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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 118, NO. 17

APRIL 23, 1946

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Titanium Hydride Properties of Metal Powders

Automatic Arc Welding Locomotive Radiator Heaters

Problems of Starting Up an Iron and Steel Plant



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Disregarding Congress

Seldom are the last words of an eminent man as pertinent to current problems as were those of Chief Justice Stone. In his final dissent, he held that "It is not the function of this Court to disregard the will of Congress."

This declaration goes to the heart of a national menace. Too often the will of Congress is distorted or nullified by courts or administrators who interpret laws not according to what Congress desires but according to what they think Congress should desire.

A case in point is the Wagner Act. When it was enacted in 1935 unionization of foremen was not an issue. Section 2 states that the term "employer" includes "any person acting in the interest of an employer, directly or indirectly." This allies supervisors with management and Congress meant it that way.

Some members of NLRB ignore Congress. Since March 7, the board has issued 18 decisions favoring foremen's union. Paul M. Herzog and John M. Houston of NLRB defend foremen's unions by saying that inasmuch as Congress has not banned them, it is not incumbent upon NLRB to do so. Gerald D. Reilly, third member of the board, has dissented in 12 of the 18 cases.

Congress can stop unionizing of foremen if it chooses. Already the House has passed the Case bill by a decisive majority of 258 to 155. It would exclude supervisory personnel from unionization. Today the Case bill languishes in the Senate Education & Labor Committee where ardent New Dealers have drawn its teeth. Sen. Robert A. Taft, in conjunction with Senators Joseph H. Ball and H. Alexander Smith, has drafted a minority report to restore the best features of the House version. It provides that supervisory employees not be included with "employees" as used in the Wagner Act. Senator Taft intends to call up the Case bill as soon as the British loan and other pressing issues are out of the way.

New Dealers and strong union lobbies will do everything possible to keep the bill in committee. They will fight it hard if it gets to the Senate floor. Industry has a moral obligation to support Senators Taft, Ball and Smith vigorously; to encourage members of Congress to see that their will is not disregarded; to commend Gerald D. Reilly for opposing his prejudiced colleagues; and to cherish the memory of Harlan Fiske Stone for his continued dissent against usurpation of the rights of our representatives in Congress.

STEEL

April 29, 1946

COMPETITION VS. OPA: Among the alarming predictions voiced by Chester Bowles and Paul Porter is that if OPA controls are abandoned, prices of many commodities will soar to dangerous heights.

Some opponents of OPA take violent issue with this prediction. They contend that although a price-rise flurry might occur when price lids are removed, competition soon would put a brake on prices. Unfortunately the Bowles-Porter predictions and the

rebuttal of their opponents are the opinion of partisans.

Something more substantial than mere opinion can be found in the reaction of the machine tool industry to the action by OPA of lifting the ceiling on prices on machine tools 20 per cent over levels of Oct. 2, 1941. In response to a quick check-up by our machine tool editor, a majority of 30 leading tool builders replied that they will take only moderate advantage of the opportunity afforded

(OVER)

by OPA. Most builders expect to increase prices only enough to take care of increased costs. One machine tool executive sums up the general attitude in these words:

"After all, it simply isn't on the cards that any machine tool builder now can increase prices to the OPA maximum right across the board and then expect to get much business. The war is over. Competition—not OPA—now is the determining factor."

Businessmen recognize the power of competition, even if Washington does not. —p. 64

LABOR, WORLD-WIDE: Representatives of 12 steelmaking nations to the International Labor Organization's Iron and Steel Committee are convening in Cleveland in the first meeting of steel employers and employees and government officials ever held on a world-wide basis. While a few steelmaking nations are not represented, the deliberations of the conference may prove to be significant.

From the early sessions, it is evident that the conference will discuss stability in employment—including the possibility of a guaranteed annual wage, social and economic problems of the industry affecting employment and industrial safety.


Thus far "full employment" and the guaranteed annual wage have received most attention. Debate on the latter probably will center on method and timing—whether this objective is to be bulled through precipitously or whether it is something to be achieved through progressive steps. The outcome on this point may well determine whether these international labor sessions are going to be radical or moderate in character. —p. 63

"OPERATION ZIPPER": Experience of the United States Navy in the use of mechanical and chemical dehumidifying methods, rust inhibitors and metal and plastic coverings in the formidable task of laying up nearly 2000 vessels for future emergencies should provide industry with many new ideas for improved packaging and storage of equipment and supplies.

One development in this Navy program, which is aptly dubbed "Operation Zipper," is the use of dehumidifying machines designed to hold relative humidity in the interiors of vessels down to a point where rusting will not occur. Should this practice be found effective and economical in Operation Zipper, it is certain that industry will explore its possibilities in buildings where machine tools, steel sheets and similar items are stored.

Corrosion still is a formidable problem and the Navy's fleet preservation project comes as a welcome laboratory for numerous new preventives. —p.91

SIGNS OF THE TIMES: During the war, many manufacturers signed government contracts containing patent clauses which seemed to be too one-sided in favor of the government. Now that the pressure is off, the War and Navy departments are studying patent provisions in contracts (p. 72) with a view of revising them in a manner that will be equitable to both contracting parties. . . . Under the title "Democracy in Action," the American Industries Salvage Committee has issued a report on its activities during World War II. A total of \$1,872,757 was contributed by industry to carry on this highly successful campaign (p. 73), which was officered by steel company executives. . . . Decision of the Interstate Commerce Commission to allow reduced rail freight rates on scrap steel moving from the West Coast to the Middle West (p. 80) is expected to stimulate scrap purchasing in the Pacific coast area during the next few weeks. . . . An investigation of the effect of variations in casting conditions upon structure and segregation in thick cylinders of nickel-chromium-molybdenum steel produced by the centrifugal casting process (p. 94) shows that the most important individual factor is the rotational speed of the mold. . . . A slam-bang struggle will ensue in the Senate when a minority of the Senate Education & Labor Committee (p. 68) attempts to restore teeth in the House-passed Case strike-control bill. . . . Popular question in Detroit is "where is all the steel going?" After estimating production and consumption from last September through April (p. 75) motordom's mathematicians cannot account for 1,100,000 tons of flat-rolled material and they wonder where it has gone. . . . H. Gerrish Smith, president of the Shipbuilders Council of America, says the outlook for shipbuilding and ship repair for the next few years is "reasonably good" (p. 61), despite heavy cutbacks. American shipyards now have foreign contracts for 82 vessels. . . . Indications in Washington point to new attacks by the Justice Department (p. 66) upon the already legally-battered basing point system. . . . While the government is tentatively considering the allocation of 650,000 tons of steel during the last half of 1946 for urgent war rehabilitation abroad (p. 59), uncertainties due to the coal strike are delaying definite decision. . . . Next week the American Foundrymen's Association will celebrate its fiftieth anniversary (p. 65) at its annual convention and exposition in Cleveland. It promises to be an outstanding event.



EDITOR-IN-CHIEF



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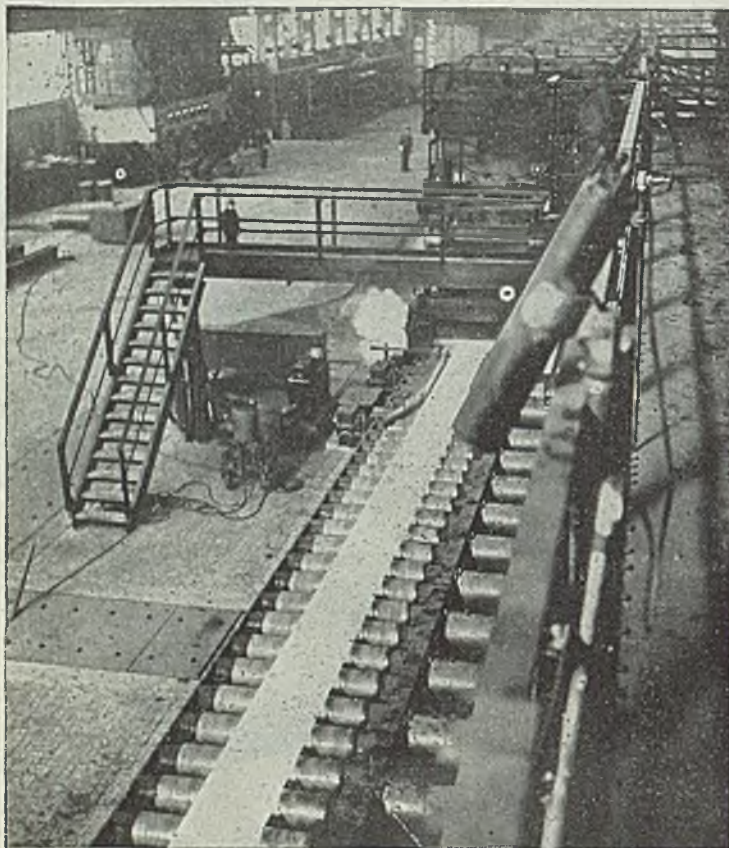
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Await Program on Steel Exports

Coal strike delays government action on earmarking shipments abroad for war rehabilitation. Report 650,000 tons tentatively considered for directive action over remainder of year

WHILE 650,000 tons of steel for urgent war rehabilitation requirements abroad are being tentatively considered by Washington for directive action over the final six or seven months of this year, the uncertain outlook with respect to settlement of the coal strike is delaying definite decision.

