STEEL

The Magazine of Metalworking and Metalproducing

VOL. 118, NO. 6 FEB. 11, 1946

NEWS

TECHNICAL

FEATURES

MARKETS

NEXT WEEK...

How One Plant Reconverted in 90 Days

Insuring Dimensional Accuracy by Heat Treating

Applications for Metal Coated Plastics

Cleaning and De-Whiskering Nails

Carbide Tool Grinder with Special Protractor

● The widespread use of triple-alloy steels containing Nickel, chromium and molybdenum is based on extensive experience in widely divergent engineering fields.

It has been found that they can be counted on for consistent performance. The depth to which full hardness is developed is comparable to that attained by other alloy steels. Their response to heat treatment is dependably uniform.

Moreover, the wide range of compositions available, makes it possible to select *accurately* suitable alloy steels for a broad range of applications.

Inquiries regarding the selection and uses of triple-alloy steels containing Nickel are invited.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 Wall Street New York 5, N.Y.

GA-2497

As the EDITOR VIEWS the NEWS

Great Potentials, But . . .

It is safe to say that practically every one of the tens of thousands who visited the twenty-seventh National Metal Congress and Exposition in crowded Cleveland last week went away impressed by the latent strength and ability of America's metalworking industries to meet the challenge of the postwar period successfully.

Throughout the numerous technical sessions of the American Society for Metals and the American Industrial Radium and X-Ray Society were prepared papers, lectures, roundtable discussions and honorary awards which gave eloquent testimony to the zeal with which technical men are tackling the problems of their industries. ASM, now said to be the third largest technical society in the world, demonstrated anew the initiative and vigor which have enabled it to rise to such a high position in such a short time.

Scattered throughout the more than 400 exhibits in the Metal Show were glimpses of tomorrow's applications of old and new metals—ferrous and nonferrous. Noteworthy was the enlarged role of electronics in the industry's processes and equipment indicated by many exhibits. Also conspicuous were the refinements in numerous heat treating, welding, baking, forging, forming, pressing, machining and other units which make it possible to place them in their logical sequence in the production line instead of segregating them in isolated departments as has been the orthodox practice in the past.

Also impressive was the evidence found in so many exhibits of more compactly designed equipment, greater precision, higher efficiencies and other improvements which will enable the operator to turn out products of higher quality and at lower cost.

Everything in the conventions and in the show pointed toward new horizons in industrial achievement. Viewing this encouraging panorama of technological progress against the background of current national confusion made one uncomfortably aware of the great gulf that exists between our rapid technological development and our slow, if not almost stagnant, progress in economic and political affairs.

The achievements reflected in the great conventions and show at Cleveland last week represent great potentials for the postwar world. To reap the full advantage of these potentials we must quickly elevate our economic and political thinking to a higher plane. Our great national asset of a strong, vigorous metalworking industry will avail us little if we continue to hamstring it at every turn by national policies that are based on cheap political expediency and economic fallacies.

Official Washington could have spent the entire week at the Metal Show with great profit.

NEW BRAINS NEEDED: Unless some unforeseen miracle comes to pass, the pattern by which the federal government is attempting to settle the steel strike will lead the metalworking industries into a state of unprecedented confusion.

This pattern consists of raising steel prices by an amount calculated by the government to be sufficient to permit steel companies to increase wages by 18.5 cents per hour, the figure suggested by President Truman several weeks ago. While this compromise may seem to be fair for primary steel producers, it will be unfair and possibly disastrous for the thousands of secondary processors, fabricators and others who, subject to wage increases similar to those granted by the primary producers, also will be forced to pay increased prices for the steel they process or fabricate.

Even if the government recognizes the plight of these secondary companies and attempts to accord them price relief, the benefits of such relief will lag far behind the time when increased costs in wages and steel prices are incurred. Under the

(OVER)

most favorable circumstances imaginable, the fabricators are in for an uncomfortable squeeze.

This comes of industry-wide strike voting and economic illiteracy among White House advisers. The mess is so bad that President Truman would be justified in completely restaffing his economic and labor brain trust.

A new set of Presidential advisers, even if they were to include the ablest the nation affords, would be confronted with a terrific task.

The job of undoing the mistakes made in Washington since V-J Day alone is tremendous. First, in order of urgency, would be to get the government out of labor disputes. Government interference has proved to be more harmful than helpful. It has intensified labor unrest and introduced complications that never should have become attached to the problem of wages.

Second step would be to put price control on a sensible basis so that manufacturers can get back into the businesses they are best qualified to handle. The present inflexible, slow moving, intricate and discriminatory price set-up is inexcusable. It needs revamping immediately.

Third would be to check every government policy with sound economics and then to point them toward economic and away from political considerations.

Strong men, pursuing this course, in time could undo the mistakes of the past few months that have brought the nation so close to the brink of chaos.

—pp. 60, 75

• • •

INACTIVE PATENTS: Last June American manufacturers were invited to list in the "Official Gazette" of the Patent Office unused patents which were available for license or sale. To date the response has been disappointing. During the last half of 1945 about 12,000 patents were listed and of these 9000 were registered by two corporations—Radio Corp. of America and International Harvester Co.

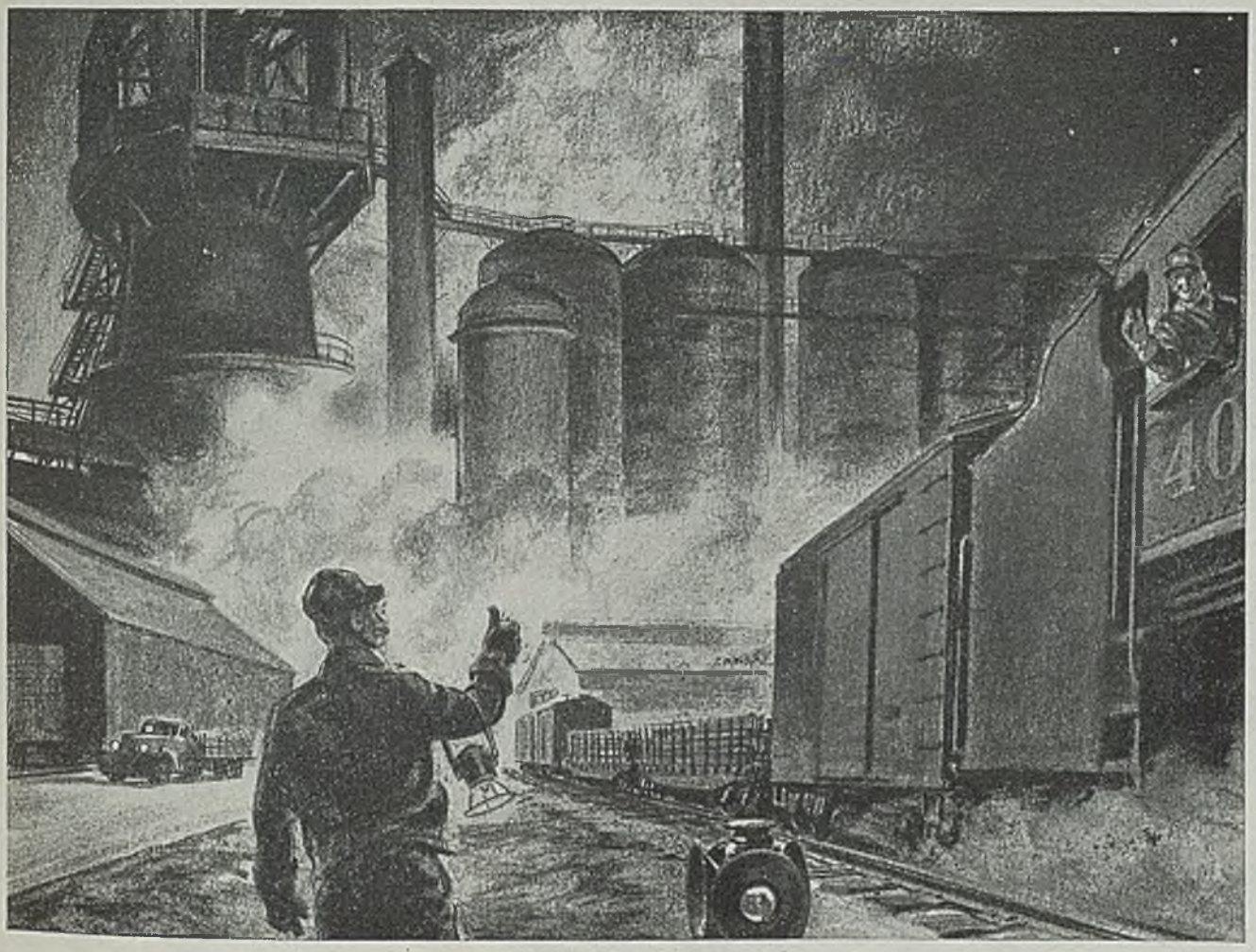
One wonders why so few companies have taken advantage of this opportunity. The "Register of Patents Available for License or Sale" was first suggested by the National Patent Planning Commission of which Charles F. Kettering was chairman. It was felt that if corporations would list publicly the unused patents available for license or sale, such listing would go far in refuting the charge of critics that corporations were holding back progress by keeping important patents "on the shelf."

Perhaps some corporations should re-examine this proposal to list inactive patents. The idea may have more merit than appears on the surface. —p. 68

SIGNS OF THE TIMES: Presidents of the Chrysler and Ford UAW-CIO unions recommend that their members voluntarily contribute the full amount of their recently negotiated wage increases (p. 76) to the relief of General Motors strikers. In Cleveland, where City Council yielded to CIO pressure by passing an ordinance authorizing a "tag day" for the relief of strikers (p. 61) Mayor Thomas A. Burke, exercising his veto power for the first time, vetoed the measure with a forceful message to the effect that this type of solicitation for relief would establish a "bad precedent". . . . A technical committee of American Iron & Steel Institute is sponsor of two simplification programs being developed through the Division of Simplified Practice of the Bureau of Standards. One would reduce the number of varieties and sizes of wire nails and staples (p. 79) and the other would simplify the stock items under the heading of woven wire fencing. . . . Mineral production in California in 1945, valued at $488 million, established a new record (p. 81)—the result of increased outputs of petroleum and natural gas. . . . A survey conducted by Civilian Production Administration before the steel strike started (p. 66) showed that the gray iron castings industry will need about 40,000 additional foundry workers in order to bring production up to current demand. . . . General Electric Co. reveals that even before the strike of electrical workers began (p. 62) the company was wrestling with the problem of obtaining a sufficient number of designers and draftsmen. Shortages in design personnel previously had been reported in the automotive and other industries. . . . The Office of Small Business has been formally established in the Department of Commerce (p. 72), absorbing the functions of the Smaller War Plants Corp. The new unit is expected to offer business men aid and guidance in sound business practice, general administration, production, buying procedure, inventory and other problems. . . . Effect of the steel strike is beginning to be reflected in weekly statistics and indexes. Railroad car loadings, electric power ouptut, bituminous coal output, department store sales and automobile assemblies all are tending downward (p. 156) as the creeping paralysis of strikes spreads. . . . In designing welded machinery parts, the possibilities of subassemblies should not be overlooked. Often a subassembly permits maximum accessibility for welding. This is important (p. 98) because the more accessible the weld, the higher will be its quality and the lower its cost.

E. C. Shane

EDITOR-IN-CHIEF



HOW TO DEVELOP LOWER DELIVERED COSTS OF STEEL

Here Is a Cost Factor Worth Checking

Steel is a low cost large tonnage product when compared with other metals. But the net cost delivered alongside your machinery and equipment varies greatly in different plants depending upon the mill methods of packing and shipping — and the manufacturers' methods of receiving and handling.

Inland metallurgists control quality from the ore to the finished product . . . but the preservation of that quality is still another factor in final machine side delivery.

So Inland shipping experts prepare the steel with care and pack it for safe arrival and quick economical receiving and handling.

But there are so many types of equipment that may be used in receiving and handling that it is important that the shipping and receiving methods dovetail in order to secure the lowest possible costs. To develop this teamwork between us, it is often advisable to compare notes.

Inland shippers are available to consult with you at any time and make recommendations toward the lowering of your final machine side cost of steel.

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

INLAND STEEL

No Mistaking Ryerson Alloys

Certified Quality Demands Positive Identification

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

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

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

"No comment." Reporters were not surprised to receive this statement from OPA Administrator Chester Bowles shown leaving the White House last week as he and other administration officials struggled to formulate a wage-price policy for the reconversion period. NEA photo

Disruption in Steel Consuming Plants To Continue After Strike Ends

Considerable delay in resumption of normal deliveries of finished products will be experienced after mills reopen. Passing along of increased costs resulting from higher labor and raw materials prices will pose difficult problem

SETTLEMENT of the steel wage controversy and reopening of the mills will not end the disruption in steel consuming and steel distributing industries that has been caused by the strike. Weeks and in some cases months will elapse before these industries will be able to get back to substantially full operations.

In the first place, there will be a considerable delay before normal steel deliveries can be resumed. Ten days or two weeks will be required to start the basic industry from a dead standstill to full production. A month or more will be required before the needed sheets and bars and other finished products are flowing to consumers' plants in the eastern and midwestern steel producing areas. In the more highly finished products even greater time may be required. Consumers on the West Coast and in other districts far removed from the large steel centers must wait even longer.

In some mills, equipment has been damaged in the cooling down process. The time that will be required to rehabilitate this damaged equipment is difficult to appraise.

Secondly, steel fabricators and consumers have indicated they will not necessarily follow the basic industry in the wage agreements reached with the union. Most of these steel users are faced with a two-way increase in costs—higher wages and higher prices for their raw material. Granting of price relief to these industries to compensate for the higher wage and material costs will be difficult and time consuming at best. Until the steel fabricators and distributors know to what extent and in what manner the higher costs are to be permitted to be passed along they will have little incentive to increase operations. Negotiating new wage contracts between the unions and the consuming and distributing industries likewise will require considerable time.

However, both producers and consumers hope that once the wage-price problem is finally adjusted demand for steel and general metalworking activity will become more active than before the walkout started. Major consumer interest at first will be devoted to obtaining deliveries as soon as possible and to building up working inventories.

Meanwhile, the slowdown in industrial activity as a direct result of the steel strike continued to spread through

the metalworking industries and to extend out to other industries.

Construction activities in many sections are being tapered and new projects delayed because of inability to obtain necessary steel products. In some areas an acute shortage of nails is reported to be holding back the building of urgently needed homes.

Food canning has felt the impact of the strike due to the cessation of the flow of tin cans. Harvesting of fruits and vegetables in some cases has been limited to the most perishable items.

Delivery of public transportation equipment to replace badly worn units has been delayed.

Additional steel consuming plants have either closed for lack of steel, furloughed part of their labor force, or reduced their work-weeks, as indicated in the following reports from STEEL's district editors.

Small Steelmakers Press Washington for Relief

Pressing for consideration in any price-wage formula which may be arrived at in the steel strike controversy, spokesmen for the nonintegrated steel producers last week sent a telegram to President Truman and other government officials pointing out the precarious position of these mills in existing circumstances and urging that their case be given attention.

The telegram, signed by Lauson Stone for the Nonintegrated Steel Manufacturers Committee, read in part:

"Most of the smaller steel products manufacturers have been operating at a loss since V-J Day and some since early last year. Nearly all of these companies are now strike bound and we think their workers expect to return to their jobs at whatever wage increase is agreed to by the larger and fully integrated steel companies.

"It must be understood that higher wage rates mean a much greater cost to the smaller companies since for the most part these smaller companies produce steel products in which labor already is a larger factor than in basic steel products.

"These smaller companies must sell at the same prices as the larger integrated companies since the latter produce the same products and the smaller companies must remain competitive with the larger and fully integrated companies or go out of business.

"Individual company price relief such as has been proposed by the OPA would offer no help whatever to the smaller companies. A formula must be conceived for the whole steel price structure that gives consideration to these vital facts affecting smaller manufacturers."

Steel Consumers Will Be Caught In Squeeze If Prices, Wages Rise

CAUGHT in the middle in the current steel wage-price tangle are some 834 steel fabricators who have contracts with the United Steelworkers and several thousands of other metalworking companies which use steel as their basic raw material.

The steel fabricators, who are not basic steel producers, were struck along with the basic producers and subjected to the same wage demands. They stand to lose both ways in a settlement providing for a wage increase and a steel price increase; they must pay the higher wages and at the same time pay more for their raw material through the increased steel prices. Meanwhile, no provision is made to increase the price ceilings on their products.

Metalworking companies which do not have contracts with the United Steelworkers are in little, if any, better position. Their prices are likewise frozen by OPA. They will have to pay more for raw materials as soon as the new steel prices go into effect. They are almost certain to be confronted with wage demands similar to those granted by the steel industry.

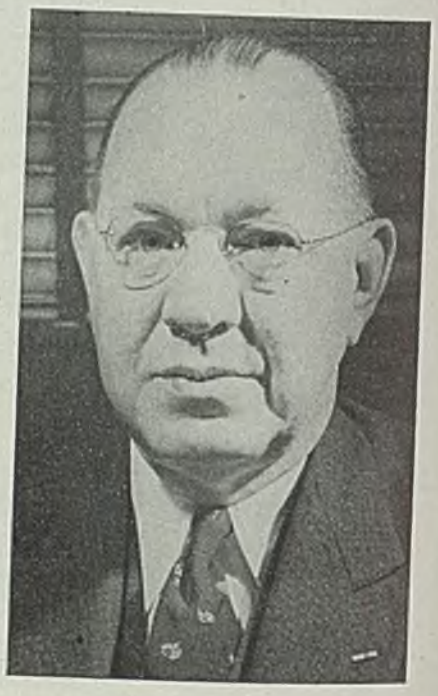
Long Time Lag Seems Inevitable

Granting that eventually these companies will be granted price relief, a long time lag between the effective dates of their increased costs and that of the new prices appears inevitable. Examination of the positions of the individual companies would be an almost endless task, requiring many months. Application of an overall formula that would be equitable to all companies would be almost impossible.

Many of the 834 strike-bound steel using fabricating plants in the country cannot reopen when the steel strike is settled unless the government grants them simultaneous price increases on products they make and sell at the same time they are requested to pay higher wages to their employees and higher prices for the steel they use.

This was the warning given Reconversion Director John W. Snyder last week by the Tri-State Industrial Association representing 56 companies in the Pittsburgh district employing 51,237 workers.

Earlier the group met with senators and congressmen from Pittsburgh area and explained the plight of the small fabricating companies. Price administrator Chester Bowles, unable to see the



COL. JAMES S. ERVIN

group, arranged a conference with Warren Huff, head of the Metals Branch of the OPA.

"A recent poll of the association's member companies closed by the strike, revealed that without immediate price relief almost none of them will be able to reopen without a loss if they must increase their employees' wages and at the same time pay more for the steel they buy from the basic steel companies," declared Col. James S. Ervin, president of the association and head of the Mackintosh-Hemphill Co. "The prices on our products have been frozen at 1941-42 levels.

"The public and most of the striking workers believe that when the United States Steel Corp., government and CIO Steelworkers agree on the price for basic steel and the amount of wage increases to be granted that the strike will be settled and everyone will go back to work. This is far from true as we have been trying to make clear to employees. If the steel fabricating plants must pay increased wages and increased costs and their own prices remain frozen, many of the 350,000 employees of steel fabricating plants throughout the country will remain out of work even after the steel strike is settled."

John J. Roche, assistant to the president, Oliver Iron & Steel Corp., a mem-

ber of the delegation, pointed out that while there is temporary unemployment due to the strike, the unemployment that may follow can be of a much more permanent nature.

"These firms cannot resume operations when they are already losing on their products," Mr. Roche said. "If they must pay more money for their raw material, steel, as well as wages they will lose even more money than before the strike was settled.

"Some firms cannot reopen at all, others must keep closed those departments manufacturing products at a loss, and widespread unemployment will follow. Our own company with 1400 employees is only one of hundreds of companies in the country that will not be able to reopen unless they are given price relief at the same time their costs are drastically increased.

"Speaking for the Oliver Iron & Steel Corp., I can say we cannot reopen our plants unless we get simultaneous relief."

"It must be apparent," said A. V. Murray, president, the Scaife Co., "that if these important companies do not reopen their plants it won't do the basic steel companies much good to try to keep operating even if they reach agreement with the government and members of the union; they won't have any customers and soon they will be closed down again. This is truly a vicious circle. These companies make many items essential to other industries and consumer markets. These plants and other industries would have to be shut down and the markets would be practically closed."

H. W. Rinearson, president, Shaw-Perkins Mfg. Co., manufacturer of convector radiators, pointed out to Mr. Snyder, Mr. Huff and the congressmen that none of the company's seven competitors in the country is on strike.

"They either have no union contract or have contracts with unions other than the CIO Steelworkers."

Proposal for Tag Day for Strikers' Relief Vetoed

CLEVELAND

A proposal by the Cleveland Industrial Union Council that it be permitted to sell tags for the relief of CIO strikers here has been vetoed by Mayor Thomas A. Burke. Permission to hold the tag day had been voted earlier by city council. Mayor Burke's veto was based on grounds that such action would establish a "dangerous precedent" and would lead to wholesale applications for similar stunts. He also protested against the pressure tactics employed by union leaders in the matter.

Resumption of Normal Steel Shipments May Require Month After Mills Reopen

CHICAGO

FABRICATORS and consumers of steel in this district are approaching closer to strangulation of their operations each day that steelworks continue idle because of the strike. Several plants have laid off large numbers of employees and others are curtailing working hours in departments where shortages of material are causing a pinch.

A rather common view appears to be that steel will be available rather quickly after the strike is settled, and because of this many consumers are due to receive a rude jolt. In all probability, a month or more will be required for mills to move from dead standstill to full operations. No one can appraise at this time the damage which equipment may have suffered in cooling down and what will happen when it is returned to heat.

Furthermore, consumers do not fully appreciate the lead time between production of steel ingots and the finished rolled product. The more finishing and processing operations a product requires, the longer the lead time. Thus, in the case of cold-rolled sheets, four or five weeks may conceivably ensue before shipments can be resumed to customers. Weeks will pass before flow of steel either in quantity or variety will approach anything like normal.

On Feb. 1, Ford Motor Co. laid off about 2000 production workers at its Chicago assembly plant because of shortages of supplies resulting from the steel strike. In addition to office employees, only 500 maintenance and other workers were kept on their jobs. Bendix Products Division, Bendix Aviation Corp., South Bend, Ind., laid off 2000 employees Feb. 4 for the same reason.

Meanwhile, the Superheater Co., Hammond, Ind., settled the strike at its plant by signing a contract with the USA-CIO granting to its nearly 750 employees the 18½-cent an hour increase, and work resumed Feb. 4. Company is not a steel producer, but a fabricator manufacturing superheaters for marine, locomotive and stationary boilers.

More Fabricators To Close at Youngstown

YOUNGSTOWN

Steel operations are still at a standstill here, with the only steel being produced being small quantities made in a small electric furnace by Youngstown Alloy Castings Corp. which makes special steel castings for steel plant equipment and other small steel castings.

Indications are more fabricators will be closed soon for lack of steel—and the fabricators are debating now as to whether it will be better to close up now or close up later to wait for the steel companies to build up inventories. They're sure they're going to be idle for lack of material for a while either way.

General Fireproofing Co., making metal furniture, is reporting trouble getting small parts and fabrics; Youngstown Steel Door Co., making rail car doors and sides, reports falling off in orders because of railroads' uncertainty. MacKenzie Muffler Co. is down.

All are much concerned about the steel price situation, fearing they will get squeezed between the boosts in prices and boosts in wages—with little hope of the OPA adjusting their own prices for some time to come.

Most of the steel plants have finally got up to date on their pays, despite difficulties. Youngstown Sheet & Tube is paying Wednesday, a week late, because of troubles in getting pay roll clerks into offices. Sheet & Tube announced also it is paying February shares of group insurance policies.

Metalworking Operations Taper as Stocks Dwindle

NEW YORK

Decline in metalworking operations here continues more as a result of partial reduction in operations than complete suspension. Certain sizable units have gone down during the past week because of lack of steel, the Ford Motor plant at Edgewater, N. J., being possibly the largest; however, the great majority of consumers have still been able to keep operating, though on a limited scale.

Shortage of steel, pig iron, scrap and other raw materials is being further created by the strike of tug boat workers in New York harbor.

Driver Harris Co., Harrison, N. J., has resumed operations, having agreed to an 18½ cent per hour wage increase for its steelworkers who struck Jan. 21. This is said to be the third company in northern New Jersey—and the largest—to have accepted President Truman's recommendation for an increase of 18½ cents per hour.

Meanwhile, thousands of workers at brass plants in Connecticut have gone on strike.

Post Strike Lag Likely, Says Grace

Bethlehem Steel chairman thinks it will take 10 days or more to restore company's facilities to 80 per cent operations after strike

EUGENE G. GRACE, chairman, Bethlehem Steel Corp., told newspaper reporters at a press conference following the quarterly meeting of the corporation's board of directors last week, that it will take his company about 10 days to get up to 80 per cent of capacity operations, except at the Lackawanna works, when the strike is ended. In the case of Lackawanna, he said, it may take as long as two months to get back to such a rate because of damage to blast furnaces and certain other facilities resulting from failure of striking workmen to properly bank furnaces and withdraw hot metal before walking out.

The Lackawanna plant has a capacity of 265,000 tons of steel per month, or a little less than a quarter of the corporation's total capacity and is second, as a steel producing unit, to Sparrows Point.

Asked as to actual damage to the Lackawanna facilities, Mr. Grace remarked that it was not so much the damage to equipment as the delay that will be required in digging out the cold metal. The plant went down before the general strike was called, over a question of nonunion members of the maintenance crew being permitted access to the plant in the event of a strike, it is understood.

Questioned as to whether Bethlehem Steel would settle with CIO on whatever basis the United States Steel Corp. might finally agree to in its case, the Bethlehem chairman said he would first have to see what agreement the Steel corporation made. He explained that it was Bethlehem's policy to do its own bargaining, and added that his company had never closed the door to negotiation with the union. The latter, he said, proposed a $2 a day increase on a "take it or leave it" basis, which did not provide Bethlehem with a chance of even making a counter proposal. He refused to comment as to what counter proposal Bethlehem may have in mind, or to go into certain other aspects of the strike situation as it prevailed.

JITTERBUGGING PICKETS: Carefree, despite the fact they are losing wages and blocking reconversion, these strikers at the Bethlehem-Alameda shipyard in California stage an impromptu street dance to music from a union sound truck. NEA photo

Resumption of Normal Deliveries To Be Slow

BOSTON

Being largely a consuming area, primary steel production limited largely to wire, strip and some cold-finished bars, metalworking operations in New England will be sensitive over the weeks ahead to steel mill rescheduling and progress toward resumption of capacity production. Already enough steel production has been lost to make for production lags later in fabricating plants.

Inventory position of plants that have been strike-bound will paradoxically be better than those weathering labor troubles. Many of the latter have already slowed because of steel shortages. Tight as steel is expected to be during the weeks ahead, the pinch in pig iron is likely to be worse. With the district furnace down, all iron must come from other districts. Furnaces have no inventories and pressure for iron on resumed schedules will be widespread. After the initial strikes and the few scattered individual settlements, there have been few developments.

Immediate Full-Scale Operations Unlikely In Electrical Industry After Strike Ends

RESUMPTION of full-scale production in the electrical manufacturing industry immediately upon settlement of the current strike will not be possible, manufacturers are advising their employees.

General Electric Co. last week in response to queries from workers as to how soon work can be resumed after the strike, stated its best guess was that probably half the G-E employees can be put back to work within the first week after the strike ends, this varying from plant to plant since conditions are dissimilar at various producing points.

The company points out that material shortages will be a factor to contend with. Deliveries have been blocked during the strike and scarce materials on order have been diverted to other manufacturers. Before production can start the flow of materials must be organized.

Then, it is pointed out, continuous processes, once stopped, require considerable time to get started again. Machines must be put in running condition and maintenance and repair work will be a bottleneck.

Further, the company states, even before the strike it was wrestling with the problem of obtaining sufficient designers and draftsmen. The shortage had put the company behind on instructions to its manufacturing plants.

E. C. SMITH

R. S. ARCHER

GERARD SWOPE

Among those receiving awards at the 27th National Metal Congress and Exposition in Cleveland were Messrs. Smith, Archer and Swope. The awards were presented at the annual banquet of the American Society for Metals

Improved Working Conditions Brought Out By Metal Show Exhibits

Practical adaptations of manifold technical developments exhibited at Cleveland are directly in the interest of comfort, convenience and dignity of the worker, as well as powerful influences toward increased production of better products

By GUY HUBBARD
Machine Tool Editor, STEEL

FIRST major industrial exposition since the end of the war attracted thousands of visitors to Cleveland from all parts of the country last week to see at first hand the many new technical and mechanical developments which have been effected in the metals world the past several years, and at the same time participate in the numerous round-table discussions and lectures provided on the program of the twenty-seventh National Metal Congress sponsored by the American Society for Metals.

Final accounting of attendance figures at the exposition and the sessions of the ASM, and the American Industrial Radium & X-Ray Society is expected to show in excess of 30,000. According to W. H. Eisenman, secretary of ASM, the show was one of the largest industrial expositions ever held in this country.

Inasmuch as the exposition was the first major industrial show since the end of the war, and inasmuch as it was held in the midst of one of the most unsettled periods in the history of organized labor in America, it is important to consider it from the human side. What are the implications of the materials and products, the instruments and machines, the processes and techniques, exhibited by 466 companies, as far as the interests of labor are concerned?

Walking down the miles of aisles through the acres of space in the arena of Cleveland's huge Public Auditorium, the exhibit hall below the arena, the north exhibit hall, the passage to the underground establishment, and the upper and lower underground halls, one could only have that question very much in mind.

Getting down to fundamentals, what about developments in heat treating and things closely associated with that ancient art? It was not so many years ago when the heat-treating department in a metal-working plant was not much more than a blacksmith shop. In fact, it commonly was called just that. Aside from the fact that it had a power-driven trip hammer and centrifugal blowers on the forges, working conditions were little if any better than in blacksmith shops specializing in horseshoeing. In fact, fumes and dirt were worse and so was the lighting.

The Metal Show this year gave ample testimony that the heat-treating department now can be deserving of that name, and can be a desirable rather than an undesirable place to work. Recent developments in oil, gas and induction heating, in fume and dust disposal (or elimination), in materials handling equipment, etc., all make possible the sort of a clean, comfortable and convenient department that will attract and hold the high type of personnel necessary to the proper functioning of such a department. There now will be no other way to win and hold that personnel in these days when labor is as well informed as management on the latest equipment and methods.

One important result of developments just mentioned, along with adoption of new materials, is the decentralization of metal-treating activities, and their placement in production lines throughout the plant. For example, many of the heating and quenching machines—those of induction type in particular—are designed for use in line with and alongside of lathes, grinders, milling machines and other machine tools. Thus, parts are—for example—turned, heat treated and finish ground "in line" instead of being back tracked. Incidentally, lathe hands, heat treaters, grinder hands, etc., all "rub elbows" and so compare relative merits of equipment and working conditions. They pace each other and they know about each others' wage scales in relation to the mental and physical effort demanded.

If one notices that he has to "horse

around" heavy objects while others have the benefit of cranes, hoists, conveyors or other mechanized handling equipment, a spot of discontent is generated. A visitor to the show got the impression that today there is no excuse for any workman doing any heavy lifting anywhere in the shop. The array of ingenious lift trucks, crane trucks, conveyors (including heat resisting wire mesh belts), overhead-supported riveting and welding guns, air and hydraulic work shifting and clamping devices, etc., have run down the curtain on employment of "strong backs and weak minds" at today's high wages.

Another point driven home by the show is the sweeping instrumentation of industry. Things which only a few years ago were mere laboratory curiosities are today an essential part of heat-treating control, size control, surface quality control, to say nothing of x-ray, magnetic and supersonic reports on the deep down interior condition of metal parts.

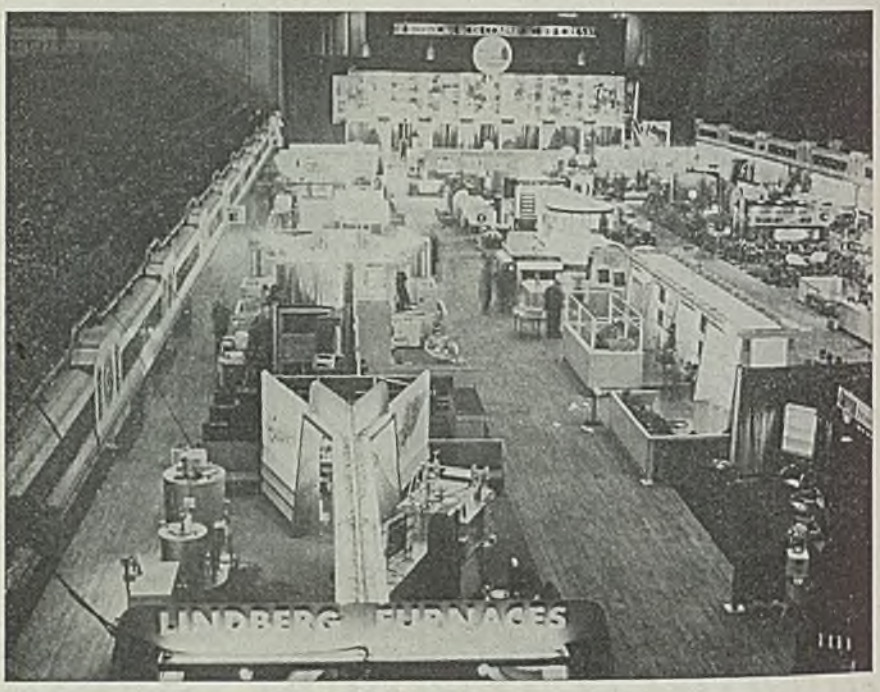
Here again, instrumentation extends all along the production line from the testing of the raw material (steel bars for instance), to the final checking of the finished parts (surface analysis of piston pins, for instance). One of the most striking exhibits in this respect, was that of the manifold adaptations to industry of photographic processes, including copying of drawings, recording of stress analyses, spectrography, ultra-speed photographic analyses of machinery in motion, photo layouts on metal, plastics, etc., photo micrography, radiography, and miniature filming of drawings for record.

Preview of Machine Tool Shows

Although the Metal Show has grown to be literally "all things to all industrial men," it was not expected that it would to any considerable degree be a machine tool and tool show. As a matter of fact, however, it did contain a surprising number of such machines and tools—enough to serve as something of a preview to the ASTE show in April, and the Machine Tool Builders' exposition, whenever in the unknown future that may be held.

Here are some hints on the basis of observation of those exhibits. Don't overlook the importance in modern industry of the so-called medium duty drill presses, lathes, turret lathes, grinders, milling machines, saws, etc. No longer are they in the basement workshop category even though their prices may be low in comparison with so-called heavy production machines.

Today, their quality is high and because of new cutting materials they can be run at their high speeds on production work which formerly would have called for heavily geared-down equipment. They are so low in cost that they can be placed throughout the shop wherever desirable to augment the usefulness of heavier equipment. Big companies are doing just that, with great gains in efficiency.



Scene above shows the main arena of the Public Auditorium in Cleveland just before the doors were opened Feb. 4 for the 27th National Metal Congress and Exposition. The show was one of the largest industrial expositions ever held with 466 companies maintaining exhibits

The possibilities of contour sawing should not be overlooked. Through improvements in machines, in narrow bandsaw blades and through study of applications, this has become one of the basic machining methods in the tool room and on production.

The possibilities of diamond wheel grinding of carbide tools to exactly specified angles cannot be ignored. Simple, economical machines now are available for this work and their use will cure many troubles formerly blamed wrongfully on the carbide materials. The tool-holding fixtures of these machines—simple though they are—have almost as many possibilities as an Erector set, in that they can be arranged to hold all sorts of tools (including big ones) at every conceivable angle to the wheels.

Rivalry of machines and methods at the show was fully matched by rivalry of materials — with the light metals, aluminum and magnesium, putting in strong bids for attention.

Thirty technical papers were presented at the sessions of the American Society for Metals. The program was well rounded, including roundtable discussions and educational lectures which offered helpful information on a variety of subjects.

Digests of some of the technical papers presented on Monday, Tuesday and Wednesday were published in STEEL, Jan. 28, p. 130. Authors of the papers, all preprinted by ASM, were outstanding metallurgists, chemists, professors and statisticians. Their subjects ranged the entire field from physical metallurgy to statistical control of product quality, including methods of joining and inspection for defects. The latest heat treating studies and stress analysis were other subjects.

A roundtable discussion on "Hardening of Steel, Including Theories on Decomposition of Austenite," which took place in the Music Hall of Public Auditorium Monday night, Feb. 4, led off a series of evening conferences which concluded Wednesday night with a session on "Nucleonics," or atomic energy and its implications.

Members of the panel on hardening of steel were Capt. J. H. Hollomon, metallurgist associated with the Army Ordnance Department, Watertown Arsenal; Robert F. Mahl, head, Metallurgical Department, Carnegie Institute of Technology; Clarence Zener, member, Institute for the Study of Metals, University of Chicago; W. H. Brandt, assistant manager, Materials Engineering Department, Westinghouse Electric Corp.; Morris Cohen, member, Department of Metallurgy, Massachusetts Institute of Technology; and E. S. Davenport, assistant to

the vice-president, United States Steel Corp. (Research Laboratory).

The discussion began with a basic exposition of the character of austenite and its factors which affect structural characteristics of bainite, troostite and martensite, and proceeded to develop relationship of these phases to hardenability. Methods of measurement of the rate of growth and/or volume changes between decreed temperature ranges of the isothermal diagram were covered, specifically those methods of evaluation which give some indication of hardness changes resulting from transformation.

Chairman of the Tuesday night round table discussion of the ASM on "superalloys" for high temperature service in gas turbines, turbo-superchargers and jet engines was C. T. Evans Jr., chief metallurgist, Elliott Co., Jeannette, Pa. Participants in the panel included Howard Cross, Battelle Memorial Institute, Columbus, O.; Russell Franks, chief metallurgist, Union Carbide & Carbon Research Laboratories, Niagara Falls, N. Y.; N. L. Mochel, metallurgical engineer, Westinghouse Electric Corp., Pittsburgh; Gunther Mohling, Allegheny Ludlum Steel Corp., Brackenridge, Pa.; W. L. Badger, metallurgical section, Thompson Laboratory, General Electric Co., Schenectady, N. Y.; F. C. Badger, metallurgist, Haynes Stellite Corp., New York.

High Temperatures Raise Problems

Considerable interest centered on the operating characteristics of the turbo-supercharger which, according to Mr. Badger, presented a difficult metallurgical problem because of temperatures reaching 1200° F at the rim of the wheel carrying the buckets, and 500° F at the center. Another problem was said to have occurred in the development of liners that could stand the extreme operating temperatures of the combustion chambers of various types of jet engines.

Slides showing the engineering detail of the British Whittle and General Electric Co. jet engines were presented and various aspects of their structures discussed. A slide showing the turbine developed by the Elliott Co. also was shown, and Mr. Evans presented salient features of its design. A discussion period in which the audience participated followed the talks by members of the panel.

Awards for metal industry achievements were presented at the annual banquet of the ASM held at Hotel Statler Feb. 7. Gerard Swope, honorary president of the General Electric Co., Schenectady, N. Y., received the ASM Medal for the Advancement of Research; the Gold Medal of the society recognizing outstanding metallurgical knowledge and a mature ability in the diagnosis and solution of diversified metallurgical problems was awarded E. C. Smith, chief metallurgist, Republic Steel Corp., Cleveland; the 1945 Sauveur Achievement Award went to R. S. Archer, metallurgical assistant to the vice president, Climax Molybdenum Co., New York, while the 1945 Howe Medal for the paper presented before the society and judged of highest merit during the year went to D. P. Antia, S. G. Fletcher and M. Cohen for their paper, "Structural Changes During the Tempering of High-Carbon Steel." Dr. Antia is with the Indian Aluminum Co., Calcutta, India; Mr. Fletcher is chief research metallurgist, Latrobe Electric Steel Co., Latrobe, Pa.; and Dr. Cohen is associate professor, physical metallurgy, Massachusetts Institute of Technology.

This 40 x 60-foot Stran-Steel Quonset loomed large among the 450 exhibits spread over Cleveland's Public Auditorium for the National Metals Show. The Quonset, which the Great Lakes Steel Corp. offers to meet industrial needs for quickly-erected economical buildings, housed a display of materials manufactured from the N-A-X low-alloy steels also produced by the company

Ruling of Tax Court Puts Annuity Plans in Jeopardy

Lincoln Electric Co., Cleveland, plans to appeal to a higher court a recent ruling by the Tax Court of the United States that $975,215.27 paid out by the Lincoln company for the purchase of retirement annuities for employees and $1 million used to establish a profit-sharing trust are taxable as part of the company's net income in 1940 and 1941.

The decision, according to James F. Lincoln, president of the company, will place in jeopardy all annuity contracts in existence and render illegal the present social security law if it stands.

The Tax Court ruled that such voluntary disbursements were not deductible either as compensation for services actually rendered or as ordinary and necessary business expense; that they were not a part of the cost of goods sold to be reflected as such in the computation of gross income, but rather that they entered into the computation of net income in which computation their deductibility from gross income is determined.

Under the Lincoln company's annuity plan employees who retire at the age of 60, following a stipulated term of service with the company, are entitled to draw benefits based on their length of service, wages and other factors.

Reports Pig Iron Cost Cut $3 at Geneva Steel Plant

Reduction of approximately $3 a ton has been effected in the cost of producing basic pig iron in the government's $200 million Geneva steel plant near Provo, Utah, the War Assets Corp. announced.

At the same time, the corporation reported the government has an agreement with the Columbia Iron Mining Co., U. S. Steel Corp. subsidiary, which will assure the Geneva plant of an adequate supply of iron ore from that source to Aug. 17, 1961.

The Bureau of Mines has completed a survey of iron ore reserves in Iron County, Utah, from which Geneva gets its ore for steelmaking, and estimates a total of 154,775,000 gross tons of reserve.

Gray Iron Foundries Need 40,000 More Workers, CPA Survey Shows

Study made prior to current work stoppage in steel industry indicates numerous job openings in castings plants must be filled if current demand from civilian goods manufacturers is to be satisfied

ABOUT 40,000 additional workers are needed in the gray iron castings industry to bring production of consumers goods up to present demand, according to the Civilian Production Administration.

Reports received from 1280 foundries (prior to the current work stoppage in the steel industry), or about 50 per cent of the industry, showed a total of 116,295 employees with 19,828 additional employees needed. A total of 1687 foundries submitted reports to CPA. Out of this group, only 1344 were operating, 279 were closed, 46 had changed to production of products other than castings, and 18 were closed by strikes.

Indicated average monthly capacity of the 1381 gray iron foundries who submitted capacity figures is 702,432 tons. November production was 358,683 tons and the backlog of unfilled orders on Dec. 1, 1945, was 1,468,179 tons. The average backlog of unfilled orders on the books of the reporting foundries was four months.

Indicated monthly capacity of the foundries closed by strike prior to the general steel strike is 70,565 tons.

Delivery Dates Variable

The reporting foundries disclosed the following delivery picture on gray iron castings at the present time: Current on deliveries, 42 per cent; two to eight weeks behind schedule, 25.6 per cent; eight to twelve weeks behind schedule, 11.4 per cent; more than twelve weeks behind schedule, 15 per cent; failed to give specific data, 6 per cent.

Tonnage booked for future deliveries in weeks of production: Heavy ingot mold products and chilled iron carwheels, 10; cast iron pressure pipe, 15; cast iron stoves, 17; cast iron brake shoes, 18; automotive castings, 20; radiators, boilers, furnaces, enamelware (bathtubs) and farm implements, 24; and cast iron soil pipe, 38.

A 15 per cent increase in employment in the malleable castings industry is needed to dislodge the 31-week backlog of orders, according to a survey reported by the Civilian Production Administration. A survey of 44 malleable iron foundries of the 115 operating in the United States yielded the following December monthly production picture: Capacity, 36,993 tons; production, 24,555 tons; shipments, 23,538 tons; and backlog, 179,620 tons.

Of the 44 reporting foundries 16 were accepting orders, 18 were refusing orders, and 10 offered no comment. Employment totaled 15,917 men in this foundry group with 2300 additional men needed to attain full production.

The following is a current picture of the shipping schedules of the 44 reporting foundries: Current on deliveries, 11.4 per cent; two to eight weeks behind schedule, 25 per cent; eight to twelve weeks behind schedule, 13.6 per cent; over twelve weeks behind schedule, 34.1 per cent; failed to answer, 15.9 per cent.

The order backlog of the 44 reporting foundries consists of the following tons on the basis of end uses: Farm machinery, 54,313; auto parts, 41,923; pipe and fittings, 19,614; railroad supplies, 11,634; power transmission parts, 8604; lawn mower parts, 6910; road machinery, 4696; electrical parts, 4332; tools, 3134; machine tools, 2600; hardware, 1901; mining machinery, 1319; stoves, 1231; trailer parts, 1169; textile machinery, 770; diesel engine parts, 605; ironing machine parts, 220; refrigerators, 187; auto jacks, 177; luggage parts, 150; bed parts, 70; oil refinery parts, 44; boiler parts, 37; and miscellaneous, 13,981.

Present, Past and Pending

■ HARVESTER BUYS DPC PLANT FOR RESEARCH CENTER

CHICAGO—War Assets Corp. announced last week that the Surplus Property Administrator has approved a bid of $1,353,000 by International Harvester Co., for the DPC plant at 5225 South Western Ave., formerly operated by Foote Bros. Gear & Machine Corp. for manufacture of aircraft parts. International Harvester, it is understood, will use it as a manufacturing research center where new processes, methods and machine tools can be tested.

■ TIN PLATE TO BE CHANNELED TO CANS, CLOSURES

WASHINGTON—Virtually all available tin plate will be channeled to cans and closures for perishable and seasonal foods, the Civilian Production Administration announced last week. This channeling will continue for some time after the steel strike ends.

■ PRICE CONTROL ON SOME METALS IS SUSPENDED

WASHINGTON—Price control on a long list of nonferrous metals, ship fittings and materials for repair, construction and maintenance was suspended last week.

■ PREVIOUS CEILING PRICES RESTORED ON USED TOOLS

WASHINGTON—OPA last week restored the previous ceiling prices on used machine tools based on date of manufacture and condition of machine as provided in regulations prior to Dec. 22, 1945.

■ NEW CANADIAN ORE PROPERTY BEING DEVELOPED

CLEVELAND—Westland Mining Co. Ltd., of which James W. Ferguson, Toronto, Ont., is president, is completing arrangements for the sale of ore from its mining property in Algoma mining area of Ontario. Considerable work has been done on the property, 40 miles north of the Soo. The ore, hematite, is said to run 65 per cent iron.

■ BUILDING OF 200-MILE NATURAL GAS LINE APPROVED

SAN FRANCISCO—California Railroad Commission last week approved request of Southern California Gas Co. and Southern Counties Gas Co., subsidiaries of Pacific Lighting Co., to proceed with proposed 200-mile natural gas line to join the projected 1000-mile El Paso Natural Gas Co. line from the Permian Basin to the California border.

■ FARM MACHINERY PRODUCTION GAINED IN 1945

WASHINGTON—Farm machinery production in 1945 totaled $663,484,196, approximately $20 million more than in 1944, the Civilian Production Administration reported last week. Export shipments in the last six months of the year amounted to 12 per cent of the total production, approximately the prewar export rate.

Steel Produced For Sale Gains In November

Distribution data for month show jobbers, dealers, etc., took largest tonnage. Railroads ranked second as outlet

DISTRIBUTION of steel products to various consuming industries gained in November, according to the American Iron & Steel Institute, New York. Total steel made for sale was 4,407,054 net tons in the month compared with 4,306,518 tons in October.

Jobbers, dealers and distributors took the largest tonnage, 850,648 tons in November, and 880,458 tons in October. Railroads for themselves and through car and locomotive builders and parts manufacturers, were second with 452,377 tons in November and 447,480 tons in October.

The pressing, forming and stamping industry was third with 438,714 tons in November, 404,279 tons in October.

The construction industry was fourth with 412,644 tons in November and 383,359 tons in October.

Companies represented in the accompanying tabulation, numbering 152, during 1944 represented 99 per cent of total output of finished rolled steel products, as reported to the institute. Further comparisons may be found in the accompanying table.

December Alloy Steel Production Shows Loss

Production of alloy steel in December totaled 494,102 net tons, compared with 517,349 tons in November, bringing the total for the year to 8,613,284 tons, according to reports to the American Iron & Steel Institute, New York. Open-hearth furnaces accounted for 5,819,494 tons of the annual output, electric furnaces for 2,793,790 tons.

Hot-topped carbon steel ingot production in December was 789,577 tons, compared with 855,208 tons in November. For all 1945, production was 13,923,126 tons. Open-hearth furnaces produced 12,869,368 tons and electric furnaces 153,732 tons.

Output of Recoverable Lead And Zinc Declines in 1945

Mine production of recoverable lead and zinc in the United States and Alaska (including that made into pigments and chemicals direct from ore) was 387,942 tons of lead and 615,927 tons of zinc,

These figures, released by the U. S. Bureau of Mines, compare with 416,861 tons of lead and 615,927 tons of zinc. 1944, indicating decreases of 7 per cent in the output of lead and 14 per cent in the production of zinc.

Greatest single factor contributing to the decline in output of both metals was the critical shortage of manpower, reportedly greater during the latter months of 1945 than at any time during the war period.

Total value of the metals produced in 1945 was $66,726,024 for lead and $141,663,210 for zinc.

Distribution of Steel Products Gains in November

(Net Tons)

	November, 1945	October, 1945
1. Steel Converting and Processing Industries		
(a) Wire drawers and wire product mfrs.	42,338	44,402
(b) Bolt, nut, and rivet manufacturers	83,585	85,568
(c) Forging manufacturers		
(1) Automotive	25,772	8,377
(2) Aircraft	2,050	24,279
(3) All other	85,729	85,729
(d) All other steel plants and foundries	136,283	114,217
Total	375,757	339,169
2. Jobbers, Dealers and Distributors		
(a) Oil and natural gas industry	59,146	49,712
(b) All other	791,502	830,746
Total	850,648	880,458
3. Construction Industry		
(a) Public (Municipal, State, National)	6,862	6,048
(b) Highways	22,485	19,023
(c) Railways	7,634	6,144
(d) Automotive	12,849	10,022
(e) Aircraft	1,367	1,335
(f) Shipbuilding	1,392	1,810
(g) Utilities	28,714	27,394
(h) Bldg. trim, accessories and builders' hdwe.	63,472	57,599
(i) Cantonments, barracks and bases	21,435	31,216
(j) Defense plants, excluding (e) and (f)	15,107	15,894
(k) All other	231,327	206,874
Total	412,644	383,359
4. Shipbuilding Industry		
(a) Naval vessels	12,623	17,674
(b) Commercial vessels	27,430	30,842
Total	40,053	48,516
5. Pressing, Forming and Stamping Industry		
(a) Metal furniture and office equipment	28,041	26,584
(b) Hardware and household equipment	98,203	84,610
(c) Automotive	198,614	179,475
(d) All other	113,856	113,610
Total	438,714	404,279
6. Container Industry		
(a) Oil and natural gas industry	36,791	32,156
(b) All other	303,412	315,645
Total	340,203	347,801
7. Agricultural, Incl. Impl. & Equip. Mfrs.	123,288	116,449
8. Machinery and Tools		
(a) Machinery and tools, not incl. elect. equip.	119,577	122,265
(b) Electrical machinery and equipment	78,693	72,788
Total	198,270	195,053
9. Automotive Industry	302,036	278,671
10. Aircraft Industry	6,475	5,484
11. Railroad Industry		
(a) All railroads	309,999	326,432
(b) Car and loco. builders and parts mfrs.	142,378	121,048
Total	452,377	447,480
12. Oil, Natural Gas and Mining Industry		
(a) Oil and natural gas, incl. pipe lines	161,374	149,888
(b) Mining, quarrying and lumbering	16,353	16,039
Total	177,727	165,927
13. Ordnance, Projectiles and Tanks		
(a) Ordnance and small arms	12,818	15,425
(b) Shells, bombs, proj. and amm. for sm. arms	8,503	14,072
(c) Combat tanks	12,170	7,857
Total	33,486	27,554
14. Unclassified	179,344	179,386
15. Miscellaneous Industries	172,717	172,065
16. Export, All Industries	303,315	306,067
17. Total (Items 1 to 16)	4,407,054	4,306,518

Listing of Patents Available for Licensing Lower than Anticipated

International Harvester Co. and Radio Corp. of America only large corporations to enter patents in Register. Officials outline advantages to owners of such offerings. Provides evidence holder is not hindering progress by suppressing use of patent

CONSIDERABLE curiosity exists among informed observers in Washington as to why only two large corporations so far have availed themselves of the opportunity to list their patents in the new "Register of Patents Available for License or Sale."

At the time the Register was launched as a regular feature of the weekly editions of the "Official Gazette" of the Patent Office in June of 1945, it was believed that in the neighborhood of 100,000 patents shortly would be submitted for listing. The Register, it then was pointed out, represented the first possibility of listing salable or licensable patents in one place. Furthermore, it was set up under the full sponsorship of the government, as a free government service. It was expected, therefore, that many patent owners would seize the opportunity to drum up business.

Actual performance so far has fallen far short of expectations. In the first six months of the Register's existence only about 12,000 patents were submitted for listings. And of this total, some 9000 were contributed by two large corporations, the International Harvester Co. and the Radio Corp. of America.

Good Reasons for Listing Patents

There appear to be good reasons why corporations, research institutions and individual inventors should list patents in the Register. Everybody is interested in promoting a high level of prosperity in the country generally, so that listing of patents is regarded generally as a patriotic gesture. It gives to many existing and large numbers of prospective new manufacturers opportunities to locate new or improved products which have promise of public acceptance. Listing of patents thus paves the way for a larger volume of business, a higher plane of living, and the creation of new opportunities for employment.

In particular, listing of patents provides opportunities to the many veterans of World War II who are eager to establish their own businesses. Many thousands of veterans already are combing the weekly lists in their search for likely products on which they can establish a business, it was pointed out.

But, as informed observers look at the various factors involved, there is an even more important reason why more interests should list their patents in the Register. That is the opportunity provided by the Register to prevent misunderstandings and unwarranted interpretations as to patent policies of patent-owning companies. It gives to companies owning large blocks of patents the opportunity to rid themselves of any onus in the eyes of many people who are continuously looking for evidence of abuses of the patent system.

"When an owner lists a patent in the Register as available for license or sale on reasonable terms," a leading patent authority told STEEL, "his action is full and automatic proof that he is not hindering progress by keeping his patent on the shelf. It is proof that he is not suppressing the patent at the expense of the economy in general.

Should Not List All Patents

"In my opinion," he continued, "no company or individual should list a patent which is the life-blood of its business. To do that would invite bankruptcy in countless instances.

"But many companies, many research institutions, and many individual inventors have patents for which they have no further use, or patents which they are willing to allow others to use. They have nothing to lose by listing such patents in the Register; on the other hand, they stand to gain by enlarging their range of opportunities to make sales or arrange licenses on a desirable financial basis.

"The big thing is that by such action they prove that the particular patents involved are not being used as blockades to progress. If enough companies listed their patents, and thus showed their willingness to let others use them, there would soon be an end to the threat of compulsory licensing which has hung over patent owners since the TNEC hearings.

"The question whether patents should be listed at all, and what patents should be listed," this authority went on, "must be determined in all cases on the basis of sound judgment. Every patent owning company or individual should have a patent policy — and the question of listing patents in the Register should be resolved in each case under such a policy.

The listings of the International Harvester Co. and the Radio Corp. of America were facilitated by the fact that both companies long have had definite patent policies. Both companies have published booklets completely describing these policies; copies may be had by writing to the Radio Corp. of America, 30 Rockefeller Plaza, New York, and to the International Harvester Co., 180 North Michigan Ave., Chicago.

The RCA policy is based on non-exclusive licensing of patents on industry-wide basis. "The extensive rights to use radio inventions that are enjoyed by RCA and its many licensees have promoted the orderly and rapid development of a great new industry and the creation of much new employment for both labor and capital," says the booklet.

These are the outstanding features of the RCA licensing policy:

1—It grants licenses to any or all of its competitors;

2—These licenses permit the licensees to use any or all of the RCA patents instead of any particular patents;

3—The licensee, without any extra charge, enjoys the benefits of all additional patents obtained or acquired by RCA during the life of the license agreement.

"The royalty rates are low both in themselves and in relation to customary rates in other fields of business," says the company's booklet.

Harvester Policy Described

The International Harvester Co. booklet directs attention to this company's traditional liberal policy in licensing its patents for use by others on a non-exclusive basis and for reasonable royalties, and explains a recent broadening in that policy to insure full use of all of its patents insofar as practicable. The booklet explains that the withholding of many patents from free licensing in the past was not due to any desire to suppress them, but rather to oversight.

"Reports to governmental agencies by many corporations, including Harvester," says the booklet, "have made it common knowledge that a large proportion of patents are not being currently used by their owners. Misinterpretations of this situation may be largely responsible for the popular belief that corporations frequently suppress valuable patents. Our own experience illustrates that a large number of unused patents is not evidence of suppression, but rather of the very vigor and success of industrial re-

STUDY SURPLUS DISPOSAL: Group of congressmen arrive in Oakland, Calif., en route home from a tour of the Pacific war areas where they investigated the problem of surplus war materials, some $4 billion of which have been reported going to waste. Representatives are, left to right: Ross Rizley, Oklahoma; Lindley Beckworth, Texas; Anton T. Johnson, Illinois; John Fogarty, Rhode Island; L. Mendell Rivers, South Carolina; Gordon Canfield, New Jersey; W. R. Poage, Texas; and Harold Cooley, North Carolina. NEA photo

search in producing new and better techniques. In seventeen years—the legal life of a patent—it is not unusual for continuing research on a particular problem to yield several patentable inventions of the same general type. Each of such patents would be used for a time and then— when superseded by a better patent—remain unused for the rest of its legal life. Healthy progress thus increases the number of unused patents."

But, the booklet explains, these unused patents—roughly about two-thirds of the number Harvester owns—may be of value to other manufacturers.

An interesting difference characterizes the arrangements under which the Harvester company and RCA have made their patents available for listing in the Register. RCA has agreed to list all of its patents without exception—some 8000 altogether. Harvester has agreed to list 1193 patents and to withhold certain key patents which it is not prepared to offer for general license at this time. But Harvester has agreed that these presently withheld patents, numbering 30 altogether, and all new patents acquired by it in the future will be made available for licensing "from time to time within five years from the date of acquisition."

The Harvester company thus, it will be noted, allows itself only five years' exclusive use of its patents instead of the 17 years permitted by the patent law.

The only qualification which must be met by patent owners who wish to list their patents is that they act in good faith. They must assure the patent commissioner that they are sincere in listing their patents, and that they are willing to sell them or grant licenses on a "reasonable" basis.

Creation of the Register, incidentally, resulted from a suggestion by a group of men of unusual stature in the field of invention and patents—those comprising the National Patent Planning Commission which went out of existence last year. These are: Chairman, Charles F. Kettering, Chester C. Davis, Francis P. Gaines, Edward F. McGrady, Owen D. Young, Andrew A. Potter and Conway P. Coe.

It may be significant that the Radio Corp. of America made the move to list its patents in the Register shortly after Mr. Coe left his former job of Patent Commissioner to become associated with RCA.

Potentialities of the Register in disclosing availability of patents for sale or license also gain in significance by reason of recent government actions. One straw in the wind is the agreement under which Aluminum Co. of America permits the Reconstruction Finance Corp. to make free use of its patents covering extraction of alumina from bauxite in order to enable Reynolds Metals Co. to operate the Hurricane Creek alumina plant and thus induce competition in the aluminum industry. Another is the signing of a consent decree terminating an antitrust action against the Wisconsin Alumni Research Foundation with the provision that processes covering irradiation and other goods processing be dedicated to the people of the United States.

The whole patent situation continues to receive close study in various places in the government, and particularly by the Department of Justice which is prepared to take action whenever it sees indications of abuses. The department's current philosophy was summed up as follows recently by Assistant Attorney General Wendell Berge:

"The great need of small business for new opportunities and new directions in the postwar world cannot be fulfilled if the individual entrepreneur is fenced in and blocked off by patent restrictions," Mr. Berge told the American Pharmaceutical Manufacturers Association in New York last December. "When a few privileged groups are able to shut off access to the market, or to build up huge patent structures blocking access to technology, they have destroyed the lifeline of democratic enterprise. If the patent system is to survive, it must be made clear to monopoly groups that they cannot continue to base their restrictive practices on patent privileges.

Improperly Used Patents Unenforceable

"Patents," Mr. Berge went on, "are grants of authority by the United States and it seems to me to be appropriate to say that if this property is used contrary to the very purpose of the grant and the constitutional provision which makes it possible, then the government which gave the property has the right to terminate its enforceability for the good of the public as a whole."

Listings in the Register may be studied at any public library maintaining a file of the Official Gazette of the Patent Office, as well as at the Patent Office in Washington. The Patent Office is glad to send out to interested parties reprints of the listings each week. It has about 1200 names on its list at present, and will add additional names when requests come in.

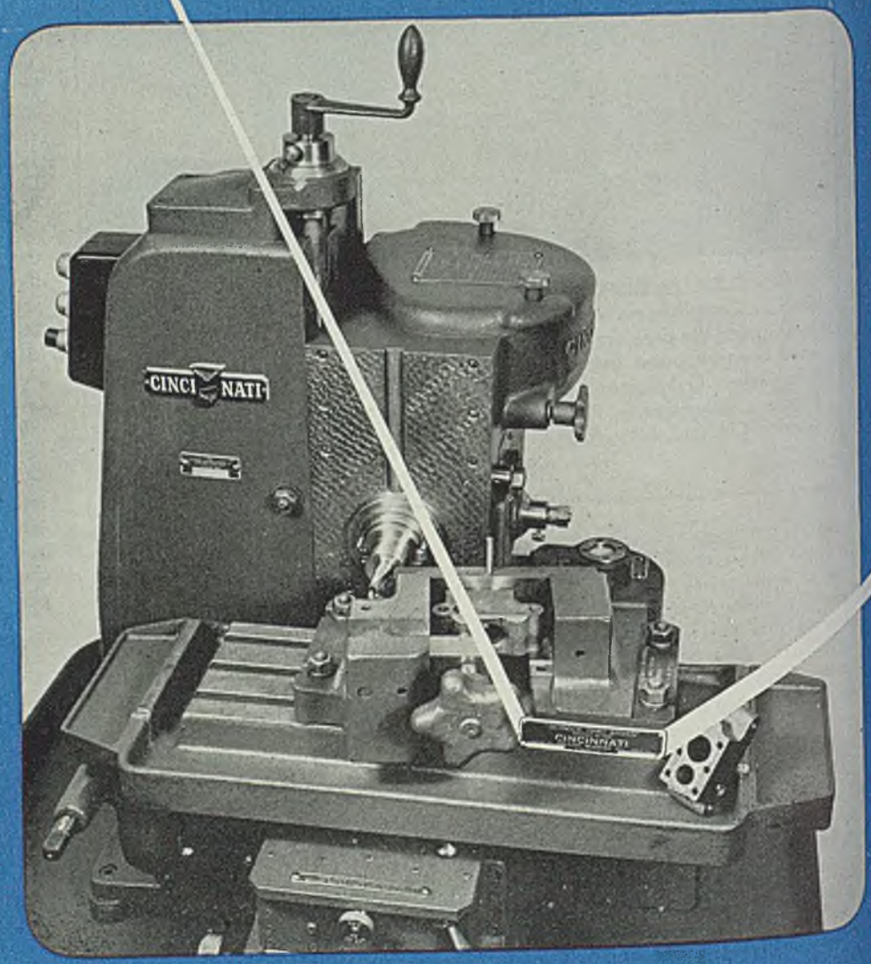
Potentialities of the Register in conveying suggestions to manufacturers or prospective manufacturers are illustrated by a few of the listings as follows:

C. N. Mitchell, 3800 Harvard avenue, Cleveland, four welding patents including one for producing welded tubing.

Maytag Co., Newton, Ia., six patents

(*Please turn to Page* 72)

"SERVICE THAT SAVES"



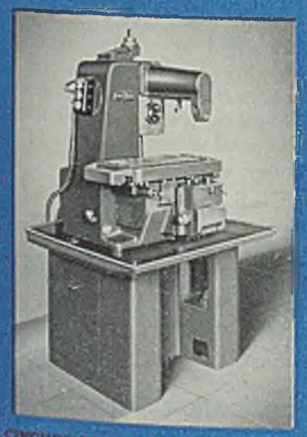
CINCINNATI No. 0-8 Plain Automatic Miller, tooled up for milling a 10° bevel on refrigerator compressor cylinder. The hand-clamping fixture holds one work piece. Automatic Table Feed Cycle and Power Table Traverse of 400" per minute makes possible a high production rate of 157 parts per hour.

CINCINNATI

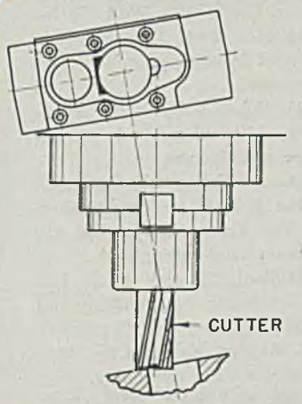
THE CINCINNATI MILLING MACHINES

takes on an even greater meaning

The wealth of experience gained under the stress of war means that Cincinnati's well-known slogan, "Service That Saves" takes on even greater significance because our engineers have made many new and revolutionary machining applications a reality. ¶ These engineers will be glad to give you the benefit of many years of experience and machining know-how in the development of a simple fixture for a standard miller, as illustrated on the opposite page, or complete tailor-made equipment for fast, economical, accurate production of many products for civilian use. Feel free to talk over your milling problems with Cincinnati Application Engineers.



