 6180 angles; and 0 to 103 de-

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 129.)



PAINTED FOR JONES & LAUGHLIN STEEL CORPORATION BY ORISON MACPHERSON



GREAT STREAM OF PETROLEUM WOULD BE ONLY A TRICKLE —WITHOUT STEEL

Without steel, the great stream of petroleum that now flows full and strong to benefit mankind with its manifold products, might have remained the mere "rock oil" trickle it was in the pioneer days in Pennsylvania. Then, shallow wells were slowly "kicked down" by foot power, or drilled from little wooden derricks by small, steam-driven rigs with iron boilers, iron engines, handmade iron tools and other rudimentary equipment. Production was exciting, but very scanty compared with today.

Today, steel does the drilling. Across the continent and around the world, steel brings in the oil. From towering steel derricks with steel tools, drill pipe, casing, tubing, wire rope and rotary rigs, wells can be drilled three miles into the earth in less time than the pioneer rigs could make a hundred feet or so of hole.

Steel research, working with petroleum research, developed some marvelously tough, hard, strong steels for the big jobs in the oil fields. But when the wells of tomorrow go still deeper to swell the beneficent flow of the petroleum stream, there will be at hand still tougher, harder, stronger steels designed for the greater depths, the harder service. Such steels are being developed and produced by Jones & Laughlin Steel Corporation in the continuous improvement of its line of oil country goods.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH, PENNSYLVANIA

J&L STEEL

LIGHTER, STRONGER, CONTROLLED QUALITY STEELS

OIL & GAS WELLS

Rotary drilling rigs in today's oil and gas fields use special steel tools that grind and cut rapidly through hard rock at the end of a long string of steel drill pipe rotated by a drill table. Jones & Laughlin developed and patented Integral-Joint Drill Pipe with joint forged as part of pipe to add strength and eliminate two-thirds of threaded connections.

Early names for petroleum were Seneca oil, Genessee oil, fossil oil, rock oil.

For "kicking down" a well in pioneer days, a pole was placed over a log, the butt end pegged outside the derrick and drilling tools suspended near whip end inside derrick. Attached to tip of pole were stirrups in which two men placed a foot and "kicked" down. By repeating this procedure all day they could drill about 3 feet of hole.

Walls of Babylon, its palaces and temples were cemented with asphalt from the Fountain of Is, oil springs in Euphrates Valley.

Drake well museum and memorial park, maintained in Titusville, Pa., by the Commonwealth of Pennsylvania, is a rich repository of photographs, documents, papers, equipment and other memorabilia preserved from the days of the "oil excitement," touched off in 1859 by Col. E. L. Drake's discovery well which struck oil at 69½ ft.

Oil still taken out of Drake well is sold in 10-cent bottles to visitors for souvenirs.

20 ft. of iron pipe and a water pump was pumping equipment on first oil well. Today, special steel tubing in long lengths of great strength, such as J&L makes of Controlled Quality steel, withstands high pressures and "pull" of suspension in hole.

2 octogenarian wells still producing oil are McClintock No. 1, near Oil City, Pa., and Buell No. 1, near Macksburg, Ohio.

Early oil wells were started by digging pit within derrick. Then a "casing" (invented by Col. Drake) was put in to shut sand and water out of hole. It was usually iron pipe in short lengths connected by iron bands heated and shrunk onto the pipe. Today's wells are safely and speedily cased with long lengths of seamless steel pipe easily threaded or welded together. Hundreds of miles of casing are made yearly by J&L.

Sea grass rope, used on pioneer wells, was replaced by manila. But, not until development of steel wire rope, such as J&L Precisionbilt Oil Country lines, could oil and gas well drillers run heavy strings of tools without danger of losing them in the hole.

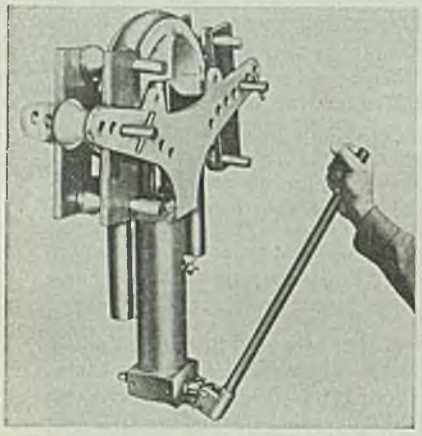
New J&L handbook of tubular products for oil industry containing many tables and other useful information may be had by writing on your business letterhead to Publicity Manager, Jones & Laughlin Steel Corporation, Pittsburgh 30, Pa.

grees in 1 degree steps making a total of 103 angles.

Steel 6/10/46; *Item No.* 9294

Pipe Bender

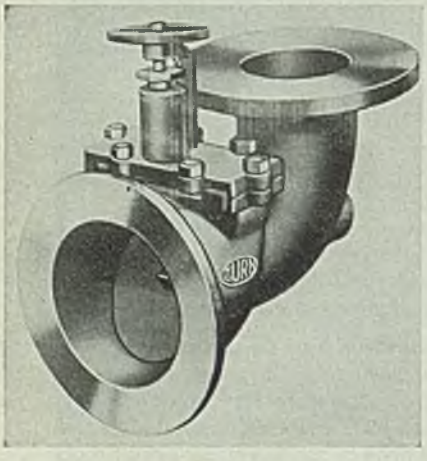
A new bending machine attachment capable of bending any wrought iron or steel pipe ⅜ to 2 in. to 180 degrees is announced by Tal's Prestal Bender Inc., Milwaukee. It is not necessary to stop machine to move or shift pipe. Bending is as readily and easily performed as bends made to a lesser radii. Illustration shows bender completing a 180 degree bend.



Steel 6/10/46; *Item No.* 9246

Check Valve

Discharge check valve, designed to give protection against back-surge of discharge lines carrying steam, sludge, waste water and other waste liquids in gravity flow installations is announced by J. A. Zurn Mfg. Co., Erie, Pa. Units feature a swing check flap suspended from a full floating pin fulcrum to insure positive full surface contact between ground face of flap and seat to eliminate fouling. Flap can be removed and replaced.



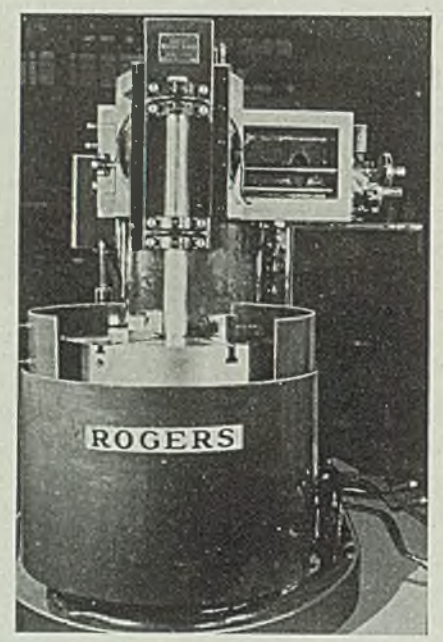
Valves may be operated with or without a manual control or with an extension shaft or flexible cable from an access box. They are available with 180, 105, or 90 degrees bodies of cast bronze, steel, semi-steel, cast iron and alloyed metals for corrosion resistance.

Steel 6/10/46; *Item No.* 9315

Boring Mill

A new boring mill for a special boring operation is announced by Rogers Machine Works Inc., 1807 Elmwood avenue, Buffalo.

It is a modified standard, "Perfect 36" vertical turret mill built to perform difficult boring operations. The heavy bar arrangement and 3-jaw combination chuck illustrated, are for single-operation work not requiring turret.



Steel 6/10/46; *Item No.* 9131

Quenching Press

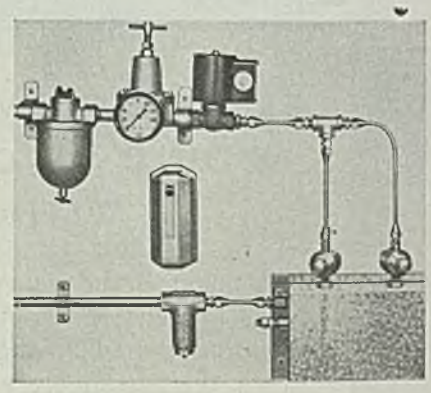
Gleason Works, 1000 University avenue, Rochester, N. Y. announces a new No. 16 quenching press for holding and quenching heated gears and other parts. Pre-heated piece is clamped between upper and lower dies and oil circulation is carefully controlled to assure uniform hardness.

Built-in pumping system and oil reservoir reduces the external oil supply to approximately 35 gpm, while providing an oil flow through die as high as 225 gpm. Work and dies are changed quickly and easily by use of a sliding lower die mechanism which automatically swings out from under upper die. The complete quenching cycle is automatic and is controlled from front of machine. Machine is air operated for die pressure with electric pump and torque motors.

Steel 6/10/46; *Item No.* 9284

Humidifying Unit

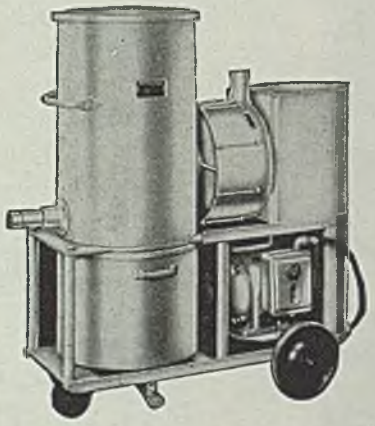
New industrial humidifying unit offered by Spraying Systems Co., 4021 West Lake street, Chicago, is a compact unit delivered ready for installation. It produces a finely atomized humidifying spray with its two or four nozzles and humidistat control. Nozzles can be set at various angles to increase efficiency of moisture distribution. Compressed air is utilized to produce an exceedingly fine, round spray. A complete 2-nozzle unit is illustrated.



Steel 6/10/46; *Item No.* 9257

Vacuum Cleaner

Invincible Vacuum Cleaner Mfg. Co., Dover, O., is announcing an improved 5 hp model industrial vacuum cleaner, the Industrial Master Truck. To make unit more compact, length, width, height and weight have been reduced. Motor mounting is reversed from above vacuum producer, eliminating two castings and putting vacuum produced directly in line with dust tank.



Dirt container capacity is increased from 2 to 3 cu ft and filter area is in-

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 129.)

Efficient means of selection—control in manufacture that leaves nothing to chance—economical, lasting sureness of performance—these are some of the winning qualities that swing the odds solidly in favor of peak production efficiency when you use Simonds Abrasive Wheels. Thousands of combinations of various types and sizes of grain in every required structure and bond make up the complete line of Borolon* (aluminum oxide) and Electrolon* (silicon carbide) products for all your production and tool room needs. For roughing, cutting, snagging or finishing, for effective, long lasting performance on any material from steel to plastics, Simonds Abrasive Wheels are your best bet. Grinding wheels of every size and shape; Segments, Mounted Wheels and Points; Grains, Bricks and Sticks give new economy and long lasting efficiency when used on the jobs for which they are intended.

You will find Simonds Abrasive distributors, located in all principal cities, eager and ready to help you select the particular Borolon and Electrolon product adapted to every specific job.

*Time-honored Borolon and Electrolon Abrasive products are now distinguished by the name Simonds.

SIMONDS ABRASIVE CO. *is a Division of*

SIMONDS SAW AND STEEL CO.

Other affiliated companies:

SIMONDS SAW AND STEEL CO. · SIMONDS STEEL MILLS

SIMONDS ABRASIVE CO.

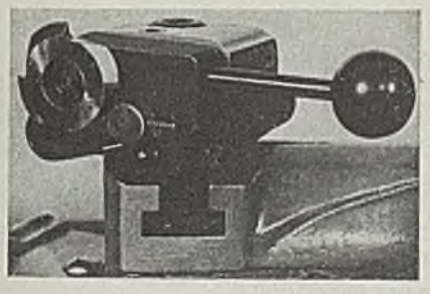
SIMONDS ABRASIVE COMPANY, PHILADELPHIA 37, PA. DISTRIBUTORS IN ALL PRINCIPAL CITIES

creased to 3554 sq in. Performance has been increased from 76 in. of vacuum to 83 in.
Steel 6/10/46; *Item No.* 9381

Threading Tool

A formed threading tool arrangement for chasing external threads is now available for the Retract-A-Tool manufactured by Foulk Mfg. Co., 4208 Airport road, Cincinnati.

The replaceable 4-edged tools can be obtained in five standard sizes with proper



flat on all edges for 32-18, 16-11, 10-9 and 8 threads per inch or with one edge arranged for each thread range. They can be sharpened on any tool grinder and readjusted to proper center height by a stake adjusting screw.

Retract-A-Tool automatically snaps tool away from work at end of each threading cut at precisely the same point, allowing increased spindle speeds without danger of tool digging into work.
Steel 6/10/46; *Item No.* 9232

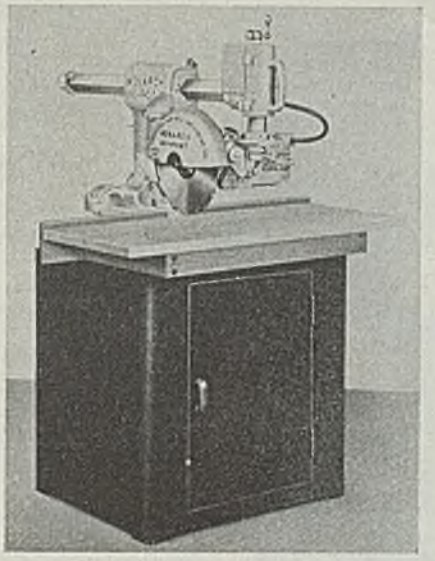
Layout Protractor

Developed for making extremely accurate layouts for use on optical projectors and form grinders, the layout protractor offered by Engineers Specialties Division, Universal Engraving & Colorplate Co. Inc., 980 Ellicott street, Buffalo, N. Y., is divided into increments of 10 min.

Composed of ¼-in. beveled plate glass, the ruling is on the under side in actual contact with layout being produced. The overall size of protractor is 13¼ x 7½ in. It comes in a lined hardwood case.
Steel 6/10/46; *Item No.* 9256

Radial Saw

A new lightweight portable 12-in. radial saw has just been added to the Monarch Uni-Point line of woodworking ma-



chinery, manufactured by American Saw Mill Machinery Co., Hackettstown, N. J. Made principally of light, nonrusting magnesium, the unit complete with carrying frame and 1½ hp electric motor weighs approximately 200 lbs. It has a 3 x 16 in. crosscut and 20½-in wide ripping capacity. Attachments may be installed for notching, routing, shaping, dadoing, sanding, boring and other jobs found in the pattern shop.
Steel 6/10/46; *Item No.* 9314

Automatic Switch

New switch for automatic sorting of small parts is announced by Micro-Switch Division of First Industrial Corp., Freeport, Ill. It has a repeatable accuracy of 0.0001-in. When solenoid is de-energized, plunger assembly descends by gravity

under control of air dash pot. Point at which plunger is stopped by work beneath determines whether neither switch or one or both switches are operated. A timer in electrical circuit controlled by these switches operates an air blast to blow work into bins, or electric lamps may be used for visual indication of results.
Steel 6/10/46; *Item No.* 9309

Reversing Contactor

A new No. 135CXX heavy-duty reversing contactor announced by Struthers Dunn Inc., 1321 Arch street, Philadelphia, is suited for control operation on small hoists, door operating devices, machine tool cross feeds and other applications.

Contactor is designed for use with

"I see what you mean— let's buy these light ones"

That's magnesium you've got there, young lady! That's what makes those field glasses so light . . . so handy . . . so nice to hold and use. Another new and effective application of this lightest metal! They'll be on the market soon—made by one of the many modern manufacturers with whom Dow, as America's leading magnesium producer, cooperates. You'll be seeing products of many types, made amazingly lighter, of magnesium. And you'll see how quickly people learn to respect magnesium for its strength and dependability, too. Yes, you'll hear it more and more: "I see what you mean —let's buy these *light* ones." And you'll say it, too!

Ready... to make products move!

MAGNESIUM

LIGHTEST OF ALL STRUCTURAL METALS

Dow's magnesium production provides manufacturers with a dependable source of this lightest structural metal in all its forms.

Further support to product manufacturers is available from the diversified magnesium fabricators with whom Dow closely cooperates.

Aircraft wings made entirely of magnesium are included in the long list of industrial applications and consumer products now in use.

MAGNESIUM DIVISION • THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN • New York, Boston, Philadelphia, Washington, Cleveland, Detroit, Chicago, St. Louis, Houston, San Francisco, Los Angeles, Seattle

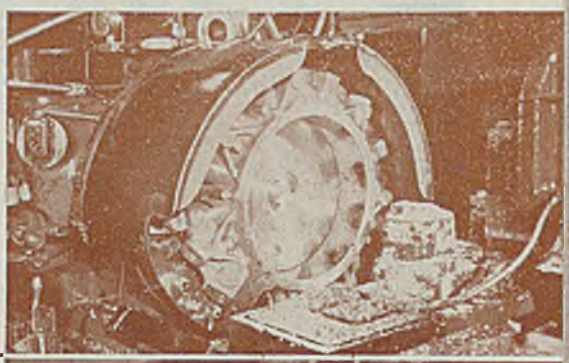
This is a reprint of a Dow magnesium advertisement which appears in full color in national magazines reaching millions of readers in all parts of the country.

Magnesium makes products move

There's fresh new sales appeal for products of magnesium! They have just the kind of modern features everybody looks for nowadays. Magnesium gives them *lightness* unmatched by other common metals . . . a lift that makes them *move* in more ways than one! Yes, magnesium moves merchandise. And in the factory it speeds production, too. Foundrymen, die casters, mill operators, manufacturers—they know magnesium can save them time and labor and power. Easy to handle, easy to work, it's doing just that in many a modern plant. New applications that make the most of magnesium are hitting the market with the combined impact of these advantages . . . in sales . . . in production.

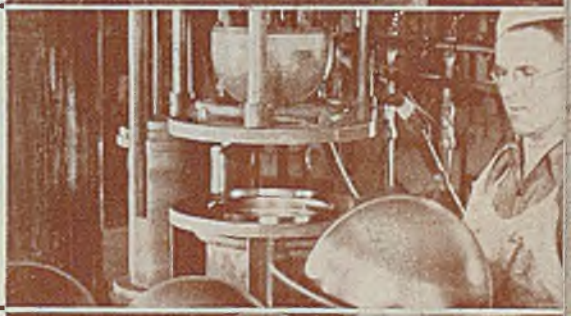
in the store . . . in the shop

MACHINING MAGNESIUM is commonly done at the maximum speeds of modern machine tools. Magnesium permits heavier depths of cut and higher rates of feed. Cutting tools stand up exceptionally well, too, and there's an additional saving in the power needed to remove a given quantity of magnesium by machining.



WELDING by all common methods is widely used in the manufacture of magnesium products of many types. Modern manufacturers are following well developed processes in joining magnesium by gas, arc, spot, and flash welding. The welding method employed on each specific product is governed by the type of joint and by service considerations.

FORMING operations with magnesium produce deep drawn parts of many kinds. Cylindrical cups, for example, are commonly drawn to a depth of 1½ times their diameter in a single draw by this hot forming method. This reduction in number of draws greatly decreases tool costs and manufacturing time.



HANDLING of parts and products is materially lightened wherever magnesium is used as a production metal. There's a notable lessening of fatigue and a corresponding economy in manpower in many a manufacturing operation with lightweight magnesium. These factors can add up to increased production volume and reduced costs.