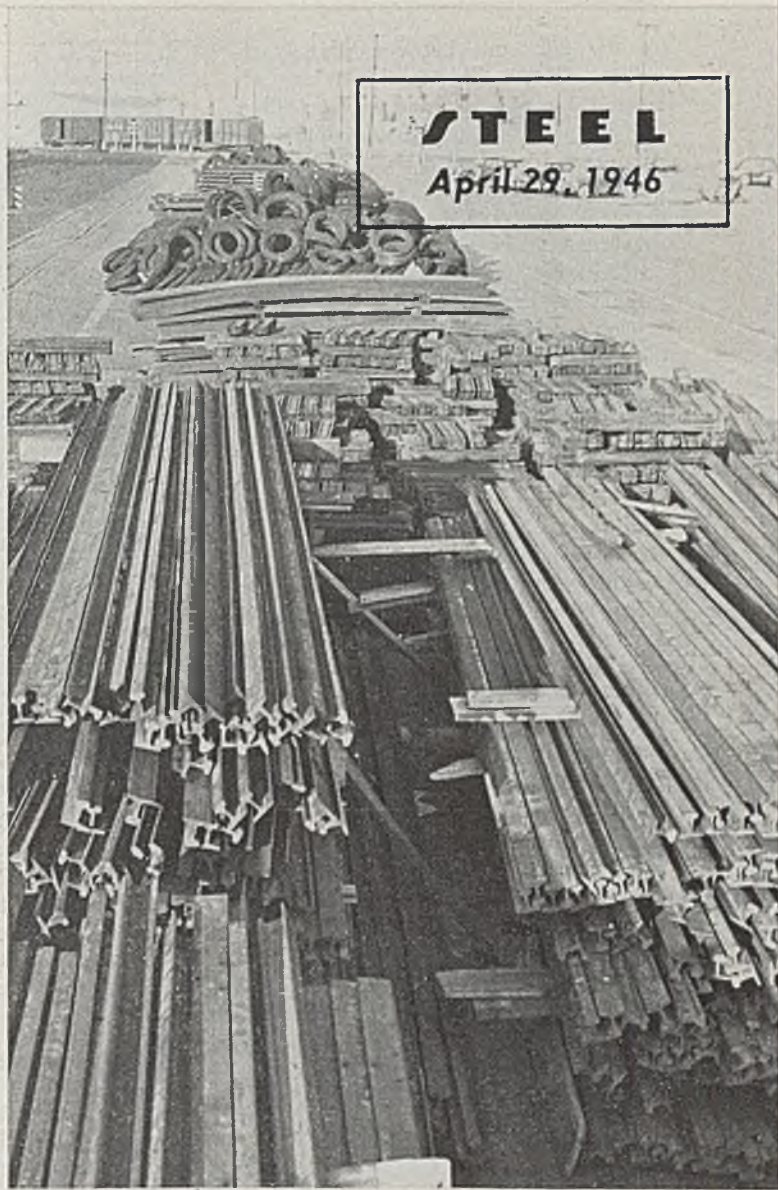
Until recently it was hoped that the program could be made effective as of June 1, but as the necessary lead time is already at hand and with no indications as to when the soft coal dispute will be adjusted, it appears that the program will not likely get under way now before July 1.

As a matter of fact, the actual tonnage involved will depend upon how long the coal strike lasts. As it stands, the tentative figure of 650,000 tons is about 75 per cent of the 850,000 tons that had been decided upon early in the year and then given up in large measure because of the steel strike. Tin plate directives were maintained, but even they were subject to revision.

While there has been nothing official as to the steel products to be involved in the projected program, it appears that the list will be made up of cold and hot-rolled and galvanized sheets, they constituting the major item, commercial bars, shapes, wire rods and some finished wire products. Wire rods, from present indications, will be the only semifinished item on the program. No tin plate is included, it is pointed out, for the reason that quotas are already established and are moving with as much expedition as the unsettled labor situation in this country will permit. As in the case of the original program, no plates, among major items, are included.

There is also some uncertainty as to what countries will be provided relief and in what relative proportion. However, it appears that France will get by far the major share, possibly almost as much as one-half, as was contemplat-

Part of an export shipment of steel products consigned to Indo-China shown awaiting loading on dock at Los Angeles harbor. Tonnage was mixed with merchant items comprising the bulk. Three sellers participated in the shipment



ed when the program was originally set up early in the year. Norway, Holland, United Kingdom, Denmark, China and the Philippines are among other countries likely to participate in one degree or another. Russia, according to present indications, is not included, and, in fact, it is understood that her second quarter quota of tin plate has been taken off the schedule because of the urgency of requirements in certain other directions.

Any such directive tonnage as may eventually be set up will be superimposed largely on export orders now on the books. In other words, if sheets, for instance, are scheduled for South America or some other section of the world where war rehabilitation is not necessary, they will have to give way to the extent that the directive will require. Domestic orders on the books will not be affected, although admittedly the directive tonnage may in some cases detract from the volume that might otherwise be available.

Normally 650,000 tons of steel for shipment over a period of several months would be scarcely more than a drop in the bucket, but under present conditions with such terrific pressure for steel of all kinds and from all quarters, the amount assumes sizable proportions.

While some opinion in Washington has been expressed to the effect that as much as 8 million tons will be shipped abroad this year, the steel trade in general believes that this estimate is highly optimistic. Some leading interests in the steel export field believe that the mills will be doing well if they ship more than 5 per cent of the hot rolled production of the country this year and judging from the present outlook they will be doing well if they produce more than 50 million tons. In other words, it is believed producers will not likely be able to ship more than 2,500,000 tons, or certainly not more than 3 million tons at the most.

Surplus steel is going abroad, but in nothing like the rate that would make

up the difference between possibly 3 million and 8 million tons (plus modest amount for pig iron and certain other ferrous items). Most of the surplus tonnage that has been moving abroad so far has been plates and in a much lesser degree, shapes and bars—principally ship steel made available through the abandonment of operations at various yards since the end of the war. There is considerable alloy steel and steel of unusual sizes and dimensions, but all of this has not attracted much attention nor is it likely to, it is believed.

Upwards of 1500 tons of bars and small shapes, with some structural shapes, formed part of a steel shipment awaiting loading at Los Angeles harbor recently. Destination, according to shipping line agents, were ports in French Indo-China, among these Gougal, Saigon and Hai-phong. Consigners were subsidiary units of the French colonial agency, such as Indo-China Supply Center and the Indo-China Programme. Several companies participated in the tonnage.

A. B. Ordway, general manager of the Kaiser mill, said his company's share in the shipment had been sold at current OPA ceiling prices. Edward Gibbons, OPA steel price chief in Los Angeles, reported the bars and small shapes in the Kaiser shipment had been sold at prices of \$3.34 per cwt and \$3.20 per cwt for the structural shapes.

Total tonnage shipped was not announced by the Williams Diamond Co., the transportation line handling the steel. Steamship agents emphasized that the shipments were direct deals between the companies and the French colonial agency and that no government surplus was involved.

Return to Private Trade Sought

Return of western European export business to established private channels on a substantial basis was predicted recently by August Maffry, vice president, Export-Import Bank, before members of the Commerce & Industry Association of New York, New York city.

"Much progress toward curtailment of the activities of the purchasing commissions and toward their disestablishment has already been made," he said. "The policy of the United States government is clear, the Department of State is now urging governments maintaining missions in the United States to discontinue them as soon as possible.

The Export-Import Bank, he said, has obtained the commitments from practically all of its borrowers that credits extended by the bank would be made available to private importers in the borrowing countries.



WOOD DECKS COME BACK: Workers at Federal Shipbuilding & Dry Dock Co.'s Kearny, N. J., yard drive cotton into the fir planking preliminary to caulking to make peacetime decks of the AFRICAN STAR waterfront. During the war the steel decks were not covered, but fleet operators say wood decking will add to the comfort of crew and passengers during peacetime runs

Early return to private trade will not only apply to all of western Europe, but to "all countries around the fringe of western Europe," he declared.

Mr. Maffry explained that foreign purchasing missions whose continued operation in this country has aroused complaints among exporters, were "only a symptom."

"The real disease," he said, "is the shortage of goods and of dollar exchange, which together account for the direct intervention of foreign governments in procurement. It would do no good and, in fact, would cause great inconvenience to foreign traders if purchasing missions were driven out of the United States only to set up shop in their own countries to which our suppliers would have to go to do business with them."

The speaker emphasized the desire of the bank to expand its financing of United States foreign trade in the future by means of direct exporter-importer credits, compared with credits extended to foreign governments and their agencies, the latter of which are the only feasible type for large scale reconstruction loans.

Such loans, he explained, involve the purchase of a great variety of products and may also be preferable from the

point of view of ease of administration. In a case of a loan for the construction of a steel mill in Brazil, he pointed out, direct loans would have involved more than 1000 separate contracts with American exporters.

As soon as the international bank is in full operation, some time late this year or early 1947, the Export-Import Bank expects to abandon the business of making reconstruction loans to foreign governments, he explained. However, it will continue to interest itself in development loans, particularly those involving countries of the Western Hemisphere, and those brought to the bank for consideration by United States manufacturers, exporters, engineering firms and banks, none of which has access for these purposes to the facilities of the international bank, Mr. Maffry said.

While it is the aim of the bank and government agencies in general to get foreign purchasing missions in this country out of business as soon as possible and to return foreign trade to private hands, both at home and in foreign countries, the problem is much broader than the bank alone is able to handle, he said. Whereas there are at present more than 50 countries maintaining purchasing missions in the United States, loans are

under consideration to only six, and in addition most of the current purchasing through the missions is carried out by funds other than those made available by the bank.

Payrolls of Steel Industry Reflect Effect of Strike

Employment and payroll figures of the steel industry for January and February reflect the national steel strike which started Jan. 21 and ended in mid-February.

The industry's total payroll, according to the American Iron & Steel Institute, New York, was \$169,890,500 for two months, January and February, 1946, against \$288,681,300 for the corresponding months of 1945, and \$122,527,700 in December, 1945.

Average earnings of employees receiving hourly, piecework or tonnage wages in January and February were 131.4 cents per hour, compared with 124.1 cents per hour in January and February, 1945, and with 122.4 cents per hour in December, 1945.

Wage earners worked an average of 24.0 hours per week in January and February, compared with 47.5 hours per week in January and February, 1945, and 39.0 hours a week in December, 1945.

Average employment in January and February was 522,300, compared with 565,100 in January and February, 1945, and 544,900 in December, 1945.

Continental Steel Corp. Reports Drop in Net Profit

Effect of the steel strike early this year is reflected in a report of Continental Steel Corp., Kokomo, Ind., that its first quarter net profit was \$10,961. In the corresponding quarter of last year the net profit was \$151,892.