CINCINNATI No. 0-8 Plain Automatic Miller. Complete specifications may be obtained by writing for Catalog M-964-3. A brief description is given in Sweet's Catalog File.



Sketch of the part being milled by the equipment shown on the opposite page.

Part Name — Compressor cylinder.

Material—Cast Iron.

Operation—Mill 10° bevel.

Production — 157 parts per hour.

Machine — CINCINNATI No. 0-8 Plain Automatic.

THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO, U. S. A.

BROACHING MACHINES • CUTTER SHARPENING MACHINES

(*Concluded from Page 69*)

on piston rods, piston rod assemblies, sealing rings and a faucet.

William E. Mansfield, 13623 Maplerow avenue, Garfield Heights, Cleveland 5, O., three patents on aluminum-base alloys.

Gustave Miller, 3101 Northampton street N. W., Washington 15, D. C., three patents including one on safety device for aircraft retractable landing gears.

Walter E. Horrocks, 1494 Rosewood avenue, Lakewood, O., seven patents on antifriction bearings.

Chester Tietig, 435 Reading road, Cincinnati 2, O., three patents including one on steel bridges and steel flooring therefor.

Joseph E. Blanding and Patrick B. McNamara, 49 Berkeley avenue, New London, Conn., patent on oil fuel feed device.

Sergei D. Mitereff, P. O. Box 426, Williamsburg, Va., patent on shock absorber.

Wilson C. Broga, 28 Jefferson street, Westfield, Mass., two patents on adjustable reamers.

John Kalix, 2132 Salem avenue, Dayton 6, O., 7 patents covering dam gates and operating device, also equipment and methods for dam construction.

Jacob Landau, 132 Essex street, Jersey City 2, N. J., patent on thermal time switch.

Edward F. Loughlin, 698 Chalkstone avenue, Providence, R. I., patent covering floating tap, reamer and drill holder.

Achille Colombo, 415 Central Park West, New York 25, N. Y., patent on silent typewriter.

James L. Gibney, Box 92, St. Joseph, Mich., patent on method of producing high tensile strength iron.

Thomas H. Ferguson, 726 South Kenilworth avenue, Oak Park, Ill., patent on auxiliary equipment to produce strip steel in wide range of widths without necessitating roll changes.

Frank P. Dahlstrom, Woodland drive, Woodbridge 15, Conn., patent on method and apparatus for controlling alignment of rolling mill rolls.

Ralph Warrender, 509 Hull street, Sharon, Pa., patents on brazing or welding tongs, and on a furnace unit.

Albert R. Stryker and Chester Tietig, 107 Billups drive, Lawrenceburg, Ind., patents on process for making pure hydrogen.

James F. Molloy, 525 East Twenty-first street, Oakland, Calif., two patents on self-closing valves.

Sam Weisman, 870 Penobscot building, Detroit, four patents on interchangeable punches and dies.

Louis Frank and Adolph Reader, Fellows, Calif., three patents covering a wire rod connector, snap-in lamp plugs, and a rivet string by which rivets are fed continuously to the work instead of one at a time.

E. W. PAULEY

TARGET: Mr. Pauley's nomination as Under Secretary of Navy, presumably to succeed James Forrestal eventually, set off a display of fireworks in the Senate Military Affairs Committee. Chief criticism was that Mr. Pauley, a California oil man, would be in a position of immense power with respect to the Navy's large oil holdings

Insectocutor Corp., 303 West Forty-second street, New York, 15 patents for extermination of insects and rodents by electrical means.

Chester F. Rohn, 4525 North Frederick avenue, Milwaukee, four patents covering shoe manufacture.

Calorider Corp., Greenwich, Conn., 27 patents in the field of air conditioning.

Marie S. Van Kuren, Bloomsville, O., three patents on hand-cutting tools.

Jay M. Hilliard, Slippery Rock, Pa., patents on automatic coal cutting and loading machinery.

David H. Reeder, Kansas City, Mo., patents on coal mining machinery.

Russell Hart, 411 West 113th street, Los Angeles, patent on a process for granulating metals.

G. and J. Teller, Los Angeles, 45 patents on gas stove construction and five patents covering refrigerator construction.

The first of the patents owned by the government to be offered for listing are those of the Department of the Interior. There are 22 of them, all offered for license on a royalty-free basis. They cover treatment of ores, concentration of boron, recovery of metallic manganese, production of low-sulphur sponge iron, beneficiation of beryllium ores, extraction of manganese by electrolytic means, etc.

Stancliff Heads Commerce Field Operations Office

Appointment of Everet Lee Stancliff as director of the Office of Field Operations was announced last week by Secretary of Commerce Wallace as part of the reorganization of the department.

Joseph A. Mack, who has directed the field service of the Bureau of Foreign and Domestic Commerce for some years, will remain as deputy to the new appointee.

A resident of Los Angeles, Calif., Mr. Stancliff was in business as an industrial and business consultant on the Pacific Coast prior to coming to Washington. From 1943 he was on assignment by the State Department to the American Embassy in Mexico as consultant and advisor on industrial development, serving in a similar capacity on the Mexican-American Commission for Economic Cooperation, and the joint Mexican-American Industrial Subcommittee.

Small Business Office To Be In Commerce Department

The Office of Small Business has been formally established in the Department of Commerce, absorbing the functions of the Smaller War Plants Corp. The director of the new unit has not been named.

The objective assigned to this unit is to offer business men aid and guidance in sound business practice, general administration, production, buying procedure, inventory, and other matters.

It will also formulate policies applying to small business aid, such as encouragement of government and private procurement practices favorable to small business, and recommendation of tax policies to encourage sound financing of smaller enterprises.

Standardization Requested For Copper Tubing, Pipe

A proposed Simplified Practice Recommendation for copper water tube and copper and brass pipe has been submitted to producers, distributors and users for comment or acceptance, or both, according to an announcement by the Division of Simplified Practice, National Bureau of Standards.

Should this proposal, as submitted, or as adjusted in accordance with suggestions received, meet with the approval of industry, it will be issued in print.

U. S. Bureau of Foreign Trade Is Reorganized

Agency separated from domestic commerce activities. Realignment designed to enlarge trade promotion program

REORGANIZATION of the Bureau of Foreign and Domestic Commerce designed to better equip that agency to deal with problems of postwar reconversion and to aid in achievement of high levels of production and employment is being effected under direction of Henry A. Wallace, Secretary of Commerce.

By this action Secretary Wallace is separating the foreign trade promotion functions from those activities of the bureau pertaining to the development of domestic commerce and is providing a mechanism for increased attention to the problems of small business.

This new realignment is designed chiefly to assist administrative direction of a larger trade promotion program previously announced, the Commerce Department reported.

Under the new plan of organization the bureau will consist of an Office of International Trade, Office of Domestic Commerce, Office of Small Business, Office of Business Economics, and Office of Field Operations.

The order also consolidated the field service offices of the Bureau of Foreign and Domestic Commerce and the Office of International Trade Operations within the Office of Field Operations.

An order issued earlier provides for the transfer of the Technical Industrial Intelligence Branch of the Office of International Trade Operations to the Office of the Declassification and Technical Services. This unit will co-operate with appropriate military agencies in collecting, screening, appraising and disseminating to the public technical and scientific industrial intelligence obtained from enemy and ex-enemy countries, it was announced.

Colombia Seen Promising Market for Tin Plate

A promising market for iron and steel tin plate from the United States is believed to exist in Colombia, according to the Department of Commerce.

Imports of tin plate from the United States in 1938 amounted to 2436 metric tons, valued at 570,000 pesos, whereas, even in this prewar period, imports from Germany totaled 133 metric tons valued at 37,000 pesos, and those from the United Kingdom, 27 metric tons of 10,000 pesos value.

Postwar competition, as in the past, will be relatively unimportant, it is believed. The immediate prewar year, 1939, saw imports of 5384 metric tons, at 1,142,000 pesos, against combined shipments of 138 tons valued at 38,000 pesos, from Germany and the United Kingdom.

This trend continued in the active war years—the peak imports amounted to 4627 tons in 1940, valued at 1,150,000 pesos, with the lowest in 1942 amounting to 1105 tons, of 307,000 pesos value, while in 1944 the United States sold in this market 1407 tons, of 324,000 pesos value, with only negligible amounts during these years from other countries.

Chile Provides for Imports Of Industrial Machinery

The Chilean government has reserved $7 million of foreign exchange for importation of industrial machinery, according to a radio report to the U. S. Department of Commerce from the Santiago consulate.

Further, more liberal credit facilities have been requested for firms importing such machinery, it was stated.

India Preparing To Regulate Electric Utilities Companies

The government of India is preparing rules and regulations to govern electric utilities in that country, according to an industrial report to U. S. authorities.

An advisory board has been established to regulate the finances of the utility companies, looking to determination of equitable rates.

New, Small Farm Tractor Being Developed in England

A new type of small, multi-purpose farm tractor is reported from England, where it is said to be under development for the use of small farmers in that country.

According to a report to the Department of Commerce, the tractor is not designed for plowing, but is adapted for attachment of various farming implements, such as cutivators, discs, sprayers, dusting, and hauling equipment.

Mass production is contemplated, aiming at a price of approximately £200, including tools and attachments.

The machine is described as being 6 ft 3 in. in length, and of 5 hundredweight, equipped with a 250 c.c. 4-stroke engine developing 3 horsepower, and having a speed range of 1 mile per hour at low gear to 3 miles in high. It will use about 2½ pints of gasoline per hour.

1944 Brazilian Machine Imports Up $4 Million

Brazilian imports of machines and machine tools in 1944 were valued at $9,514,000 compared with 1943 imports totaling $5,146,250, according to a report from that country. Cutlery, sewing machines and scientific apparatus led the imports showing gains.

Russians Plan 1.4 Billion KWH Generator in Caucasus

A Russian plan for construction of a hydroelectric station to be built in connection with a water project in the Caucasus is reported by American authorities in that country. The station will have a capacity of 1.4 billion kwh and is intended to supply cheap power to the Azerbaidzhan Republic.

Imports of Iron and Steel Products Rise in Palestine

Palestine is taking considerable amounts of iron and steel products, an American consular survey shows. For the first half of 1945, the following imports are shown for the country: Iron bars, rods and angles, £53,774 (Palestine pound is equal to $4.002); black iron sheets and plates, £8,198; galvanized sheets and plates, £15,833; iron pipes, £36,679; hot-rolled mild steel wire, £23,776; iron bars and angles, of British origin, £4,751; iron pipes, £13,127; tin plate, £9,634 value.

Honduras Reports Sewage, Water Supply Improvements

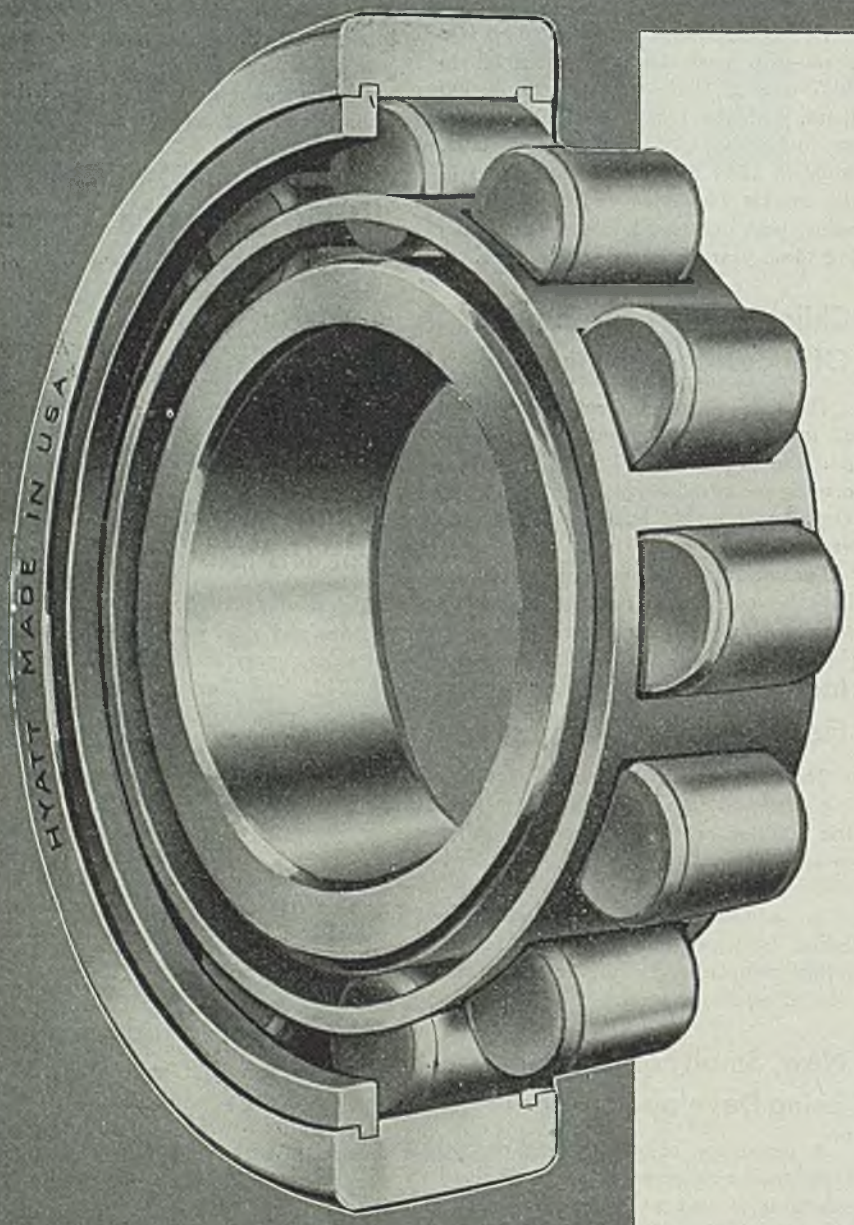
Construction and improvement of the sewage system and municipal water supply installations of Honduras, to be financed by the Honduran government aided by the Inter-American Co-operative Service for Public Health, is being planned, according to a consular report to the United States.

British Labor Shortage Slows Machine Production

British textile machinery manufacturers have advised British Indian buyers that they may be unable to complete present orders within two years, under present labor conditions, according to unofficial reports reaching this country.

Rollers Roll—

IMPROVING MACHINE PERFORMANCE



FOR THE FIFTY-FOURTH YEAR Hyatt Roller Bearings go rolling along—carrying loads—reducing friction — enabling machines to do their jobs better—and at less cost for power and maintenance.

★

Hyatt Bearings have won the confidence and earned the preference in many fields—mills and factories—farms—railroads — highways — everywhere.

★

Hyatt engineering service with its vast experience as bearing specialists is at your service—write us. Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.; Chicago; Detroit; Pittsburgh; Oakland, California.

HYATT ROLLER BEARINGS

mirrors of MOTORDOM

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

"Wage patterns" established by increases granted by Ford and Chrysler difficult to apply to all automotive companies. Some already have granted increases beyond area or industry average. Fabricators contracting with United Steelworkers squeezed

DETROIT

CONSIDERABLE comment is heard in automobile circles on the establishment of "wage patterns" in raises already agreed upon, such as those announced by Ford and Chrysler, and the likelihood such patterns will be applicable broadly throughout both the automotive and allied industries. It is well to go a little slow in assuming the immediate application of such 15-18 per cent patterns indiscriminately. For one thing, both the Ford and Chrysler agreements are still very much in the preliminary stage, the Ford contract in fact not even being completed as yet pending decision on some form of guarantee on productivity and elimination of wildcat strikes. The Chrysler contract still must be submitted to and ratified by members of the various plant locals. Beyond this there remains the determination of price relief made necessary by sharply higher wages.

Additional Raises May Be Sought

And further, as Frank Rising of the Automotive & Aviation Parts Manufacturers Inc. points out, various individual companies may be approached by their union local leaders for wage boosts of the same order when in fact such companies may already have granted increases beyond the average area or industry increases. Other variations, such as in incentives, rate of productivity and historical relationships must be given close study. Take a quick look at the big three automobile companies: GM has many plants throughout the country, and its large-city wage levels are somewhat higher than in small towns. Still, if it dealt with the UAW on the basis of the latest corporation offer of 13½ cents an hour raise, average hourly rates would have been increased by about 36 per cent over January, 1941. Chrysler is understood to have reached an average rate of $1.325 if the current settlement is approved and thereby will have increased rates by 36-37 per cent over the past five years. Ford is reported willing to add 18 cents to average rates of $1.21, maintaining a differential which has existed between it and other companies for years.

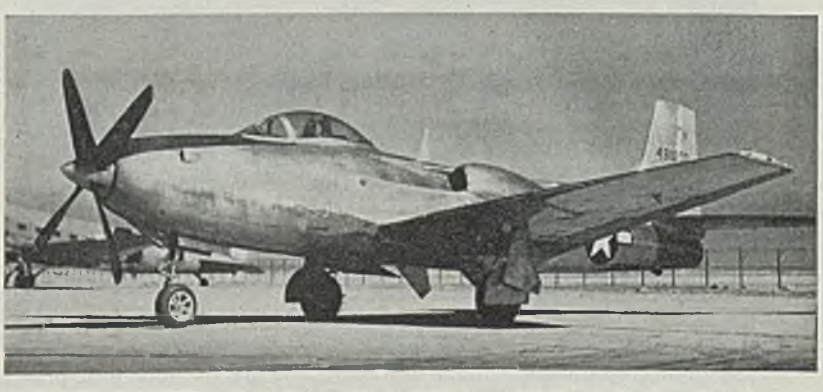
But—and here is where the pattern formula breaks down—a principal parts manufacturer in Detroit has a current average rate of $1.27 with no increase at all. It also has high incentive-productivity and high grade of working force. It cannot afford an increase of 18 cents without endangering its ability to continue in business, since it has already granted wage increases of 33 per cent since January, 1941, and must meet competition which has not granted comparable raises. This company thinks it might stand 10 cents an hour, but certainly not much more.

It must be recognized, notes Mr. Rising, that the bitterness, distrust and vilification of managements encouraged in union ranks over the past ten years are not going to dissolve merely by moving wage rates up 18 cents an hour. The problem is more basic than that, and perhaps will require years of time and the passage of reasonable labor legislation to wash away. Care should be taken to avoid overoptimism because of a few local rays of sunshine that may appear on the labor front.

Nowhere is the disparity between different plants operating under contracts with the same union more critical than in the metal fabricating plants with CIO steelworkers' union contracts. These 700-odd manufacturers are really up against it in now being closed down and faced with identical wage demands to those presented to the large steel plants where wage scales are entirely different. Base hiring rate in steel, for example, is 78 cents an hour, against a typical base rate of $1 an hour in a Detroit fabricating plant now on strike. It would appear manifestly unfair to force the application of a wage settlement in basic steel willy-nilly to all companies saddled with steelworkers' contracts, particularly when hundreds of these plants are caught in the double squeeze of having to pay $4 or more per ton extra for steel when the price formula is worked out.

The President himself has recognized these inequities, as the following quotations demonstrate: "The extent to which the industry can grant wage increases without price increases will vary from company to company and from industry to industry . . .I want to make it clear, further, that there are companies where wage or even overtime pay continues and where no suffering will be caused to the workers during reconversion . . . Labor must recognize these differences and not demand more than an industry or a company can pay under existing prices or conditions." In the light of events, these words have proved mere hollow phrases.

The solution is for union members in



PROPJET FIGHTER: This Consolidated Vultee XP-81 built for the AAF is the first plane ever to fly with a gas turbine engine designed for propeller drive. Powered by a General Electric gas turbine engine in the nose and a GE jet engine in the tail, the fighter has a speed of more than 500 miles an hour. The engines operate independently and their combined power is virtually the same as that produced by all four engines on a B-29

the 700 fabricating plants to go back to work and resolve their differences by collective bargaining over the conference table. To date there has been no such collective bargaining so far as these companies are concerned, and CIO leaders have insisted there can be no negotiating until such time as "the pattern" has been set in the present controversy between producers of steel and the steelworkers' union.

Consolidated Vultee Aircraft Corp., by means of the controlling interest in ACF-Brill Motors Co. and its wholly-owned subsidiary, Hall-Scott Motor Car Co. (California), finds itself an established part of the automotive industry, in the manufacture of motor busses, trolley coaches and specialized engines, under direction of a man, Irving B. Babcock, who has had 25 years of experience in the truck field. The $7.5 million transaction is also the first entrance of a large aircraft manufacturer into the automotive field.

Commenting on the move, Mr. Babcock states, "Brill and Convair working together will create a well-rounded organization . . . In the building of thousands of aircraft Convair has acquired a knowledge of engineering and mass production which can be of tremendous value in the manufacture of busses and trolley coaches. The aircraft industry also knows a great deal about the load-carrying abilities of such metals as aluminum and magnesium, which are expected to help reduce the weight of vehicles used for surface transportation. At the same time, the aircraft industry is in a position to benefit from the long experience in commercial manufacture enjoyed by the surface transportation industry."

Ronald R. Monroe is president of Brill and will continue in that capacity. Present output is concentrated on two models of busses, one for city and the other for intercity operation. Both are powered by Hall-Scott underfloor engines and incorporate such improvements as air-conditioning, radio and public address systems. Order backlog is in excess of $50 million. Plant facilities at Philadelphia include 804,000 square feet of plant space on 29 acres of property. The company was founded in 1869 when John G. Brill and his son began manufacture of horse-cars. In August, 1944, the business was merged with American Car & Foundry Motors Corp.

Believed to be the first postwar union contract to incorporate specific provisions for increased productivity is that announced by the Eclipse-Pioneer Division of Bendix Aviation Corp. and the Aircraft Workers' Union of New Jersey Inc. It provides for a 12 cents per hour general wage increase, along with a no-strike pledge and a union commitment to increase production by at least 15 per cent.

BEFORE AND AFTER: Improved working conditions and efficiency are reflected in these prewar and postwar views of the Studebaker "doll-up" line. Especially benefited by a reconversion program are the lighting system, which now contains several hundred feet of fluorescent tubing, and the conveyor line. In the former practice, top photo, cars were hauled down the line by a chain that protruded from the floor. Guide rails for the wheels were an additional hazard as workers performed finishing operations in and around the automobiles. Now all mechanism is concealed, bottom photo. Endless chain conveyor principle is fundamentally the same, but the 12-inch square steel plates are attached to the chain. The cars ride on the plates. Electric motors turning the cog wheels against the chain are also beneath the floor

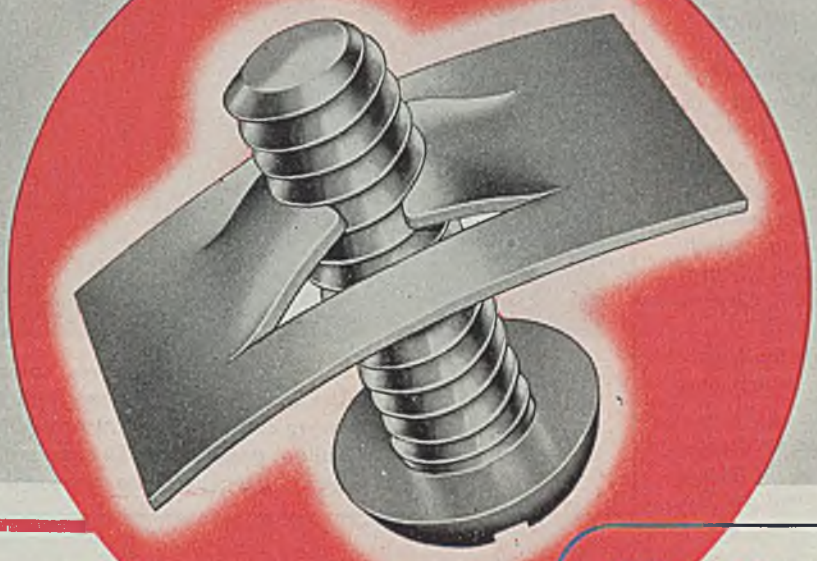
Suggest Relief for Strikers

Latest strategy in Detroit union quarters is the announced recommendations of presidents of Chrysler and Ford locals to ask their members voluntarily to assess themselves for the duration of the GM strike the full amount of increases received in their recent negotiations. Specifically, the publicity accompanying the proposal states, "We will urge that every Ford and Chrysler worker make such a contribution out of the first pay he receives after the increases are in effect, even if the GM strike has already been settled, because relief will still be needed. If it has not been settled by that time, we will urge that the contribution be continued for the duration of the strike."

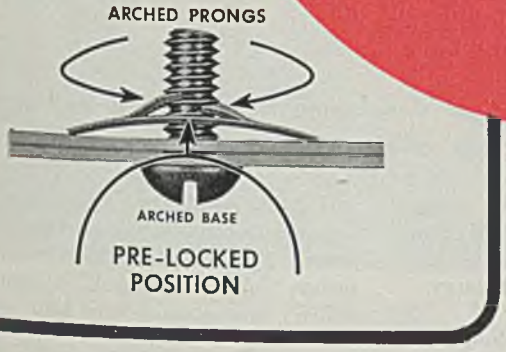
Largest cost-plus-fixed-fee contract settled since V-J Day was announced a week ago when the government approved claims involved in termination of aircraft engine production at Studebaker plants, covering the manufacture of $750 million worth of engines and parts. Settlement terms dealt exclusively with work in process and supplies on hand and on order at the time of the termination. Included in the agreement were 3334 open claims from about 1000 subcontractors and vendors. In all, 2666 claims were settled without cost to the government, while claims in the remaining 668 aggregated over $11.5 million on V-J Day but were scaled back to $2,572,749.

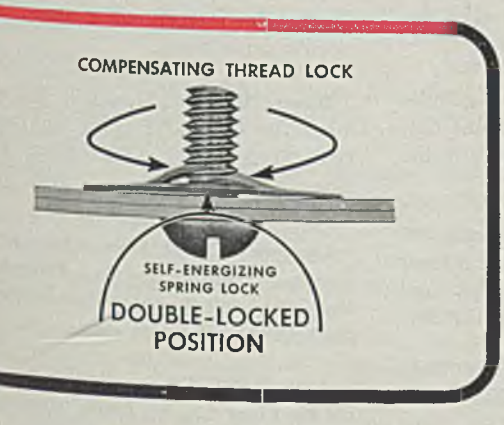
ONLY THE SPEED NUT HAS THE

Self-Energizing Spring Lock



OVER 3000 SHAPES AND SIZES





The SELF-ENERGIZING spring lock is an engineering development that is unique and distinctive with SPEED NUTS. To understand the SELF-ENERGIZING principle you need only observe how the prongs are forced deep into the root of the thread simultaneously with the downward pull on the main arch as the screw is tightened.

When any SPEED NUT assembly is subjected to stress or strain tending to separate the two parts, the prongs of the SPEED NUT actually exert more pressure into the thread root—locking the SPEED NUT even tighter. The free-acting prongs also COMPENSATE for tolerance variations to facilitate easier and faster application of screws and bolts. Manufacturers using porcelain enamel, glass or plastic parts in assembling their products also prefer SPEED NUTS because this SELF-ENERGIZING spring lock, engineered out of live spring steel, is a practical guarantee against breakage during or after assembly.

Write for literature and include your assembly details for quicker action.

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.
In Australia: Simmonds Aerocessories, Pty. Ltd., Melbourne

Speed Nuts* PATENTED

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

FASTEST THING IN FASTENINGS

White Motor Co. To Expand Bus Production

New $2½ million plant will permit firm to more than double its output. Straightline operations planned

DETAILS for streamlined production that will more than double its output of busses are being worked out by White Motor Co., Cleveland.

Nucleus for the new $2½ million factory is a modern plant and office building at 1455 East 185th St., Cleveland, which formerly was occupied by the Nottingham Equipment Works of the General Electric Co.

First step will be to double the length of the plant, resulting in a building 328 ft x 920 ft.

Metal stock for immediate processing will be stored at one end of the plant, and directly off this room will be the press and machining department where parts are made up.

Along one side of the building, starting from the press and machining department, will be the frame and engine assembly line, a straightline operation. This will lead to the prime coat section of the paint department at the other end of the plant. Following the surfacing and priming, the busses will go across the end of the plant and through a color section. Modern spraying and oven drying equipment will be used.

After going through the paint department, the vehicles will go down another side of the plant in a final assembly line.

In the center of the plant, between the lines, will be a large central storage area for fabricated materials and parts.

Parts, bodies, and metal units will be made up at the bus plant, while engines and axles will come from the main White plant on East 79th St.

Sharon Steel Seeks Lease On By-Products Coke Plant

Sharon Steel Corp. is reported seeking a lease on the government-owned by-products coke plant at Morgantown, W. Va., as a source of coke supply for its blast furnaces. This plant consists of four ovens. The corporation plans to eventually build its own by-products coke plant near its two Farrell blast furnaces, but hopes to lease the Morgantown plant.

SALES CONFERENCE: More than 100 executives, salesmen and engineers of eight of the 14 member companies of Dresser Industries Inc. met in an annual sales and engineering conference in Mineral Wells, Texas, recently. Shown here are H. N. Mallon, president of Dresser Industries, and John B. O'Connor, executive vice president

BRIEFS . . .

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

Massachusetts Steel Treating Corp., Worcester, Mass., has organized Presmet Corp. as a subsidiary to produce metal parts by powdered metallurgy.

—o—

Truscon Steel Co., Youngstown, has reopened Seattle offices at 757 Central Bldg., with Guy H. Taylor as sales engineer and manager.

—o—

General Grinding Wheel Corp., Philadelphia, has appointed A. R. Soltis Co., Detroit, as exclusive representative in the midwest region.

—o—

Lectromelt Castings Co., Barberton, O., has been formed as a result of the merger of Lectromelt Steel Casting Co. and Barberton Foundry Co., both of that city.

—o—

Yale & Towne Mfg. Co., New York, plans to establish a plant at 2933 Main St., Buffalo.

—o—

Burdett Oxygen Co., Cleveland, has opened a service store at Lakeside Ave. and East 33rd St., that city.

—o—

Baltimore Aircoil Co., Baltimore, has reopened at 400 Colvin St., that city, and will manufacture condensers for refrigeration and air conditioning equipment. The company closed when its owner, John Engalitchoff Jr., entered military service three years ago.

—o—

Lisbon Hoist & Crane Co., Lisbon, O., has been organized to manufacture electric cable hoists.

—o—

Rheem Mfg. Co., New York, has transferred its General Engineering Department from Standard Oil Bldg., Baltimore, to 570 Lexington Ave., New York 22.

—o—

Dampney Co. of America, Boston, has acquired Thurmalox Co., Doylestown, Pa., and will continue production of protective coatings for metal.

—o—

Arpe Metal Works and Faris & Smith Plastic Floor Co., St. Louis, has changed its name to W. W. Faris Mfg. Co.

LeTourneau Will Establish School and Plant in Texas

R. G. LeTourneau Inc., Peoria, Ill., has purchased for $870,000 Harmon Gen-

eral Hospital at Longview, Tex., for use as a technical institute for training of workers for a LeTourneau company branch factory to be built in the Longview area. The hospital recently was declared surplus by the government.

The earth-moving machinery concern plans to organize a training school at the former Army hospital. The school will be known as the LeTourneau Technical Institute of Texas. Capacity will be 2000 trainees, with preference extended to war veterans.

Use also will be made of the Lone Star Steel Co.'s $25 million steel plant built by the government during the war but never put into full operation. Steel would be purchased from the Lone Star plant which is located in the East Texas iron ore deposit area and which has not been extensively exploited.

Construction of the LeTourneau plant awaits settlement of the strike in the steel industry. The project, including 10,000 acres to be used as a proving ground by LeTourneau, will involve several million dollars. The plant itself is expected to cost nearly $1 million. The plant will employ 2500 people, and the entire project will employ 5000.

Great Lakes Steel Co. Building $1 Million Mill

Construction work on a $1 million cold rolling mill at the Ecorse, Mich., plant of Great Lakes Steel Co. was halted when workers of the American Federation of Labor refused to cross the picket lines of the CIO United Steelworkers union. This expansion project of Great Lakes Steel had not been revealed previously. According to unofficial reports, 2500 new jobs will be created when the new mill goes into production in addition to the company's present payroll of 7100.

OPERATING CLINIC: Heads of the divisions and subsidiaries of Rockwell Mfg. Co. met recently to co-ordinate their diversified manufacturing, engineering, research, purchasing and marketing facilities. Shown at the session are, left to right, top row: J. E. Brown, assistant to general sales manager, Rockwell Mfg. Co.; W. F. Crawford, president, Edward Valves Inc., East Chicago, Ind.; E. W. Meyers Jr., controller, Rockwell Mfg. Co.; A. H. Chatley, vice president, Delta Mfg. Co.; C. S. Bygate, assistant general purchasing agent, Rockwell Mfg. Co.; W. H. Newbaker, general purchasing agent, Rockwell Mfg. Co.; H. F. Zorn, president, V & O Press Co. Inc.; I. P. Gassman, sales manager, Arcade Mfg. Division; second row: L. X. Ely, vice president, Monessen Foundry & Machine Co., Monessen, Pa.; E. E. Matheson, sales manager, Nordstrom Valve Co., Oakland, Calif.; A. R. Whittaker, general manager, Brooklyn plant, Pittsburgh Equitable Meter Division; B. C. Trublood, general manager, Arcade Mfg. Division, Freeport, Ill.; H. F. Sacknus, factory manager, Pittsburgh plant, Pittsburgh Equitable Meter Division; R. C. DuBrucq, vice president, Crescent Machine Co., Leetonia, O.; Andrew Kuhl, superintendent, Monessen Foundry & Machine Co.; W. A. Marsteller, general advertising manager, Rockwell Mfg. Co.; H. C. Stuckeman, vice president, Delta Mfg. Co., Milwaukee, Wis.; Front row: T. I. Shriver, chairman, V & O Press Co. Inc., Hudson, N. Y.; E. W. Meyers, treasurer, Rockwell Mfg. Co.; A. J. Kerr, vice president of sales, Rockwell Mfg. Co.; Col. W. F. Rockwell, chairman and president, Rockwell Mfg. Co.; W. F. Rockwell Jr., vice president and general manager, Rockwell Mfg. Co.; W. S. Potter, vice president of research, Rockwell Mfg. Co.; H. S. Rockwell, president, Rockwell Machine Co., Hopewell, N. J.

Seek Standards For Wire Nails, Staples, Fence

Two closely related simplification programs are sponsored by American Iron & Steel Institute committee

TWO CLOSELY related simplification programs being developed through the Division of Simplified Practice, National Bureau of Standards, are being sponsored by a technical committee of the American Iron & Steel Institute, New York.

One program proposes a list of stock sizes and types for wire nails and staples. It includes fence staples, poultry netting staples, and all kinds of wire nails commonly used by the various building trades and by box manufacturers.

The other program is a proposed revision of Simplified Practice Recommendation R9-28, Woven Wire Fencing. It presents a list of stock items in the following products: Farm fence, close mesh fence, wolf-proof fence, poultry and garden fence, chick fence, galvanized barbed wire, and galvanized two-ply barbless wire.

If these proposals as submitted, or as adjusted in accordance with suggestions which may be submitted, meet with approval of producers, distributors and users, the proposals will be promulgated and issued in printed form.

Mimeographed copies of the programs are available for approval, comment or both, from the Division of Simplified Practice, National Bureau of Standards, Washington 25.

Harvester Company Takes Over Malleable Iron Foundry

To meet an urgent need for greater malleable foundry capacity in its farm implement manufacturing operations, International Harvester Co., Chicago, on Feb. 1 took over the malleable iron foundry of General Malleable Corp., Waukesha, Wis. The gray iron and aluminum foundry owned by General Malleable, and also in Waukesha, will not be taken over by Harvester, but will continue to be operated by its owner.

Although Harvester has already started operation of the malleable foundry, negotiations for the purchase are still in process. The plant occupies 12 acres of land and has in excess of 160,000 sq ft of floor space under one roof.

Cessation of Steel Deliveries Is Reflected in Metal Plants Activities

More than half of plants expected to be closed by end of February unless shipments are resumed. Nail shortage threatens to halt work on construction of thousands of homes. Estimate six weeks will be required to build up normal stocks after strike ends

LOS ANGELES

CESSATION of steel deliveries to the Los Angeles area, while a mounting threat growing more serious by the day, has not as yet exerted a wide influence on fabricating industries here, according to George Smith, assistant manager, Metal Trades Manufacturers' Association, Los Angeles.

Certain small plants, Mr. Smith said, have been forced to shut down due to stoppages in deliveries of assembled parts from component makers whose steel stocks are diminishing, but all foundries and large machine shops continue in operation.

This is in contrast to manufacturers who receive steel direct from mills. With the spread of the strike to affect some 50 plants, the indirect results are beginning to be felt in basic manufacturing operations as compared with fabricating from components made elsewhere.

The Merchants and Manufacturers Association here estimates more than half of the Los Angeles County concerns whose production depends on the use of steel expect to close their doors within a month.

53 Per Cent To Close This Month

A summary of an association survey discloses that 20 per cent of the firms expected to shut down within the first 10 days in February. Some 53 per cent reported they will close before the end of February. Only one manufacturer believes he can last more than three months if the strike continues.

From other sources in Los Angeles it was learned that a nail shortage looms as a serious threat to stoppage of work on hundreds of new homes and hundreds more of remodelings. This development also will have a vital effect upon the overall labor picture.

When the strike does end, it will require at least six weeks to get supplies of steel sufficient for normal production into the area.

It was estimated that layoffs now pending will reach 10,000. A total of about 16,000 already are out.

One typical example of indirect effects of the strike is the Rheem Mfg. Co., South Gate, where management announced that it soon would lay off 400 of the 900 workers producing thermostats and other items for the 18 Rheem plants throughout the world. The plant itself, of course, is not struck.

"The Kaiser mill at Fontana, the only one in operation in this region, is not yet a factor in the market, and won't become so for months," Mr. Smith said. "Even then the making of motor cars and other activities of the corporation and its affiliates may take the majority of output."

Seasonal Unemployment Is Felt in Pacific Northwest

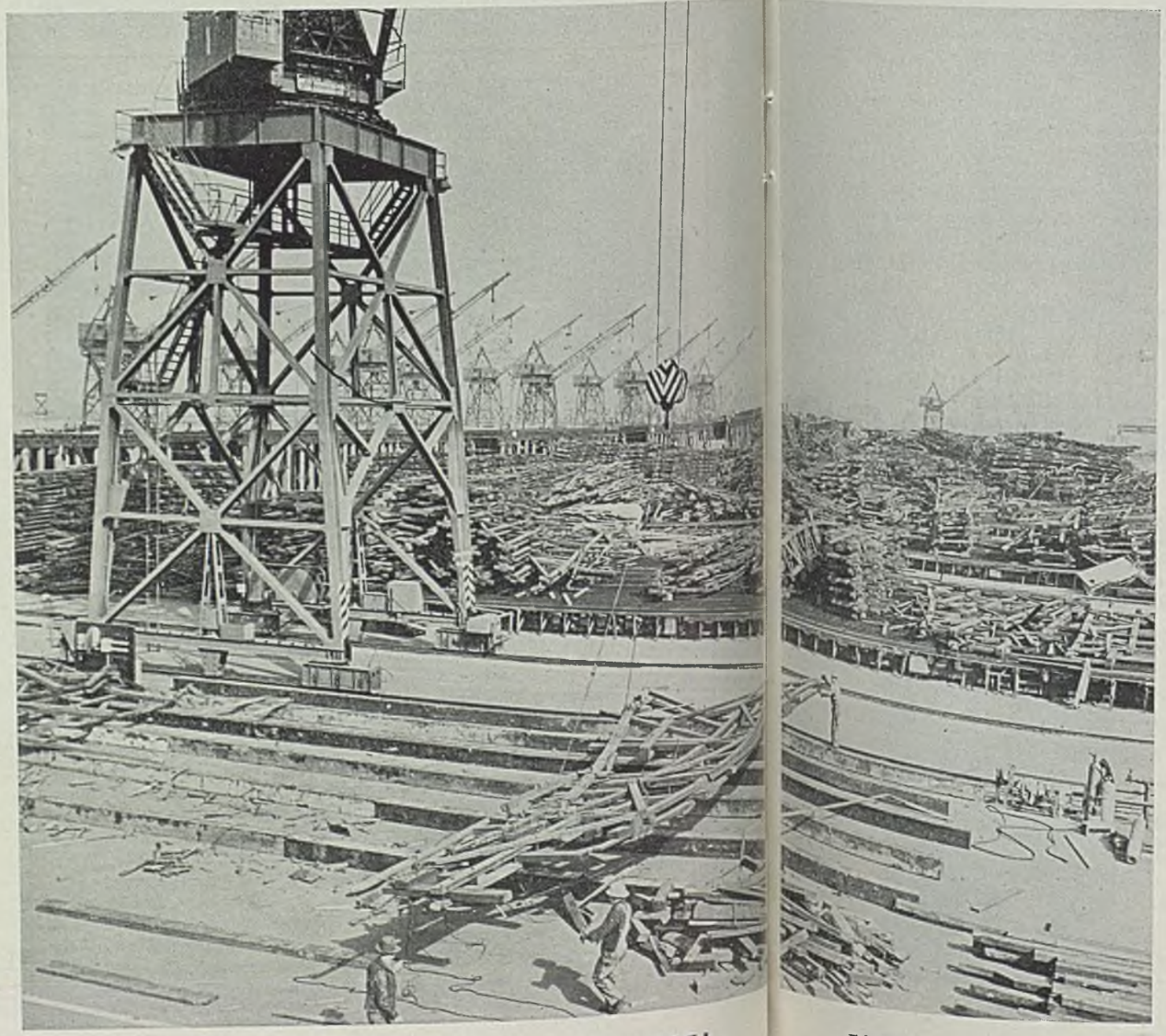
SEATTLE

Seasonal layoffs and fewer job opportunities are features of the current labor picture in Washington state. More veterans are returning; agricultural and lumbering workers are in the midst of seasonal layoffs; settlement of some labor controversies has improved the outlook; the housing shortage continues critical; more construction is necessary to absorb unskilled workers.

Increased steadiness in the Seattle labor market is noted, claims filed for unemployment in December registering a decrease. Major retail establishments report a net increase in employment following downward adjustments after the holiday season. The aircraft industry showed a 10 per cent employment increase. Present job openings are mostly for clerical, service and skilled workers. Large scale construction will serve to provide jobs for many semi-skilled and unskilled workers.

Conditions in British Columbia are similar to those along the Pacific Coast states. At present it is estimated Vancouver has 15,000 jobless and probably an equal number clamoring for housing facilities.

War jobs attracted thousands from the prairie lands of eastern Canada and many want to remain here.



Fourteen shipways and supporting structures are being dismantled at the California Shipbuilding Corp. where 467 Liberty and Victory ships were constructed during the war. Plenty of lumber, pipe fittings and plumbing to build 5000 homes will be salvaged. A crane is shown stacking some of the 25 million board feet of lumber that will be made available to builders within the next nine months. NEA photo

Mineral Production in California Reaches All-Time Peak in 1945

Greatest gain is in production of petroleum and natural gas. Gold, state's most important metallic mineral, gains 47 per cent but still is only 12 per cent of prewar output. Silver, lead and zinc production increase

SAN FRANCISCO

MINERAL production in California in 1945 reached the highest level on record, according to the State Division of Mines.

Estimated value of recovery last year was $488,244,000, approximately 4 per cent more than the 1944 total of $469,775,000. Although a number of important minerals showed increases last year, nearly all of the total gain was the result of larger petroleum and natural gas output.

Petroleum production expanded to 328,144,000 barrels, valued at $347,832,000, an increase of about 5.3 per cent over 1944 and the highest in the history. Natural gas output rose about 16.4 per cent.

Gold, the state's most important metallic mineral increased about 47 per cent in 1945 from the low point of 1944, but reached only about 12 per cent of production in the peak prewar year. Gold production last year was valued at $6,023,000 compared with $4,108,000 in 1944. The gain was due chiefly to a slight increase in dredging operations.

Other metals to show an increase in 1945 over 1944 were silver, lead and zinc, but the amount of increased value for those was not enough to offset declines in chromite, copper, manganese ore, quicksilver and tungsten.

Expect Geneva Steel Bid From U. S. Steel Corp.

SAN FRANCISCO

ACCORDING to reports reaching San Francisco from Salt Lake City, Sen. Elbert D. Thomas (Dem., Utah) has advised that Washington surplus property disposal officials expect at least one bona fide bid for the Geneva Steel Works. Senator Thomas is reported to have said Benajamin Fairless, president, U. S. Steel Corp., wanted to make a firm bid, but hesitated to do so while the present steel strike continues.

Other steel observers here, however, are inclined to believe that the chief reason for extending bidding time 30 days to April 1 was because no bids had been received, nor were any firm bids in prospect. Up to now, U. S. Steel has not indicated publicly in any way that it intends to make an offer for the plant, although there have been purely unofficial indications that the corporation is making a renewed study on the mill's possibilities.

Kaiser Bids for Government Aluminum Plants in West

SAN FRANCISCO

Kaiser Co., apparently with the intention of building up a source of aluminum to be used in production of the Kaiser and Frazer automobiles, has bid to lease plants owned by the government in the Pacific Northwest. The plants are a major rolling mill near Spokane, Wash., and the Troutdale potline production plant near Portland. These plants form one of the largest integrated aluminum facilities in the Pacific Northwest and now are idle.

Kaiser's bid for the rolling mill is in opposition to an offer made by Reynolds Metals Co. The Reconstruction Finance Corp. recently has been hearing arguments from the two contenders and is expected to make a decision soon on disposal of the plant.

Kaiser Opens Temporary Offices in Long Beach

LOS ANGELES

Although Kaiser-Frazer Corp. executives announced last week that temporary offices have been set up in the Douglas Aircraft Co.'s former plant at Long Beach, they added that plans to convert part of the factory for automobile assembly are still indefinite.

MEN of industry

James McBeth Jr. has been appointed manager of sales of the newly established Furnace Products Division, Carnegie-Illinois Steel Corp. The new division will handle sale of pig iron, ferromanganese, spiegeleisen and coke.

—o—

J. Raymond Smith, who recently resigned as assistant to the general sales manager, Rustless Iron & Steel Corp., has been named district manager, Baltimore, for the Edgcomb Steel Co., Philadelphia.

—o—

Newly elected officers, effective April 1, Perfect Circle Co., Hagerstown, Ind., are: **Lothair Teetor,** chairman, **Ralph Teetor,** president and **Macy Teetor,** vice president in charge of engineering. **Daniel Teetor,** vice president in charge of manufacturing, **Donald Teetor,** vice president in charge of sales, and **Leslie Davis,** secretary and treasurer, continue in those offices.

—o—

Frederick J. Bruckner has been appointed assistant manager of sales, Chicago district, United States Steel Supply Co., Chicago.

—o—

Frank B. Rhodes Jr. has been appointed purchasing agent, Boston Wire Stitcher Co., East Greenwich, R. I.

—o—

Gwilym A. Price has been elected president and chief executive officer, Westinghouse Electric Corp., Pittsburgh. Mr. Price, formerly executive vice president, succeeds **George H. Bocher** who has been elected vice chairman of the board of directors. **A. W. Robertson,** chairman since 1929 and chief executive officer, has reached retirement age. He remains as chairman and will continue in a less active capacity.

—o—

Charles W. Stone, on leave of absence doing special work for the Office of Price Administration, Washington, has been elected secretary, Interstate Drop Forge Co., Milwaukee. Officers re-elected are: **C. E. Stone,** president, **H. C. Osborn,** vice president, and **C. C. Bremer,** treasurer.

—o—

E. R. Jacobsen recently was named sales manager of the Paul & Beekman Metal Stamping Division, Philadelphia, Portable Products Corp., Pittsburgh. Mr. Jacobsen formerly was New York sales manager for the Industrial Battery Division, Gould Storage Battery Corp. **A. G. Koenig** succeeds **E. D. Wacker** as general sales manager of the C. J. Tagliabue Instrument Division, Brooklyn, N. Y.

—o—

Robert W. Cornell has been elected comptroller, Parker Appliance Co., Cleveland, to succeed **Oliver W. Berndt,** who has resigned to establish a public accounting practice. Mr. Cornell has resigned as manager, Ivanhoe Mfg. Division, Reliance Electric & Engineering Co., Cleveland, to accept the new position.

—o—

Allyn Dillard, who joined Reynolds Metals Co. in November, 1945, has been appointed secretary and will have headquarters at Richmond, Va. For the past 17 years Mr. Dillard has practiced law with the firm of Mitchell, Capron, Marsh, Angulo & Cooney, New York.

—o—

A. R. Shevlin, Park Square Bldg., Boston, has been appointed sales and engineering representative for eastern Connecticut and Rhode Island for the Kelly Reamer Co., Cleveland.

—o—

P. J. Urso has been appointed manager of sales, Concrete Bar Division, West Virginia Steel & Mfg. Co., Huntington, W. Va. **Paul G. Davis** has been named manager of sales, Steel Products Division. Both have been released from active duty with the Army recently.

—o—

William P. Spofford has been appointed eastern manager, Engineering Works Division, Dravo Corp., Pittsburgh. Mr. Spofford will be in charge of management and operation of the company's Wilmington, Del., yard.

—o—

O. Fred Habegger has been named manager, advertising and sales promotion, Bryant Heater Co., Cleveland.

—o—

F. D. Rideout has been appointed contract manager, Osborn Engineering Co., Cleveland. Mr. Rideout formerly was assistant engineer and contracting manager of the American Bridge Co. in Cleveland.

—o—

Roy E. Waltemade has been promoted from works manager of the North Tonawanda, N. Y., plant, Rudolph Wurlitzer Co., to general manager of the company's DeKalb, Ill., works.

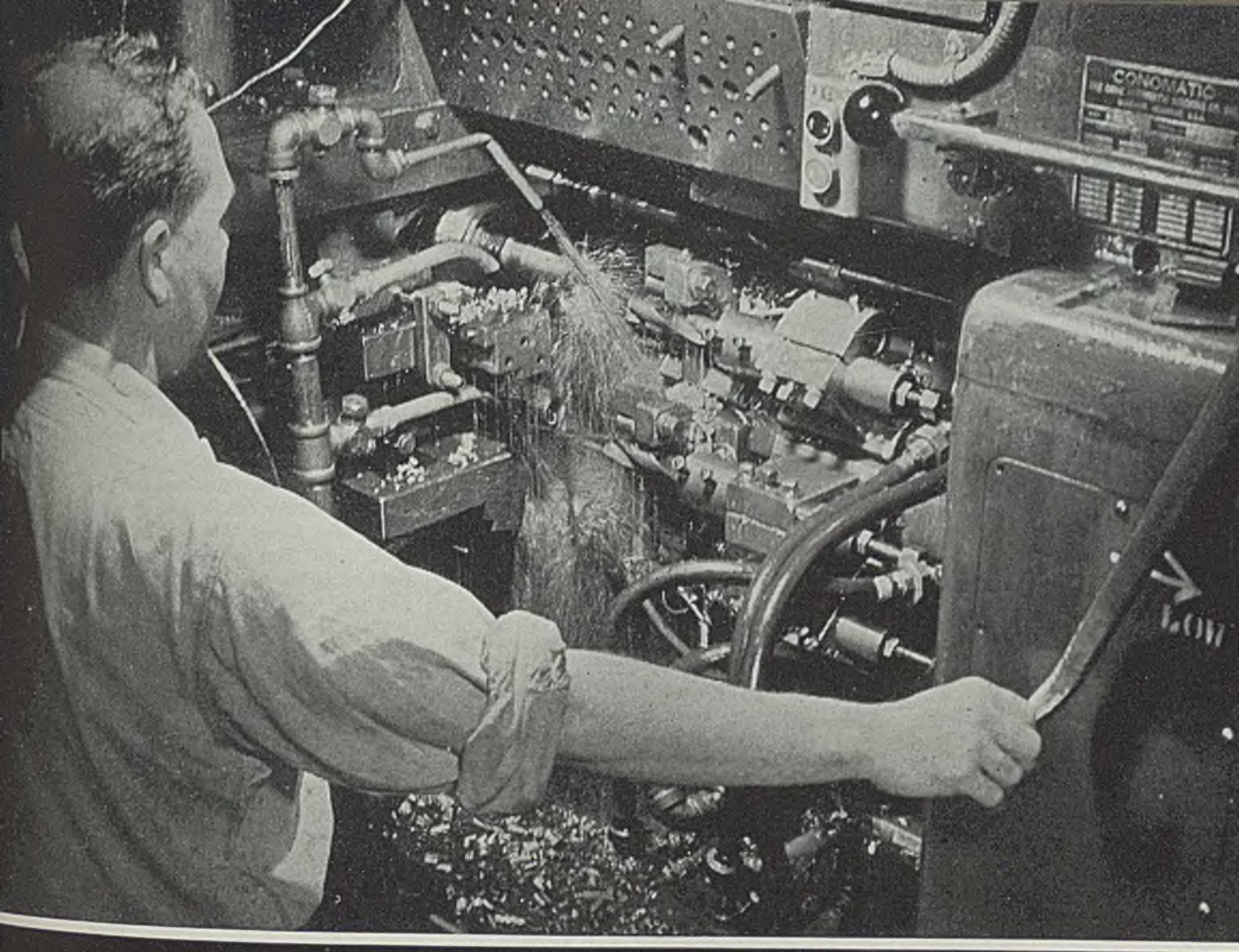
—o—

Lt. Col. Harold N. Hill, until recently assistant to the district chief, Birmingham Ordnance District, has been appointed manager of railway sales, Gulf Oil Corp. Mr. Hill became associated

GWILYM A. PRICE

ALLYN DILLARD

HAROLD N. HILL



5 OPERATIONS – *33 Seconds*

SUNICUT CUTTING OIL...

Used as Machine Lubricant and Cutting Lubricant on 8-Spindle Conomatic

For exacting metal-cutting requirements, the Sun Oil Company perfected "Sunicut," a clear, free-flowing, straight, cutting lubricant, produced by an exclusive process.

Here is a typical example of the fast, accurate work which is being done in hundreds of shops with Sunicut:

Machine: Cone Automatic Machine Co. 8-spindle Conomatic
Operation: Turning (2⅛" Form-Tool), drilling and reaming (3⅛" depth), knurling
Material: 1335 Hot rolled bar stock
Spindle Speed: 275 R.P.M.
Cycle: 33 seconds
Feed: (drilling and reaming) .007" per revolution
Machine lubricant: Sunicut
Cutting lubricant: Sunicut

Sunicut has high lubricating value and is an excellent dispenser of heat. It makes possible heavy cuts at high speed while maintaining accuracy and finish. Call the Sun Cutting Oil Engineer in your territory for full information, or write...

SUN OIL COMPANY • *Philadelphia 3, Pa.*
Sponsors of the Sunoco News-Voice of the Air—Lowell Thomas

SUN
SUNOCO
INDUSTRIAL PRODUCTS

E. P. TURNER

L. J. FRALICK

with the corporation in 1934, serving as industrial lubrication service engineer handling railway sales for its Atlanta Division.

—o—

E. P. Turner and **LeRoy J. Fralick** recently were elected vice presidents, Midland Steel Products Co., Cleveland. Mr. Turner has been associated with the company since 1924 and is now manager of its Detroit Pressed Steel Division. Mr. Fralick has been with the sales department of the Midland company since its organization and he has been sales manager of the company, with offices in Detroit, since 1932.

—o—

Russell J. Roberts has resigned his commission with the Coast Guard and has been elected assistant to the president, Sterling Engine Co., Buffalo.

—o—

A. Chester Beatty Jr., managing director, Selection Trust Ltd., London, England, and **Arthur H. Bunker**, partner of Lehman Bros., Hoboken, N. J., were elected directors of the American Metal Co. Ltd., New York.

—o—

A. L. Ralston recently was named manager of roll sales, Lewis Foundry & Machine Division, Blaw-Knox Co., Pittsburgh. Mr. Ralston has been associated with the Lewis division since 1927.

—o—

Bert Conway, formerly vice president in charge of manufacturing, Aviation Corp., New York, has become associated with **Joseph W. Rothmeyer**, Detroit.

—o—

Fred J. Tobias, research and metallurgical engineer, recently has become associated with Advance Pressure Castings Inc., Brooklyn, N. Y., to take charge of production and metallurgy.

—o—

John R. Johnston succeeds the late **William I. Howland Jr.** as manager of sales, Milwaukee district office, Carnegie-Illinois Steel Corp., Pittsburgh.

—o—

R. David Thomas Jr., director of research and engineering, Arcos Corp., Philadelphia, has been elected vice president of the company and continues as head of the research and engineering department.

—o—

R. H. Munn Jr. has been appointed manager of the Pittsburgh office, Ampco Metal Inc., Milwaukee. He was the company's representative in that territory prior to active service with the Army. **W. J. Nebel** has assumed duties as field engineer in Newark, N. J., formerly being in the Wisconsin district.

—o—

James W. Birkenstock has been promoted to general sales manager, International Business Machines Corp., with headquarters in New York. Mr. Birkenstock has been associated with the company since 1935.

—o—

A. A. Gustafson has been appointed distributor for Harris Calorific Co., Cleveland. He will operate as the Harris Calorific Sales Co., St. Paul.

—o—

Jerome F. Hurlbert, vice president, Bostwick Steel Lath Co., Niles, O., has returned to that position following 41 months' service as lieutenant commander with the Navy.

—o—

William H. Summers, formerly Washington district manager, Mechanical Goods Division, Goodyear Tire & Rubber Co., Akron, has been transferred to Cleveland in a similar capacity. Mr. Summers replaces **R. E. Britt**, Cleveland district manager, who is resigning to head the Central States Industrial Supply Co., Cleveland, a Goodyear jobber.

—o—

Albert O. Vogel, formerly lieutenant commander, Navy, has returned to Vilter Mfg. Co., Milwaukee, as assistant to the president. Mr. Vogel has been on leave of absence for 40 months.

—o—

Col. John Slezak, chief of the Chicago Ordnance District since June, 1944, is retiring from active Army service and is returning to the presidency, Turner Brass Works, Sycamore, Ill. He is succeeded by **Col. Joel G. Holmes.**

—o—

L. M. Cassidy and **T. K. Mial** have been elected vice presidents, Johns-Manville Corp., New York. **L. R. Hoff**, vice president in charge of sales, has retired.

—o—

Omer W. Blodgett has been appointed welding engineer for the Grand Rapids, Mich., area, Lincoln Electric Co., Cleveland. **Frank Boucher** has been named welding engineer, Detroit area; **R. K. Kewley**, welding engineer, Cleveland territory; **G. B. Moseley**, welding engineer, St. Louis area; and **L. J. Cogan**, recently released from the armed forces, has returned as welding engineer in the Philadelphia area.

—o—

American Foundry Equipment Co., Mishawaka, Ind., announces the following changes in its sales force: **A. H. Freeman** has been appointed sales representative with headquarters in Milwaukee; **Vernon S. Spears**, sales representative, Indiana; **Charles E. Ludwig**, representative in a newly created territory with headquarters in Buffalo; **Donald E. Matthews**, sales representative, St. Louis; **Joseph F. Underway**, sales representative, Houston, Tex; **Robert A. Campbell**, Canadian sales engineer, Toronto, Ont., Canada; **G. R. Bryant**, associated with **Robert L. Orth** as sales engineer, Detroit; **John N. Harper**, sales representative, Pittsburgh.

—o—

Lee W. Delhi has resigned as vice president in charge of operations, Western Pipe & Steel Co. of California, San Francisco, to become a member of the engineering and contracting firm of Hunt, Mirk & Co., San Francisco. Mr. Delhi is president, California Metal Trades Association.

—o—

Dr. George V. Slottman has been named to head the newly organized Technical Sales Division, Air Reduction Co., New York. **S. D. Baumer** and **E. V. David** are assistant managers.

—o—

Samuel M. Felton, general sales manager of the Railway Division, Edward G. Budd Mfg. Co., Philadelphia, for the past 9 years, has been elected first full-time president of the American Railway Car Institute.

—o—

Hiland G. Batcheller, president, Alle-

Why . . your New Equipment should be made from

Stainless Steel

The Encyclopedia says, "*Stainless Steel*—various types of steel or iron alloys capable of *resisting atmospheric corrosion* or attack by chemicals, acids and organic solution. These steels consist of steel or iron alloys in which chromium is the chief alloying element."

We say, "Stainless Steel is all that, and furthermore, it is easily fabricated by standard metal working practices, and has excellent physical and mechanical properties after fabrication."

Stainless in every form is easy to get from INDUSTRIAL STEELS, INC.

A complete stock of all types and forms of stainless steel is as near as your telephone. INDUSTRIAL STEELS, INC. maintains America's largest warehouse stock of stainless steel hardware, sanitary fittings, shapes, and other parts. Your order can be filled completely and promptly through one telephone call. You pay no premium for this service—for all stock is listed at mill prices. JMLCo. CI-B2

For Stainless . . .

BARS · VALVES · PLATES · FITTINGS
SHEET · WIRE · HARDWARE · WELDING ELECTRODES

Call *INDUSTRIAL STEELS, INC.*

Engineers, Purchasing Agents, and Designers—Ask to have your name put on the mailing list for the weekly stock list published by INDUSTRIAL STEELS, INC. Lists all types and forms available for immediate delivery.

Everything in STAINLESS

INDUSTRIAL STEELS, INC.

255 BENT STREET
Cambridge 41, Massachusetts

TROwbridge 7000
Teletype: Cambridge 547

gheny Ludlum Steel Corp., Brackenridge, Pa., has been elected to the board of trustees, Industrial Hygiene Foundation.

—o—

Carlos E. Harrington has been named chief engineer, Winfield H. Smith Inc., Springville, N. Y., builder of speed reducers and gears. Mr. Harrington will be in full charge of design, research and development work. During the war he acted as chief engineer for the Amphibian Car Corp.

—o—

W. A. Gray Jr. has been appointed sales representative, Scullin Steel Co., St. Louis, and will have headquarters in that city.

—o—

Hendrick Mfg. Co., Carbondale, Pa., has added the following to its sales force: **Clyde M. Watson**, Atlanta, to serve Georgia and Florida; **R. Grayson Yarrington**, Baltimore, the major portion of Maryland; and Westchester Steel Products, White Plains, N. Y.

—o—

Ralph M. Monk has been named director, industrial and labor relations, Caterpillar Tractor Co., Peoria, Ill. **George W. Torrence** has been appointed manager of the newly organized labor relations department and **Warren Kinsey** is industrial relations manager. **Dr. L. A. Blanc, W. L. H. Doyle, C. R. Maxwell** and **C. R. Schad** have been named assistant directors of research.

—o—

Maxwell A. Goodwin has returned from service with the Army to his prewar position as manager of the Chicago office, Clark Tractractor Division, Clark Equipment Co.

—o—

Samuel J. Gibson is president and **Warren C. Bigelow**, vice president, Gibson Inc., Toledo, a recently organized distributor for industrial rubber products.

—o—

William Osborne has been appointed assistant to the general manager, and **John A. Baldinger**, assistant sales manager, Automatic Transportation Co., Chicago, a division of Yale & Towne Mfg. Co. Mr. Baldinger succeeds **Robert M. Whitney** who recently was named assistant advertising manager.

—o—

C. W. Ginter, associated with Aro Equipment Corp., Bryan, O., since its organization 16 years ago, has been appointed vice president.

—o—

John O. Logan has been appointed an assistant general manager of sales, Mathieson Alkali Works, New York, and **Harry P. Smith** has been named New York district sales manager.

—o—

Lawrence Fenn, former assistant to **Joseph H. Cone**, president, Casco Products Corp., Bridgeport, Conn., has been appointed sales manager for automotive accessories. **Wallace Powell** has been named assistant sales manager, automotive section. In the newly created post of service manager is **Herman C. Yellen. Edwin J. Cone** has been assigned to the power tool section, Electrical Division. **Edward Wallace** has been appointed to the Electrical Division, heating pad sales section. **John T. Galvin** will serve as new copy chief of the company's advertising department.

—o—

Max L. Murdock has returned from 4½ years in the Navy, and has been appointed assistant manager of the centrifugal pump section, Norwood, O., works, Allis-Chalmers Mfg. Co., Milwaukee. **A. W. Kremser** has been named branch manager of the company's office at Davenport, Iowa, where he succeeds **C. J. Schutty**, who is being transferred to the company's Kansas City, Mo., office.

—o—

John C. White succeeds **George LeBoutillier** as vice president, New York, Pennsylvania Railroad. Mr. White, who for the past 7 years has been general manager of the company's central region at Pittsburgh, will also serve as vice president, Long Island Railroad.

—o—

B. W. Hagerman, Rice Barton Corp., Worcester, Mass., has been elected president, New England Foundrymen's Association. **D. L. Parker**, General Electric Co., Lynn, is vice president; **Ernest Stockwell**, Barbour Stockwell Co., Cambridge, secretary, and **Arthur W. Gibby**, treasurer. **M. A. Hosmer**, Hunt Spiller Mfg. Co., Boston, is retiring president.

—o—

J. F. Bechtle recently was appointed representative, Wyatt Metal & Boiler Works, Houston and Dallas, Tex., his territory to include New York, Pennsylvania, Delaware, Maryland and the District of Columbia with headquarters in New York.

—o—

Theodore C. Ekman, following 32 months service with the Navy, has become associated with Peninsular Grinding Wheel Co., Detroit, as assistant factory manager.

—o—

A. D. Graves has been named district manager, Cleveland territory, Fort Pitt Bridge Works, Pittsburgh, and will have offices in the Bulkley Bldg.