MAGNESIUM DIVISION • THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

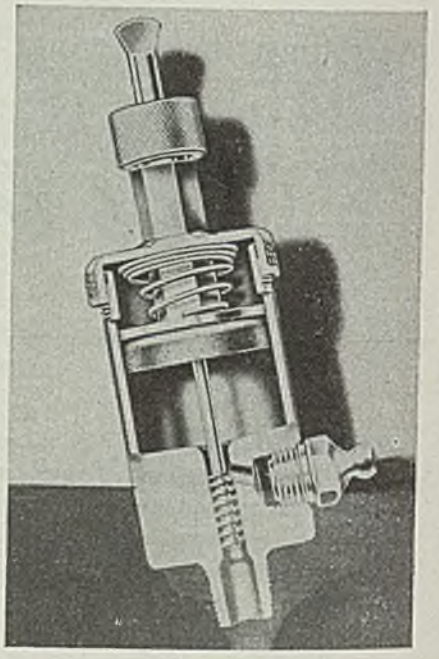
polyphase motors up to 1 hp, single-phase motors to ¾-hp, and is available from 110 to 600 v ac.

All contacts, terminals and coil leads are accessible from front without removing parts, and all contacts are interchangeable. Contactor measures 5¾ x 4 x 1⅞ in., weighs approximately 2½ lb.

Steel 6/10/46; *Item No.* 9161

Bearing Lubricators

Gray Co., 60 Eleventh avenue, N. E., Minneapolis, announces production of Gun-Fil lubricators, which automatically



dispense oil or grease in a measured, uniform flow to moving bearings, and stop when bearing becomes motionless. Offered in four sizes, the pressure-filled units have lubricating capacities ranging from ½ to 8 oz. Six interchangeable valves exert varying degrees of feed on greases of different densities.

Steel 6/10/46; *Item No.* 9267

Gage Blocks

A new acid-resisting gage block for use in the shop or inspection department is introduced by DoAll Co., Minneapolis, Minn. Of Doalloy, a wear resistant alloy having expansion characteristics similar to steel, the blocks may be used under any temperature conditions without danger of change in size or flatness.

Blocks of 0.250-in. and smaller are of solid Doalloy, larger blocks having an alloy wear surface and a chemically treated steel core. Greasing and degreasing during regular usage is not necessary.

Steel 6/10/46; *Item No.* 9139

Special Veeder-Root Counter built into Pratt & Whitney's Electrolimit Gage.

How can they COUNT on the thickness of a sheet of steel?

FROM HIS PULPIT, this rolling-mill operator can see at any moment whether there is any variation . . . *even down to 0.0001"* . . . in the thickness of the steel sheet passing between the rollers in front of him. Nor does this take "second sight" or "X-ray eyes." For facing him is a Veeder-Root Counting Device, built-in as an integral part of an electrolimit gage housed in alloy steel of low thermal expansion. This counter is pre-set to the space between the rolls. And when these rolls are in contact with the steel strip, the operator gets a continuous *direct*, micrometric reading which indicates in decimals any variations in the strip passing by.

So it's easy for him to keep everything under constant *Count*rol . . . to keep himself free from the nerve-frazzle of threatening errors, eye-fatigue, and damage to his equipment. In fact, in *all* precision operations, this is the trend in micrometric measurement. . . . direct, decimal readings that are plain and unmistakable. And *you* can count on Veeder-Root to give you the same *Count*rol as here . . . facts-in-figures you can count on to tell you the truth, protect your profits, save you time. Write.

The Counting House of Industry

VEEDER-ROOT INC.

Hartford 2, Connecticut

In Canada: Veeder-Root of Canada, Ltd., Montreal
In England: Veeder-Root Ltd. (New address on request)

Heat Exchangers

(*Concluded from Page* 90)

backward and forward one station, driven by cam action.

After washing in a caustic solution and being thoroughly dried, cups are pressed into the central exchanger assembly which contains 34 cups on a hydraulic press of special Servel design. It has horizontal action, and operates on 400 psi air pressure. Cups are nested on rod, as in Fig. 8, or stacked through center hole that has no fin. Rod is clamped in press fixture by operator, and ram presses group of exchanger cups. Assembly must be absolutely leak-proof.

These central sections then are submitted to an oxidizing treatment in a special gas-fired oven where oil is burned off. All oil used in metal fabrication of Servel gas refrigerators also must be water-soluble, as absorption system will not tolerate oil. This oxidizing treatment also tends to increase strength of union, or seal, of these cups in central section assembly. Sections are racked in special steel cars for heat treatment, and remain in oven to soak for 60 min at 800°F (Fig. 9). Cooling is by air blast.

Inner or central gas exchange tube then is assembled into outer exchange tube (Fig. 10). Latter is of drawn 14 gage 1⅞ in. diameter steel. Bottom is swedged to conform to bottom cup angle. Special blanking and forming treatment is given to a number of exchanger cups, after their seven-station fabrication, to supply proper bottom contour for central section which fits into swedged end of outer exchange tube. After inspection, completed gas exchanger passes to welding department for final assembly.

Three veteran Servel engineers supervise respective operations contributing to the success of gas heat exchanger fabrication program. They are W. R. Campbell, superintendent of gas refrigerator and water heater production; H. W. Ferguson, superintendent of tooling; and W. I. Winnebald, assistant superintendent of tooling.

Viscosity Meter

A new continuous Viscosimeter constructed to permit observation of viscosity values existing in a moving fluid steam under full line pressure, is announced by Fischer & Porter Co., Hatboro, Penn. It is offered in simple indicating form, or arranged for continuously recording viscosity values on a 24-hour chart, or for controlling fluid viscosity by automatic blending or heating means. Instrument is said to be valuable for blending lube oils, indicating end points in plastic processes and in maintenance of constant fuel oil viscosity for oil burner operation.

WHEELABRATORS

Proved by Performance

in nearly 3000 plants

2-10 MACHINES USED BY 322 PLANTS

10 MACHINES

USED BY
Owens-Illinois Can Co.
Auto Specialties Mfg. Co.
Cleveland Graphite Bronze Co.
Unitcast Corp.
Dayton Mall. Iron Co.
Walworth Company

11 MACHINES

USED BY
American Brake Shoe Co.
Packard Motor Car Co.
Ohio Rubber Co.
U. S. Steel Corp.
A. O. Smith Corp.
Allis-Chalmers Mfg. Co.

12 MACHINES

USED BY
American Radiator and Standard Sanitary Co.
Goodyear Tire & Rubber Co.
Eastern Mall. Iron Corp.
Kelsey-Hayes Wheel Co.
Crucible Steel Co. of America

14-20 MACHINES

USED BY
Bendix Aviation Corp.
Campbell, Wyant & Cannon
Magnus Metal Division Associated Spring Corp.
Wyman Gordon Co.
Spicer Mfg. Corp.

20-25 MACHINES

USED BY
Thompson Products, Inc.
Borg-Warner Corp.
Firestone Tire and Rubber Co.
Eaton Mfg. Co.
B. F. Goodrich Co.
U. S. Government

25-50 MACHINES

USED BY
International Harvester Co.
General Electric Co.
Timken Roller Bearing Co.
National Mall. & Steel Cstgs.

50-173 MACHINES

USED BY
General Motors Corp.
Chrysler Corp.
Curtiss-Wright Corp.
Ford Motor Company

THE WHEELABRATOR
WHAT IT IS AND WHAT IT WILL DO

New, informative book gives complete, concise information on all phases of airless blast cleaning. Included are descriptions of the Wheelabrator principle and mechanism; types and sizes of machines; list of typical products Wheelabrated; types of finishes; performance data; and a wealth of other information. Ask for Catalog No. 74

American
FOUNDRY EQUIPMENT CO.

509 SOUTH BYRKIT ST.
MISHAWAKA, INDIANA

RAPID SPOT WELDING

ON AN ASSEMBLY LINE

T-W Portable Gun Spot Welders

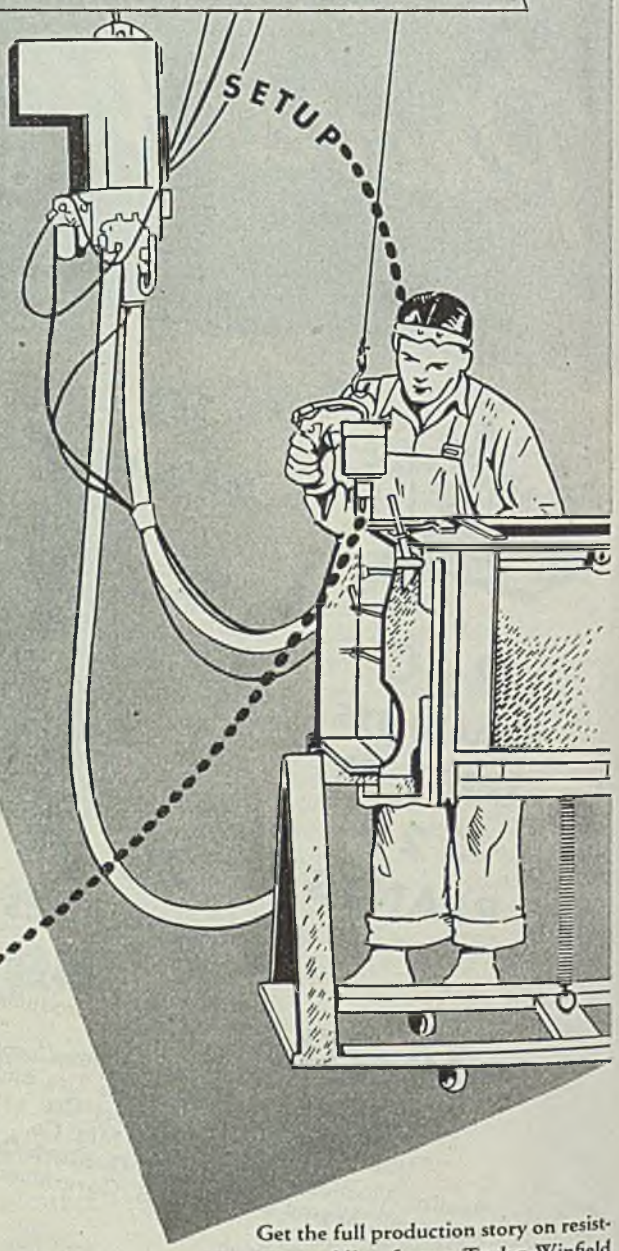
This assembly line can be applied to many products and parts where metals have to be joined together . . . refrigerators, sink cabinets, railway coaches, automobiles, and in this case—stoves.

Each jig is mounted on a dolly. The first operator spot welds certain parts, then rolls the dolly to the next man, who in turn moves the dolly to the third and fourth operators. Each one has specific spot welds to make.

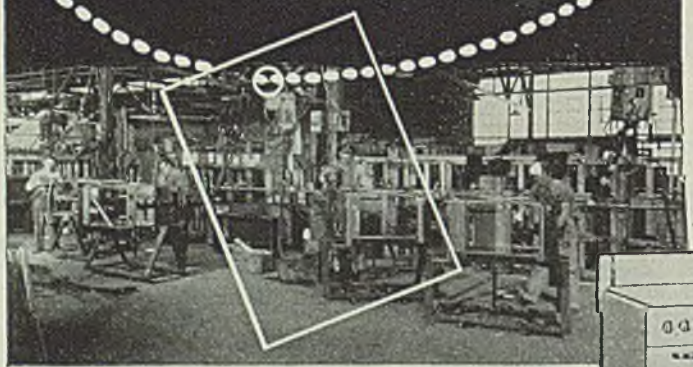
Portable gun spot welders make possible this fast production operation. Each gun is designed for specific work, such as corners, frames, and various hard-to-get-at places. Taylor-Winfield makes many and varied designs of guns for simple as well as intricate or out-of-the-ordinary spot welding jobs.

The advantages are numerous. More production with lower unit costs . . . less weight in the finished product with increased strength and durability . . . highest possible rigidity . . . elimination of costly punch and die work such as piercing holes for bolted or riveted construction.

Most important, portable gun welders can be used to weld *at many angles* and on almost any shape of product.



Get the full production story on resistance welding from a Taylor-Winfield sales representative, available through letter or phone call.



The superintendent of the above production line has this to say about resistance welding:
"For multiple joining of our sheet metal parts of different gauges and shapes, resistance welding is the best known method. It leaves little to be desired."

One of the newest gas range models manufactured by Florence Stove Company.

The TAYLOR-WINFIELD CORPORATION
WARREN . . . OHIO

TAYLOR-WINFIELD RESISTANCE WELDERS

Increasing Production

(*Continued from Page* 93)

double fixture was also used on this operation, enabling the operator to unload and load one station while the cut was being taken in the other station.

The milling operation, shown in Fig. 6 is done with four low-cost standard carbide tipped tool bits similar to those used for turning on lathes. The bits are held in a holder made of machine steel and each bit is held in place with two socket head set screws.

By allowing each bit to project slightly lower than the one before it and by positioning the slots in the holder so that the first slot is ½-in. from the edge, and each succeeding slot ⅛-in. further toward the center, four separate cuts are taken with each revolution of the cutters.

As the section of the casting on which the cut was taken was rather thin, pressure of the cutters against the work had to be kept to a minimum to avoid distortion. By using this method of stock removal, cutting pressures are kept low and removal of stock is extremely fast.

The job had formerly been done with a 10-in. diameter high speed steel face mill. The feed was very low and the speed comparatively slow. Comparison of feed and speed is shown below:

High Speed Steel Face Mill 10-in. Diam., surface feet per minute ½ ipm table travel	68
Carbide Mill, 4 Teeth, 8-in. Diam., surface feet per minute 6 ipm table travel	400

Grinding of the carbide mill is much easier and faster than the 10-in. face mill. The four bits are removed and offhand ground on a diamond wheel. Resetting of the bits in the holder is done by using a small template to locate each bit to the proper depth in relation to the others. All bits are ground with a side cutting clearance of 8 degrees, end cutting clearance 6 degrees, side rake 6 degrees and back rake zero. Tool life increased 100 per cent and grinding costs were reduced 50 per cent.

Forming Bomb Fuze Parts: Carbide form tools aided materially in producing the 5,500,000 bomb fuzes made by East Springfield plant during the war. The two parts shown in Fig. 4 were formed on Cone automatic screw machines, using the form tools also depicted. The part shown on the extreme left of the photograph is made of half hard brass and the part on the extreme right, of aluminum.

The machine speeds used with high speed steel tools were not changed, yet production increased 6000 pieces per week. The increase in production was due to the reduction in down-time,

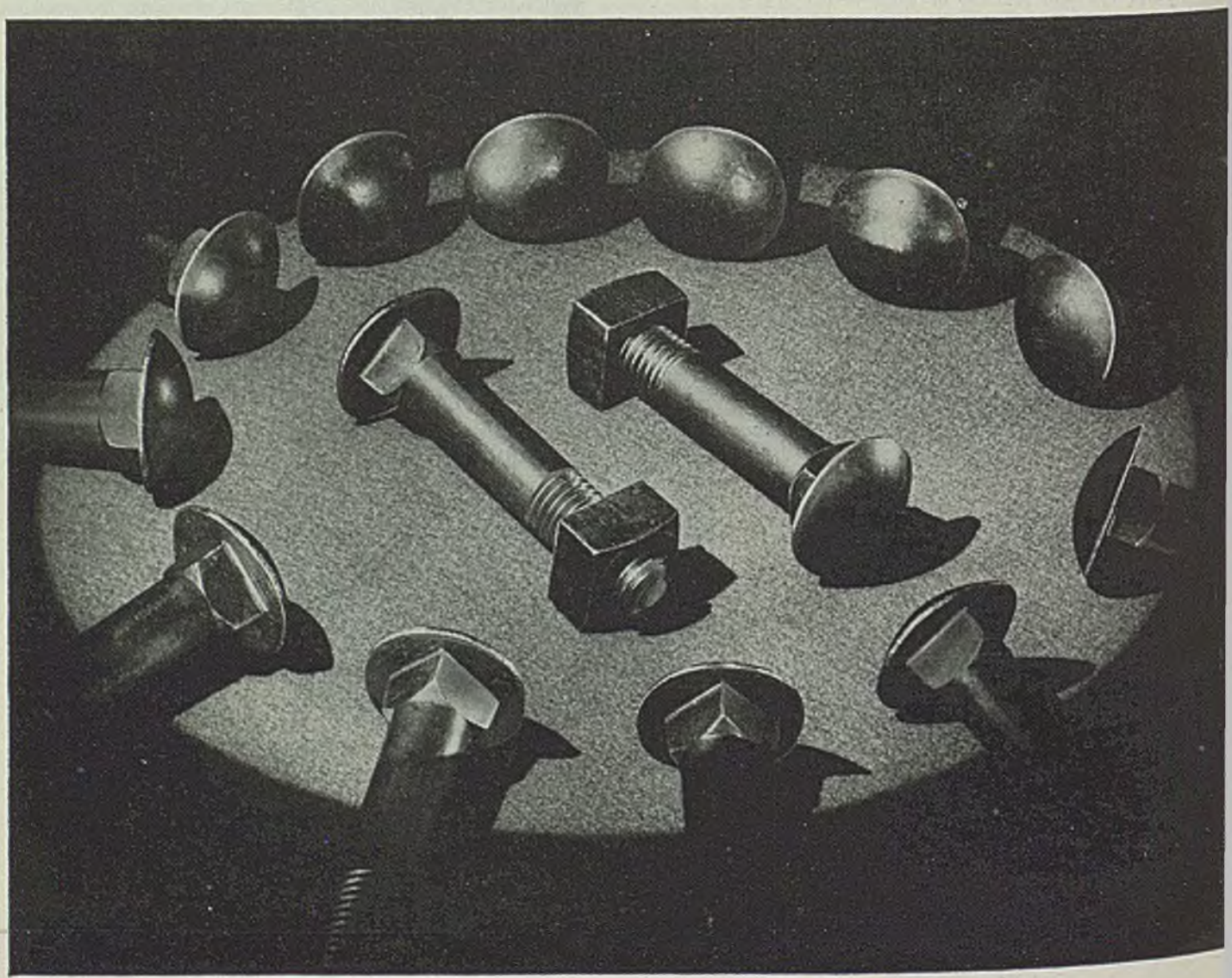
RB&W carriage bolts

KEEP THEIR HEADS

The art of making a good carriage bolt lies largely in the method of forming the head. By extremely close control over the amount of metal collected in the first "bulb" (the first cold-heading operation) — making sure that the "bulge" of metal is evenly distributed and concentric and that the continuity of flow lines is preserved — RB&W produces a carriage bolt of maximum soundness in the head.

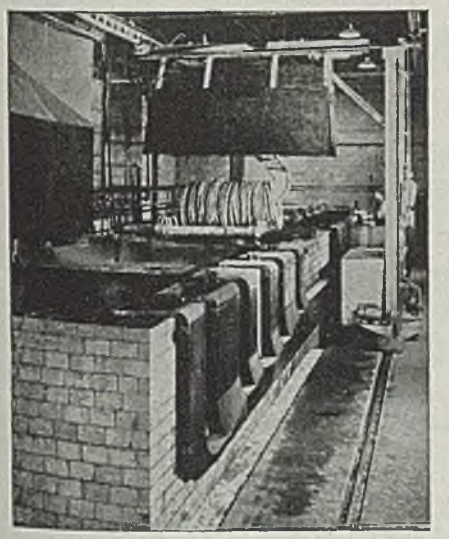
This close control . . . plus the careful preparation of material to insure accurate, round shanks and the use of the same thread-forming methods as used for machine bolts . . . results in a product of maximum utility.