In common with the industry, the Continental plants were closed four weeks by the strike and approximately one additional week was required to get the plants back into full production.

Lukens Reports Loss for First Half of Fiscal Year

Lukens Steel Co., Coatesville, Pa., and its subsidiaries, By-Products Steel Corp. and Lukenweld Inc., report a consolidated net loss for the first half of their 1946 fiscal year, ended March 23.

The loss, \$1,626,485, before estimated tax recoveries due to carry-back provisions of the internal revenue code, included \$979,162 which the company said is chargeable directly to the steel strike in January and February.

Outlook for Shipyards Reasonably Good For Next Several Years, Despite Cutbacks

OUTLOOK for shipbuilding and ship repair for the next several years are reasonably good, despite the heavy cancellations which accompanied the end of the war, according to H. Gerrish Smith, president of the Shipbuilders Council of America.

"Unfinished merchant contracts at the beginning of this year represented tonnage several times in excess of any unfinished business prevailing in any pre-war year," he told members at the council's annual meeting in New York recently.

"Private shipyards at the close of 1945

were engaged in the construction of 84 combatant ships and 35 heavy auxiliaries for the Navy and in addition 123 commercial vessels of 927,000 gross tons.

"Present foreign contracts total 82 vessels but with the reconstruction of foreign shipyards and the low wages obtaining in foreign yards as compared with those in the United States no large volume of foreign business can be anticipated.

"Activities in our ship repair yards are impressive and the volume should be reasonably steady during the next two years," Mr. Smith said.

Present, Past and Pending

■ THIRTEEN BLAST FURNACES DECLARED SURPLUS

WASHINGTON—Thirteen blast furnaces costing the government \$198 million and having capacity for 4,370,000 tons of pig iron annually, have been declared surplus by War Assets Administration. They are located in Chester, Braddock and Monesson, Pa.; Cleveland, Warren and Youngstown, O.; Houston and Daingerfield, Tex.; Gadsden, Ala.; Indiana Harbor, Ind.; Granite City, Ill.; and Duluth, Minn.

■ APPROVE ADJUSTABLE PRICING FOR IRON ORE

WASHINGTON—Lake Superior iron ore sellers have been authorized by OPA to make sales at going prices subject to adjustable pricing provisions, pending completion of OPA study of the industry's request for higher ceiling prices.

■ CEILINGS RAISED ON MALLEABLE IRON CASTINGS

WASHINGTON—OPA has increased ceilings for malleable iron castings by an average of 7 per cent to encourage production by normal prewar producers.

■ MEGAN ELECTED SECRETARY OF INLAND STEEL CO.

CHICAGO—Graydon Megan has been elected secretary of Inland Steel Co., succeeding J. H. Morris, retiring after 28 years service.

■ INLAND PLANS \$12 MILLION STRIP MILL EXPANSION

CHICAGO—Inland Steel Co. plans a \$12 million mill expansion which will add about 40,000 tons a month to its hot and cold-rolled strip capacity.

■ YOUNGSTOWN SHEET & TUBE OFFICIAL JOINS CPA STAFF

WASHINGTON—Harry Bryant of Youngstown Sheet & Tube Co. has been appointed chief, Construction Division, Civilian Production Administration.

■ CONTINENTAL NOT TO ENTER AUTO MANUFACTURING FIELD

MUSKEGON, MICH.—C. J. Reese, president, Continental Motors Corp., denied last week Continental proposes to engage in the automobile manufacturing business. The company is building a new engine manufacturing plant at Dallas, Tex., involving an initial investment of \$250,000.

■ PEAK JAP STEEL OUTPUT ONLY 9,656,000 TONS IN 1943

NEW YORK—Japanese steel production reached its war peak in 1943 when 9,656,000 net tons of ingots were produced.

■ DESCRIBES PROCESSES FOR VACUUM MELTING OF ALLOYS

WASHINGTON—German processes for vacuum melting and pouring of metallic alloys prevent loss of beryllium in beryllium alloys, result in hardenable alloys with reproducible properties, eliminate gases, and improve composition of alloys, according to the Department of Commerce.

■ PIG IRON PRODUCTION RISES SHARPLY IN MARCH

NEW YORK—Pig iron production for March rose sharply to 4,384,057 tons, making the first quarter total 8,151,088 tons, while ferromanganese and spiegel output was 39,859 tons and 64,944 tons, respectively. Production of all grades was at 77.3 per cent of capacity in March and 49.5 per cent in the first quarter.

Sharper Cuts in Steel Output Pend

Independent mills to reduce operations this week as stalemate between miners and operators continues. Hope for early settlement fades

STEEL production will be cut more deeply this week as coal reserves of independent producers dwindle to levels necessitating curtailments and as the stalemate between the bituminous miners and operators continues unimproved.

Outlook for any early settlement of the coal strike is dark. John L. Lewis, chief of the miners' union, declared the negotiations will remain deadlocked until the operators accede to the miners' demands for the establishment of a health and welfare fund to be financed by the industry. He told anthracite miners at Hazelton, Pa., the soft coal strike may continue "a week, a month or even six weeks."

Some observers in the steel industry gloomily predicted the coal strike might drag on for several weeks or until the end of May, by which time most steel mills would be closed, and operations of metalworking plants would be drastically curtailed for shortage of both steel and coal.

Steel mill operations last week receded 4.5 points to 70 per cent of capacity. Most independent mills maintained fairly high operations in the hope that the coal strike would be settled before their fast-shrinking reserves would force suspension of furnaces. That point is now at hand and this week's schedules call for reductions at a number of independent mills.

Principal reduction to date has been by Carnegie-Illinois mills at Pittsburgh and Chicago. At Pittsburgh, United States Steel Corp. subsidiaries last week were down to 26 per cent of capacity and average for all mills in the district was down to 57 per cent.

In Chicago, Carnegie-Illinois units started the week at 60 per cent of capacity and dropped to 40 per cent by week's end. This rate is expected to be maintained until May 18, at which time it would drop to 22 per cent. By June 1, coal stocks would be exhausted.

An estimated 1,000,000 tons of ingots already have been lost during the coal strike, with U. S. Steel units in Pittsburgh alone accounting for a loss of 450,000 tons. The loss in steel production will become much sharper in May unless there is an immediate settlement of the dispute, which appears unlikely.

Republic Steel Corp. announced it will



FRENCH EXPORT AUTOS: This shipment of new passenger automobiles recently arrived in Stockholm, Sweden, from the Renault works near Paris. NEA photo

cut operations about 30 per cent this week to conserve its coal stocks. Wheeling Steel curtailed blast furnace, open hearth and coking operations at Portsmouth late last week, will wind up blooming and bar mill operations April 30 and rod and finishing mill operations May 8.

Birmingham's operations have dropped to 64 per cent, lowest point in years, except for the complete stoppage during the steel strike. Tennessee Coal, Iron & Railroad Co. has laid off about 3000 blast furnace and steel mill employees, bringing the list of idle to about 7000.

Youngstown Sheet & Tube Co. will cut its operations about 25 per cent this week, and further reductions are scheduled if the coal strike continues.

Intermittent finishing mill operations are becoming more general as the supply of raw steel shrinks. Steel consumers are having to rely to an increasing extent on their limited inventories. Some metalworking companies already have initiated a gradual tapering in production and this trend will become more pronounced over the next two weeks.

Extent of the growing shortage in finished steel among consumers is indicated by the increasing number of automotive officials who are making personal calls to the steel mills in search of sheet, strip and other finished items.

The effect of the coal strike is spreading beyond the steel and metalworking industries and even beyond the boundaries of the United States. Canada has instituted a rationing program to conserve stocks of coal imported from this country,

and exports from the United States to distressed countries in Europe are jeopardized.

Railroads, large users of coal, expect curtailments of service in about two weeks. The carriers already have lost substantial business in carrying coal.

Great Lakes shipping is being held up and some fleet operators last week were sending their engineers home until the coal strike is ended. Pittsburgh Steamship Co., United States Steel Corp. subsidiary, is sending out its ships as they are made ready but officials expect sailings can continue only about three weeks unless the coal strike ends. Great Lakes shippers also are threatened by the continuing strike at many of the upper lake iron ore mines.

Voluntary Rationing of Copper Requested by CPA

Voluntary rationing of copper and copper products was requested last week by the Civilian Production Administration. Action would affect copper and brass warehouses, as well as copper producers and fabricators.

Supplies have been sharply reduced recently because production has been cut by strikes at the mines and refineries in addition to the cumulative effects of the coal strike.

Mine and smelter production has dropped more than 50 per cent; brass mill production has been cut to only 15 per cent of capacity; copper wire mills to 25 per cent and copper rod mills to 40 per cent of capacity.

Full Employment Dominates Talks At ILO Iron and Steel Sessions

Trade union delegates to Iron and Steel Committee meeting voice demands for guaranteed annual wage, larger voice in economic affairs, world-wide collective bargaining and improved safety devices

HOW full employment can be achieved in the world's iron and steel industry during peacetime and how relations between steel labor and management can be improved dominated discussions in the early sessions of the International Labor Organization's Iron and Steel Committee meeting which opened in Cleveland City Hall Apr. 23.

The meeting, the first of its kind, brought together representatives of employers, workers and government officials of the leading iron and steel producers of the world. Similar meetings for other industries are being scheduled and sessions for the Metal Trades Committee will open in Toledo May 2.

The agenda for the sessions of the Iron and Steel Committee emphasized two items: The social problems of the iron and steel industries of the various countries during the transition from war to peace; and the future international cooperation concerning social policy and its economic foundations in the industry.

Discussion of these problems quickly brought to the fore the concern of workers' representatives of the various countries over full employment, the possibility of a guaranteed wage, the part the workers will have in determining the economic life of their countries, the relations between employers and employees, safety and training of workers.

The issues of full employment and the guaranteed annual wage were pointed up sharply by United States delegates. David McDonald, secretary-treasurer, United Steelworkers of America-CIO, asked that the conference devise and recommend a full employment program, and came out flatly for a guaranteed annual wage.