—o—

Melvin L. Manning, assistant chief engineer, Kuhlman Electric Co., Bay City, Mich., has been advanced to chief engineer in charge of electrical and mechanical design and development.

—o—

K. W. Green, manager, Railway Sales Division, Electric Storage Battery Co., Philadelphia, has been appointed manager of the company's newly consolidated Railway & Engineering Sales Division.

—o—

C. G. Pommer has been appointed manager, Ordnance Division, formerly the Ordnance Control Division, General Electric Co., Schenectady, N. Y. Mr. Pommer succeeds **C. E. Clark** who will serve as a consultant to the division.

—o—

Austin Co., Cleveland, engineers and builders, has appointed three new vice presidents: **Harold A. Anderson**, New York, eastern district manager of the company; **Charles W. Payne Jr.**, Chi-

K. C. GARDNER JR.

Who has been elected vice president in charge of operations, United Engineering & Foundry Co., Pittsburgh, noted in STEEL, Feb. 4 issue, p. 112

JOHN S. CHAFEE

Who has become associated with Saco-Lowell Shops, Boston and Biddeford, Maine, as vice president and noted in STEEL, Jan. 28 issue, p. 108

JOHN HARVEY BRYAN JR.

Who recently has been released from the Army and has become associated with J. Harvey Bryan Co., New York, noted in STEEL, Jan. 28 issue, p. 108.

HARRY M. HECKATHORN

Who has been appointed executive vice president, Mullins Mfg. Corp., Warren, O., and noted in STEEL, Jan. 28 issue, p. 108.

DR. C. F. GOODEVE

Who has been appointed director, British Iron & Steel Research Association, and also awarded a knighthood, noted in STEEL, Feb. 4 issue, p. 114.

cago district manager; and **Richard Ellis,** Seattle, district manager in the Pacific Northwest.

—o—

J. A. Grass has been elected president, York Corrugating Co., York, Pa., to succeed the late **Dr. C. P. Rice.** Mr. Grass, who formerly was secretary and treasurer, will continue as treasurer.

—o—

Harry Wilson Jr., formerly vice president in charge of operations, has been elected first vice president, Jessop Steel Co., Washington, Pa. Mr. Wilson has been associated with the Jessop company for the past 40 years, serving as general superintendent, works manager and vice president in charge of operations.

—o—

Parker Rust-Proof Co., Detroit, announces the following promotions: **Dr. R. C. Gibson,** director of research; **Dr. E. W. Goodspeed,** former assistant research director, assisting in the office of the president; **H. J. Lodeesen,** assistant research director. **Dr. George A. Baumstark,** formerly with Firestone Tire & Rubber Co.; **Richard I. Somers,** Willow Run bomber plant; **Amos R. Anderson** and **Charles G. Neuroth,** Houdaille-Hershey Corp., have joined the research staff.

—o—

Ira S. Latimer, associated with the Detroit sales staff, Rotary Electric Steel Co., has been placed in charge of a new Chicago sales office of the company at 1822 Engineering Bldg., Chicago.

—o—

John A. Bauer has been appointed sales manager, Hanson-Van Winkle-Munning Co., Matawan, N. J. **Ralph R. Granquist** has been appointed manager of the company's Chicago office. **William J. Wise,** recently released from the Navy, has rejoined the company as a field representative with headquarters in Dayton, O. **Edward M. Close** has been appointed assistant purchasing agent. **Robert Noland** has joined the company and has been assigned as field engineer, Chicago office.

—o—

Frank M. Aldridge recently was elected president and treasurer, J. W. Kelley Co., Cleveland, and **James W. Kelley,** president and founder of the company, becomes chairman of the board of directors. **Arthur F. Ruffner** continues as vice president. Mr. Aldridge formerly was national sales manager, Ohio Tool Co., Cleveland.

—o—

Eugene E. Gloss has been designated as service manager of ball bearings, New Departure Division, Bristol, Conn., General Motors Corp. **Seth H. Stoner** has been appointed assistant chief engineer in charge of automotive and tractor applications of that division.

OBITUARIES...

Frank W. Bachman, 66, former vice president, Russell & Watson Inc., Buffalo, kitchen equipment manufacturers, died recently at his home. Mr. Bachman retired in November, 1945, due to ill health after 50 years' service with the company.

—o—

Edward D. Townsend, sales representative, Eureka Fire Brick Works, Pittsburgh, died Jan. 20.

—o—

Dan C. Swander, chairman, Columbian Vise & Mfg. Co., Cleveland, died Jan. 27. Mr. Swander was one of the founders of the company in 1926.

—o—

Ernest R. Quade, 56, superintendent of the Syracuse, N. Y., branch, Precision Castings Co., died recently.

—o—

Arthur C. Obrock, 62, treasurer, American Foundry & Mfg. Co., St. Louis, died Jan. 29 at his home in that city.

—o—

Henry W. Corning, 77, former president, Standard Sewing Machine Co., Cleveland, died Jan. 31.

—o—

George H. L. Peay, 45, sales engineer for 10 years, Worthington Pump & Machinery Corp., Harrison, N. J., died Feb. 1 in South Orange, N. J.

—o—

Hamilton O. Penn, president, H. O. Penn Machinery Co., New York, and retiring president, Associated Equipment Distributors, died Jan. 31 at the Edgewater Beach Hotel, Chicago, where the association was holding its annual convention.

—o—

Earl A. Munger, 53, former president, Durham Mfg. Corp., Muncie and Ft. Wayne, Ind., died Jan. 28 at his home in Pasadena, Calif. Mr. Munger organized National Industries Inc., in 1944 and resigned as president of the Durham company in 1945 to devote all his time to the new concern. He resigned as president of National Industries several weeks ago due to ill health.

—o—

Harry F. Davis, 55, field engineer, Mathews Conveyer Co., Ellwood City, Pa., died at his home in Drexel Hill, Pa., Jan. 27.

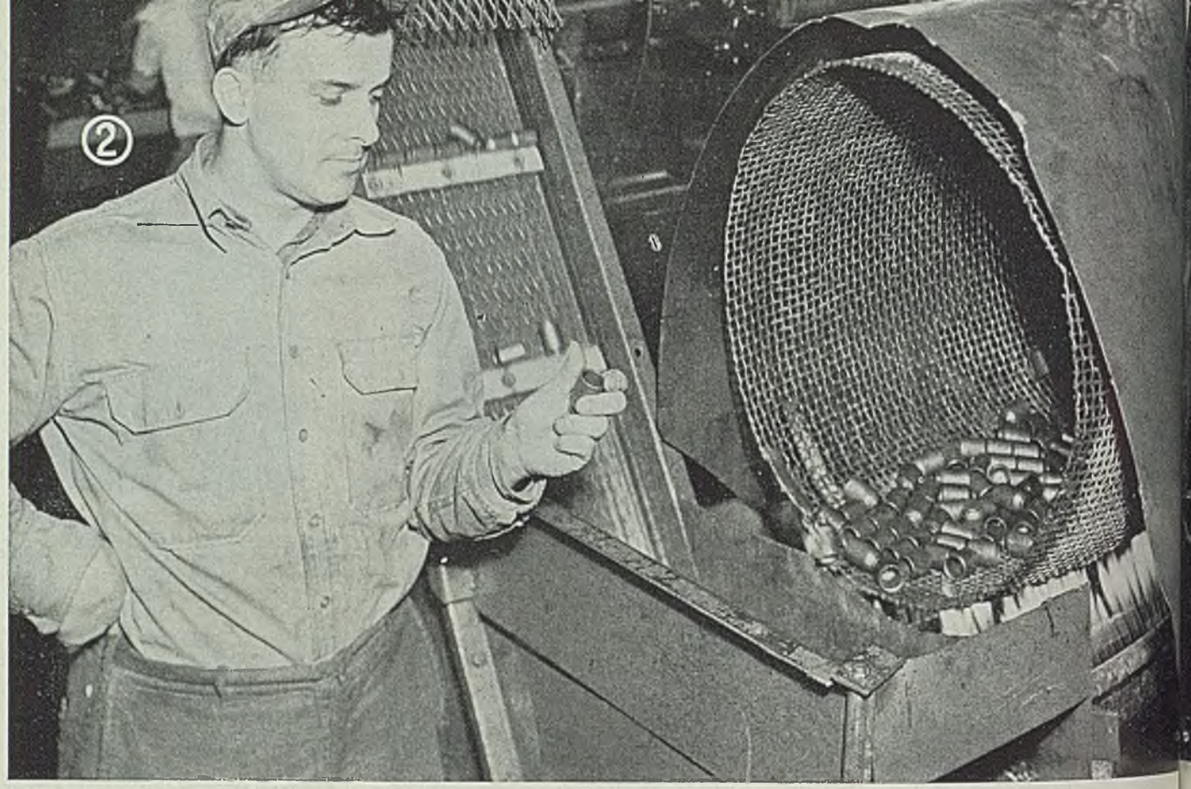


Fig. 2—Shell cases received wax bath in spiral washer, from which they emerged, as shown, in tumbling basket over special gas drier. Lightly coated cases were automatically conveyed from washing machines to hoppers at each of four draw presses

Fig. 3—No stream of lubricant for drawing dies was necessary in using wax drawing compound. This shows second drawing operation on 20 mm shell, on dial feed press of 106-ton capacity, running 25 strokes per min, with maximum reduction of 40 per cent in wall thickness, using carbide dies

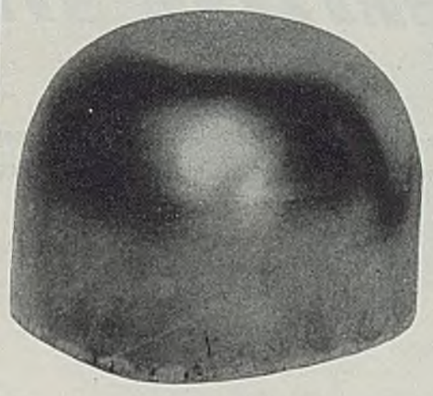


Fig. 1—Shows quality of surface finish obtained with wax drawing compound. Fig. 1 is 1-in. extruded section drawn in successive operations to a 60 mm mortar shell; Fig. 4—shows first cupping operation on sheet which was then drawn four times to produce involved shape of rifle grenade case

WAX DRAWING COMPOUND

. . . . for press-forming metals is adaptable to alloy steels and brass, prevents atmospheric corrosion, and is reported to increase die life and reduce die maintenance. Compound dries to form a coating clean to handle

By DR. E. A. BUNTING
Technical Director
Plasteel Corp.
Detroit

DRAWING of steel and brass has been, historically, a matter of steadily increasing amounts of cold working of the metals; each successive problem has been more severe and more difficult than the former. A limiting factor in press-forming metals has been the character of lubricants and drawing compounds available. As the type of work became more severe, products having greater lubricating and film value became more scarce, until there were few from which to choose for severe deep draw. Most of these were pigmented heavy oils of sulphur oils and greases, all of which presented production problems in application, subsequent cleaning and the maintenance of satisfactory employe working conditions. The operation was often dirty; inspection of the finished pieces difficult before cleaning, and the cleaning process itself complicated and expensive, both from the operational point of view and from the number of operations involved, as well as the amount of scrap frequently made during the run, due to difficulty of inspection.

One alternative is the use of a wax drawing compound, such as developed by Plasteel Corp., Detroit. One preparation normally is used in a concentration of one part water to one part drawing compound, and the parts are immersed for a few seconds and dried, after which they may be drawn at any time. The dry coating is almost imperceptible and feels slightly waxy. Pieces go through the drawing operation dry without the use of any other lubricant or coolant. If sequence draws are desired, it has been found that up to as many as five draws may be run in succession without recoating the work—sufficient residual compound remains from preceding draws to lubricate the punch and die sufficiently for subsequent operations.

Work comes from the press with a satiny finish. If annealing is done in a furnace without atmosphere control, the residual wax can be left on to serve as an annealing compound. During the anneal there is no hard mill scale formed which would necessitate pickling; a soft, porous scale is formed which is easily removed. In most instances it has been found advisable to remove the residual wax when bright anneal furnaces are employed in order to prevent the formation of a slight carbon film at the annealing temperatures. The pieces may be cleaned readily in most mild alkaline solutions. However, standard degreasing processes are not applicable as they do not completely remove the compound.

This wax drawing compound has been used mostly on steel and brass, and has been successfully employed in the drawing of steel plate nearly 1-in. thick. It also has been used to draw stainless steel and aluminum, but experience on these products is not as broad. Work is now under way in drawing alloys of copper, nickel and cobalt.

Use of such a material permits latitude in the rearrangement of equipment and manufacturing procedure so that more uniform products are made with less operations. Largely because of this ability to combine operations and eliminate others, one manufacturer, using wax drawing compound, reports he is now using 30 operations to manufacture a completely processed piece where he previously had employed 48.

The compound has been used successfully in drawing

(*Please turn to Page* 138)

PROGRESS IN BRITISH STEEL

Wartime emergency steels and production techniques promise important changes in peacetime steelmaking practice

By ERIC N. SIMONS
Edgar Allen, Ltd.
Sheffield, England

BRITAIN'S steel manufacturers faced great problems upon the outbreak of World War II. Demands of war greatly intensified the call for steel, and at the same time, the need for troops intensified the call for men. New, inexperienced workers had to be trained as air raids interrupted operations. Shortages of alloying elements called for development of new types of steel and new production techniques to meet the emergency.

In the field of cutting tools and steels the greatest difficulty, perhaps, lay in replacing tungsten in high speed steels by other alloys, without any loss of efficiency. This resulted at first in development of a range of molybdenum high speed steels, molybdenum replacing tungsten to some extent. Then, when molybdenum became short because the United States entered the war, and because of her own heavy demand for this metal, British metallurgists devised a 16/1.5 per cent tungsten-molybdenum steel which was found highly satisfactory.

A new alloy steel for reamers proved so satisfactory when compared to costlier and more highly alloyed steels previously used that it was widely advocated by the government.

Great advances were made in the tool salvage and reclamation, and one firm succeeded in building up work or making new tools by deposition of high speed steel by atomic hydrogen welding. This type of welding had been known and used for a considerable time, but had never previously been used for welding high speed steel because it lowered carbon content, so that cutting ability was seriously reduced. New process completely overcame this difficulty, and carbon content proved entirely controllable. A patent for this process is being sought.

Easy machining, a requisite of steels for making parts of machines where speed of production is concerned, led to the development of steels exceptionally high in sulphur. That is, steels softer and therefore freer-cutting, without any marked decline in physical properties.

Hitherto, high sulphur had always been shunned. Manufacture of tonnage steels was rendered increasingly controllable and accurate by virtue of pyrometers capable of measuring with precision the temperature of molten steel. They are immersed in the molten metal itself.

Substitution of alloy steel by carbon steels and lower alloyed steels has been the subject of intensive research, and has resulted in production of a number of entirely new steel specifications. For example, manganese has been employed in replacement of nickel and chromium. In general, the line of advance is in the direction of rather greater carbon percentages together with modifications in heat-treatment so as to provide necessary mechanical properties.

Open hearth furnaces depend on their linings, which have usually been of magnesite and chrome ore, but as a result of the scarcity of these raw materials, it has been found necessary to develop fresh mixtures to take their place. Small steel castings are being mass produced with the help of electrical machinery. Plant comprises two cupola furnaces, a horizontal furnace on rollers, fired by powdered coal, and two converters for preparing the steel. Electrical machinery moves the materials, drives the blowing plant, and serves many other functions.

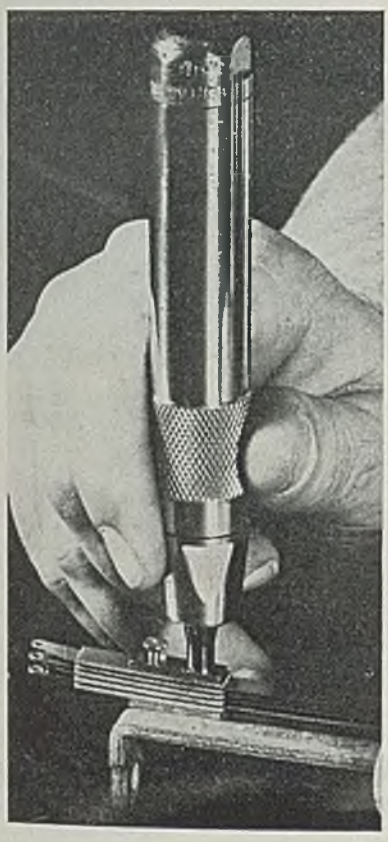
Much progress has been made in special methods for detecting flaws in steel. In one of the latest of these, the part is immersed in a fluorescent liquid and afterwards examined under ultra-violet light. Existence of any crack then is readily perceptible. The photoelectric cell is being used to control auxiliary equipment in steel rolling mills as a means of regulating fuel gas supply to furnaces; to detect holes in thin sheets and plates; and the cell also is used to control a sheet catcher.

Calcium Becomes An Additive

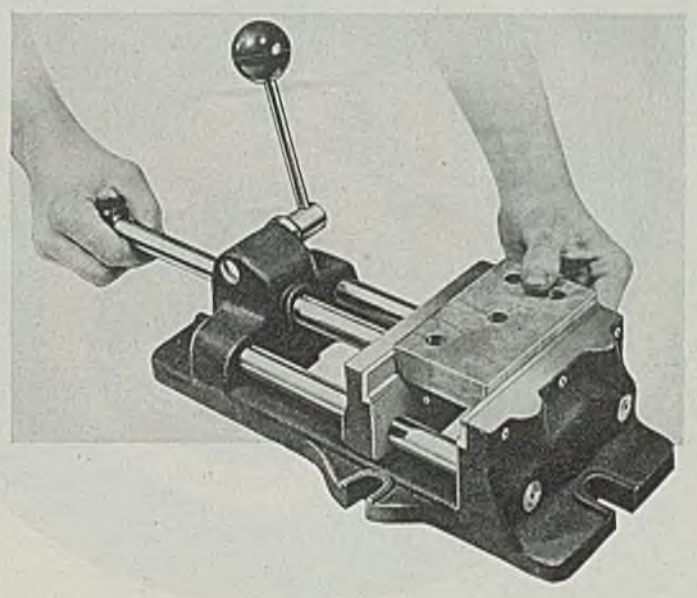
An interesting development is the use of calcium in the form of calcium phosphate as an addition in steel melting furnaces. Economic utilization of alloy steel scrap in the production of steel also has engaged the attention of British metallurgists. In one process, at Sheffield, a center of Britain's alloy steel industry, the charge introduced into the steel-melting furnace contains all alloying elements necessary to produce a specified composition, together with the usual margin of carbon. Nickel chromium steel turnings of 2-6 grade are converted into grade 30 by chipping. Pre-melting is favored as a means of using mixed alloy steel turnings.

Oil is being removed and recovered from large quantities of steel turnings. The material is washed by water sprays as it is carried forward by a conveyor, and oil is recovered from wash water by a combination of settling and centrifuging. Plant will clean 10 tons of turnings a day, from which as much as 30 gal of oil per ton is recovered.

Other problems successfully solved by British steelmakers and metallurgists included the transport and utilization of great quantities of low-grade, indigenous ores; conservation of alloying elements; reduction of the number of steel specifications; planning factories for mass production of cast steel bomb bodies; and the organization of steel supplies and price stabilization. These advances are expected to play an important part in postwar development. In addition, war has taught the British steel industry the importance and vital necessity of research and development, and vast sums are to be spent on this branch of the national postwar effort.

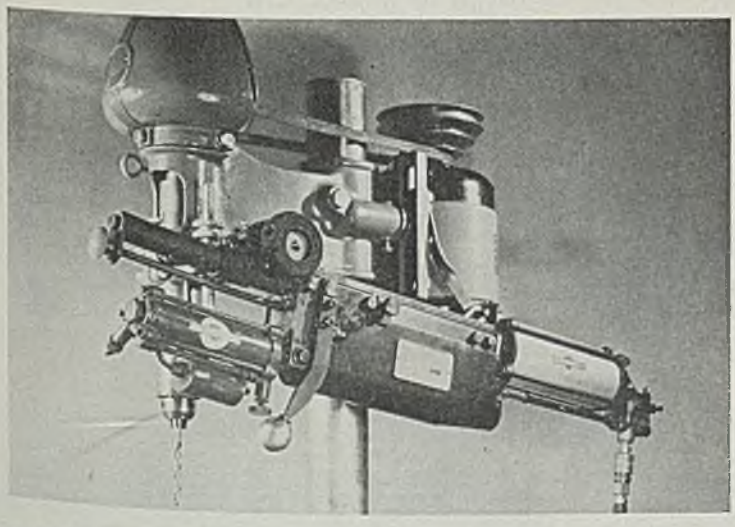


PNEUMATIC SCREW DRIVER: Designed especially for driving small screws, this power screw driver with rotary type motor, 4-blade construction and hardened and ground steel rotor and cylinder is about the size and shape of the average cigar. It is 4 7/8 in. long, 3/4 in. in diameter and weighs 8 oz. Finder and bits are easily interchanged to handle screw sizes Nos. 1 to 6, and adapter socket is available for nut setting. Tool, made by Aro Equipment Corp., Bryan, O., starts automatically when applied to work

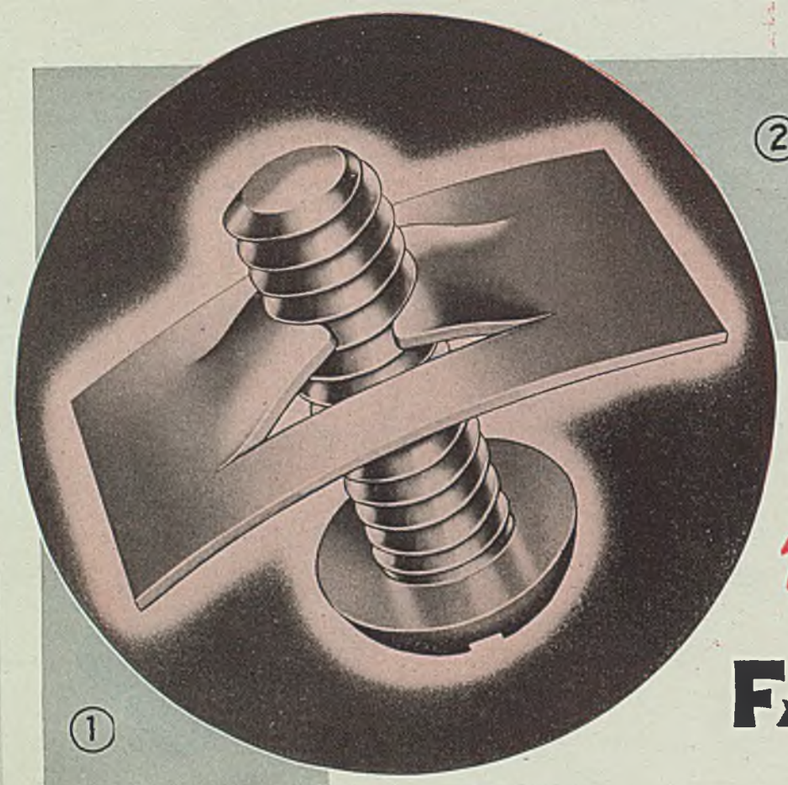


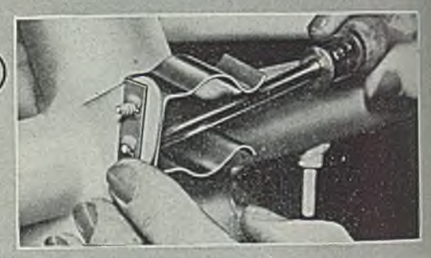
STEPLESS POWER FEED: Touch of a handle on this air-powered feed for drill press, milling machine or surface grinder advances work or tools a predetermined distance, for a predetermined power thrust, and automatically returns setup to starting position. Power thrust is approximately five times operating air line pressure, according to Bellows Co., Akron, O., and any air pressure up to 160 lb may be used. Adjustment of two throttle valves permits unlimited variation of feed and retraction speed in a stepless range. A built-in hydraulic resistance unit counteracts natural bounce of air and maintains constant feeding rate

SCREWLESS VISE: Instead of the usual adjusting screw common to most vises, this unit, made by National Machine Tool Co., Racine, Wisc., has a movable jaw quickly adjusted to work by sliding forward on round bars and locking by light press on locking lever. Built-in, recessed jaws keep work parallel, wide clearance between jaw guides avoids accumulation of chips, and removable accessory permits drilling of round or oval pieces



FLAW DETECTIVES: Six timed strokes are automatically applied at two points on electron tube envelopes to reveal shorts, r-f and audio noises and other potential faults by the rod-like solenoid-operated tappers at left and behind tube. Tapper, made by Sylvania Electric Products Inc., Emporium, Pa., eliminates use of hand mallets and provides adjustable and uniform control of force, angle and timing in testing for structural faults





Advanced FASTENING SYSTEM

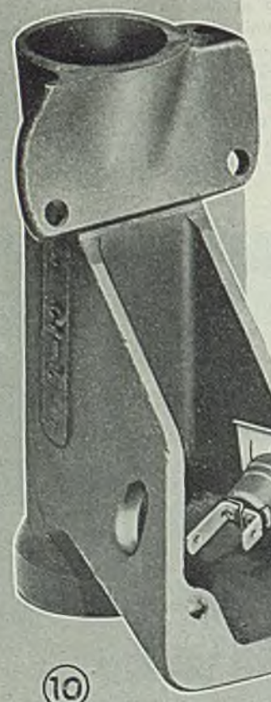
Simple spring steel shapes combine thread lock with spring lock, affording unusually fast and effective method of assembling sheet metal, porcelain, glass and plastic parts. Over 3000 different modifications of basic idea adapt system to exceptionally wide range of applications

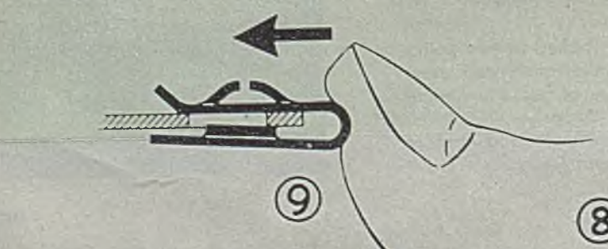
Fig. 1—Closeup of Speed Nut reveals thread-engaging prongs and arched base

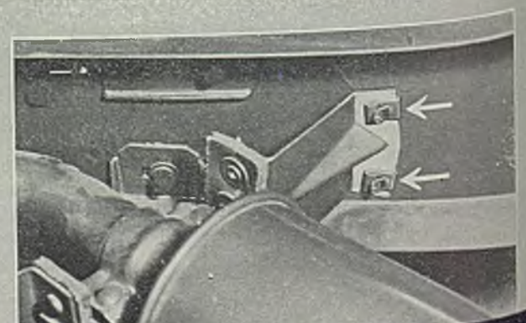
Fig. 2—Twin unit being used to mount spring clip on welded steel tubular frame

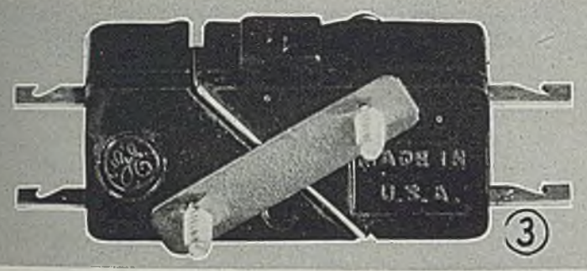
Fig. 3—Double unit simplifies construction and speeds assembly of this switch

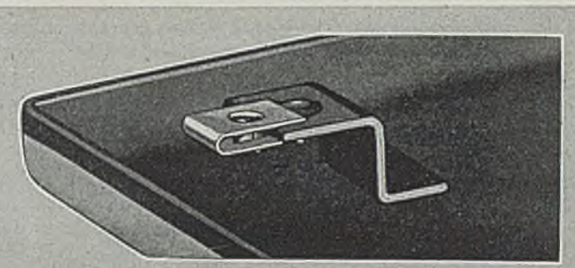
Fig. 4—"U" nut slipped over bracket permits blind assembly of oven door, prevents damage to porcelain enamel surfaces by affording resilient mounting, supplies "float" required to accommodate variations in making up the assembly











WAR YEARS have seen extended development and many new applications of the Speed Nut system of joining metals and other materials. Originally developed for making up assemblies in production of stoves and ranges, the system early proved to be outstanding in holding porcelain enameled sheet metal parts without cracking or chipping the finish. Its cost reducing and production increasing features resulted in quick acceptance for the assembly of mass production items such as automobiles, refrigerators, washers, stoves, radios, toys, etc.

The basic advantage of the system is that the tempered spring steel fasteners are so shaped (see Fig. 1) as to provide two locking elements—thread engaging prongs that are drawn down and in against root of thread as the screw is tightened to grip the threaded member and so prevent the nut from turning, and the arched base that flattens out as the nut is drawn up, keeping the assembly tight regardless of vibration. The thread engaging prongs are free acting, thus function on under or oversize threads. The design results in increased locking pressure as the load on the assembly thus joined is increased.

Result is that assemblies made by this method easily withstand aircraft vibration tests at 4000 strokes per minute and remain tight after hundreds of hours of this severe punishment. The resilient spring tension distributed over the wide base prevents damage to porcelain enameled surfaces or to glass and plastic materials. Made from sheet metal, these fasteners effect weight reductions up to 80 per cent. Too, it is easy to shape the units to perform multiple functions where they eliminate up to five other parts.

Savings—50 to 80 Per Cent: Mass production industries have found the push-on feature and multiple function ability of prime importance in cutting down assembly time with savings up to 80 per cent. Since the Speed Nut supplies its own lock, no lock-

Fig. 5—One end of fastener is formed here to shield bolt end completely

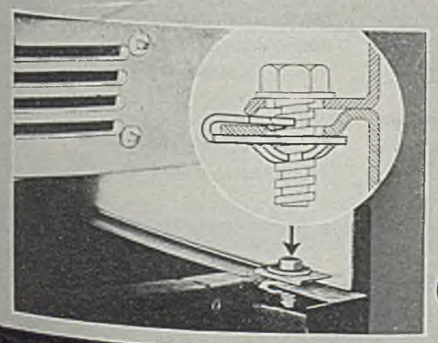
Fig. 6—Plastic window assembled into frame by spring tension fasteners frees the assembly from dead-tight fastening pressure, resists vibration of aircraft and permits expansion and contraction of the plastic without damage

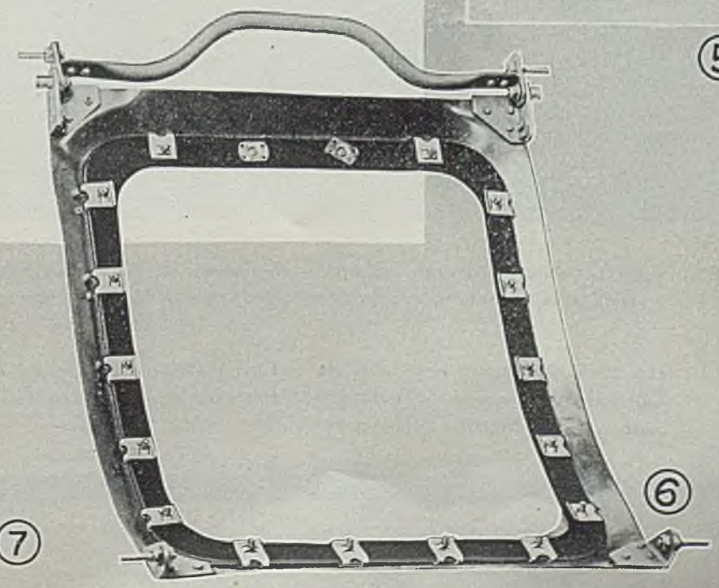
Fig. 7—"J" type nut affords another type of self-locating unit

Fig. 8—Muffler assembly mounted onto truck frame by heavy duty fasteners

Fig. 9—Modified U-type unit grips edge of panel, holds fastener securely in place

Fig. 10—Special fastener allows use of round hole in steering column for mounting this ignition lock, prevents lock from turning





washer is required, eliminating at least one part in applying every fastener. Because the thread engaging prongs are flexible enough to allow the fastener to be pushed on the screw instead of painstakingly "finding" the thread and turning the screw, in many cases the spring tension fasteners are "zipped" on at an amazing rate.

Result of these inherent advantages is that even before Pearl Harbor, manufacturers were using more than 3 million of these units daily. Although hundreds of applications of this spring tension system were developed before the war, these uses were multiplied many times by the Army, Navy and Air Corps in the great production race which ended in victory. A large number of these new applications were related to aircraft where the basic saving in material and weight as well as the great inherent resistance to vibration are of prime importance.

Great Versatility: This fastening system lends itself readily to a large number of variations of the basic unit shown in Fig. 1. More than 3000 different modifications have already been developed and new ones are being produced daily.

To learn what can be done by these modifications, let's look at some of the most widely used units and see where they fit into the picture.

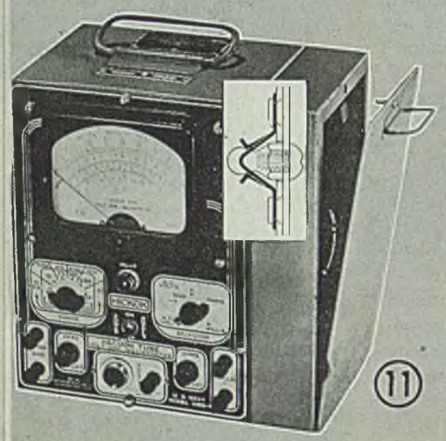
Twins, Multiples, Etc.: Since these fasteners are made from strip steel, one of the first and most useful ideas was to make up a single strip in which multiple Speed Nut impressions were formed at two or more points along the single strip.

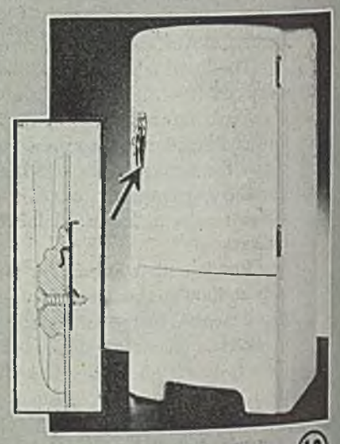
Such a multiple unit is especially useful in making up panels and other assemblies where a number of screws may be spaced at intervals in a straight line. The advantage is that only a single unit need be handled in making up multiple joints using 10, 20 or more screws.

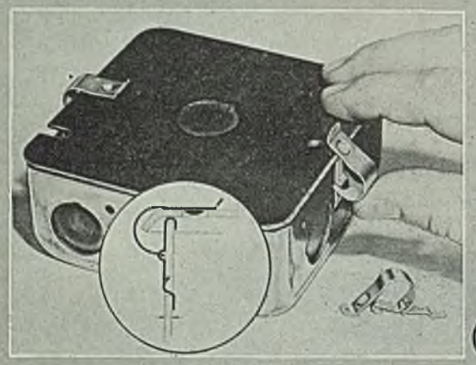
Fig. 2 shows a twin fastener being used to mount a spring clip on the welded steel tubular frame of an airplane. It is easy to apply and once set up, holds steadfastly against extreme conditions of vibration and fluctuating load.

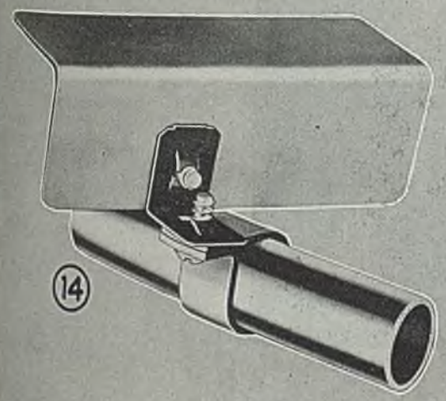
Fig. 3 illustrates another twin unit that has proved exceptionally advantageous in assembling a small electric switch into various control units. This single fastener incorporating two Speed Nut impressions replaces a tapped plate or tiny, hard-to-handle individual nuts and lockwash-

(*Please turn to Page* 140)









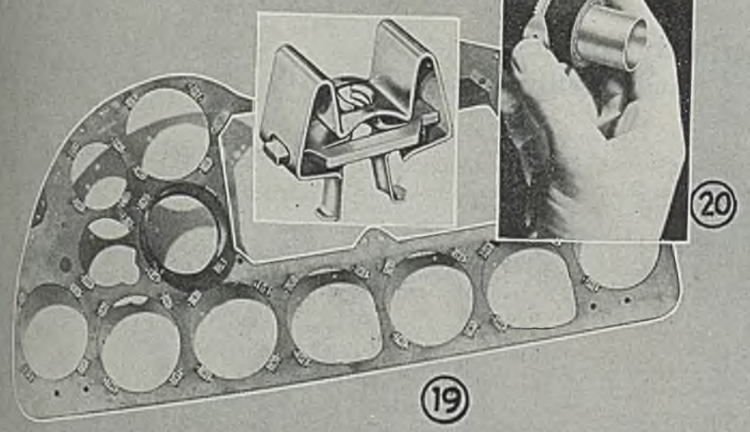


Fig. 11—Spring latch grips ball stud, suitable for access doors as shown

Fig. 12—Refrigerator coolant tubes are held securely using stud spot welded to inner liner of refrigerator before porcelain enameling. Speed Nut zipped over stud then holds tubes firmly under spring tension

Fig. 13—Latching type self-retaining unit used to mount door catch on a refrigerator

Fig. 14—Here angle bracket is combined with fastener, saving assembly time and material requirements

Fig. 15—Cover plate unit makes simple, easily applied assembly

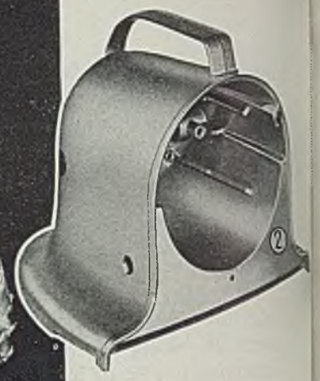
Fig. 16—Self-locating spring fastener combined with spring clip holds box cover securely

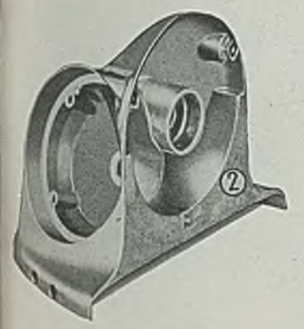
Fig. 17—Spring tension fasteners here provide vibration assembly of the suspension band on this chemical bomb. They eliminate placing four nuts, assembling lock washers and cementing screw threads after assembly, formerly required

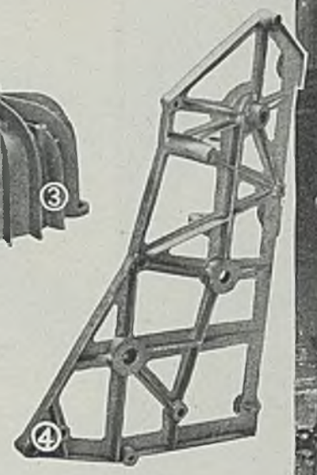
Fig. 18—Special unit for holding cables clips and holds itself to mounting panel through hole as shown

Fig. 19—Instrument type Speed Nuts are self-locating and afford "float" required

Figs. 20, 21—These show how special hose clamp operates







Expansion in Die Casting

. . . ascribed to process economy and quality of product

Heavy demand for die cast products, resulting in part from economical fabrication, has necessitated expansion of die casting capacity. Largest bottleneck at present facing that industry is shortage of specially trained die makers and designers

By JOHN PARINA, JR.
Assistant Editor, STEEL

DIE CASTING has received a "shot in the arm" as a result of the war, even though prior to such stimulus this comparatively young industry was making rapid strides. Main cause for the upsurge has been the increased recognition on the part of fabricators of the quality attainable in quantity production, even with intricate designs and shapes, with accompanying elimination of costly and time-consuming finishing and assembly work.

Demand for die cast parts has become so great that Charles Siefert, die-cast division manager of the Cleveland Hardware & Forging Co., Cleveland, predicts present capacity of the firms in this field will prove to be inadequate for future needs. Although the industry is pretty well loaded, it nevertheless is looking to increased business which Mr. Siefert anticipates will be met only by future expansion. However, largest bottleneck facing die casting companies at the present time is the inadequate supply of specially trained die makers.

Cleveland Hardware & Forging Co., like other die casting producers, was not fully prepared to go into 100 per cent civilian production of die castings when the war with the Japs terminated so suddenly. In spite of this, the company had enough dies ready to carry it through the reconversion period and quantity production of such parts as stove burners, generator end plates, vacuum cleaner parts—and, juke box parts are now under way.

To obtain physical properties commensurate with the functional character of the parts, various die casting alloys are used. These are kept in a storage section adajacent to the casting department, thereby reducing handling to a minimum. Alloying crucibles as well as the melt-down pots are located in this department. Alloy bar aluminum, such as Alcoa 380; virgin zinc; and zinc alloy of the Zamak 3 and 5 types developed by the New Jersey Zinc Co., New York, are the metals used. Although Zamak alloys are employed for most hardware parts, zinc base alloys are often made to special analysis by the company to meet specifications which vary in end-product requirements for strength, etc. A similar practice also is followed to obtain special qualities with aluminum. For example, copper free aluminum is used for stove burners to obtain

(*Please turn to Page* 150)

Fig. 1—Casting as it appears directly after removal from die casting machine. Parts illustrated are M-52 fuse heads. At base of each fuse head are die cast threads made without a parting line

Fig. 2—One of many peacetime products produced is this scalp massaging machine. Entire housing is made of two castings; it is ready for assembly after inclusion of motor, and vibrator parts

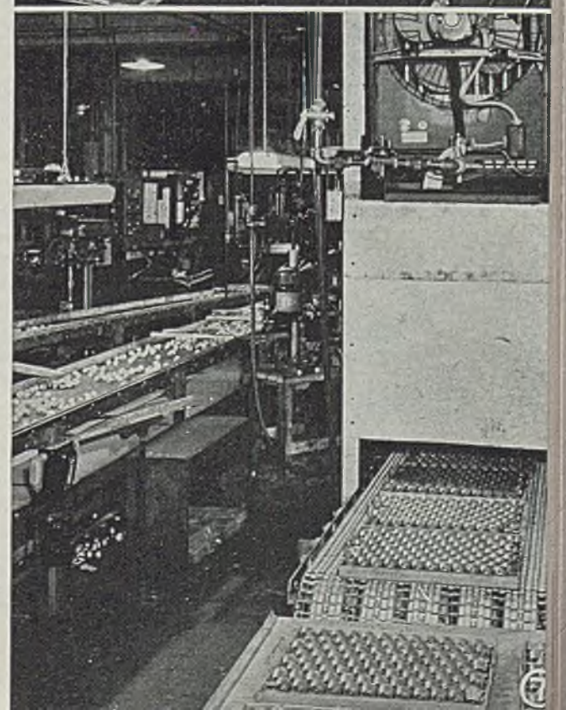
Fig. 3—Motor bell and cooling fins die cast to form an integral unit. All holes in part are cored, and only punch press work required is for trimming flashes

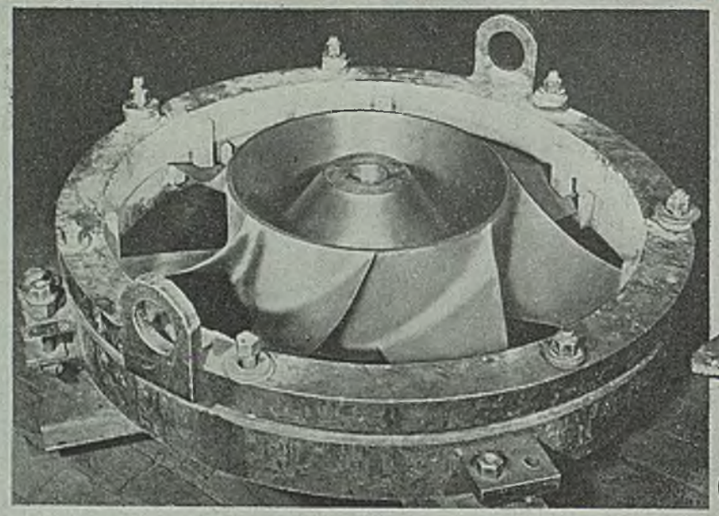
Fig. 4—Front frame bracket for business machines. Close adherence to high tolerances must be maintained so that shafts and gears carried by bracket can be assembled accurately and without difficulty

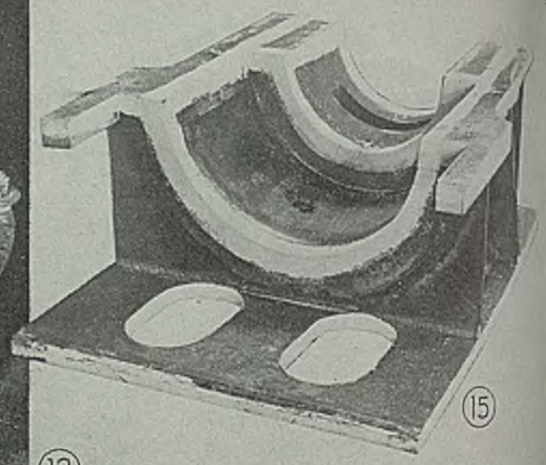
Fig. 5—Operation shown de-gates six castings at once. Fuse heads drop on to conveyor which carries them past series of inspection positions

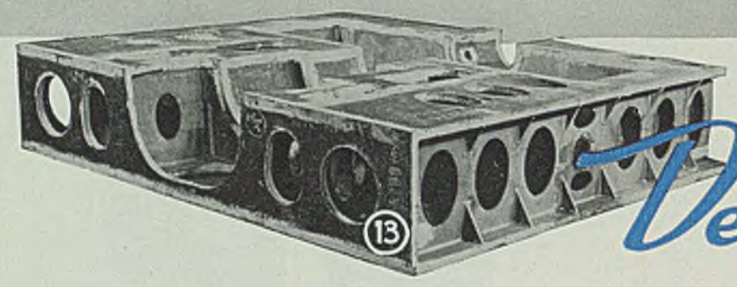
Fig. 6—Setup used for Cronak process. Trays of parts being lifted from final rinse are ready to be placed on conveyor which will carry them through drier located in background

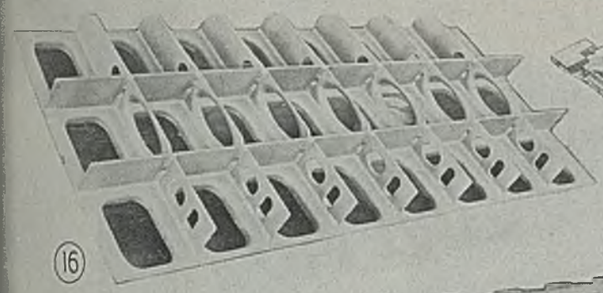
Fig. 7—Exit end of drier. Parts are given final inspection and are then ready for packing

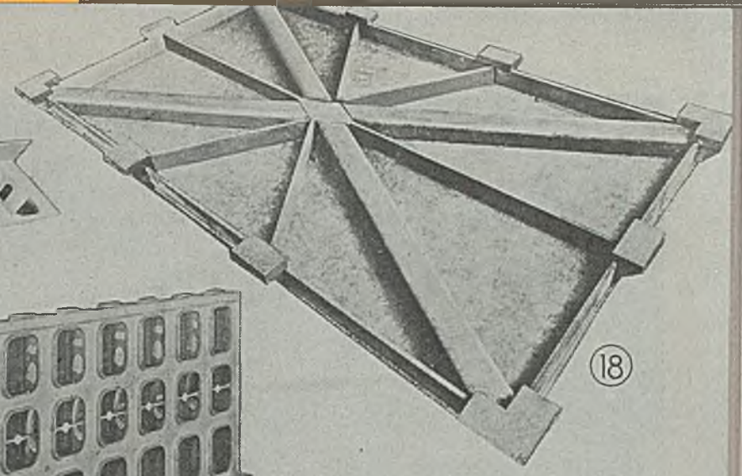


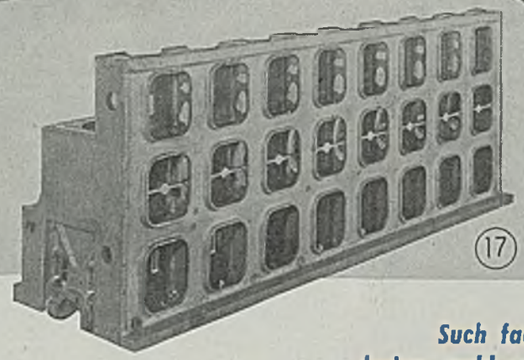












Such factors of fabrication as freedom of design, weld quality, and economy made possible by careful positioning of welded joints are discussed in this, the second part of a three-part series of articles on theory and practice in designing weldments

Designing WELDED MACHINERY PARTS

By GEORGE L. SNYDER
Chief Engineer
Lukenweld Inc. Division
Lukens Steel Co.
Coatesville, Pa.

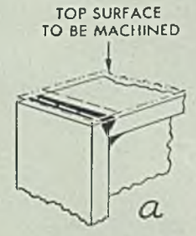


Fig. 12—High speed welded fan and jig in which it is welded

Fig. 13 — Lower section of welded gear reduction housing utilizes subassemblies

Fig. 14 — Types of welded joints which deserve design consideration

Fig. 15 — One subassembled component of a weldment. Welding is completed before further assembly is done

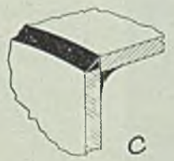


Fig. 16—Welded subassembly, welding is readily accessible

Fig. 17—Weldment of which subassemly shown in Fig. 16 is a part

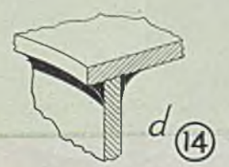


Fig. 18—Stiffener arrangement on underside of shallow machine bed

PRODUCTION and application of components having been considered in the preceding article, the subject of fabrication from the designer's viewpoint in developing a weldment is the next consideration. The first aspect covers the type and extent of available equipment in a weldery which will produce the pieces designed. This is important, as the more flexible and extensive the equipment, the more freedom there is in design. In addition, when quantities are involved, advantage may be gained in designing the job to suit particular facilities of a weldery. Usually, it is well to consult with the engineering staff of the weldery most likely to be involved regarding these matters, particularly if repetitive items are contemplated.

Fabrication: Production methods concerning fabrication of weldments may be considered from two aspects. The first involves the extent of what might be termed "universal" equipment, such as positioning facilities, automatic welding units, inspection methods, and stress relieving facilities. Many types and sizes of positioning equipment are use in welderies today. The second aspect involves special jigs or fixtures or other types of tooling that might be justified or imperative. Usually, if product is to any degree repetitive in quantity, the possibilities in special tooling should be considered.

Also to be considered by the designer to promote economy and quality is possibility of breaking up weldment into subassemblies in sizes to suit positioning equipment. If final size of the part as designed exceeds limits of available equipment, it can perhaps, be redesigned so that a minimum of handling of the piece in its final size is necessary. Often, use of automatic welding equipment with its finite scope and features merits a thought in designing the weldment, especially in considering the advantage such equipment offers for cost reduction.

With special tooling, designer should keep in mind that he is dealing still with rough component parts despite measures that might have been taken to minimize tolerances. Weld shop tooling naturally is more restricted than that usually available in machine shops. Tools, such as jigs or fixtures, should be designed with the necessity of flexibility in mind. Special tooling also might be mandatory in order to hold components in proper relation to each other during the welding operation. Fig. 12 shows a special fixture with weldment in place.

Although subassemblies frequently are important to designers of weldments, design limitations often prohibit their use. Obviously, the more work done on small pieces, the easier and quicker will be the completion of final assembly. A completely welded subassembly is shown in Fig. 15 and the final weldment in Fig. 13. Here, design controls method of fabrication, for the lower flange member could be made in one piece. In that case, at least a portion of subassembly welding would have been required on the larger and more cumbersome piece.

Subassemblies of components should be made so that particular portions in certain instances can be sized before they become part of final weldment. This practice helps insure that final weldment is close to required dimensions. Where tolerances have accumulated, straightening or trimming might be involved. Effect of the welding on completed subassembly from standpoint of warpage or shrinkage has been eliminated as a factor on the finished weldment.

Sometimes in very complicated structures involving considerable welding, various subassemblies are stress relieved before being assembled into the whole structure to reduce accumulation of residual stresses.

Subassemblies also facilitate inspection of welds. At times, where x-ray inspection is specified, subassembly welding is necessary; if the welding were not completed and x-rayed in the subassembly, the interference of adjacent components in the completed assembly might make it impossible to x-ray or repair such welds.

At times, subassemblies are welded completely when they include compartments subjected to pressure tests or oil retention specifications. Tests are made and necessary repairs completed on the subassembly piece. Clearly, such practice is more economical than to attempt such work on

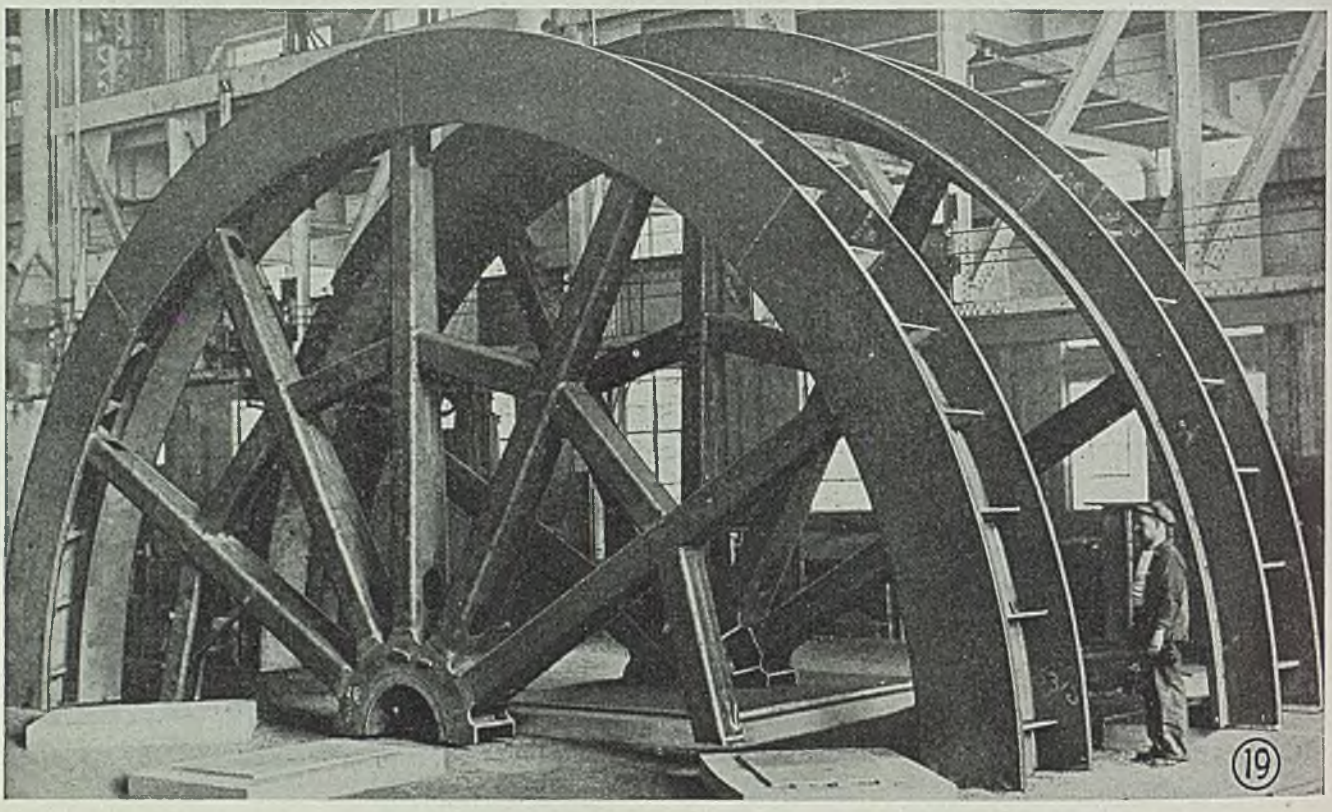


Fig. 19—Two halves of large welded machine part which are welded into one piece after shipment to destination

the final piece, if only from the standpoint of relative bulk to be handled in testing and repairing.

An important reason for careful consideration of subassembly possibilities in design is provision of maximum access for greatest possible amount of welding to be done, for the more accessible the welding, the less it will cost. Also, quality is more readily achieved if welding operator can work under open or accessible conditions. Fig. 16 illustrates a subassembly on which all welding to be done is before the operator, Fig. 17 shows completed weldment with subassembly in place. Obviously, welding has been simplified since the joining welds between sub and main assemblies are completed by working through access openings shown. If welding had not been completed in the subassembly it would have had to be performed through such openings. This would have necessitated use of a mirror by the welder with resulting slow and consequently expensive welding.

At times it is advantageous to design so that progressive subassembly is possible. Thus, one portion of weldment is completed before it is assembled and welded to other components as a step in final assembly of completed weldment.

When maximum access is provided, by subassembly practice or other design control, inspection can be more conclusive. Fig. 13 illustrates design for accessibility with elliptically shaped openings permitting access to inner side of the joints to be welded. Here, desirable structural qualities of a box member are not sacrificed for access, but care has been taken in shaping openings so that abrupt discontinuities in contour of members are avoided.

Welded joints of maximum quality and predictability from standpoint of either external contour or internal soundness are almost impossible to execute with the manual arc if joint is not reasonably accessible from both sides. However, at certain points where stresses are of secondary nature and fatigue loading is not present in structures, joints do not require work on both sides.

In addition to type of welded joints used, their position in the weldment deserves careful design consideration for several important reasons besides positioning them for maximum access. Where machined surfaces occur in design, care in placing joints can effect economy as shown in the comparative illustration of Fig. 14. Clearly, if joint is placed as in Fig. 14a, a portion of deposited weld metal will be removed in machining operations. Depositing weld metal is expensive and removing it is wasteful. Joint placed as shown in Fig. 14b shows how the amount of necessary weld metal has been reduced. As illustrated, it need only have the cross-sectional area of that shown in Fig. 14a

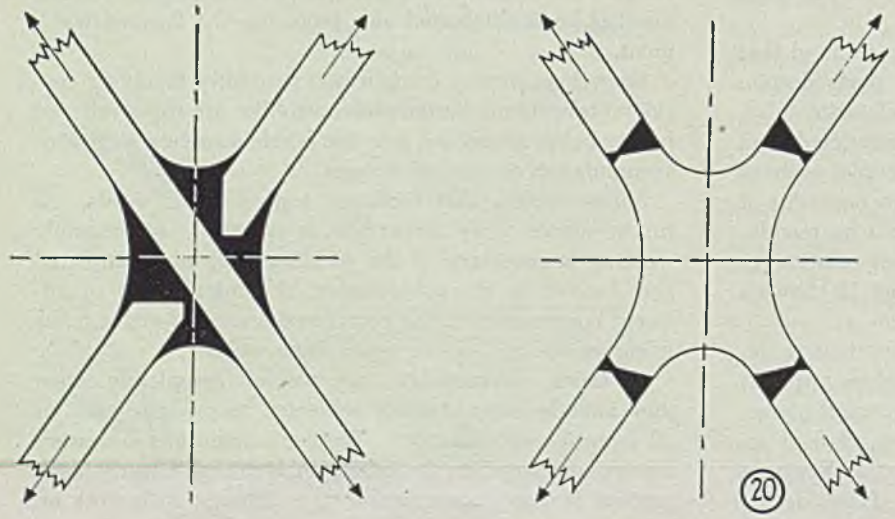


Fig. 20—Types of intersections without, and with spline piece

New high-solids lacquer . . .

»LIKE ADDING ANOTHER FINISHING DEPARTMENT

With high-solids lacquers providing coatings of twice the usual thickness, finishing departments can turn out far more work with no increase in space, manpower, or equipment. Each coat now does the work of two! Higher percentages of lower-viscosity nitrocellulose have made this possible. Increased thickness and protection are noticeable only after drying. Investigate high-solids lacquers now . . . for high-speed finishing of metal, wood, fabric, rubber, leather, paper, plastics . . . and see what time and money you can save.

ASK YOUR LACQUER SUPPLIER

for complete details and application data on these new time-and-money-saving lacquers, as they become available. Hercules does not make high-solids lacquers, but concentrates on the production of the highest quality nitrocellulose from which they are made.

CL-54A

HERCULES

Cellulose Products Department
HERCULES POWDER COMPANY
INCORPORATED
930 Market St., Wilmington 99, Del.

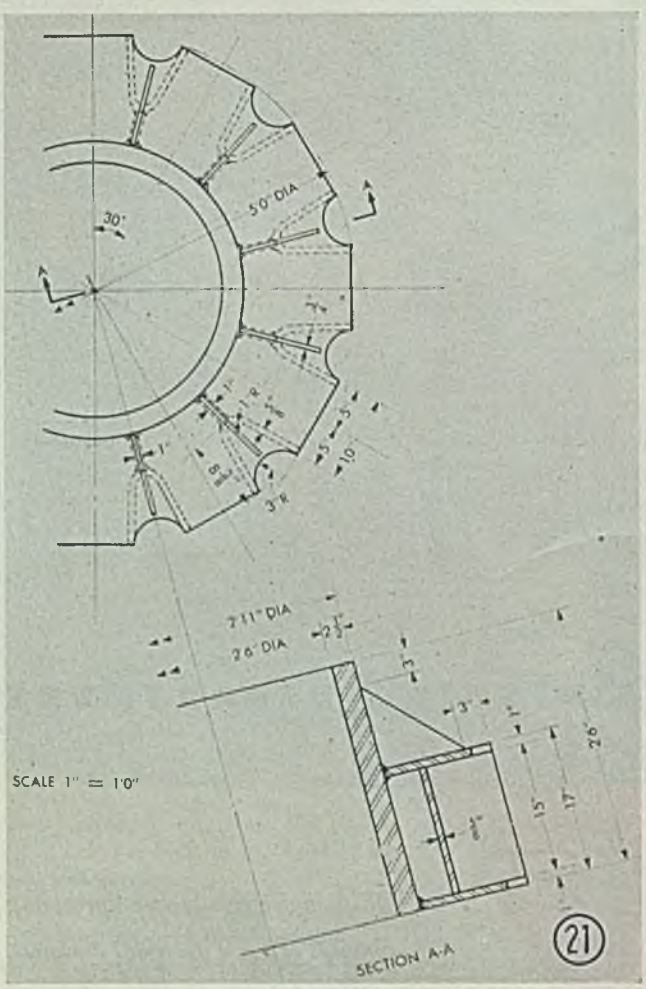


Fig. 21 — Detail of construction of center hub on piece shown in Fig. 19

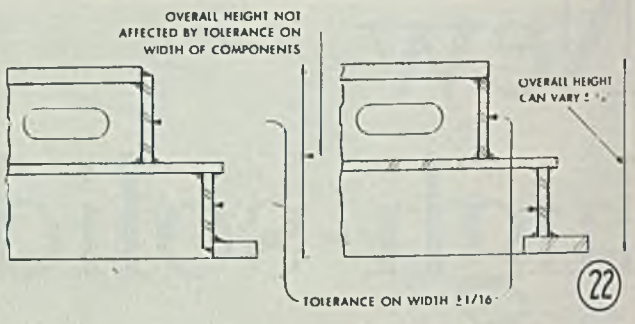


Fig. 22 — Effects of controlling cumulative tolerances

after it is machined. Economy may be possible by positioning a joint as shown in Fig. 14c which eliminates kerf and its cost, or 14d which also simplifies fitting, in contrast to the same joint detailed in Fig. 14a.

At times, spoked or diagonal members are indicated by design considerations and their intersection usually presents a type of joint difficult to fit and costly to weld if proper external contours are to be maintained. Shown in Fig. 18 is a diagonal pattern of box stiffeners on the underside of a machinery bed which is highly desirable from the standpoint of maximum rigidity. However, their central intersection presented a problem of the nature just described. By utilizing a flame-cut central member, square joints at the intersection were obtained, hence, fitting and welding were simplified.

Fig. 19 shows a simple treatment of an intersection of spokes. Central member in this is a subassembly so designed that spokes do not converge on each other resulting in poor fitting and welding conditions. An illustrative sketch showing the construction of this central hub is given in Fig. 21.

At intersections of members subject to high stress levels, fatigue, impact, or a combination of these, careful design treatment is imperative. Contrasting designs of such an intersection are shown in Fig. 20, where left illustration shows intersection as welded without benefit of a transition member. Clearly, in order to provide curved contours, an inordinate amount of weld metal would be necessary. In addition, it is practically impossible to execute such a welded joint so that full predictable strength will result and, x-ray inspection would be practically impossible to obtain. Fitting conditions are poor and the excessive amount of weld metal adds to warpage and shrinkage problems. Desirable features of a similar joint as executed in the right illustration are self-evident.

Designers should remember the generality that in a weldment the fewer separate and different components required, the cheaper and better the design will be.

At times, particularly with secondary members such as ribs or stiffeners, slight changes will permit uniformity in size of different components. Such consideration might make quantity production by blanking economically possible. Another somewhat minor consideration is difficulty caused to assembler or fitter in trying to identify parts that appear almost the same.

Designer should keep in mind, also, possible utilization of hot rolled bar stock. Often such material can be used by making a slight change in dimension of a given cross-section to conform to standards.

All components, regardless of method of producing them, are subject to dimensional tolerances. Designer must keep this in mind for economy and good fit-up so that he can control ill effects of cumulative tolerances. Fig. 22 gives a simple illustration of a typical weldment in which the designer has kept cumulative tolerances in mind. Drawing at left shows a partial cross-section. That at right shows a similar cross-section in which the point has been ignored.