RB&W EMPIRE Carriage Bolts — like the other products in the broad quality line of bolts, nuts, screws, rivets and allied fastening products — are widely used by the great names in American Industry . . . firms that find in RB&W's 101-year history of progress their assurance of finest quality — dependable strength and accuracy and fine appearance.



This photograph suggests the broad range of fasteners manufactured by RB&W. From stove bolts to Hi-Carbon Heat-Treated Cap Screws, the energies of development, manufacturing and quality-control departments are directed toward creating an *engineered* fastener — one that can be depended upon by the user for fast assembly, assured holding power, and appearance that will be a credit to the product on which it is used.

BOLTS BY BILLIONS — RB&W maintains stocks of raw material that are large enough to provide flexibility for a wide range of fastener production. This raw material is subject to careful analysis in RB&W's completely-equipped laboratory.



CLEANING AND COATING — RB&W draws its own wire to assure close tolerances vital to perfect cold-heading. Pickling — in this scientifically controlled cleaning department — leaves the wire free from mill scale, and provides opportunity to coat it properly for subsequent drawing and heading.

NUT FITTING AND PACKING—Fitting nut to bolt is a final inspection of the product, and provides protection for the threads during shipping and handling. From these automatic machines, assembled bolts and nuts are put into durable cartons and packages labeled for maximum visibility.

FAST SERVICE — In RB&W's three plants (Port Chester, N. Y., Coraopolis, Pa., and Rock Falls, Ill.) immense stocks normally are carried in a broad variety of types, sizes and finishes. Modern handling equipment contributes to rapid shipment, full quantities, and accurate markings.

101 YEARS *Making strong the things that make America strong*

PLANTS AT: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill. SALES OFFICES AT: Philadelphia, Detroit, Chicago, Chattanooga, Los Angeles, Portland, Seattle. DISTRIBUTORS from coast to coast. By ordering through your distributor, you can get prompt service for your normal needs from his stocks. Also, the industry's most complete, easiest-to-use catalog.

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

which had been caused by the frequent regrinding and adjusting necessary with these tools. High speed steel tools had to be reground every 24 hours and several adjustments made to maintain size during this time.

During the first tests with the carbide form tools they were left in the machine for 28 days, performing satisfactorily during that time without being reground. Later, an arbitrary time of 15 days between regrinds was established. This insured a keen cutting edge during the run and allowed a minimum amount of stock removal when regrinding.

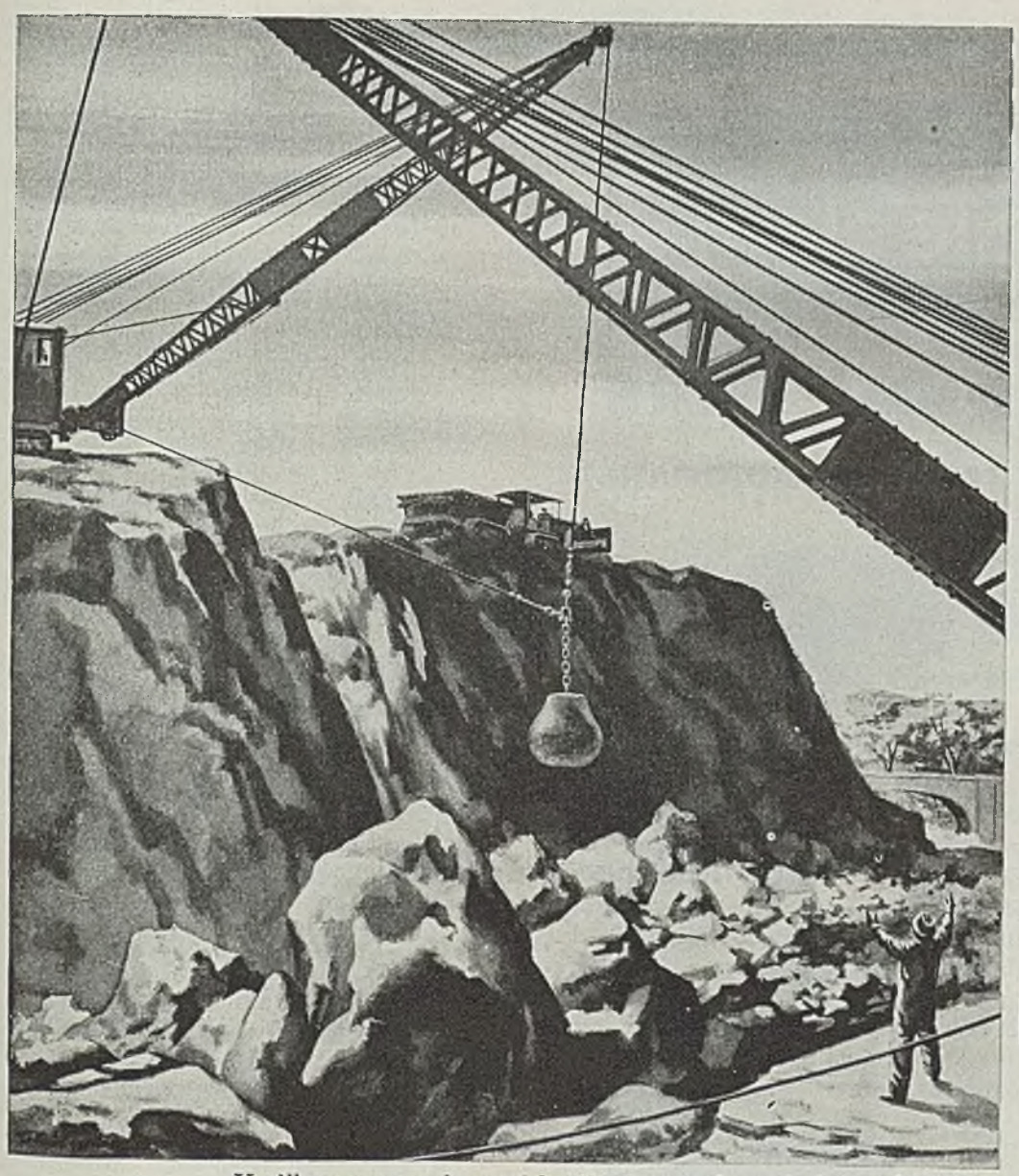
Draw Dies for the Insecticide Dispenser: From September, 1942, to August, 1945, there were produced for the armed forces 25,026,110 insecticide dispensers. Carbide draw dies for drawing the metal shell which holds the insecticide contributed to this production record by reducing lost man-hours and improving product quality. Completed steel and carbide draw die are shown in Fig. 1.

Prior to the adoption of carbide as a die material, tool steel was used. The shell is drawn from a 6 1/32-in. diameter blank of 0.044-in. thick steel. The finished shell measures 2⅞ in. in diameter and is 2⅝-in. long. It was possible to produce 63,000 shells with the tool steel die before it was worn oversize and had to be shrunk and reground. Shrinking and regrinding could be done only four times before the die was discarded; therefore, the maximum number of pieces it was possible to produce was approximately 250,000. In addition to the shrinking and regrinding, many hours were spent each week polishing "bugs" from the die to insure shells which would be free of die marks. Scratches on the shell cause a weakness in the material which must be avoided due to pressure of 80 psi at room temperature created by the insecticide propellant (Freon-12). With the introduction of carbide, hand polishing was eliminated and shells were free of die marks.

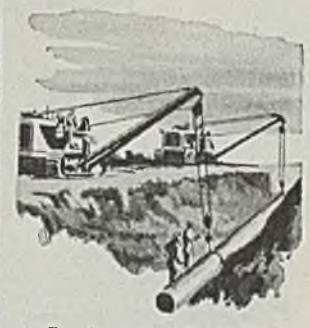
The initial cost of the carbide die was greater than that of the tool steel die. However, in the long run, carbide proved to be much lower in cost as shown by the following data:

Carbide die cost per 100,000 shells (Based on 5,000,000 shells produced with this die to date)	$8.00
Steel die cost per 100,000 shells (Based on maximum 250,000 shells produced with this die)	$64.00
Savings per 100,000 shells	$56.00

During experiments with the carbide die, it was found necessary to make the shank of hardened tool steel. Drawing the blank over the surface of a die with a soft shank has a tendency to pick up



You'll see more and more jobs like these as the nation's new highway and airport building program gets under way. Skull-crackers and draglines use a lot of Preformed wire rope to get the material out.



Laying pipe lines is a fast job today with machines and Preformed wire rope. Improved methods and improved wire rope make the work easier and faster.

Do you worry when you see great weights lifted by shipyard cranes? The operators don't, for they know the Preformed wire rope will hold.

Here you see Post-War Progress in Action...

Wire Rope Makes it Possible

For the busy post-war days ahead, machines are rigged with Preformed wire rope. It lasts longer. It reduces time lost for replacement. It handles easier. It is safer. These operators and the front office agree Preformed is the rope for post-war progress.

ASK YOUR OWN WIRE ROPE MANUFACTURER OR DISTRIBUTOR

material from the shank and drag it over the carbide area where it adheres and causes scratches on the work.

Production of the insecticide dispenser is continuing for peacetime use and the carbide draw die is still functioning perfectly. Based on the data available now, we expect to produce 10,000,000 shells with the carbide die before the maximum wear of 0.005 is reached.

Spring Winding: Millions of phosphor bronze springs were produced each month for use in bomb fuzes, gyroscopic motors and various other devices. These were made on a Sleeper-Hartley spring winding machine, using wire guides made of tool steel.

Each wire guide consists of two pieces of steel, one being flat and approximately ½ x ⅜ x ⅛-in. in size and the other a cylindrical piece of steel ¼-in. in diameter by ¾-in. long. Two grooves 0.0075-in. in radius are ground in the flat piece and one groove of the same radius is ground on each end of the cylindrical piece to accommodate wire 0.015-in. in diameter. When one groove is worn oversize, the guides are turned over and the other groove is used. Ten thousand phosphor bronze springs was the quantity produced with a set of steel guides, and keeping a sufficient number on hand became a problem.

By brazing a strip of carbide on each end of the cylindrical guide and on top of the flat guide shown in Fig. 5, the figure of 10,000 springs increased to 1,000,000 springs with only 0.00025-in. wear on the carbide. With wear on guides of this type so slight we expect to produce several million more springs before having to discard the guides.

New Resin Binder Eases Removal of Core

Uformite 580, a newly developed synthetic urea-formaldehyde resin binder that improves the core sand used in casting such metals as aluminum and magnesium has been developed by the Resinous Products & Chemical Co., Philadelphia. Its use requires no departure from standard preparational procedure.

This new resin is a dust-free, water dispersible powder which decomposes at the pouring temperatures of aluminum and magnesium much more rapidly than drying oils so that cores break down readily, facilitating removal of the core.

Advantages claimed are that it relieves the tendency to stick to core boxes, that boxes may be used continuously without cleaning, and that sands may be stored as long as 5 hours without loss in tensile strength or surface hardness. The low temperature, short bake properties of this resin mean marked savings in fuel and increased oven capacity.

Silver Alloy Brazing

(*Concluded from Page 94*)

Smoke Shell: The steel tube is silver alloy brazed to the cast iron base.

M-8 Unrifled Projectile: (Rocket) The burster tube is silver alloy brazed to the shell body; the nosepiece, to the shell body.

M-15 Hand Grenade: The adapter is brazed to the body and a spud to the burster well.

Anti-Personnel Mines (Land Mines): The tube is joined to the body with preplaced rings of silver brazing alloy.

Shell: Chemical shell (75 mm; 81 mm; 105 mm; 155 mm) for joining the adapter to the body and for brazing the open ends of the burster tube. Windshields for the 47 mm, 75 mm, 105 mm, and 155 mm shell are brazed to the shell bodies with preplaced rings of silver brazing alloy.

Machine Guns: Jackets of 40 and 50 caliber water-cooled and air-cooled machine guns.

40 mm Bofors Guns: Flash hiders on both the Navy and Army versions of the 40 mm Bofors gun are brazed to the barrel. Water jacket on the Navy Bofors gun is brazed into the gun barrel.

Torpedoes: Silver brazing alloys are used in the fabrication of parts and on piping and pressure lines; also in construction of the discharge tubes.

Anti-Tank Guns: Various parts, including solenoid housing and coil spool are assembled with these alloys.

Miscellaneous Gun Parts: The following gun parts are among the many being brazed. Silver brazing alloys are used on the 37 mm and 20 mm aerial cannons and on various other aircraft and artillery pieces: Torque tubes; fire-control mechanism parts; driving spring tube body; ring stop on tubular guide; range finder fittings; gun turret parts; gun sights (front and rear); solenoid clamps; gun mount parts; elevation mechanism parts; and gun mounting brackets.

It is an extraordinary and anomalous situation that in the manufacture of destructibles—guns, shells, bombs, hand grenades, etc.—it has been found best from the standpoint of both perfection and speed to use the precious metal, silver.

The same features offered by these brazing alloys and so urgently needed in wartime point to the reasons why this process of joining metals is equally valuable in normal production when economy is a more important factor.

—o—

Electrodes for welding nickel and nickel-copper alloys are now manufactured by Arcos Corp., Gulf Building, Philadelphia. Trade name Monend, electrode is used in welding wrought, cast or clad monel.

Steel Erection Method

(*Concluded from Page* 107)

tons of structural steel in this case.

This system of erection was developed by Van Rensselaer P. Saxe, a consulting engineer engaged in building hospitals of structural steel using arc welding, where elimination of noise was essential. He worked out the use of the experimental clip and seat in trying to eliminate shop-handling necessary to move heavy pieces to a layout man for punching or drilling holes. In erecting the structurals in the field it was found that work could be erected quickly, providing a more rigid structure than previously obtained.

Fluid Measurement Is Subject of New Handbook

A concise treatment of fluid measurement, including related factors, equipment, equations and computations in terms of steam, water, oil and gas flow, is offered in a new volume, "The Flow Meter Engineering Handbook," compiled and edited by Louis Gess and R. D. Irwin, flow meter engineering department, Brown Instrument Co., Division of Minneapolis-Honeywell Regulator Co.

The first chapters discuss principles of orifice meter measurement and orifice plate and differential connections, design details of flow meters, flow approximation tables, derivations of working formula, working equations, compressibility of gases, relationship between coefficient of discharge, viscosity of fluids and orifice calculations for steam, water, oil and gas flow.

Final chapters are given over to a summary of equations and nomenclature, changes for corrections in operating conditions and volume computations. Thirty-eight figures and 55 tables are included in the book's 151 pages, available from the company in Philadelphia, at $2.50 per copy.

Honan-Crane Announces Four New Products

A case history of Honan-Crane oil purification in the Steckel cold-rolling mills of Thomas Steel Co., Warren, O., is presented in the latest issue of "Clean Oil," published by the Honan-Crane Corp., 636 Wabash avenue, Lebanon, Ind., subsidiary of Houdaille-Hershey Corp.

This issue also discusses development of oil purification in recent years, present application, and the place of laboratory research in solving problems related to the subject.

In addition, there is an announcement of four new products, two sump cleaners and two coolant filters.

Clutch Lever Parts

(*Concluded from Page 96*)

for blanking and forming individual parts of assembly. Fig. 2 shows progressive blanking punch and die set which blanks out lever and latch complete with all necessary holes as first operation as shown in Fig. 3A. Second operation (Fig. 3B) uses a simple die to raise lever attaching arms. Lever handle is bent down by hand (Fig. 3C). We found that this preforming was easily done by press operator and resulted in elimination of a more complicated and costly die.

In Fig. 3D the attaching arms have been raised to their final position and legs have been preformed in one operation. Final forming operation completes part by closing legs to required position. Clutch lever handle, latch, latch spring and pin are shown in Fig. 3E, and completed assembly is shown in Fig. 3F.

With success of this method, we are now reviewing all parts of the tractor which lend themselves to fabricating by steel sheet stampings with the thought of redesigning in order to take advantage of lower cost and improved appearance offered by this method of production.

Electrode Offered for Building Up Carbon Steel

Abrasoweld AC, is a new hard-faced shielded arc electrode, which the manufacturer, Lincoln Electric Co., Cleveland, is offering for building up straight carbon steel, low-alloy steel or high-manganese steel with a self-hardening deposit to resist severe abrasion battering and impact. Although designed for alternating current, it is said to be suitable for use on both industrial and small welding machines and on direct current.

Moderate peening will increase hardness of weld metal as it is deposited from 20-40 to over 50 rockwell C, the manufacturer claims, thus leaving a cushion of softer metal beneath the surface which eliminates checking and flaking.

Another Lincoln product, Magnaweld A, has been improved and is again being manufactured for reclaiming worn austenitic manganese steel parts containing 11 to 14 per cent manganese. Intended for direct curent use, it can be used on alternating current industrial and small welding machines.

Recommended for flat work only, this electrode produces a flat bead, is air-toughening and is resistant to abrasion and impact. Having a hardness of 5 to 10 rockwell when deposited, the weld metal can have a hardness of 45 to 50 when cold worked.

Both electrodes are offered in 14 in. lengths and in various sizes.

the BUSINESS TREND

CLEARING AWAY of the soft coal and railroad strikes has brightened the outlook for industrial activity, and when figures are available for the week ended June 8 they will show production has responded to improved conditions.

Before this improvement got under way, however, the index of industrial activity had slipped to 98 per cent (preliminary) in the week ended June 1, low point in the soft coal strike period. This represented a drop of 34 index points or 25 per cent over the two months the bituminous mines were inoperative. Low mark during the steel strike early this year was 74 per cent.

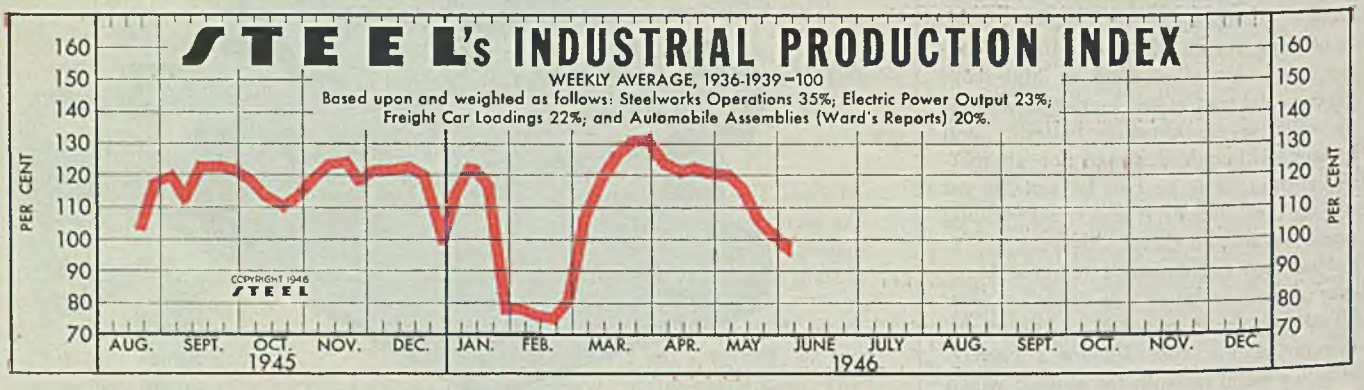
Although industrial production again is on the upgrade, the rate at which it will climb will depend to some extent on how rapidly numerous small work stoppages are resolved and how equitably prices are adjusted. Increased production in some industries will of necessity lag until a sizable flow of basic raw materials, such as steel, develops again.