"It is inevitable," he asserted, "that a guaranteed annual wage will fit into the problem of full employment."

John A. Stephens, vice president, United States Steel Corp. and employer delegate to the meeting, counseled a gradual approach toward the full employment goal.

"Full employment is a normal aspiration of most people. The question is whether it is going to be permitted to develop gradually, or whether in our own impatience to arrive at a goal, which

perhaps we envision but incompletely, we shall impair the functioning of the industry."

Speaking for all the employer representatives, Mr. Stephens pledged the "whole-hearted co-operation toward the sound attainment of ever-increasing opportunity for employment."

Attending the conference are representatives of 12 steelmaking countries: United States, Australia, Belgium, Canada, China, France, United Kingdom, India, Italy, Luxembourg, Sweden and South Africa.

United States delegates are, employers: Mr. Stephens; C. H. Murray, assistant to the president, American Rolling Mill Co., Middletown, O.; and Joseph Voss, director of industrial relations, Republic Steel Corp., Cleveland, as alternate. Union delegates are Mr. McDonald and Clinton Golden, assistant to the president, United Steelworkers.

Chairman of the sessions is Nathan P. Feinsinger, professor of law at the University of Wisconsin, public member of the War Labor Board and chairman of President Truman's fact-finding panel in the steel wage dispute early this year. Mr. Feinsinger outlined the purpose of the sessions as assembling of information, exchange of ideas and experiences, the setting up of standards and the making of recommendations to labor and management in the countries involved.

Discussions on the floor emphasized the sameness of the yearnings of the

workers of Belgium, France, United Kingdom, Canada and other countries with those of the United States. The labor delegates first asked for full employment (with some recommending a guaranteed wage) and second for a larger voice in the determining of their country's economic life. Safety, training, compensation laws, new techniques and production methods also were mentioned.

Discussions during the meetings and conversations with delegates revealed a spotty outlook for iron and steel industries in the various countries represented.

French delegates pictured the condition of that country's industry as very grave. While the country has a capacity for about 12 million tons of steel, it is producing only about 3 million tons, or at 25 per cent of capacity. Chief difficulty is the lack of coal and coke, and scarcity of skilled labor.

India has tremendous potentialities for expansion and is awaiting the availability of iron and steel mill machinery from the United States.

K. A. D. Naorji, representing the Tata Iron & Steel Works, told STEEL that "the sky is the limit" for expansion of India's industry. Tata officials plan to enter the production of pipe and tubing, cotton ties, and other items not now made in that country, when the necessary equipment can be obtained.

Financing is not expected to be a serious problem for India when certain credits due the country are unfrozen. England, for example, is said to owe India some \$5 billion.

Indian officials also are contemplating expansion in other metal fields and establishment of an automobile industry there in a few years is expected.

China has a large program for industrial expansion with particular emphasis on iron and steel and the other heavy industries. China likewise has some exceedingly large problems, the first of which is financing. Unless a loan can be obtained from the United States, the program may be stymied. China also lacks accurate statistical data on coal and iron resources in northern China, her richest deposits.

Much interest in the convention corridors centered on the recent announcement of the impending nationalization of the British iron and steel industry. The announcement was made after the British delegates had left England and came as a surprise to many of them. They were interested to learn the reaction of Americans.

Generally the trade union delegates were in favor of the nationalization program.

British employer interests were strongly opposed to the move.



JOHN A. STEPHENS



MACHINE TOOL BUILDERS: Senator Leverett Saltonstall of Massachusetts, third from left, was guest speaker at the banquet of the National Machine Tool Builders' Association held in Atlantic City, N. J., April 16. Others in photo, left to right: James Y. Scott, president, Van Norman Co., Springfield, Mass.; Herbert H. Pease,

president, New Britain-Gridley Machine Division, New Britain Machine Co., New Britain, Conn.; William P. Kirk, vice president, Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford, Conn., and president of the association; A. G. Bryant, vice president, Cleereman Machine Tool Co., Chicago. Photo by Fred Hess & Co.

Tool Builders Take Conservative Position on Increasing Prices

Survey of representative companies by STEEL indicates no sudden, sharp advance in list quotations will result from OPA action lifting ceilings. Majority inclined to raise prices but well below the 20 per cent permitted

By GUY HUBBARD
Machine Tool Editor, STEEL

IF THE machine tool industry is any barometer as to what will happen if and when OPA price controls in general are drastically eased or wiped out entirely, there will be no such sudden and disastrous zooming of prices as has been predicted by proponents of continuing government control.

Such is the conclusion to be drawn from the replies by 30 leading machine tool builders to telegraph and telephone inquiries sent out by STEEL last week.

At the time of the spring meeting of the National Machine Tool Builders' Association at Atlantic City, N. J., Apr. 15-17, (STEEL, April 22, Page 54) suspension of price control already had been granted on certain large machines and some special machines, but general relief under OPA then was only an unconfirmed rumor. From conversations overheard at that time in the halls and lobby of the

Ambassador, it was apparent that machine tool builders considered that their industry definitely would be "on trial" as an example of the effect of OPA easing or decontrol. As usual, the inclination was to lean over backward in an effort to do the right thing.

Now that the ceiling has been lifted for the entire industry by 20 per cent, under the OPA ruling effective Apr. 19, it is evident this industry is putting into effect its assurance that it would do the right thing. STEEL's survey covers leading builders in widely separated parts of the country and in varied lines. Thus it represents a fair cross-section of opinion. Here in brief is the situation revealed by this survey.

Of the 30 companies involved, 12 were not yet prepared to make a statement other than to the effect that they are making a thorough restudy of their costs. Several of these 12 have implied that moderate increases are probable. Two of the 12 say the OPA rulings are not

yet sufficiently clear to them to warrant definite action. Two others stress the necessity for careful cost analysis before taking any action.

Of the 30 companies, another group of four indicate they are going to try to "hold-the-line" on prices. One of these, a large builder of multiple spindle automatic bar machines and chucking machines, has made widespread announcements of this policy—including reasons for it and provisions for maintaining it. This announcement appears elsewhere in this issue.

The remaining 14 of the 30 companies interviewed state positively that their prices are to be advanced, but only in one case is a sweeping 20 per cent increase foreseen. In this particular instance, it is evident that more than ordinary increases in power and speed requirements and in control apparatus have jumped costs far above the figures at the time of the 1941 "price freeze." The next highest "across the board" proposed increase is 14 per cent.

Here are a few typical comments by members of this group—which incidentally is made up of large companies whose products include: Gear making machines; precision boring machines, production

and toolroom milling machines; turret lathes; heavy duty drilling machines, engine and toolroom lathes; automatic lathes; single and multiple spindle automatic screw machines and chucking machines; thread grinders; tapping machines; honing and lapping machines; way-type drilling machines; threading machines; and special machines.

(1) "Necessary to increase prices on some machines, particularly on checking equipment, but will hold increases to minimum consistent with present costs."

(2) "No general across-the-line increases are contemplated. Examining specific items to determine cost. As result of this scrutiny some items undoubtedly will require moderate increases."

(3) "Going over all costs carefully having in mind increases only on those items where profit margin clearly inadequate. Don't expect to make sweeping increases all across the board nor to full 20 per cent."

(4) "Our current cost study will be completed within a week. Any adjustments we make will be on basis to insure base period pre-war earnings."

(5) "Machine tool price increases necessary to offset progressively rising costs since October, 1941, which have resulted in losses to us on some sizes and profits narrowed to vanishing point on others. We are carefully studying our cost structure to determine basis of new prices. This will take several days."

(6) "Our policy tentatively to raise machine tool prices 14 per cent, tools and fixtures 10 per cent and on certain outside purchased accessories to pass on to customers increases imposed by manufacturers."

Charles J. Stilwell, president, the Warner & Swasey Co., Cleveland, sums up the case for the majority in these words: "The lifting of OPA ceilings on machine tools is—in our opinion—no occasion for this industry to go haywire in the way of indiscriminate price increase of 20 per cent. In our own case there are two small machines which because of lack of precedent prior to the price-freeze as of Oct. 2, 1941, and because of changed conditions since then, are today so greatly underpriced that a full 20 per cent increase on them will be necessary. However, these machines represent only a small fraction of our output.

"Three or four other more important items in our line are underpriced under existing conditions to the degree that increases ranging from 4 to 10 per cent may be necessary. By-and-large, our increases as weighed in terms of our business in general will not exceed 5 or 6 per cent. Every case will be determined on the basis of careful exploration of

current costs. No item will be increased in price any more than is necessary to show a fair profit on a conservatively estimated volume of sales.

"After all, it simply isn't on the cards that any machine tool builder now can increase his prices to the OPA maximum 'right across the board' and then expect to get much business. The war is over. Deliveries are getting better. Competition—not OPA—is the determining factor now."

National Acme Co. To Hold Line on Tool Prices

Commenting on suspension of ceilings on machine tools by the Office of Price Administration, F. H. Chapin, president, the National Acme Co., Cleveland, said there is "no disposition on the part of this company to increase machine prices in general within the broad category of advances under which the recent price lifting allowances of OPA is intended to give machine manufacturers relief."

The OPA suspension provides for price increases without reservation on certain types of production machines above 2½-in. spindle capacity and allows for increases up to 20 per cent on smaller machines over the price levels frozen on Oct. 2, 1941. The National Acme's major production is machine tools known as Acme-Gridley bar and chucking auto-

matics. Despite the fact the company builds a range of 25 different sizes, it is expected that with very few exceptions former prices can be maintained.

"Two factors," says Mr. Chapin, "make this company's hold the line policy currently possible in spite of 75 per cent wage and salary increases since the price freeze date and the recent sharp increases in costs of materials. The first of these was an early determination to practice what we preach—our own investment of \$2,600,000 in the newest types of manufacturing equipment including faster, more accurate automatic machines and other production equipment. These new tools and the rerouting of flow lines have served in part to offset rising man hour and material cost. Of no less importance is our ability to maintain a steady volume of orders which permits processing component machine parts in lots sufficiently large to hold costs within normal bounds.