Shrinkage and warpage problems which exist in production of weldments will continue to be a factor so long as drastic heat gradients occur during welding. A degree of experience is needed to be able to predict such effects and to control and counteract them. It is impossible to discuss this factor here in detail. The designer should, however, sense the general aspects of such phenomena so that he does not develop designs that may be impossible to produce within necessary tolerances.

Warpage will occur to a great or little degree depending on the relative size of given welds and their distances from the neutral axis of assembly. This is due simply to relative ability of a member to resist shrinkage stress imposed at different points in its cross-section with respect to the neutral axis of that cross-section.

Welding results in shrinkage both longitudinally and at right angles to weld metal. The extent varies for sizes as well as types of welds. When number of different sizes and types of welds which occur in an average weldment and their length and position with respect to each other are considered, it can be realized that control of warpage is to a large degree a matter of practical experience. Sequence of welding also should be carefully controlled as a counteracting measure. At times, special fixtures are used to restrain warpage.

Conditioning and Inspection Methods: Following completion of welding, it is an established practice to condi-

(*Please turn to Page* 155)

From Plates to Nuts

The same attention and expediency with which heavy plates and structurals are handled at Hanlon-Gregory —are given to *all* orders . . . Nuts, bolts, screws, rivets —that require protection against rust—*all* receive the best possible coating of protective zinc.

No order is too small for the world's largest hot-dip job galvanizing plant.

and Fastest

THE WORLD'S LARGEST JOB GALVANIZING PLANT

HANLON-GREGORY GALVANIZING COMPANY

Pittsburgh, Pennsylvania

Substantial economy can be realized by using high-calcium limestone to neutralize free acid and precipitate part of the iron, and by use of lime to complete treatment

Treatment of SPENT PICKLING LIQUORS

IT IS common practice to remove the oxide film from steel, preparatory to further processing, by acid pickling of the metal usually in a sulphuric acid bath. This treatment results in a waste liquor consisting essentially of a solution of ferrous sulphate and sulphuric acid.

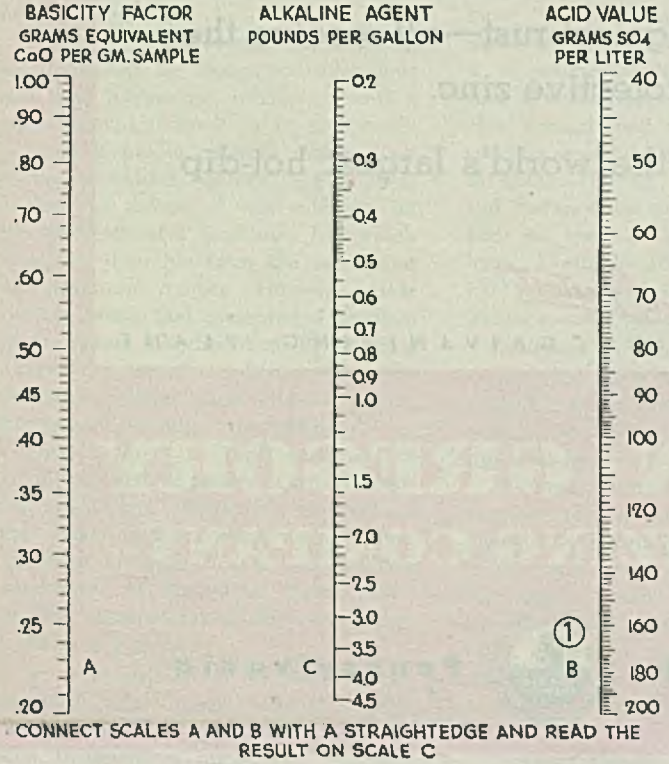
Many steel companies can dispose of this liquor only after treating it with lime to neutralize the free acid and precipitate the iron. The lime treatment commonly used for waste pickle liquors is expensive; sometimes the overall cost of disposing of the spent liquor is as great as the cost of pickling. Thus an understanding of the factors involved in the treatment of waste pickle liquors is of importance for the most efficient operation of the process under a particular set of conditions.

Details of a limestone-lime split treatment giving substantial economy in waste pickle liquor treatment were first made known by Richard D. Hook, C. J. Lewis, and W. W. Hodge in a paper presented as part of the symposium on industrial wastes before the Division of Water, Sewage, and Sanitation Chemistry at the 108th meeting of the American Chemical Society in New York[1].

The Sharon Steel Co. co-operated in the investigation by permitting the authors to make plant scale runs of this process in its pickle liquor treatment equipment. These trial runs successfully demonstrated the practicability of the split limestone-lime treatment in their plant, which was currently using quicklime to provide the complete treatment. After a 30-day test period with its own operators, this plant adopted the split treatment because of its manifest economy over the use of quicklime exclusively.

A scheme previously had been presented[2] whereby the determination of the basicity factor of an alkaline agent and the acid value of a waste liquor

Fig. 1—Nomograph for acid waste treatment
Fig. 2—Rate of removal of iron from pickle liquor with representative pulverized limestones



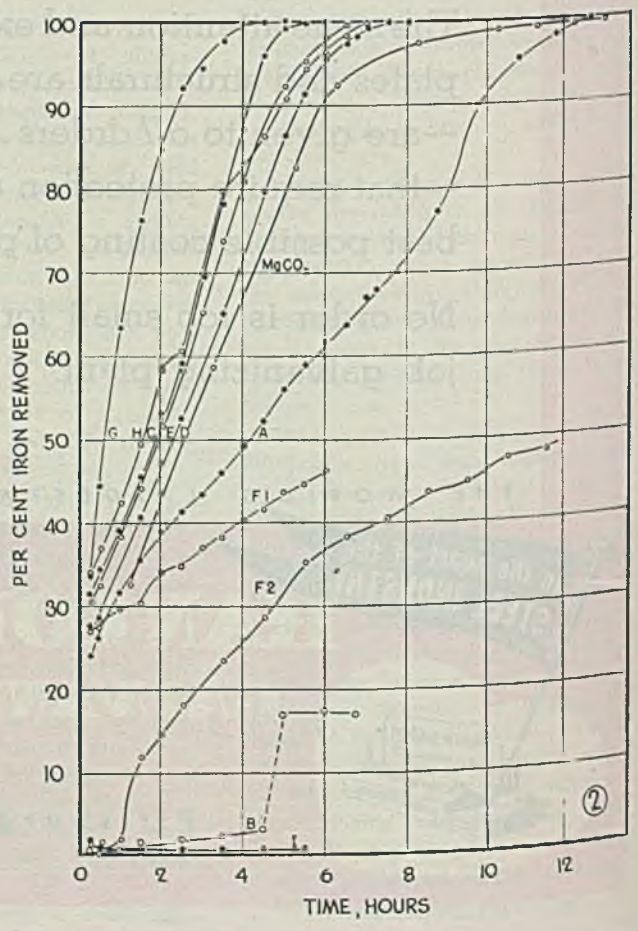


TABLE I

BASICITY FACTOR OF LIMESTONE AS GRAMS EQUIVALENT CaO PER GRAM SAMPLE

Boiling Time-Hr.	Samples Ground To Pass Mesh No.: 30	65	80	100	200
½	0.4443	0.4572	0.4798	0.4874	0.5231
1	0.4571	0.4879	0.5030	0.5153	.....
1½	0.4736	0.5088	0.5170	0.5244	.....
2	0.4855	0.5211	0.5229	.....	.....
2½	.....	0.5249	.....	.....	.....
3	0.4958	.....	.....	.....	.....

TABLE II

COMPARISON OF RESULTS WHEN MATERIALS WERE IGNITED IN MUFFLE AT 900° C*

Boiling Time-Hr.	Basicity Factor of Quicklime: Rotary	Ignited	Shaft	Ignited
¼	0.9340	0.9363	0.8674	0.8891
½	.....	.....	0.8809	.....
1	.....	.....	0.8842	.....
1½	.....	.....	0.8880	.....

* Average of three determinations in each case.

TABLE III

SCREEN ANALYSIS OF PULVERIZED LIMESTONE TESTED

Limestone	+65	—65 +100	—100 +200	—200 +325	—325
A	0.0%	1.5%	10.0%	28.0%	60.4%
B	2.1	5.9	20.4	37.9	31.2
C	0.0	0.4	0.8	85.0	13.0
D	1.2	3.8	10.3	41.9	40.7
E	0.2	0.7	1.9	15.0	81.7
F	0.2	1.0	12.8	33.6	51.7
G	0.2	1.6	11.7	83.5	2.5
H	0.0	0.3	7.0	33.5	58.0
I	0.0	0.0	4.0	21.5	74.2

provide a rapid method for calculating the proportions of the two materials which should be combined to effect a desired result. This procedure has the advantage of quickly measuring the available basicity of an alkaline agent under the conditions of the treatment and eliminates speculation concerning the applicability of basicities calculated from chemical analysis.

Extensive investigation has demonstrated the reliability of this procedure as applied to treatment of waste pickle liquors. Outlines of specific methods for determination of basicity factors of neutralizing agents, limestone and lime, and acid values of the waste pickle liquors to be treated are given in following paragraphs.

Basicity Factor of Limestone: Basicity factors are of particular use in evaluating the available alkalinity of limestone and lime because the chemical analysis of these substances is time-consuming and the results give limited information concerning the reactivity of the material. The term, "basicity factor," is used to represent grams of calcium oxide per gram of alkaline agent. The method evolved for determining the basicity factor of limestone or lime reflects the value of the substance as a neutralizing agent under the conditions of use.

In the development of the procedure, samples of Bellefonte pulverized limestone and of shaft-kiln and rotary-kiln lime produced from the same source were selected as representative of good grades of high-calcium limestone and lime. Sulphuric acid was used to decompose the samples because the spent liquor from the sulphuric acid pickling of steel is a typical industrial waste where it was desired to demonstrate the practical application of the method. Basicity factors were determined on a series of samples of different particle size prepared by grinding portions of the original 30-mesh material until all the portions passed through a given standard screen.

Procedure: Weigh accurately a 2-gram sample of pulverized limestone, representative of its condition at the time of use, into a 500-milliliter Erlenmeyer flask containing 10 milliliters of distilled water. Run in from a buret the amount of 0.5 N sulphuric acid estimated to decompose the sample completely, and add 30-35 ml in excess. Boil sample, adding water to make up evaporation loss, until decomposition appears to be complete. Cool to room temperature, wash down inside of flask, add two drops of phenolphthalein, and titrate to the usual end point with 0.5 N sodium hydroxide. Calculate the net acid required in terms of equivalent calcium oxide.

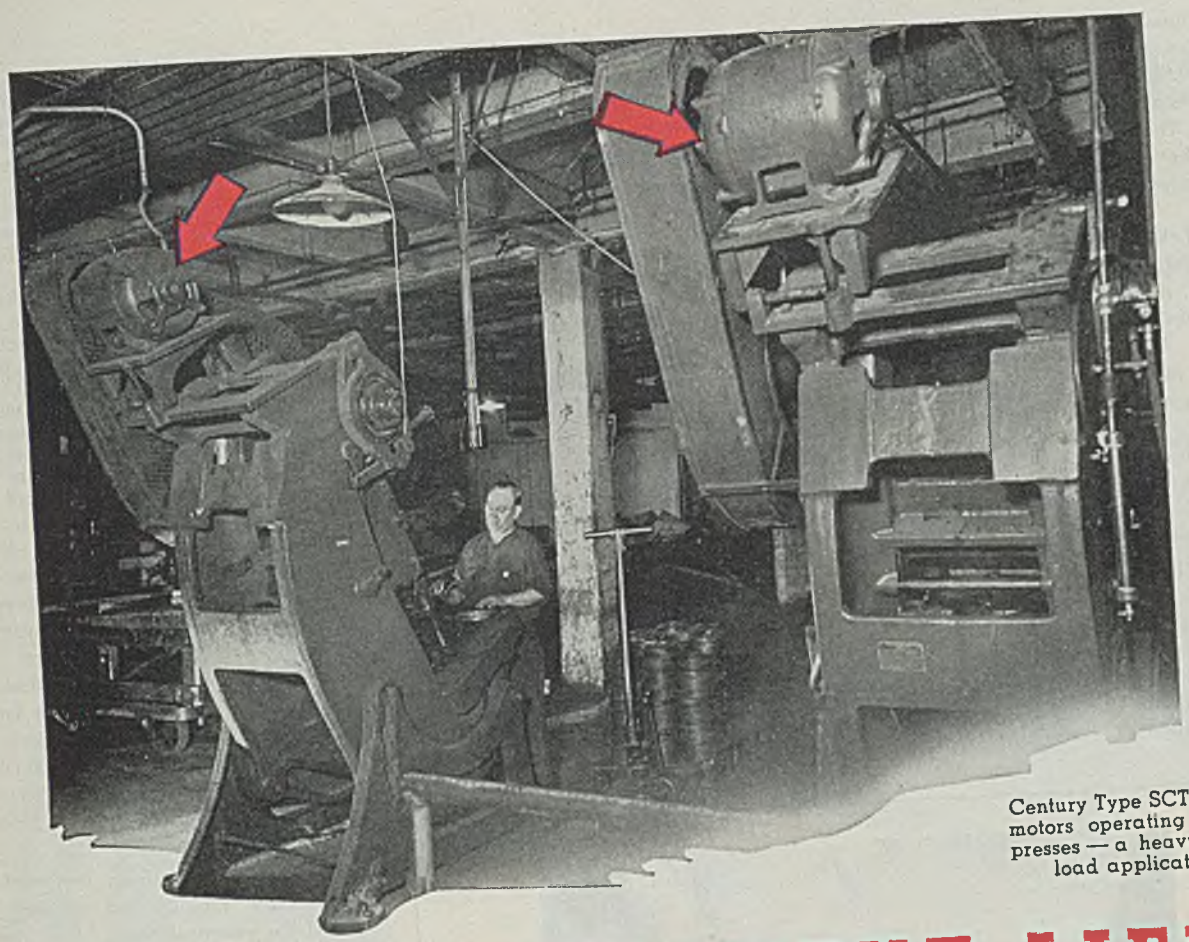
When several samples are run at the same time, it is convenient to condense a part of the water vaporized during boiling by circulating cold water through narrow U-tubes inserted two-thirds of the way to the bottom of the flasks. Single tubes made from 6 mm soft glass may be used, or a series can be made in one piece from a length of tubing.

Each of the figures in Table I represents the average of three determinations of basicity factor for the several particle sizes. The average of six determinations of basicity factor on samples of this limestone, after calcining in a muffle at 900° C and slaking in boiling water by the procedure to be described, was 0.5230 gram of calcium oxide per gram of sample. This value was taken to represent the maximum of possible basicity of the limestone under the conditions of calcination. Where a basicity factor is calculated from the chemical analysis, the value is 0.5334, or about 2 per cent higher than actual basicity. Results in Table I were obtained by boiling samples (except 30 mesh) until maximum basicity was realized. These findings illustrate the greater reactivity of the more finely pulverized limestones.

Basicity Factor of Lime: Upon calcination of limestone some of the calcium and magnesium oxides may combine with silica, alumina, and iron oxide to form compositions which are insoluble even in moderately concentrated acids; the available neutralizing value of the substance is thereby reduced. On the other hand, certain complex calcium and magnesium silicates in limestone may decompose when the stone is calcined. Temperature of calcination and the particle size of the product are important factors governing the availability of its neutralizing value. Basicity factors were determined on samples of rotary-kiln and shaft-kiln lime, produced from the same source of limestone, to define the difference in reactivity which may exist between these two types. The procedure used is as follow:

Procedure: Using a weighing bottle, weigh accurately about 1.3 grams of lime and transfer the sample to a small porcelain crucible. Place the crucible upright in a 250-ml beaker containing 15 ml water. Cover the beaker, heat the water to boiling, and tip crucible to fill it with hot water. Continue heating for several minutes to slake lime completely. Scrub crucible inside and out with a rubber "policeman," wash and remove it, run in from a buret the quantity of 0.5 N sulphuric acid required to react with the lime, then add 30-35 ml in excess. Wash mixture into an Erlenmeyer flask, boil, make up evaporation loss with water, cool to room temperature, and titrate with 0.5 N sodium hydroxide to a phenolphthalein end point.

Data in Table II represent an average of three determinations in each case. Results are compared with those obtained when samples of the same materials were ignited in a muffle at 900° C for 1½ hr to eliminate differences caused by air slaking and unburned stone. For comparison with basicity factors, available calcium oxide was determined by the usual sugar test. Three



Century Type SCT Form I motors operating punch presses — a heavy shock load application.

PROLONG EQUIPMENT LIFE •

By Reducing the Impact of Shock Loads . . . with CENTURY High Torque, High Slip Motors

Century high torque, high slip, industrial motors (type SCT) are made for such applications as punch presses and shearing machines — where there is a sudden load impact in the operating cycle. These motors help to cushion this shock because the motor speed is pulled down as the peak load comes on.

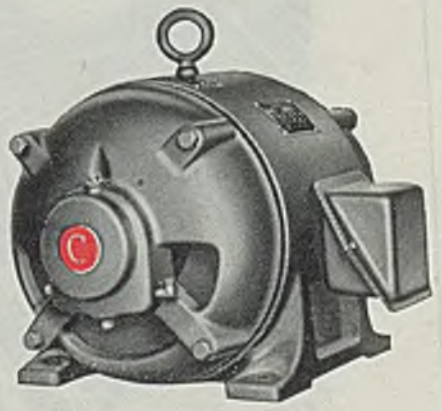
As this peak load is reached the machine operates from the energy stored in the flywheel. Then the motor picks up speed again, and stores up energy in the flywheel for the next cycle.

Century high torque, high slip motors are particularly adaptable to applications where the length of the cycle gives time for slowing down and speeding up.

This saves wear and tear on equipment, reduces maintenance costs, saves on tools, dies, or shearing blades.

Specify Century motors on all your electrically powered equipment. Engineered to the functional characteristics of the machines they drive to assure top performance — Century motors are a vital factor in producing a better product at a lower cost.

Century motors are built in many types and sizes from 1/20 to 600 horsepower.



Century C MOTORS

455

CENTURY ELECTRIC COMPANY

1806 Pine Street St. Louis 3, Missouri

Offices and Stock Points in Principal Cities

determinations on samples of rotary kiln lime as represented in Table II averaged 0.8533. This result indicates some recarbonation of the lime during storage. The basicity factor includes not only the available calcium oxide but all substances in the lime which react with acids.

Acid Value of Waste Pickle Liquor: The acid value method provides an extremely rapid means for determining the total sulphate content of a waste pickling liquor. Accurate chemical analysis of a sample of such liquor requires considerable time. Thus, where the pickling liquor is to be completely treated with an alkaline agent such as lime or limestone, the advantages of a rapid method for determining the neutralizing value of the liquor are obvious. When spent pickle liquor is treated with an alkaline agent to neutralize the free acid and precipitate all the iron, a complex of reactions occurs whose precise mechanism can be established only with difficulty. From the practical standpoint, neutralization of a sulphuric acid liquor with lime or limestone, including complete precipitation of iron may therefore be considered a union of calcium and sulphate ions.

To compute the amount of alkaline agent required to neutralize a given quantity of acid liquor, it is necessary to know only the total sulphate content of the liquor. Method developed permits determination of total sulphate within an accuracy of 0.2 per cent.

Procedure: Pipet 5 ml of the sulphate liquor into 50 ml of distilled water in a 250-ml beaker. Run in from buret 25-30 ml of 0.5 N sodium hydroxide in excess of that required for complete reaction. Heat to boiling for 2 to 3 min, stirring to avoid loss by bumping. Prepare a filter by placing a No. 42 Whatman (or equivalent) filter paper in a Buchner funnel, moisten, and apply vacuum. Pour about 10 ml of a thin slurry of acid-washed asbestos on to filter, and rotate funnel rapidly to throw the fiber to edges of paper and form a good seal. Turn off vacuum, and pour boiling mixture on filter. Immediately begin applying vacuum gradually, taking 15-20 sec to turn it on full, to prevent finely divided precipitate from passing filter. Wash residue with four 10 ml portions of water. (In more than 50 determinations by this method, this washing procedure has been found adequate to remove all free alkali; however, final wash may be tested for alkali with phenolphthalein paper.).

Next add about 1 ml bromothymol blue for each 200 ml of filtrate, and titrate with 0.5 N sulphuric acid to pH 7.0. Determine the end point by adding a little less than 0.5 ml of bromothymol blue to 10 ml of the titration mixture in a comparison tube and matching the color with the standard for pH 7.0. Calculate the net sodium hydroxide required to grams of sulphate ion per liter.

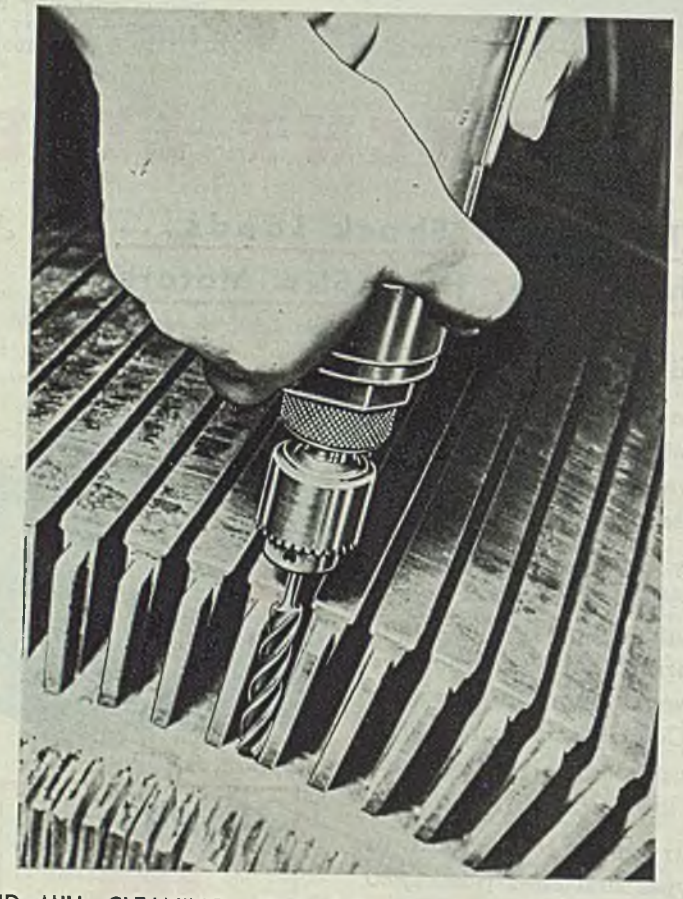
Where the acidity value is desired for application in lime or limestone neutralization, the method may be simplified by titrating the excess sodium hydroxide to a phenolphthalein end point. Use of this indicator yields results which are slightly high; but where basicity factors are determined with phenolphthalein, results are slightly low, and in neutralizations these effects practically cancel and cause an inappreciable error in calculations.

The method has been developed to provide the rapidity and accuracy required for practical work. It is important that the liquor contain a negligible concentration of metals whose hydroxides are soluble in excess alkali. For example, a liquor which contained 5 per cent of zinc sulphate yielded an acid value which was about 2 per cent high. Numerous determinations have shown that the method outlined is accurate to 2 parts per 1000. Owing to the fact that in neutralizations, it is the availability of hydrogen ions which is important, the procedure should be applicable to most waste acid liquors.

The Nomograph—Using basicity factors and acid values obtained by above rapid analytical procedures reference can be made to nomograph given in Fig. 1 from which the pounds of neutralizing agent per gallon of liquor to be treated can be read directly. Where both the basicity factor of a lime and the acid value of a pickle liquor have been determined to a phenolphthalein end point and the quantity of lime required for treatment, determined from the nomograph, is added to the liquor, it will be found that the iron has been removed completely.

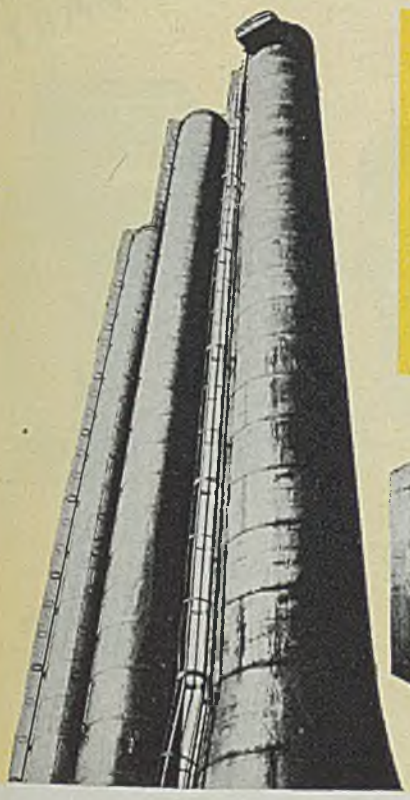
Although a quicklime slurry is commonly used for the purpose, the cost of pickle liquor treatment can be substantially reduced in many areas under favorable conditions by employing a combination of limestone and lime. In the operation of the process based on results obtained from experimental plant scale

(*Please turn to Page* 154)



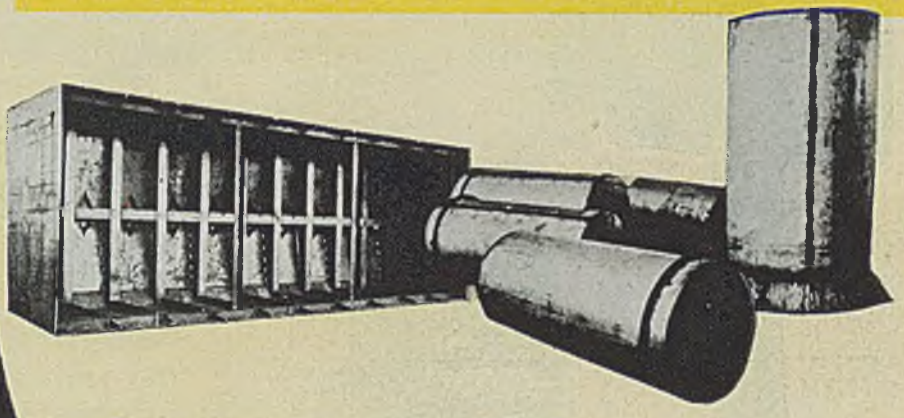
END MILL CLEANING: Method for cleaning old insulation and dried varnish from armatures after stripping, using an end mill with a recessed shank placed in an air drill, is a development of engineers at Middle Atlantic District Maintenance and Repair Shop of Westinghouse Electric Corp. Shank is recessed so that end mill can be moved freely in slot. Approximately 90 per cent of time formerly spent in doing this work is saved

PLANNING REPLACEMENTS



Annealing Covers	Steel Stacks
Bases—Welded	Weldments
Bins	Accumulator Tanks—High Pressure
Charging Boxes	Large Diameter Pipe & Mains
Elevated Tanks	Pots—Tin or Galvanizing
Pressure Vessels	Steel Plate Fabrication

Storage Tanks—oil-water-acid-propane-butane



There is no substitute for experience

Many outstanding steel mills are now using General American plate fabricated equipment which has rendered long and satisfactory service.

Much of this equipment was precision fabricated from drawings and specifications submitted by the customer. Some of this equipment was designed, fabricated and installed entirely by this organization.

Regardless of whether you want us to engineer and design the equipment, or you design the equipment yourself and have us fabricate it to your specifications, General American is equipped to do a good job.

You will be working with an organization which has the knowledge, experience and shop facilities to produce equipment for superior performance.

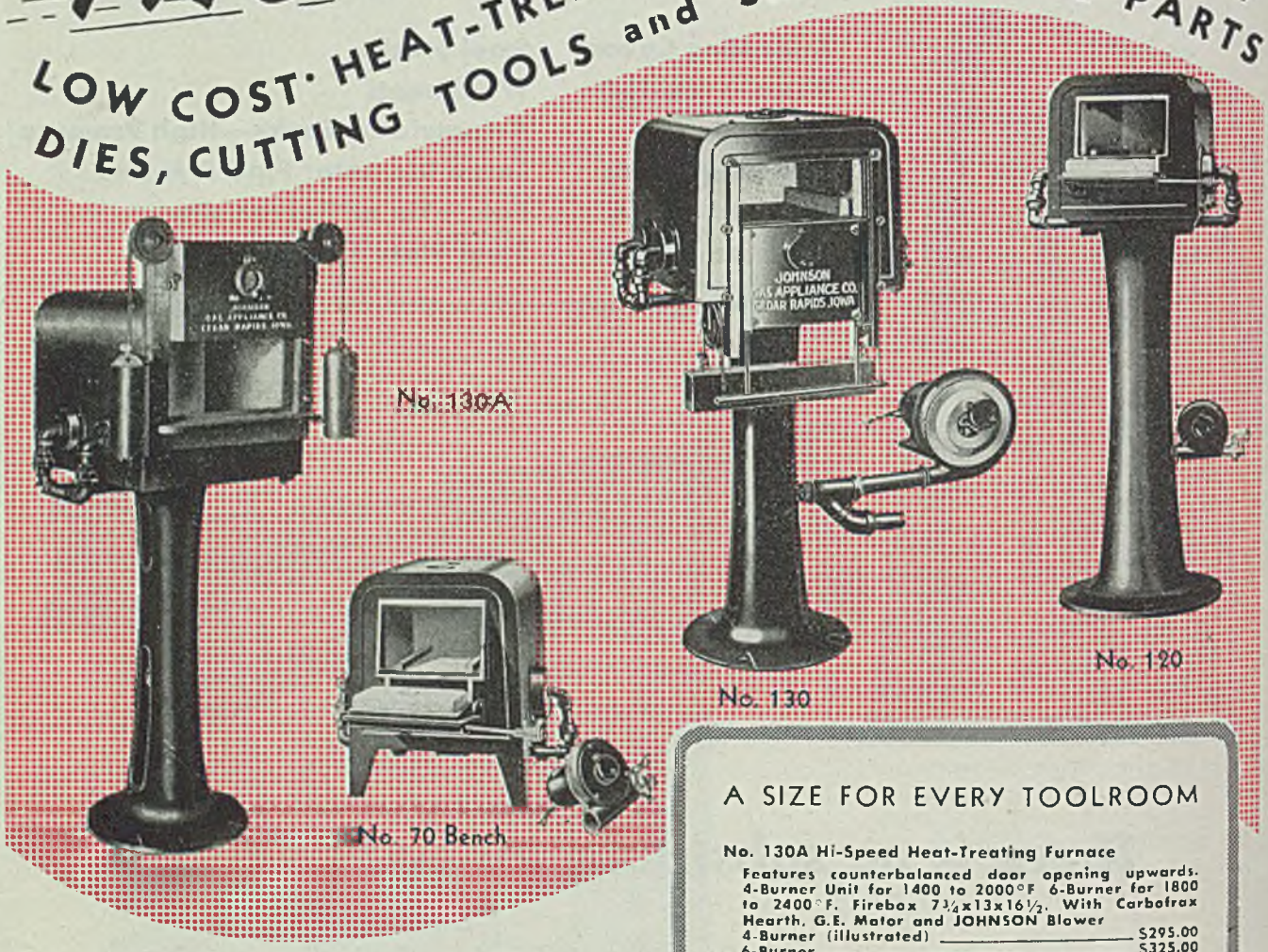
General American
TRANSPORTATION CORPORATION
process equipment • steel and alloy plate fabrication

SALES OFFICE:
519 Graybar Bldg., New York 17, N. Y.
WORKS: Sharon, Pa.; East Chicago, Ind.

OFFICES: Chicago, Louisville, Cleveland, Sharon, Orlando, St. Louis, Salt Lake City, Pittsburgh, San Francisco, Washington, D. C.

FAST

LOW COST HEAT-TREATING HIGH-SPEED STEELS, DIES, CUTTING TOOLS and SMALL METAL PARTS



Turn on the Heat and You're Ready for ACTION

• When you want QUICK, high, accurate temperatures there's no delay when you use Quick-Acting JOHNSON Hi-Speed Furnaces.

Designed primarily for high-speed steels, they're READY for ACTION in toolroom or shop. Equally efficient for hardening ANY steel tools, dies, or small metal parts.

Remarkably economical in operation, Quick-Acting JOHNSON Furnaces cut costs three ways . . . save time, save gas, save space. Write today for complete information.

A SIZE FOR EVERY TOOLROOM

No. 130A Hi-Speed Heat-Treating Furnace

Features counterbalanced door opening upwards. 4-Burner Unit for 1400 to 2000°F 6-Burner for 1800 to 2400°F. Firebox 7¼x13x16½. With Carbofrax Hearth, G.E. Motor and JOHNSON Blower

4-Burner (illustrated) _____ $295.00
6-Burner _____ $325.00

No. 70 Hi-Speed Bench Furnace

Reaches 2250°F. in 30 minutes from a COLD START! Firebox 5x7¾x9. Complete with Carbofrax Hearth, G.E. Motor and JOHNSON Blower _____ $89.50

No. 130 Hi-Speed Heat-Treating Furnace

Consistently develops 2300°F. in 25 minutes. Four burners fire under hearth in 5½x13x13½ firebox. Complete with Carbofrax Hearth, G.E. Motor and JOHNSON Blower _____ $248.00

No. 120 Hi-Speed Heat-Treating Furnace

Compact, powerful, and remarkably economical to operate. Reaches 1500°F. in 5 minutes! 2300°F. in 30 minutes! Easily regulated. Firebox 5x7¾x13½. Complete with Carbofrax Hearth, G.E. Motor and JOHNSON Blower _____ $129.50

All Prices F.O.B. Factory

JOHNSON GAS APPLIANCE CO.
573 E. Ave. N.W., Cedar Rapids, Iowa
Established 1901

Please send me FREE Complete Information on Quick-Acting JOHNSON Furnaces

Name _____

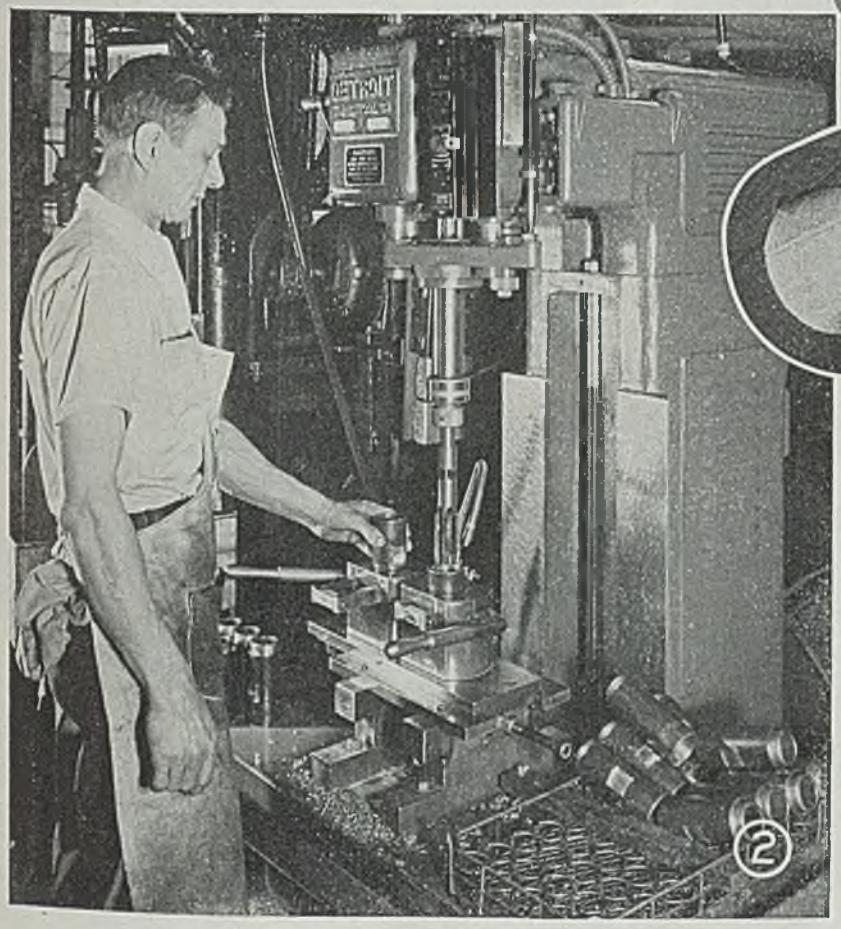
Street _____

City _____ State _____

Quick Acting **Johnson** Furnaces

POSITIONING FIXTURE...

permits tapping to 4½-in. depth an unmachined heavy walled pipe



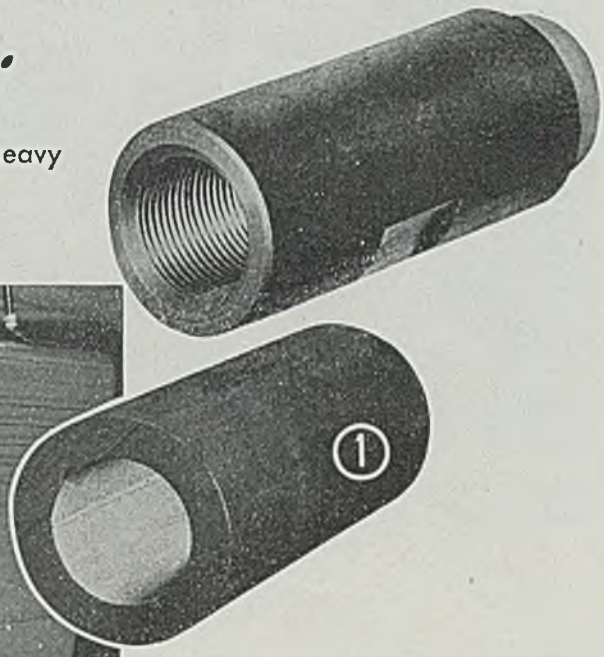


Fig. 1—Heavy duty welded pipe stock of approximately 1½ in. ID, (bottom) showing amount of metal that had to be removed to tap cut a full 100 per cent 10 NS thread 1-5/8 in. diameter, 4½ in. deep, (top)

Fig. 2—Hand operated shuttle type positioning fixture used in conjunction with a manual slide lock and a 0.020-in. automatic positioning float. Holder permitted the loading and unloading of one work holder during the tapping operation, thus helping to increase production

BOTTLENECK at the standard lead-screw tapping machines in one plant has been eliminated by a hand-operated shuttle type positioning fixture. This fixture, plus slight modification of the tool holder, also has made it possible for Schneider & Makowski, Inkster, Mich., to cut full 100 per cent threads in rough (unmachined) sections of heavy duty welded pipe stock. Untapped pipe is shown in Fig. 1 beside the finished article.

Difficulty on this job was tapping a 1⅝-in. 10 NS thread 4½-in. deep in the pipe. Rough inside diameter is approximately 1½-in., requiring the tap to cut a full 100 per cent thread. Extra torque needed to remove the necessary metal, plus wide chip of the 10 NS thread, imposed a heavy load on both machine and work holding fixture. However, no trouble was experienced with the installation.

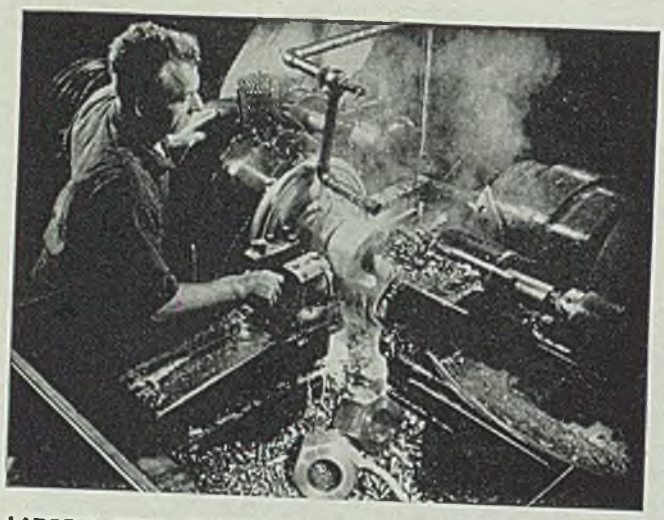
A standard tap, ground with a long chamfer, spiral pointed and mounted in a floating tap holder, is used on the machine. Long chamfer distributes load on tap and spiral point enables chip to be thrown ahead of the tap, thereby avoiding tendency of chip to roughen threads. Floating tap holder compensates for slight variations in eccentricity of work pieces.

Power takeoff to drive the tap in this design is at base of lead-screw immediately above spindle, thus requiring lead-screw to function only as lead guide. Lead-screw is not subjected to torque of driving the tap and, since there is no lead-screw wind-up, lead errors are minimized. Production of clean, accurate threads is also helped by the fact elimination of wind-up also eliminates metal piling up on back of tap teeth during return stroke.

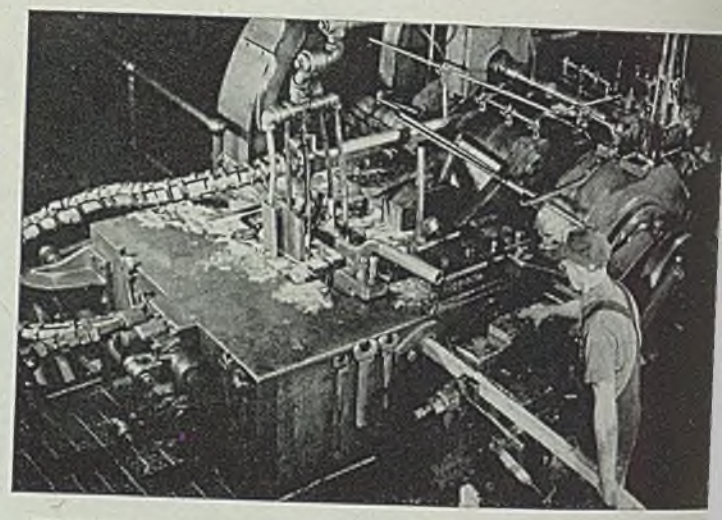
Fig. 2 shows the two positions of hand operated shuttle type work holder with a manual slide lock and a 0.020-in. float which automatically positions work piece. Holder permits the loading and unloading of one work holder during the tapping operation.

In addition to boosting production to a total of 70 pieces per hour, this machine, designed and built by Detroit Tap & Tool Co., Detroit, practically eliminated rejects, and made possible the use of relatively unskilled labor on this particular job.

The work holder, built by Schneider & Makowski, is said to have contributed greatly to the reduction of manufacturing costs at this particular operation.



LARGEST NUTS—EMPIRE Nuts larger than 1¾" bolt size are produced on machines of this type, especially adapted to RB&W requirements. Sizes up to 6½" across the flats are processed.



WORLD'S LARGEST—This cold-punching machine, fed rectangular bars, punches the hole, cuts the blank, chamfers, retrims, repunches to clear and center the hole, burnishes the sides — everything but tapping.

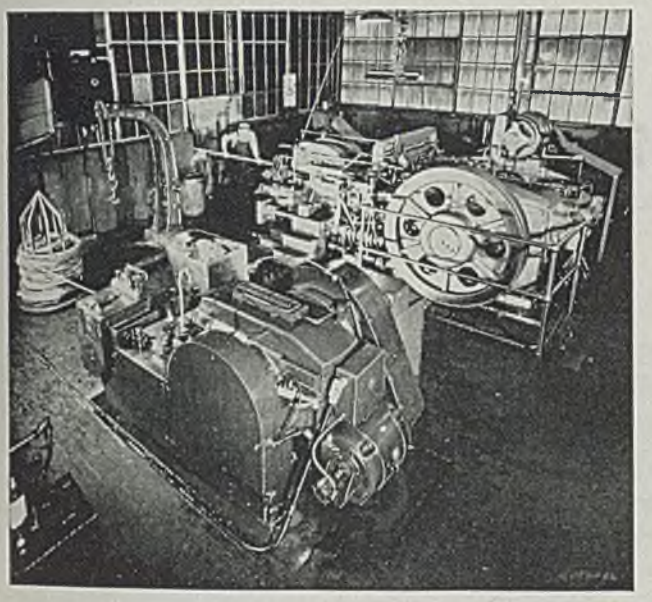
We spent millions . . .

ACCURATE BEARING—RB&W Semi-finished Nuts have an accurate bearing surface at right angles to the axis of the thread. Special facing equipment and quality control insure satisfaction.

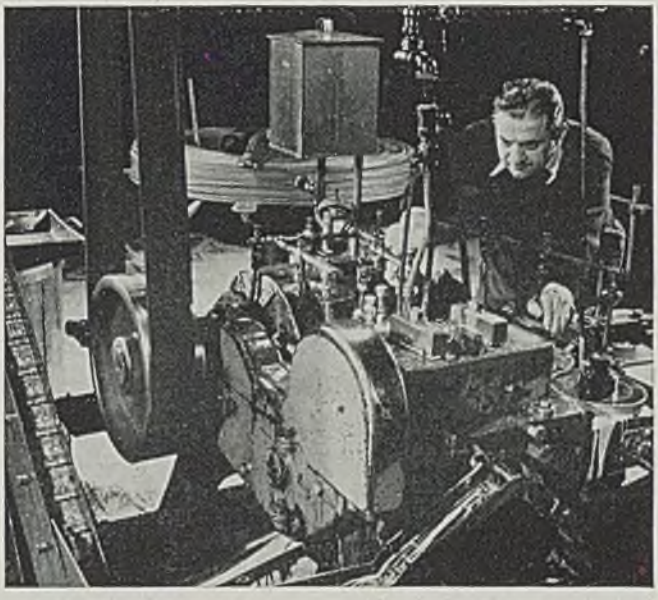
TO SAVE YOU MONEY

You pay no more for RB&W EMPIRE Nuts, when you buy their superior strength, accuracy and finish . . . and you also get freedom from assembly trouble and the permanent dependability assured by the millions RB&W has invested in special equipment and quality control.

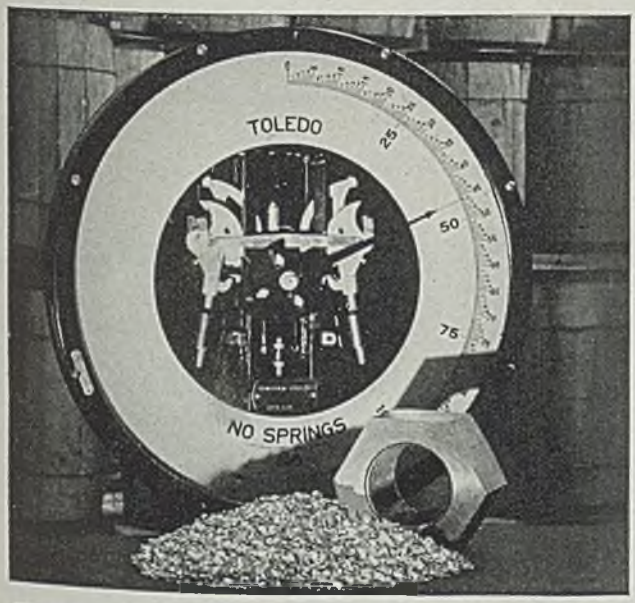
Quality control is found in actual processing as well as in the laboratories and inspection departments. For example, the method of cold-punching which RB&W developed has the valuable asset of insuring continuous inspection as part of the manufacturing process. Faulty bars cannot escape detection . . . the nuts must be uniform in size . . . and the hole must be central and concentric after repunching.



NEWEST MACHINES—RB&W works constantly to develop and perfect new processes. These machines are radically different in design and principle . . . are the only ones of their kind in the world.



HIGHEST SPEED—One thousand ¼-inch Square Nuts a minute is the pace of this machine which eats up a ton of steel every three hours. The raw material is cold-rolled in RB&W's own bar mill.



WIDE RANGE—RB&W produces light, regular and heavy nuts, hot-pressed, cold-punched, semi-finished and slotted. The 11,040 6-32 nuts in the pile are equal in weight to the single 4" nut.

LARGEST PLANT—RB&W's Coraopolis (Pa.) plant is the world's largest devoted exclusively to manufacturing cold-punched nuts. Several millions of nuts are produced and shipped each day.

DRAINS 640-TON SALAMANDER From Stack in An Hour

Two holes in concrete hearth foundation, 2 feet apart, serve as guides for oxygen lance which provides well-defined notch, 3 to 4 in. diameter. Molten metal is cast into a 200 x 28-ft pit in 2-ton pigs to facilitate handling by a magnet. Repair work started three days after removal of metal

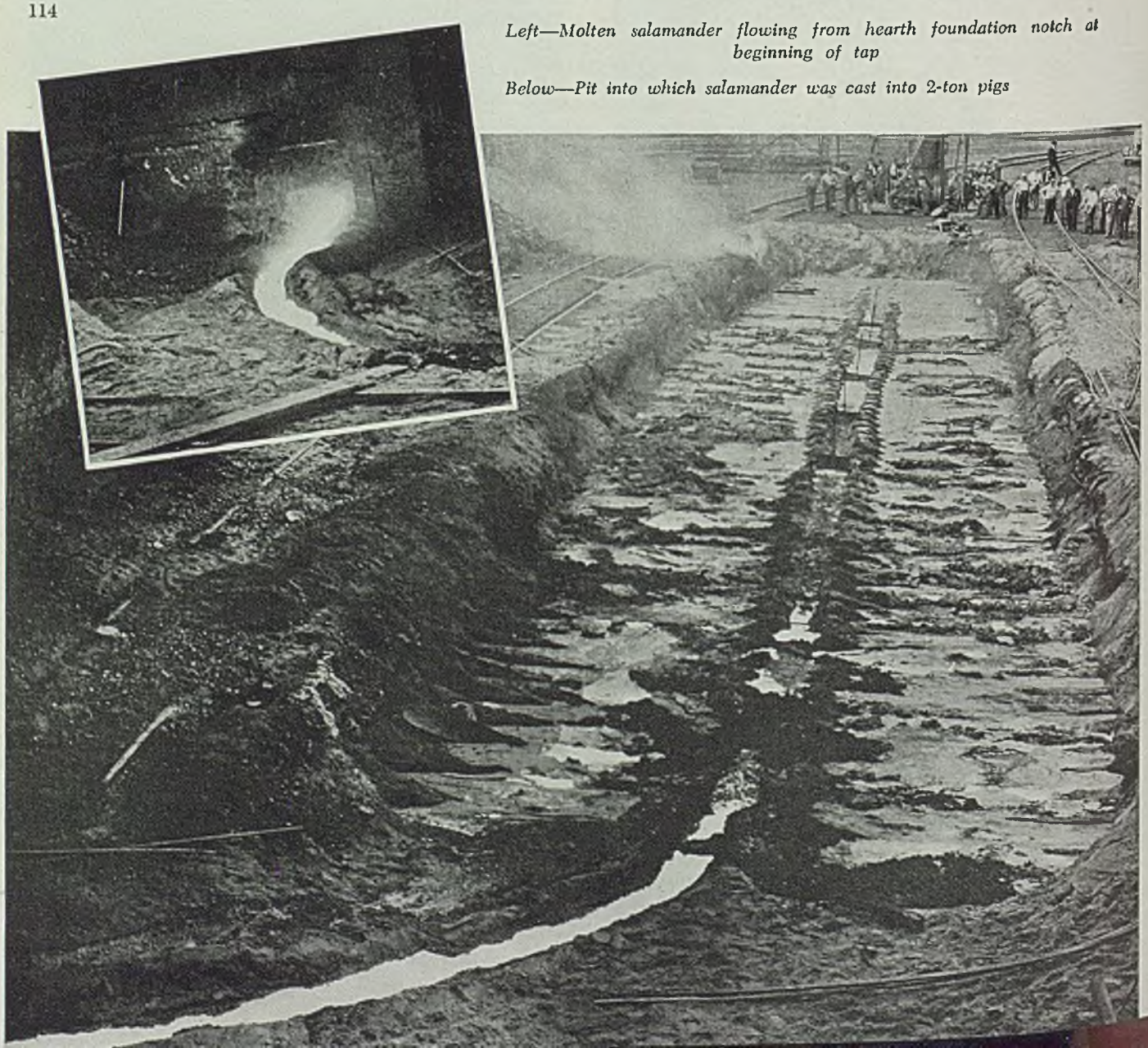
SHUTTING down a blast furnace for bottom and foundation repair involves the removal of iron below the taphole. The best practice has been to allow the iron to cool and then drill, blast and lance the skull into small enough pieces to permit removal.

In July, 1942, the Youngstown Sheet & Tube Co., at its Indiana Harbor plant, had a blast furnace to be shut down for repair. It was planned in advance to drain the salamander as quickly as possible after the blast was shut off by drilling and lancing a hole below the taphole in the base of the furnace while the salamander was still in a molten condition. An estimate was made as to the amount of salamander, based on the length of time the furnace had been in operation and previous practice results.

A concrete breaking contractor was given the job of breaking a hole in the foundation about 8 ft high, 6 ft wide and 9 ft toward the back of the furnace bottom. Two holes about 3 in. diameter and 7 ft deep were made in the concrete to be used as lance guides — the second

Left—Molten salamander flowing from hearth foundation notch at beginning of tap

Below—Pit into which salamander was cast into 2-ton pigs



Finishing Mounting Flanges

——of small generators accomplished on standard engine lathes when precision boring and turning machines or automatic lathes are unavailable

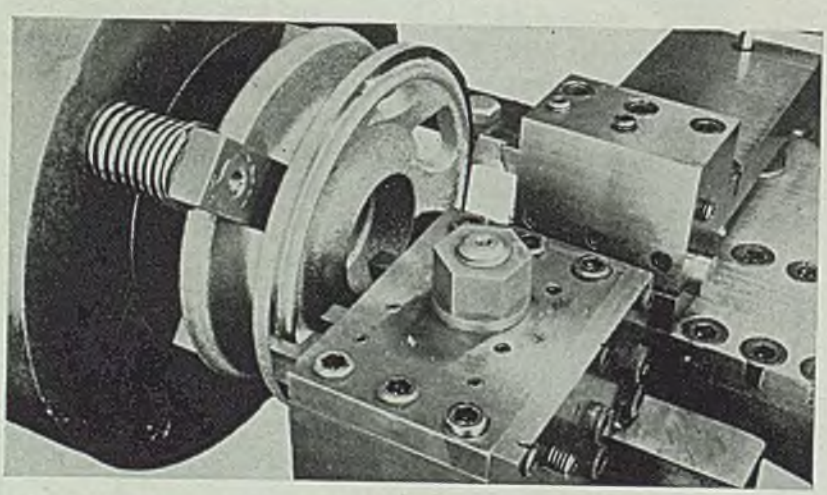
STANDARD engine lathes have been adapted for a finishing operation on small generator mounting flanges by the Apprentice Division of General Electric's Lynn River Works. Precision boring and turning machines, or automatic lathes normally employed, were unavailable. Operations involved facing the bolt flange and hub, and finish-turning the rabbet, with a tolerance of plus 0.000 or minus 0.002-in.

Rabbet diameter sizing cut was considerably simplified by this new method, which mounts the tool in an inverted position in a bridge-type tool holder with a pivoting arrangement for tool adjustment. The holder is attached directly to the carriage of the machine and thus is not affected by movement of the cross slide.

For facing cuts, gang tools, in the proper relationship to each other, are set in the tool block on the compound, as shown in the accompanying illustration. They are controlled in one direction by adjustable stops clamped to the cross ways of the carriage, and in the other direction by a gage block and a standard micrometer stop on the main ways.

Best location for the carriage was found to be axially against the gage block, between the micro-stop and carriage, when facing the flange and roughing the rabbet. The last few thousandths of movement, which rough the diameter of the rabbet, are taken by hand.

When facing the hub and sizing the rabbet, the cross slide is located against the outer stop on the cross ways. The carriage is fed axially until it contacts the micro-stop, without the block in between. This affords a finished diameter on the rabbet from the fixed tool attached to the bridge holder. It also sizes the end of the rim adjacent to the rabbet, and the end of the hub, by plunge cutting two tools held in the tool block on the compound.



hole being about 2 ft above the lower hole. Precautions were taken to avoid any appreciable cracks in the base, which precluded the possibility of liquid iron exploding from moisture in the crack. The lower hole was to be tried first and if it was found that this was below the melt, the higher hole would be used and a second attempt made.

An oxygen line was installed at a point 100 ft from the lancing location. The pipe line was 1 in. diameter with two ¾-in. valves and 22A20 adaptors, to accomodate ½-in. hose. Six sections, 100 in. long, were made up from ½-in. pipe. A supply of aluminum pellets and coke screenings were also kept on hand for immediate use.

A pit, approximately 200 ft long and 28 ft wide, was dug and packed with an over-runner through the middle, so that the iron could be run into 2-ton ingot size pigs for easy handling with a magnet. Wood and oil were kept burning in the pit to keep it dry and eliminate the possibility of an explosion. The blast was shut off about 8 a.m., but a light rain had soaked the pig bed, making it necessary to dry it with oil fires. At 10:44 a.m. paper, aluminum pellets and coke screenings were packed into the lower lance guide hole. At 10:45 a.m. the lance was started and the lancing operation continued until about 75 ft of the pipe was consumed. At short intervals the lance was removed and a few handfuls of coke and aluminum pellets were thrown into the hole. A new lance was started (by heating with a cutting blowpipe) and used until 60 ft more was consumed.

The third lance pipe was in service when the hole filled with liquid iron, which occured at 10:50 a.m. At 11:50 a.m. the furnace was completely drained of its salamander.

To sum up the oxygen equipment, the 1-in. diameter line was run from a 1½-in. main for a distance of about 300 ft, then through 100 ft of ½-in. hose, two 22A20 adaptors, and finally through 100 ft of ½-in. pipe. The ½-in. pipe was consumed until a length of 25 to 40 ft remained. "Driox" oxygen station pressure was 120 psi with a 110 psi at tie-in during operation.

Lance Overshoots Bottom

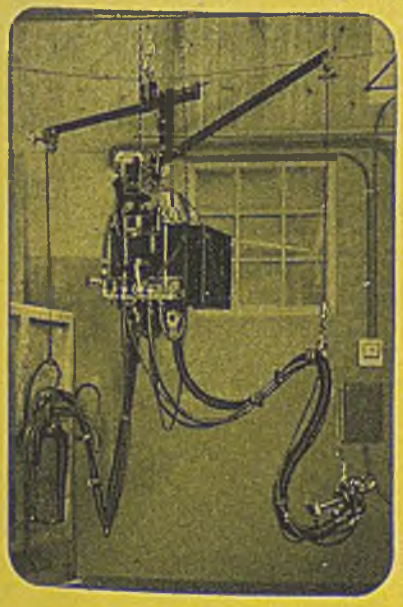
When the furnace had cooled, an examination was made and it was discovered that the lance had come in above the bottom, and about 40 to 50 tons of iron and some slag remained. Actually 614 tons were drained from the salamander. It was found that a well-defined hole, between 3 and 4 in. had been made over the full course of the lance.

With this method of draining, a savings of approximately 30 days in time was effected. The furnace cooled faster because it did not contain a large mass of metal and the crews were able to start outside and upper repair work within 3 days.

At another stack a lance, using a pressure of 200 psi failed to effect an opening. By decreasing the pressure to 30 psi good progress was made with the lance, but iron did not flow. The process was given up, and the old method of blasting was initiated. It was discovered that the lance had given the 3½ in. diameter hole, only it was 2 ft below the bottom of the salamander. The local management not having planned a second choice hole and skeptical of the process, gave up the lancing idea after the first attempt failed, which caused a loss of time of 25 to 30 days.

It cost them ONLY $3,650 . . .

to Boost Output 30%



At right: Operator using one of the two Progressive guns in assembling a "walk-in" cooler frame. Above: Vering's simple production-boosting installation.

Vering Mfg. Co. of Los Angeles builds all kinds of refrigerator cabinets, from water coolers to big walk-in jobs. It used to fabricate them by drilling, reaming and bolting or riveting. Today, for a total cost of only $3,650 for equipment and about $750 for installation, Vering produces 30% more cabinets, has cut costs per unit, reduced assembly time, and IMPROVED STRENGTH AND DURABILITY.

Vering brought its problem to Progressive who studied the designs, recommended certain modifications and then designed for Vering a simple installation consisting of two portable welding guns operating from a single transformer, booster and timer. With this, all points on both large and small Vering cabinets can be welded.

This manufacturer's experience again proves that "Design for Resistance Welding" pays dividends in short as well as long runs. We will be glad to help you, too, lower costs, increase output, and improve quality by "Design for Welding".

Have you seen the Idea book of 100 "Designed for Resistance Welding" applications, "Resistance Welding at Work"? Ask for Booklet WP-44.

IT PAYS TO WELD

PROGRESSIVE Welder Co. 3050 E. OUTER DRIVE • DETROIT 12

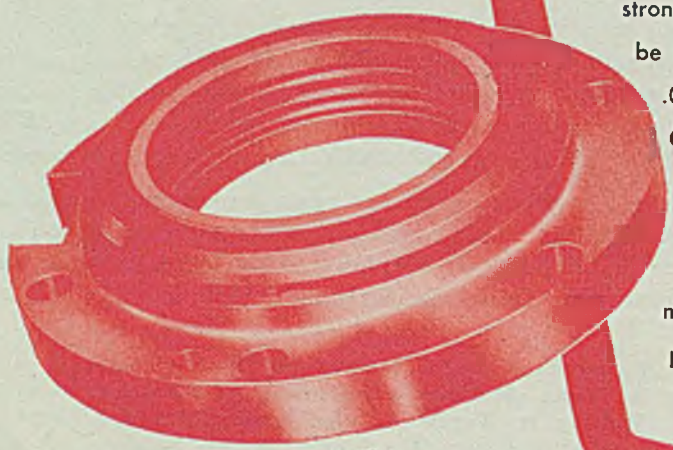
RESISTANCE WELDING EQUIPMENT

GRAPHITAR "CARBON GRAPHITE"

PROVES IDEAL MATERIAL FOR TORQUE CONVERTER SEALS

RUBBER RING

GRAPHITAR SEAL



METAL MATING PIECE

Seals made of Graphitar, a carbon-graphite product of the United States Graphite Co., have proved ideal for holding hot, light oils in torque converters. Sealing against a lapped metal surface, a Graphitar seal does not gall or leak hot oil, and it holds a static head under pressures up to 100 lbs./sq. in. It performs satisfactorily under maximum operating temperatures and its lapped surfaces will not warp or distort.

Its many outstanding characteristics have earned for Graphitar a widespread acceptance among engineers throughout industry. Chemically inert, it is used successfully as bearings for conveyor belts in tanks containing corrosive solutions. Its exceptional resistance to heat makes it perfect for bearings in ovens, kiln cars, steam dryers, and hot glass conveyors. Clutch release bearings, turbine packing rings, elevator gibs, and liquid meter pistons are just a few of the many industrial applications of Graphitar. Mechanically strong, yet extremely light in weight, it can be machined to tolerances as close as .0005" in small sizes.

Graphitar is constantly solving engineering and manufacturing difficulties in nearly every industry. Write for complete information on how it may help to solve your particular problems.

THE UNITED STATES GRAPHITE COMPANY • SAGINAW, MICHIGAN, U. S. A.

Use of Statistical Methods

In Quality Control Program

Scope of material includes a comparison of two common methods of presenting data as well as certain representative applications for obtaining quality and production control in manufacturing processes

By W. T. ROGERS
Metallurgical Statistician
National Tube Co.
Lorain, O.

CONSTANCY of factors involved in producing material by repetitive processes is not obtained. Numerous variables associated with quality and production occur with more or less mathematical regularity about any one desired value. Generally, the desired value is the most frequently encountered, with values on either side occurring with less and less frequency between certain limits which can, in most cases, be determined by statistical methods.

Regardless of the characteristic shape of any curve, there is one thing which should be known about any distribution, and that is whether or not it takes its shape from a chance or nonchance system of causes. To determine this fact correctly is one of the important tasks of the quality control statistician.

Chance causes may differ from time to time so that a distribution of any one variable will have a different form in one period than in another. As time progresses, an element may periodically enter and leave the system. A factor may appear in different magnitude from time to time, depending upon previous processes, or a completely new factor may enter or an old established factor leave the system. Regardless of these situations, one thing is constant whether statistical control is practiced or not, and that is, that in every manufacturing process the manufacturer aims for a definite mark in controlling all of his processing variables to the end that the most satisfactory product may be made with the greatest economy.

Tests Are Helpful

Knowing the chance system of causes from which a distribution arises, it is possible by statistical tests to arrive at a conclusion as to whether or not a group of observations can be regarded as having originated from the known system. The one question which must be answered is, "Do these data come from a constant system of chance causes?"

Many cases arise in industry where it is necessary to evaluate a condition by the method of attributes instead of variables. In other words, instead of evaluating a condition numerically, it must be measured by a certain characteristic to which it either does or does not conform. An example of this type is the performance of nozzle assembly on an open-hearth pouring ladle. In order to facilitate the pouring operation, it is necessary to have a nozzle assembly which will operate smoothly and give a good shut-off from ingot to ingot, and inasmuch as the evaluation of this condition depends on the judgment of the operator, it is evident that it can only be recorded as satisfactory or unsatisfactory. A frequency distribution of the daily percentage of nozzle assemblies giving unsatisfactory results is the familiar fraction defective curve found in practically all cases where conditions are considered as conforming or nonconforming.

Though statistical tests bear out the inference of visual inspection and considered judgment, one can only arrive at the probable conclusion that a given set of data did or did not come from a controlled system of chance causes. Furthermore, it cannot be determined from a frequency distribution whether more than one level of control is included in the data, nor can the existence of trends be detected. One therefore is forced to the conclusion that frequency distributions are not suited to the routine analysis of observed data in a manufacturing process.

If one wishes to know the whole story relative to the chance or nonchance occurrence of observed values, the control chart is of inestimable value, in that it tells:

1. The state of statistical control.
2. The evidence of more than one level of control.
3. The existence of nonchance causes.
4. The existence of cycles or trends.