AUTOS—Among industries pinched by the shortage of materials are automobile producers, which in the week ended June 1 made only 32,480 passenger cars, trucks and busses, lowest output since the week ended Mar. 9.

FRB INDEX—Reflecting effects of the soft coal strike, the Federal Reserve Board's index of industrial production for April declined to 164 per cent of the 1935-1939 average, compared with 168 per cent in March. However, the drop in coal output after Apr. 1 and the resultant curtailment in operations in some industries were offset in part by substantial increases in activity in the automobile and electrical machinery industries after wage disputes in them were settled in the latter part of March.

NEW BUSINESSES—A growing movement to enter into business is reflected in a Dun & Bradstreet study which shows the number of corporations chartered in the first quarter of 1946 exceeds by far the rate of incorporations for any preceding year on record. The previous peak occurred in 1929, from which time on there has been a gradual recession, with the low point being reached in 1942-1943. In 42 states, 32,567 stock corporations were organized in the first quarter of 1946, compared with 20,765 in the last quarter of 1945.

CASTINGS—Shipments of gray iron castings in March totaled 796,000 tons, highest monthly figure since June, 1945, and nearly 50 per cent over February, 1946. About half of the increase in March shipments over those of February was in molds for heavy steel ingots, which increased from 13,000 tons in February to 135,000 tons in March, a somewhat higher volume than the usual monthly shipments before the steel strike. Unfilled orders for castings for sale to the trade at the end of March totaled approximately 2,265,000 tons, 5 per cent above February.



The Index (see chart above): Latest Week (preliminary) 98 Previous Week 101 Month Ago 120

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)§	43	45	64.5	91.5
Electric Power Distributed (million kilowatt hours)	3,925†	3,942	4,012	4,203
Bituminous Coal Production (daily av.—1000 tons)	1,322	1,550	125	1,951
Petroleum Production (daily av.—1000 bbls.)	4,756	4,759	4,721	4,859
Construction Volume (ENR—Unit $1,000,000)	$71.9	$104.2	$108.8	$21.4
Automobile and Truck Output (Ward's—number units)	32,480	53,020	67,060	18,100

*Dates on request. §1946 weekly capacity is 1,762,381 net tons. 1945 weekly capacity was 1,831,636 net tons.
†Preliminary.

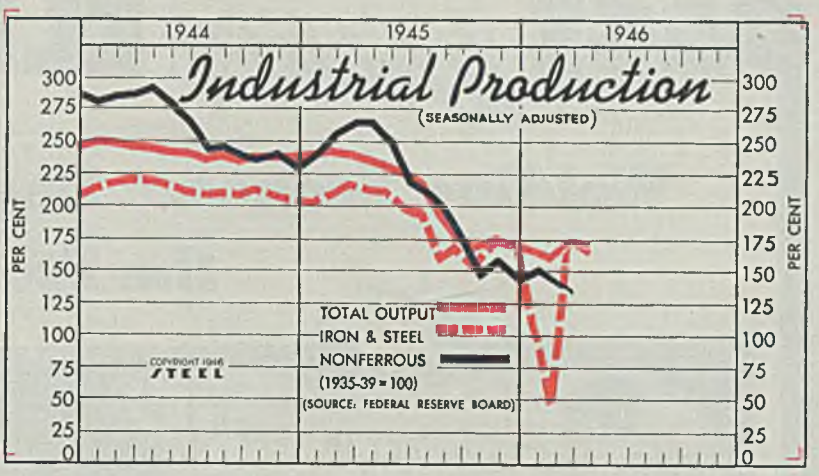
TRADE				
Freight Carloadings (unit—1000 cars)	660†	572	671	838
Business Failures (Dun & Bradstreet, number)	18	21	23	13
Money in Circulation (in millions of dollars)‡	$28,106	$27,961	$27,888	$26,500
Department Store Sales (change from like wk. a yr. ago)‡	+34%	+38%	+26%	+9%

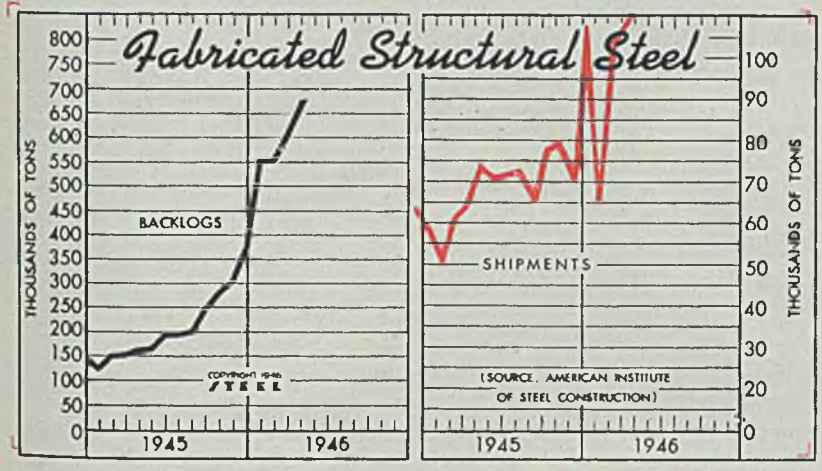
†Preliminary. ‡Federal Reserve Board.

Federal Reserve Board's Production Indexes

(1935-39=100)

	Total Production		Iron, Steel		Nonferrous	
	1946	1945	1946	1945	1946	1945
Jan.	159	234	105	197	150	240
Feb.	153	236	43	202	141	257
Mar.	168	235	169	210	133	265
Apr.	164	231	159	206	...	264
May	...	226	...	204	...	251
June	...	220	...	192	...	219
July	...	211	...	187	...	210
Aug.	...	187	...	155	...	198
Sept.	...	171	...	163	...	176
Oct.	...	163	...	146	...	147
Nov.	...	168	...	167	...	159
Dec.	...	164	...	165	...	144
Avge.	...	204	...	183	...	211





Fabricated Structural Steel

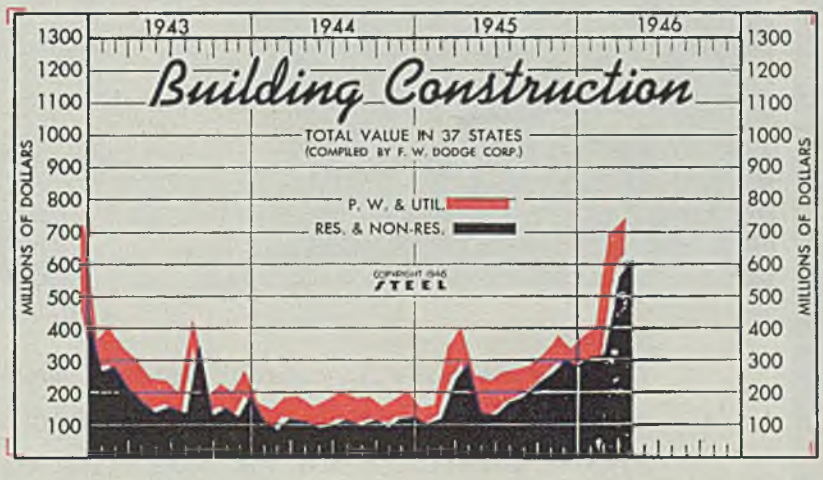
(000 Tons)

	Shipments			Backlogs		
	1946	1945	1944	1946	1945	1944
Jan.	107.5	57.0	35.2	552	124.4	113.1
Feb.	63.8	49.0	42.9	551	151.6	117.6
Mar.	102.8	59.5	41.4	605	153.3	106.3
Apr.	110.4	62.8	44.5	674	162.5	111.2
May	....	72.6	50.7	...	165.7	116.3
June	....	69.2	43.0	...	195.2	122.7
July	....	69.9	45.3	...	194.0	125.4
Aug.	....	70.6	55.2	...	201.1	130.4
Sept.	....	63.4	57.5	...	248.5	151.1
Oct.	....	76.6	61.6	...	282.8	174.4
Nov.	....	78.0	59.4	...	304.9	184.2
Dec.	....	68.8	61.3	...	375.2	142.5
Total	....	797.4	597.9	...	....	....

Construction Valuation in 37 States

(Unit—$1,000,000)

	Total	Public Works-Utilities		Residential and Non-Residential	
	1946	1946	1945	1946	1945
Jan.	357.5	50.2	39.8	307.3	101.2
Feb.	387.4	64.7	32.0	322.7	115.0
Mar.	697.6	143.6	90.6	554.0	238.3
Apr.	734.9	128.1	111.9	606.8	283.9
May	....	....	107.9	....	134.6
June	....	....	95.0	....	132.3
July	....	....	89.9	....	167.8
Aug.	....	....	77.5	....	186.1
Sept.	....	....	54.6	....	223.6
Oct.	....	....	61.1	....	255.5
Nov.	....	....	74.0	....	296.0
Dec.	....	....	51.0	....	279.7
Tot'l	....	....	885.3	....	2,414.0



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$10,637	$11,838	$12,418	$8,503
Federal Gross Debt (billions)	$273.0	$273.0	$272.9	$239.2
Bond Volume, NYSE (millions)	$16.0	$19.7	$34.4	$47.4
Stocks Sales, NYSE (thousands)	7,247	6,338	5,446	6,795
Loans and Investments (billions)†	$64.2	$64.1	$65.3	$57.5
United States Gov't. Obligations Held (millions)†	$45,965	$45,871	$46,935	$42,897

†Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$63.54	$63.54	$63.54	$58.27
All Commodities†	110.7	110.9	109.6	105.9
Industrial Raw Materials†	124.2	124.6	123.0	118.3
Manufactured Products†	106.2	106.1	105.1	102.1

†Bureau of Labor Statistics Index, 1926=100.

PAGE *Welding* ELECTRODES

Welding Economy Begins in the Front Office . . .

The right electrode . . . correct welding technique—these add up to economy in production welding. Page offers both: A complete line of electrodes and gas rods (with emphasis on PAGE-Allegheny stainless steel)—plus the benefit of the experience of PAGE selected distributors and PAGE Service Engineers. For uniformly high quality electrodes and rods and information about their most efficient use—get in touch with your PAGE distributor.

ACCO

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.

TRADE MARK

PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

HELPFUL LITERATURE

1. Tractors

Caterpillar Tractor Co.—32-page illustrated booklet "Men of Vision" relates history of company from first work on combined harvester through continued advancement of steam powered wheeled traction engines, steam powered track type tractors, gasoline engine track type tractors, diesel powered tractors, diesel engines, electric sets, marine engines, motor graders and line of earthmoving equipment.

2. High Speed Steel

Latrobe Electric Steel Co.—8-page illustrated booklet describes Desegatized high speed steel in which the steel is freed from usual carbide segregation. Advantages gained from process by user of steel are outlined.

3. Overhead Conveyors

Lamson Corp.—20-page illustrated bulletin No. 645 entitled "Utilize the 'Air Rights' of Your Ceilings . . . "outlines savings of time, space and handling costs obtainable from overhead chain conveyor installations. Typical installations for manufacturing operations, stockrooms and warehouses, and packing and shipping departments are shown.

4. Furnace Atmospheres

Lindberg Engineering Co.—12-page illustrated bulletin No. 190 is entitled "Lindberg Controlled Atmospheres for Heat Treating." Hydrizing is discussed. Equipment for producing special atmospheres is described and properties of typical atmospheres are outlined. Brief information is given on heat treating furnaces.

5. Hydraulic Pumps

Marco Co.—10-page illustrated bulletin No. 25 discusses features of Flow-Master Victor, Challenger, DeLuxe and Commander pumps which are designed for equipment requiring hydraulic power. Capacities range from 5 to 4000 gallons per hour and pressures up to 750 pounds per square inch. Special sizes can be built to order.

6. Rubber & Synthetic Products

B. F. Goodrich Co.—12-page illustrated guide book on rubber and synthetic products describes and suggests applications of these materials. Koroseal synthetic flexible material, line of Vibro-Insulator vibration reducers, rubber lined equipment and other rubber and plastic products are covered.

7. Silver Brazing Alloy

Handy & Harman—16-page illustrated bulletin No. 14 covers recommended methods of repairing broken cutting tools with Easy-Flow low temperature silver brazing alloy. Procedures for repairing broken broaches, milling cutters, saws and other cutting tools are covered in detail.

8. Circular Form Tools

Hardinge Brothers, Inc.—4-page illustrated bulletin F describes precision ground circular form tools for automatics, chucking machines and turret lathes. Standard styles and shape precision ground circular cut-off tools and circular form tools for Brown and Sharpe screw machines are covered also.

9. Hard Surfacing Electrodes

Metal & Thermit Corp.—16-page illustrated bulletin "Hard-Surfacing with Hardex Arc-Welding Electrodes" gives properties of this material and shows how deposits are affected by temperature, chemical composition and rate of cooling. Electrode selection, application procedure and case studies of typical uses are outlined.

10. Milling Attachment

Globe Products Mfg. Co.—Illustrated folder "Globe Miller" describes attachment which can be fitted quickly to standard lathe to perform milling operations. Illustrations show unit performing slot cutting, keyway cutting, slitting, gang milling and similar operations.

11. Roller Bearings

McGill Mfg. Co.—4-page illustrated bulletin No. IR-45 shows design features and installation procedure employed with Solidend Multirol inner race assemblies. These bearings can be used in equipment having heat treated parts which can be used as outer raceways.

12. Mercury-Arc Rectifiers

General Electric Co.—36-page illustrated bulletin No. GEA-2706 lists advantages and uses of Ignitron mercury-arc rectifiers for 501-kilowatt and higher ratings at 250 to 900 volts for converting alternating current to direct current in mines, railways, steel mills, electrochemical and other industrial plants. Design, construction, operation and steps in manufacture and assembly are covered.

13. Die Casting Machines

Hydropress Inc.—8-page illustrated catalog "Hydrocast Cold Chamber Die Casting Machines" describes full-hydraulic, self-contained, semiautomatic and electrically controlled hydraulic presses, rolling mills, pumps and accumulators. Diagrams and cut-away photos complete engineering data.

14. Small Power Hammer

McKiernan-Terry Corp.—16-page illustrated bulletin No. 56 is descriptive of Blacker hammers which are designed to enable single blacksmith to handle practically any small forging operation. Details of installation and operation are given. Tool delivers up to 140 blows per minute, with each blow having energy of 400 foot-pounds.

15. Threading Machine

Landis Machine Co.—8-page illustrated bulletin No. H-91 presents data on Landis ⅜-inch threading machine, discusses design and operation and gives general specifications of unit.

16. Pneumatic Tools

Keller Tool Co.—60-page illustrated catalog No. 12 presents application information, engineering data and specifications for drills, nut-setters, screwdrivers, grinders, chipping hammers, riveting hammers, compression riveters, air hoists, special air motors and accessories.

17. Parallel Set-Up Blocks

Moore Special Tool Co.—4-page illustrated bulletin describes parallel set-up blocks for use with Moore jig borer and jig grinder and in toolroom, production and inspection work. Specifications are given on set that can be built up to twelve different heights and that can be used on any of three sides.

18. Cylinder Calculator

Hanna Engineering Works—Slide chart type calculator for Hanna hydraulic cylinders determines practically all required characteristics from given information. Calculator is designed for engineers, maintenance men and others who use hydraulic cylinders.

19. Machine Tools

Moline Tool Co.—56-page illustrated folder "Machine Tools" is composite of many of company's catalogs and folders covering machine tools for wide range of application in industry. Described are precision production units for boring, honing, drilling, tapping and milling. Specifications and engineering data for individual tools are presented.

20. Nickel Alloys

International Nickel Co.—8-page revised list "A" describes current publications on nickel alloy steels, nickel cast irons, nickel brass and bronzes and on nickel plating. Publications cover production, fabrication, properties and uses of nickel alloys for industrial applications.

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21. Rack Insulating Coating

Michigan Chrome & Chemical Co.—6-page illustrated folder "Miccrotex Air-Dry Rack Coating" describes this thermoplastic insulating material for use on plating racks, and on all plating, anodizing, Parkerizing and Bonderizing cycles.

22. Variable Speed Drive

Master Electric Co.—24-page illustrated engineering data book No. 7525 gives design and application information on complete line of Master Speedrangers which provide infinitely variable speed ranging up to 15 to 1 ratio. Sizes are available for equipment requiring up to 3 horsepower. Typical installations in machines and equipment are shown.

23. Visible Index System

LeFebure Corp.—20-page illustrated booklet No. 756 describes Speedex visible index system which is adaptable to any plan of indexing. Numerous typical record keeping applications are shown and described.

24. Gas Drive Welder

Hobart Brothers Co.—48-page illustrated booklet No. EW-113 entitled "How to Build Your Own Gas Drive Welder" takes reader through progressive step-by-step plan by which gas driven welder can be built. Plans and full instructions are included.

25. Industrial Equipment

Gardner-Denver Co.—34-page illustrated catalog "Engineering Foresight, Manufacturing Progress" describes wide range of industrial equipment. Operational photos depict air tools, portable air compressors, centrifugal pumps, oil field rotary steam drilling engines and governors in actual use.

26. Milling Machines

Kearney & Trecker Corp.—22-page illustrated catalog No. CSM-20 covers engineering information, features and inherent qualities of company's knee type milling machines. Details of models H and K are presented and additional information is included on carbide milling equipment for production requirements.

27. Materials Handling

Lewis-Shepard Products Inc.—Illustrated folder No. 80-113 briefly describes lift trucks, stackers and portable elevators, power fork trucks, skid platforms and floor trucks.

28. Power Generating Plants

Kato Engineering Co.—8-page illustrated folder describes alternating and direct current Katolight electric plants in wide range of wattages for continuous and standby power generating service. Models driven by diesel, gas and gasoline engines are described.

29. Milling Machines

Cincinnati Milling Machine Co.—24-page illustrated publication No. M-1372 describes plain and duplex Hydromatic milling machines designed for routine milling operations employing automatic table feed cycles on work of average to large size. Tables of dimensions and specifications on all models are given.

30. Steel Castings

Lebanon Steel Foundry—Illustrated file sheet No. 669.1 describes Lebanon Circle 9 carbon molybdenum steel castings. Characteristics of material are set forth. Chemical analysis and physical properties are given.

31. Lift Truck

Hyster Co.—8-page illustrated bulletin No. 699 presents information on Hyster 150 space saver lift truck. Recommended uses, specifications and design features are covered.

32. Precision Casting

Kerr Dental Mfg. Co., Industrial Div.—12-page illustrated booklet entitled "Fundamentals of Industrial Precision Casting" was prepared by company's research department. Brief outline of precision casting process is presented and characteristics of castings are given.

33. Hydraulic Press

Hydraulic Press Mfg. Co.—4-page illustrated folder describes method used in drawing washing machine tub with single draw as accomplished on H-P-M Fastraverse hydraulic press.

34. Power Shears

Cleveland Crane & Engineering Co.—8-page illustrated catalog No. 2011A presents engineering data, diagrams and application photos of Steelweld pivoted blade power shears. Catalog includes overall dimensions, strokes per minute, front and back gage range.

35. Gearing

Michigan Tool Co.—8-page illustrated bulletin No. 742 is entitled "Cone-Drive Gearing at Work in Materials Handling." Use of double enveloping gearing in wide variety of equipment for materials handling is shown. Design and application principles are covered. Data are presented on how gearing has been engineered into specific equipment.

36. Trolleys & Wheels

Gray Hub Co.—8-page illustrated pamphlet shows details of trolleys designed for closest possible headroom and sealed ball bearing wheels which take maximum radial and thrust loads. Standard and special types for new installations or replacement are covered.