"This company's hold the line policy is based on the principle that increased prices tend to limit sales, increase costs and promote inflation; whereas stable prices at narrower profit margins promote volume sales, make more jobs and better living.

"Neither our current operations nor disturbances that we can now anticipate justify a general price advance in our machines at this time," Mr. Chapin said.

Record Attendance Expected at AFA Foundry Congress and Show

RECORD-BREAKING attendance is expected at the Fiftieth Anniversary Foundry Congress and Show opening in Cleveland May 6 and extending through May 10 under auspices of the American Foundrymen's Association.

Last minute convention details are being worked out this week and indications are the convention will be the largest in the history of the organization.

An impressive schedule of technical papers has been prepared for presentation at the various sessions of the meeting. The Gray Iron Division's program includes a 2-session symposium on engineering properties of gray iron which will include four papers on engineering properties as well as a special paper prepared specifically for use by those who design metal parts.

The Steel Division plans three technical sessions at which a total of 13 papers will be presented on steel practice.

Sessions of the Aluminum & Mag-

nesium Division will include three technical meetings and a round table luncheon. Five papers will be presented covering such subjects as die castings, permanent mold castings, microporosity, mold materials, and centrifugal casting of magnesium.

Brass & Bronze Division meetings will include three technical sessions and a round table luncheon. At these sessions a total of eight papers is scheduled.

The Malleable Division's program will include three technical sessions and a roundtable luncheon. Several papers on various phases of core practice and chemical composition will feature the malleable program.

Patternmaking Division has scheduled only one session, at which two papers will be presented.

The Annual Lecture Course will include five sessions, one covering each of five metal casting divisions. The general subject to be dealt with is Foundry

(Please turn to Page 167)

Justice Department Planning New Attacks on Basing Point Pricing

Assistant Attorney General Berge gives tipoff of contemplated action in statement before Senate committee considering Bulwinkle bill involving freight rates. Says eastern steel interests oppose rate reductions from Geneva steelworks

INDICATIONS in Washington are that new government action with respect to basing point pricing is in the offing. Just what is "in the wind" is not yet clear but Wendell Berge, assistant attorney general, in a recent statement before the Senate Committee on Interstate Commerce with reference to the Bulwinkle bill gave a tipoff to expect action on the basing point question soon.

One of Berge's objections to the Bulwinkle bill is a provision under which the railroads may enter into rate agreements and then apply to the Interstate Commerce Commission to validate them. He blames the railroads for the government's difficulty in interesting likely purchasers of its Geneva, Utah, steel plant, (bids are to be taken May 1), maintaining that the railroads, in response to pressure from eastern steel producers, had refused to reduce freight rates from Geneva to a fair level. If adopted, he said, the Bulwinkle bill would give the railroads immunity to eliminate competition from large sections of the economy.

Anti-Trust Laws Violated

Berge went on to say: "The Supreme Court has recently held that industrial basing point systems, characterized by 'phantom freight' and other economic evils, violate the anti-trust laws. As a result of these decisions the Department of Justice has presently pending, both for trial and investigation, major attacks upon industrial basing point pricing systems. Since the evidence discloses that an arbitrary and rigid freight rate structure is the principal instrumentality by which basing point systems are maintained, it is essential that this committee realize that, in the immunity accorded the railroads' collusive price fixing scheme by this bill, is involved more than a threat to the continuance of the freight rate suits by the United States. The passage of this bill may offer a convenient device whereby industrial pricing systems generally may secure for themselves the immunity here ostensibly conferred solely upon the railroad industry."

The assistant attorney general in discussing the freight rate situation as it affected the Geneva steel plant pointed out that the basic published rate governing shipments of steel articles from

Geneva to the West Coast is \$12 per net ton.

"No traffic was moving at this rate prior to the time that the Geneva plant commenced production," he said. "The plant's principal western competitor will be the Kaiser plant at Fontana, Calif. This plant enjoys a basic rate on steel of \$4.40 per net ton to San Francisco, \$9.50 to Portland, Oreg., and \$9.80 to Seattle. The big eastern steel companies are major competitors in the western market. They reach the West Coast by water. They control common and contract water carriers and, by use of the inland waterways and the Panama Canal, reach the Pacific very cheaply. Thus, the water rate on pig iron from Birmingham to all West Coast points is \$8.06 per net ton, \$11.61 on cast iron pipe, and \$13.39 on ingots and blooms. The water rate on iron and steel plate from Sparrows Point, Md., to all Pacific Coast points is \$10.60 per net ton. Moreover, it should be borne in mind that the big eastern plants, through control of the water carriers, have the power not only to lower the water rates, if necessary, in order to participate in the western market, but also that only the steamship costs, estimated at \$6.50 per net ton, need be taken into consideration in arriving at the delivered price of steel."

Corporation lawyers serving many industries throughout the country are wait-

ing the answer of the Federal Trade Commission to the latest petition of the United States Steel Corp. and its subsidiaries for a clarification of the FTC's cease and desist order on "Pittsburgh plus."

Federal Trade Commission attorneys have notified the Third Circuit Court of Appeals, Philadelphia, that they propose to file their reply on Friday, May 31.

The point on which the FTC must take a stand is a provision of the cease and desist order which would require Steel corporation subsidiaries to refrain from the sale of rolled steel products "upon any other basing point than that where the products are manufactured or from which they are shipped." Steel corporation attorneys contend that literal compliance with this provision would prevent the subsidiary companies from meeting delivered prices of competitors in cases where the competitors enjoyed lower freight rates to the delivery points.

A Washington attorney who specializes in anti-trust law holds the view that, in order to make a logical reply to the Steel corporation petition, Federal Trade Commission attorneys may be forced to make some compromise with their previous view that the only pricing system involving no discrimination is strict fob mill pricing.

"When you allow that kind of freight equalizations," this attorney told STEEL, "you actually are charging different mill prices to the different customers. Yet, the goal of the Federal Trade Commission is to bring about a maximum amount of competition, and you narrow a consumer's choice of sources when you forbid freight rate equalization. In many cases the consumer would have only one source at the lowest delivered price. If the Federal Trade Commission continues to insist on fob mill prices only the effect would be to reduce rather than encourage real selling competition."

Decision Deferred on Plea for Reduction In Steel Freight Rate to Atlantic Ports

NO DECISION was handed down at the recent public hearing (Apr. 17) in Buffalo on midwestern steel producers' request, initiated by U. S. Steel Corp., for reduction in freight rates on shipments of steel products to Atlantic ports for further shipment by water to the Pacific Coast.

The carriers agreed to take the matter up again in a closed meeting May 15. However, in light of recent petition by the railroads for a general boost in freight rates it appears likely no action will be taken on the steel producers' request in the near future.

At the Buffalo hearing, A. C. Schweitzer, traffic manager, Pittsburgh district, Carnegie-Illinois Steel Corp., stated other steel producing districts competing with Pittsburgh "have enjoyed, for some years, lower rates on iron and steel products for intercoastal movement than applicable on local traffic."

In his argument, Mr. Schweitzer pointed out whereas the all-rail rate from Pittsburgh to San Francisco on bars, shapes and plates is \$1.27 per 100 pounds, and the rail and ocean rate is \$0.8795, or 69.2 per cent of the all-rail charge, the all-rail rate from Sparrows

GOVERNMENT CONTROL DIGEST

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

Point, Md., to the same destination is \$1.43 and the rail and ocean rate is \$0.5955, or 41.6 per cent of the all-rail figure. The requested reduction would still only bring the rail and ocean rate from Pittsburgh to \$0.8095, or 63.7 per cent of the all-rail rate.

It was also emphasized that, compared with 1903, the Pittsburgh-to-Baltimore rate has risen from 13 to 30 cents, an increase of 17 cents, while during the same period, the rate from Bethlehem to Philadelphia has risen only from 9 to 11.5 cents or an increase in Pittsburgh's disadvantage.

A plan submitted by the railroads to revise rail freight rates on scrap shipments throughout the Midwest and East also came up for consideration at Buffalo. Under the plan these rates would be uniformly established to reflect a minimum of 70 per cent of the manufactured iron and steel freight rates. Steel officials and scrap dealers opposed the plan for bulk of scrap consumed at these centers must be obtained from distant points, on which shipments most of the proposed freight increase would be applicable. No action was taken on this proposal.

Of primary importance to steel producers in the Chicago area was the reduction, effective shortly, in freight rates on shipyard scrap shipments from the West Coast into that area. Dealer scrap is not involved. Under the new ICC regulations the freight rates on these shipments is \$12.32 per gross ton.

Screw Machine Product Producers Get Price Relief

Manufacturers of screw machine products, which are used in a wide variety of products, including household appliances, automotive equipment and machinery, have been given increase factors. Office of Price Administration announced recently. Screw machine products were given a 13.6 per cent increase over their March, 1942, prices. At the same time, services performed on screw machine products were granted a 10 per cent increase over March, 1942, prices.

This double action was necessary because many screw machine products are fabricated from materials, owned by another. Such services are subject to the commodities and services regulation, No. 581, and the increase factor, therefore, does not reflect material increases.