It is often necessary, in an industrial process, to evaluate the results obtained by changing a process in order to determine whether an additional change will give a more uniform product. A common method of making such comparisons is the frequency distribution from which an opinion is formulated on the basis of congruity of two curves. Where chance factors of variation are numerous and nonchance conditions likely to arise, the control chart is more desirable that the frequency distribution. It is believed that, in general, this conclusion holds true in this type analysis.

Control of a production process consists essentially in determining immediately the degree of success being attained and a system of repeating this determination from time to time as a matter of routine. There are, however, certain processes where the actual measure of effectiveness is not only time-consuming, but in addition may be so destructive of material that repeated measurements at short intervals are economically undesirable. An instance of this kind is the metallic coating of steel pipe by the hot dip galvanizing process.

In cases of this kind, it is generally much more desirable to have a method which will give rapidly, without the destruction of finished product, a measure which indicates a certain value that is highly correlated to the variable under consideration. Instruments now are available which give quickly, and without destructive testing, numerical values which are highly correlated to the actual coating weight. It is necessary only to obtain a suitable instrument and to develop the relationship between the values obtained by its use and the actual coating weights obtained by more precise methods.

Another type of problem frequently encountered in industry is one in which the end result of a process must be determined in one of the preliminary stages of manufacture. A good example of this is the chemical analysis of steel. The steel manufacturer must accept steel based on the analysis of the metal in the as-cast condition (ladle analysis). The ladle analysis which is taken directly from

the molten steel represents the greatest degree of homogeneity in chemical constituents that is possible to obtain, while the check analysis, due to the physical characteristics of the solidification process, is subject to considerable variation. In view of this condition, it is necessary for the metallurgist, charged with the responsibility of accepting material to meet certain specifications, to know something about the relation between the ladle analysis and check analysis.

Thus it can be seen that by setting up statistical relationships based on reliable past experience, statistical methods of control are not only practical but are a valuable adjunct to any control program.

The place of multiple correlation in a quality control program has only recently been given adequate recognition. In the past, when trying to isolate the individual effect of numerous variables on a quality characteristic, it was felt necessary to accumulate an enormous quantity of data so that each supposedly related variable could be more or less stabilized. Fortunately, however, research workers in other fields have developed methods of multiple correlation whereby regression constants may be worked out simultaneously on several variables at one time. With the adoption of these methods in industry it has been found that highly reliable data can be obtained with a limited supply of data.

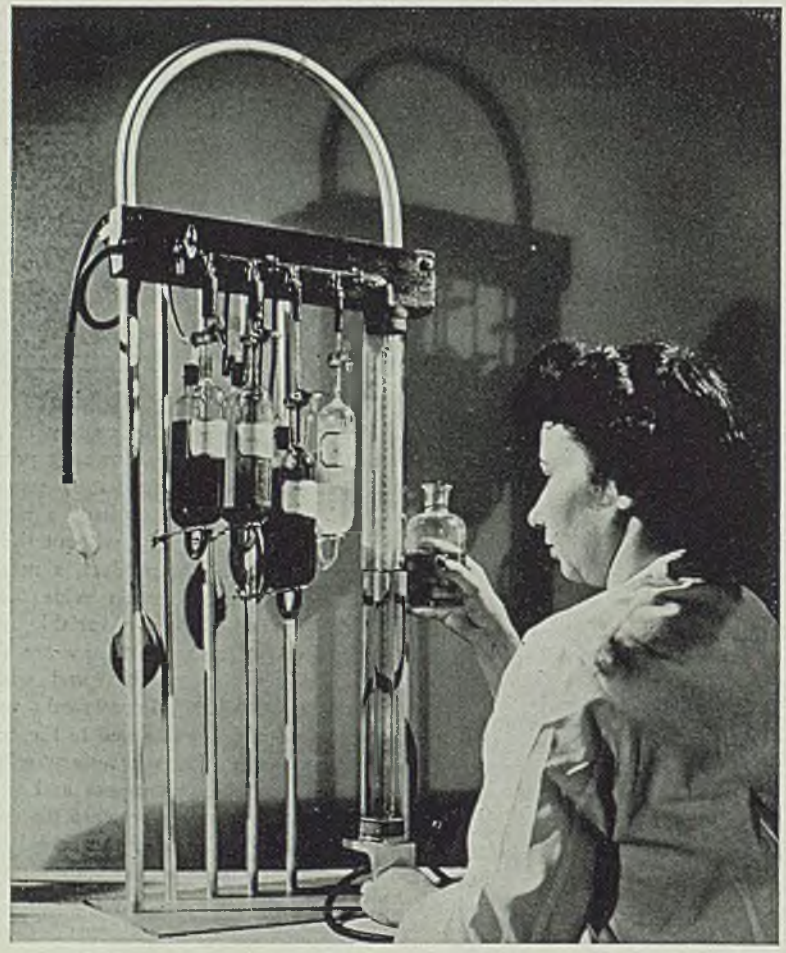
Factors Affecting Surface Finish

For example, it was desired to determine the factors affecting the surface quality of a certain grade of open-hearth steel billets with the view to reducing the inspection rejects and thereby increase the yield of good product. A review of the data revealed that there were 131 heats on which complete information was available and there were 21 variables which were thought to be contributing causes to the variability of surface quality. Of these 21 factors six were considered of sufficient significance to be included in a final multiple correlation analysis.

Only close co-ordination of control charts and correlation, when dealing with operations such as exist in steel plants, where isolation of factors causing trouble is extremely difficult, is it possible for a control program to develop its maximum efficiency. The control chart tells the state of control present in a variable but it does not tell whether the average level of control and the variability observed is the condition desired. Evaluating the desired level of control is the function of correlation. It is therefore evident that the value of each method will be greatly enhanced by a co-ordination of their use.

It is not always possible to wait until a large backlog of data has been accumulated before attempting an analysis of the various factors related to quality, for while thus marking time, product continues to be manufactured and if the quality characteristic is not controlled at a desirable level, continued production entails unnecessary loss of both material and money. Furthermore, changes cannot be made promiscuously by the trial and error method because such practice is as likely to affect the quality of the product adversely as it is to improve it. In other words, making changes without foundation is unlikely to be more advantageous than pursuing a set course. Essentially the same problem is present here as in the example of multiple correlation mentioned previously. The probably related factors are numerous, the data are limited, and in addition it is necessary that results be known as soon as possible in order that rejects may be kept at a minimum and the best possible quality of product made.

From a paper presented last week at the annual meeting of the American Society for Metals, Cleveland.



GAS ANALYZER: Made 11 lb lighter by use of magnesium than the 20-lb apparatus it replaces, this analyzer is constructed of extruded tubing and plate and finished with aluminum paint. It is used by Dow Chemical Co. for determining amount of carbon dioxide, carbon monoxide and oxygen in system, and must be carried frequently by technician who takes gas samples at different locations on all three floors of building. It is easy to handle and sturdily constructed

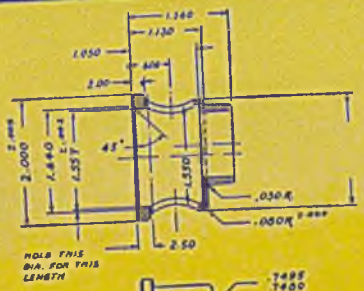
Plug Gage Bushings

"Go" and "no-go" plug gage bushings are being carried in stock in "rough" form, ready for finishing for immediate shipment in 40 standard sizes each by Carboloy Co. Inc., Detroit. They range from a finished gage diameter of 0.366-0.406 in. to a finished gage diameter of 1.501-1.531 in.

Rough ring gage bushings of Carboloy for gages ranging from 0.059 to 1.510 in. in diameter also are available. Outside diameter of these bushings range from ⅜ to 1⅛ in.

All stock gage bushings are of Grade 44A, selected for its exceptional resistance to wear.

Scovill
NON-FERROUS FORGINGS



When SCOVILL becomes your METAL-PARTner... you can avoid headaches on machined forgings like this

This is a brass part for an airplane engine oil strainer — *forged and machined by Scovill.* An interesting job — but tolerances aren't too tough. Notice that the cavity in the large end is held to ±.002; the center of the hole through the bottom boss, to ±.005 off the center line of the part proper; and the outside of the boss, to ±.003.

If your metal parts present more difficult problems than that, why not unload part of your headache on us. Because we've solved such a wide variety of nonferrous forging problems, there's a good chance that we can be of real assistance to you in suggesting design improvements or manufacturing economies, or both.

YOURS FOR THE ASKING

Give us a chance to prove to you that you can save time, trouble and money by making us *your* METAL-PARTner. Fill in the coupon below and mail it today.

SCOVILL
Masters of Metal

Please send me information about your metal-working facilities. I am interested in metal forgings for the applications checked:

- ☐ Aircraft
- ☐ Automobiles
- ☐ Band Instruments
- ☐ Blow Torches
- ☐ Cameras
- ☐ Communication Equipment
- ☐ Compressed Gas Cylinders
- ☐ Fire Extinguishers
- ☐ Household Appliances
- ☐ Industrial Instruments
- ☐ Plumbing Goods
- ☐ Pumps
- ☐ Valves
- ☐ Welding Equipment

Other applications .....

.....

SCOVILL MANUFACTURING COMPANY
Forgings Division
20 Mill Street
Waterbury 91, Connecticut

Name .....

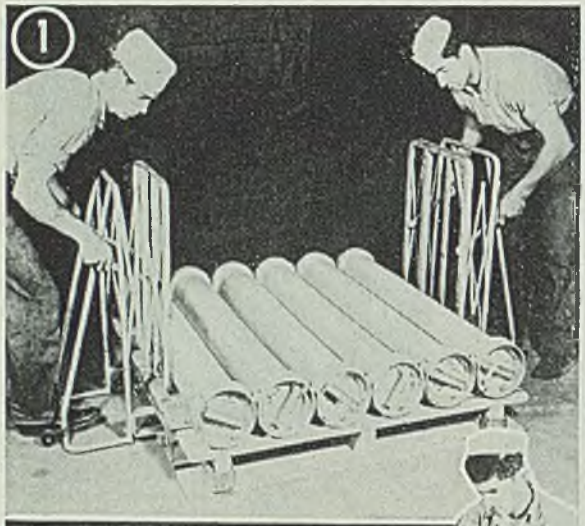
Company .....

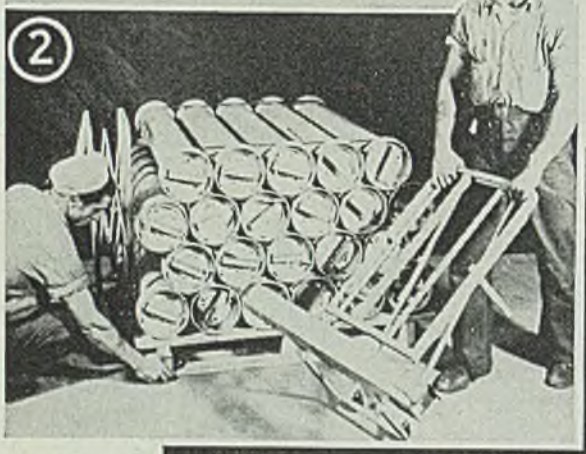
Address .....

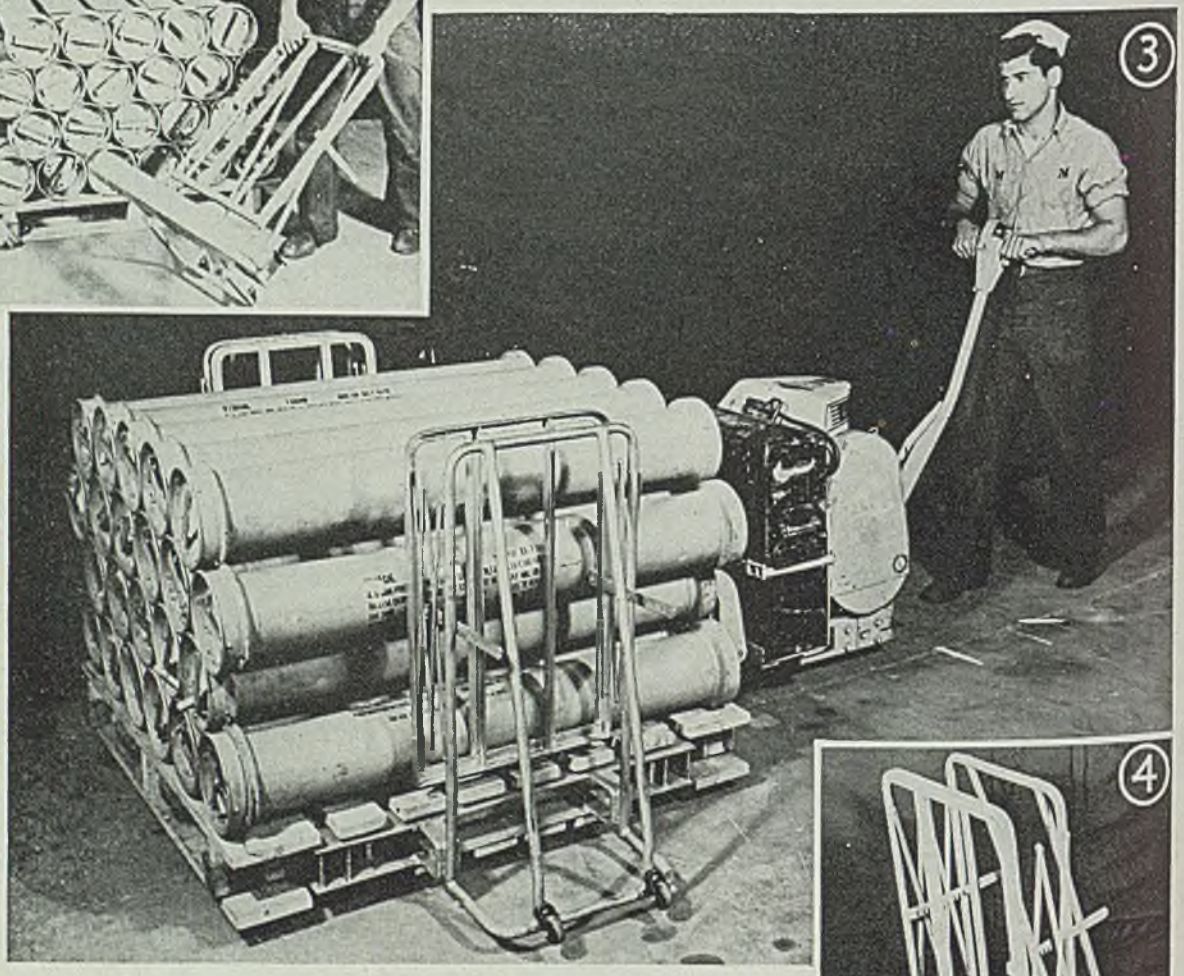
JIG FACILITATES handling ON PALLETS

THE LIGHT metal jig illustrated in the accompanying story-telling photos was developed at the Naval Ordnance Materials Handling Laboratory, U. S. Naval Ammunition Depot, Hingham, Mass., to facilitate the palletization of ammunition in tanks or other cylindrical objects. It is part of the Navy's intensive and successful effort to increase the efficiency of its materials handling operations, even in peacetime.

Because this particular development has broad possibili-







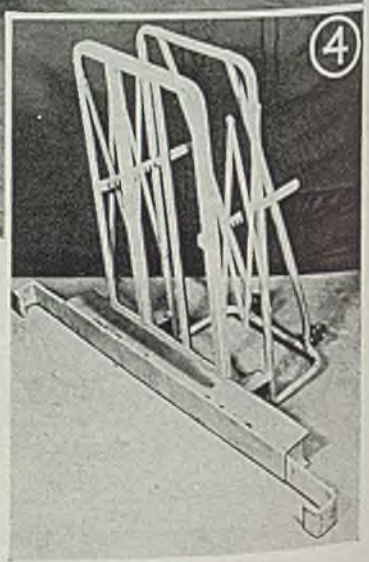


Fig. 1—Upper framework is adjusted to load by pantograph arrangement

Fig. 2—After application of steel straps, jigs are detached and rolled away to be used over again. Photos from "The Palletizer"

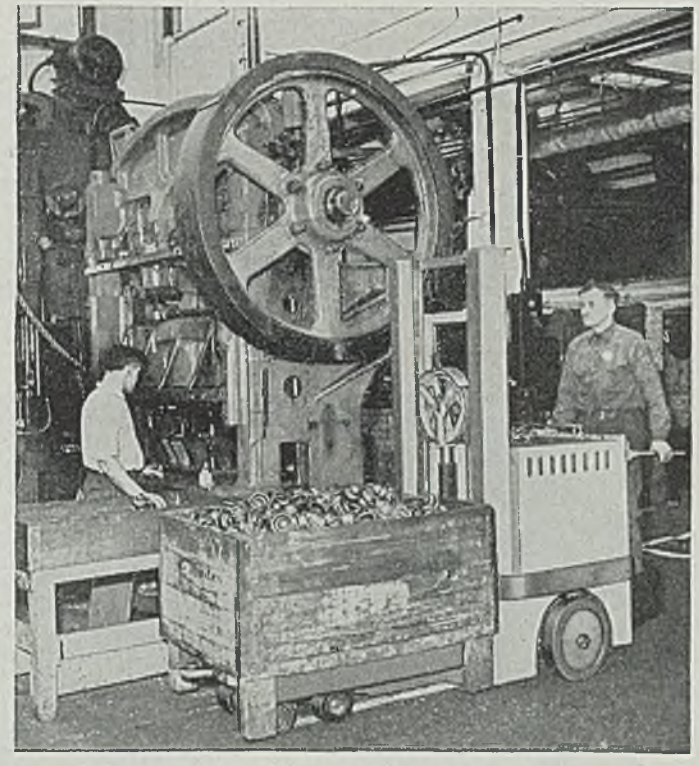
Fig. 3—Upper layers cannot push lower units out of place, so facilitates movement of load from end of production line to free area for strapping

Fig. 4—Jig has adjustable hooks on bottom member which lock around side stringers of all standard Navy pallets

USE BATTERY TRUCKS

for most efficient

STOP-and-GO handling



In Industrial Trucks, Alkaline Batteries Give You These Important Advantages

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

Edison
ALKALINE BATTERIES

. . . ALKALINE BATTERIES

for most economical power

In moving materials to and from a production machine, an industrial truck will usually make 14 or more moves forward, backward, up and down. A battery-powered industrial truck has natural advantages in this and other stop-and-go handling services because of its superior maneuverability, high availability and extremely dependable operation. It gets the necessary surges of power instantly from its battery, yet consumes no power during stops. Thus it not only uses power with high efficiency but the current used for charging its batteries is the lowest-cost power available.

Its electric-motor drives for traction and lifting, operate quietly, without vibration, and with almost negligible repair requirements. With batteries exchanged two or three times per 24-hour day, the truck is continuously supplied with power. So except for the few minutes needed to exchange batteries, the truck need not stop work for servicing of its power unit.

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

ties for use as a materials handling aid, it is worthy of study. As shown in Fig. 4, the jig consists of a light metal framework which has hooks on the bottom member arranged to slide in and out so they will lock around the side stringers of all standard Navy pallets used in the Navy's fork-truck-pallet handling system and also increasingly employed by industry in general.

After a jig has been locked in position at each end of the pallet, the upper framework can be adjusted by means of a pantograph arrangement to accommodate any reasonable overlap or underlap between the goods carried and the bed of the pallet. Notches in the pantograph permit it to be locked at the adjustment chosen.

As shown in Fig. 1, the jig is locked firmly against the bottom layer of material to be carried. Then when upper layers are added, they will not push units in the lower layers out of place.

Then the completely loaded pallet can easily be moved away from the production line or the like to be strapped in a free area. Note that the ends of the load are free from obstructions that would make strapping difficult. Of course, straps are easily threaded inside the jigs so they can be removed in a matter of seconds as soon as the steel straps have been tightened and locked. Casters on the jig permit it to be rolled easily to location of next job.

The Navy has found this development particularly valuable in breaking down unit loads at marine terminals where loads of many types must be taken apart for issue to single ships. Obviously, it is highly applicable to warehouse work.

Ice formed in neck of this container when cap was removed, preventing the expanding air from escaping to outer atmosphere, and causing it to explode

Precautions for Safety in

Handling Liquid Air

By A. A. RAPP
Safety Supervisor, Lamp Division
Westinghouse Electric & Mfg. Co.
Bloomfield, N. J.

HANDLING liquid air presents a safety problem so subtle in nature that it usually does not receive attention in proportion to its potential danger.

Liquid air containers are specially constructed to hold a rapidly vaporizing liquid of extremely low temperature. The neck of the container is long and narrow and has a ⅜-in. orifice. A special cap is provided for this neck which has the double effect of keeping foreign matter out of the container and allowing for the escape of vaporizing air. If these caps are removed from the container for any length of time, particularly when there is a large amount of moisture in the atmosphere, a condensation will occur in the neck of container and will form an effective plug of ice. The rapidly expanding gas then will have no means of escaping to the outer atmosphere. When this happens, it is only a matter of time until enough pressure will be built up to cause the container to blow apart, as shown in the accompanying illustration.

To insure against accidents, the following points should be emphasized to employes:

1. When not in use, liquid air cans are to be kept covered at all times with the cap which is attached to the can nozzle. This will keep atmospheric moisture from condensing in the container.
2. When it is necessary to use a funnel in pouring liquid air from one container to another, the funnel must be put away when the operation is completed, and the cap put back on the storage can.
3. If any difficulty is experienced in pouring liquid air due to an icy obstruction in the neck of the bottle, the following procedure should be followed:
   A. Bring the problem to the attention of the foreman at once.
   B. Remove the can from any congested working area while waiting for its disposal.
   C. Puncture the obstruction immediately with a clean rod, stick or wire if possible. Do not use a heat-producing implement for this purpose.
4. When pouring liquid air, be sure the employe's hands are not covered with gloves or rags. Liquid air will evaporate very quickly if it splashes on bare skin. If it becomes trapped in a glove or rag, serious burns may result.
5. Keep oil away from liquid air.

We admit they're good

Heppenstall Shear Knives

have proved their ability

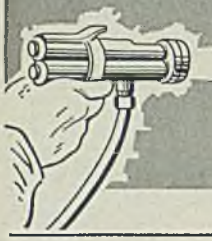
to do more work and a

better job at a lower cost

It's easy to *talk* a good shear knife and build a story around how well they're made BUT, cold records of actual shear knife service in a man's *own* mill—that's all that means much *to him*. That defies argument . . . That's the *only* evidence that we ask you to believe—that Heppenstall Shear Knives, over a 50 year period, under various closely competitive conditions, have delivered more and cleaner cuts per grind and per dollar of original cost. So, we feel safe in saying that they will reduce *your* shearing costs *substantially*. Write for quotation. Heppenstall Co., Pittsburgh, Pa.

Heppenstall

the most dependable name in forgings



THE FINISHING TOUCH

SECOND SERIES—NUMBER SEVEN

MANY NEW FINISHES DEVELOPED IN JAPAN COMPANY LABORATORY

Whether sales appeal or surface protection is the prime consideration in the finishing of your products, laboratory control of materials is deeply important to you.

Here in the modern laboratory shown above is where the finishing process really begins. Materials are analyzed, tested, mixed, applied and baked in trial runs before production. Here is where tomorrow's newest and finest coatings must prove their quality to a staff of finishing experts.

Among the new developments of our laboratory are special finishes to make your products more colorful, attractive and durable for today's competitive market. Metallic finishes, for instance, that equal plating in appearance, in gold, silver, bronze and many colors . . . more attractive wrinkles, crackles and Hammerloids . . . new plastic coatings in every shade of color, so tough and flexible that metals can be stamped and formed *after* finishing . . . coatings that offer hitherto unheard of resistance to heat, abrasion and chemical action . . . silk screened designs at lower cost than you have thought possible . . . these and many other new developments of modern finishing science are at your disposal.

It is impossible to name all of the finishes and services which we provide for our customers, because we are constantly discovering new solutions for the problems which are brought to us. Just to give you an idea of our scope, however, following is a general list:

Preparation of metals.
Phosphate coatings.
Etching of die castings.
Steel pickling.
Laboratory control of materials.
Developing of specific formulas.
Lacquering, enameling, japanning, graining.
Wrinkle and Hammerloid finishes.
Roller coating.
Silk screening.
Electrostatic spraying and detearing in continuous line production.
Processing and packaging for export.

REJECTS COST MONEY

The lower the reject rate, the lower the over-all cost of finishing. This picture shows another way in which we simulate actual working conditions before starting a finishing run. If any mistakes are to be made (and everybody makes 'em), they are made and corrected *in the laboratory instead of on the production line.* Parts are

sprayed or dipped, air dried, baked and tested for adhesion, sheen, color and various other requisites of a perfect finishing job before production begins.

We have over 75,000 feet of space devoted *exclusively* to finishing, processing, assembly and packaging. If you have a problem in one of these fields, just call HEnderson 5153.

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

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

- PHILADELPHIA, PA. 18 WEST CHELTEN AVE. BLDG. VICTOR 2900
- DETROIT, MICH. 642 NEW CENTER BLDG. MADISON 1032
- CHICAGO, ILL. 1609 BANKERS' BLDG., STATE 3363
- NEW YORK CITY 156 EAST 42ND ST., LEXINGTON 2-6964
- ROCHESTER, N. Y. 75 WINTON ROAD, SOUTH, MONROE 5392
- ST. LOUIS, MO. 1905 CONTINENTAL BLDG. NEWSTEAD 6075

THE **JAPAN** CO.
INDUSTRIAL FINISHERS

HARRY FORSBERG, PRESIDENT

JAPANNING, ENAMELING AND PHOSPHATE COATING

ROLLER COATING ELECTROSTATIC FINISHING

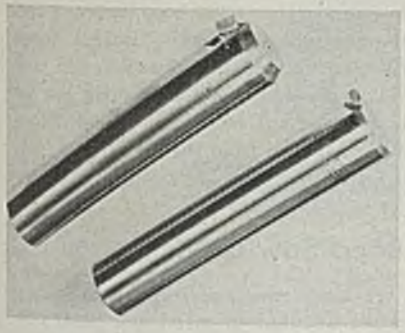
5103 LAKESIDE AVE. HENDERSON 5153 CLEVELAND 14, OHIO

INDUSTRIAL EQUIPMENT

Tool Bits

Triangular shaped tool bits manufactured by Weddell Tools Inc., Rochester 9, N. Y. have been applied to boring bars.

One or more Tri-Bits are fitted into triangular holes, tying the body together all around the blade. The triangular tool bit is locked securely home into a vee by a single lock screw. The blade is further backed up and adjustable by a single adjusting screw in back of the blade. The bits made of high speed



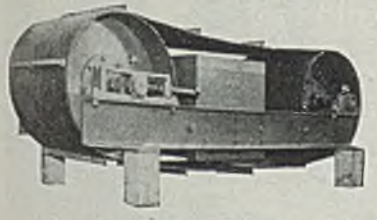
steel, cast alloys or carbide tipped may be reground in individual grinding holder and reset to size.

Boring bars are made standard, with plain, straight or tapered shank. They are also made special with plain or strip pilots integral in the body or in combination with other tools as facing or chamfering heads or hollow mills.

Steel 2/11/46; *Item No.* 9976

Self-Cleaning Magnet

Dings Magnetic Separator Co., Milwaukee, announces a new self-cleaning, rectangular, electro-magnet for use where a large amount of miscellaneous iron is to be separated. Unit is made complete-



ly automatic in operation with the aid of cross-belt that conveys tramp iron to a discard pile.

Nonmagnetic angles riveted to the cross-belt plus a fast belt speed assure quick removal of tramp iron from the magnet face so that oncoming iron cannot pile up and clog this area. Magnet is available in widths comparable to that of the conveyor belt over which it is to be suspended. It is available in both standard and heavy-duty intensities.

Applications of this magnet include where magnetic head pulleys cannot be installed or where excessive main conveyor belt speeds are present.

Steel 2/11/46; *Item No.* 9979

Center-Driven Lathes

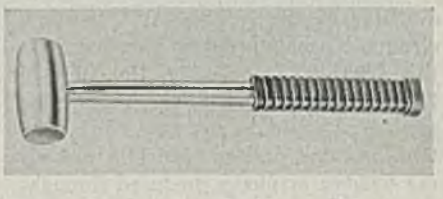
Four center-driven lathes have been designed and built by Snyder Tool & Engineering Co., 3400 East Lafayette, Detroit 7. Lathes are hydraulically operated and electrically controlled and operate on an automatic work cycle.

Machines illustrated are left to right: No. 42595. A prewar machine for processing fabricated steel axle shaft housings for trucks. Center drive unit is small with short rear center movement actuated by air cylinders. Tail stock housing is rigidly mounted. Operations include turning various diameters near the wheels ends of the housing and facing numerous shoulders and flanges. No. 47826. Basically the same as No. 42595 but built to handle heavier cast parts. Operations are turning with front tool blocks, facing and shouldering with rear tool blocks, which are reversible for rough or finish facing. Tail stop assembly slides in and out of work as an assembly. Bottom row, left to right: No. 43218. Essentially the same as above mentioned machine, but built to handle a cast armor plate rotor and designed with considerable travel of the tail stock to provide loading space. Operations are turning and facing from both ends. No. 51113. For processing cast armor plate recoil housings. Rear tool slides have extremely long travel and conventional head stock and motor drive to center drive have been eliminated. Center drive is direct from motor and transmission in rear of machine. Operations include turning with front tool blocks and facing and shouldering with rear tool blocks.

Steel 2/11/46; *Item No.* 9981

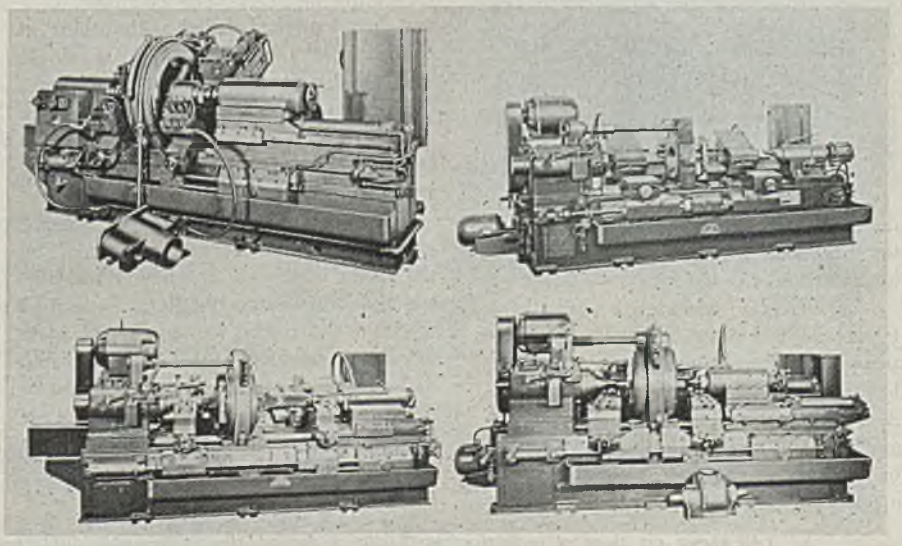
Lead Hammer

Utilizing an entirely new principle of hammer design, a new lead hammer meets a wide range of requirements. Manufactured by Nu Products Co., 1060 Broad street, Newark 2, N. J., it is made of virgin tellurium lead with an antimonial content which minimizes wear, and practically eliminates danger from



flying chips and splinters, as the head actually toughens with use. It will not blemish contacting metal surfaces.

Shaft is double steel rod, cadmium plated, and offers extra strength by the duplicate construction. Welded cross members on both ends absorb shock and impact, thus protecting hands of user from vibration of blows. Handle is of durable plastic, serrated for sure grip, and with safety bulge at end to prevent hammer from slipping from hands. Head and handle are securely fixed—unique



(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 130.)

construction prevents loosening. Hammer is designed for use with one or two hands. Weight of head is 5 lb; head size is 4¾ x 2 in.; handle length, 7 in., and overall length 16 in.

Steel 2/11/46; *Item No.* 9993

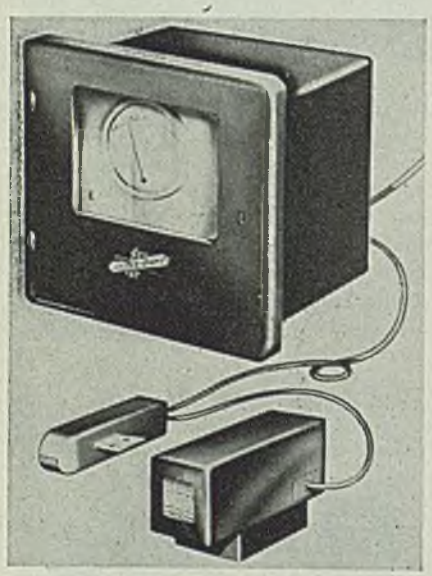
Boring Chuck

A boring chuck with which it is possible to center drill, bore a hole or holes and then drill again without removing boring chuck, is announced by De Soto Tool Co., 16 Sproat street, Detroit 1. When drilling is required, operator removes boring bar, brings chuck to dead-center by moving adjusting screw back to end of travel and setting to zero; the boring chuck is then ready to receive the drill chuck. It is held in place by two hold-down screws. After center drilling and open drilling to required size, drill chuck is removed and boring bar is inserted again for the boring operation. In this same manner, it may be used as an adaptor for most special tools such as end mills, cutters, key-way cutters, saws, flytools, etc. With the precision adjusting screw, provided in all chucks, boring bar can be moved to within 0.001-in. of the hole size required. This being a positive adjustment, duplicate holes can be bored by setting graduation the same on each hole in the series. Construction consists of four hardened, ground and lapped parts, the shank is alloy steel hardened and drawn to a rockwell 45-50, ground all over with a taper 0.0003-in. oversize at large end to increase the pressure at this point when inserted in the machine. Dove-tail block is of oil hardened tool steel and ground all over and lapped into shank. To a push-fit, screw threads are lapped to a gage which assures a perfect fit, cover is of alloy steel, hardened and ground all over and with an elongated slot to slip-fit on the dove-tail block, the screw and dial are hardened and lapped into the dove-tail block. All parts are made to standard gages so that any part can be replaced. There are no gibs or moveable jaws, which together with 1-in. hardened and ground adjusting screw, located above dove-tail eliminates vibration and any riding or creeping of the boring bar for large or small holes and on operations 12 and 18 in. from the chuck.

Steel 2/11/46; *Item No.* 9849

New Electronic Device Checks Production

Further details now have been made available on the Lectro-Count, the new electronic counting device introduced by the Lansing Engineering Co., 934-36 Clark street, Lansing, Mich. This device may be attached to any type of production machine and permanently records the number of pieces produced throughout a working day. Thus, it aids in making time studies, in time keeping, estimating costs and the like.



The machine includes a large electronic control box, for adjustment of power requirements, which may be located near the machine or remotely. A machine counter is located at the machine and records the number of parts or operation completed. A recording mechanism may be located in the production superintendent's office and visualizes work progress minute-by-minute.

The Lectro-Count is actuated by the difference in the current consumed by the electric motor when the machine is idling and the current consumed when the motor is doing useful work.

The primary of the current transformer is connected in series with the motor driving the machine. The secondary of the transformer is connected to the Lectro-Count. Power taken from the motor circuit in operating the device is approximately 7 w. It operates from 110 v, single phase, 220 v or 440, three phase, 60 cycle current. The electronic system operates from 110 v single phase and consumes approximately 40 w.

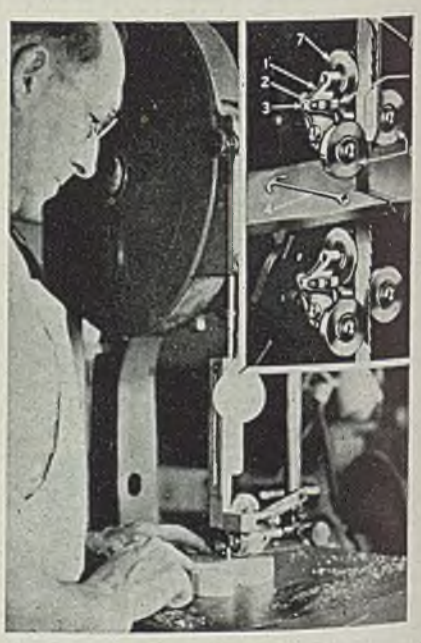
A small current transformer which is included, but not shown, is located at the junction box close to the motor that drives the machine. The electronic control box may be placed with others at central location remote from the machine. From this central location a lead is run to the machine counter located at the machine. The recording mechanism can be located in a central production office wired from electric control box.

The Lectro-Counter takes advantages of the maximum current consumed by the motor in driving a machine and also the time this current will be consumed to count and record the number of parts or pieces produced. With a calibrated dial and switch the Lectro-Count system can be quickly adjusted to adapt itself to the various machining, forming or drilling operations.

Steel 2/11/46; *Item No.* 9051

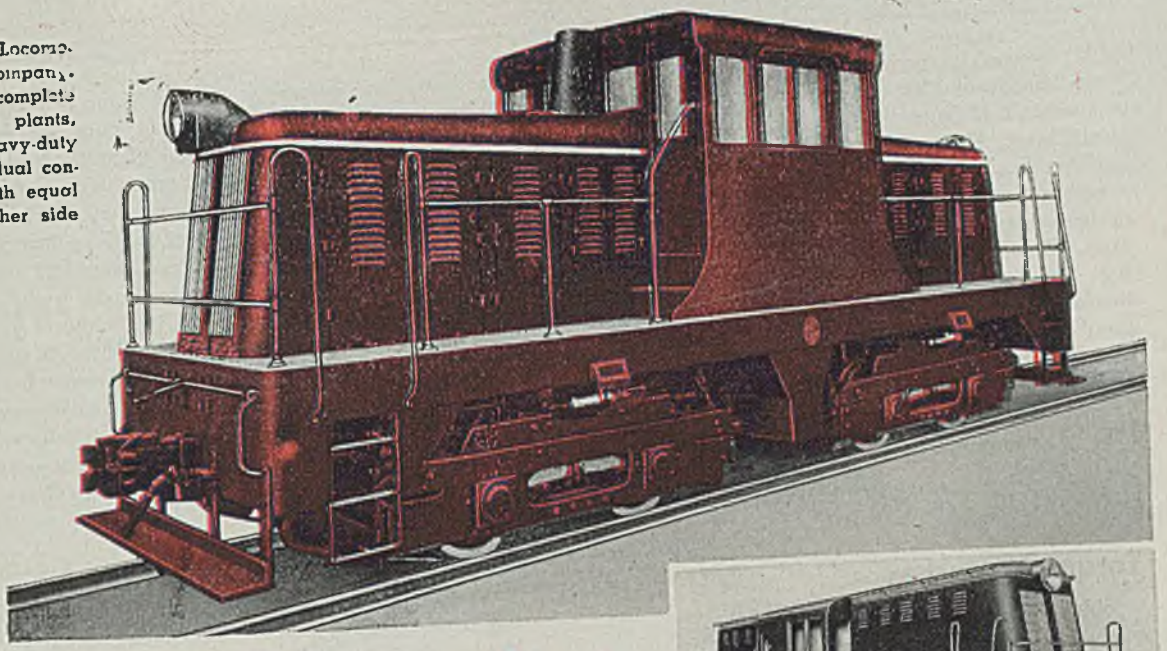
Band Saw Guide

A band saw guide and metal safety guard adapted to metal and plastics as well as wood and adjustable to blades ¼ to 1½ in. wide, is announced by Safety Division of Boyer-Campbell Co., 6540 St. Antoine street, Detroit 2. With side guide wheels mounted in a staggered



position to eliminate binding, and a grooved back wheel to hold saw in position; all equipped with double sealed, permanently lubricated ball bearings—give a smoothness of operation that produces a clean, accurate cut, reducing breakage to a minimum. Positive adjustment of mounting arm on supporting bracket is provided by a set screw that exerts pressure against a 90° pin that in turn presses against the adjusting screw. This eliminates any tendency to loosening or creeping. A special 10-in.

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 130.)



70-Ton, 56½" gauge, Locomotive for large steel company. Equipped with two complete Diesel-electric power plants, four high-speed heavy-duty traction motors and dual control, for operation with equal convenience from either side of cab.

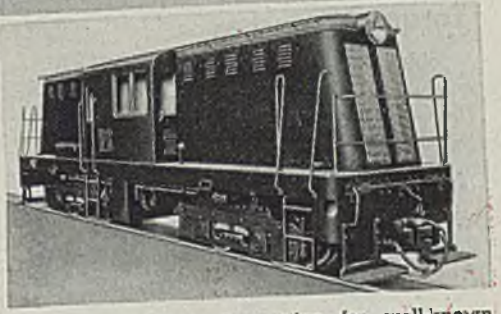
Diesel-Electric Locomotives

Wide or Narrow Gauge

The Vulcan Diesel-Electric Locomotives here illustrated are typical of many others now operating successfully throughout the United States and other countries—few of which are exactly alike, yet all of which embody certain distinctive features of design and construction which have proved advantageous, and thoroughly dependable, under a wide range of operating conditions.

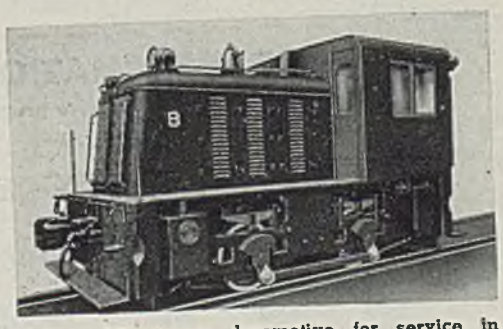
One of these features is a compact but powerful enclosed driving-gear assembly which not only permits an unusually wide range of reduction ratios but also any desired track gauge down to 30" in width. Other distinctive Vulcan features are illustrated and described in new bulletins which will be mailed promptly on request.

Correspondence is invited regarding any locomotive requirement up to approximately 100 tons in weight—Diesel-Electric, Diesel Geared or Steam. Our experienced engineers welcome opportunities to make recommendations and submit proposals for "custom-built" locomotives which will give best possible results under any specified combination of operating conditions.



65-Ton, 30" gauge, locomotive for well-known mining company; designed for minimum height and width. Two complete power plants and four traction motors.

50-Ton, 56½" gauge, locomotive for industrial plant. Two complete power plants and two traction motors.



25-Ton, 60" gauge, locomotive for service in Canal Zone. One complete power plant and one traction motor.

VULCAN IRON WORKS

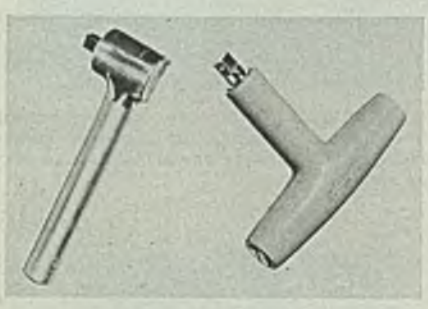
WILKES-BARRE, PA., U. S. A.

socket wrench is provided for the set screw and adjusting screw to move grooved wheel in and out for various width saws. Minor adjustments may be made with a No. 4 wrench, while saw is running. Two other models of the same design are available for the smaller sized saws. Thumbnail illustrates: (1) Mounting arm adjustable upon supporting bracket; (2) set screw for mounting arm; (3) 90° pin for locking adjusting and set screw; (4) 10 in. socket wrench for adjusting screw; (5) adjusting screw for mounting arm; (6) side guide wheels; (7) grooved back wheel; (8) metal safety guard.

Steel 2/11/46; *Item No.* 9869

Torque Wrenches

Jotee and Joel torque wrenches are announced by the Jo Mfg. Co., South Gate, Calif. Originally developed for lighter precision assembly on aircraft, they are particularly suited to production



of washing machines, refrigerators, stoves, radio and other appliances.

Jotee, at right in illustration, is a ratchet type torque wrench, constructed of solid aluminum. It is pre-set at factory to any torque within a range of 5 to 40 in./lb, and it may be reset whenever assembly specifications change.

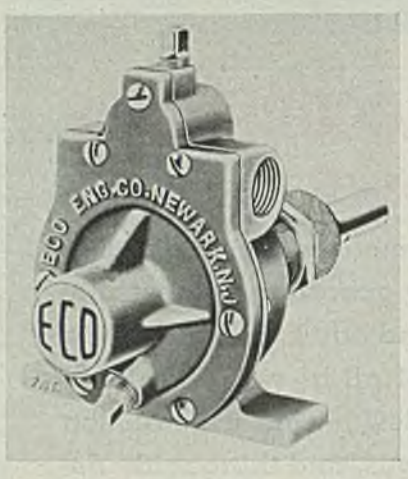
The Joel, at left, has same range as the Jotee and is particularly adaptable to close assembly work. It is made in both ratcheting and nonratcheting types.

Action of both tools is positive releasing when predetermined torque is reached, making errors in judgement impossible. Adaptability suits them for work with plastics where damage to materials from overtightening is likely to be high.

Steel 2/11/46; *Item No.* 9970

Gearless Pump

Gearless pump for water, light oil or other liquid circulating use has been introduced by Eco Engineering Co., Department 82, 12 New York avenue,



Newark 1, N. J. Pump is equipped with special bearings which require only water lubrication, eliminating need for grease cups. No adjustments are necessary. All metal is bronze. Pump can be used in oil, or fresh or salt water; it is easily installed and can be mounted at any angle and operated in either direction with equal efficiency. Dependable and durable, it prevents motor failures due to usual pump troubles. Jamming or breaking of gears is avoided as opening of face plate allows quick removal of any obstructing material.

Impeller, which is a removable unit, is of tough resilient material composed of several laminated sections vulcanized together under great pressure. It enables sandy, muddy, or gritty particles to pass without harm to the pump should they get in the water or oil system. Gearless pump is available with single impeller and standard ½-in. connection and double impeller with standard 1 in. connection.

Steel 2/11/46; *Item No.* 9992

Operator's Stamps

Spiral line of individualized operator's stamps is offered by New Method Steel Stamps Inc., 145 Jos. Campau, Detroit 7. They are based on the inspector's stamps developed by company. Stamps are numbered from 1 to 99 and numbers are enclosed in identifying borders of varying shapes. Thus, numbers in one

group are enclosed in a square; others appear in a triangle, a circle, an oval, etc. The 2-digit numbers are easily

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

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

9976	9869	9989
9979	9970	9982
9981	9992	9924
9993	9990	9972
9051	9919	9994
9849		

2-11-46

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

COMPANY .....

PRODUCTS MADE .....

STREET .....

CITY and ZONE ..... STATE .....

Mail to: STEEL, Engineering Dept.—1213 West Third St., Cleveland 13, Ohio

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

Output of sound production jumps 75%
. . . with RADIOGRAPHY

A foundry was getting 100,000 pounds of sound castings from 250,000 pounds of melt. Radiography of pilot castings showed how to improve production methods—yield from same amount of melt increased to 175,000 pounds.

If your problem is faster, better production . . .

. . . just as radiography has helped hundreds of other businesses, it may be able to help *you*. For example . . .

If your field is *machining*, radiography can help you increase production and lower costs by preventing waste of man-hours and machine time on internally unsound castings.

If you run a *foundry*, radiography can indicate more definitely than any other method the proper technic to give consistent runs of internally sound castings.

If your business is *assembly* of parts requiring internal examination of the completed assembly, radiography permits you to see, without disturbing them, that hidden parts are properly assembled.

If you are in the *welding* business, radiography can create acceptance for your work . . . can enable you to compete for jobs on high-pressure equipment and other installations governed by rigid safety codes.

Radiography does other things, too. It shows your designers how to reduce weight safely . . . helps your engineers specify less costly processing technics . . . guides your fabricators to better construction methods.

NOW IS THE TIME to look carefully at your costs on jobs now in the shop . . . to weigh carefully the causes of lagging or costly production. Your x-ray dealer will be glad to discuss your problems with you. Or write to

EASTMAN KODAK COMPANY, X-ray Division
Rochester 4, N. Y.

Radiography

Another Function of Photography

Kodak

Another problem solved by WHEELABRATING

* PROBLEM

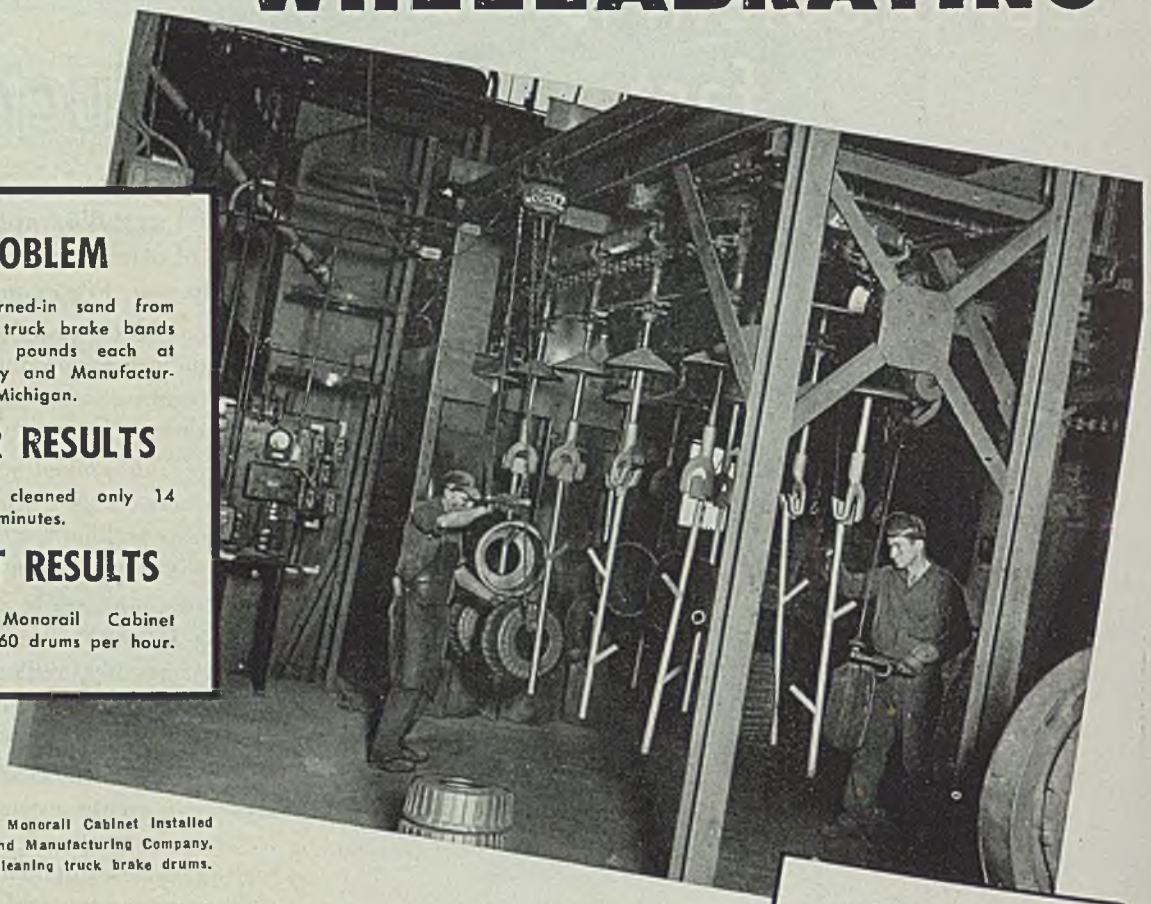
To remove burned-in sand from 18" Meehanite truck brake bands averaging 100 pounds each at General Foundry and Manufacturing Co., Flint, Michigan.

FORMER RESULTS

Tumbling mills cleaned only 14 castings in 50 minutes.

PRESENT RESULTS

Wheelabrator Monorail Cabinet cleans 120 to 160 drums per hour.



Above: Wheelabrator Monorail Cabinet Installed at General Foundry and Manufacturing Company, Flint, Michigan, for cleaning truck brake drums.

THE ability of American to engineer and build blast cleaning equipment that will meet production requirements and show an attractive profit on the investment has been demonstrated in more than 2500 installations. If you have a troublesome cleaning problem our engineers will be glad to give you the benefit of their experience and recommendations in solving it the practical way. We invite a discussion of your problems with them at any time. Write today for "Wheelabrating—what it is and what it will do." Ask for Catalog 74.

THE ANSWER TO YOUR PROBLEM

The most efficient and economical way to handle your cleaning problem can be determined by sending products to our laboratory where equipment of all kinds is available for testing purposes. Avail yourself of this service today — doing so involves no obligation whatever.

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

American FOUNDRY EQUIPMENT CO.
509 SOUTH BYRKIT ST.
MISHAWAKA, IND.

read and identified, while the large border is similarly identified at a glance.

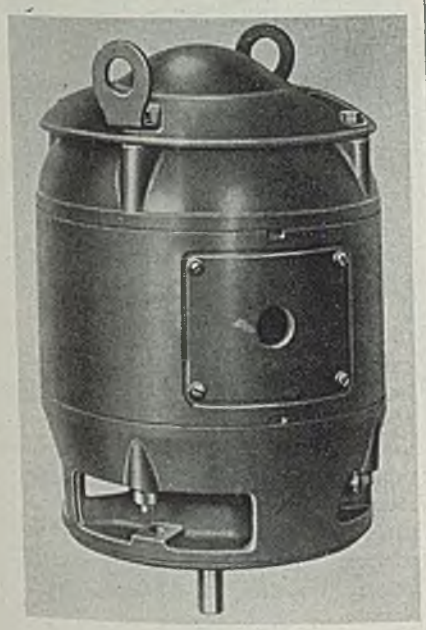
Use of this system makes it simple for inspection department to identify any desired workman or machine from among hundreds which may be performing identical operations on a given run of parts, regardless of whether part in question was produced on the night or day shift. They help prevent laxity and materially reduce scrap and salvage work.

Stamps are available in sets of numbers as stated and with different border designs in 5/32, 1/8, 1/4, and 5/16-in. sizes for the border. All have knurled thumb and finger grips and are heat treated to prevent mushrooming.

Steel 2/11/46; Item No. 9990

Vertical Motor

Crocker-Wheeler Division of Joshua Hendy Iron Works, Ampere, N. J., announces a vertical dripproof alternating current motor which is rated at 40 C rise continuous duty with a 15 per cent service factor, and is designed for operation from 60 or 50 cycle, 3 or 2 phase circuits



at all standard voltages. At present a NEMA B flange type mounting up to and including the 284 frame, and a NEMA C face type mounting up to and including the 326 frame is available.

All ventilating openings of this Protected-Type line of motors are shielded against the entrance of dripping liquids and falling particles. Oversize ball bearings are provided to carry thrust in addition to the rotor, and the use of the company's patented centrifugal bearing seal permits the use of softer grease for lubrication and longer bearing life.

A recessed junction box provides room

for making electrical connections. The company's alucast rotor, with bars, fans and end rings cast in one operation from aluminum alloys, is used. Other features include: Heavy cast frame construction and coils protected with Cinylastic insulation.

Steel 2/11/46; *Item No.* 9919

Magnifying Lens

Two-tube fluorescent indirect daylighted 5 in. diameter magnifying lens unit manufactured by Larrimore Sales Co., P. O. Box 1234, St. Louis 1, has

plastic underface to protect lens, reflectors, tubes, etc., from grit, oil and other damaging materials. It can be mounted before grinding wheels, routers, band saws, millers, etc., as a guard for the operator's face and eyes and reduces accidents and enables better work because of excellent spot lighting and moderate magnification.

Unit can be installed in cabinets at handy locations throughout plant for emergency first-aid, or for all inspection purposes, either receiving, production or final check.

The device comes equipped with two 6 x 9 in. daylight fluorescent tubes, transparent plastic underface, and 8 ft of rubber covered connecting cord, etc., ready to install, and use. Starters are in head, where they can be easily serviced. Snap switch is on top, handy to operator.

Small spirit level is mounted on head, in front of lens, to enable operator to adjust lens to same level as inspected work. Ballasts are in small metal base container, fully sealed in against moisture, etc., by having the container completely filled with black insulating compound.

Steel 2/11/46; *Item No.* 9989

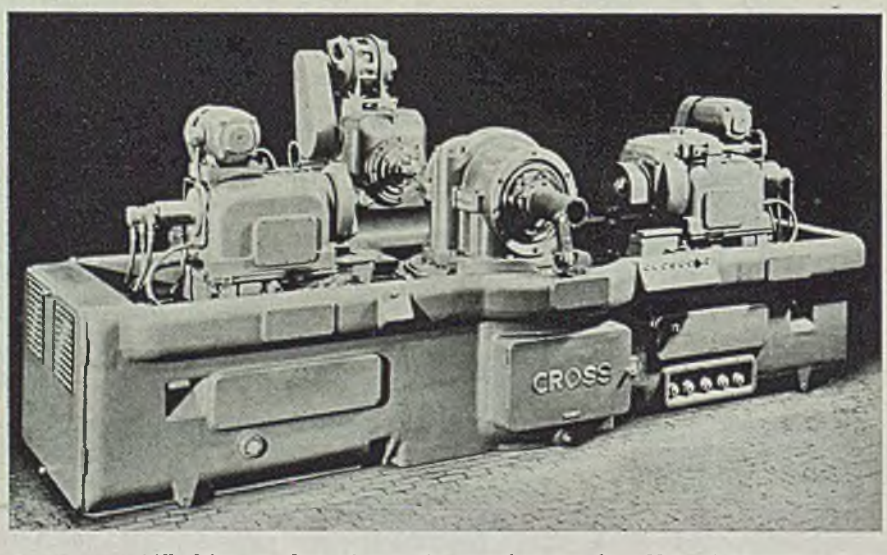
Special Machine

Taper thread milling (six pitch acme thread), precision boring and precision facing operations are automatically performed on heat treated alloy steel oil tool joints with the special machine made by Cross Co., 3250 Bellevue avenue, Detroit.

Machine chucks two joints at opposite ends of a central work-holding fixture with provision for rotating the work in milling the threads, boring and facing operations are performed simultaneously at the other two stations. Pieces are unloaded and loaded opposite and during the threading cycle.

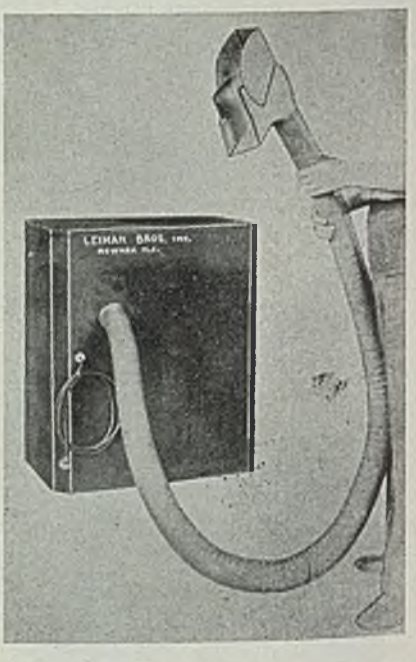
Features of the machine are: Power automatic indexing, location and clamping of the work held stationary at stations 1 and 3, automatic work rotation at station 2; rough and finish taper thread milling operation with electric controlled operating cycle arranged for automatic precision resetting of the cutter for the second and finishing cut.

Steel 2/11/46; *Item No.* 9982



Dust Collector

A recently designed dust collector employs the centrifugal vortex principle, whereby air suction draws the dust through the flexible hose and hood and into the interior of the cabinet, which contains a circular, conical shaped cyclone tank. The rapid spinning of the air forces the dust particles to the center



of this mass of spinning air where gravity can pull the particles to the bottom and into a dust receptacle. The outer edge of the mass of almost pure air floats out through the fiberglass filter top of the cabinet and is free to recirculate in the room. This system of separation eliminates use of dust bags as primary air strainers. Dust collector is a product of Leiman Bros. Inc., 145-80 Christie street, Newark 5, N. J.

Steel 2/11/46; *Item No.* 9924

Electric Sander

Detroit Surfacing Machine Co., 7433 West Davison, Detroit 4, announces new models XL50 and XL90 reciprocating electric sander. It is reported new features including floating pistol-grip type handle, mounted on rubber, a more powerful motor, perfected balancing slide type switch mounted on side of handle have been added.

Both models retain their original

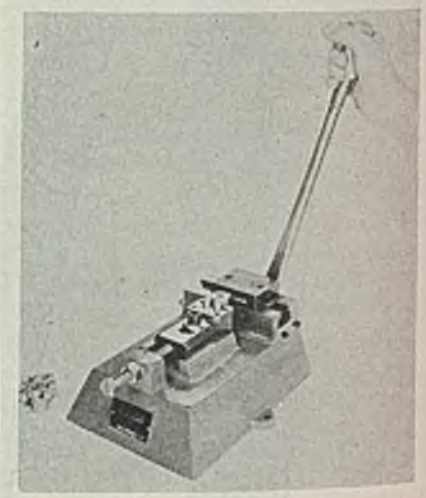
(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 130.)

straightline, reciprocating action that mechanically duplicates the back-and-forth motion of hand block sanding, rubbing, or polishing. The short rapid stroke develops little heat. Detachable sanding pads are a feature of the model XL90. A simple snap-action device permits instant attachment of the correct type of pad for the job. To insure maximum efficiency on flat, curved, wet or dry work, pads are furnished of felt, rubber, and other materials.

Steel 2/11/46; *Item No.* 9972

Marking Machine

Improved Acromark No. 924A hand operated bench marking machine has a number of advantages and design improvements. Construction has been simplified to give fewer moving parts and adjustments have been provided to compensate for wear of the marking head. An entirely new style of nesting jig allows greater variety of work to be marked and also simplifies adjustment for depth of imprint. At the same time, a highly stressed work support has been replaced by a solid casting, eliminating the marking misalignment on heavy work.



Jigs to locate individual pieces are easily attached to the machine and can be released by removing a single cap screw which clamps the nest block between machined ways. Practically all types of cylindrical work requiring marking around the periphery and near one edge can be handled with this machine and also certain types of thin gage flat work. Machine provides quick die changing and both interchangable type and solid logotype dies may be used individually or in combinations. Made by Acromark Co., 398 Morrell street, Elizabeth 4, N. J., it will mark steel, brass, aluminum, and other metals as well as plastic or fiber.

Steel 2/11/46; *Item No.* 9994

Wax Drawing Compound

(*Concluded from Page 89*)

small shells of light materials up to deep pieces, some of the latter starting with a blank nearly 1-in. thick.

Users of the material report increased die life and less die maintenance. While relative comparisons are meaningless in specific instances, the overall reports in this respect indicate satisfactory performance. One user advises he is using only one die setup man in his plant where previously 12 were required.

Due to the fact a continuous, nearly imperceptible film of wax covers the pieces, it is possible to carry stock blanks before and after drawing operations with minimum danger of atmospheric corrosion and rusting. This contributes to flexible shop schedules and tends toward economical and smooth operation. It is possible to run lots completely through an operation, change dies and use the same machine for the subsequent operation, or to process certain operations on one shift and to leave the pieces for later operations. Furthermore, the adaptability of the material to various metals eliminates the necessity of having more than one drawing lubricant in the plant.

Since the compound is used dry, it has the important advantage of being clean to handle. Presses are clean, as are the operator's hands and clothing. Boxes in which the processed pieces are handled and stored are clean and remain clean, and the floors of the plant do not become slippery and dirty from dripping and splashed oil. This improves employe morale and indirectly his psychological attitude toward his work. It also has permitted the employment of women on operations they previously refused to do.

Dermatitis has been common among press operators, particularly among those using heavy oils. Although the exact cause has not been fully ascertained, it is blamed generally upon oils. While the manufacturer of the wax compound does not claim the elimination of dermatitis, it stands to reason that if hands and clothing of the operator do not become saturated with the drawing material, the chances of dermatitis are diminished.

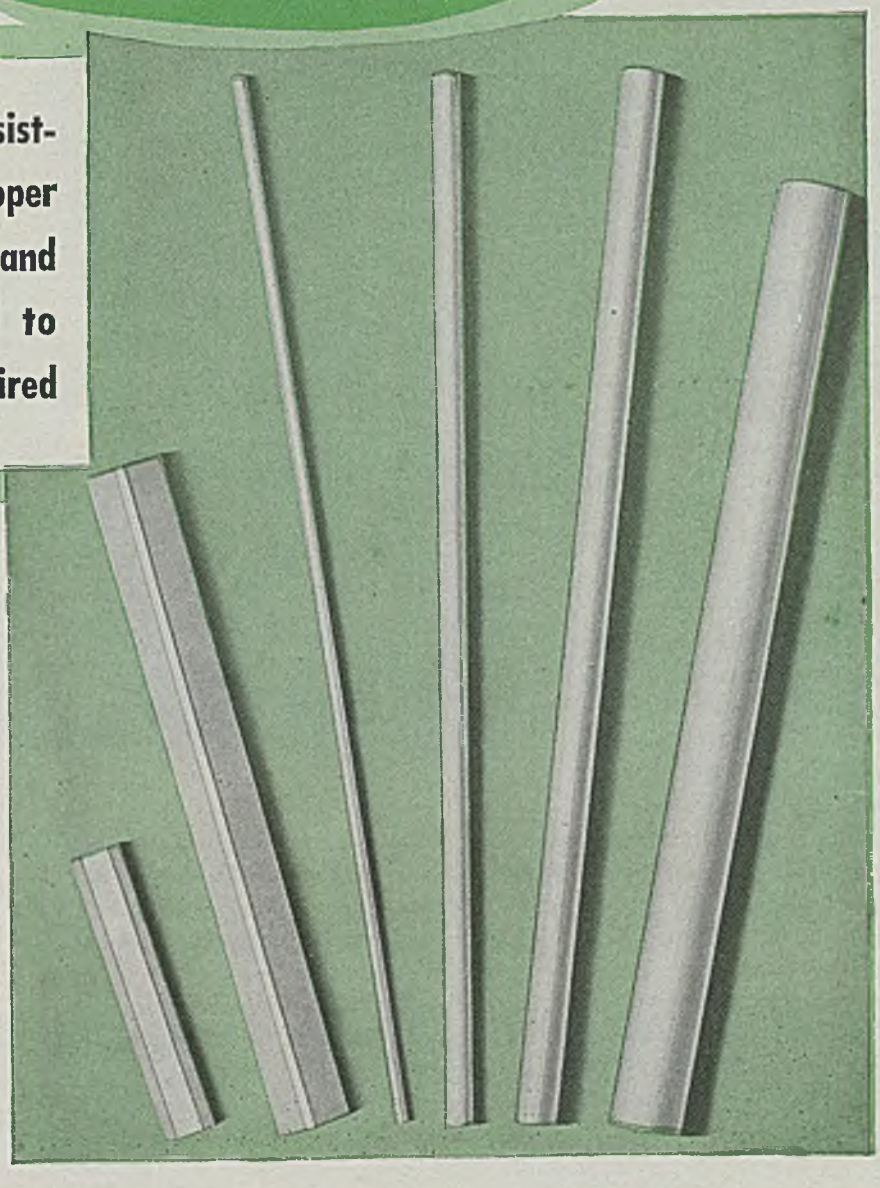
—o—

Grinding wheel dresser line said to have helped manufacturers to increase production and decrease maintenance cost of grinding equipment for over 20 yr is again generally available. Included is the self-lubricated Yellow Head dresser, made by City Machine Co., Piqua, O. Rotating parts of this dresser are lubricated by graphite, sucked from a magazine in the handle as cutter and shaft rotate.