37. Heat Treatment

Lukens Steel Co.—12-page illustrated bulletin "Lukens Heat Treatment Service" outlines facilities of company which are available for stress relieving, annealing, normalizing, spheroidizing, hardening, tempering, x-ray examination, testing, pickling and sand blasting. Typical work produced is shown.

38. Fluoborate Solutions

General Chemical Co.—Two illustrated manuals Nos. ZF-1 and LTF-1 contain technical information on zinc fluoborate for zinc plating and lead and tin fluoborate for plating lead-tin alloys of low tin. Physical and chemical properties, bath control analytical methods and analysis of deposit are detailed.

39. Castings

Meehanite Research Institute—4-page illustrated bulletin No. 146 is entitled "Meehanite Quality Control Assures Uniform Dependability." Metallurgy of Meehanite casting is covered and engineering characteristics of various types are summarized.

40. Bearing Size Finder

Johnson Bronze Co.—Slide chart type bearing size finder is designed for selecting proper general purpose bearing from over 800 sizes. Computation is based on known inside diameters of bearings, in which case all other specifications are readily determined.

41. Milling Machine Attachment

Leo G. Brown Engineering Co.—4-page illustrated folder "All Universal Precision High-Speed Milling Machine Tool" describes this attachment which converts Atlas horizontal milling machine for high speed vertical milling operations.

42. Planers

Liberty Planers—20-page illustrated catalog No. 157 presents specifications, general information, advantages of use and shows typical installations of double housing, open side convertible and die block planers.

43. Bearings

Gatke Corp.—64-page illustrated brochure "Gatke Bearings & Their Peerless Achievements" reports improvements attainable through use of molded fabric bearings. Operational use of bearings are shown in equipment varying from cement machines to merchant vessels.

44. Portable Pyrometer

Illinois Testing Laboratories Inc.—2-page illustrated folder No. 3879 describes Alnor type 1500 portable pyrometer for temperatures up to 3000 F. It is supplied in shielded case for laboratory and general industrial use. Folder No. 4017 describes model No. 8 precision dew point indicator for dew point indication with any noncorrosive gas.

45. Flexible Couplings

Gear Grinding Machine Co.—4-page illustrated bulletin entitled "Ballflex Angular & Axial Flexible Coupling" presents diagrams, capacities and installation information on flexible couplings. Angular misalignment for various speeds and safety factors involved are discussed.

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MARKET SUMMARY

Heavy Steel Order Load Bars Much New Buying

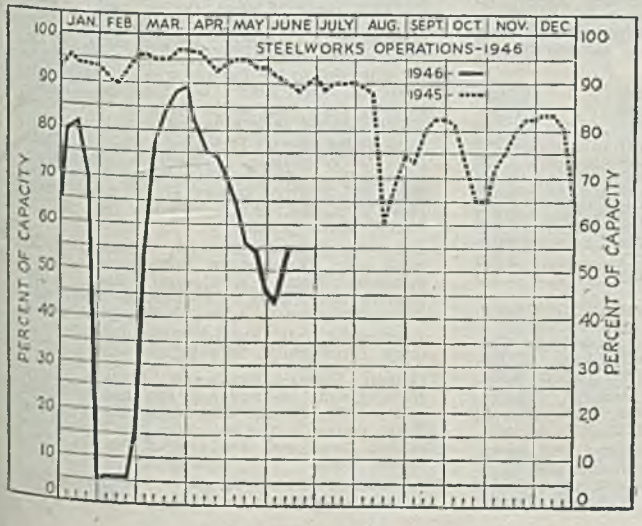
Mills sold for rest of year . . . Renewed fuel supply boosts steel production . . . Mills slow to accept orders for next year

PROSPECTS for immediate relief from shortage of steel products are not bright, as steelmakers, recovering from effects of the coal strike, are eight to twelve weeks behind on current commitments and by the end of third quarter they may be even more delayed. Much of third quarter production will be applied to catching up on these arrearages. In addition to these tonnages mills also have a heavy backlog of orders not yet scheduled, in some cases sufficient to absorb production through the year.

With third quarter only about a fortnight away producers generally have not opened books for next year and one mill which had booked stainless steel orders for shipment through most of first half next year has canceled all these commitments, in view of the confused outlook. Heavy carryovers into next year are inevitable and this causes sellers generally to hold back opening of books for next year. Significant development is subsidizing by the government of a substantial sheet bar tonnage purchase for five nonintegrated sheetmakers. This is the first time in history the government has subsidized a steel purchase.

A further complication is threatened in the maritime strike June 15, as stoppage of export movement and possible rail embargoes against shipments to tidewater would have an adverse effect on schedules. By-product coke manufacturers along the Atlantic coast depend largely on coal shipments by coastal vessels and should this traffic be stopped coke production would be disrupted in that area. Fuel oil supply also might be affected by interference with coastal shipping.

Further substantial increase in steelmaking operations is expected this week, following the decided upturn last week as supply of fuel began to increase when mines reopened. However, it probably will be impossible to reach a normal output before fall, similar to the point reached in March after the steel strike ended. Shortages in pig iron and scrap will be a drag for some time and hot weather and vacations interfere with capacity operations in midsummer.



DISTRICT STEEL RATES

(Percentage of Ingot Capacity Engaged in Leading Districts)

	Week Ended June 8	Change	Same Week 1945	Same Week 1944
Pittsburgh	38.5	+11.5	90	92
Chicago	61	+3.5	95	101.5
Eastern Pa.	57	+23	92	94
Youngstown	30	+17	85	95
Wheeling	65	+12	95.5	92
Cleveland	72	+11	91	90
Buffalo	79	+16	90.5	90.5
Birmingham	54	+10	26	95
New England	80	+20	90	90
Cincinnati	82	None	89	87
St. Louis	54.5	+ 5	75	79.5
Detroit	79	None	83	88
Average national rate	55	+12	90	98

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.

Estimated national steel production rate last week advanced 12 points, from 43 to 55 per cent of capacity, first fruits of the resumption of coal mining. Ten of the twelve districts showed substantial improvement and the other two held the rate of the prior week, both being districts not greatly affected by the coal shortage. Pittsburgh recovered 11½ points to 38½ per cent, leaving a large margin for further recovery. Youngstown regained 17 points to 30 per cent, Buffalo 16 points to 79, Wheeling 12 points to 65, Cleveland 11 points to 72, eastern Pennsylvania 23 points to 57, Birmingham 10 points to 54, Chicago 3½ points to 61, St. Louis 5 points to 54½, New England 20 points to 80. Cincinnati remained unchanged at 82 per cent and Detroit at 79. West Coast production was unchanged at 84 per cent.

April pig iron production, beset by strikes in the coal industry, totaled 3,613,560 net tons, compared with 4,423,916 tons in March. Sufficient proof of the great shortage of iron for steelmaking and for foundry use is found in the fact that in four months this year pig iron output totaled only 11,829,592 tons, compared with 19,521,211 tons in the corresponding period in 1945.

Movement of Lake Superior iron ore is far below that of recent years, total shipments to June 1 being only 4,846,017 gross tons, compared with 18,403,277 tons to the same date last year. This is a loss of 14,057,260 tons, or 76.38 per cent. May shipments were 3,616,115 tons, compared with 11,121,203 tons in May, 1945. With the coal strike settled and fuel available for Great Lakes ships the ore movement is expected to increase rapidly during the remainder of the season.

Average composite prices of steel and iron products continue at the level of the past few months, at Office of Price Administration ceilings. Finished steel composite is $63.54, semi-finished steel $40.60, steelmaking pig iron $25.50 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	June 8	June 1	May 25	One Month Ago May, 1946	Three Months Ago March, 1946	One Year Ago June, 1945	Five Years Ago June, 1941
Finished Steel	$63.54	$63.54	$63.54	$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 8, 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	3.25	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 ½-inch, Pitts.	2.30c	2.30c	2.30c	2.15c

Pig Iron

	June 8, 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, $46.80.

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, $56.16; del, Detroit $58.16; eastern Mich. $59.16.

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—47-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, 2.81c; Detroit, del., 2.91c. (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	$0.104	4300	$1.768
2300	1.768	4600	1.248
2500	2.652	4800	2.236
3000	0.52	5100	0.364
3100	0.884	5130 or 5152	0.468
3200	1.404	6120 or 6152	0.988
3400	3.328	6145 or 6150	1.248
4000	0.468	8612	0.676
4100 (.15-.25 Mo)	0.728	8720	0.728
(.20-.30 Mo)	0.78	9830	1.352

*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, 3.48c; Detroit, del., 3.58c; eastern Mich., 3.63c.

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, 8.00c.

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, 3.05c. 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, 3.75c; Gulf ports, 4.20c; Pacific ports, 4.40c.
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 ..... †$3.25
Galvanized ..... ††$2.90
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.
††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

Steel In.	Blk.	Galv.	Iron In.	Blk.	Galv.
⅛	53	30	⅛	21	0½
¼ & ⅜	56	37½	¼	27	7
½	60½	48	1-1¼	31	13
¾	63½	52	1½	35	15½
1-3	65½	54½	2	34½	15

Lap Weld

Steel In.	Blk.	Galv.	Iron In.	Blk.	Galv.
2	58	46½	1¼	20	0½
2½-3	61	49½	1½	25½	7
3½-6	63	51½	2	27½	9
7-8	62	49½	2½-3½	28½	11½
9-10	61½	49	4	30½	15
11-12	60½	48	4½-8	29½	14
			9-12	25½	9

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
2¼"	12	17.07	20.28	16.57	19.83
2½"	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

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

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., ⅞ and ⅝ x 6-in. and shorter.. 63½ off
Do., ¾ to 1 x 6-in. and shorter .... 61 off
1⅛ and larger, all lengths ..... 59 off
All diameters, over 6-in. long ..... 59 off
Tire bolts ..... 50 off
Step bolts ..... 56 off
Plow bolts ..... 65 off

Stove Bolts

In packages, 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.
⅞-in. and smaller	..	64
½-in. and smaller	62	...
½-in.-1-in.	..	60
⅞-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

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	13.65
Chicago, outside delivered	13.00
Chicago, delivered	13.75
Terre Haute, delivered	13.50
Milwaukee, ovens	13.75
New England, delivered	14.65
St. Louis, delivered	†13.75
Birmingham, delivered	10.90
Indianapolis, delivered	13.50
Cincinnati, delivered	13.25
Cleveland, delivered	13.20
Buffalo, delivered	13.40
Detroit, delivered	13.75
Philadelphia, delivered	13.28

•Operators of hand-drawn ovens using trucked coal may charge $8.00; effective May 28, 1945.
†14.25 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal. freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	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, bbl, to jobbers	8.00c
Per ton, bulk, fob port	
Sulphate of ammonia	$29.20

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[12]	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[12]	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[12]	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[18]	5.097[25]	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[25]	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[20]	4.491[21]	.....
Norfolk, Va.	4.315[1]	4.252[1]	4.221[1]	5.715[1]	3.996[1]	4.365[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[10]	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[51]	4.525[10]	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[12]	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[12]	4.525[24]	4.10[21]	4.60
Cleveland (city)	3.60[1]	3.888[1]	3.65[1]	5.438[1]	3.575[1]	3.95[1]	3.850[1]	5.327[12]	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[18]	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[18]	.....	.....	.....
Cincinnati	3.861[1]	3.941[1]	3.911[1]	5.541[1]	3.650[1]	4.025[1]	3.925[1]	5.275[18]	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[16]	.....	.....	.....
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[15]	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[18]	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[18]	4.793[24]	4.43[21]	5.030
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[18]	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[11]	3.997[1]	5.622[18]	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[8]	5.715[18]	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[15]	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[15]	5.304[24]	5.079[21]	.....
Houston, Tex.	4.00[8]	4.50[1]	4.50[1]	5.75[9]	3.988[8]	4.663[8]	4.563[9]	5.763[30]	5.819[18]	4.10[22]	.....
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[12]	7.425[6]	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[18]	6.875[18]	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[18]	6.825[18]	5.983[18]	.....
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[18]	6.55[18]	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[18]	6.55[18]	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	$4.95
Mesabi nonbessemer	4.55
High phosphorus	4.55
Mesabi bessemer	4.70
Old range nonbessemer	4.80

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	13.00

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	Chemical Composition Limits, Per Cent						Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per GT
	Carbon	Mn	Si	Cr	Ni	Mo				
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	$0.780	$15.60	$1.300	$26.00
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.780	15.60	1.300	26.00
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.832	16.64	1.352	27.04
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.676	13.52	1.196	23.92
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.248	24.96	1.612	32.24
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.248	24.96	1.612	32.24

Extras are in addition to a base price of 2.808c, per pound on finished products and $56.16 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%, $45.50 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. 54.80

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., net ton, bulk 22.00
net ton, bags 26.00

Basic Brick

Net ton, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick 54.00
Chem. bonded chrome 54.00
Magnesite brick 76.00
Chem. bonded magnesite 65.00

Fluorspar

Metallurgical grade, fob Ill., Ky., net tons, carloads, CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. After Aug. 29, 1944, base price any grade $30.00.

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 10 cents per lb higher.

Ferrochrome: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l. 13.90c; central, add 0.40c and 0.65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome; Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l. max. 0.06% carbon 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 2.00% 22.50c 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add 0.4c for bulk, c.l. and 0.65c for 2000 lb to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb c.l.; carload packed differential 0.45c; fob shipping point, freight allowed. Prices per lb contained Cr, high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each 0.25% of nitrogen over 0.75%.

Special Foundry Ferrochrome: (Cr 62-66%; C approx. 5-7%.) Contract, carload bulk 13.50c, packed 13.95c, ton lots 14.40c, less 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up 0.25c.

S.M. Ferrochrome, high carbon: (Cr 60-65%, Si 4-6%, Mn 4-6% and C 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up 0.25c; per pound contained chromium.

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, 20.85c, 21.65c 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 add 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, eastern zone, bulk, c.l., 8.25c per lb of briquets, 2000 lb to c.l., 8.75c; central, add 0.3c for c.l. and 0.5c for 2000 lb to c.l.; western add 0.70c for c.l., and 0.2c for 2000 lb to c.l.; **silicomanganese,** eastern, containing exactly 2 lb Mn and approx. ½ lb Si, bulk, c.l., 5.80c, 2000 lb to c.l., 6.35c; central add 0.25c for c.l. and 1c for 2000 lb to c.l., western, add 0.55c for c.l., and 0.2c for 2000 lb to c.l.; **ferrosilicon,** eastern, approx. 5 lb, containing exactly 2 lb Si, or weighing approx. 2½ lb and containing exactly 1 lb of Si, bulk, c.l. 3.35c, 2000 lb to c.l., 3.80c; central, add 0.15c for c.l., and 0.40c for 2000 lb to c.l.; western, add 0.30c for c.l. and 0.45c for 2000 to c.l.; fob shipping point, freight allowed.

Ferromolybdenum: 55-75% per lb contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphrous: 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: Eastern zone, 90-95%, bulk c.l., 11.05c, 2000 lb to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 lb to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 lb to c.l., 8.75c; fob shipping point, freight allowed. Prices per lb contained Si.

Grainal: Vanadium Grinal 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; eastearn. 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 ¼c 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 5.50c; ton lots 6.00c. 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 consumer's plant)

No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	14.25
Short Shovel Turnings	16.25
Mixed Borings, Turn.	14.25
Cast Iron Borings	15.25
Low Phos.	21.75

PITTSBURGH:

(Delivered consumer's plant)

Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Mach. Shop Turnings	15.00
Mixed Borings, Turnings	15.00
No. 1 Cupola Cast	*20.00
Heavy Breakable Cast	*16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	22.00

* 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	$15.00
No. 2 Heavy Melt. Steel	14.00
No. 1 Busheling	15.50
No. 1, No. 2 Bundles	13.00
No. 3 Bundles	8.50
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	15.50
Iron, Steel Axles	23.00
No. 2 Cast Steel	15.50
Uncut Frogs, Switches	15.50
Scrap Rails	15.00
Locomotive Tires	15.50

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

LOGEMANN
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THE NATION NEEDS YOUR SHEET SCRAP!

In mills, industrial plants and scrap yards, LOGEMANN SCRAP PRESSES are working day and night to prepare sheet scrap for the furnaces.

Sheet mills particularly recognize the value of the years of experience and the performance records which back up LOGEMANN designs and workmanship.

The line includes scrap presses *designed for mill Service,* presses *designed for automobile plant conditions,* presses *designed for general plant applications.* Write for details.

The scrap press illustrated operates in one of the largest industrial plants. Compresses scrap from three directions to produce high-density mill size bundles. Built in various capacities.

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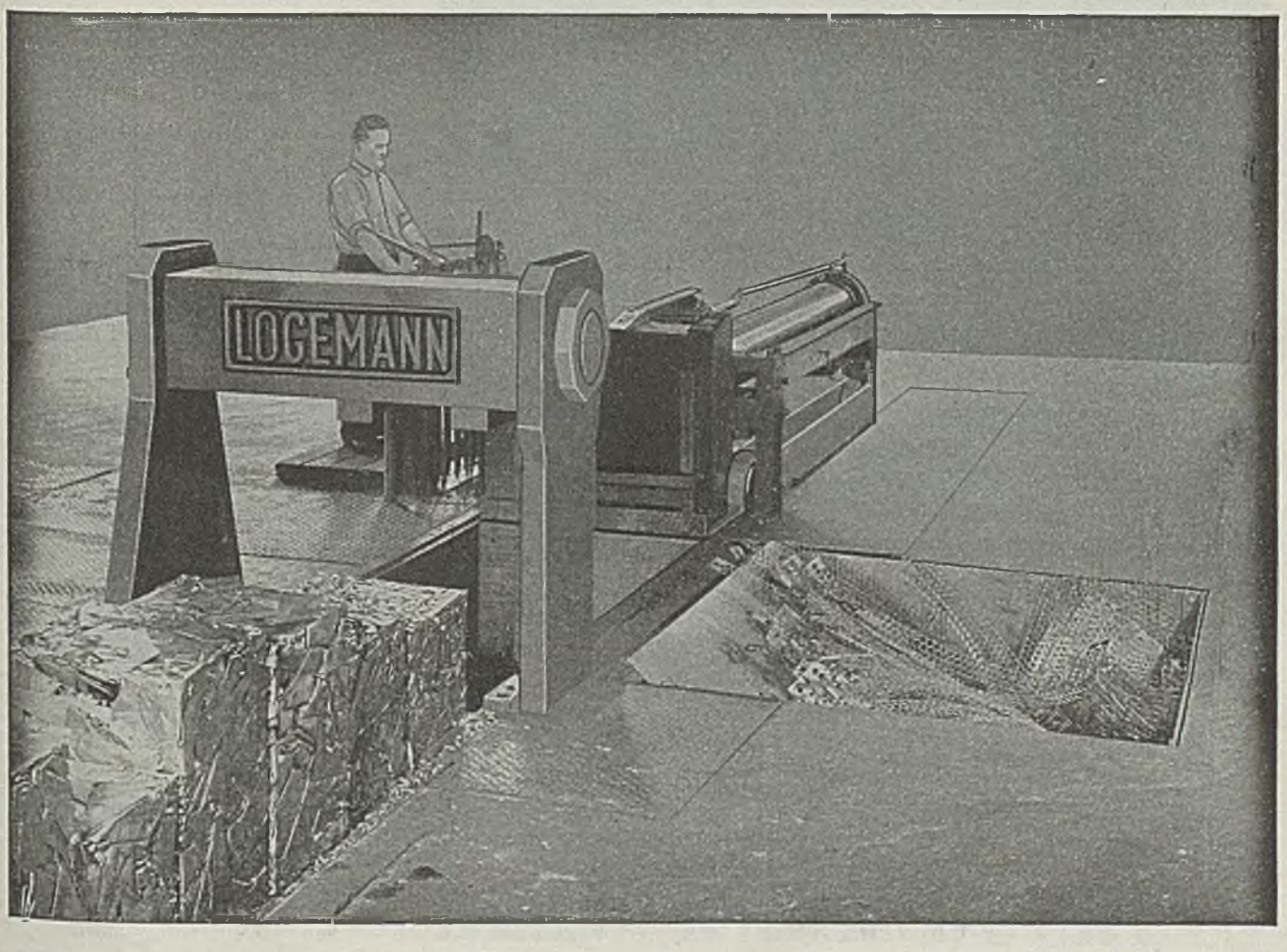

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 14.37½c, del. Conn.; less carlots 14.50c, refinery. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, 14.12½c, refinery, 20,000 lb or more; 14.37½c, less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 15.25c; 88-10-2 (No. 215) 18.50c; 80-10-10 (No. 305) 18.00c; No. 1 yellow (No. 405) 12.25c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than 20 tons.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 8.10c, chemical, 8.20c, corroding, 8.20c, E. St. Louis ofr carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland - Akron - Detroit area, New Jersey, New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston - Worcester, Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 10.50-11.00c; No. 12 foundry alloy (No. 2 grade) 10.50-10.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 11.75-12.00c; grade 2 (92-95%) 10.25-10.75c; grade 3 (90-92%) 8.50-9.00c; grade 4 (85-90%) 8.25-8.50c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 1000-10,000 lb; 1c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lb) 20.50c per lb, carlots; 22.50c 100 lb to c.l. Extruded 12-in. sticks 27.50c, carlots; 29.50c 100 lb to c.l.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224 lb.; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, fob refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c.