The increase applicable to screw machine products covered by MPR-136, effective Apr. 19, applied to all sales, and replaces the 8 per cent increase given these producers on Sept. 19, 1945

OFFICE OF PRICE ADMINISTRATION

Machine Tools: Ceiling prices increased 20 per cent for all machine tools not included in the machinery and equipment products suspended from price control April 8. Increase applies to manufacture Oct. 1, 1941, "freeze" prices. Manually operated machine tools, which are not portable, have been added to price regulation 67 so that the price increase will apply to them also. (MPR-67; OPA-T-4418)

Screw Machine Products: Screw machine products given a 13.6 per cent increase over March, 1942, prices, replacing an 8 per cent increase given these products on Sept. 19, 1945. Services performed on screw machine products granted a 10 per cent increase over March, 1942, prices. (MPR-136 and 581; OPA-T-4424)

Manganese Steel Castings: Ceiling prices increased 9.6 per cent for manganese steel castings and products, effective April 22. The increase was granted by substituting an increase of 14 per cent, applied on Oct. 1-15, 1941, base period prices, for one of 4 per cent that became effective Feb. 12, 1945, and which has been revoked. (MPR-235; OPA-T-4415)

Power Transmission Equipment: Manufacturers of industrial power transmission equipment, including drive shafts, pulleys and similar parts, granted a price increase of 7.8 per cent over Oct. 1, 1944, prices, effective April 19. (MPR-136; OPA-T-4412)

Electrical Control Products: Manufacturers of electrical industrial control products may sell on adjustable pricing arrangement under which prices may be increased later by OPA. Products covered include contactors, drum switches, some types of relays and other products listed in the industrial control section of the National Electrical Manufacturers Association manual, Vol. 14, "Products Scopes of NEMA Subdivisions as of Jan. 31, 1946." In addition to these, toggle switches and electrical clutches. (MPR-136; OPA-T-4410)

Line Construction Specialties: Ceiling prices of pole line hardware and line construction specialties increased 15 per cent, effective April 23. Increase does not apply to overhead trolley line material. (MPR-136; OPA-T-4422)

Brass Mill Products: Distributors of all brass mill products permitted to pass along ceiling price increases, averaging about 1.5 per cent effective April 1, granted recently to producers. Formerly distributors were permitted to pass along the increases only in direct mill shipments and deliveries of pipe and water tubes from warehouse stocks. (MPR-408; OPA-T-4421)

Construction Materials: Adjustments of maximum prices established under area orders for building and construction materials now may be made by regional OPA administrators and OPA district directors. The area orders set up ceilings for a particular community or defined area. The action covers sales of commodities under jurisdiction of the Building and Construction Price Division (Gen. Order 68; OPA-T-4405)

Tin: Jobbers and distributors of pig tin now are permitted to make sales to exporters for export at prices based on cost of acquisition from the Office of Metals Reserve, plus specified quantity differentials. (MPR-17)

Secondary Lead: Following additional charges per ton may be added for secondary lead and for primary and secondary antimonial lead when any seller is requested to provide special packing and loading services, effective April 29: For pig lead or antimonial lead wired or strapped, 30 cents; for lead or antimonial lead in ingots or linked ingots wired or strapped on wooden pallets, 50 cents; for lead or antimonial lead in ingots or linked ingots wired or strapped

on steel pallets, 70 cents. (MPR-70)

Conduit: Manufacturers of rigid conduit, electric metallic steel tubing and flexible conduit granted a price increase factor of 13 per cent over previous ceiling prices, effective April 23 and exclusive of any increase established by individual producers. (MPR-136; OPA-T-4425)

Metal Upholstery Springs: Effective April 30, manufacturers of metal upholstery springs, constructions and accessories may sell their products on an adjustable pricing basis, pending action by OPA on the industry's request for an upward revision in ceiling prices. (MPR-548)

Automotive Parts: Maximum prices at the manufacturers level, except passenger automobile and commercial vehicle manufacturers, increased 12 per cent for replacement sales of mufflers, tail pipes and exhaust pipes, effective April 25. Wholesalers must absorb two-thirds of the increase and retailers one-third. (MPR-452)

Cutting Tools: Ceiling prices for cutting tools and attachments and accessories for machinery and machine tools increased 17.3 per cent over March 31, 1942, prices, effective Apr. 24. More than 200,000 items are covered by this action, including all such items listed under revised maximum price regulation 136. Buffing and polishing wheels are not included. (MPR-136; OPA-T-4434)

CIVILIAN PRODUCTION ADMINISTRATION

Tin Mill Products: Following changes have been made in permitted uses of tin mill products in containers: (1) Packers allowed choice of using 1941 or 1945 as a base for calculating 1946 packing quota; (2) packers of following products permitted to obtain metal cans under the preference B sequence of delivery, equal to 100 per cent of those used in 1941 or 1945: abrasives and valve grinding compounds; boiler sealing compounds; buffing compounds; caulking compounds; gasket assembling compounds; graphite with liquid content; lubricating greases; soap, paste; solder paste; and welding fluxes; (3) food products of a seasonal and perishable nature, which heretofore were restricted to a monthly use of not more than 10 per cent of the annual quota, may be packed unrestricted by monthly percentages; (4) base period for quotas on frozen foods, except frozen cherries, changed from 1944 to 1945 with base period of cherries still 1944; (5) packers of beans with tomato sauce (other than Army or Navy offshore use) given an option of using plate containing 1.25 pounds of tin per base box for solder parts instead of 0.5 pound plate but if this option is exercised, a pack must be limited to 50 per cent of a base year instead of 100 per cent when 0.5 pound tinplate is used for solder parts; (6) containers for packing whole milk (dry or powdered) moved up to the A sequence of delivery from the former B category (packing quota is now unlimited); (7) a packer who used fiber body cans to pack paint in the base period, may consider these cans as though they were made of all metal, for the purpose of calculating his 1946 packing quota.

Adoption of Workable Labor And Economic Policy Urged

A workable national labor and economic policy was urged by Robert R. Wason, president of the National Association of Manufacturers, speaking in Cleveland recently at the 26th annual meeting of the Associated Industries of Cleveland. An immediate need is the lifting of price controls, he pointed out.

Adoption of Strike-Control Bill By Senate To Be Sought by Taft

House-approved Case bill may be called up for consideration before upper house recesses for summer though other legislative matters claiming prior attention may delay prompt action. Passage of "anti-Petrillo" measure considered good omen

REAL strike control legislation is expected to be brought up for debate in the Senate sometime after that body concludes its action on the British loan agreement. The time is not certain as numerous pressing matters are on the Senate calendar, including Army-Navy unification, universal training, extension of the draft, minimum wages, a National Science Foundation bill, atomic energy, and extension of price control.

In addition, many senators are restive over having been deprived of the Easter vacation which closed down the House, and are talking of a late June or early July adjournment until after the fall elections. However, Senator Barkley, majority leader, is pressing for disposal of major pending bills before a recess is taken. This may mean labor legislation may get an early hearing.

Sen. Robert A. Taft (Rep., O.) intends to call up the House-passed Case "Federal Mediation Act of 1946 (H. R.

4908)" just as soon as the British loan is out of the way and he proposes to put up a slam-bang struggle to get some real labor legislation approved by the Senate. As a matter of fact, Senator Taft is eager to reprove Sen. James E. Murray (Dem., Mont.), chairman of the Senate Education & Labor Committee, not only for taking the lead in removing the teeth from the Case bill but for fostering "socialistic legislation" such as the health bill on which Senator Murray's committee now is holding hearings.

In a minority report prepared by Senator Taft in conjunction with Sen. Joseph H. Ball (Rep., Minn.) and Sen. H. Alexander Smith (Rep., N. J.), Senator Taft admitted that "drastic amendment of a bill upon the floor of the Senate undoubtedly will be criticized as an undesirable method of legislating. We submit, however, that the contents of the bill reported by the majority of the committee make such floor revisions neces-

sary if any measure, designed to correct the serious situation that now exists, is to emerge from this Congress."

If Senator Taft succeeds in bringing the Case bill to the floor chances are favorable for adoption of something about half way between the harsh bill passed by the House and the watered-down version approved by the Senate Education & Labor Committee. Action by the Senate on April 6 in passing the "anti-Petrillo" bill with provision of a year's imprisonment and \$1000 fine for attempts to force radio broadcasters to submit to union "featherbed" demands proved that the Senate finally is aroused to the urgent need for corrective labor legislation.

"Supreme Court interpretations of the Norris-LaGuardia Anti-Injunction Act and the Clayton Act, for all practical purposes, seems to have placed union activities above and beyond all federal law, no matter how wrong and harmful to society their actions might be," stated the minority report.

"We believe the importance to the nation of keeping industrial strife to a minimum and the record of testimony taken by the Committee on Education & Labor," the report declared, "make it imperative that Congress enact legislation designed to achieve two objectives:

"1—To strengthen federal mediation machinery to assist in peaceful settlement of disputes and require both employees and employers, in the public interest, to utilize fully such machinery before resorting to strikes or lockouts which halt needed production.

"2—To impose on labor unions and their leaders legal responsibilities commensurate with the vast economic power which they exercise today.

"It is our belief that a fair and equitable labor policy can best be achieved by equalizing existing laws in a manner that will encourage free and private collective bargaining. Government decisions should not be substituted for free agreement and both sides—management and labor—must recognize the rights of the general public.

"The desired end of bargaining between management and labor is a contract, equally binding and enforceable on both parties with appropriate safeguards against resort on either side to wrongful and unlawful conduct."

"The National Labor Relations Act," it goes on, "was passed on the announced theory that federal encouragement and legal protection of union organization and collective bargaining would bring industrial peace. To that end, it imposed many legal obligations and restrictions on employers, although none on unions or employees. But organization and col-



RAILWAY WAGE PANEL: A wage increase of 16 cents an hour for railroad trainmen and locomotive engineers was recommended by President Truman's fact-finding panel. This parallels the recommendation returned earlier for other operating and nonoperating personnel. Members of the panel, shown leaving the White House, are, left to right: Gordon S. Watkins, University of California, Los Angeles; Chairman Leif Erickson, former chief justice of the Montana Supreme Court; and Frank M. Swacker, New York. NEA Photo

The CONE AUTOMATIC MACHINE COMPANY



sees many

GOOD THINGS AHEAD

It is reported that

U. S. Steel's Carnegie-Illinois has patented "Stainless W", a chrome nickel steel that can be heat-hardened.

get ready with CONE for tomorrow

"Homogenization", a familiar treatment for milk, is being tried by the Marco Co. of Wilmington for its effect on metal alloys, petroleum, rayon and chemicals.

get ready with CONE for tomorrow

General Motors' engineers state that diesel engines are now so refined that they are creating a demand for special fuels with specific properties.

get ready with CONE for tomorrow

Texas Industrial Co. of Houston, Texas, has developed a radial diesel aircraft engine, from government surplus, into a power plant capable of lighting a town with 300 population.

get ready with CONE for tomorrow

Glenn L. Martin Co. and U. S. Plywood have collaborated on a construction material in the form of a sandwich. The core is a honey-comb of impregnated cloth or paper and the surfaces are of aluminum, steel, wood or plastic.

get ready with CONE for tomorrow

A relay capable of speeds up to 1,000 operations per second has been developed by Stevens-Arnold.

get ready with CONE for tomorrow

Measuring 9 inches in diameter, a new hydraulic pump made by Hydraulic Machinery Co. of Detroit is said to develop 5,000 lbs. per square inch pressure.