AGALOY

Corrosion Resistant TUBING

Corrosion and heat resisting Agaloy tubing — proper surface condition INSIDE and OUTSIDE — processed to form and bend as required



Accurate, cold drawn AGALOY tubing manufactured in *seamless* and cold drawn *welded* is available in the following metals:

- **STAINLESS—304, 321, 347, 410, 430, 446 and other types**
- **MONEL metal**
- **INCONEL**
- **NICKEL**
- **L NICKEL**

Sizes 5/8-inch O.D. and smaller.

For all *small tubing* requirements AGALOY manufactures cold drawn low carbon, high carbon and alloys in sizes up to and including 5/8-inch O. D. *Write for catalog.*

AGALOY TUBING COMPANY • 75 WEST STREET, NEW YORK 6, N. Y.

Chicago Office: 221 North La Salle Street, Chicago 1, Illinois • *Mill:* Springfield, Ohio

Advanced Fastening System

(*Continued from Page* 95)

ers. Here the vibration absorbing spring tension of the fastener locks the assembly tightly, yet resiliently, so operation of the switch is not impaired.

This application resulted in important savings in assembly time, thus reducing cost of equipment utilizing these midget switches. No wrenches or other special assembly tools are needed—only a screwdriver. These particular fasteners are made from SAE-1060 steel, heat treated, with Parkerized and zinc chromate primer finish.

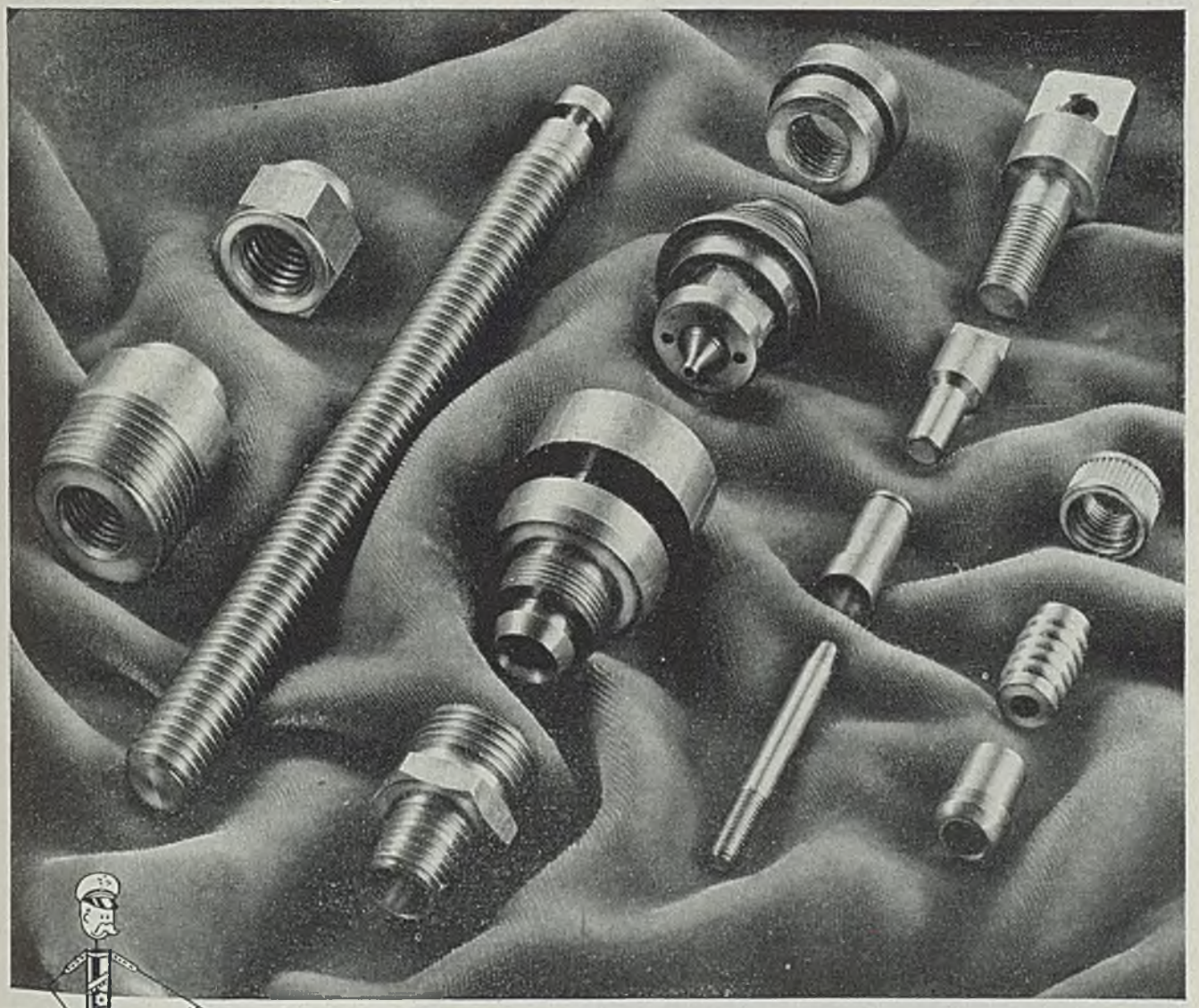
Self-Locating "Blind" Position Fastening: There are many cases where there is no ready access to the back or nut side of a bolted assembly, so it is not possible for the operator to hold the nut in position while making the assembly. In such work, a common method is to weld a standard nut in position on the back side or a retainer of some kind may be used to hold the nut and keep it from turning and in line with the hole through which the screw is to be inserted.

For these applications, the basic spring tension fastener is formed into a U-shaped unit that grips over the edge of work as shown in Fig. 9. The hole in the lower leg is extruded so that when the fastener is applied to the panel, the extrusion snaps into the clearance hole, making the unit self-retaining. By making the hole in the panel slightly larger than the extrusion on the fastener, considerable variation in fitting up the parts can be accommodated as the fastener will then automatically center itself properly when the screw is inserted.

There are many applications where this modification is valuable. In Fig. 5, these fasteners are used to assemble a plastic window. They provide a spring tension grip that frees the assembly from dead-tight fastening pressure. In Fig. 4, a saddle bracket with "U" attached and spot welded to a panel permits the "blind" assembly of a kitchen range door structure as the nut is completely covered by the top panel. For such uses, this nut snaps in place readily and will stay securely on the bracket yet "float" a considerable amount to take care of variations in making up the assembly.

The J-type unit in Fig. 7 is like the U-type except that the extended leg is just long enough to clip into the back side of the bolt hole, as shown in the cross section in the circle. This illustration reveals application in assembling another section of a kitchen range where porcelain enameled sheet steel parts are joined together, the spring tension system here permitting assembly without cracking or marring the enameled sur-

Finer Screw Machine Products Are Made of Steel Shipped from the GENSCO Warehouse



GENSCO

Shown above are a few of the many products made of cold finished screw stock shipped from our warehouse to GENSCO customers.

For fast, smooth-flowing production use GENSCO cold finished Screw Stock.

Cold Rolled Strip Steel — Coils and Straight Lengths • Sheet Steel • Cold Finished Bars Shafting • Tempered and Annealed Spring Steel • Round Edge Flat Wire • Round Wires Shim Steel • Aircraft Strip Steel • Feeler Gauge • Drill Rod • Steel Balls

GENERAL STEEL WAREHOUSE CO., INC.

1830 N. Kostner Avenue, Chicago 39, Ill., Belmont 4266

New York 17
441 Lexington Ave.
Vanderbilt 6-2750

Cincinnati 2
1200 Times Star Bldg.
Cherry 0691

Milwaukee 2
208 E. Wisconsin Ave.
Broadway 7629

St. Louis 5
9301 Bonhomme Rd.
Wydown 1368

Minneapolis 11
100-17th Ave., North
Cherry 4457

faces near the bolts—a particularly important feature in kitchen ranges, etc. where good appearance is vital.

Mechanical Strength: One of the features of this fastening system is the great strength obtained. In fact, tests have been made where a single Speed Nut has proved strong enough to support the entire weight of an automobile. And this strength is maintained under vibration that would prove fatal to many fasteners.

For example, the arrows in Fig. 8 point to two of these spring tension fasteners employed to hold a bracket supporting the muffler on a truck. Note that the muffler is carried through heavy fabric type mounts to provide sound proofing. Despite severe vibration, these "U" nuts hold the bracket securely without loosening. Additional strength and spring action are obtained in the fasteners used here by turning over the entire end to form another thread engaging prong.

In certain applications, it is desired to cover the end of the bolt that extends through the fastener. The assembly in Fig. 5 reveals how one end of the fastener is formed into a shield that covers the bolt end completely. It would be difficult to imagine a simpler combination that would do the same job.

Self-Retaining Fasteners: While joints along the edges of a piece are easily made by means of the U or J-type fastener, these units obviously cannot be employed where the bolt hole is not near the edge of the work. For such applications, however, the latching type fastener can be used at any point on a panel as it snaps into an auxiliary hole that positions the fastener directly over the bolt hole and holds it there for blind assembly (where the bolt is later inserted from the opposite side of the work). In this manner, there is no need for nut retaining plates that are costly to use and apply.

In Fig. 13, this latching or self-retaining type of fastener is employed to mount a door catch on a refrigerator. The fastener is snapped into place from the back side of the door panel when the door is assembled and holds itself in position over the bolt hole until the door catch is attached later on along the production line. Also the catch can be removed and replaced at any time without the fastener falling off of the back side of the door panel.

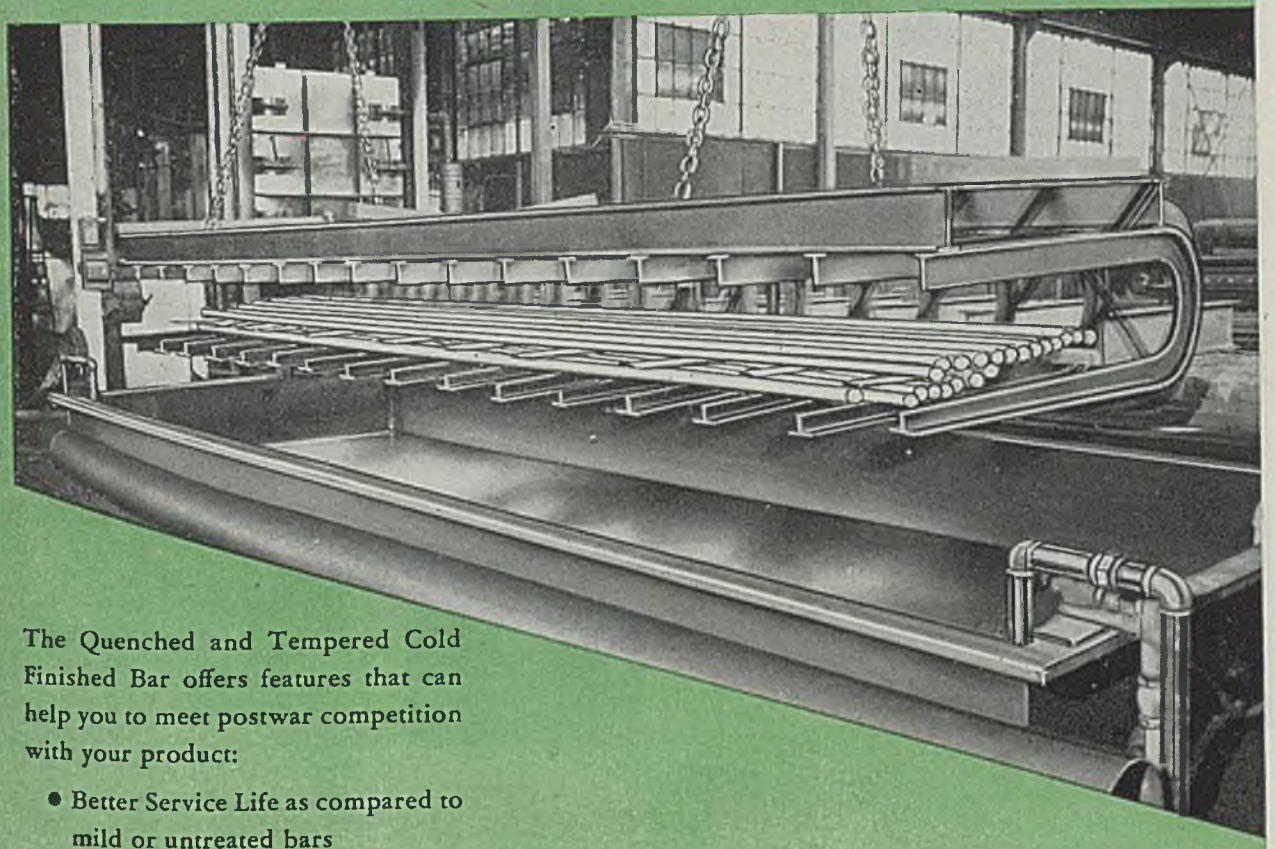
Fastener-Structural-Member Combinations: Greatest economies are obtained when combining fastener elements with structural members. Fig. 14 is a good example of such an application. Here the fastener elements have been formed in a right-angle bracket employed to support a tubular element in a special assembly.

Important savings in material and pro-

WYCKOFF

QUENCHED AND TEMPERED COLD FINISHED STEEL BARS

Provide a Refined Structure with a Uniform Combination of High Strength and Toughness that adds up to RELIABILITY



The Quenched and Tempered Cold Finished Bar offers features that can help you to meet postwar competition with your product:

- Better Service Life as compared to mild or untreated bars
- Lower Cost as compared to Heat Treating after machining with the attendant straightening, cleaning and finish machining operations
- Better Reliability as this method of producing High Strength does not sacrifice other valuable Mechanical Properties

We will be glad to discuss with you the application of Quenched and Tempered Cold Finished Steel Bars to your production.

Wyckoff STEEL CO.

First National Bank Building · Pittsburgh 30, Pa.
3200 South Kedzie Avenue · Chicago 23, Illinois
Works at Ambridge, Pa., Chicago, Ill., Putnam, Conn., Newark, N. J.

duction time are obtained here because only one piece of metal is required instead of a bracket, two nuts and two lockwashers that would be needed for a conventional fastening.

In Fig. 16, this idea has been carried a step further. Here the self-locating fastener has been combined with a spring clip to form a means for holding on covers of conduit boxes, etc. No screws, nuts or rivets are required, units being attached by hand to provide a fast simple attachment, yet spring tension securely holds the box cover in place. Since clips are entirely outside the box, there is nothing inside to obstruct or damage wires or other elements. The same unit works well on sheet metal, die cast, plastic or plywood boxes. A wide variety of wall thicknesses can be accommodated by its use.

Fig. 11 is another variation of interest because it contains two spring arms to provide a simple, yet very secure grip for holding any removable type of assembly where a spring latch is required. The spring arms of the center or gripping element engage ball studs or grooved studs, depending upon the type of assembly. The instrument case pictured here employs a ball stud.

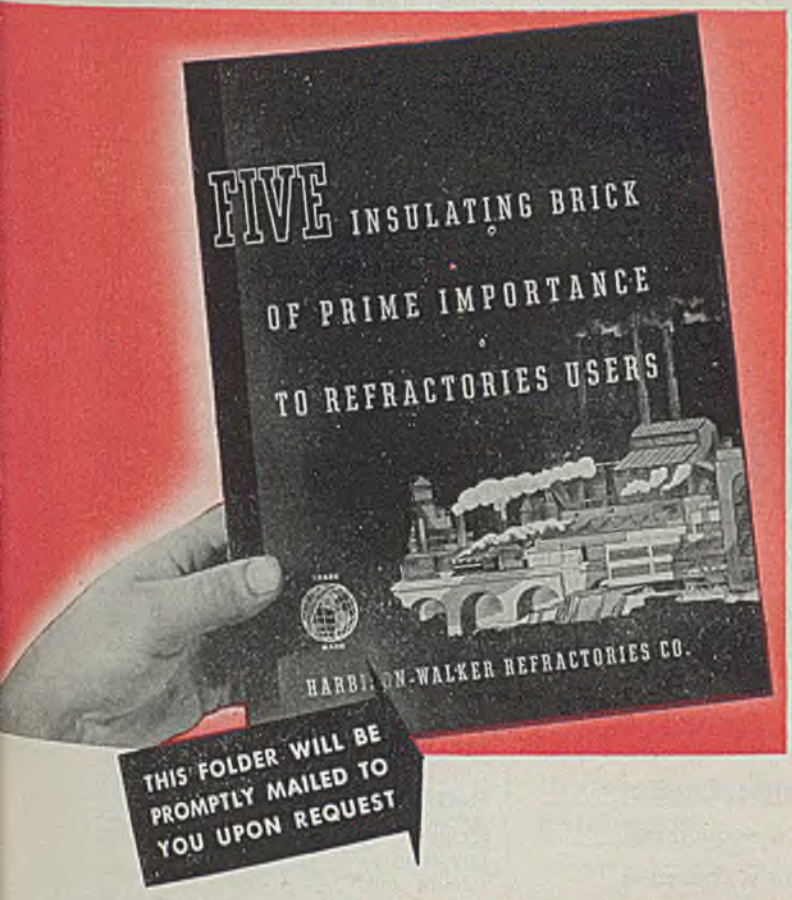
Such a device is well suited for use on access doors, glove compartment doors, box covers, handhole plates and the like. Desired amount of pull-out tension can be had by selecting a fastener unit of the correct thickness, thicker metal in the fastener providing greater pull-out tension.

Another fastener that has been combined with structural elements is the cover plate unit shown in Fig. 15. While originally designed as a method for quickly patching bullet holes in the metal skins of our fighting aircraft, this idea soon found other applications in the form of a removable cover for inspection doors, access holes and vent holes. Units are quickly attached from one side by sliding one end of the Speed Nut into the hole, centering the cover plate and tightening the screw.

Two pairs of integrally formed attaching legs are incorporated into units designed for use in joining plywood assemblies. When driven into thick plywood, the cam-like structure of the legs forces them outward, permanently holding the fastener in place with a firm spring tension grip on the wood itself. On thin plywood, the legs "peen" over against the backing plate, again providing a secure lock for the fastener.

Rivets, Unthreaded Studs: For joining all types of plastic assemblies, and for use with rivets or unthreaded studs, an effective fastener is obtained by leaving the thread-engaging prongs flat instead of forming them to fit the thread. This

INSULATE WITH SAFETY at any temperature



THIS FOLDER WILL BE PROMPTLY MAILED TO YOU UPON REQUEST

For insulating the refractory linings of industrial furnaces, many combinations of insulating fire brick and refractory fire brick are possible.

Harbison-Walker, with complete lines of both insulating fire brick and refractory fire brick, can furnish the correct combination for any service requirements.

	MAXIMUM TEMPERATURE LIMIT	
H-W 16		1600° F
H-W 20		2000° F
H-W 23		2300° F
H-W 26		2600° F
H-W 28		2800° F

In the research and manufacturing developments preceding the introduction of each of these five brands, Harbison-Walker has achieved balance between the important and interrelated properties of strength and thermal efficiency. Light weight, essential to high insulating value and low heat storage capacity have been attained without undue sacrifice of the mechanical strength necessary to insure minimum loss through breakage in transit and in normal handling on the job. Brick masons prefer to handle Harbison-Walker brick, and combustion engineers recognize the efficiency and economy resulting from their use.

HARBISON-WALKER REFRACTORIES COMPANY
AND SUBSIDIARIES
WORLD'S LARGEST PRODUCERS OF REFRACTORIES

produces four contact points on the stud which are under spring tension to afford a good grip. At the same time, the curved base of the unit provides the spring tension required to hold the assembled parts together tightly.

Assemblies of plastic and metal parts find "push-on" type nuts particularly useful. A typical radio panel bezel, for example, employs more than 36. Here they are pushed over studs molded in the plastic panel to hold on the various attachments. They are applied with a simple hand tool that presses them securely in the locked position.

Assembling with the above units is done from the back side of the work. For applications where it is not practical to reach the back side during assembly, a tubular type Speed Clip is snapped into a round hole from the front and then rivets or studs pressed into the clip to virtually nail metal and plastic parts together.

As the rivet or stud is pressed into the clip, the fastener expands and grips the rivet with a firm spring tension, making possible a fully concealed fastening that grips and holds securely and is installed instantly without tools. This system permits attachment of parts by merely pushing them into place on the product.

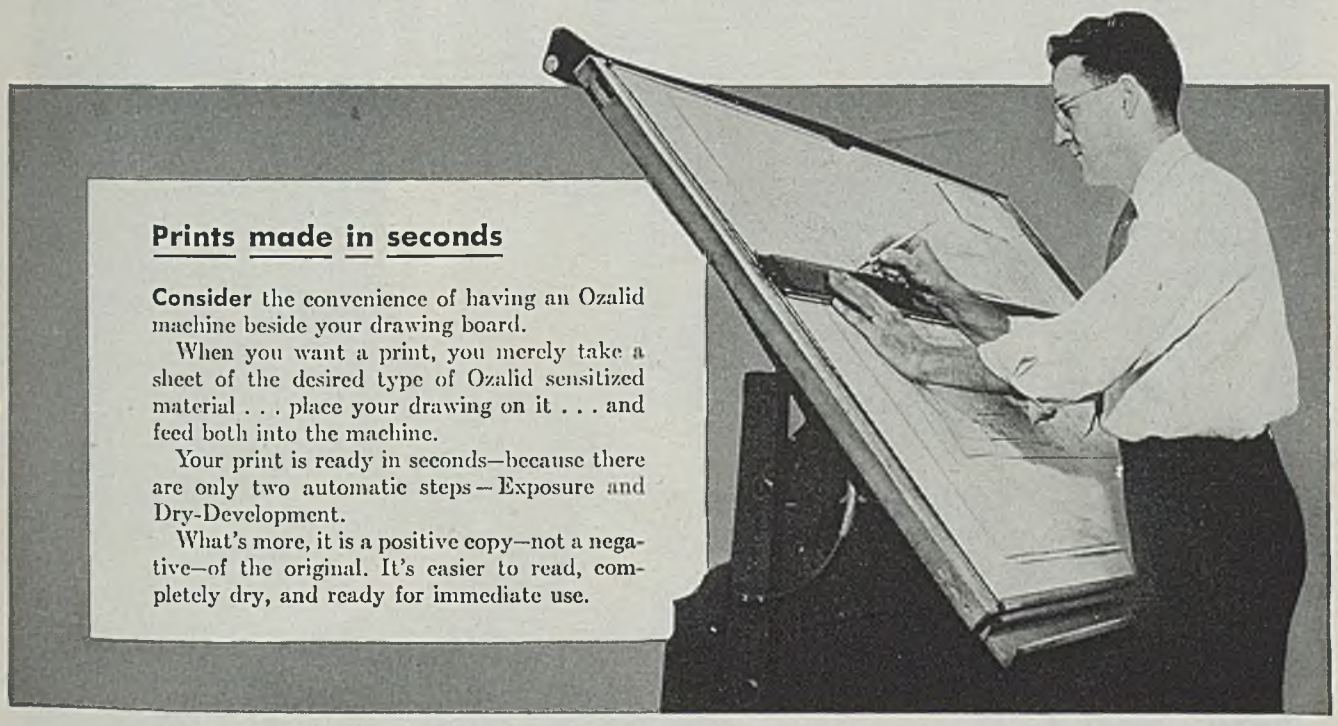
Special Applications: To meet specific fastening or assembly problems, a number of special purpose units have been developed that utilize the same spring tension principles as other fasteners in the Speed Nut system.

A typical example is the cable clip, Fig. 18, designed for holding wires and cables in place on aircraft where its exceptionally light weight and positively maintained vibration resisting grip are important features. Like other self-retaining units in the Speed Nut system, this fastener is applied by inserting an integrally formed "hook" through a hole in the sheet metal wall or bracket supporting the fastener. As the hook is engaged, another integrally formed element of the fastener engages the opposite side of the hole, securely locking the fastener into its support. The cable or wires are then snapped into the V-shaped main opening of the clip.

While such clips are easily applied and removed by hand without any tools, tests have indicated they will not come loose under severe vibration.

Another application of spring tension fastening is the hose clamp, Figs. 19-20, which combines the locking element with the structural member thus obviating the necessity for gears, screws or other members. To install this unit, the clamp is snapped into the prelatched position by hand, Fig. 20, and then locked up securely with one-hand compression of

Hours are saved with OZALID



Prints made in seconds

Consider the convenience of having an Ozalid machine beside your drawing board.

When you want a print, you merely take a sheet of the desired type of Ozalid sensitized material . . . place your drawing on it . . . and feed both into the machine.

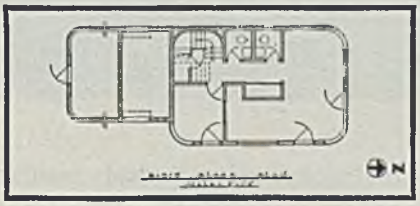
Your print is ready in seconds—because there are only two automatic steps—Exposure and Dry-Development.

What's more, it is a positive copy—not a negative—of the original. It's easier to read, completely dry, and ready for immediate use.

Offers Unlimited Versatility

In identical fashion, you turn out all 10 types of Ozalid prints—prints that have black, blue, red, or sepia lines . . . prints that are on paper, cloth, foil, or film.

You'll appreciate this versatility. For you can assign identifying colors to prints of different operations . . . always make the type of print best suited for the job at hand . . . and save time, labor, and materials in numerous ways.

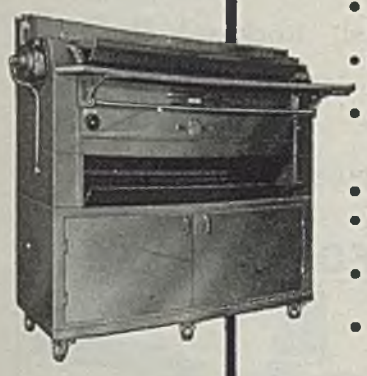


Unnecessary drafting eliminated

Assume that you want additional tracings of the above floor plan so that you can add the plumbing layout to one copy; the air-conditioning layout to the next, and so on.

With Ozalid, you need never redraw the "Master" original. Just make Ozalid Intermediate prints of it . . . and add the individual details in pencil or pen. Then use the "Intermediate" to produce the desired number and type of positive OZALID PRINTS.

This is just one example . . . that probably suggests dozens of uses in your work.



SPECIFICATIONS OZALID MODEL F
(Designed for Medium Requirements)

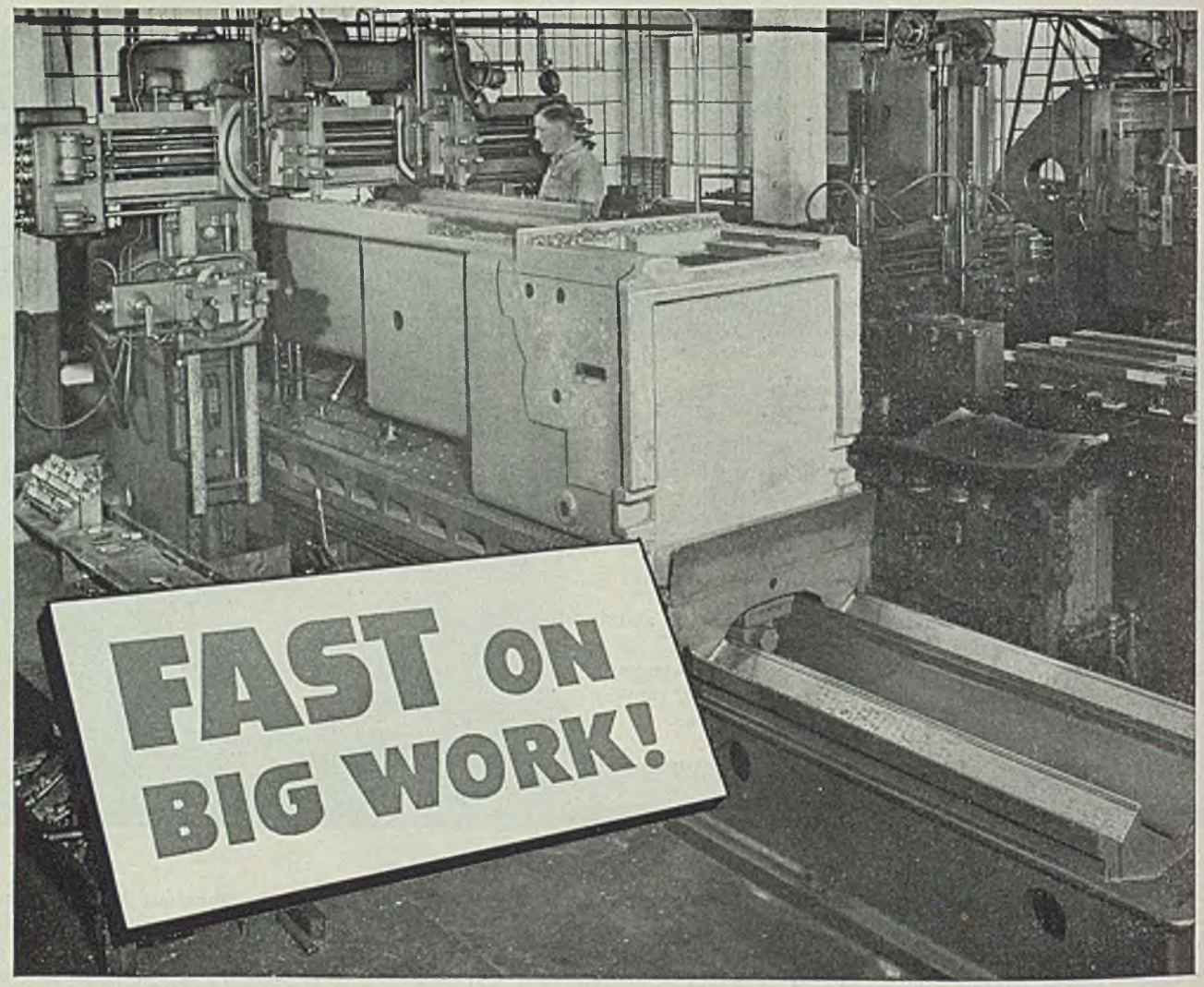
- Accommodates materials up to 42 inches wide.
- Printing speed 4" to 72" per min.—Developing speed 48" per min.
- Electrical consumption:
  Starting.....19 amps. at 220 V.—
  Operating.....15 amps. at 220 V.
- Power factor corrected to.....87.5%.
- Wired for.....205-235 Volts, A.C., 60 cycles, single phase.
- Width.....68⅜"—Height.....51⅞"—Depth (Incl. feed board).....33⅛".
- Net weight.....725 lbs.—Shipping weight (approx.).....1145 lbs.

Write today for free booklet No. 57... containing the 10 types of Ozalid prints and telling the complete story.

OZALID

DIVISION OF GENERAL ANILINE & FILM CORPORATION
JOHNSON CITY, NEW YORK

Ozalid in Canada—Hughes Owens Co., Ltd., Montreal



In 13 hours floor-to-floor the Rockford Double-Housing Hy-Draulic Planer illustrated planes ten surfaces on the machine column shown. That's really *fast* for this job. Workpiece weighs some 10,000 pounds, is 11 feet 3″ long, 46″ in height above planer table, a husky hunk of cast iron for any planer to handle. An interesting feature is planing a narrow transverse rib. On this, the table-stroke isn't over 8″ and the speed is "right up there". Two rail-heads divide the work and walk across the width of the casting at almost shaper speed. The cushioned quick reversals and the accurate stroke control which make this possible are Rockford Hy-Draulic features that "pay off" on every chip; on every job, large or small.

Rockford Hy-Draulic Double-Housing Planers are made in four capacities, of which 60″ x 60″ is the largest. Maximum stroke-lengths of all sizes range from 10 feet to 20 feet, by increments of two feet. On big work, or on smaller work-pieces ganged, Rockford Hy-Draulic Double-Housing Planers are effective, economical, easy to operate . . . highly profitable investments. Write for details. Ask for Bulletin 2911.

4520

ROCKFORD MACHINE TOOL CO., ROCKFORD, ILLINOIS

standard 6-in. pliers, Fig. 21. Removal is equally simple.

Future Outlook: In spite of the great wartime expansion in development and application of this spring tension system of fastening, company engineers are convinced that the surface has merely been scratched. Possibilities for the improved fastening of an untold number of different assemblies are seen. Examination of the comparatively few applications that the limited space has permitted showing here tends to confirm their opinion.

Chart Gives Data on Carbide Milling Cutters

Carbide milling cutter data calculating chart has been compiled by Industrial Tool Division, Cooper-Bessemer Corp., Mount Vernon, O. It is expected to be particularly useful to machine operators and tool purchasers, and is designed to facilitate finding of cutter speeds, table feed and approximate horsepower for milling cutter operation by a quick glance at chart's compilations.

To find cutter speed, for example, it is only necessary to select desired depth of cut on a scale located in lower left hand corner of the chart. Line indicating this depth is followed until it intersects with desired cutter diameter and a horizontal line which crosses that intersection indicates suggested cutter speed. Finding table feed and approximate horsepower is equally simple.

Chart 99-MC also may be applied to company's single point tools by determining data for a two-tooth cutter and dividing by two.

Welding Electrodes Chart

A reference chart on high and low alloy welding electrodes is available from Arcos Corp., 1515 Locust street, Philadelphia 2. Data includes tables on corrosion resistance, heat resistance, and weld metal surfacing, as well as chemistry of weld metal. Welding current and voltage tables provide information of value to operator.

History of Lubrication

Man's struggle with friction, beginning with the discovery of prehistoric man that it was easier to roll a log than to drag it, and concluding with lubrication recommendations for all types of modern machinery, is the subject of a book just published by Alemite Division, Stewart-Warner Corp., Chicago. Entitled "Alemite Answers," it is an illustrated presentation of the how, what, when, where and why of lubrication. It is to be distributed at $3 per copy.

Expansion In Die Casting

(*Continued from Page 96*)

high, surface polishing qualities.

Formerly, a wider range of metals—namely, brass, bronze, and magnesium, in addition to aluminum and zinc—had been used by the company in making die cast products. But with the close of the war a policy was inaugurated to limit production to zinc and aluminum base alloys.

It is interesting to note that in the past few months there has been a tremendous increase throughout the nation in zinc die casting whereas aluminum capacity has declined.

Two types of die casting machines are used at Cleveland Hardware, the gooseneck and the newer, cold chamber machine. The gooseneck machine uses air pressure to inject metal into the dies, whereas a hydraulically actuated ram does this work in the cold chamber types.

The cold chamber method is capable of extremely high injection pressures; pressures up to 2000 psi are used in the hydraulic system.

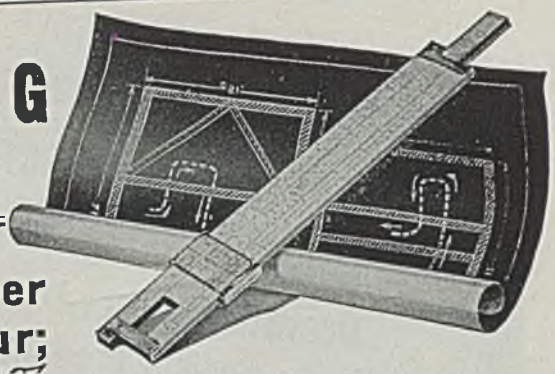
The ratio of the hydraulic cylinder diameter to the ram or plunger diameter, transforms the line pressure of 2000 psi to 25,000—35,000 psi of pressure on the metal in the last squeeze just before the metal "freezes."

Molten Metal Poured

A ladle of molten metal is poured in front of the ram. By means of a pilot valve actuating a four-way valve, the piston in the "shooting" cylinder is moved forward, pushing the ram ahead. After closing the opening of the sleeve through which metal had poured in the first part of its travel, the ram forces the metal into the die. When the die has been filled with metal and the injection plunger meets resistance, a booster pump automatically applies additional pressure. This assures sustained pressure to completely fill the die and thus force out entrapped air. Injection speed and pressure can be varied to meet the requirements demanded by different dies and types of castings.

Though this method of die casting is sometimes slower than with the gooseneck machine, denser castings are obtained. The gooseneck is giving way to cold chamber machines because of the closer specifications possible with these newer machines. The government specified in its contracts that cold chamber machines be used for die castings. This trend, according to Mr. Holder, foreman of the die casting department, had started prior to, but gained headway during the war. This newer process was insisted on for such highly important items as airplane parts, components of range

OVEN ENGINEERING NEWS



Wire Speeds Through This Lacquer System at 72,000 Feet per Hour; Production Rates Increased 25%

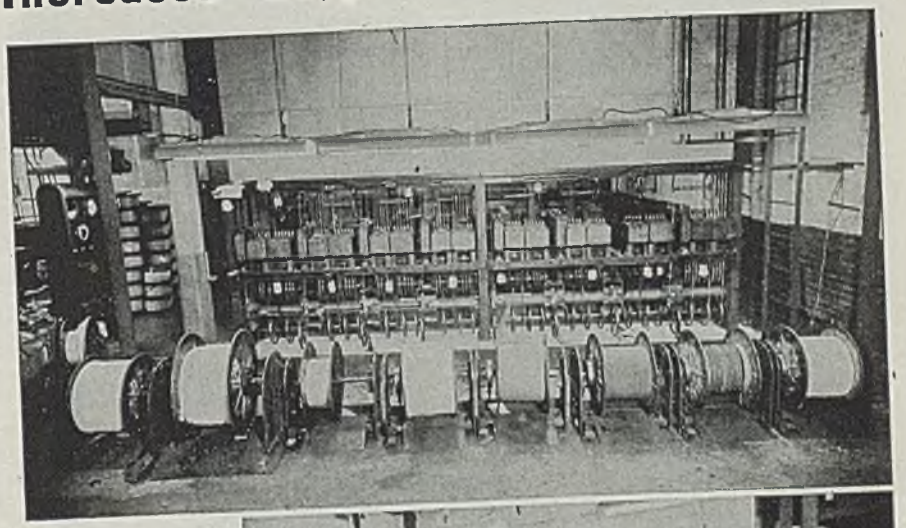
"Our Industrial Oven wire and cable lacquering system has stepped up our finishing speed 25 percent while reducing our labor cost for this operation approximately 30 percent."

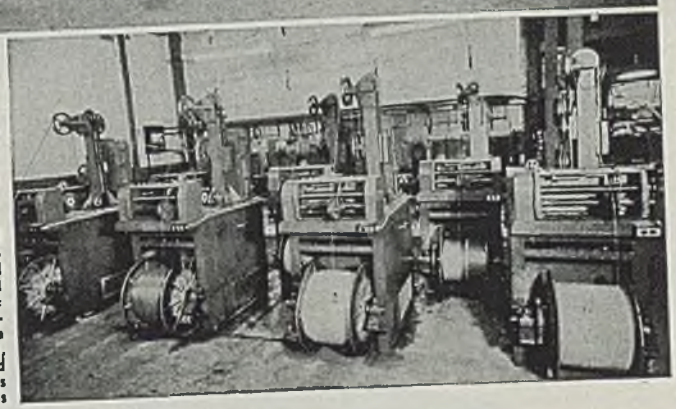
Those are the words of E. W. Gundstrom, chief engineer of the Rome Cable Corporation of Rome, New York. This company uses its **IOE** system to bake lacquer finishes on radio hook-up wire and ignition cable ranging in diameter from .070" to .600" OD, simultaneously applying one saturating coat and 11 lacquer coats. The full range of the equipment includes wire from .010" to .750".

Operating 24 hours a day, six days a week, Rome Cable has enjoyed satisfactory continuous operation, with down time for maintenance and repairs a negligible factor.

"We have made a great improvement in the quality of the finish with our **IOE** equipment," said Mr. Gundstrom. "This is due to better heat distribution in the oven, constant tension and speed through all coating passes, proper wiper design and highly efficient lacquer and saturant storage equipment. Other advantages which mean a lot to us are the excellent oven exhaust system, which is safer and makes the work more pleasant; the completely automatic safety and production controls, which give us a feeling of security we have not had in the past; and the individual takeup machines, which enable us to stop one wire without interfering with general production."

All **IOE** oven processing units are supplied with the most complete and modern automatic control systems, installed and field wired by our engineers. **IOE** lacquer towers are explosion proof whether heated by electricity, gas, oil or steam.





ABOVE—At the Rome Cable Corporation, eight controlled-tension payoffs feed wire into the saturation and lacquer pots of the **IOE** cable lacquering system. The oven tower is seen above the pots.

RIGHT—In this view of the system, windup machines draw the finished wire from the oven and wind it on reels. These machines maintain constant tension within a wide range of speeds, allowing high-speed processing under tensions ranging from a few ounces to hundreds of pounds.

Similar systems, with minor adaptations necessitated by the nature of materials processed, are used by other industries. **IOE** payoffs, lacquer pots, ovens and windup machines save time and money in the impregnation and coating of paper, textiles, rope, tape, fishline, surgical suture and other continuous materials.

How Do They Work?

The operation of **IOE** systems such as the one at Rome Cable is described in our 16-page reprint of a *Wire and Wire Products* article. A copy will be sent to you on request.

(This is No. 23 of a series. Reprints of previous advertisements will be sent free upon request.)

IOE ENGINEERING VERSATILITY

THE INDUSTRIAL *Oven Engineering* COMPANY

13825 TRISKETT ROAD, CLEVELAND 11, OHIO

Engineering Representatives in Principal Industrial Areas

★ ASSOCIATED COMPANY: JAMES DAY MACHINERY LTD., LONDON, W. 1, ENGLAND ★

finders, etc. Possible failures resulting in loss of life and valuable equipment were thus overcome with the development of higher quality products made to more rigid specifications and inspection.

Die casting dies are made in a machine shop adjoining the casting department. A full line of machine equipment—lathes, boring and milling machines, a shaper, drill presses, etc., are available to convert the slabs of tool steel into dies. Repairs to dies are also made here.

Since dies must be able to withstand cycles of heating and sudden cooling, they must be so designed that these conditions do not unduly shorten die life. Working temperature of these dies is as high as 600° F, depending upon the metal being cast. At times inserts are used for the impressions. These inserts may be individually replaced or repaired without materially holding up production. Sometimes, die casting impressions are cut into the solid die slab; when this is done the whole die becomes worn out rather than only the cavity inserts.

Dies Are Heat Treated

After machining, dies are heat treated to better withstand the wear to which they are subjected. Over a period of time, the sudden infusion of the molten metal into the die, cooled for the ejection of the previous casting, has a tendency to check the die surface. Hardness to which the dies are heat treated depends of course on the analysis of the steel used and the material to be cast. In the case of dies for aluminum castings, brinell hardness from 425 to 444 is necessary. These dies for aluminum must always be hardened; many times dies that are to be used for long runs on zinc castings are also hardened.

Die complexity and tolerance limits are ever increasing. Holes for the previously mentioned generator end plates, for instance, are cast to within 0.003-in.; parts for a Sperry device were held to an overall dimensional tolerance of plus or minus 0.005-in.; closer tolerances have been held on some recent special jobs. Tolerances on the business machine (front frame bracket shown in Fig. 4) must be of a high degree in order that the components it carries function accurately.

Problems other than that of accuracy arise in the design of the dies. Such a problem was met when it was necessary to make a fuse nose, shown in Fig. 1, without a parting line on the die cast threads. In this instance recourse was made to a mechanism inside of the die to rotate cores for relieving the casting. Also, a machine gun assembly which had at one time contained 30 separate pieces called for some thoughtful work to cast it in its final form comprising

two pieces. It is a problem at times to design and make a die which will contain all various parts going into one unit or assembly.

Castings having undercuts do not permit the use of usual dies therefore, loose cores are employed; they are knocked out on an arbor press or special fixture by a helper after the casting is formed. Although this permits casting of intricate forms, the process presents special problems in trimming of flash, and high production of die casting machines is slowed down. A wide range of casting sizes can be handled—from parts for zippers to the 2 ft long automobile grillwork and, washing machine tops.

The castings are loaded into tote boxes as they come off the machine and these are delivered to the finishing department. Here the gates, runners and flashes are machined off, holes are bored and, when desired, articles are given a polishing operation. A typical setup employed in the removal of gates is shown in Fig. 5. Machine work is, however, held to a minimum. Using again the generator end plates for an example, the only work of this nature that is necessary is to turn the OD and ream the center hole.

Jig Fitted Machines

All machines are fitted with holding jigs, fixtures, or adapters to reduce setup time. Operator has only to load, start, stop, and unload machine. Such simplification of operation at this end of the production line is imperative to keep up with the machines producing 15,000 to 16,000 zinc castings a day.

Usual inspection practice is followed at the end of the machining stage. All finished castings are given visual inspection and physical and chemical tests are taken of representative lots. However, with the advent of the war, the interior condition of the castings assumed a new significance. X-ray inspection of the same magnitude was used to control the interior as had been used for visual exterior examination. The Sperry Gyroscope Co., to mention one instance, used 100 per cent x-ray inspection on all critical parts.

It was stated by some members of the administrative staff that a large percentage of die castings users are likely to insist upon such inspection inasmuch as they have been introduced to it.

Castings are sometimes given a Cronak film coating to prevent the formation of white, basic $ZnCO_3$ which develops in presence of stagnant water, salt atmospheres, or in high humidity. The equipment employed in producing this coating is shown in Fig. 6. Parts to be plated are cleaned in Oakite, rinsed in water, dipped for 1½ to 2 sec in the H_2SO_4 acidified plating bath, rinsed, and then conveyed to an oven for drying.

Spent Pickling Liquors

(*Concluded from Page* 108)

runs, pulverized limestone is added while the liquor is agitated rapidly, until the sludge turns light yellow. As all pickle liquors contain more or less ferric iron, the addition of limestone until trivalent iron precipitates is an indication that all of the free acid has been neutralized. This is a sharp endpoint which is easily recognized if sufficient ferric iron is present in the liquor. Where a trial shows that the liquor contains too little ferric iron, the addition of oxidized sludge to the reaction vessel will provide enough.

Because treatment tanks are not pumped dry, each batch after the first should contain ample ferric iron. Agitation of the slurry is continued without further additions until examination of a sample dipped out with a paddle indicates that evolution of gas has practically ceased. It is important that the bulk of the entrained carbon dioxide be expelled to prevent its subsequent reaction with the lime. Only 5-8 min are required to ensure the elimination of most of the gas. Milk of lime is then run in from the lime-slaking tank until a pink color is obtained with phenolphthalein on a spot plate, and the treatment is complete.

Desired Result Attained

Although phenolphthalein first turns pink at a pH of about 8.3, and it is desired to finish the treatment at pH 9 or higher, usually enough time will elapse between taking the test and turning off the lime feed for the desired result to be attained.

Evolution of carbon dioxide in the limestone treatment causes no difficulty. In the plant operation, limestone is added as rapidly as possible (fourteen 80-lb bags in 3 min) to a reaction tank with a freeboard of less than 4 ft, and it does not froth over. Installation of an exhaust fan is desirable for winter operation to keep the concentration of carbon dioxide in the room at a low level; such a fan also removes limestone dust and acid mist and thus permits the ferric endpoint to be seen clearly. The time required to treat a batch by this process is no greater than when lime alone is used. Installation of a bin for feeding bulk limestone would reduce the time somewhat.

Economy which can be realized by substituting the limestone-lime split treatment for treatment with lime alone depends largely on the cost of pulverized limestone. In some areas the prices of crude bulk limestone and pulverized limestone will be equivalent in terms of calcium oxide, and there will be no great advantage in using limestone. Frequently, however, pulverized limestone can be obtained locally at a considerable saving; it can sometimes be purchased for $1 to $2 per ton. Where limestone can be bought at a lower cost than the equivalent amount of lime, adoption of the split treatment results in savings.

Where the treating equipment is of sufficient size and limestone can be purchased at a satisfactory price, the savings from the split treatment can be increased by taking advantage of the ability of limestone to precipitate a greater proportion of the iron as the stirring period is increased. In this way as much of the treatment as possible would be accomplished with the cheaper material. Indeed, in a mill which produces a relatively small volume of liquor, treatment with a high-calcium limestone alone may be practical.

In evaluating the relative economy of treating pickle liquor with lime alone, with the split treatment, or with limestone alone, it should be kept in mind that bulk lime must be stored in an airtight bin to prevent recarbonation and that lime is a skin irritant; pulverized limestone does not have these disadvantages. The installation of bulk storage and dry-feeding equipment for both materials will reduce the treatment cost by saving the bagging charge. Such saving will range from 10 to 20 per cent of the cost of the bagged product. Also, where sludge storage space is limited, it is important to recognize that the sludge produced by a limestone treatment has a smaller volume than that produced by lime.

REFERENCES

[1]Also see *Industrial and Engineering Chemistry*, June, 1945. This resume given with permission of American Chemical Society.

[2]*Industrial and Engineering Chemistry*, 36,274 (1944).

Issues Bulletin on Slag Fluidity Investigations

Information of value dealing with the orderly working and control of an acid open-hearth heat has been published in a 60-page pamphlet entitled "Acid Open Hearth Slag Fluidity and its Significance." Previous fluidity investigations are discussed including the inclined plane and viscosimeter methods. A standard fluidimeter for acid open-hearth slags is described and the procedure for taking readings in the association's standard fluidity mold is recommended. Twenty-four illustrations, mostly graphs, four tables and bibliography of 81 items are included. The bulletin may be obtained for $1 from the Acid Open Hearth Research Association, Inc., P. O. Box 1873, Pittsburgh.

Welded Machinery Parts

(*Concluded from Page* 102)

tion the weldment by removing spatter, grinding edges or surfaces where specified because of design requirements, and by grit blasting when size permits.

Spatter is removed for appearance and to insure that it will not drop off progressively when weldment is in service. Spatter can be detrimental mechanically if, for instance, it were left in a lubricating oil compartment.

Weldments are grit blasted to remove mill scale from plate surfaces and to facilitate visual inspection of welds. Under-cuts usually are more difficult to detect before weld is grit blasted.

Welds are inspected visually for proper size, surface cracks or other surface defects. X-ray is used to inspect welds for internal defects. Various specifications, such as those of the ASME and the U. S. Navy, provide inspection standards for the acceptance or rejection of welds by means of x-ray photographs.

Hydrostatic testing often is required by design specification. Oil tight compartments should be checked and tested before a part leaves the weldery. Finally, the weldment should be laid out for a final inspection at weldery to verify that it is dimensionally correct within specified tolerances.

Any weldment to be machined, subsequently, to any appreciable degree should be stress relieved if the machined surface or other parts of weldment are to hold their relationship within service life. Any weldment subjected to severe stresses or to fatigue or impact, should also be stress relieved. Especially is this advisable since locked-up stresses, the magnitude or direction of which cannot be predicted, can be of a high order following welding. If normal service loading imposes design stresses having same direction at a given point as that of a residual or locked-up weld stress, structural distress or failure can result.

Many weldments are in use that have not been stress relieved. Hence, definite predictions cannot be made that difficulty will result for a given type of weldment whose stress has not been relieved. Stress relief therefore, may be regarded somewhat like insurance having a low premium rate because the per pound cost of stress relieving is usually only a fraction of a cent.

(*Continued next week*)

—o—

A new 28-page book, No. C9-1, describing grab bucket cranes built for service on a variety of jobs in the metal working industries, including handling of bulk materials such as ores and solid fuels, has been issued by Harnischfeger Corp., 4460 West National, Milwaukee.

the BUSINESS TREND

INDUSTRIAL PRODUCTION last week continued to reflect the choking effect of the steel strike, which in the week ended Feb. 2, latest for which figures are available, held STEEL's industrial production index down to 75 per cent, compared with 77 in the previous week.

Although biggest depressive factor on the index was the strike in the steel industry where ingot production has been cut to about 5½ per cent of capacity, railroad car loadings, electric power output, and automobile assemblies, all somewhat affected by the steel strike, contributed to the low index.

AUTOS—Lack of supplies held automobile production to 29,295 units in the week ended Feb. 2, compared with 29,410 in the preceding week. Of the 29,295 cars, Ford Motor Co. produced 14,985 and Chrysler Corp., 5000.

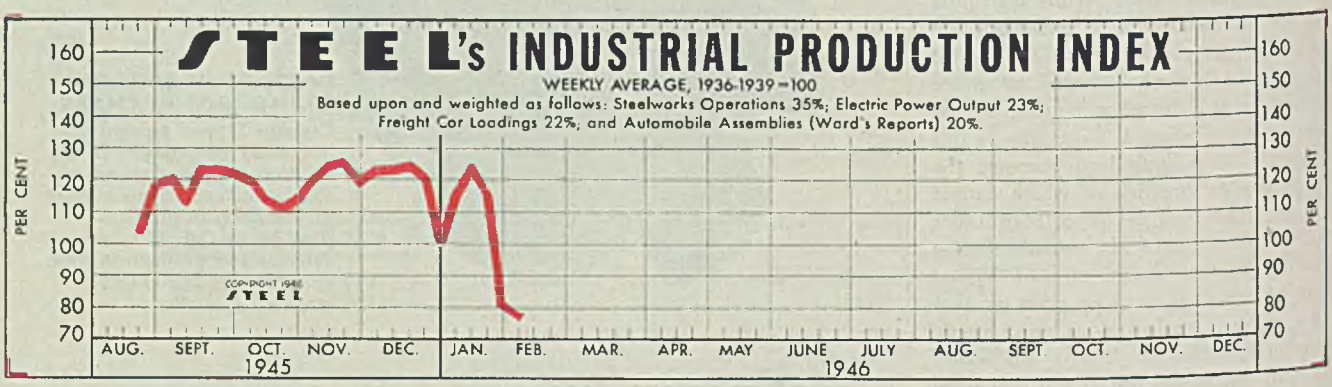
RAILROADS—Car loadings which in the past few weeks had been narrowing the decrease from the preceding year have begun to show a less favorable performance as a result of the steel strike. Partly responsible for the better comparison car loadings had been making before the steel strike was the fact that loadings from mid-January into February, 1945, were reduced by abnormal snowfalls and that wartime requirements for capacity loading held down loadings in early 1945.

EMPLOYMENT—Lowest point in manufacturing employment in 1945 was reached in December with 11,873,000 employees. Year's high mark was 15,555,000 in January. Manufacturing employment in 1945 declined successively each month, except in November.

CONSTRUCTION—New dwellings involved in construction contracts in the 37 states east of the Rocky mountains increased 129 per cent in the last quarter of 1945, or from 12,268 units in the last quarter of 1944 to 28,180 in the last quarter of 1945. The sharp and contra-seasonal gain in the final quarter was sufficient to make the total new dwellings for the year 21 per cent over those in 1944, the 1945 total being 76,495 units. Total of all construction contracts awarded in the 37 states in 1945 was $3,299,303,000, a 65 per cent increase over 1944.

CASTINGS—Shipments of malleable iron castings in November totaled 57,315 tons, 3 per cent under October. New orders booked, less cancellations, in November were 69,092 tons, 22 per cent below October. Steel castings shipped in October totaled 119,857 tons, 8 per cent over September, and unfilled orders were 429,698 tons at the end of October, 14 per cent less than a month earlier.

FORGINGS—Steel forgings shipped in November totaled 117,953 tons, 8 per cent less than in October, and unfilled orders at the end of November amounted to 619,901 tons, 4 per cent less than at the close of October.



The Index (see chart above): Latest Week (preliminary) 75 Previous Week 77 Month Ago 114

FIGURES THIS WEEK

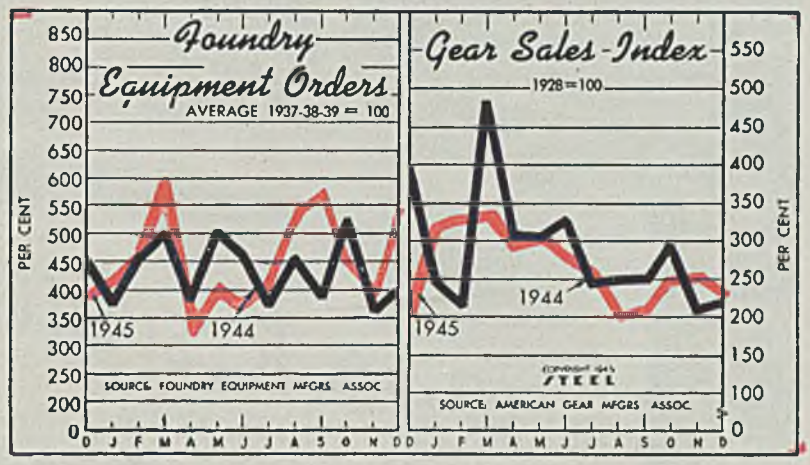
INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	5.5	5	81	91
Electric Power Distributed (million kilowatt hours)	3,980†	4,034	3,845	4,539
Bituminous Coal Production (daily av.—1000 tons)	2,033	2,133	1,167	1,947
Petroleum Production (daily av.—1000 bbls.)	4,600†	4,626	4,548	4,723
Construction Volume (ENR—Unit $1,000,000)	$70.2	$101.4	$43.3	$28.7
Automobile and Truck Output (Ward's—number units)	29,295	29,410	13,920	20,770

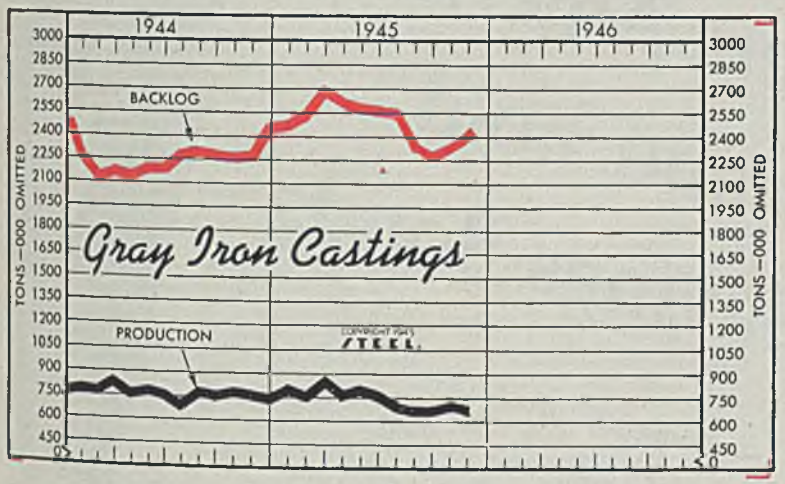
*Dates on request. †Preliminary.

TRADE				
Freight Carloadings (unit—1000 cars)	673†	709	652	739
Business Failures (Dun & Bradstreet, number)	31	24	13	16
Money in Circulation (in millions of dollars)‡	$27,914	$27,977	$28,491	$25,290
Department Store Sales (change from like wk. a yr. ago)‡	+17%	+19%	+28%	+17%

†Preliminary. ‡Federal Reserve Board.

	Foundry Equipment Orders — Index (1937-38-39=100)			Gear Sales — Index (1928=100)		
	1945	1944	1943	1945	1944	1943
Jan.	422.4	378.3	429.8	323	246	268
Feb.	465.3	456.8	399.5	331	214	303
Mar.	604.7	498.4	562.7	339	485	334
Apr.	325.0	385.7	362.7	296	308	240
May	404.7	503.9	348.9	309	305	342
June	375.4	466.1	413.6	271	328	401
July	411.7	375.8	379.4	264	242	374
Aug.	532.2	450.5	390.4	205	247	312
Sept.	577.2	388.0	346.6	213	248	320
Oct.	457.8	526.5	436.6	251	293	368
Nov.	416.6	369.5	388.0	255	209	387
Dec.	547.6	397.4	442.8	239	219	387
Ave.	461.7	433.1	408.4	275	279	336



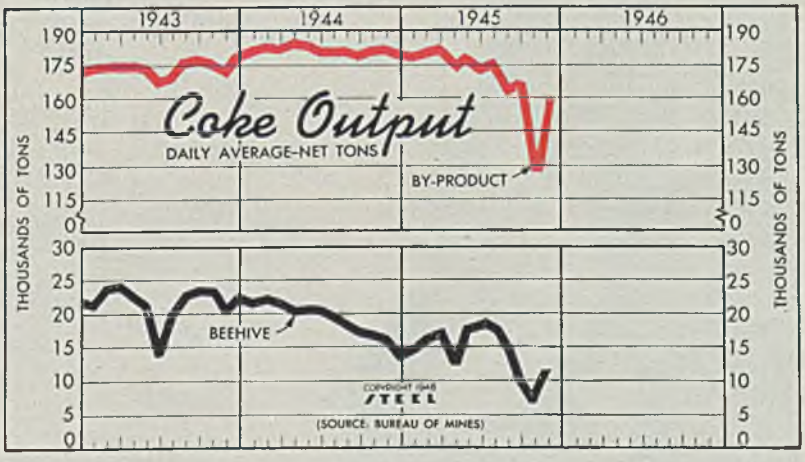


Gray Iron Castings
(U. S. Bureau of Census)
Tons—000 omitted

	Production		Backlog	
	1945	1944	1945	1944
Jan.	791	765	2,497	2,259
Feb.	752	764	2,562	2,145
March	858	829	2,714	2,184
April	774	758	2,641	2,159
May	798	791	2,603	2,205
June	782	763	2,596	2,213
July	690	690	2,565	2,314
Aug.	683	778	2,375	2,335
Sept.	662	745	2,325	2,304
Oct.	684	780	2,403	2,297
Nov.	667	760	2,454	2,300
Dec.	...	742	...	2,475
Mo. Ave.	...	764	...	2,266

Coke Output
Bureau of Mines
(Daily Average—Net Tons)

	By-Product		Beehive	
	1945	1944	1945	1944
Jan.	179,879	182,226	14,745	21,933
Feb.	180,727	184,384	16,210	22,248
Mar.	182,120	183,123	17,115	21,529
Apr.	174,239	185,259	12,554	20,457
May	178,338	184,071	17,963	20,783
June	172,201	181,891	18,616	20,472
July	175,163	181,506	17,682	19,531
Aug.	163,567	181,718	14,669	18,572
Sept.	166,559	179,234	9,924	17,305
Oct.	127,173	181,772	6,407	16,994
Nov.	159,646	182,383	11,798	16,199
Dec.	...	180,746	...	13,307
Ave.	...	182,359	...	19,128



FINANCE

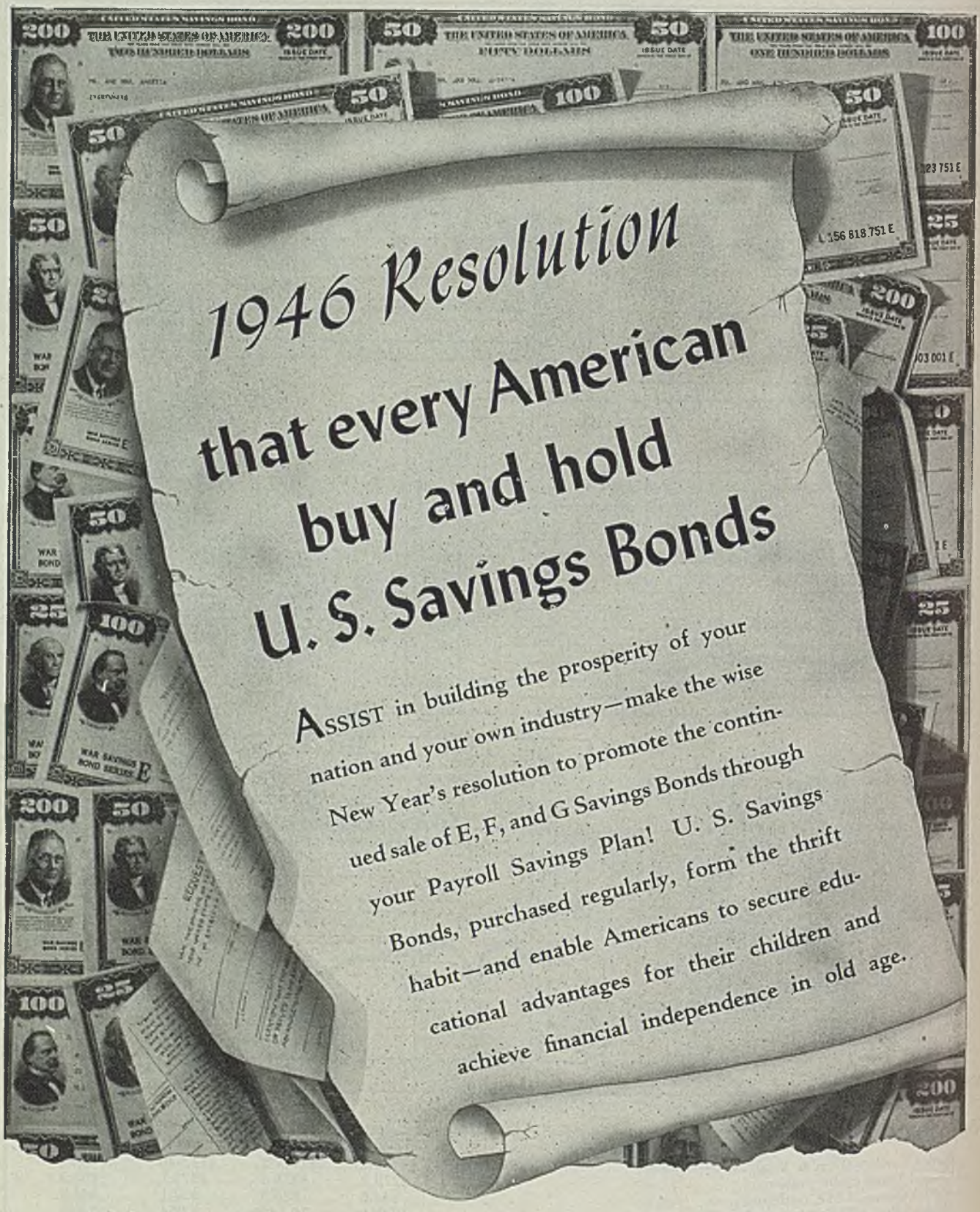
	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$11,862	$12,552	$11,936	$10,991
Federal Gross Debt (billions)	$279.2	$278.6	$278.7	$233.9
Bond Volume, NYSE (millions)	$34.6	$35.3	$27.1	$41.9
Stocks Sales, NYSE (thousands)	12,921	10,142	5,054	8,546
Loans and Investments (billions)†	$68.1	$68.2	$67.7	$59.6
United States Gov't. Obligations Held (millions)†	$49,531	$49,629	$48,541	$44,554

†Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$58.27	$58.27	$58.27	$57.55
All Commodities†	106.8	106.7	107.0	104.7
Industrial Raw Materials†	119.0	118.7	120.6	115.3
Manufactured Products†	102.9	102.9	102.6	101.6

†Bureau of Labor Statistics Index, 1926=100.