Mercury: Open market, spot, New York, $103-$107 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be, $14.75 lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $1.50 lb., for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

Indium: 99.9%, $2.25 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 70.625 per ounce.

Platinum: $35 per ounce.

Palladium: $24 per troy ounce.

Iridium: $165 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 14.37½c, Conn., for copper. Freight prepaid on 100 lb or more. Prices on copper and brass mill products are subject to further possible revision, pending issuance of official price lists by producers.)

Sheet: Copper 25.81c; yellow brass 23.67c; commercial bronze, 95% 26.14c, 90% 25.81c; red brass, 85% 24.98c, 80% 24.66c; best quality 24.38c.

Rods: Copper 23.16c; yellow brass 18.53c; commercial bronze, 95% 25.83c, 90% 25.50c; red brass, 85% 24.67c, 80% 24.35c; best quality 24.07c.

Seamless Tubing: Copper 25.85c; yellow brass 26.43c; commercial bronze 90% 28.22c; red brass 85% 27.64c, 80% 27.32c; best quality brass 26.79c.

Copper Wire: Bare, soft, fob eastern mills, carlots 19.89c, less carlots 20.39c; weatherproof, fob eastern mills, carlot 22.07c, less carlots 22.57c; magnet, delivered, carlots, 23.30c, 15,000 lb or more 23.55c, less carlots 24.05c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lbs. or more del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 11.25c; cut sheets 11.50c; pipe 9.90c, New York, 10.00c, Philadelphia, Baltimore, Rochester and Buffalo, 10.50c Chicago, Cleveland, Worcester and Boston.

Zinc Products: Sheet fob mill, 13.15c; 36,000 lbs. and over deduct 7%; Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

PLATING MATERIALS

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic Cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% Cu, 100-lb kegs or bbls. 34.00c, fob, Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c fob Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c fob Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 35.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c fob Niagara Falls.

Scrap Metals

Brass Mill Allowances: Prices for less than 15,000 lbs. fob shipping point. Add ⅝c for 15,000-40,000 lbs.; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	12.000	12.000	11.250
Tinned Copper	11.375	11.375	11.125
Yellow brass	9.875	9.625	9.125
Commercial bronze			
95%	11.250	11.000	10.500
90%	11.125	10.875	10.375
Red brass			
85%	10.875	10.625	10.125
80%	10.875	10.625	10.125
Best Quality (71-79%)	10.500	10.250	9.750
Muntz metal	9.250	9.000	8.500
Nickel silver, 5%	10.500	10.250	5.875

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are fob shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 11.50c; No. 2 copper wire and mixed heavy copper, copper tuyeres 10.50c

(Grou 2) Soft red brass and borings, aluminum bronze 10.75c; copper-nickel solids and borings 11.00c; lined car boxes, cocks and faucets 9.50c; bell metal 17.25c; babbitt-lined brass bushings 14.75c.

(Group 3) Admiralty condenser tubes, brass pipe 8.75c; muntz metal condenser tubes 8.25c; old rolled brass 8.25c; manganese bronze solids: (lead 0%-0.40%) 8.00c; (lead 0.41%-1%) 7.00c; manganese bronze borings, 7.25c.

Aluminum Scrap: Price fob point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb., 11, 14, etc., 3 to 3.50c lb. All other high grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb. borings and turnings one cent less than segregated.

Lead Scrap: Prices fob point of shipment. For soft and hard lead, including cable lead, deduct 0.75c from basing point prices for refined metal.

Zinc Scrap: New clippings 6.50c, old zinc 4.75c, fob point of shipment, add ½c for 10,000 lb or more. New die cast scrap 4.45c, radiator grilles 3.50c, add ½c for 20,000 lb or more. Unsweated zinc dross, die cast slab 5.30c, any quantity.

Nickel, Monel Scrap: Prices fob point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 23.00c; 90-98% nickel, 23.00c per lb nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 152

Continued scarcity of sheets and strip hamper manufacturers, especially in galvanized and silicon grades, the latter much needed for electrical equipment. Most sheetmakers will have no more than a month's production to allocate for third quarter, carryovers being sufficient for two months' production. In some cases mills are booked well into next year, some having taken orders to cover first half.

New York — Assuming there are no further important labor disturbances which might affect steel production, most sheet sellers may be able to take on new tonnage in third quarter to the extent of at least one month's production. Certain producers say that they will be behind by almost three months when third quarter opens, but they are more the exception than the rule.

Meanwhile, consumer inventories are greatly unbalanced, with a number of buyers operating very much on a hand-to-mouth basis. Some of these consumers are planning to suspend operations for a period of two or three weeks and longer because of the uncertain outlook, not only with regard to steel but other materials and parts needed in their assemblies.

Silicon sheets are particularly scarce. Some electrical equipment manufacturers could easily consume five times the quantity they are now being promised for third quarter. Galvanized sheets are almost as scarce, a situation that is particularly reflected in the building industry.

Stainless steel sheets have been one item on which certain producers have accepted orders into next year, in one or two instances as late as May and June of next year. However, one leading producer has recently canceled all orders beyond the end of this year, partly because of the belief that many buyers do not have the other materials necessary to go ahead on the basis of the schedules indicated by their purchases of stainless steel, and hence will not need much of the tonnage specified. In other words, there is a disposition in this case to wipe the slate clean on these more extended commitments and then endeavor to meet such requirements later.

Cleveland — Producers of flat-rolled steel products expect to attain full output by the end of this week, since preference in allocating available steel was given to those with the heaviest backlogs. Orders for all products accumulated rapidly during the first six months of this year, since some mills lost as much as four months' output in that period. Outlook for uninterrupted operations is now the most promising since V-J Day, with many workers having taken their annual vacations while mills were closed. Sellers are still cautious in making rolling schedules and generally are restricting them to a maximum of 90 days. No new orders will be accepted until 1947 books are opened, which will be delayed longer than usual since prospective 1946 carryovers in some instances will absorb at least first quarter output.

Boston — Not before next month are hot strip deliveries expected to approximate normal and rerollers of narrow stock continue on restricted and unbalanced schedules. Inventories of hot strip are low and include grades and sizes unsuited to meet current cold-rolled orders. Carryovers in hot-rolled are mounting. Production schedules are undergoing revisions. While mills in theory aim to take up the slack in order of sequence, this is not entirely possible. Scheduling problems fall into two major groups, one involving carryovers of tonnage overdue and the second the volume booked and accumulating, which never has been scheduled.

Pittsburgh — Sheet output on a limited basis is expected to get under way this week at plants of the leading producer here, but prestrike pace is not in prospect until around last week of this month. Other companies, not so hard hit by coal strike, likely will be able to attain normal production somewhat sooner. Most mills have little semifinished steel on hand, making it necessary to wait until operating balance is accomplished. Carryover tonnage represents about three months capacity output in most instances and cannot be made up this year on basis of present backlogs, which extend into 1947 on some items, such as galvanized and electrical sheets. Demand for galvanized sheets in particular far exceeds prospective production through remainder of year, with recently augmented housing program accentuating this situation. Many sheet consumers will have to continue reduced operating schedules until late this month, as inventories are badly

depleted and there is little prospect sheet tonnage will reach consumers in any significant quantity before that time.

Through a temporary arrangement established by RFC with Jones & Laughlin Steel Corp., five nonintegrated mills will receive a total of 12,500 tons of sheet bars to keep production going. Four of these interests are negotiating a loan with RFC for the purchase of Sharon Steel Corp.'s Lowellville, O., plant as a permanent semifinished steel source.

Cincinnati — Earlier estimates that the carryover in district sheet mills for the quarter will equal 30 days' production have been revised upward. Average of all specifications may reach half of third quarter production. Mills are considering cuts in tentative third quarter allocations to permit a clean start on fourth quarter schedules. District output is being expanded by utilization of additional equipment and elimination of measures which had been taken to conserve coal.

Birmingham — Availability of sheets has been drastically tightened during the coal strike. Already at a premium in this district, most items in sheets are practically unobtainable or only in limited quantities. Probably the greatest demand currently is for roofing sheets for agricultural use. Sheet processors have practically no inventories.

St. Louis — All sheet and plate production here remains at a standstill in the fourteenth week of a strike at Granite City Steel Co. The company last week dismissed all office workers, including executives, and announced all activity will cease and the offices remain closed indefinitely.

Steel Bars . . .

Bar Prices, Page 152

Some barmakers are delayed as much as three months on steel bars, particularly in smaller sizes and some are booked for all they can produce during the remainder of the year. Some expect to have a carryover of at least three months at the end of the year. Bar production is expanding but probably several weeks will be required to bring production to anything like normal. In larger sizes of hot-rolled bars some producers can book tonnage in limited amounts for November and December.

New York — While bar mill operations continue to expand, now that the soft coal strike has ended, some producers believe it will take them another three or four weeks at least to get back to anything like normal operations. Various sellers are said to be behind as much as three months on some commitments, especially smaller sizes of hot carbon bars. Certain producers who have accepted orders for the remainder of the year, believe that on the smaller sizes they will have a carry-over into 1947 of almost three months, indicating that they expect to do no more than hold their own during the last half. In certain of the larger hot-rolled rounds and flats their position is not as stringent; in fact, some can still accept a little new tonnage for shipment late in November and December. Cold-drawn carbon bar sellers generally are well booked over the remainder of this year on smaller sizes, but appear to have capacity available on larger sizes for as early as October and possibly late September in one or two cases. Hot alloy bar shipments range eight to ten weeks.

Philadelphia — Hot-rolled carbon bar producers are behind about three months on current commitments and even longer on some smaller sizes. Except on some sizes of larger rounds and flats producers have nothing available for the remainder of this year, considering quota obligations as well as outright commitments. Large sizes of cold-drawn bars still can be had in some quarters for late September delivery but shipments fall generally in fourth quarter and in small sizes little, if any, can be had this year.

Pittsburgh — Gradual resumption in bar mill operations is indicated this week, with normal output not in prospect until the end of the following week at the earliest. Cold finishers are not expected to reach prestrike rate until late this monh, as inventories were badly depleted during the coal strike, with at least one interest forced to shut down. Somewhat better progress toward increased alloy bar production is indicated. Scheduling for fourth quarter is being held up until extent of record-breaking carryover tonnage is determined. Mills are sold through the year on small carbon bar sizes, with large rounds and flats expected to be available for late fourth quarter delivery. Order backlogs on alloys extend into August on most items, while cold finish-

ers have no openings in schedules through remainder of this year.

St. Louis — Scarcity of merchant bars is unabated, with the rail strike producing new pressure for delivery. Schedules are filled into next year and new business generally is being refused. Light bars are in especially heavy demand. Bar production has held up well, mills here not having been seriously curtailed. Shipments are around 90 per cent of capacity. Reinforcing bars are obtainable in 90 to 120 days.

Steel Plates . . .

Plate Prices, Page 153

Plate production is being resumed as rapidly as steel supply is available, numerous producers handicapped by strikes and other disturbances resuming production. Pressure is heavy from various sources and most producers are three months behind schedule on definite delivery promises, and with heavy backlogs of orders beyond that.

Philadelphia — District plate mill operations will undergo a sharp increase this week. One nearby mill will resume after suspension for two weeks, while another will start after a layoff of a little more than a week. Other eastern plate mills will also increase. One plate producer, forced down by floods for about five days, resumed early last week. Most district plate mills will go into third quarter with arrearages of about three months and with order books for the remainder of the year. Carbuilders, among other major consumers, are exerting heavy pressure for plates, their construction program still being stymied by lack of steel. Shipbuilders appear to be the only important consumers letting up on specifications, with outlook for work this fall rather bleak.

Boston — Plate mill schedules are in for substantial revision in most cases and all are set back to a point where limited new tonnage may be booked for rolling this year. Fabricating shops are laboring with more unbalanced inventories with few exceptions, but a major problem with users of heads and flanged parts is co-ordinating deliveries with plates; some head diameters are six months or more behind. Most mills have booked all tank quality steel they can handle and in some instances only tonnage taking attractive extras attracts interest. A development is the broadening of production at shipyards. Electric Boat Co. is doing some structural fabricating and new lines include offset presses for the printing industry, electric pin-boys for bowling alleys, truck bodies, castings for additional heavy industries and a new line of electric motors; Bath Iron Works is also going into new products, new type of merchandise vending machine for one.

Birmingham — Plate production has not been resumed in Birmingham proper and output at Republic's Gadsden mill is limited. Result is that plate users, especially tank manufacturers, are clamoring for what they can get when they can get it. Deliveries are becoming regularly more extended.

Wire . . .

Wire Prices, Page 153

Pittsburgh — Critical short supply in wire rods, nails and other merchant and manufacturing wire items is expected to remain acute through third quarter at least. Jobbers' stocks of fencing, nails and other items are nearly depleted in many instances. The latter is said to be one of the many products holding up the housing program. Galvanized fine wire, valve spring wire, wire mesh and electrical wire and cable are other items on which mills are booked through most of this year. Despite extended deliveries sellers report a heavy influx of new inquiries persists.

Boston — Wire mills are confronted by heavier carryovers, with no easing in tight rod supply. On some items producers are two months behind schedule and even integrated mills experience shortages in rods. Consumers are short of drawn wire in most cases, notably in the socalled "cheaper" grades on which margins are small. Production of basic wire is at a low point. Selectivity in acceptance of orders in recent months is showing in an unbalanced schedule in carryovers. Another factor in this are delays in getting new equipment in operation. Orders taken in expectation of production on some new equipment have not been processed in some instances. Demand for high-carbon is heavy and the automobile industry is pressing hard for valve spring wire deliveries.

Chicago—Wiremakers, beset by the steel and coal strikes, are snowed by

tonnage on books. Consumers urgently are pressing for deliveries of manufacturers' products as well as merchant. In the former classification, spring wire is about the tightest; while bale ties and nails lead in the latter. There are reports that contractors offer as high as $50 a keg for 8 and 16 penny nails, which are extremely short because of the home building program.

Tubular Goods . . .

Tubular Goods Prices, Page 153

Pittsburgh — Pipe output at National Tube Co.'s plant here is not expected to get into full swing until about June 20. Other producers here hope to attain normal production somewhat sooner because of greater flexibility in operations. Due to shortage of pig iron most cast iron pipe producers have not been able to meet delivery schedules, with most interests booked through remainder of this year. Jobbers' inventories of steel pipe and oil country goods are lowest in many months as a result of the steel and coal strikes, and because of the heavy demand there is little prospect this situation will be remedied until possibly fourth quarter. Mill backlogs are extended well into fourth quarter.

Seattle — While many major cast iron pipe projects are being held back, other cities are calling for bids, hoping for good position on order books when deliveries are resumed. Meanwhile contracts specify deliveries as soon as possible. Inventories are low. Everett, Wash., has called bids for June 10 for about 1300 tons of 3 to 12-inch and Toppenish, Wash., for 16,000 feet of six-inch and 21,200 feet of eight-inch, with fittings, totaling about 650 tons.

Tin Plate . . .

Tin Plate Prices, Page 153

Pittsburgh — Although tin plate output held up well through the coal strike there is some concern over possibility supply will be inadequate to meet requirements for the food pack. Export quotas for third quarter have not yet been established, which leads sellers to believe these quotas are being held up until tin supply in respect to food pack is clarified. Normal deadline for establishing the July quota was May 15, and since this has not been received producers are going on the assumption there will not be one for that period.

OPA is reported reviewing producers' production costs on nails, bail ties and barbed wire to determine necessary price relief individual companies must have as an incentive to resume or increase output. On basis of pre-strike operating schedules supply of these items was far below requirements, while demand for nails for the housing program alone has been sharply increased in recent weeks.

Structural Shapes . . .

Structural Shape Prices, Page 153

New York — Further restrictions on "non-housing" construction are being placed. Ralph A. Parker, regional director of the Civilian Production Administration, reports that authorizations

on such work in this area have been reduced to one-third of the mid-May rate because of lowered production of scarce materials. He believes that new restrictions will apply for at least 45 days, maybe longer.

Indicative of the trend is the approval here recently of applications for seven "non-housing" projects estimated to cost $599,098, and the denial of applications for six others amounting to $1,483,000.

Pittsburgh — Sharp reduction in number of industrial and commercial construction projects approved by CPA recently is said to be prompted by orders from federal housing agencies aimed at reducing all non-residential building by two-thirds for a 45-day period. During the week ended May 30 the local CPA officials denied 54 out of 60 projects seeking approval. In contrast with this the agency had denied only 61 out of 577 proposed structural jobs screened during the period April 2 to May 23.

Chicago—Still critically short of plain material from mills, structural fabricators display little more than passing interest in new construction projects. Even after shape production returns to normal, weeks will be required for shops to acquire sufficient tonnage to complete work in progress and far behind schedule. New projects are far less numerous than earlier this year, due to CPA restrictions on industrial building and to general discouragement of prospective builders because of materials shortages. A substantial amount of tonnage now being placed with fabricators represents projects bid weeks ago but delayed in award.

Philadelphia — Shape mills generally have no open capacity available for this year, despite the fact that new demand for building construction is definitely off. Most fabricating shops had heavy backlogs when the CPA building restrictions went into effect this spring and there has been enough approved work since to add materially to backlogs, all of which is reflected in the extended position of shape mills. Further, warehouses are pressing constantly for tonnage, being unable to get stocks anywhere near balance, and export specifications are always available for acceptance.

Philadelphia CPA regional office recently announced approval of 123 projects and rejection of 82 from May 24 to May 29. Value of the approved work was $2,593,078, with the rejected work equal to 46.8 per cent of that value. Some of the important work approved will not be up for bidding by fabricators for weeks, as builders have wished first to be sure of approval before going ahead with detailed drawings.