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B. F. Goodrich has broken ground for a new research laboratory on a 260-acre tract between Akron and Cleveland.

DuPont reports the development of porcelain enameling on aluminum castings.

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The world's largest concrete dam and hydro-electric plant will be built by the Chinese on the Yangtse River.

get ready with CONE for tomorrow

Victor Division of RCA is using electronic heating to seal in the metal contacts in cathode ray tubes.

get ready with CONE for tomorrow

The new Crosley automobile engine is built largely of sheet steel stampings and develops 26 h.p. with a weight of only 59 lbs.

The City of New Orleans proposes to expedite its future traffic by building a tunnel under the Mississippi.

get ready with CONE for tomorrow

The "Quantometer" is made to analyze the amounts of each element in an alloy automatically and at production-line speed. It has been developed by the Applied Research Laboratories of Glendale, California.

get ready with CONE for tomorrow

A new Westinghouse device is said to snap an X-ray picture in a millionth of a second showing imperfections in parts under stress at high speed.

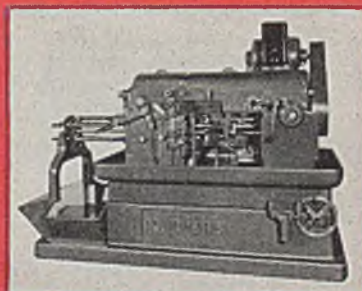
get ready with CONE for tomorrow

Peninsular Chemical Products Co. of Van Dyke, Michigan, has a new odorless, quick-drying maintenance paint that is proof against acids, alkalis and water and may be applied to wet, porous or heated surfaces.

Extra facility is extra value



This brass compression nut from 7/16" hex stock, a job ordinarily assigned to lighter duty machines, was produced by a rugged 1/2" 4-spindle Conomatic at the rate of 4 seconds each—fifteen per minute.



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AUTOMATIC MACHINE CO., INC. ★ WINDSOR, VERMONT, U.S.A.

lective bargaining alone have not brought industrial peace."

The Taft-Ball-Smith report criticizes especially that feature of the emasculated Case bill in which the committee majority outlawed union interference with delivery to market of perishable farm produce. "The only possible basis for such a provision," say Senators Taft, Ball and Smith, "is that the Congress is prepared to protect farmers in certain cases against wrongful acts of unions, but the rest of the public is not entitled to such protection. That, we submit, is an untenable position."

To meet the minimum requirements for industrial peace, says the minority report, the following six amendments are necessary:

1—A delay up to 60 days in calling a strike or lockout to permit the Federal Mediation Board to act. Violating employers would be guilty of an unfair labor practice, while violating unions would lose their status under the Wagner Act.

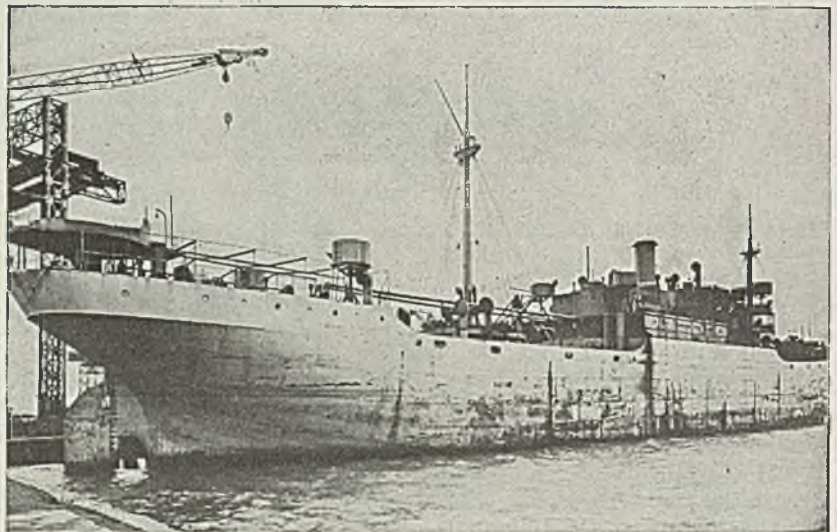
2—Establishment by the President of emergency fact-finding commissions in disputes threatening stoppages in public utility services. The commissions would have 30 days in which to report recommendations, and employers and employees would be required to withhold lockout or strike action until five days later.

3—Unions would be "suable" as legal entities in the federal courts for violation of contracts, with liability limited to union assets and not enforceable against individual members or their property. In cases of "wildcat" strikes unions would not be liable but employees would lose their status under the Wagner Act.

4—Secondary boycotts in restraint of commerce by labor, agricultural or horticultural organizations would be unlawful and subject to prosecution under the anti-trust laws "in exactly the same manner as such activities would be subject to restraint if engaged in by employers." In many ways, says the minority report, "the secondary boycott as it is being employed is the most serious threat to the free flow of commerce and free competition now existing."

5—Supervisory employees would not be included under the term "employees" as used in the Wagner Act, and employers would be relieved of the legal obligation of negotiating "wages, hours, and working conditions of such personnel, so vital in the management function, with unions."

6—(a) The use of violence or threats to force workers to strike would be illegal; (b) industrial espionage would be outlawed; (c) strikebreakers could not be employed; (d) armed guards could not be employed during or in anticipation of a labor dispute; (e) use of explosives or firearms in connection with a labor dispute would be banned.



SOON TO BE SCRAP: Scrapping operations have begun on the 8000-gross ton OLDHAM, the first ship to arrive at the ship-breaking plant of the recently organized Patapsco Scrap Corp., Baltimore, a subsidiary of the Bethlehem Steel Co. Operations are being conducted at properties formerly occupied by the Bethlehem-Fairfield shipyard, which Bethlehem had operated for the account of the United States Maritime Commission in the building of Liberty and Victory type ships. C. R. Holton, vice president, Bethlehem Steel Co., is president of the new organization and G. J. McVicar, manager

These proposed amendments, the minority report states, "are directed specifically against admitted and widespread evils which not only are seriously restricting free competition in industry but are curtailing the economic freedoms and opportunities of millions of workers. We defy anyone to show how the proposals we advance will interfere with or hamper in the slightest the legitimate activities of labor unions aimed at advancing the welfare of employees.

"Unrestrained and unregulated power in the hands of any individual or group is dangerous to democracy and freedom," the report goes on. "Labor unions and their leaders exercise such unrestrained and unregulated power today. The proposals which we are making in these amendments are aimed to be corrective of certain labor practices in the same sense that the antitrust laws of the early decades of this century were corrective of the abuses of the free-enterprise system."

The chain of argument presented in the minority report, and the tenor of the language employed, are such as to make it seem probable that Senators Taft, Ball and Smith will win much support for the program from among farm-bloc and southern senators.

RECEIVES COMPLAINTS

House Special Committee on Small Business reports that about 30 complaints daily reach it from small businessmen,

either in letters or personal visits, or through their congressmen.

"Investigation of these complaints shows that several of the reconversion agencies, particularly OPA, CPA and the Department of Agriculture, have no clear-cut policy providing for 'the preservation and strengthening of the competitive position of small business,'" declares the committee.

"When the Congress adopted Public Laws 457 and 458 (Surplus Property Act and OWMR Act) a policy of this nature was outlined as being the intent of Congress."

As an illustration, the committee holds that the CPA Regulation M-38 on lead operates to the advantage of the large storage battery manufacturers.

"This regulation," declares the committee in a recent report, "limits the use of lead in automotive batteries for replacement purposes to 22 per cent of the amount of lead used for the same purpose during 1944. At the same time, the regulation does not restrict to any quota the amount of lead which may be used in storage batteries for original equipment. Since it is the large storage battery manufacturers who control the battery contracts with original equipment manufacturers, the effect of this order gives an unwarranted advantage to the large storage battery manufacturers, since they not only have their regular quotas for replacement purposes, but are not limited to any quota on

their original equipment business."

The committee reports CPA Administrator Small's rejection of its suggestion that small steel users be given priorities assistance to enable them to get enough steel "to operate at a minimum economic rate."

PATENT LISTINGS PAY

Patent owners who have listed their patents with the Department of Commerce register of patents available for license or sale are receiving considerable inquiry. A recent survey showed that of 187 owners replying to a questionnaire, 121 had received inquiries, some as many as 17. Twenty-eight had sold or licensed patents or had negotiations under way.

\$12 Million of Machine Tools To Be Sold at Auction

Machinery and equipment originally valued at over \$12 million will be sold within the next two months at what is believed to be the largest auction sale ever held. The machines are those used in the Wright Aeronautical Corp. plants in the vicinity of Paterson, N. J., where the sale will be held. Herbert I. Segal, managing director of Asset Realization Co., Newark, N. J., will be the auctioneer.

It is estimated more than 10,000 pieces of equipment will be sold. No price limits will be set. The principal machine tools included in the sale are 80 tool room and engine lathes, 175 ram and saddle type turret lathes, 175 mill- and 250 grinding machines.

Prospective buyers will be required to inspect the machinery before the sales open by reason of the vast number of items to be sold. Inspection dates will be announced as soon as inventories are completed.

Inventory of Machine Tools In Warehouses To Be Taken

To facilitate disposal of fixed-price surplus machine tools, War Assets Administration will utilize the help of the "approved dealers" in making inventories of these tools in warehouses. The first step was taken in the Detroit regional office preparatory to instituting a program of placing on continuous sale all machine tools in warehouses. Through March 24 these "approved dealers" had sold a total of \$23,557,900 (cost to government) of surplus machine tools and certain other production equipment. The government's recovery was \$11,822,681, less "approved dealer" commissions of 12½ per cent.