The Treasury Department acknowledges with appreciation the publication of this message by

STEEL

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and War Advertising Council

HELPFUL LITERATURE

1. Welded Steel Products

Cleveland Welding Co.—8-page illustrated bulletin covers Cleve-Weld circular rolled and welded steel products fabricated to specification for manufacturers. Products included are gear ring blanks, flame cut gears, motor and generator frames, truck and tractor rims and special products.

2. Pipe

Naylor Pipe Co.—56-page illustrated catalog No. 44 features applications of Lockseam Spiralweld lightweight pipe in diameters from 4 to 30 inches. New type pipe coupling is presented. Data on pipe sections, on precision fabrication and pipe connections are included.

3. X-Ray Equipment

North American Philips Co.—12-page illustrated booklet describes Norelco industrial x-ray equipment. Description and specifications are given for four models. X-ray spectrometers and camera-type x-ray diffraction unit are also described. Application chart shows which unit is best suited for given job.

4. Rotary Shaft Seal

Crane Packing Co.—4-page illustrated bulletin "Specify the John Crane Bellows-Type Shaft Seal" lists construction details, operating information, advantages, available materials, engineering data, space requirements and typical installations of this mechanical seal for centrifugal and rotary pumps, refrigeration compressors, gear boxes, speed reducers and other industrial applications.

5. Aluminum Alloy

National Smelting Co.—8-page illustrated bulletin on Allcast aluminum alloy covers history, principal advantages, mechanical properties and recommended applications. Superior mechanical properties are claimed.

6. Inserted Blade Cutters

Midwest Tool & Mfg. Co.—26-page illustrated booklet No. 1045, supplement to general catalog No. 17, covers specifications and prices of high speed steel inserted blade cutters for general purpose milling, and carbide tipped inserted blade cutters for milling steel, aluminum and other nonferrous materials. Cutter adjustment suggestions are given.

7. Gear Drives

Cone-Drive Div., Michigan Tool Co.—8-page illustrated bulletin No. 632 entitled "Cone-Drive Gearing at Work In Machine Tools" explains principle of drives, outlines advantages of their application and illustrates numerous applications in turning and facing, drilling and boring, milling, broaching and threading, and special purpose machine tools.

8. Cold Finished Steel Bars

Monarch Steel Co.—24-page illustrated brochure entitled "Speed Case and Speed Treat Cold Finished Steel Bars" presents specifications, characteristics, physical properties and recommended applications for material. Numerous typical fabricated parts and products are shown.

9. Gages

AA Gage Co.—8-page illustrated bulletin describes steel and chromium plated cylindrical plug gages, ring gages and setting discs; special built-up gages and precision fixtures; tungsten carbide gages, both tipped and solid; gage salvaging by hard chrome plating; and gage block inspection by Lundgren laboratory method. Services offered to industry are covered.

10. Industrial Tires

B. F. Goodrich Co.—38-page illustrated brochure entitled "How to Save Money on Industrial Hauling Jobs and Equipment" describes all types of industrial rubber tires. Selection maintenance, repair and specification data are included. Tables of manufacturer's specifications of tire requirements for various makes of industrial power trucks and tractors are given.

11. Marking Equipment

Acme Marking Equipment Co.—32-page illustrated catalog No. GC-1145 describes Rams Head steel stamps and type holders, machine stamps, marking machines, hobs, molds, embossing dies, numbering heads, branding irons, etching equipment, shipping supplies and stencils, seals, punches, rubber stamps, name plates, tool checks and badges.

12. Tools

Masterform Tool Co.—6-page illustrated folder describes Masterform circular, dovetail and flat forming tools, cut-off tools, recessing tools, reamers, counterbores, forming tool blanks, cast metal alloy tool bits and associated products. Specifications and prices are given.

13. Heat Treatment Service

Lukens Steel Co.—8-page illustrated bulletin form 281-11-45 describes heat treatment service for stress relieving, annealing, normalizing, spheroidizing, hardening and tempering, x-ray testing, pickling, painting and grit and sand blasting. Furnace capacities are listed.

14. General Utility Crane

Hyster Co.—8-page illustrated bulletin form No. 693 gives specifications and complete description of Karry Krane mobile crane for general utility handling of machinery, crates and boxes, barrels and kegs, cases and cartons, bales and bags, and sling loads. Gasoline powered unit has 10,000-pound capacity.

15. Lapping & Grinding Machines

Norton Co.—Illustrated folder No. 9-45 entitled "The Norton Part in the Production of Electric Refrigerating and Air Conditioning Units" covers five types of lapping and grinding machines particularly adaptable for use in these industries. Typical jobs accomplished are shown.

16. Cold Wrought Products

Chandler Products Corp.—16-page illustrated bulletin "Chandler Engineered Products" relates manufacturing procedure and shows technique employed in making cap screws and other cold wrought products. Machines and methods used are described.

17. Metalworking Equipment

Barnes Drill Co.—12-page illustrated condensed catalog covers complete lines of metalworking drilling and tapping machines, hydraulic drilling units, vertical and horizontal hydraulic honing machines and magnetic-automatic coolant separators for use on machines using liquid coolants. Specifications are included.

18. Bookkeeping Equipment

LeFebure Corp.—32-page illustrated loose-leaf-type catalog No. 667 describes and shows typical installations of bookkeeping equipment including tray binders, posting stands, machine bookkeeping equipment, desks, speedex indexing system, sorting rack desks, portable files and other office and accessory equipment.

19. Thread Gages

Locke Gage Co.—8-page illustrated catalog gives specifications and prices of Thread Plug and Thread Ring gages. Advantages of design featuring clearance below roots of threads are set forth. Full data on standard sizes are given. Special sizes are available.

20. Stress Distribution

Mechanite Metal Corp.—2-page reprint from STEEL of article "Stress Distribution" by E. S. Clark, chief engineer, presents check list of current stress determination methods which prove helpful to those following present tendency to limit weight by more effective use of materials.

FIRST CLASS
PERMIT No. 36
(Sec. 510 P.L.&R.)
Cleveland, Ohio

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

4c POSTAGE WILL BE PAID BY—

STEEL
Penton Building
Readers' Service Dept. CLEVELAND 13, OHIO

STEEL
1213 West Third St., Cleveland 13, Ohio

1	11	21	31	41
2	12	22	32	42
3	13	23	33	43
4	14	24	34	44
5	15	25	35	45
6	16	26	36	46
7	17	27	37	47
8	18	28	38	48
9	19	29	39	49
10	20	30	40	50

Please have literature circled at left sent to me.

NAME _____ TITLE _____

COMPANY _____

PRODUCTS MANUFACTURED _____

ADDRESS _____

CITY AND STATE _____

This card MUST be completely filled out. Please TYPE or PRINT

21. Structural Arc Welding

Lincoln Electric Co.—4-page illustrated technical bulletin A.I.A. File No. 13c2 discusses design and fabrication of jack truss by arc welding methods. Cutting and welding costs for fabrication are given.

22. Stainless Steels

Lebanon Steel Foundry—4-page illustrated bulletin No. 669.1 presents information, specifications and recommended applications of Circle L 11, 12, 13, 14 and 15 straight-chromium stainless steels. Acids, salts and miscellaneous materials to which it is resistant are listed.

23. Universal Grinder

Gear Grinding Machine Co.—4-page illustrated bulletin gives specifications on GearGrind universal oscillating precision chucking grinder which is designed to handle external and internal cylindrical surfaces; internal tapers and external conical surfaces; generated or formed spherical external and internal surfaces; and generated or formed annular surfaces such as ball bearing races and fillets.

24. Forging Service

Kropp Forge Co.—52-page illustrated book entitled "Forgings by Kropp" is pictorial presentation of forging service available to industry. History of company and typical forgings made are covered. All departments of company are shown.

25. Pyrometers

Claud S. Gordon Co.—Two illustrated 2-page bulletins on XacTemp pyrometers give information on hand instruments for measuring temperatures of nonferrous molten metal and for general use in heat treating and fabrication applications. Both models are of direct reading type. Thermocouples are replaced readily.

26. Firebox Boilers

Kewanee Boiler Corp.—20-page illustrated catalog No. 96E describes and gives specifications of steel riveted firebox boilers for 100, 125 or 150 pounds steam pressure. Sizes from 6 to 304 horsepower are included. Cutaway illustrations show construction and advantages.

27. Corrosion Prevention

Haynes Stellite Co.—4-page illustrated bulletin "Hastelloy Facing for Corrosion Resistance" describes new process used to protect chemical plant and oil refinery equipment from corrosion. Concise data are given on grades of Hastelloy available and corrosive media that they will resist. Also covered are procedures used in applying Hastelloy facings, procedures for facing with welding rod and with sheet and plate.

28. Welding Rods

R. G. LeTourneau Inc.—Quick reference wall chart measuring 16½ x 21½ inches gives information about five types of Tournaweld welding electrodes. Three are for special repair and maintenance work and two are for general purpose production work.

29. Hydraulic Presses

Hydraulic Press Mfg. Co.—36-page illustrated catalog No. 37 presents typical applications of hydraulic presses for metal forming, Micabond insulation forming, armor plate production, pressure processing of synthetic resins, transfer molding, injection molding, extrusion molding, and forging.

30. Boring Machine

Kearney & Trecker Products Corp.—16-page illustrated catalog No. CMA-10 describes Model C Milwaukee Autometric boring machine. Specifications, features, dimensions, typical applications and available accessories are covered.

31. Manufacturing Facilities

Ideal Commutator Dresser Co.—4-page illustrated folder shows offices and manufacturing facilities of company's six plants.

32. Casting Sealer

Metallizing Co. of America—2-page illustrated bulletin No. C-1A describes Mogul M-1500 circulator for low-cost salvage of castings which must withstand operating pressures and have been rejected because of porosity or pinhole cracks. Unit circulates Mogul Cast-Seal through castings under pressure. Information on use, specifications and price is included.

33. Conversion Factors

I-T-E Circuit Breaker Co.—8-page looseleaf folder or wall chart entitled "Conversion Factors and Formulas for Electrical Engineers" contains over 600 conversion factors commonly used by electrical engineers. Definitions of basic electrical units, prefixes, mensuration and temperature conversion factors are also included.

34. Enclosed Electric Motors

Crocker-Wheeler Div., Joshua Hendy Iron Wks.—4-page illustrated bulletin describes Sealdpower motors for use in dusty locations or where excessive moisture is present. Motors are available in sizes from 2 to 15 horsepower. Features of motor are discussed and cutaway illustrations show construction.

35. Spray Nozzles

Yarnall-Waring Co.—16-page illustrated bulletin No. N-616 presents information on line of spray nozzles for cooling condensing water, for air conditioning service and for other industrial processes. Typical installations of spray nozzles and of spray cooling systems are pictured.

36. Protective Coating

Enthone Co.—4-page illustrated bulletin is descriptive of Alumox chemical process for producing corrosion resisting coatings on aluminum alloys. Corrosion inhibiting characteristics of treated aluminum and aluminum alloy surfaces are discussed. Method of application is described.

37. Silica Brick

Harbison-Walker Refractories Co.—12-page illustrated bulletin entitled "Vega—The Super-Duty Silica Brick" explains advantages of this refractory material which is claimed to yield as much as 20 to 30 per cent longer life in open-hearth roofs, permit higher operating temperatures and increase tonnage output over that possible with standard silica brick.

38. Gear Motors

General Electric Co.—16-page illustrated bulletin No. GEA-1437D is descriptive of many types of gear-motors. Advantages are listed and information is given as to various locations where their use is most desirable. Mechanical and electrical features of these polyphase motors are described. Charts show horsepower-speed ratings.

39. Clutch

Carlyle Johnson Machine Co.—4-page illustrated bulletin describes Maxitorq floating disk clutch. Design, construction and specifications are covered. Dimensional drawings are included. Coupling is available in single, double, pulley, and cut-off coupling types.

40. Electronic Equipment

Autotron Co.—Two 4-page illustrated bulletins describing model 500 electronic Shadowcount portable counting unit for counting up to 1000 items per minute and model 700 automatic electronic gage for internal depths, external lengths and outside diameters. Applications and specifications are given.

41. Plastic Materials

Bakelite Corp.—36-page illustrated booklet entitled "Selecting the Right Thermosetting Molding Material" is companion piece for technical film of same name. Subject matter of film is expanded and explained. This study booklet is for foremen, molders, engineers, designers, executives and others. Thermosetting Plastics Comparator chart showing relative values of various phenolic and urea plastics is included.

42. Spherical Bearings

Heim Co.—16-page illustrated looseleaf catalog No. 10 describes Unibal spherical bearings and spherical bearing rod ends. Engineering data, dimensional charts and partial list of applications are included. Advantages of use are set forth.

43. Fatigue of Metals

Nitralloy Corp.—88-page illustrated data book entitled "Fatigue of Metals—Some Facts for the Designing Engineer" by D. Landau, industrial applications engineer, is technical discussion of subject. Various types of testing machines are shown and described. Bibliography is included.

STEEL 3
1213 West Third St., Cleveland 13, Ohio

1	11	21	31	41
2	12	22	32	42
3	13	23	33	43
4	14	24	34	44
5	15	25	35	45
6	16	26	36	46
7	17	27	37	47
8	18	28	38	48
9	19	29	39	49
10	20	30	40	50

Please have literature circled at left sent to me.

NAME _____ TITLE _____

COMPANY _____

PRODUCTS MANUFACTURED _____

ADDRESS _____

CITY AND STATE _____

This card MUST be completely filled out. Please TYPE or PRINT

FIRST CLASS
PERMIT No. 66
(Sec. 510 P.L.&R.)
Cleveland, Ohio

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

4c POSTAGE WILL BE PAID BY—

STEEL
Penton Building
CLEVELAND 13, OHIO

Readers' Service Dept.

Heavy Steel Demand To Follow Strike Settlement

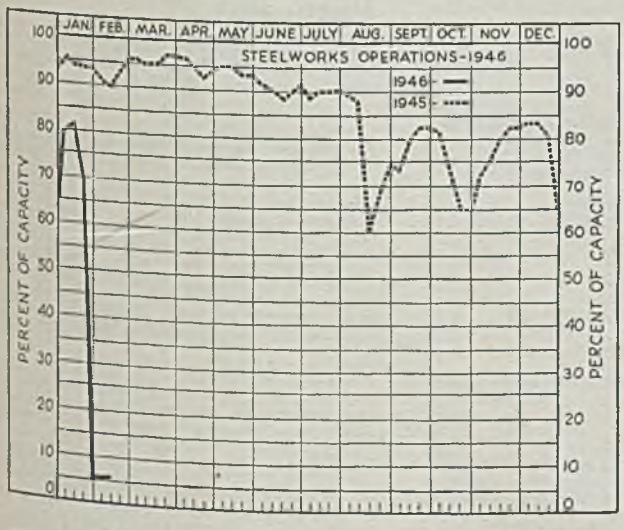
Mills more disposed to accept orders despite delivery uncertainties . . . Pig iron and scrap shortage still severe

END of the steel strike is expected to result in more active demand than before the interruption, as settlement of the controversy will mean clearing of the greatest obstacle in the path of reconversion and probably early adjustment of a number of important strikes in steel consuming industries.

Major consumer interest at first will be devoted to obtaining shipments on orders now on mill books as early as possible, as attention before the steel walkout was directed primarily to the same purpose, to build inventories to help out while mills were down. However, volume of new orders is expected to expand sharply as more stable conditions prevail and the cost and labor pattern is clarified. Also seasonal factors should prove stimulating.

Third week of the steel strike saw inquiry at the lowest point since the interruption began, despite the belief that a break in the deadlock might come soon, as a result of the expected announcement by Washington of a new price-wage formula. Growing additional individual problems of consumers had much to do with slowing of inquiry. Those not already down because of strikes of their own were being forced to curtail operations because of materials shortage, a number suspending entirely for this reason.

Recently there has been a freer disposition on the part of producers to enter orders and promise deliveries based on a time beginning with the end of the strike. In these cases sellers are limiting their commitments. They still favor regular customers and in general still are unable to promise nearly as much as is asked. With so much tonnage already lost because of the strike many consumers must reconcile themselves to a revision in requirements. However, various producers, including some leading mills, are not making promises of any description as to future deliveries, except perhaps on certain specialties or identified projects, and even then they are limited as to what they can do. Where consumers do not take their orders back for reinstatement later the orders are simply filed for future consideration.



DISTRICT STEEL RATES

(Percentage of Ingot Capacity Engaged in Leading Districts)

	Week Ended Feb. 9	Change	Same Week 1945	Same Week 1944
Pittsburgh	1.5	None	80.5	99.5
Chicago	5	None	99.5	102
Eastern Pa.	6	+ 2	87	94
Youngstown	0	None	83	95
Wheeling	56	None	88	101
Cleveland	0	None	86.5	97
Buffalo	0	None	72	88.5
Birmingham	0	None	95	95
New England	10	None	92	95
Cincinnati	44	None	92	94
St. Louis	19	None	75	79.5
Detroit	32	None	87	75
Estimated national rate	5.5	None	89.5	100

*Based on steelmaking capacities as of these dates.

Steel operations continued last week at an estimated rate of 5½ per cent of capacity, conditions being unchanged in all districts but one, eastern Pennsylvania making a gain of 2 points to 6 per cent of capacity, insufficient to affect the national rate. At Youngstown, Cleveland, Buffalo and Birmingham operations were entirely suspended. Pittsburgh remained at 1½ per cent, Wheeling at 56 per cent, Cincinnati at 44, St. Louis at 19, Chicago at 5, New England at 10, St. Louis at 19 and Detroit at 32.

Pig iron melters in general are in need of more tonnage as most foundries are not affected by the strike and are continuing castings production. Some have begun to taper activities to conserve supplies for use when the situation clears as some time will be necessary to start supplies moving freely from blast furnaces. Efforts to stretch metal supply by using larger proportion of scrap meet a shortage in cast grades. In some areas all blast furnaces are idle, while in others production continues sufficiently to allow moderate shipments.

Scrap continues scarce, at ceiling prices and in strong demand. Shortage is expected to continue well into the summer at least and melters, even though strike-bound, are using every device to assure as great supply as possible for poststrike use. Material is being stored wherever possible, to be available when steel production is resumed. Though no new orders are being given, steelmakers promise further tonnages as soon as mills become active.

Average composite prices of steel and iron products continue unchanged at present Office of Price Administration levels. Finished steel composite is $58.27, semifinished steel at $37.80, steelmaking pig iron at $24.80 and steelmaking scrap at $19.17.

COMPOSITE MARKET AVERAGES

	Feb. 9	Feb. 2	Jan. 26	One Month Ago Jan. 1946	Three Months Ago Nov. 1945	One Year Ago Feb. 1945	Five Years Ago Feb. 1941
Finished Steel	$58.27	$58.27	$58.27	$58.27	$58.27	$57.55	$56.73
Semifinished Steel	37.80	37.80	37.80	37.80	37.80	36.00	36.00
Steelmaking Pig Iron	24.80	24.80	24.80	24.80	24.25	23.55	22.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	20.05

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, cents per lb.; coke, dollars per net ton; others dollars per gross ton.

Finished Material	Feb. 9, 1946	Jan., 1946	Nov., 1945	Feb., 1945
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.15c
Steel bars, Philadelphia	2.57	2.57	2.57	2.47
Steel bars, Chicago	2.25	2.25	2.25	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.25	2.25	2.25	2.20
Plates, Philadelphia	2.30	2.30	2.30	2.25
Plates, Chicago	2.25	2.25	2.25	2.20
Sheets, hot-rolled, Pittsburgh	2.20	2.20	2.20	2.20
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.70	3.70	3.70	3.65
Sheets, hot-rolled, Gary	2.20	2.20	2.20	2.20
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.70	3.70	3.70	3.65
Hot-rolled Strip, Pittsburgh	2.10	2.10	2.10	2.10
Cold-rolled strip, Pittsburgh	2.80	2.80	2.80	2.80
Bright bess., basic wire, Pittsburgh	2.75	2.75	2.75	2.60
Wire nails, Pittsburgh	2.90	2.90	2.90	2.80
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$36.00	$36.00	$36.00	$34.00
Slabs, Pittsburgh, Chicago	36.00	36.00	36.00	34.00
Rerolling billets, Pittsburgh	36.00	36.00	36.00	34.00
Wire rods, No. 5 to 9/32-inch, Pitts.	2.15	2.15	2.15	2.00

Pig Iron	Feb. 9, 1946	Jan., 1946	Nov., 1945	Feb., 1945
Bessemer, del. Pittsburgh	$26.94	$26.94	$26.94	$25.69
Basic, Valley	25.25	25.25	25.25	24.00
Basic, eastern del. Philadelphia	27.09	27.09	27.09	25.84
No. 2 fdry., del. Pitts., N.&S. Sides	26.44	26.44	26.44	25.19
No. 2 foundry, Chicago	25.75	25.75	25.75	24.50
Southern No. 2, Birmingham	22.13	22.13	22.13	20.88
Southern No. 2 del. Cincinnati	26.05	26.05	26.05	24.80
No. 2 fdry., del. Philadelphia	27.59	27.59	27.59	26.34
Malleable, Valley	25.75	25.75	25.75	24.50
Malleable, Chicago	25.75	25.75	25.75	24.50
Lake Sup., charcoal del. Chicago	37.34	37.34	37.34	37.34
Gray forge, del. Pittsburgh	25.94	25.94	25.94	24.69
Ferromanganese, del. Pittsburgh	140.00	140.00	140.00	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	18.75
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	$7.00
Connellsville, foundry ovens	8.25	8.25	8.25	7.75
Chicago, by-product fdry., del.	13.35	13.75	13.75	13.35

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 Issued April 16, 1941, revised June 20, 1941, Feb. 4, 1942 and May 21, 1945. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to individual companies are noted in the table. Finished steel quoted in cents per pound.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.

(Empire Sheet & Tin Plate Co., Mansfield, O. may quote carbon steel ingots at $33 gross ton, f.o.b. mill).

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop, $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $36; Detroit, del. $38; Duluth (bll) $38; Pac. Ports, (bll) $48. (Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Laclede Steel Co., $34 Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives. Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co. $58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $42, Detroit, del. $44; Duluth, billets, $44; forg. bil. f.o.b. Pac. ports, $54.

(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O. Geneva Steel Co. $64.64, Pacific ports.)

Open Hearth Shell Steel: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section; 3-12 in., $52; 12-18 in., excl., $54.00; 18-in. and over $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon. $54, del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $36. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth. O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, 5—9/32 in. inclusive, per 100 lbs., $2.15 Do., over 9/32—41/64-in., incl., $2.30; Galveston, base, 2.25c and 2.40c respectively. Worcester add $0.10; Pacific ports $0.50 (Pittsburgh Steel Co., $0.05 higher.)

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3: Pittsburgh, Youngstown, Chicago Gary, Cleveland, Buffalo, Birmingham base 20 tons one size, 2.25c; Duluth, base 2.35c; Detroit, del. 2.35c; Eastern Mich. 2.40c; New York del. 2.59c; Phila. del. 2.57c; Gulf Ports, dock 2.62c; Pac. ports, dock 2.90c, (Calumet Steel Division. Borg-Warner Corp., and Joslyn Mfg. & Supply Co., may quote 2.55c, Chicago base; Sheffield Steel Corp., 2.75c, f.o.b. St. Louis.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem base 20 tons one size, 2.70c; Detroit del., 2.80c. (Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.70
		4100 (.20-.30 Mo)	0.75
2300	1.70	4300	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.85	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

* Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.75c; Detroit 2.80c; Toledo 2.90c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City, New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.)

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.45c; Eastern Mich. 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c.

Iron Bars: Single refined, Pitts. 4.40c; double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, single ref., 5.00, double ref., 6.25c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.20c; Granite City, base 2.30c; Detroit del. 2.30c; Eastern Mich. 2.35c; Phila. del. 2.37c; New York del. 2.44c; Pacific ports 2.75c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.35c on hot carbon sheets, nearest eastern basing point.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.70c; Granite City, base 3.80c; New York del. 3.94c; Phila. del. 3.78c; Pacific ports 4.25c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.36c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific ports 4.25c; copper iron, 3.90c; pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.25c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 2.85c; Granite City, base 2.95c; Detroit, del, 2.95c; eastern, Mich. 3.00c; Pacific ports 3.50c; 20 gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.45c; Detroit del. 3.55c; eastern Mich. 3.60c; Pacific ports 4.10c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.30c	4.05c	3.30c
Armature	3.65c	4.40c	3.75c
Electrical	4.15c	4.90c	4.25c
Motor	5.05c	5.80c	5.15c
Dynamo	5.75c	6.50c	5.85c
Transformer			
72	6.25c	7.00c	....
65	7.25c	8.00c	....
58	7.75c	8.50c	....
52	8.55c	9.30c	....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c.

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.05c; Eastern Mich. 3.10c; Worcester base 3.35c.

Cold Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary. 100-lb. base box, $5.00; Granite City, Birmingham, Sparrows Point, $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.25 lb. tin, $4.35: 0.50 lb tin, $4.50; 0.75 lb. tin $4.65; Granite City, Birmingham, Sparrows Point, $4.45, $4.60, $4.75, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, Birmingham, Sparrows Point, 3.15c; Pacific ports, boxed, 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City, Birmingham, Sparrows Point, $4.40.

Plates

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I. C. 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16; 30-lb. $17.25; 40-lb. $19.50.

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.25c; New York, del. 2.44c; Phila., del. 2.30c; St. Louis, 2.49c; Boston, del. 2.57-82c; Pacific ports, 2.80c; Gulf ports, 2.60c.

(Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. mill; Central Iron & Steel Co. 2.50c f.o.b. basing points; Geneva Steel Co., Provo, Utah, 3.20c f.o.b. Pac. ports.)

Floor Plates: Pittsburgh, Chicago, 3.50c; Pacific ports, 4.15c; Gulf ports, 3.85c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del. 2.27c; Phila., del. 2.215c; Pacific ports, 2.75c; Gulf ports, 2.45c.

(Phoenix Iron Co., Phoenixville, Pa., may quote the equivalent of 2.45c, Bethlehem, Pa., on the general range and 2.55c on beams and channels from 4 to 10 inches.)

Steel Piling: Pittsburgh, Chicago, Buffalo, 2.40c; Pacific ports, 2.95c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham to manufacturers in carloads.

Bright, basic, bessemer wire *$2.75

Spring wire ..... *††$3.35

Wire Products to the Trade:

Standard and cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, $2.90; Pac. ports, $3.40; galvanized, $2.55 and $3.05, resp.

Annealed Merchant quality wire, 100-lb., Pittsburgh, Chicago, Cleveland, Birmingham ..... ††$3.20

Galvanized Merchant quality wire, 100-lb., Pittsburgh, Chicago, Cleveland, Birmingham ..... ††$3.55

Woven fence, 15½ gage and heavier, per base column 67

Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 72; twisted barbless wire, column 72.

*Add $0.10 for Worcester, $0.05 for Duluth; add $0.50 for bright, annealed, galvanized and $0.70 for other finishes for Pacific ports.

†Same bases as for bright basic except Birmingham.

††Add 10 cents for Worcester; 50 cents for annealed, bright basic and 70 cents for all other finishes for Pacific ports.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel. pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

	Steel			Iron	
In.	Blk.	Galv.	In.	Blk.	Galv.
⅛	56	33	½	24	3½
¼ & ⅜	59	40½	¾	30	10
½	63¼	51	1-1¼	34	16
⅝	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

	Steel			Iron	
In.	Blk.	Galv.	In.	Blk.	Galv.
2	61	49½	1¼	23	3½
2½-3	64	54½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½-3½	31½	14½
9-10	64¼	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

		—Seamless—			—Lap Weld—
O.D.		Hot	Cold		Char-
sizes	B.W.G.	Rolled	Drawn	Steel	coal Iron
1"	13	.....	$ 9.01	.....	.....
1¼"	13	.....	10.67	.....	.....
1½"	13	$10.23	11.72	$ 9.72	23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44 25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $43.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $45.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates $46 net ton, base, Standard spikes, 3.25c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb.; Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c

Tung	Chr.	Van.	Moly.	Base, per lb.
18.00	4	1	...	67.00c
1.5	4	1	8.5	54.00c
.....	4	2	3	54.00c
6.40	4.15	1.90	5	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
†347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
††430F.	19.50	22.50	29.50	18.75	24.50
440A.	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	§§18.00	19.00	.....	.....	

—*With 2-3% moly. §With titanium. †With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Rivets, Washers

Birmingham

F.o.b. Pittsburgh, Cleveland, Chicago

Structural 3.75c

⅞-inch and under ..... 65.-5 off

Wrought, Washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l. . $2.75.-3.00 off

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%

Carriage and Machine

½ x 6 and smaller ..... 65½ off

Do., ⅝ and ⅝ x 6-in. and shorter.. 63½ off

Do., ¾ to 1 x 6-in. and shorter .... 61 off

1⅛ and larger, all lengths ..... 59 off

All diameters, over 6-in. long ..... 59 off

Tire bolts ..... 50 off

Step bolts ..... 56 off

Plow bolts ..... 65 off

Stove Bolts

In packages with nuts separate 71-10 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

	U.S.S.	S.A.E.
Semifinished hex		
⅞-inch and less	62	64
½-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller ..... 64 off

Milled 1-in., smaller ..... 60 off

Square Head Set Screws

Upset, 1-in., smaller ..... 71 off

Headless, ¼-in., larger ..... 60 off

No. 10 smaller ..... 70 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*7.50
Connellsville, foundry	8.00- 8.50
New River, foundry	9.00- 9.25
Wise county, foundry	7.75- 8.25
Wise county, furnace	7.25- 7.75
By-Product Foundry	
Kearney, N. J., ovens	13.05
Chicago, outside delivered	13.00
Chicago, delivered	13.75
Terre Haute, delivered	13.50
Milwaukee, ovens	13.75
New England, delivered	14.65
St. Louis, delivered	†13.75
Birmingham, delivered	10.90
Indianapolis, delivered	13.50
Cincinnati, delivered	13.25
Cleveland, delivered	13.20
Buffalo, delivered	13.40
Detroit, delivered	13.75
Philadelphia, delivered	13.28

*Operators of hand-drawn ovens using trucked coal may charge $8.00; effective May 26, 1945.

†14.25 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha	
Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.23c
Do., tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$20.00

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extra mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price.

Seconds, maximum prices: flat-rolled rejects 85% of prime prices, wasters 75%, waste-wasters 65% except plates, which take waster prices; tin plate $2.80 per 100 lbs; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold-rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series	NE hot bars 9400 series
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[14]	4.244[11]	4.715	6.012[23]	6.012[23]
New York	3.853[1]	3.758[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[13]	4.613[14]	4.203[21]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[13]	4.613[14]	4.203[21]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[1]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[15]	4.872[15]	4.172[21]	4.772	5.816[23]	5.860[23]
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[23]	4.152[21]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.196[17]	4.841[20]	4.141[21]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[14]	4.265[21]	.....	.....	.....
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.63[1]	5.26[1]	3.35[1]	3.819[1]	3.819[1]	4.75[15]	4.40[10]	3.85[21]	4.668	5.60[23]	5.75[23]
Buffalo (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.81[1]	3.50[1]	4.65[15]	4.30[10]	3.75[21]	4.35	5.60[23]	5.75[23]
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[13]	4.40[24]	3.85[24]	.....	.....	.....
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[13]	4.30[24]	3.75[24]	.....	.....	.....
Cleveland (city)	3.35[1]	3.588[1]	3.40[1]	5.188[1]	3.35[1]	3.60[1]	3.60[1]	4.877[13]	4.40[24]	3.85[21]	4.45[21]	5.60[23]	5.65[23]
Cleveland (country)	3.25[1]	.....	3.30[1]	.....	3.25[1]	3.50[1]	3.50[1]	.....	4.30[24]	3.75[21]	4.35[21]	.....	.....
Detroit	3.450[1]	3.661[1]	3.609[1]	5.281[1]	3.450[1]	3.700[1]	3.700[1]	5.000[13]	4.500[24]	3.900[21]	4.659	5.93[23]	5.93[23]
Omaha (city, delivered)	4.043[1]	4.093[1]	4.093[1]	5.693[1]	3.793[1]	4.143[1]	4.143[1]	5.615[13]	5.443[24]	4.543[13]	.....	.....	.....
Omaha (country, base)	3.943[1]	3.993[1]	3.993[1]	5.593[1]	3.693[1]	4.043[1]	4.043[1]	5.515[13]	.....	.....	.....	.....	.....
Cincinnati	3.611[4]	3.691[1]	3.661[1]	5.291[1]	3.425[1]	3.675[1]	3.675[1]	4.825[13]	4.475[24]	4.111[21]	4.711	6.10	6.20
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.40[13]	.....	.....	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.65[15]	.....	.....	.....	.....	.....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	5.231[15]	4.20[24]	3.85[21]	4.65	5.75[23]	5.85[23]
Milwaukee	3.637[2]	3.687[1]	3.687[1]	5.287[1]	3.387[1]	3.737[1]	3.737[2]	5.272[15]	4.337[24]	3.987[21]	4.787	5.987[23]	6.087[23]
Indianapolis	3.58[1]	3.63[1]	3.63[1]	5.23[1]	3.518[1]	3.768[1]	3.768[1]	4.918[15]	4.568[24]	4.08[21]	4.78	6.08[23]	6.18[23]
St. Paul	3.76[2]	3.81[2]	3.81[2]	5.41[2]	3.51[2]	3.86[2]	3.86[2]	5.257[15]	4.46[24]	4.461[21]	5.102	6.09[23]	6.19[23]
St. Louis	3.647[1]	3.697[1]	3.697[1]	5.297[1]	3.397[1]	3.747[1]	3.747[11]	5.172[15]	4.347[24]	4.131[21]	4.931	6.131[23]	6.281[23]
Memphis, Tenn.	4.015[29]	4.065[5]	4.065[5]	5.78[5]	3.965[5]	4.215[5]	4.215[5]	5.265[13]	4.78[24]	4.43[21]	.....	.....	.....
Birmingham	3.50[1]	3.55[1]	3.55[1]	5.90[31]	3.45[1]	3.70[1]	3.70[1]	4.75[15]	4.352[24]	4.64	5.215	.....	.....
New Orleans (city)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	4.058[4]	4.20[4]	4.20[4]	5.25[26]	5.079[10]	4.70[21]	5.429	.....	.....
Houston, Tex.	3.75[2]	4.25[1]	4.25[1]	5.50[9]	3.763[6]	4.313[6]	4.313[3]	5.313[26]	5.594[10]	3.75[22]	.....	.....	.....
Los Angeles	4.40[4]	4.65[4]	4.95[4]	7.20[4]	5.00[4]	4.95[4]	6.75[4]	6.00[13]	7.20[6]	5.683[23]	5.613	5.85[23]	5.95[23]
San Francisco	4.15[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	5.75[7]	6.35[13]	7.30[15]	5.433[21]	7.333	8.304[23]	8.404[23]
Portland, Oreg.	4.45[27]	4.45[27]	4.75[27]	6.50[27]	4.65[27]	4.75[27]	6.30[27]	5.75[15]	6.60[15]	5.633[15]	.....	.....	8.00[23]
Tacoma	4.35[5]	4.45[5]	4.75[5]	6.50[5]	4.65[5]	4.25[5]	5.45[5]	5.95[15]	7.60[15]	5.883[21]	.....	.....	8.00[23]
Seattle	4.35[5]	4.45[5]	4.75[5]	6.50[5]	4.65[5]	4.25[5]	5.45[5]	5.95[15]	7.05[15]	5.883[21]	.....	.....	.....

*Basing point cities with quotations representing mill prices, plus warehouse spread.
NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 33 to Revised Price Schedule No. 49. Deliveries 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]—800 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; [26]—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, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 66-69% f.o.b. Rio de Janeiro	7.50-8.00

Tungsten Ore

Chinese Wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80

Brazilian—nominal

44% 2.5:1 lump	33.65
48% 3:1 lump	43.50

Rhodesian

45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50

Domestic (seller's nearest rail)

48% 3:1	52.80
less $7 freight allowance	

Manganese Ore

Sales prices of Metals Reserve Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85.0c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91.0c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 248, effective as of May 15. Price at basing points which are also points of discharge of imported manganese ore is f.o.b. cars, shipside, at dock most favorable to the buyer.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Electric furnace: Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per GT
	Chemical Composition Limits, Per Cent									
NE 8612	.10-.15	.70-.90	.20-.35	.40-.60	.40-.70	.15-.25	$0.65	$13.00	$1.15	$23.00
NE 8720	.18-.23	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.70	14.00	1.20	24.00
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.30	26.00
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.15	23.00
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.80	36.00
NE 9830	.28-.33	.70-.90	.20-.35	.70-.90	.85-1.15	.20-.30	1.30	26.00	1.55	31.00
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00		

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximum fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, and Oct. 22, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included.

	Foundry	Basic	Bessemer	leable Mal-
Bethlehem, Pa., base	$26.75	$26.25	$27.75	$27.25
Newark, N. J., del.	28.28	27.78	29.28	28.78
Brooklyn, N. Y., del.	29.25	.....	.....	29.75
Birdsboro, Pa., base	26.75	26.25	27.75	27.25
Birmingham, base	22.13	20.75	26.75	.....
Baltimore, del.	27.36	.....	.....	.....
Boston, del.	26.89	.....	.....	.....
Chicago, del.	25.97	.....	.....	.....
Cincinnati, del.	25.81	24.48	.....	.....
Cleveland, del.	25.87	24.99	.....	.....
Newark, N. J.	27.90	.....	.....	.....
Philadelphia, del.	27.21	26.71	.....	.....
St. Louis, del.	25.87	24.99	.....	.....
Buffalo, base	25.75	24.75	26.75	26.25
Boston, del.	27.25	26.75	28.25	27.75
Rochester, del.	27.28	.....	28.28	27.78
Syracuse, del.	27.83	.....	28.83	28.33
Chicago, base	25.75	25.25	26.25	25.75
Milwaukee, del.	26.85	26.35	27.35	26.85
Muskegon, Mich., del.	28.94	.....	.....	28.94
Cleveland, base	25.75	25.25	26.25	25.75
Akron, Canton, del.	27.14	26.64	27.64	27.14
Detroit, base	25.75	25.25	26.25	25.75
Saginaw, Mich., del.	28.06	27.56	28.56	28.06
Duluth, base	26.25	25.75	26.75	26.25
St. Paul, del.	28.38	27.88	28.88	28.38
Erie, Pa., base	25.75	25.25	26.75	26.25
Everett, Mass., base	26.75	26.25	27.75	27.25
Boston, del.	27.25	26.75	28.25	27.75
Granite City, Ill., base	25.75	25.25	26.25	25.75
St. Louis, del.	26.25	25.75	.....	26.25
Hamilton, O., base	25.75	25.25	.....	25.75
Cincinnati, del.	26.19	26.36	.....	26.86
Neville Island, Pa., base	25.75	25.25	26.25	25.75
§Pittsburgh, del. No. & So. sides	26.44	25.94	26.94	26.44
Provo, Utah, base	23.75	23.25	.....	.....
Sharpsville, Pa., base	25.75	25.25	26.25	25.75
Sparrows Point, base	26.75	26.25	.....	.....
Baltimore, del.	27.74	.....	.....	.....
Steelton, Pa., base	.....	26.25	.....	27.25
Swedeland, Pa., base	26.75	26.25	27.75	27.25
Philadelphia, del.	27.59	27.09	.....	28.09
Toledo, O., base	25.75	25.25	26.25	25.75
Youngstown, O., base	25.75	25.25	26.25	25.75
Mansfield, O., del.	27.69	27.19	28.19	27.69

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenbridge 1.24

Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., $2 per ton; for each additional 0.25% nickel, $1 per ton.

High Silicon, Silvery

6.00-6.50 per cent (base)	$31.25
6.51-7.00	$32.25
7.01-7.50	33.25
7.51-8.00	34.25
8.01-8.50	35.25
8.51-9.00	36.25
9.01- 9.50	37.25
9.51-10.00	38.25
10.01-10.50	39.25
10.51-11.00	40.25
11.01-11.50	41.25

F.o.b. Jackson county, O., per gross ton. Buffalo base $1.25 higher, whichever is most favorable to buyer. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Electric Furnace Ferrosilicon: Sil. 14.01 to 14.50%, $45.50 Jackson Co.; each additional .50% silicon up to and including 18% add $1; low impurities not exceeding 0.005 Phos., 0.40 Sulphur, 1.0% Carbon, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Northern

Lake Superior Furn. $34.00
Chicago, del. 37.34

Southern

Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. $33.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $25.25
Valley base 25.25

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo, N. Y., $31.25 base; $32.49, del. Philadelphia. Intermediate phos., Central Furnace, Cleveland, $28.25.

Switching Charges: Basing Point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differential: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky. $68.50

First Quality

Pa., Ill., Md., Mo., Ky.	54.40
Alabama, Georgia	54.40
New Jersey	50.35
Ohio	47.70

Second Quality

Pa., Ill., Md., Mo., Ky.	49.35
Alabama, Georgia	40.30
New Jersey	52.00
Ohio	38.15

Malleable Bung Brick

All bases 63.45

Silica Brick

Pennsylvania	54.40
Joliet, E. Chicago	62.45
Birmingham, Ala.	54.40

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press	32.90
Wire Cut	30.80

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded Magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net tons, carloads, CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. After Aug. 29 base price any grade $30.00 war chemicals.

Ferroalloy Prices

Ferromanganese (standard) 78-82% c.l. gross ton, duty paid, $135 f.o.b. cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer; Rockdale or Rockwood, Tenn.; where Tennessee Products Co. is producer; Birmingham, Ala., where Sloss-Sheffield Steel & Iron Co. is producer; $140 f.o.b. cars, Pittsburgh, where Carnegie-Illinois Steel Corp. is producer; add $6 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese (Low and Medium Carbon); per lb. contained manganese: eastern zone, low carbon, bulk, c.l., 23c; 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c; 2000 lb. to c.l., 24.40c; medium 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.75c and 17.20c; f.o.b. shipping point, freight allowed.

Spiegeleisen: 19-21% carlots per gross ton, Palmerton, Pa., $36; Pittsburgh, $40.50; Chicago, $40.60.

Electrolytic Manganese: 99.9% plus, less ton lots, per lb. 37.6 cents.

Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, per lb. contained chromium bulk, c.l., 79.50c, 2000 lb. to c.l. 80c; central 81c and $2.50c; western $2.25c and 84.75c; f.o.b. shipping point, freight allowed.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l. 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome; Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l. max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65 for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

Special Foundry ferrochrome: (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome, high carbon: (Chrom: 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil. 4-6%, mang. 4-6% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium, 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

Silcaz Alloy: (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed, 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

Silvaz Alloy: (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir. 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern, freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up ¼c.

CMSZ Alloy 4: (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c.

CMSZ Alloy 5: (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%. car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75c, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western; spot up .25c.

Ferro-Boron: (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% max.) per lb. of alloy contract ton lots, $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Manganese-Boron: (Mang. 75% approx., boron 15-20%, iron 5% max. sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract ton lots, $1.89, less $2.01, eastern; freight allowed; $1.903 and $2.023, central, $1.935 and $2.055 western; spot up 5c.

Nickel-Boron: (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract, 5 tons or more, $1.90, 1 ton to 5 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Chromium-Copper: (Chrom. 8-11%, cu. 88-90%, iron 1% max. sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide, approx. 2%, or Red Cake: Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity, $1.10 eastern, freight allowed per pound vanadium oxide contained; contract carlots, $1.105, less carlots, $1.108, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

Calcium metal; cast: Contract ton lots or more $1.35, less, $1.60, pound of metal; $1.36 and $1.61 central, $1.40 and $1.65, western; spot up 5c.

Calcium-Manganese-Silicon: (Cal. 16-20% mang. 14-18% and sil. 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c.

Calcium-Silicon: (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, carlot, lump 18.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up .25c.

Briquets, Ferromanganese: (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.) per lb. of briquets. Contract, carlots, bulk .0605c, packed .063c, tons .0655c, less .068c eastern freight allowed; .063c, .0655c, .0755c and .078c, central; .066c, .0685c, .0855c, and .088c, western; spot up .25c.

Briquets: Ferrochrome, containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l., and .2c for 2000 lb. to c.l.; **silicomanganese,** eastern, containing exactly 2 lb. manganese and approx. ½ lb. silicon, bulk, c.l., 5.80c, 2000 lbs. to c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; western, add .5c for c.l., and 2c for 2000 lb. to c.l.; **ferrosilicon,** eastern, approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l., and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75% per lb. contained molybdenum f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all f.o.b. Bridgeville, Pa., usual freight allowance.

Silicon Metal: Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c; 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon.

Manganese Metal: (96% min. manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 30c, 2000 lb. to c.l., 32c, central, 30.25c, and 33c; western 30.55c and 35.05c.

Ferrotungsten: Spot, 10,000 lb. or more, per lb. contained tungsten, $1.90; contract, $1.88; freight allowed as far west as St. Louis.

Tungsten Metal Powder: Spot, not less than 97 per cent, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40 eastern. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20% contract basis, per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi River and North of Baltimore and St. Louis, 6.8% carbon $142.50; 3-5% carbon $157.50.

Carbortam: Boron 0.90 to 1.15% net ton to carload, 8c lb. f.o.b. Suspension Bridge, N. Y., frt. allowed same as high-carbon ferrotitanium.

Bortam: Boron 1.5-1.9%, ton lots 45c lb.. less ton lots 50c lb.

Ferrovanadium: 35-55%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Zirconium Alloys: 12-15%, per lb. of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads, bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot ¼c per ton higher.

Zirconium Alloy: 35-40%, Eastern, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼ cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis f.o.b. Niagara Falls, N. Y., per lb. 5.75c; ton lots 6.50c. Spot ½ cent higher.

Siminal: (Approx. 20% each si., Mn., Al.) Contract, frt. all. not over St. Louis rate, per lb. alloy; carlots 8c; ton lots 8.75c; less ton lots 9.25c.

Borosil: 3 to 4% boron, 40 to 45% Si., $6.25 lb. cont. Bo., f.o.b. Philo, O., freight not exceeding St. Louis rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page 156 of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.75
No. 2 Heavy Melt. Steel	18.75
No. 2 Bundles	18.75
No. 3 Bundles	16.75
Mixed Borings, Turnings	13.75
Machine Shop Turnings	13.75
Billet, Forge Crops	23.75
Bar Crops, Plate Scrap	21.25
Cast Steel	21.25
Punchings	21.25
Elec. Furnace Bundles	19.75
Heavy Turnings	18.25

Cast Grades

(F.o.b. Shipping Point)

Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:

(Dealers' buying prices)

No. 1 Heavy Melt. Steel	$15.33
No. 2 Heavy Melt. Steel	15.33
No. 2 Hyd. Bundles	15.33
No. 3 Hyd. Bundles	13.33
Chemical Borings	14.33
Machine Turnings	10.33
Mixed Borings, Turnings	10.33
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstrip Motor Blocks	17.50
Stove Plate	19.00

CLEVELAND:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	14.50
Short Shovel Turnings	16.50
Mixed Borings, Turnings	14.50
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	13.50-14.00
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec. Furnace Bundles	20.50

BOSTON:

(F.o.b. shipping points)

No. 1 Heavy Melt. Steel	$14.06
No. 2 Heavy Melt. Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	14.06
No. 1 Busheling	14.06
Machine Shop Turnings	9.06
Mixed Borings, Turnings	9.06
Short Shovel Turnings	11.06
Chemical Borings	13.31
Low Phos. Clippings	16.56
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

Boston Differential 99 cents higher, steel-making grades; Providence $1.09 higher.

PITTSBURGH:

(Delivered consumer's plant)

Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Mach. Shop Turnings	15.00
Mixed Borings, Turnings	15.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	22.00

VALLEY:

(Delivered consumer's plant)

No. 1 R.R. Heavy Melt.	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Cast Iron Borings	16.00
Machine Shop Turnings	15.00
Low Phos. Plate	22.50

MANSFIELD, O:

(Delivered consumer's plant)

Machine Shop Turnings	$15.00

BIRMINGHAM:

(Delivered consumer's plant)

Billet Forge Crops	$22.00
Structural, Plate Scrap	19.00
Scrap Rails Random	18.50
Rerolling Rails	20.50
Angle Splice Bars	20.50
Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.00
Long Turnings	8.50- 9.00
Cast Iron Borings	8.50- 9.00
Iron Car Wheels	16.50-17.00

CHICAGO:

(Delivered consumer's plant)

No. 1 R.R. Heavy Melt.	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dlr. Bundles	18.75
Baled Mach. Shop Turn.	18.75
No. 3 Galv. Bundles	16.75
Machine Turnings	13.75
Mix. Borings, Sht. Turn.	13.75
Short Shovel Turnings	15.75
Cast Iron Borings	14.75
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00

(Cast grades f.o.b. shipping point, railroad grades f.o.b. tracks)

BUFFALO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	14.25
Short Shovel Turnings	16.25
Mixed Borings, Turn.	14.25
Cast Iron Borings	15.25
Low Phos.	21.75

DETROIT:

(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

ST. LOUIS:

(Delivered consumer's plant)

Heavy Melting	17.50
No. 1 Locomotive Tires	20.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	10.50
Shoveling Turnings	12.50
Rerolling Rails	21.00
Steel Car Axles	21.50-22.00
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
(Cast grades f.o.b. shipping point)	
Stove Plate	18.00

CINCINNATI:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.50
No. 2 Heavy Melt. Steel	18.50
No. 1 Comp. Bundles	18.50
No. 2 Comp. Bundles	18.50
Machine Turnings	9.50-10.00
Shoveling Turnings	11.50-12.00
Cast Iron Borings	11.00-11.50
Mixed Borings, Turnings	10.50-11.00
No. 1 Cupola Cast	20.00
Breakable Cast	16.50
Low Phosphorus	21.00-21.50
Scrap Rails	20.50-21.00
Stove Plate	16.00-16.50

LOS ANGELES:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$14.00
No. 2 Heavy Melt. Steel	13.00
No. 1, 2 Deal. Bundles	12.00
Machine Turnings	4.50
Mixed Borings, Turnings	4.00
No. 1 Cast	20.00

SAN FRANCISCO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$15.50
No. 2 Heavy Melt. Steel	14.50
No. 1 Busheling	15.50
No. 1, No. 2 Bundles	13.50
No. 3 Bundles	9.00
Machine Turnings	7.00
Billet, Forge Crops	15.50
Bar Crops, Plate	15.50
Cast Steel	15.50
Cut, Structural, Plate, 1", 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	15.50
Locomotive Tires	

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12,12½c, refinery; dealers may add ¾c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more. 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, chemical, 6.45c, corroding, 6.45c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester, 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 lbs. and over; add ½c 2000-9999 lbs.; 1c less through 2000 lbs.

Secondary Aluminum: All grades 12.50c per lb. except as follows: Low grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (92¼% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 (95-97½%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.00c to 8.25c, Grade 4 (85-90%) 7.75c; any other ingot containing over 1% iron, except PM 754 and hardeners, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 20.50c lb., add 1c for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or B-80-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing screening, barrelling, handling, and other preparation charges, 23.50c. Price for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, f.o.b. plant, any quantity; carload freight allowed all other alloys for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239. 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12¼c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American bulk carlots f.o.b. Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other 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%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: Open market, spot, New York, $108-$110 per 76-lb. flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $17 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $1.50 lb. for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

Indium: 99.9%, $7.50 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 70.625c per ounce.

Platinum: $35 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.45c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.48c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 26.50c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c; Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlot 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%; Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c f.o.b. Niagara Falls.

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ¼c for 15,000-40,000 lbs.; 1c for 40,000 or more.

Scrap Metals

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.785
Commercial bronze			
90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz Metal	8.000	7.750	7.250
Nickel Sil, 5%	9.250	9.000	4.625
Phos. br., A, B, 5%	11.000	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	8.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 7.50c; Muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Price f.o.b. point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb., 11, 14, etc., 3 to 3.50c lb. All other high grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb. borings and turnings one cent less than segregated.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings 7.25c, old zinc 5.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c, add ½c 20,000 or more. Unsweated zinc dross; die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 162

Both producers and consumers of sheets are looking forward to the strike end and procedure to be followed when mills resume operations. Means are sought to prevent a flood of orders, including limitation of inventory to 45 days and other provisions. At best it seems that when the strike ends hot and cold-rolled sheets would not be available before late third quarter and then only in small quantities.

New York — An increasing number of sheet mills are following a policy of entering new orders for shipment on a basis of schedules dated from the time the steel strike ends. However, various sellers are still doing little more than place the orders on file for definite action later and in certain cases only after an effort has been made to have consumers hold up their orders for reinstatement once conditions become stabilized.

Should the steel strike end at once, most buyers, except those protected by quotas, would find they could not obtain promises on hot and cold-rolled sheets before late in third quarter, and only then in relatively limited amounts. As a matter of fact, some producers have little capacity available before the end of the year, and this applies not only to hot and cold-rolled sheets, but to galvanized sheets and certain specialties, such as silicon sheets and polished stainless sheets.

Pittsburgh — New business in sheets is still coming in but in sharply reduced volume. No delivery commitments are made on new orders for undoubtedly some revisions in present schedules will be necessary to meet critical needs when operations are resumed. One important question, for example, is whether steel distributors will be permitted a larger proportion of post-strike output to build up badly depleted inventories. A flood of new orders, and inquiries from customers regarding delivery status of present commitments, undoubtedly will develop immediately after the termination of the strike. Producers intend to resume output where they left off and some state they will not alter production schedules for at least 30 days after operations are resumed for difficulty at the mill level in getting rolling schedules back to normal will be bad enough without further complicating the situation.

Under a recent CPA regulation all steel users must immediately adjust their outstanding steel orders where scheduled delivery would result in an inventory in excess of 45 days' supply. This regulation will not have much bearing on the current situation for only a few mills are currently operating, while stocks of sheets in most instances are well under this limitation. However, if the regulation remains in effect following termination of the strike, it would help to restrict the huge volume of incoming orders at that time and might open up some space on rolling schedules which would result from order cancellations.

Decision of OPA to cancel the first half steel export program, of which only the quota for 215,500 tons of tin plate had been officially set, should measurably ease the heavy production load facing producers immediately following the strike. The Navy Material Redistribution and Disposal office here will take bids Feb. 14 on about 320,000 pounds of stainless steel sheets, stainless coils and slabs, located at American Rolling Mill Co.'s Butler, Pa., plant.

Cincinnati — Appeals for shipments of sheets, received by the district mill unaffected by the strike, are growing louder. Shipments are being held fairly close to previous commitments; an occasional tonnage is released for other consumers by conditions incident to the strike. Schedules had been so heavily loaded that, even without the extraordinary demand due to the steel strike, the supply was tight. A definite slowdown has been noted in new ordering.

St. Louis — Inquiries for sheets are undiminished. Struck rolling mills had hoped to do some repair work in the interim, but only a portion is going on. At the largest mill erection of a new cold mill scheduled for completion July 1 has been stopped, even though it was being done by an AFL union. Inquiries are coming from all sections for places in rolling schedules next fall, especially cold-rolled sheets.

Boston — Shortages of specialty grades of sheets will be acute before production is resumed in volume, electrical, enameling and stainless, polished and unpolished. Since several larger consumers of these grades have been closed, however, stocks will be sufficient in these cases for resumption of operations. Small tank building has slackened, due to need of No. 12 hot-rolled pickled and heads, several shops having worked off the latter. Warehouse stocks, already low, notably in light-gage black, will have to be replenished in substantial volume. Two producers of narrow cold-rolled strip are operating largely on inventory, which is becoming increasingly unbalanced. One supplier of hot strip still rolling is shipping against old orders, but being on earlier allocation is unable to offer much relief. Surplus sales include 200 tons of strip, 170 tons to Berger Machine Co., Maspeth, N. Y.

Chicago — Notwithstanding continuance of the steel strike, sheetmakers continue to receive orders in substantial volume. They are, of course, unable to make any promise on delivery dates, for this will depend upon when the strike ends, time required to get operations back to capacity and carryovers. Consumers of sheets and strip in many instances will encounter delay in receipts when mills start producing again, because of the lead time required between ingots and finished product. In the case of cold-rolled sheets, this may be from three to five weeks.

Philadelphia — Most sheet producers refuse to accept orders until the labor situation is clarified although some recently have formally entered contracts with deliveries based on periods dating from the strike end. These periods run around eight months on hot and cold-rolled sheets in most cases and longer in others. On galvanized and electrical sheets the periods average nine to ten months and in all cases tonnages involved are limited.

New Extras on Special Aluminum-Killed Sheets

Metals Price Branch of the Office of Price Administration recently approved extra charges on special (aluminum) killed steel sheets filed by producers. The ruling was made in answer to a request from metal stampers for clarification of the price setup.

Metal stampings are produced principally from regular commercial quality sheets, special rimmed quality sheets, special (aluminum) killed sheets, deep drawing quality sheets and extra deep drawing quality sheets.

Approved extra mill charges on steel sheets, per 100 pounds, follow:

	12 gage or heavier	13 to 21 inclusive	22 gage or lighter
Regular Commercial	None	None	None
Special Rimmed	None	None	None
Special (aluminum) Killed	$.15	$.25	$.35
Deep Drawing Quality	.15	.25	.35
Extra Deep Drawing	.25	.35	.45

Steel Bars . . .

Bar Prices, Page 162

Consumer inventories of steel bars are being depleted rapidly in absence of mill shipments and some fabricators are conserving supplies to provide material for the period after the strike ends. Most mills are placing new orders on file for later scheduling. In most cases rolling schedules will be taken up where they left off, with no revision during the first 30 days after the end of the strike.

Pittsburgh — With all bar production facilities in this district idle, consumers' inventories are being depleted. The present supply situation, however, is offset in part by fact that many companies are shutdown for they also are under USA-CIO contracts, while other operations have in turn been affected by hold-up of shipments to many of their prime customers. This, plus the general policy of conserving bar stock inventories until termination of the steel strike, has resulted in a general tapering in metalworking operations.

Although no decision has yet been reached by the Bureau of Standards in Washington on the subject of standardization of carbon bar specifications, producers intend to continue to limit output within those sizes contained in Order L-211, which was effective through the war period. Sellers expect a flood of new orders and inquiries as to delivery status of previously booked orders immediately after termination of the steel strike. Due to the unsettled situation at the mill level that will be prevalent at that time, larger producers intend to resume output where they left off and not to alter production schedules to take care of even the most essential needs until 30 days after operations are resumed.

An increasing amount of surplus steel bar stock is reaching the bidding stage through the local Navy Disposal office here including 130,000 pounds of carbon steel bars, random lengths, ranging from 7/8-inch diameter to 1 5/16-inch, located at Palmer Bros. Tool & Forge Co., Meadville, Pa.; 120,000 pounds of carbon bars, located at Carnegie-Illinois Steel Corp.'s Duquesne Works, and 808,000 pounds of hot-rolled rounds, at Jones & Laughlin Steel Corp.'s Pittsburgh plant. All bids are due Feb. 16.

New York—While some bar producers are not formally entering orders but placing them on file for scheduling later, still others are now accepting contracts

for delivery within a given period of time after the steel strike ends. In most cases, assuming the strike ends soon, this would mean late July and August delivery on the larger sizes of hot carbon bars and fourth quarter on smaller. In fact, on the very smallest sizes an increasing number of producers are now practically sold up for the remainder of the year. Promises on cold-drawn bars in general range around five to six months after the end of the strike, although better is offered in some cases. Hot alloy bars are being quoted two to three months after the strike. Overall demand is declining, because of the increasing disruptions in operations.

Boston—Stocks of small size, two-inch and under, in both hot and cold-drawn carbon are becoming exhausted. Several shops have reduced production schedules to stretch inventories and several, including forge shops supplying the automobile industry with parts, are behind shipping schedules. Machine tool builders as a rule have not been seriously hampered, drawing on inventory and warehouses. Busier machine tool shops are those with orders for special machines for the automobile industry. Small forged hand tool production is beginning to slacken in several instances. With some mills booked into fourth quarter on small sizes, carbon bars will be tight for weeks after production is resumed. The lag in alloys will not be as extended; backlogs are smaller and capacity, notably in electric furnace grades, is relatively larger.

Chicago — The lone barmaker in this district unaffected by the steel strike continues to afford relief to some consumers shut off from regular sources of supply. Most production from this source normally goes to the farm equipment industry, but the latter went down on strike about the same time as the steel industry. Thus, the availability of small lots of bars has enabled some manufacturing plants to hold operations at a level higher than would otherwise be the case.

Philadelphia — Most producers of hot carbon bars believe they will not be able to get back to prestrike production for two to three weeks after settlement of the strike. With an early adjustment indicated it appears that the best consumers can expect in placing new orders is middle of third quarter delivery and then only on a limited number of larger sizes. Shipments on small sizes will probably not be available much before late fourth quarter. On the basis of early strike settlement cold-drawn bars are being quoted in some quarters for late May and June shipment, although substantially later deliveries are being offered in others, especially on small sizes. Some producers, however, are not making promises of any description at the moment.

Steel Plates . . .

Plate Prices, Page 163

Shipment of plates five to six months after the end of the steel strike is offered by most platemakers. This would mean July as the earliest delivery on current orders, should the strike end at once. Construction of a number of passenger and cargo ships brings into the market considerable demand for plates and other steel products. Light gages are deferred further than heavier.

New York — Most plate producers are quoting shipments on the basis of five to six months following the end of the steel strike. In other words, should the strike end at once, consumers would find July about the best delivery available, with few exceptions. Meanwhile, orders are less active, reflecting generally disturbed conditions throughout the steel fabricating industry. Some district sellers report demand as decidedly dull; others, as fair.

Construction of 89 new passenger and cargo ships for 11 American steamship lines within the next three years is in prospect, according to the National Federation of American Shipping. The vessels will have a total cargo carrying capacity of 700,000 deadweight tons and a total passenger capacity of between 14,000 and 15,000 persons. Construction on several of the ships has already begun.

Boston—Contrary to the trend in some products, several plate producers are soliciting volume or rather selling mill capacity for future rolling. Most of this tonnage will eventually fall into third quarter and in light gages beyond. Demand for heavy plates is confined mostly to weldments and wider stock is retarded by the decline in submarine building at two yards. Volume of low alloy material on mill books is relatively high. Fab-

ricators still operating are becoming short of material.

Seattle — The plate market is active but dealers report inventories short, although some relief is being afforded by shipyard materials, which probably will be entirely absorbed during the emergency. Boilers, tanks and miscellaneous plate work are creating an active demand.

Philadelphia — Plate demand has sagged noticeably, after holding up fairly well during the first two weeks of the strike. One district mill reports that during the second week of the strike orders were 50 per cent in excess of theoretical capacity. Producers are quoting shipments five to six months from the end of the strike and in some instances longer. One eastern producer, as the situation now stands, has practically no capacity left before October.

Tubular Goods . . .

Tubular Goods Prices, Page 163

Pittsburgh — Cast iron pipe producers have revised production schedules downward in effort to conserve pig iron inventories during the steel strike. On present operating basis most interests have sufficient stock for about two weeks and report order backlogs extend five to six months. Should strike continue much longer, it is probable that considerable municipal pipe projects will be delayed. No inquiries of significance have developed.