Seattle — Fabricating shops are greatly handicapped by lack of plain material and decline to bid on many jobs. Inventories have almost disappeared, with little indication of renewed shipments from the East. Recent bids for Washington state bridges are still pending, officials considering prices too high. War Assets Administration asks bids July 16 on 14,000 tons of shapes and plates at the Kaiser Vancouver shipyard. Star Iron & Steel Co., Tacoma, Wash., is low at $49,000 for fabricating a 150-ton gantry crane for the Coulee project.

Pig Iron . . .

Pig Iron Prices, Page 155

Resumption of coal mining is increasing fuel supply and pig iron production promises to increase steadily from now on. Foundries, faced by heavy castings demand and having a better labor supply, are ready to go ahead at a better rate than for some time. Improvement promises to be slow for the remainder of this month but as fuel stocks increase it should approach normal during the summer.

New York — District pig iron consumers started the current month with about two weeks supply of pig iron on the average, according to trade estimates. The movement since then has continued relatively light but a slow but steady pickup in pig iron shipments over the remainder of the month is anticipated and in general it is believed that the melt this month will show a noticeable improvement, with coal shipments now resumed and coke oven operations being increased.

Cleveland — Stepping up production of pig iron following settlement of the coal strike was slow in most instances, especially where coke supplies had to be replenished, and normal operations will not be attained for another two weeks. At least one merchant stack interest, however, was able to attain full capacity operations by the end of last week. About two months output

has been lost as a result of the strike. Foundries are increasing their melt gradually as iron shipments improve and are attempting to replenish part of their reserves.

Buffalo — Last week several midstate foundries were forced to close because of floods, but resumed at the week end. Pig iron production here has increased six points to 56 per cent of capacity as more fuel was available and further increase will follow as coal arrives. Melters find coke shortage is more of a problem than lack of pig iron in many instances.

Pittsburgh—Quick return to normal operations in coal mines last week made it possible for steel interest to resume pig iron output sooner than expected. During the period 21 blast furnaces were brought into service, making a total of 35 out of 54 active by close of week. At end of this week near prestrike level of pig iron output is expected to be reached. To ease the anticipated iron shortage through remainder of this year, CPA is pushing plans for establishment of subsidy arrangements which would make possible returning a number of high-cost units to service. There also is some prospect of an industrywide allocation of iron. Such a program has been carried out with CPA officials in the Chicago district in recent months, but in other areas distribution has been on a voluntary rationing basis to producers' regular customers. Most foundries were able to step up operations last week on basis of somewhat brighter outlook. The merchant producer here was able to return to normal production last week.

Chicago—End of the coal strike will result in somewhat larger production of foundry pig iron, but demand is so great that foundries will face tight supply for months. Within two or three weeks metallurgical coke will be near normal output, but distributors will be forced to allocate iron, and this will constitute the No. 1 bottleneck to castings production. Seven blast furnaces have resumed, but most of the metal made will be basic.

Philadelphia — Pig iron production is picking up appreciably but it will be another three or four weeks at least before operations will be fairly normal. In the immediate district the smaller of two stacks at Swedeland, Pa., is expected to resume about June 17 and will start making foundry iron. The larger is running on basic and the furnace at Birdsboro, Pa., which was blown out recently, probably will be down until August, undergoing complete relining. Scarcity of pig iron is expected for some time, although shortage of coke, which recently has proven a greater bottleneck than iron at many foundries, should be over fairly soon, unless the threatened maritime strike should interfere, applying to coatwise as well as overseas shipping. Northeastern seaboard by-product coke producers rely heavily on coastal transportation for their coal.

Boston—Need for 15,000 tons monthly production of Mystic Furnace, Everett, Mass., by New England foundry and steel consumers has long been apparent but resumption by that unit is attended by complicated economic factors. Included are prices, ore supply and coke. Down for many months while the pig iron supply was becoming progressively critical, Mystic cannot operate profitably on lake ore, even with price premiums previously allowed. The furnace has some ore, about two months' supply, but lower cost imported ore is needed for sustained operations and higher water rates will make imported material cost well above prewar levels. Fuel shortages have repeatedly diverted coke required by this furnace to domestic heating. At best it would take some time to get this unit into production. Meanwhile New England foundrymen, through the New England Council, are pressing Washington to start this furnace as one means of easing the shortage. Iron deliveries from Buffalo and one Pennsylvania furnace are slightly improved, but far below normal, with melters pressing for tonnage. The load on Buffalo producers is especially heavy with most furnaces, including Mystic, in no position to aid in the immediate future.

St. Louis — Pig iron producion remains at near capacity here, little damage has been done to output by the coal and rail strikes. Coke inventories, already low, were depleted by half and coal piles are exhausted. Stoppage of pig shipments put melters on a hand to mouth basis. Smelters averted real hardship among customers by having loaded cars ready to move promptly with the end of the strike. Users of outside iron, however, are extremely low and volume shipments have not yet begun to arrive. There has been no slackening of demand and stocks are substantially lower than a month ago. Improvement is not expected this year. Production is reported held back somewhat by OPA pricing.

Birmingham — Pig iron is moving in somewhat better volume this week, although far from adequate even for strictly local needs. Melters and users of pig iron see no substantial or lasting improvement in the overall iron situation in the near future at least, with the result that there is little prospect of needs being adequately met indefinitely. Tennessee Coal, Iron & Railroad Co. has returned three idle furnaces to blast, making five active, but merchant iron is still on a reduced production basis.

Scrap . . .

Scrap Prices, Page 156

Scrap scarcity is becoming increasingly important and there is evidence that some tonnage is being held back in hope of an increase in prices, color to this belief being lent by receint advances allowed on nonferrous metals. Eastern dealers will meet in New York June 10 and western dealers in Chicago the same day, with their suggestions to be considered at a meeting of the industry advisory committee at Cleveland June 11. The latter meeting may formulate final suggestions to OPA. There appears to be considerable sentiment against price increases.

Chicago — Inventories of scrap at steel plants are distressingly low, new supply falls far short of demand, and considerable apprehension is felt. The situation arises chiefly from restricted flow of factory scrap, effects of strikes having forced manufacturing industries to low operations. Until new steel reaches consumers in volume, scrap output must remain low. Foundries also

are desperately in need of scrap. Except for certain alloys, ceiling prices prevail.

Association of Iron and Steel Dealers, Chicago, has adopted a resolution opposing an increase in ceiling prices of scrap and urging continuance of OPA for another year. This resolution has been presented to Warren Huff, head of the OPA scrap advisory committee. The association's stand is that higher prices would not bring out more scrap. Chicago chapter of the Institute of Scrap Iron & Steel Inc. will meet June 10 to formulate its stand on ceiling prices.

Pittsburgh — Downward trend in volume of industrial scrap is expected to continue over the next week or two, as most metalworking companies will not begin receiving any significant steel tonnage from mills until about June 20, with the result further curtailment in production schedules may be necessary in many instances. It is expected to take 30 to 60 days before mills will begin receiving industrial scrap in normal volume. During this period most mills will be forced to use a greater proportion of hot metal in open hearth operations to conserve inadequate scrap inventories. The scrap supply is expected to become acute during this period for mill operations should reach near capacity within a week or two.

The Southwest Steel Corp., Glassport, Pa., has let a contract for a large new crusher, which will increase company's operations 100 per cent. The crusher is expected to be ready within a month.

Buffalo — Increase in nonferrous metals prices has caused producers to expect a similar increase on ferrous scrap and they are refusing to sell, causing a stalemate and further reducing movement. Mills are taking material from reserves, which already are low. Receipts by the barge canal are also much reduced, the leading interest here having nothing scheduled from the East by water until the end of the month and nothing from the upper lakes. On the other hand, a leading midwest consumer has been trying to buy in this territory.

Cleveland — Scarcity of scrap has not been relieved in any degree and melters are short, in many cases unloading direct from cars to charging boxes instead of putting it on the ground. Prices are being paid fob shipping point with $2 to $2.50 additional freight cost. Low phos continues to be bought at its higher price to be used in open hearths, thus limiting the supply for electric furnace users. Some instances have occurred of scrap being held in the hope of a higher price, arising from the fact that increases have been allowed on nonferrous metals. Extent to which this is being done is not known. All grades are scarce, not an item being in sufficient supply to meet demand.

Boston — Lower melt has had no effect on strong demand for scrap in steelmaking and foundry grades. Most consumers seek to improve inventories, but with limited success, due to tight supply. Steel ingot production is up slightly but foundries are barely holding recent levels, although some improvement is developing. Industrial scrap production is well below expectations and supply of low phos also is tightening. Railroad offerings are mea-

ger. Demand for scrap outside this area is keen but car shortages are holding back some shipments. Dealers pay ceilings and sometimes above for unprepared, made possible by shading preparation charges or salvage.

Philadelphia—Scarcity of scrap is increasingly acute and may exert a dampening effect on steel mill and foundry operations for weeks. Talk of higher prices may be retarding flow of material to some extent, but it is doubtful if it is having much influence at the moment. Discussions with OPA are scheduled, however, eastern dealers and brokers planning to meet in New York June 10 and western dealers in Chicago the same day, with their suggestions to be considered at a meeting of their industry advisory committee in Cleveland June 11. Some stimulation to flow of scrap may result should prices be advanced in remote areas, it is suggested in some quarters.

Cincinnati — None of the strikes this year has cut into demand for iron and steel scrap, which is far in excess of available tonnage. Brokers and dealers contend there is a true scarcity although they hope more tonnage will be coming out soon. Railroad lists continue small, with the material spread thin among many bidders. The pig iron shortage has not yet been relieved and there has been no relaxing in appeals for cast scrap.

St. Louis — Scrap shipments have resumed about normal pace, except for a few spots where loading facilities had become overcrowded during the rail tieup. Considerable metal had been loaded to move quickly. Rail service improved but outlying dealers had accumulated little scrap. Generally speaking, mills suffered little distress although most reserves were cut below 30 days. Pressure on brokers to replenish them has picked up sharply.

Birmingham — Scrap has not yet started to move in substantial volume. Most dealers are rather unconcerned, it is reported, in view of high preparation costs and OPA ceilings, which they describe as inadequate. Mills are in the market and have been even through the recession, for whatever scrap they can get. Lifting of the railroad embargo will ease the situation some, but all wanted grades, especially cast, are acutely short.

Washington — Office of Price Administration has issued an order, effective June 5, allowing sales of railroad steel scrap prepared by a dealer or passing through a dealer's yard at maximum railroad scrap prices if the dealer warrants the scrap to be railroad scrap and names the railroad from which it originated. This is said to affect only a small portion of the approximately 3,250,000 tons of railroad scrap available annually as about 80 per cent of these grades normally are sold direct to consumers. Most of the remainder is sold by a small group of sellers, who frequently prepare and store it in separate establishments. Railroad scrap ceilings are $1 per gross ton higher than for corresponding grades of dealer and industrial scrap. The former regulation requiring railroad scrap passing through a dealer's yard to be priced as dealer scrap was based on the assumption that such scrap might lose its identity and be upgraded, mixed with other material not originating from a railroad.

Iron Ore . . .

Iron Ore Prices, Page 154

Shipments of Lake Superior iron ore in May totaled 3,616,115 gross tons, compared with 11,121,203 tons in May, 1945, the Lake Superior Iron Ore Association, Cleveland, reports. This was a decline of 7,505,088 tons, 67.48 per cent. Canadian mines accounted for 89,754 tons, compared with 58,623 tons in May last year.

Details of the movement are as follows:

	May, 1946	May, 1945
Escanaba	69,494	697,358
Marquette	26,854	472,590
Ashland	116,347	684,863
Superior	450,697	3,677,497
Duluth	1,610,126	2,942,338
Two Harbors	1,252,843	2,587,934
Total U. S. Ports	3,526,361	11,062,580
Michipicoten	61,652	58,623
Port Arthur	28,102	.....
Total Canadian	89,754	58,623
Grand Total	3,616,115	11,121,203

Decrease from year ago, 7,505,088 tons, 67.84 per cent.

Movement to June 1 this year totaled 4,346,017 tons, compared with 18,403,277 tons to the same date last year, a decline of 14,057,260 tons, 76.38 per cent. Canadian mines shipped 165,894 tons, compared with 105,555 tons to the same date last year.

Details of the season's shipments are as follows:

	To June 1, 1946	To June 1, 1945
Escanaba	69,494	1,257,401
Marquette	26,854	889,701
Ashland	116,347	1,192,197
Superior	450,697	5,731,150
Duluth	1,937,226	4,737,917
Two Harbors	1,579,505	4,489,356
Total U. S. Ports	4,180,123	18,297,722
Michipicoten	125,715	105,555
Port Arthur	40,179	.....
Total Canadian	165,894	105,555
Grand Total	4,346,017	18,403,277

Decrease from year ago 14,057,260 tons, 76.38 per cent.

Ferroalloys . . .

Ferroalloy Prices, Page 155

New York — June shipments of ferroalloys may not reach April volume, heaviest for any one month so far this year, but will likely equal if not exceed the May movement, which was second largest to date.

General expectation is that actual consumption will be heavier than last month as steelmaking operations are expected to reach a higher average; however some stocking of ferroalloys in May might make a little less pressure on shipments during the current month. At the same time though, there is a possibility that higher prices on some alloys may be permitted by the Office of Price Administration within the relatively near future and that being the possibility there may be extra specifying which might even lift the movement this month to a level comparable with April.

With shipments in April largest so far and those in May second largest, the movement in March comes third, January fourth and February fifth. That

February shipments should be the lightest is due primarily to the fact that the steel industry was closed down for the first 20 days of that month because of strike.

Warehouse . . .

Warehouse Prices, Page 154

Cincinnati — Warehouse volume in May was off, in some cases 50 per cent. Lack of replacements, because of strikes, brought depletion in many items despite a rationing plan. Inquiries for heavy tonnages have reappeared but jobbers foresee a lag of several weeks before sales can be lifted to pre-strike levels.

Chicago — Warehousemen are hopeful that the steel industry will return to full operations quickly and will resume flow of materials. Distributors have been under pressure from consumers seeking to obtain enough material to keep plants running. Sheet items, small bars, light structurals, nails and the like, are exhausted in many cases. As a result, considerable steel will be required to rebuild inventories to workable levels.

Philadelphia—Jobbers find an improvement in incoming shipments and anticipate a gain in daily sales average for this month. They will fall well short of meeting demand, however, especially for light flat products, shapes and bars.

Steel in Europe . . .

London — (*By Cable*) — Production of steel in Great Britain has reached an annual rate of 13,250,000 tons and is increasing as pressure for material continues. Demand is maintained at a high rate but deliveries are well extended. Exports are severely limited by unprecedented home requirements.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1430 tons, three drum gates, Spec. 1220, Shasta dam, Coram, Calif., for U. S. Bureau of Reclamation, to American Bridge Co., Pittsburgh; bids April 24.

1140 tons, cofferdams, Shasta dam, specification 1279, Coram, Calif., for U. S. Bureau of Reclamation, to Consolidated Steel Corp., Los Angeles; bids May 20.

900 tons, factory building, Milwaukee, for Heil Co., 800 tons to Bethlehem Steel Co., Bethlehem, Pa., and 100 tons to Milwaukee Bridge Co., Milwaukee; Klug & Smith Co., Milwaukee, contractor; bids May 23.

650 tons, New Jersey state bridge, Route 25, near Elizabeth, through Boirier-McLane, general contractors, to American Bridge Co., Pittsburgh.

600 tons, water cylinders, Mead Paper Co., Macon, Ga., to Alco Steel Products Co., New York.

500 tons, maintenance building, Gulf Oil Co., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

460 tons, building, Fawcett Publishing Co., Greenwich, Conn., to Harris Structural Steel Co., New York.

460 tons, grinding building, Fulton, Mo., for Harbison-Walker Refractories Co., to American Bridge Co., Pittsburgh.

450 tons, building General Foods Corp., Hoboken, N. J., through Walter Kidde, New York, to American Bridge Co., Pittsburgh.

425 tons, factory building, Bendix Helicopter

Co., Stratford, Conn., through Dyker Building Co., New York, to Harris Structural Steel Co., New York.

420 tons, truss span and repairs, bridge No. 656 in Oklahoma, for Missouri-Kansas-Texas Lines, to American Bridge Co., Pittsburgh; bids April 29.

400 tons, plant addition, Simonds Saw & Steel Co., Fitchburg, Mass., to United Structural Steel Co., Worcester, Mass.; E. J. Cross Construction Co., Worcester, Mass., general contractor.

300 tons, machine shop additions, Kennedy-Van Saun Mfg. & Engineering Co., Danville, Pa., to Reading Steel Products Co., Reading, Pa.

300 tons, plant building, Bush Mfg. Co., Hartford, Conn., through F. H. McGraw, contractor, to National Steel Products Co., Hartford.

300 tons, coaster gates, specification 1254, Grand Coulee pumping station, Odair, Wash., for U. S. Bureau of Reclamation, to Arthur M. Meyerstein Inc., Brooklyn, N. Y.; bids May 6.

220 tons, bridge over Kalamazoo river, Plainwell, Mich., for state, to American Bridge Co., Pittsburgh.

150 tons, bridge, Ainsworth, Iowa, for Chicago, Rock Island & Pacific railroad, to American Bridge Co., Pittsburgh; bids May 6.

120 tons, plate girder spans, repairs to bridge in Oklahoma, for Missouri-Kansas-Texas Lines, to American Bridge Co., Pittsburgh; bids April 17.

STRUCTURAL STEEL PENDING

3700 tons, bridge, Milan, Ill., for state; bids May 3 rejected, new bids June 7.

3000 tons, New Jersey State vertical lift bridge over Passaic river, Route 25-A; Mt. Vernon Bridge Co., Mt. Vernon, O., low bidder, at $1,532,454.

2275 tons, highway bridge, relocation U. S. highway 66, Madison county, Illinois; bids to U. S. engineer, St. Louis; work also takes 30 tons cast steel and 12,220 square feet roadway grating.

1000 tons, manufacturing building, Lincoln, Ill., for Lehn & Fink Products Corp.; B-W Construction Co., Chicago, contractor.

293 tons, bridge, Polk county, Iowa, for state; bids May 28 rejected.

165 tons, five-span I-beam bridge at Newport, Vt.; bids June 17 to Austin J. Beebe, city clerk; also 44 tons reinforcing bars.

Unstated, 150-ton gantry crane for Coulee project; Star Iron & Steel Co., Tacoma, low, $49,000.

Unstated, shapes for L-9 Coulee power plant; bids to Bureau of Reclamation, Denver, July 2. (Spec. 1360).

REINFORCING BARS . . .

REINFORCING BARS PLACED

600 tons, grain elevators in eastern Washington and Idaho, to Bethlehem Pacific Coast Steel Co., Seattle.

235 tons, science building, Boston, for Boston University, to Concrete Steel Co., New York.

100 tons, expansion, Milwaukee, for Wisconsin Telephone Co., to W. H. Pipkorn Co., Milwaukee.

REINFORCING BARS PENDING

414 tons, including 154 tons bars and 260 tons wire mesh, highway construction, project R-2686 Johnson County, Ind., for state; William D. Vogel, Indianapolis, low on general contract; bids May 21.

385 tons, highway bridge, relocation U. S. highway 66, near Mitchell, Ill.; bids to U. S. engineer, St. Louis.

800 tons, main canal Deschutes project; bids to Reclamation Bureau, Bend, Oreg., June 15.

268 tons, including 88 tons bars and 180 tons wire mesh, highway construction, project R-2661, Johnson county, Ind., for state; Reith-Riley Co., Indianapolis, low on general contract; bids May 21.