With the addition of the new Chicago basing point on mechanical tubing, this product is now based at Pittsburgh, Chicago, Milwaukee, Canton and Shelby, O., and Detroit. Other producing points include Beaver Falls, Allenport and Monessen, Pa., which are considered within the Pittsburgh area. A few companies, such as Globe Steel Tubes Co., Milwaukee, and Detroit Seamless Steel Tubes Co., Detroit, are not closed down because of the steel strike. However, their inventories of tube rounds are inadequate to sustain present operations for more than two to three weeks.

Jobbers' stocks of standard pipe likely will be depleted within 30 days, despite present rationing of shipments to regular customers. Indicative of the serious inventory situation among pipe fabricators, A. O. Smith Corp., Milwaukee, started to curtail operations last week to conserve stock. Most interests plan to have two to three weeks inventory at termination of the strike for it requires this much time before mill production schedules can be restored to normal levels.

Seattle — Demand for cast iron pipe continues strong but agencies face curtailed supplies and uncertain deliveries. The potential market in this area is promising and assures a large tonnage as soon as production and shipping conditions become normal. At Portland, Oreg., George Abram Co. is low at $149,918 for rail delivery and $139,952 for water delivery of ten miles of pipe for Capitol Highway District. Bids are in at Snohomish, Wash., for 43,000 feet of cast iron pipe or alternates for the Lake Stevens project.

Boston — Merchant steel pipe stocks with distributors are in better balance than most products and demand is well maintained. Seamless and other types of tubing are in less favorable supply. Cast pipe buying is more active; recent orders approximate 7500 tons, including 2000 tons for utilities. The district foundry has been down and lack of pig iron and scrap is curtailing production in other districts. There is some curtailment for this reason in the South.

Wire . . .

Wire Prices, Page 163

Boston — Rescheduling by wire mills will be extensive, influenced materially by rod supply. Rods have been the major problem with most mills for some time because of the withdrawal of several suppliers from the Worcester base. An increase in price for rods may attract some to return, but an across the board rise to include finished wire, would be no help to nonintegrated producers of drawn wire. That fabricators' inventories are low is indicated by continued pressure and jockeying for a place on future mill schedules. Most of this volume is accepted without delivery promise and on some products capacity is filled for the balance of the year. Some suspensions to the automobile industry, including valve spring wire, continue. Antifriction bearing makers, with one exception, are operating in the Connecticut district. This industry entered the strike with about 30-40 days of steel and has built up some reserve of finished bearings because of lag in automobile assembly. Razor blade steel supply, built up substantially before the strike, is again on the downward path. Sustained stoppage in some instances would mean use

of more Swedish steel, consumers indicate.

New Base at Trenton, N. J., On Furniture Spring Wire

New York — American Steel & Wire Co. has established a basing point at Trenton, N. J., on furniture spring wire, at 3.60c. However, New York consumers will continue to buy on the Pittsburgh base of 3.35c, as the delivered price amounts to 3.71c, against 3.74c, delivered price from Trenton. Philadelphia consumers also, it is pointed out, will continue to buy on the Pittsburgh base as the delivered price is 3.67c against 3.68c from Trenton. No changes on this product have been reported from other producers.

Tin Plate . . .

Tin Plate Prices, Page 163

Pittsburgh — Loss of tin plate output during the strike may adversely affect the scheduled food pack program. An indication of the seriousness with which government officials view this problem is illustrated in the recent suspension of 215,500 tons of tin plate scheduled for export during first half. Trade reports indicate that the next move by the government would be to direct can manufacturers to restrict container output to that for perishable food items.

In view of present relatively low tin plate inventories, there is every indication that output of this product will be under forced draft in the immediate post-strike period to meet peak food pack requirements expected during July and August; possibly at the expense of sheet production for other purposes.

Tin plate producers are seeking OPA permission to establish the sale of tin mill black plate on a base box base price basis, with proper differentials from the tin plate base. This would simplify the present price structure for these items by placing tin plate and tin mill black plate on a base box set-up. No average increase for tin mill black plate is said to result from the proposed change. The present tin mill black plate price is $3.05 per 100 pounds, base Pittsburgh, Chicago and Gary, with a 10-cent base differential for Granite City, Birmingham, and Sparrows Point.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 163

New York—District bolt and nut manufacturers are forced to reduce operations in order to conserve stocks. Some manufacturers are following the plan of stopping production on a certain size as soon as inventories are reduced to a certain point. Demand is active although not as brisk as a short while ago, this reflecting a slowing in operations at consuming plants for various reasons, but all related apparently to present labor disturbances and a slowing up in building construction for much the same general reason.

Rails, Cars . . .

Track Material Prices, Page 163

New York—Car buying is spotty, due in part at least to uncertainty as to costs of raw materials, to say nothing of their actual availability when required. Meanwhile several car shops throughout the country are down because of labor difficulty and still others are reducing operations to conserve supplies.

Structural Shapes . . .

Structural Shape Prices, Page 163

Boston — Indications are several of the larger fabricated structural projects recently placed will be delayed. Some work is also being held back, but inquiry still continues surprisingly active. Spot stocks of shapes in small size ranges are badly depleted. District fabricating shops are for the most part operating, but backlogs are not heavy. Delay in public works inquiry is welcome; pressure is increasing to delay all but essential construction of this type until labor and materials are easier.

Seattle — Shapes are moving in fair volume and shops report a large number of small orders for construction work, larger projects being delayed until more material is available. Inventories will be exhausted in 60 days or less. The Navy has awarded to Scheumann & Johnson, Seattle, a contract for subdividing dock No. 3 at Puget Sound Navy yard, requiring about 250 tons of shapes. The Navy also has allocation of $5,325,000 and will call for bids soon for 15 piers, breakwaters and other facilities for its berthing terminal at Tongue Point, Oreg.

Chicago — New structural steel inquiry has slowed perceptibly in the past

few days, without doubt a consequence of the steel strike and a realization that commitments made now probably will be subject to indeterminate delays. This being the case, building construction cannot be undertaken and maintained on anything like a schedule. Because of the variables in steel supply when the strike ends, fabricators are not anxious to figure and quote on new work.

Pittsburgh — Prospect of substantial increase in labor and materials costs has forced fabricators to rely on an escalator clause in contracts on which they are submitting bids. Fabricators forced to close their shops because of strikes are taking this opportunity to catch up on drafting work. Shortage of draftsmen and estimators has made it impossible for fabricators to keep up with the large amount of drafting work in recent months. The steel strike will accentuate the shortage of building materials and should materially delay new construction programs scheduled to get under way this spring. Volume of this type work likely will reach near record proportions once wage and price levels are established. Prior to the strike mills were booked ahead about five months on structurals, with angles 6 x 6-inch and under, and channels 15-inch and under somewhat more extended.

Philadelphia — Structural demand has reached the lowest level in recent months. Some fair-sized projects are under active consideration but awards are few and until the outlook is clarified there is prospect of little improvement. One district fabricating shop has been forced down within the past week because of lack of steel, leaving at least two in this immediate area still operating. Bids are being taken on erection of a Pennsylvana state viaduct, Fayette-Somerset, with steel to be furnished by Ft. Pitt Bridge Works, Pittsburgh, against an order placed a few days ago and then held up after much of the fabrication has been completed.

New York — While there is a heavy accumulation of pending structural work, new inquiries are light at the moment and orders are spotty. Office of district fabricators are taking advantage of present lull by working on drawings on which they are far behind.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 163

Pittsburgh — Reinforcing bar inquiries both in number and tonnage, have declined steadily the past three months. No accurate estimate of sales for producers east of the Rocky mountains is available for January, because some of the largest producers have made no effort to enter new inquiries since start of steel strike. However, a rough estimate indicates new bookings during January for these interests totaled less than 60,000 tons, compared with 85,000 tons in December and the peak month last year of 150,000 tons, during October. Contractors have been reluctant to bid on many projects because of the uncertain wage and steel cost factors, and future steel delivery promises. These unpredictable factors also have forced some companies to hold up contemplated expansion programs. Contractors report unbalanced stocks are holding up some work as well. Largest recent inquiry includes 800 tons for state of Kentucky. Export inquiries have taken a sharp spurt in recent weeks, prompted by report that government agencies plan to set aside a larger proportion of reinforcing bar production for essential foreign needs. However, the proposed first half export program has been canceled by CPA. Prior to the strike producers' order backlogs averaged five to six months for domestic tonnage and in some instances sellers were covered 18 months ahead on export business on basis of tonnage allotted for that purpose.

Chicago — Unpredictable factors, arising from the steel strike, are being felt fully in the reinforcing steel market. Not only are suppliers showing a disposition to decline new business, but companies planning new construction and contractors are adopting a policy of deferring plans. Until the wage-price policy has become known, building estimates cannot be made with any degree of accuracy. During the past few days, awards of reinforcing material have been light, representing projects bid some time ago. New inquiry is almost negligible.

Pig Iron . . .

Pig Iron Prices, Page 165

Foundries still able to operate are tapering production to conserve pig iron supply for the period following end of the steel strike, while blast furnaces are resuming operation. Supply is short in some areas and fairly good in others, depending on the blast furnace situation.

In some areas no merchant furnaces are producing, while in others supply is not much reduced.

New York — Although relatively few iron foundries have been forced to suspend recently as a result of the further shortage in pig iron, operations are nevertheless tapering as the companies attempt to conserve stocks. In addition to the steel srike an added complication is the walkout of 3500 tug boat operators serving New York harbor. So far the movement of railroad-owned tug boats has cushioned the effect of the strike and some pig iron still trickling into the district from the few blast furnaces still in operation and dependent upon ferrying across the harbor, is reaching destination. However, there is a backing up of freight as a result of the tug boat operators now out and more serious results are expected if the strike is continued much longer.

Pittsburgh—Those foundries not closed down due to the general walkout of USA-CIO union employes have been able to maintain operations at approximately prestrike pace. However, some are expected to start tapering production schedules this week in an effort to conserve rapidly dwindling inventories. Most interests plan to have sufficient stock on hand at the termination of the steel strike to tide them over the two to three-week period that must elapse before full operations can be resumed. No merchant pig iron stacks are in operation here. Producers still operating in other areas are flooded with inquiries, and despite fact they are rationing output to regular customers, inventories are steadily declining. Many foundries are increasing proportion of scrap, but shortage of cast scrap is a retarding factor.

Adequate supply of foundry coke is reported, with most beehive ovens having switched from blast furnace to foundry coke. The steel strike occurred at an opportune time for one merchant producer here, for its furnace was badly in need of relining. It appears logical that merchant iron producers will have to continue to ration pig iron following termination of the steel strike for requirements necessary to rebuild inventories or even to meet current needs will be enormous.

St. Louis — Pig iron supplies continue short but sellers utilize the steel strike opportunity to catch up. Most have switched to malleable iron to fill accumulated demand of foundries, which have not been able to build satisfactory reserves since the war. Production is at capacity. Plenty of takers are found for all output in plants not affected by the strike, although a good part of tonnage here normally is delivered hot. Manpower now is adequate and no drop in production is forecast, inventories still being at a low point.

Cincinnati — The foundry melt is unchanged against a tight pig iron supply situation. Two major foundries are shut down or curtailing operations drastically because of strikes but so far there is no diverted tonnage. Regular users are getting former tonnages, no more, and all melters report demand for castings pressing. Even strike-bound fabricators are asking that castings be produced, and stored.

Boston — Melt has declined further, due to falling reserves of iron; few additional shops closed because of strikes, but lack of iron is showing up more frequently. Those operating will be bare of iron when production gets under way, worse off for immediate requirements than those closed. Among the latter are some of the largest consumers of both foundry and basic. The one basic user melting is running low. Pressure for iron is not expected to ease for weeks and the effect of the stoppage will be seriously felt for some weeks.

Chicago — Some foundries are getting perilously close to being forced down for lack of iron and coke. A few foundries in the district with USWA (CIO) unions were struck when the strike started, but no shops are known to have suspended work for lack of materials. Some merchant blast furnaces continue to operate and this iron plus some obtained on directives against other furnaces have kept foundries running. However, the day is approaching where inventories will be exhausted and current receipts will be inadequate to maintain melts. Coke supply is becoming critical, too, and in some instances may cause trouble as soon as iron. Operating blast furnaces in the district number nine, same as last week.

Philadelphia — With most blast furnaces serving this district down since the beginning of the strike and with substantial delay expected in getting stacks back into production after resumption, a severe shortage of pig iron is likely to

prevail for a number of weeks. Of those who normally ship tonnage in this district only one seaboard producer has been able to keep going, two in the Buffalo area and two in the Birmingham district.

Scrap . . .

Scrap Prices, Page 166

Scrap consumers, whether strikebound or not, are anxious to accumulate all material possible for use when production is resumed. Storage is resorted to by all possible means to avoid shortage later. General opinion is that scarcity will last well into summer at best and probably longer. Dealers are processing as much tonnage as possible during good weather. Shipments are difficult except where measures have been taken to allow unloading. Prices are firm at ceilings.

Chicago — Overall movement of scrap in this district has been little affected by the steel strike, which has all but one mill here out of production. Contrary to what might be expected, this producer has not found its requirements easier to obtain, the reason being that idle mills are accepting shipments of scrap and laying it down at previously arranged docks or storage yards, and are actively seeking additional supplies. With melting material in short supply, this may assure a better level of operations when the strike ends. Production scrap already is narrowing down to a trickle as steel fabricators exhaust stocks, and it cannot rebound until some time after mills start shipping steel again. Dealers' operations are declining because of shortage of material for preparation. Ceiling prices are holding on all grades of scrap and spring board is paid freely on remote offerings.

Pittsburgh — Further reduction in movement of production scrap is noted here as additional plants curtail operations. Brokers' shipments are off at least 50 per cent. American Rolling Mill Co.'s Butler, Pa., plant is still operating and is taking advantage of the current situation to build scrap inventories, while U. S. Steel Corp. subsidiaries here continue to store scrap at Curry Hollow on the Union Railroad near Irvin, Pa. Pittsburgh Steel Co. also is still accepting shipments. Other production units are no longer attempting to store scrap adjacent to plants. One mill, for example, continued to accept shipments with the intention of leaving material in freight cars, but this practice was soon banned by the railroad. A number of companies are attempting to get dealers' permission to store scrap in dealers' yards. However, the handling charges involved make this effort prohibitive in most instances. It is difficult to determine probable scrap demand immediately following termination of the strike, for in some instances the larger consumers have been able to increase inventories somewhat. There also undoubtedly will be a time lag of two to three weeks before near capacity blast furnace and open-hearth operations can be reached. Considerable time will also elapse before metalworking companies can get production schedules to desired levels, particularly those companies that operated through the strike period and therefore sharply reduced their steel inventories.

Cleveland — In spite of shipments to local steelworks being shut off completely

some scrap is moving to other consuming centers, notably to Weirton, W. Va., where steel production is not interrupted. All shipments are to outside points. Prices are strong as at any time and no sign of weakness has been seen. All interests expect shortage of scrap will extend into the summer at least. While no new orders are being placed now and much tonnage remains to be shipped on old orders, steel mills promise further orders as soon as the steel strike is ended.

Boston — Demand for foundry scrap is active, although numerous consumers have been down. Only in a few cases are cast scrap stocks ample and efforts to increase ratio of scrap in charges are hampered. Although shipments of steelmaking grades are down, offerings and available supplies are also off. Unprepared steel scrap is scarce. Yards seek to improve reserves against expected heavy demand with limited success.

Buffalo — While dealers' supplies have dwindled, processing of scrap is at about recent levels. Dealers report fair tonnages have been bundled and stored for mill consumers, who continue to press for material in spite of holdup in shipments. With yard receipts low and production scrap virtually cut off because of strikes dealers expect a scramble for material. Downstate dealers are reported shipping into the Pittsburgh district. Small shipments are also reported to nearby foundries not hampered by strikes.

St. Louis — Volume of scrap movement remains nearly normal despite the strike. Foundries have been building stocks until they now average 45 to 60 days, the best in many months. Dealer shipments have slowed, largely because of diversion to points unaffected by the steel shutdown. An effort is being made to hold back some shipments and those forced to come in under earlier mill orders have been successfully diverted to other users. Terminated scrap is not becoming available in volume. No. 2 heavy melting steel continues in top demand. All prices are at ceiling.

Cincinnati — Supply of iron and steel scrap has receded and there is no lack of buyers. Most active demand centers about rails and cast. However, brokers and dealers are moving all offerings, in all grades, in spite of suspensions imposed by the strike. Some district interests point to the current light offerings as proof that, had not the steel strike intervened, the scrap supply would have been seriously short. Prices are firm.

New York — Certain Pittsburgh consumers continue to by heavy melting steel here, with some tonnage also moving out of this district for Steelton, Pa., and Sparrows Point, Md. Cast grades continue in heavy demand from local foundries. Strike of tugboat workers in New York has retarded scrap shipments to some extent, although operation of railroad tugs has helped out materially and relief is expected as a result of government seizure of boats tied up by the strike.

Philadelphia — Resumption of steelmaking, following settlement of the steel strike, will result in heavy pressure for scrap. This will be accentuated by the fact that supplies have been restricted by the decline in industrial scrap resulting from labor disturbances and by the likelihood of higher prices on this material eventually as a result of an increase in steel prices. One fairly large con-

sumer of heavy melting steel has been consistently able to store some scrap since the beginning of the strike and one or two others have been able to do with occasional interruptions.

Warehouse . . .

Warehouse Prices, Page 164

Pittsburgh — Steel distributors are expected to continue some form of voluntary allocation of depleted inventories for at least 30 days following termination of the steel strike. Flood of inquiries, some from as far as Texas, that developed throughout the first ten days of the strike, have receded considerably the past week for most metalworking companies have by now become reconciled to the uselessness of getting relief from warehouse stocks. In this district 8 out of 11 distributors have USA-CIO contracts and thus are shut down completely. A trickle of steel continues to originate from the surplus war steel stock pool, but this is wholly inadequate from a tonnage standpoint and in most instances is not of required specifications.

Except for tonnage set aside for emergency repairs, distributors' inventories are nearly depleted, particularly in wide flange beams, galvanized sheets and other sheet items in lighter gages. In some instances the present situation has made it possible for distributors to reduce substantially their top-heavy stocks of alloy bars. Distributors express concern over whether OPA will permit proportionate adjustment in resale prices in line with whatever steel price increase is granted producers. It will be recalled that the steel price boost granted last year was restricted to steel producer except in those instances where individual warehouse interests were able to prove a hardship case. Distributors are hopeful that some preference will be granted them on deliveries of their mill orders once production is resumed.

St. Louis—Warehouse inventories are badly broken with popular sizes about gone. Virtually no sheet or strip is available, although some plates, structurals, bar and alloys can be had. Manufacturers eager to get going despite the strike, are accepting substitutes wherever possible. Items like 2 by 2 1-4-inch bars are cleaned out. Warehouses have received practically no shipments since Jan. 20. A truck strike here earlier had prevented deliveries. This stoppage, plus a prestrike run on warehouses from all over the nation, built up an order backlog that has not yet been worked off and has seriously depleted stocks. Shutdown of warehouses here is predicted within 45 days. A slight decline in the number of inquiries currently is noted. This is attributed to buyer despair and plant curtailments rather than to lessening need.

Seattle — Jobbers face an uncertain future with low inventories and replacements uncertain and far in the future. Demand continues strong for all items, sheets being the most critical.

Cincinnati — Warehouse stocks are being conserved by rejection of orders. Even for maintenance and repair work steel is being doled out, despite pressure for tonnage. All jobbers have had inquiries from far outside normal sales territory.

Chicago — Warehouses continue to guard sales of steel against excessive drain. Customers are exerting considerable pressure for material, but volume of inquiries is not as large as might have been expected. A few distributors had been fortunate in bolstering inventories just before the tie-up came. Chief shortage is in light-gage sheets and light structurals.

Philadelphia—Jobbers report better business in January than in the preceding month but expect a decline this month in the daily rate as stocks are becoming too unbalanced. Even should the steel strike end shortly they doubt if shipments could be resumed in time to restore the balance. They appear confident that on a monthly basis at least, business will be lighter because of the smaller number of working days. Comparing January with December one leading distributor said the gain in January was about 2 per cent.

Iron Ore . . .

Iron Ore Prices, Page 164

Shipments of Lake Superior iron ore by lake in 1945, including mines in the United States and Canada, totaled 74,957,624 gross tons, of which 74,010,532 tons were from mines in the United States and 947,092 tons from Canadian mines, according to figures by the Lake Superior Iron Ore Association, Cleveland. Totals by ranges and percentage of the total are shown in the following tabulation, in gross tons:

U. S. Ranges	Tons	Per cent of total
Mesaba	57,664,524	76.93
Vermilion	1,323,920	1.77
Cuyuna	2,267,097	3.02
Total Minnesota	61,255,541	81.72
Gogebic	4,265,598	5.69
Marquette	4,266,995	5.69
Menominee	4,222,398	5.63
Total Michigan-Wisconsin	12,754,991	17.01
Total U. S. ranges	74,010,552	98.73
Canadian ranges		
Michipicoten	461,974	.62
Steep Rock	485,118	.65
Total Canadian	947,092	1.27
Grand total	74,957,092	100.00

These figures do not include any all-rail tonnage, such as is included in the later report of mine shipments by Association.

Classified by grades, 57,456,537 tons were nonbessemer ore, 76.65 per cent of the total, 13,497,326 tons were bessemer, 18.01 per cent of total, 2,457,105 tons were manganiferous, 3.28 per cent and 599,564 tons were siliceous, 0.80 per cent, all from United States mines. Canadian mine shipments by lake were 947,092 tons, all bessemer, 1.26 per cent of the total.

For the first time in this report the Association breaks down the manganiferous ore into that containing 5 per cent or more manganese, 913,646 tons, and that containing less than 5 per cent manganese, 1,543,459 tons. This is done because the Bureau of Mines does not include in its iron ore reports any manganiferous ore over 5 per cent manganese, such ores being included in its manganese reports. The separation is made to assist in reconciling the Association figures with Bureau of Mines reports.

Nonferrous Metals . . .

Nonferrous Prices, Page 167

New York — Strikes for higher wages in brass plants hinge on increased prices

for brass products and in many respects resemble the situation in the steel industry. Buying of foreign copper by the Metals Reserve Co. at about 20,000 tons a month has been resumed. Total consumption of copper last year is estimated at 1,462,440 tons, against 1,656,052 tons in 1944. Controls over cadmium have been tightened and starting Feb. 1 manufacturers may take 90 per cent of volume used in 1941. Inventory limits are lowered from 45 to 30 days.

A small shipment of tin arrived from Batavia recently. Stocks in the Far East are being distributed by the tin committee, and while additional shipments are expected the supply situation is not likely to be eased until production gets under way in volume later this year.

Canada . . .

Toronto, Ont. — The first intimation of higher prices for steel products in Canada came this week with announcement that all classes of nails have been increased 35 cents per 100 pound keg. The increase applies to producers, wholesalers and retailers and must not exceed the 35 cents, with the exception of retailers who sell in less than 100 pound lots and these may carry the increase to 50 cents per keg.

Another step which will lift the price on various steel products payable to producers is the dropping of all discounts in payment of accounts for most steel items. Whereas formerly steel producers granted a discount of 2 per cent on accounts when paid within 10 days, as of Feb. 1 all discounts were discontinued and bills now are payable net 30 days. At the same time the elimination of discounts was announced it also was reported that higher prices buyers will pay under this arrangement must not be passed along to consumers of finished goods.

Demand for steel in the Canadian markets is expanding rapidly, with many consumers that formerly obtained supplies from the United States now turning to domestic mills for steel. Suspension of imports of steel from the United States is beginning to have rather serious effect on manufacturing activities in this country, and already many workers have been laid off owing to lack of special steels. This situation may become even more serious within the next two or three weeks unless there is an early end to the strike across the line. Canadian steel producers are beginning to withdraw from the market as far as some of the more popular steel materials are concerned. Backlogs on bars, sheets and plate now extend well into second quarter and some producers are beginning to doubt their ability to fill all bookings during first half. In some instances deliveries on old orders have not been up to earlier expectations, with the result that on some materials orders booked for first quarter delivery may not be shipped until some time in second quarter. The announcement that Algoma Steel Corp. will increase production of steel and pig iron by 10,000 tons per month, and that Dominion Steel & Coal Corp. will ship 4000 tons of steel monthly to Montreal, may relieve some of the shortages. It is understood that a large part of this increased output will be made available for further processing by the Steel Company of Canada at its Hamil-

ton and Montreal plants. If Canadian steel mills could operate at maximum capacity, it is doubtful if production would be sufficient to take care of the immediate greatly enlarged demand.

While some steelmakers are hesitating with regard to acceptance of additional business, inquiries continue to pour in. As far as sheets are concerned, the supply situation has become critical and producers are not accepting additional orders. Sheet production has not advanced as rapidly as was expected a few months ago, with the result that some producers have sufficient tonnages booked to absorb practically all output to the end of June. Any new orders being accepted are for delivery in the indefinite future and at prices to be made known at time of shipment.

Structural steel fabricators are beginning to feel the pinch with regard to supply of shapes from the United States. While fabricators report enough steel on hand from American sources to meet requirements for the next two or three weeks, if the strike in the United States continues beyond that time a serious shortage will develop here and have disastrous effects on new construction slated to get under way in the early spring.

Demand for steel plate has been expanding steadily and deliveries against old orders now extend well into May and June. Shipbuilding orders recently placed with Canadian yards by the French government have been reflected in an outpouring of orders for steel plate, while at the same time there has been a consistent flow of orders from builders of rolling stock for railroads. Boiler and tank builders also have shown more interest.

The pig iron supply stuation is becoming tighter and it is stated that Algoma Steel Corp. is preparing to blow in another furnace to increase production by 10,000 tons per month. Producers continue to make deliveries to merchant melters, averaging about 11,000 tons per week, with increased demand from this source largely due to shortage of scrap. Some blast furnaces that have been in continuous operation for two or three years and now are in urgent need of repairs are being kept in blast to provide urgently needed iron for steelmaking.

No improvement is reported in the Canadian scrap market. A general shortage prevails in all materials. Supply of cast scrap and stove plate is well below consumer requirements and foundries are making use of larger quantities of pig iron in their daily melt. Steel mills are drawing heavily on stock for current needs and some have not sufficient inventory to carry them through the winter. Dealers report further reduction in receipts as a result of heavy snow, which has shut out all deliveries from outside points. Slowing down in industrial plants through steel shortages also is affecting offerings of industrial scrap. The scrap situation as a whole is becoming critical and there is little prospect of overcoming the serious shortage before April or May.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2300 tons, plant for Western Electric Co., Allentown, Pa., to Lehigh Structural Steel Co., Allentown, through Austin Co.

1100 tons, plant for construction of prefabricated houses, Anchorage Homes Inc., Westfield, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; J. R. Worcester Co., Boston, engineer.

1100 tons, crane runway, pump house extension, and miscellaneous work, East Chicago, Ind., for General American Transportation Corp., to American Bridge Co., Pittsburgh.

900 tons, new plant No. 1, New Albany, Ind., for Gunnison Homes Inc., to American Bridge Co., Pittsburgh.

390 tons, factory building, Milwaukee, for Harnischfeger Corp., to Wisconsin Bridge & Iron Co., Milwaukee.

380 tons, National Research Laboratory, Cambridge, Mass., to Lehigh Structural Steel Co., Allentown, Pa., through Thomas O'Connor Co., Cambridge, contractor.

325 tons, factory building, Chicago, for Maxwell Bros. Inc., to American Bridge Co., Pittsburgh.

250 tons, dormitory, Pembroke college, Brown University, Providence, R. I., to Bethlehem Steel Co., Bethlehem, Pa.; Gilbane Building Corp., Providence, general contractor.

155 tons, plant building, American Reinforced Paper Co., Attleboro, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Austin Co., New York, contractor.

125 tons, addition to plant, Olympia Brewing Co., Olympia, Wash., to Isaacson Iron Works, Seattle.

125 tons, Midfield Packing Co. plant, Olympia, Wash., to Isaacson Iron Works, Seattle.

100 tons, Bell Telephone Co. building, Sharon Hill, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

1800 tons. tobacco warehouse, Lexington, Ky.; bids Feb. 9 to United Engineers & Constructors, Philadelphia.

1520 tons, beam and DPG spans for line change between Ainsworth and Brighton, Iowa, for Chicago, Rock Island & Pacific railroad; bids Feb. 16.

700 tons, additions to buildings 51 and 52, Laporte, Ind., for Allis-Chalmers Mfg. Co.

500 tons, factory, Montgomery, Ill., for United Wallpaper Inc.

500 tons, extension to power plant, La Crosse, Wis., for Northern States Power Co.

317 tons, bridge over Gallisteo river, Cerrillos, N. Mexico, for State Highway Commission.

290 tons, spans, Rule, Tex., for State Highway Commission.

260 tons, beam spans, San Benito, Tex., for State Highway Commission.

225 tons, bridge 356.08, Pinto, Tex., for Texas & New Orleans railroad.

180 tons, state bridge, Cameron county, Pennsylvania; bids Feb. 26.

120 tons, bridge for Pennsylvania railroad at Washington; American Bridge Co., Pittsburgh, reported low.

100 tons, miscellaneous building construction, Hercules Powder Co., Burlington, N. J.

REINFORCING BARS . . .

REINFORCED BARS PLACED

200 tons, expansion, Peoria, Ill., for Pabst Brewing Co., to Joseph T. Ryerson & Son Inc.; James McHugh Construction Co., Chicago, contractor; bids Jan. 17.

200 tons, expansion, Milwaukee, for Sears, Roebuck & Co., to Ceco Steel Products Corp., Chicago; Hunzinger Construction Co., Milwaukee, contractor.

150 tons, brewery building, Holyoke, Mass., to Concrete Steel Co., Boston.

120 tons, building No. 10, Kankakee, Ill., for American Marietta Co., to Joseph T. Ryerson & Son Inc., Chicago.

110 tons, bars and shapes, brewhouse addition, Dawson Brewery Inc., New Bedford, Mass., to Fabricated Steel Products Co., Boston, 70 tons, and J. E. Cox Co. Inc., Fall River, Mass., 40 tons; Theo. Loranger & Sons, New Bedford, general contractors.

REINFORCED BARS PENDING

850 tons, dam, Poteau river, near Wister, Okla.; bids about Feb. 25 to U. S. engineer, Tulsa, Okla.

260 tons, building, Chicago, for American Colortype Co.; bids Feb. 5.

PLATES . . .

PLATES PLACED

100 tons or more, one all welded steel hopper barge, 175 x 26 x 10 feet, eight inches, equipped with four cylindrical tanks, eight feet, four inches diameter, 63 feet long; Union Barge Line Corp., Pittsburgh, bids Feb. 15; also three all-welded steel liquid cargo barges, same overall size as Hopper Barge.

RAILS, CARS . . .

RAILROAD CARS PLACED

Columbus & Greenville Railway Co., 50 fifty-ton all-steel flat bottom gondola cars, to American Car & Foundry Co., New York.

Godfrey L. Cabot Inc., 20 fifty-ton steel covered hopper cars for the transportation of carbon black, to American Car & Foundry Co., New York.

Gulf Mobile & Ohio, 50 seventy-ton covered hopper cars, to American Car & Foundry Co., New York.

RAILROAD CARS PENDING

Ann Arbor, 50 fifty-ton box cars, bids asked.

Chicago, Indianapolis & Louisville, three passenger trains of five cars each, permission to purchase granted by federal court.

Erie Railroad, seven light-weight sleeping cars; bids asked Feb. 28.

New York, New Haven & Hartford, 75 caboose cars.

Wheeling & Lake Erie, 750 fifty-ton gondola cars, pending.

LOCOMOTIVES PLACED

Union Freight Railroad Co., Boston, five diesel-electric switching locomotives, to General Electric Co., Schenectady, N. Y.

LOCOMOTIVES PENDING

Chicago, Indianapolis & Louisville, 14 diesel-electric freight locomotives, permission granted by Federal court to purchase; also to buy three trains of five cars each.

CONSTRUCTION AND ENTERPRISE

MICHIGAN

CARROLLTON, MICH.—Saginaw Furnace Co., 701 Carrollton St., has been incorporated with $49,999 capital to manufacture machinery and castings, by Clarence E. Ahlborn, 421 North Webster St., Saginaw, Mich.

DETROIT—Redford Tool & Die Co., 17170 Rockdale St., has let contract to Stibbard Construction Co., 3000 Grand River Ave., for a one-story plant building to cost about $75,000. Jensen & Keough, 15875 Couzens Highway, are architects.

DETROIT—Steelcraft Tractor Equipment Co., 17528 Kentucky Ave., has been incorporated with $50,000 capital to manufacture automotive and tractor equipment, by D. Harrison Millard, 18869 Santa Rosa Ave.

DETROIT—Van Syoc Industries Inc., 5-220 General Motors Bldg., has been incorporated with $100,000 capital to manufacture machines, machined parts and accessories, by Glen W. Van Syoc, same address.

DETROIT—Arcadia Tool & Die Co., 8690 Grinnel Ave., has been incorporated with $50,000 capital to manufacture tools and dies, by Anthony J. Wagner, same address.

DETROIT—Precision Automatic Specialties Co.,

8356 Indiana St., has been incorporated with 250 shares no par value to conduct an engineering and manufacturing business, by George Pascoe, same address.

DETROIT—Acme Metal Etching Co., 4857 St. Aubin St., has been incorporated with $30,000 capital to manufacture etched and lithographed products, by Harold E. Ebbers, 15 East Kirby St.

DETROIT—Air-O-Tomic Inc. 460 West Jefferson Ave., has been incorporated with $50,000 capital to manufacture heating and air conditioning equipment, by E. H. Van Valkinburgh, 645 Janette Ave., Windsor, Ont.

DETROIT—Advance Steel Treating Co., 520 Orleans Ave., has been incorporated with $50,000 capital to heat treat ferrous and nonferrous metals, by Claude Sintz., 1928 Stanley St.

FERNDALE, MICH.—General Die Casting Co., 1956 Bardett St., has been incorporated with $50,000 capital to manufacture die castings, by James E. Marchand, 16913 Sorrento St., Detroit.

GRAND RAPIDS, MICH.—Litscher Mfg. Co., 507 Monroe St. NW, has been incorporated with 2500 shares no par value to manufacture electrical apparatus, by Christian J. Litscher, 1622 Sherman Ave. SE.

GRAND RAPIDS, MICH.—Diesel Equipment Division of General Motors Corp., 300 Allen Rd. SW., has let contract to Owen-Ames-Kimball Co., 38 Pearl St. NW., for a diesel plant to cost $250,000. Allen & Kelly, Architects & Builders Bldg., Indianapolis, are architects.

IRON MOUNTAIN, MICH.—Grede Foundries & Lake Shore Engineering Co., is having plans drawn by Giffels & Vallett & A. Rosetti, 1000 Marquette Bldg., Detroit, for a foundry, machine shop and power house, to cost about $300,000.

ROYAL OAK, MICH.—Lawson-Leschke Co., 110 East Sixth St., has been incorporated with $75,000 capital to manufacture tools, dies, machinery and accessories, by Elmer H. Leschke, 17385 Pinehurst Ave., Detroit.

MASSACHUSETTS

ATTLEBORO, MASS.—Standard Plastics Co., 62 Water St., has let contract to Swanson Construction Co., 89 County St., for a two-story 50 x 90-foot plant addition, a one-story office and a power plant, to cost over $40,000. Dwight Seabury, 188 Main St., Pawtucket, R. I., is engineer.

CAMBRIDGE, MASS.—National Research Co., 100 Brookline Ave., is having plans drawn for a plant costing about $500,000. Perry, Shaw & Hepburn, Park Square Bldg., Boston, are architects.

LYNN, MASS.—Signal Mfg. Co., 587 Washington St., plans a one-story 80 x 185-foot plant to cost about $65,500. M. F. Coombs, 56 Central Ave., is architect.

WOBURN, MASS.—F. Fowle, 10 Cedar St., plans a one-story plant 40 x 100 feet and 45 x 100 feet, to cost over $40,000. H. E. Davidson & Son, 50 Beacon St., Boston, are architects.

CONNECTICUT

BRIDGEPORT, CONN.—American Metal Products Co., 80 Parallel St., has let contract to C. I. Stalhammer, 329 Mapledale Place, for a two-story plant building, to cost about $40,000. C. W. Sword, 337 Colorado Ave., is architect.

HAMDEN, CONN.—Plasticrete Corp., 1883 Dixwell Ave., has let contract to Patterson Construction Co., 66 Anderson St., New Haven, Conn., for a machine shop and office building costing about $50,000.

MILFORD, CONN.—Nathan Mfg. Co., 250 Park Ave., New York, is having plans drawn for a 100 x 100-foot plant at Hill and Washington Sts., to cost about $50,000.

NEW YORK

PEARL RIVER, N. Y.—Lederle Laboratories Inc., 30 Rockefeller Plaza, New York, will let contract soon for a power plant and boiler house.

NEW JERSEY

SEWAREN, N. J.—Public Service Electric & Gas Co., 222 South Main St., Trenton, N. J., has plans under way for a generating plant, including two 100,000 kw generators, docks and coal storage facilities, to cost about $23 million.

PENNSYLVANIA

CORAOPOLIS, PA.—Homestead Valve Mfg. Co., Coraopolis, plans a one-story plant costing about $140,000. Prack & Prack, Martin Bldg., Pittsburgh, are architects. R. A. Wallace, Clark Bldg., Pittsburgh, is consulting engineer.

PHILADELPHIA—Reyburn Mfg. Co., Indiana Ave. and Sixteenth St., will take bids about Feb. 15 for a plant addition costing about $100,000. G. M. Ewing, Broad and Chestnut Sts., is architect.

TYRONE, PA.—Corning Glass Co., Walnut St., Corning, N. Y., has let contract to H. K. Ferguson Co., Hanna Bldg., Cleveland, for a plant and office building, estimated to cost about $1 million.

WASHINGTON, PA.—Washington Steel Corp. has plans for an additional building and remodeling several existing structures at cost of over $40,000. J. A. Hopkins, City Saving Bank Bldg., Alliance, O., is engineer.

OHIO

AKRON—Goodyear Tire & Rubber Co., 1144 East Market St., will take bids soon for a two-story 100 x 340-foot plastic plant to cost about $1 million. J. Gordon Turnbull Inc., 2630 Chester Ave., Cleveland, is consulting engineer.

CINCINNATI—Steelcraft Mfg. Co., 16 East 72nd St., Carthage, O., plans a new plant on a nine-acre site at Rossmoyne, if a street is opened to give access to the tract. Approximately 25,000 square feet of floor space is planned. Charles Levinson is vice president.

CLEVELAND—Cuyahoga Tool & Mold Co., James L. Lover, 16131 Holmes Ave., plans new plant at 17920 Waterloo Rd., to cost about $65,000.

CLEVELAND—Cleveland Aircraft Tool & Die Co., 9016 Manor Ave., plans one-story factory and office building 60 x 160 feet and will ask bids probably in March. Lester Zatco is president.

CLEVELAND—Cleveland Republic Tool & Gage Co., 9615 Meech Ave., will build a $15,000 addition, one story, 68 x 121 feet. Joseph G. Luke is president and treasurer.

JACKSON, O.—Armstrong Furnace Co., 1639 Olentangy, Columbus, O., J. W. Norris, president, plans a plant costing about $150,000.

TOLEDO, O.—Plaskon Division of Libbey-Owens-Ford Glass Co., Nicholas Bldg., has let contract to Stone & Webster Engineering Corp., 49 Federal St., Boston, for several multi-storied buildings for manufacture of plastic moulding powders, to cost about $5 million.

ILLINOIS

PEORIA, ILL.—Hiram Walker & Sons Inc., foot of Ehrman St., plans distillery rack house with 110,000-barrel capacity, to cost $1 million, with equipment.

INDIANA

INDIANAPOLIS—International Harvester Co., H. E. Gottberg, works manager, will build a foundry addition as part of $360,000 foundry expansion program. Addition will cover 15,000 square feet floor space, including core room enlargement and additional equipment for engine block casting.

INDIANAPOLIS—Light Metals Inc., 100 East

24th St., is having plans drawn for a plant addition to cost over $40,000.

NEW CASTLE, IND.—Ingersoll Steel Division of Borg-Warner Corp. announces $850,000 expansion program when materials are available.

WHITING, IND.—Standard Oil Co. of Indiana, 910 South Michigan Ave., Chicago, has let contract to Gust K. Newberg Co., 9 South Clinton St., Chicago for research laboratory buildings including three-story 49 x 324-foot, three-story 53 x 280-foot and one two-story 72 x 122-foot buildings, to cost about $2 million.

MARYLAND

SPARROWS POINT, MD.—Bethlehem Steel Co., Bethlehem, Pa., has plans for spending over $75 million on an expansion, including coke oven battery, 66-inch hot strip mill and four 25,000-ton ore carriers at Bethlehem-Sparrows Point Shipyards Inc.

NORTH CAROLINA

CHARLOTTE, N. C.—Linde Air Products Co., 30 East 42nd St., New York, plans a manufacturing plant here.

LOUISIANA

LAKE CHARLES, LA.—Mathieson Alkali Works, Lake Charles, plans facilities here for manufacture of sodium nitrate, to cost about $1 million.

MISSOURI

ST. LOUIS—Moog Industries Inc., 6650 Easton Ave., has let contract to J. E. Williams Construction Co., 6635 Delmar Blvd., for a one-story 71 x 141-foot machine shop and office building, estimated to cost over $40,000, with equipment.

ST. LOUIS—A. B. Ideson, 4914 Gravois Ave., has let contract to Brown & Ideson Inc., for one-story 100 x 261-foot and 20 x 60-foot plant buildings to cost over $100,000 with equipment.

WISCONSIN

MILWAUKEE — International Motor Truck, branch of International Harvester Co., 180 North Michigan Ave., is having plans prepared for a truck sales and service garage to cost about $500,000, including equipment.

MILWAUKEE—Ellsworth Pipe & Supply Co., 1739 West St. Paul Ave., has let contract to Peters Construction Co., 2901 North 38th St., for a one-story 120 x 122-foot plant estimated to cost $70,000. Grassold & Johnson, 734 North Jefferson St., are architects.

PORT WASHINGTON, WIS.—Harnischfeger Corp., 4400 West National Ave., Milwaukee, plans a one-story 180 x 360-foot factory building to cost about $300 000. R. A. Messmer & Bros., 231 West Wisconsin Ave., Milwaukee, are architects.

MINNESOTA

MINNEAPOLIS—Champion Outboard Motors Co., 2633 27th Ave. South, has let contract to Madsen Construction Co., 1790 Lyndale Ave. South, for a one-story 300 x 350-foot plant building to cost about $300,000. Magney, Tusler & Setter, 202 Foshay Tower, are architects.

KANSAS

EL DORADO, KANS.—Skelly Oil Co., El Dorado, plans refinery expansion for recovery of light oil fractions, to cost about $300,000.

TEXAS

BROWNSVILLE, TEX. — Carthage Hydrocal Inc. and United Gas Corp., Fairfield Ave., Shreveport, La., have plans in preparation for a gasoline refining plant, to cost about $14 million.

DALLAS, TEX.—Texas Sheet Metal & Mfg. Co., 6114 Forest Park Rd., is having plans drawn by Avery & Shanklin, 1420 Wood St., for a sheet metal shop addition, to cost about $40,000.

FREEPORT, TEX.—Dow Chemical Co., Freeport has let contract to Tellepson Construction Co., 3900 Clay Ave., Houston, Tex., for a chemical plant to cost about $2 million.

HOLLIDAY, TEX.—Warren Petroleum Corp., National Bank of Tulsa Bldg., Tulsa, Okla., has let contract to J. F. Pritchard & Co., National Bank of Tulsa Bldg., Tulsa, Okla., for a natural gasoline plant here and another at Wichita Falls, Tex., costing $650,000 and $750,000, respectively.

IRVING, TEX.—Aircraft Industries Inc., Irving, is having plans prepared for plant expansion to cost about $75,000.

CALIFORNIA

COMPTON, CALIF.—L. P. Goltra Sr. is building a machine shop at West Rosecrans Ave., 50 x 60 feet, to cost about $12,000.

LONG BEACH, CALIF.—Marine Engineering & Supply Co. is erecting a shop building at 21742 South Alameda St., containing 2100 square feet floor space.

LOS ANGELES—Steel Furniture Mfg. Co., 1020 East 59th St., has let contract to C. Witt, 6227 South Wilton Place, for a plant addition 37 x 206 feet, to cost about $20,000. Robert F. Train, 406 South Hill St., is architect.

LOS ANGELES—Fractional Motors Corp. has been incorporated with $20,000 capital, represented by Hill, Morgan & Farrer, 1007 Title Guarantee Bldg.

LOS ANGELES—American Boiler & Engineering Co., 4710 Long Beach Ave., is building a welding shop 40 x 70 feet, to cost about $10,000.

PASADENA, CALIF.—Barry Moore Industries is building a machine shop at 1363 Wesley Ave., 74 x 96 feet, to cost about $15,000.

OAKLAND, CALIF.—Earle M. Jorgensen Co., 10510 South Alameda St., Los Angeles, will build a warehouse addition at 1657 22nd St., Oakland, to cost about $110,000. Haas Construction Co., Merchants Exchange Bldg., San Francisco, is contractor.

VERNON, CALIF.—Electric Tool & Supply Co., 5316 Santa Fe Ave., will build a one-story 123 x 141-foot plant at Santa Fe Ave. and 30th St., to cost about $80,000.

VERNON, CALIF.—Standard Auto Body Co., 1521 South Central Ave., Los Angeles, has let contract to T. R. Cooper, 1121 South Hill St., Los Angeles for a one-story 220 x 260-foot plant at 4828 Soto St., to cost about $175,000.

OREGON

ONTARIO, OREG.—Bridgeford Co., division of Frozen Foods Co., Los Angeles, is considering bids for a $1 million quick-freeze plant here.

PORTLAND, OREG.—Pacific Chain & Mfg. Co., R. A. Miller, president, has bought the Kaiser subassembly plant at The Dalles and is moving its equipment to Guilds Lake, where a site has been bought for a $200,000 plant.

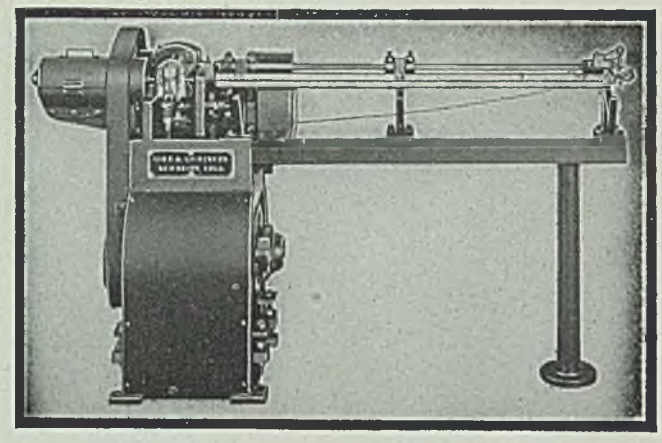
WASHINGTON

CENTRALIA, WASH.—Alva Yeager, 719 North Tower St., plans erection of a machine shop, steel construction.

KELSO, WASH.—City, Lora Blackstone, city clerk, will open bids Feb. 15 for a sewage treatment plant.

SNOHOMISH, WASH.—Hershey Packing Co. plans addition to plant for freezer and storage warehouse.

SEATTLE—Fentron Steel Works, 1401 West Garfield St., has plans for steel fabricating plant at 2800 Market St., steel, with aluminum roof, 150 x 193 feet, to cost about $65,000.



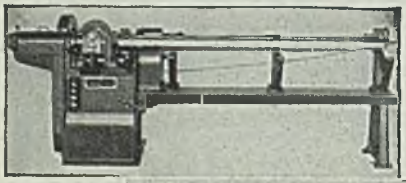
SHUSTER WIRE STRAIGHTENER TYPE A
Wire Capacity 1/32"—1/16" Diameter

Faster Cutting Speeds
GREATER PRODUCTION!

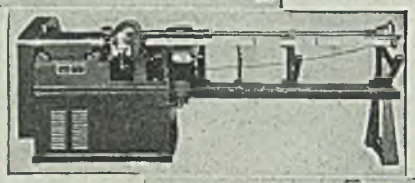
Outstanding Features—

Almost continuous wire travel
Lightning cut-off assures square-cut ends
High speed, direct driven 5-die straightening flier
Quiet, highly efficient V-belt motor drive
Ball and roller bearings throughout
Extremely rigid construction
Fully guaranteed as to material and workmanship.

Descriptive folder on request.

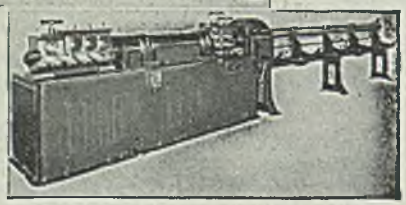


Type 1A
1/16"—3/16"
Dia.



Type 2A
⅛"—¼"
Dia.

Type 3A
3/16"—3/8" Dia.
Type 4A (not shown)
3/8"—5/8" Dia.



The F. B. Shuster Mfg. Co., Inc., New Haven, Conn.

SHUSTER
Automatic
WIRE STRAIGHTENING
AND CUTTING
MACHINES
Since 1866

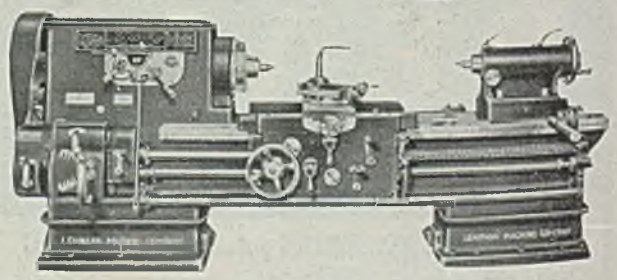
"American"
Internationally Known
Cold Pipe, Conduit & Tube Bending Machines

Hand Operated: We manufacture ten sizes and types, bending from ¼" to 6" inclusive.

Motor Powered: → Three capacities, 1" to 4", 1" to 6", and 1" to 8" inclusive, all for bending pipe cold.

"American"
PIPE BENDING MACHINE
Company INC.
Factory and Main Office, 11 Furnace Street, Pawtucket, Vermont
(Sales Office Formerly 37 Pearl Street, Boston, Massachusetts)

For Heavy Duty—
HYDRATROL LATHES



Sizes 20" to 36". The 27" Heavy Duty Lathe, shown above, has ruggedness and power for the heaviest work, yet operates as easily as a small machine.

Lehmann MACHINE CO.
CHOUTEAU AT GRAND ★ ST. LOUIS 3

$$\left(2\tfrac{7}{16} \times 7\right) \times \left(4\tfrac{7}{8} \times 3\tfrac{5}{16}\right) =$$

$$17\tfrac{1}{16} \times \left(\frac{39}{8} \times \frac{53}{16}\right) = 17\tfrac{1}{16} \times \frac{2067}{128}$$

$$17\tfrac{1}{16} \times 16\tfrac{19}{128} = \frac{273}{\cancel{16}\ 1} \times \frac{\cancel{2048}^{\ 1}_{\ \cancel{128}\ 1}}{} = \cancel{275}$$

$$= 275.5327$$

CLOSE FIGURING

by buyers and sellers of good used or surplus machinery and supplies adds up to **STEEL'S** *"Used and Rebuilt Equipment" section. Rates are moderate . . . results are excellent. Make no mistake about it and send your instructions to* **STEEL**, *Penton Building, Cleveland 13, Ohio.*

USED and REBUILT EQUIPMENT
MATERIALS

WANTED
COLD DRAWN STEEL WIRE—IN COILS

SAE 1010—or similar composition.
Sizes 5/16" Diam. down to 1/16" Diam.
(No. 0—No. 16 Gauges)
in Plain, Cop'd or Galv'd.
Wire us description and quantities.

E. H. TITCHENER & CO.
BINGHAMTON, N. Y.
"59 years makers of Wire Products"

FOR SALE
ALLOY STEEL
ROUND, HEX, SQUARE BARS
New York and Pittsburgh
Warehouse Stocks
L. B. FOSTER CO.
3 Park Place, New York 7
Phone—Barclay 7-2111
P. O. Box 1647, Pittsburgh 30
Phone—Walnut 3300
Michigan Distributor
C. J. GLASGOW COMPANY
2009 Fenkell Ave., Detroit 3
Phone—Townsend 8-1172

RAILS NEW AND RELAYING
TRACK ACCESSORIES
from **5** *Warehouses*
- PROMPT SHIPMENTS
- FABRICATING FACILITIES
- TRACKAGE SPECIALISTS

EVERYTHING FROM ONE SOURCE
L. B. FOSTER COMPANY
PITTSBURGH CHICAGO
NEW YORK SAN FRANCISCO

WANTED TO BUY
Buffalo combination PUNCH AND SHEAR—1-1/2 or similar; ANGLE SHEAR; PLATE OR SQUARING SHEAR; PRESS BRAKE, Medium capacity.
OWEN STEEL COMPANY
P. O. Box 741, Columbia, S. Car.

RAILWAY EQUIPMENT AND ACCESSORIES
We can furnish rails, spikes, bolts, angle bars, locomotives, cranes and other railway material.
Write, wire or phone for prices
SONKEN-GALAMBA CORP.
108 N. 2d St. Kansas City, Kansas

Wanted For Large Steel Processing Corporation
5 TRAVELING CRANES: 230 volt D. C. 5 and 10 ton capacity. 63 ft. span. Must be definitely modern crane equipment.
Address Box 371,
STEEL, Penton Bldg., Cleveland 13, O.

RELAYING RAIL
TRACK ACCESSORIES
MIDWEST STEEL CORP.
Gen'l Off. CHARLESTON 21, W. VA.
Warehouses
CHARLESTON, W. VA.
KNOXVILLE, TENN. ● PORTSMOUTH, VA.

Use This Section

When you have machinery or equipment you want to sell—STEEL can help you. For rates, write STEEL, Penton Bldg., Cleveland

---

DULIEN Buys
DULIEN Sells
DULIEN Liquidates

Rail, Accessories
Railway Equipment
All Steel Products

DULIEN STEEL PRODUCTS, Inc.

SELLERS — BUYERS — TRADERS
More for your Dollar
IRON & STEEL PRODUCTS INC.
41 Years' Experience
13462 S. Brainard Ave.
Chicago 33, Illinois
"Anything containing IRON or STEEL"

FOR SALE
L. & A. SHEAR
122" x 1-1/8" Capacity
36" Gap
Motor Driven

AARON MACHINERY CO.
45 Crosby St., New York 12, N. Y.
CAnal 6-0421-3

PLANT FOR SALE
All steel building, 502' long, 162' wide. Center bay 60' with 51' bay on each side. Has 5 to 10 ton Shaw traveling crane, 30' high to top of rail and 40' from ground to bottom of truss. Railroad track running thru center of building; concrete floor, unlimited load. Located in the Greater St. Louis Industrial Area—the Hub of America, with railroad, truck, water and air transportation facilities; complete with all utilities.

JOS. GREENSPON'S SON PIPE CORPORATION
National Stock Yards, Ill.
(Across the Mississippi from St. Louis)

FOR SALE
We have 80,000 lbs. of 3/4" Rd. Cold Drawn SAE-3115 ELECTRIC FURNACE ALLOY STEEL which we wish to dispose of quickly. If you can use all or any substantial part, we will name attractive price.
LELAND-GIFFORD CO.
Worcester, Mass.

Wanted
SQUARING SHEAR
Cincinnati preferred, 3/8 x 8 to 1/2 x 12 capacity.
A. LUCAS AND SONS
1325 S. Washington St., Peoria 2, Illinois

Help Wanted

WANTED SALES ENGINEERS

Young men with engineering background interested in selling heavy machinery to metalworking and process industries. Old established firm located in central Ohio. Excellent opportunities for advancement. A good sales personality is essential. Write today stating age, education, experience and expected salary. Interviews will be arranged for those who qualify. All replies confidential. Address Box 417, STEEL, Penton Bldg., Cleveland 13, O.

Steel Plant Manager

For a Foreign Plant

Experience in Open Hearth Bessemer Converters and Duplexing Practice Supervision of Open Hearth Supt. and other Department Foremen Reliable, Temperate, Capable Executive required. All negotiations strictly confidential. For interview with Company Representative

C. W. KINTER
1916 Clark Bldg., Pittsburgh 22, Pa.

EXPERIENCED DESIGN ENGINEER AND ESTIMATOR for immediate and permanent employment by a progressive Central New England steel plate fabricating concern in business for the past half century. A man experienced in the design and estimating of welded steel piping, penstocks, storage and pressure tanks preferred. Experience in road machinery and snow removal equipment design and estimating would be of value to the applicant. Address Box 420, STEEL, Penton Bldg., Cleveland 13, O.

WANTED: EXECUTIVE WHO CAN BE RECommended to run small precision wire manufacturing concern for owner. Middle age acceptable. Must have good experience in wire industry and sufficient metallurgical knowledge of high carbon and other ferrous wire products to supply to each customer products exactly suited to their special needs. Write for interview describing wire industry experience and managerial work in detail. Address Box 425, STEEL, Penton Bldg., Cleveland 13, O.

SHEET METAL AND LIGHT STRUCTURAL concern (Cleveland, Ohio) doing industrial work desires a Plant Superintendent with A-1 references and character. Must have complete knowledge of sheet metal working machines. Must be able to layout all types of patterns, must be able to handle and supervise mechanics. State complete qualifications in application. All replies held in confidence. Address Box 416, STEEL, Penton Bldg., Cleveland 13, O.

ENGINEERS AND DRAFTSMEN — STRUCtural, experienced in heavy material handling equipment, such as cranes and waterfront unloading structures. Old established manufacturer. Vicinity New York. Reply stating experience, age, salary expected, when available. Address Box 409, STEEL, Penton Bldg., Cleveland 13, O.

Help Wanted

Wanted COST ESTIMATOR

Young man experienced in estimating manufacturing costs of heavy machinery. Engineering background preferred. Old established firm located in central Ohio. Excellent opportunities for advancement. Write today stating age, education, experience and expected salary. An interview will be arranged at your convenience. All replies confidential. Address Box 418, STEEL, Penton Bldg., Cleveland 13, O.

SALES ENGINEER WANTED

Young man with sales engineering experience and executive ability as Assistant to Sales Manager. Knowledge of fabricated steel and plate work required. Send references with letter of application. Address Box 399, STEEL, Penton Bldg., Cleveland 13, O.

WANTED: DISTRICT SALES MANAGER WAter treating and process equipment for liquids. Must be familiar with these lines and have held similar positions. Location New York City. Write stating experience, education, age, companies worked for, references, positions held, salary expected, etc. Enclose picture. Address Box 351, STEEL, Penton Bldg., Cleveland 13, O.

WANTED: SALES MANAGER EXPERIENCED in process equipment for liquids and water treating equipment. Location middle west. Write giving age, education, experience, positions held, companies employed by, references, salary expected. Enclose picture. Address Box 377, STEEL, Penton Bldg., Cleveland 13, O.

SALESMAN, EXPERIENCED ON STAINLESS Steel, especially bars and wire—must also have executive experience and ability. For an active, energetic man, position holds excellent opportunity for advancement. Write fully, please. Address Box 398, STEEL, Penton Bldg., Cleveland 13, O.

STENOGRAPHER, FEMALE, EXPERIENCED metal industry, buying-selling. Interesting work. Must have good telephone voice and diction. Good opportunity. Address Box 423, STEEL, Penton Bldg., Cleveland 13, O.

WAREHOUSE MAN EXPERIENCED, TO TAKE full charge shipping, receiving, buying-selling. Good opportunity for right man. Address Box 424, STEEL, Penton Bldg., Cleveland 13, O.

CLASSIFIED RATES

All classifications other than "Positions Wanted," set solid, minimum 50 words, 7.00, each additional word .14; all capitals, minimum 50 words 9.00, each additional word .18; all capitals leaded, minimum 50 words 11.00, each additional word .22. "Positions Wanted," set solid, minimum 25 words 1.75, each additional word .07; all capitals, minimum 25 words 2.25, each additional word .09; all capitals, leaded, minimum 25 words 2.75, each additional word .11. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request.
Address your copy and instructions to STEEL, Penton Bldg., Cleveland 13, Ohio.

Accounts Wanted

MANUFACTURER'S REPRESENTATIVE

Eastern Michigan, Detroit office, Sales Engineer. Automotive and allied industries requirements. Broad background; wide acquaintance with established confidence in product represented. Die castings; plastics, auto-body interior components preferred. Qualifications also cover tubular products, drop forgings or stampings. Must be high grade established source desiring first-class aggressive overall representation. Address Box 415, STEEL, Penton Bldg., Cleveland 13, O.

Manufacturer's Representative

State of Ohio or Northern section. Cleveland Office. Forgings, castings, screw machine parts, plastics, etc. Must be hi-grade account.

Address Box 338
STEEL, Penton Bldg., Cleveland 13, O.

Manufacturers' Representative

With extensive background among electronics, plastic and metal working industrial plants in the metropolitan New York City area, invites inquiries from manufacturers who are interested in obtaining aggressive and effective representative for their products in this area.

Address Box 391
STEEL, Penton Bldg., Cleveland 13, O.

SALES ENGINEER WITH OFFICE IN PITTSburgh, and 15 years' selling experience in Pittsburgh, Youngstown, Wheeling area, solicits inquiry from manufacturer of mechanical equipment requiring engineering representative in this district. Commission basis. Address Box 419, STEEL, Penton Bldg., Cleveland 13, O.

MANUFACTURERS' REPRESENTATION DEsired. Well established Washington export company desires representation in dealing with Washington and New York Governmental and foreign agencies. All types products. Excellent connections. Apply Box 402, STEEL, Penton Bldg., Cleveland 13, O.

Employment Service

SALARIED POSITIONS $2,500-$25,000. THIS thoroughly organized confidential service of 36 years' recognized standing and reputation carries on preliminary negotiations for supervisory, technical and executive positions of the calibre indicated through a procedure individualized to each client's requirements. Retaining fee protected by refund provision. Identity covered and present position protected. Send only name and address for details. R. W. BIXBY, INC., 110 Dun Bldg., Buffalo 2, N. Y.

EXPAND

YOUR REPRESENTATION . . .

An advertisement here puts you in touch with trained, efficient, reliable men looking for new lines. Write STEEL, Penton Bldg., Cleveland, O.

Positions Wanted

METHODS TOOL ENGINEER. AVAILABLE for sheet metal fabrication plant. Age 33. 13 years' experience in processing; production methods; design and estimating of tools, dies and products. Also supervision. Desires responsible position requiring the above qualifications. Address Box 414, STEEL, Penton Bldg., Cleveland 13, O.

SALES AND ENGINEERING SERVICES available to mill or warehouse by experienced metallurgical engineer with many years of consumer contact; mill experience, on carbon, alloy, stainless bar and wire products, as well as tool steels. Cleveland area preferred. Address Box 426, STEEL, Penton Bldg., Cleveland 13, O.

PLANT MANAGER OR EXEC. ASST.: YOUNG consulting management engineer desires position in small or medium sized manufacturing enterprise. Experience in sheet metal, steel, rubber, glass, paper, food and service industries. Address Box 411, STEEL, Penton Bldg., Cleveland 13, O.

A MANUFACTURING AND SALES EXECUtive aged 30 with over 25 years sales experience with Detroit industry desires to represent an established and reputable concern in the Detroit area. Address Box 383, STEEL, Penton Bldg., Cleveland 13, O.

OPPORTUNITIES AND PROFITS

are of equal interest to distributors and manufacturers—use an ad on this page next week to let manufacturers know you are interested in taking on new lines.

Opportunities

Opportunities

WANTED

MECHANICAL OR ELECTRICAL PRODUCTS

Must be fully patented with a working model available and have large volume possibilities. All items submitted will receive confidential consideration. Principals only.

ADDRESS BOX 421

STEEL, PENTON BLDG. • CLEVELAND 13, O.

WILL BUY FOR CASH

A going industrial business located in the Middle West involving $250,000 to $750,000 for factory and products having a large potential volume.

With your reply, please submit complete information including pictures of your factory and products.

All proposals will be held confidential and receive immediate consideration.

No brokers, please.

Address Box 422 • STEEL, Penton Bldg. • Cleveland 13, O.

SPECIAL MANUFACTURERS TO INDUSTRY... *Since 1905*

Metal Specialties comprised of STAMPINGS, FORMING, WELDING, SPINNING, MACHINING. All Metal or Combined with Non-Metal Materials

Write for Folder

LARGE SCALE PRODUCTION OR PARTS AND DEVELOPMENT ONLY

GERDING BROS.

SE THIRD VINE ST. • CINCINNATI 2, OHIO

Wanted

SMALL STAMPING WORK

11, 12, 13, 14 gauge.

We have plenty of steel and can give fast delivery on the above gauges.

Also equipped to handle tool and die work.

Ohio Valley Tool & Die Co.

113 Washington St., Steubenville, Ohio

AVAILABLE NOW

Expert

FORGING SERVICE

We forge, anneal & sandblast board hammer forgings of

1—All tool steels including Tungsten, Molybdenum and Cobalt High Speed Steels up to 3 lbs.

2—Carbon and alloy steels up to 25 lbs. Can also make your dies.

THE OK TOOL CO., SHELTON, CONN.

A Div. of Aerodynamic Research Corp.

Automatic and Hand Screw Machine Products

Up to 2¼ inches - Any Metal Drilling and Lathe Work.

E. J. BASLER CO.

221 S. La Salle St., Chicago 4, Ill. Plant—Chesterton, Ind.

Send Your Inquiries for

SPECIAL ENGINEERING WORK

to the

A. H. NILSON MACHINE COMPANY, BRIDGEPORT, CONN.

designers and builders of wire and ribbon stock forming machines.

We also solicit your bids for cam milling

ADVERTISING INDEX

~ ~ ~

Table of Contents Page 53
Classified Advertisers, Pages 189, 190, 191