240 tons, including 90 tons bars and 150 tons wire mesh, highway construction, project R-2689, Marion county, Ind., for state; McCalman Construction Co., Danville, Ill., low on general contract; bids May 21.

200 tons, steel joist, store building, Gary, Ind., for Montgomery, Ward & Co.; bids May 28.

200 tons plus, navy idle-fleet piers, Tacoma, Wash.; general contract to Manson Construction Co., Seattle.

100 tons, high school for boys, Glen Lake, Minn., for Hennepin county.

Unstated, $400,000 reinforced grain elevator, Pendleton, Oreg.; general contract to Henry Georg & Son, Spokane.

Unstated, buildings for Pacific Light & Power Co., Naches, Wash.; bids soon.

PLATES . . .

PLATES PENDING

215 tons, two lots, direct bid to U. S. engineer, Memphis, Tenn.; also 72 tons steel sheets.

Unstated, 9600 feet, 12-foot diameter steel pipe, Coulee project; bids to Bureau of Reclamation, Denver, June 14.

PIPE . . .

CAST IRON PIPE PENDING

1300 tons, 12, 8, 6 and 3-inch, cast iron bell and spigot, Everett, Wash.; bids June 10.

650 tons, 8 and 6-inch valves and fittings; bids to Aleta A. Bennett, city clerk, Toppenish, Wash., June 14.

RAILS, CARS . . .

RAILROAD CARS PLACED

Ann Arbor, 50 fifty-ton box cars, to own shops.

Atchison, Topeka & Santa Fe, 350 forty-ton refrigerator cars, to Pullman-Standard Car Mfg. Co., Chicago.

Central of New Jersey, 125 seventy-ton cement hopper cars, to Harlan & Hollingsworth Corp., Wilmington, Del.

Denver & Rio Grande Western, 10 caboose cars, to Pressed Steel Car Co., Pittsburgh.

Norfolk & Western, 250 fifty-ton box cars, to own shops.

Pere Marquette, 25 caboose cars, to Harlan & Hollingsworth Corp., Wilmington, Del.

Pittsburgh & West Virginia, 150 drop-end gondolas, to Harlan & Hollingsworth Corp., Wilmington, Del.

RAILROAD CARS PENDING

Chicago, Illinois & Louisville, 500 fifty-ton box cars and 150 fifty-ton flat cars.

Kansas City Southern, 100 seventy-ton pulp wood cars; pending.

New Orleans Public Belt, 5 seventy-ton hopper cars; pending.

Railway Express, 500 express refrigerator cars.

Union Tank Lines, 500 fifty-ton tank cars; bids asked.

LOCOMOTIVES PLACED

Nigerian Railway, fourteen 2-8-2 type locomotives, 3½ foot gage, to Montreal Locomotive Works Ltd., Montreal.

West Virginia & Northern, two 1000-horsepower diesel-electric switch engines, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

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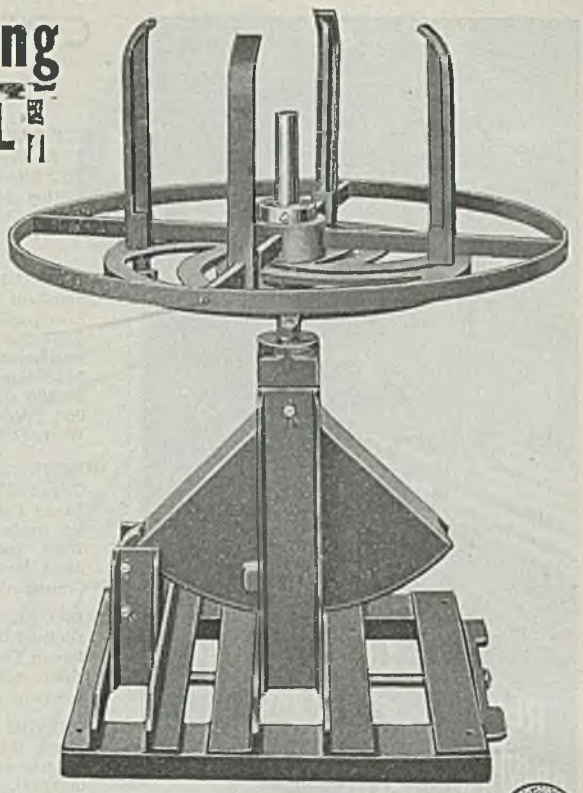

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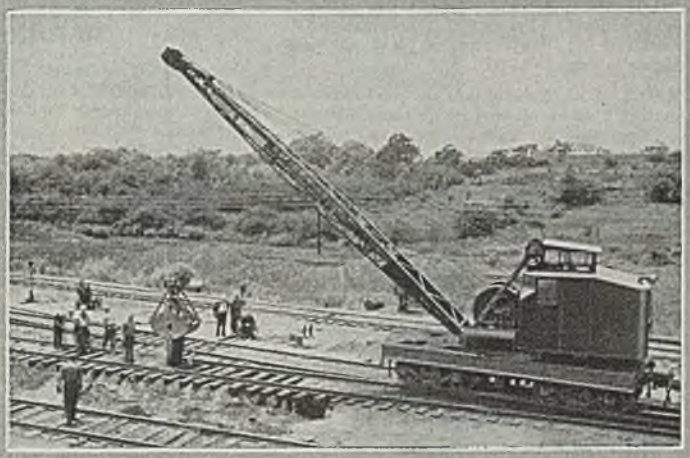

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CONSTRUCTION AND ENTERPRISE

ALABAMA

FORT PAYNE, ALA.—City has let contract to J. E. Woolley Construction Co., 304 Ridge Rd., Birmingham, for a sewage disposal plant costing $117,000.

CALIFORNIA

GLENDALE, CALIF.—American Radiator & Standard Sanitary Corp., 2135 Atlantic St., Los Angeles, has let contract to Myers Bros., 3407 San Fernando Rd., Los Angeles, for a warehouse, office and shipping building at 5438 San Fernando Rd., Glendale, covering 52,906 square feet, estimated to cost $215,000. Edward C. and Ellis W. Taylor, 803 West Third St., Los Angeles, are architects.

HUNTINGTON PARK, CALIF.—Kellefer Mfg. Co., 5525 Downey Rd., subsidiary of John Deere Farm Implement Co., Moline, Ill., has let contract to E. S. McKittrick Co. Inc., 7839 Santa Fe Ave., Los Angeles, for a plant building covering 60,000 square feet. Construction will start about July 1.

LONG BEACH, CALIF.—City council has let contract to Transpacific Construction Co., 351 Ocean Center Bldg., Long Beach, for a machine shop and equipment at Spring St. and Junipero Ave., to cost about $52,000.

REDONDO BEACH, CALIF.—Southern California Edison Co. plans a 120,000 kw steam electric generating plant to cost about $15,000,000. Stone & Webster Engineering Corp., 601 West Fifth St., Los Angeles, is consulting engineer.

RIVERSIDE, CALIF.—Food Machinery Corp. is building plant structure 167 x 265 feet at 3075 Twelfth St., to cost about $40,000.

VENICE, CALIF.—McCulloch Aviation Co. is erecting a plant building 51 x 151 feet at 6101 West Century Blvd., to cost about $40,000.

VERNON, CALIF.—Bethlehem Pacific Coast Steel Corp. has let contract to Bechtel Bros. McCone Co., 3780 Wilshire Blvd., Los Angeles, for concrete foundations and footings for new steelmaking facilities to be erected here. Total cost of plant is estimated at $8 million.

VERNON, Calif.—Reliance Steel Corp., 2068 East 37th St., is building a plant addition costing about $42,000.

VERNON, CALIF.—Bethlehem Steel Co. is erecting a group of steel frame manufacturing buildings at 3396 East Slauson Ave., to cost about $130,000.

VERNON, CALIF.—Byron Jackson Co., is erecting an office building at 2300 East Vernon Ave., to cost about $143,000.

CONNECTICUT

BRIDGEPORT, CONN.—Remington-Rand Inc., 2 Main St., plans erection of a plant for production of plastics parts, to cost about $225,000. F. Thompson Inc., 211 State St., is architect.

STAMFORD, CONN.—Taylor-Reed Corp. plans erection of a plant in the Glenbrook section, to cost about $200,000.

STRATFORD, CONN.—Contract Plating Co. Inc., 540 Longbrook Ave., plans erection of a plant costing about $55,000.

WEST HAVEN, CONN.—Western Electric Co. Inc., 135 Wood St., West Haven, Conn., has let contract to Dwight Bldg. Co., 152 Temple St., New Haven, for a plant addition to cost about $270,000.

FLORIDA

JACKSONVILLE, FLA.—Niagara Sprayer & Chemical Division, 145 Parker Ave., plans a manufacturing plant to cost about $140,000.

PENSACOLA, FLA.—International Mineral & Chemical Corp., Goulding, Fla., plans a fertilizer plant to cost about $145,000.

ILLINOIS

BLUE ISLAND, ILL.—Illinois Brick Co., 228 North LaSalle St., Chicago, has let contract to Bulley & Andrews, 2040 West Harrison St., Chicago, for a one-story 200 x 250-foot manufacturing plant; structural steel will be furnished by Henry Gemp Co., 2864 East 95th St., Chicago.

CHICAGO—Pyramid Metals Co., 1335 North Wells St., has let contract to L. B. Strandberg Co., 608 South Dearborn St., for a one and two-story plant and office building, 218 x 301 feet, to cost about $300,000.

LA GRANGE, ILL.—Electro Motive Corp., La Grange, has plans by Schmidt, Garden & Erikson, 104 South Michigan Ave., Chicago, for a power plant to cost about $2 million

MAYWOOD, ILL.—William J. Strange Co., 2536 West Monroe St., Chicago, has let contract to the Austin Co., 510 North Dearborn St., Chicago, for a one and two-story factory building, to cost about $500,000.

SAVANNA, ILL.—C. R. Jahn Co., 1341 West 37th Place, Chicago, is having plans drawn by American Engineering & Management Co., 141 West Jackson Blvd., Chicago, for a plant building 140 x 200 feet, to cost over $100,000.

INDIANA

CONNERSVILLE, IND.—City, City Hall, is taking bids on a water softening plant to cost about $175,000.

PERU, IND.—Square D Co., H. R. Ostrander, manager, plans a plant building 100 x 280 feet for manufacture of switches and other electrical equipment, to cost about $100,000.

LOUISIANA

BATON ROUGE, LA.—Ethyl Corp., C. W. Bond, manager, is having plans prepared by Bodman & Murrell, architects, Reymond Bldg., for two buildings, estimated to cost about $1 million.

MARYLAND

BALTIMORE—Crown Cork & Seal Co., Kurson St. and Eastern Ave., has let contract to Consolidated Engineering Co., 20 East Franklin St., for a one-story machine shop 450 x 570 feet, to cost about $750,000.

BALTIMORE—Eastern Stainless Steel Corp., Rolling Mill Ave., has let contract to Turner Construction Co., 1500 Walnut St., Philadelphia, for a one-story 80 x 200-foot polishing plant. H. D. Ganteaume, 99 Chauncey St., Boston, is engineer.

MASSACHUSETTS

CAMBRIDGE, MASS.—Boston Woven Hose & Rubber Co., 29 Hampshire St., is taking bids on a one to four-story 45 x 325-foot plant building. Charles T. Main, 201 Devonshire St., Cambridge, is engineer.

LUDLOW, MASS.—Ludlow Mfg. & Sales Co. let contract to Tredennick Billings Co., 10 High St., Boston, for a one-story 73 x 120-foot power plant to cost about $55,000.

MICHIGAN

DEARBORN, MICH.—Superdraulic Corp., 1225 Ford Rd., has plans completed for a two-story laboratory and office building to cost about $250,000.

MINNESOTA

MINNEAPOLIS—Minneapolis Honeywell Regulator Co., 2753 Fourth Ave. S., plans a two-story 100 x 125-foot plant addition cost-

ing about $100,000. E. J. Prondzinski, 949 Plymouth Bldg., is architect.

MISSISSIPPI

JACKSON, MISS.—Armstrong Cork Co., Lancaster, Pa., and Jackson, has let contract to Capital Bldg. Co., Jackson, for a plant building to cost about $355,000.

MISSOURI

ST. LOUIS—Westinghouse Electric Corp., 717 South Twelfth St., has let contract to Sheppard, Wilson & Krugs, Jefferson Hotel, St Louis, for a one-story 146 x 351-foot warehouse building and boiler house and a one and two-story shop and office building, to cost about $750,000.

ST. LOUIS—Century Foundry, 3727 Market St., will let contract soon for a one and two-story addition 245 x 250 feet. Rathmann, Koelle & Carroll, 316 North Eighth St., are architects.

ST. LOUIS—Brewer Machine & Tool Co., 3437 North Broadway, has let contract to Bonded Hauling Co., 3820 North Broadway, for a one-story 60 x 100-foot plant and office building.

ST. LOUIS—Atlas Tool & Mfg. Co., 5147 Natural Bridge Ave., has let contract to W. H & Nelson Cunliff Co., 3320 Lindell Blvd., for a one-story 40 x 100-foot plant building.

NEW YORK

NEW YORK—Burndy Engineering Co. Inc., 107 Bruckner Blvd., plans foundry, machine shop, assembly plant and office buildings at 138th St. and Walnut Ave., to cost about $500,000.

NORTH CAROLINA

CHARLOTTE, N. C.—Southern Metals Co., 224 South Graham St., H. Helbein, president, plans two one-story warehouse buildings 100 x 200 feet and one-story office and warehouse building, to cost about $150,000.

OHIO

ASHTABULA, O.—Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland, has let contract to Gran Bros., 5827 Washington St., for a manufacturing plant to cost about $750,000, with equipment. (Noted May 6).

CLEVELAND—Ferro Enamel Co., 4150 East 56th St., R. A. Weaver, president, plans expansion and remodeling program costing about $80,000 when materials can be obtained.

CLEVELAND—International Molded Plastics Inc., George V. Goulder, president, 4387 West 35th St., will build plant with 15,000 square feet floor space at 2500 Brookpark Ave., to increase manufacturing facilities.

CLEVELAND—M. D. Kilmer Co., wire manufacturer, 1956 East 66th St., soon will build a $30,000 factory and warehouse, one story, 80 x 100 feet. A. H. Kilmer is president.

MANSFIELD, O.—Renie Metal Products Co., 807 Bowman St., plans erection of a plant addition 40 x 80 feet.

PAINESVILLE, O.—Butler Bros. Iron Mining Co., Terminal Tower, Cleveland, plans a plant for manufacture of electrolytic iron powder, at cost of about $310,000. C. L. Wyman is manager of the Cleveland office, Terminal Tower. Harold Trask is chief metallurgist.

TOLEDO, O.—DeVilbiss Co., 300 Phillips Ave., has let contract to George W. Lathrop & Sons Inc., 1510 Montcalm St., for a boiler room addition and warehouse and one-story 80 x 200-foot manufacturing building to cost about $175,000.

WARREN, O.—Thomas Steel Co., Warren, plans a boiler house addition 45 x 60 feet 45 feet high, to cost about $60,000. Edward G. Hoefler, 5005 Euclid Ave., Cleveland, is engineer.

OREGON

NYSSA, OREG.—Amalgamated Sugar Co. plans expansion, including construction of acid plant and other additions, at total cost of about $500,000.

PENNSYLVANIA

BEAVER FALLS, PA.—Babcock & Wilcox Tube Co., Beaver Falls, plans a two-story plant addition 237 x 280 feet, to cost about $150,000.

BENTLEYVILLE, PA.—Industrial Collieries Corp., Bentleyville, is taking bids on a one and two-story filtration plant at Ellsworth, Pa., to cost about $90,000, and a similar plant at Marianna, Pa., to cost about $93,000. Morris Knowles Inc., 1312 Park Bldg., Pittsburgh, is engineer.

CORAOPOLIS, PA.—Homestead Valve Mfg. Co., will build a one-story plant building 100 x 400 feet. Prack & Prack, 119 Federal St. NS., Pittsburgh, are architects.

ELLWOOD CITY, PA.—Mathews Conveyer Co., Factory Ave. and Tenth St., has let contract to Uhl Construction Co., 6001 Butler St., Pittsburgh, for a one-story plant 80 x 200 feet and 20 x 100 feet, to cost about $85,000.

MARCUS HOOK, PA.—Sinclair Refining Co., Marcus Hook, has let contract to C. F. Brown, Alhambra, Calif., for a refinery plant costing about $60,000.

MEADVILLE, PA.—National Bearing Metals Co. has plans by J. G. Turnbull, 2630 Chester Ave., Cleveland, for a manufacturing plant and office building to cost about $550,000.

MONACA, PA.—St. Joseph Lead Co., Rochester, Pa., is having plans prepared for power plant and manufacturing facilities to cost about $3,500,000.

PHILADELPHIA—Texas Co., 135 East 42nd St., New York, plans erection of refinery opposite Philadelphia Navy Yard on Delaware river, to cost over $1 million.

PHILADELPHIA—Edward G. Budd Mfg. Co., 2450 Hunting Park Ave., has let contract to Wark & Co., 1700 Sansom St., for an incinerator plant costing about $70,000.

RHODE ISLAND

WARWICK, R. I.—Johnson Automatics Mfg. Co., Second Ave., Cranston, R. I., has plans by Cleverdon, Varney & Pike, 120 Tremont St., Boston, for a plant building to cost over $500,000.

TENNESSEE

MEMPHIS, TENN.—International Harvester Co. Inc., 180 North Michigan Ave., Chicago, has let contract to Virginia Engineering Co., Newport News, Va., for a one-story 400 x 800-foot plant building to cost about $3 million.

NASHVILLE, TENN.—Ferro Enamel Corp., 4150 East 56th St., Cleveland, has let contract to Foster & Creighton, American National Bank Bldg., for a one-story 100 x 200-foot plant building, estimated to cost about $115,000.

TEXAS

HOUSTON, TEX.—Continental Spring Co., 2400 Nance St., has plans under way for additional plant buildings to cost about $400,000. J. B. Dannanbaum, 2136 Albans St., is engineer.

WASHINGTON

MARKHAM, WASH.—Crawford Canneries Inc., W. S. Jacobsen, manager, has let contract to Grays Harbor Construction Co. for a cannery plant 80 x 300 feet, to cost $120,000, of which $75,000 is for equipment. Building replaces plant burned in 1942.

WISCONSIN

BEAVER DAM, WIS.—Metalfab Inc., Beaver Dam, is having plans drawn for a one and two-story 80 x 160-foot plant by Weiler & Strang, architects, 114 North Carroll St., Madison, Wis.

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MATERIALS

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200-Ton Alliance 100' Span
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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-Tan 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-Tan Toledo 82' Span
15-Ton Whiting 74'8 1/4" 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 48'10 1/2" 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
7 1/2-Ton Erie 70' Span
7 1/2-Ton P&H 30'6" Span
7 1/2-Ton Shepard 36' Span
6-7-Tan Milwaukee 70' Span
6-Ton Shaw 23' Span
6-Ton "American" 10' Span
6-Ton Champion 37'6" Span
6-Ton Euclid
6-Ton Milwaukee 39'6" Span
6-Ton Milwaukee 66'9" Span
6-Ton Milwaukee 70' Span
5-Ton Northern 49'6" Span
5-Ton P&H 45' Span
5-Ton Shaw-Box 25' 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 67'3" 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
1 1/2-Ton Cleveland 28' Span
1 1/2-Ton P&H 22'8" Span 34' Span
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