WAA Licenses Additional Dealers To Sell Surplus Machine Tools

LIST of "approved dealers" who have been licensed by the War Assets Administration to negotiate sales of government-owned surplus machine tools and production equipment is growing steadily. In addition to those previously listed by STEEL, the following have been licensed:

District of Columbia

Washington: Victor Gottsman, 3725 Macomb St. N. W.; John A. Ball, 416 Fifth St. N. W.; Hudson-Potomac Associates, 618 Twelfth St. N. W.; Lehigh Associates, 201 Evans Bldg., 1420 New York Ave. N. W.; McLaughlin & Co., 301 Woodward Bldg.; Ray B. Roberts, 1400 M St. N. W.

New Jersey

Newark: Wengle & Rainwater, Raymond Commerce Bldg.; John Rowe & Co., 433 Central Ave.; Pan-American Engineering Corp., 1060 Broad St.; Adolph Friedman, 278 Halsey St.

Clifton: Trans-National Export Co., 119 E. Eighth St.; Harrison: Stewart Products Co. Inc., 35 Harrison Ave.; Irvington: Gould & Eberhardt Inc., 433 Fabyan Place; Passaic: William B. Palko, 207 Howard Ave.; William R. Kent, 11 Kent Court; Rahway: Lucien Revol, 23 W. Scott Ave.; Roselle Park: Roselle Park Machinery Co., 130 Dalton St.; S. Orange: Engineering & Management Associates Inc., 249 N. Ridgewood Rd.; Union: R. Gelb & Sons Inc., Box 356; Verona: Parkhurst Distributing Co., 17 Sunny-side Place.

New York

Brooklyn: Fulton Machinery Co., 493 Atlantic Ave.; Burton P. Barr, 105 Court St.; George S. Badders, 532 Clinton Ave.; A. T. Wendt, 173 Washington Park; Weber & Rose, 6902 Eighteenth St.; United National Trading Co., 164 Montague St.

Buffalo: Earl J. Westfall, 15 Lisbon Ave.; Arthur J. Barry, 832 William St.; Joe O'Rourke, 466 Potomac Ave.; O'Connell Machinery Co., 284 Woodward Ave.; A. J. Fitzgibbons Co., 1525 Marine Trust Bldg.

Bronx: Bronx Hardware & Supply Co. Inc., 2733 Third Ave.; Jamaica: American Engineering & Equipment Co., 91-17 182nd St.; Long Island City: James F. Nullmeyer, 29-05 Review Ave.; Ossining: Cullen Sales, Croton Ave.; Rockville Centre: James & Hawkins Inc., 231 Sunrise Highway; Rome: Bartell Engineering Co., 200 Elm St.; Syracuse: C. A. Braun Inc., 307 University Ave.; DoAll Hudson Co. Inc., 618 S. Salina St.; Troy: Read-Lewis Machine Co., 391 Third Ave.; Yonkers: Frank K. Smith, 85 Bronx River Rd.

New York: McCabe & Sheeran Machinery Corp., 50 Church St.; Chemical & Process Machinery Corp., 146 Grand St.; R. F. Baer Corp., 60 Beaver St.; Machinery & Equipment Corp., 533 W. Broadway; George Joseph Pidgeon, 141 Broadway; Supreme Woodworking Machinery Co., 50 Howard St.; Edward F. Hennessy, 420 Lexington Ave.; Walter H. Allen, 30 Church St.; Atlas Maritime Corp., 29 Broadway; Ritterbush & Company Inc., 50 Church St.; John A. Stockman, 123 Lafayette St.; Loma Machine Manufacturing Co. Inc., 580 Fifth Ave.; M. J. Massimo Associates, 655 E. 228th St.; Deegan Rogers Co. Inc., 188 E. 135th St.; Machinery Distributors Inc., 332 E. 28th St.; Noah Woodworking Machine Co. Inc., 29 Howard St.; Boris M. Volynsky Mfg. Co. Inc., 311 W. 66th St.; Henry Berkowitz, 350 Fifth Ave.; McCorry Bros., 2 Broadway; John V. Snow, 130 W. 42nd St.; Stein Equipment Co., 426 Broome St.; Henry E. Moore, 556 W. 140th St.; Universal Hydraulic Machinery Co., 285 Hudson St.; L. J. Land & Co., 142 Grand St.; Marcus Machinery Co., 150 Nassau St.; Hackett Im-

ports Ltd., 8 W. 40th St.; J. M. Finlayson & Associates, 420 Lexington Ave.; Atlantic Machinery Exchange, 212 Centre St.; Emerson C. Hallock, 369 Lexington Ave.; William J. Shanley, 91 Ft. Washington Ave.; Scott-Greene Corp., 24 State St.; Rosenkranz, Weisbecker & Co., 149 Broadway.

North Carolina

Wilmington: Mill & Contractors Supply Co., 121 N. Water St.; Asheville: W. B. Hughes Inc., Box 662; Hickory: Anchor Supply Co. Inc., Statesville: DoAll Carolina Co., 605 W. Front St.; Charlotte: William J. Crosby Jr., Piedmont Armature Co., 129 N. Brevard St.; Winston Salem: R. R. Crawford, 206 N. Liberty St.

North Dakota

Fargo: Fargo Motor Supply Inc., 320 N. P. Ave.

Ohio

Berea: Peterseim Equipment Co., 6520 Grayton Rd.; Columbus: H. C. Sandel & Associates, 145 High St.; Dayton: Woodall Engineering & Sales Co., 910 Winters Bank Bldg.; Parma: Adams Machine Tool Co., 4902 Wellington; Salem: Ralph B. Long Jr., 836 E. Third St.; Toledo: Toledo Machinery Exchange, 24 S. St. Clair St.; DoAll Toledo Co., 2952 Monroe St. Cleveland: Ailico Co., 14838 Euclid Ave.; Bernardi & Co., 225 Hanna Bldg.; DoAll Cleveland Co., 6517 Euclid Ave.; J. C. Mann & Son Inc., 12715 Miles Ave.; Stewart Bowling & Co. Inc., 3190 E. 85th St.; Saron Packaging Co., 1937 St. Clair Ave.; Ralph S. Keller, 12905 Willard Ave.; Clark Machinery Co., 1235 St. Clair Ave.

Oklahoma

Oklahoma City: Woodford Supply Co., 1420 E. Reno; H. & E. Distributing Co. Inc., 718 Commerce Exchange Bldg.

Pennsylvania

Eric: Thompson Mfg. Co. Inc., 152 W. Twelfth St.

Rhode Island

Providence: Lincoln Machine Co. Inc., 235 Georgia Ave.; Aero Industrial Equipment Co., 18 Bassett St.; East Providence: Abrasive Machine Tool Co., Dexter Rd.; Pawtucket: Potter & Johnston Machine Co., 1027 Newport Ave.

Tennessee

Bluff City: Leon H. McClellan.

Texas

Austin: Crump Sales Co., 2003 East First St.; Bammel Machine Co., 2501 East Fifth St.; Corpus Christi: General Export Iron & Metal Co., 3000 Agnes St.; Laredo: Sam Cunningham, 1213 Laredo St.; San Marcos: Delta Distributing Co.; Fort Worth: Hutchison Pipe & Waste Material Co., 601 Throckmorton St.; Sherman Eastern Iron & Metal Co., 400 E. Mulberry St.; Dallas: Ainsley E. Stuart, 1831 Kessler Blvd.; M. L. Harrell Co., 3218 Lec St.; Houston: Gulf Equipment Corp., 726 M. & M. Bldg. San Antonio: Joseph T. Kenny, 208 W. Norwood; Gerald R. Mazur, 815 W. Mistletoe Ave.; Service Equipment Co., 238 Flores St.; Eagle Supply Co., 101 Sixth St.

Vermont

Springfield: Jones & Lamson Machine Co., 160 Clinton St.

Virginia

Richmond: Industrial Supply Corp., Fifteenth & Franklin Sts.

Washington

Spokane: Equipment Sales & Service, West 925 First Ave.; Pacific Equipment Register, North 106 Division St.

West Virginia

East Charleston: Wm. S. Bolden Co., 814 Washington St.

Wisconsin

Milwaukee: Wallace Machinery & Supply Co., 743 N. Fourth St.; Monroe Engineering Corp., 2610 N. Fourth St.

War and Navy Departments To Revise Patent Provisions in Contracts

Services act on suggestions of manufacturers, who found during war that contract provisions were ambiguous or too one-sided in favor of government. Uniformity on fair basis to contractors will be sought in rewriting articles

GENERAL revision of patent provisions in War and Navy Department contracts is being undertaken by the two services in response to suggestions by a large number of manufacturers. During the war, many manufacturers accepted contracts containing patent clauses which were not to their liking. In some cases, they felt, the wording of certain clauses was ambiguous. Some of the clauses, they felt, were too one-sided in favor of the government.

Now that the war is over and there is time to make a detailed study, the two services are going over the patent provisions with a fine-tooth comb. Some of the changes recommended by manufacturers probably will be adopted if it is shown that such action will not weaken the government's position.

Under agreement reached at a recent meeting of responsible officers in the War Department's Offices of Procurement and Judge Advocate and the Navy's Office of Research & Inventions, the Navy will perform the spade work, and the War Department will defer action until such time as the Navy is ready with its recommendations. The Navy at present is studying the subject matter in co-operation with representative contractors and, in particular, with spokesmen of the Navy Industrial Association.

Admiral Bowen in Charge

In charge of the program is Rear Adm. H. G. Bowen, chief of the Navy's Office of Research & Inventions. His chief aides in the work are Capt. J. H. Austin, general patent counsel for the Navy on Admiral Bowen's staff, and Dr. Murray O. Hayes, director of the Patents Division of the Office of Research & Inventions.

"We will rewrite the existing patent clauses when that is found necessary in order to provide fair treatment to everybody concerned," Admiral Bowen told STEEL. "We think that we will be able to satisfy the contractors while at the same time providing ample protection for the government. After all, patent clauses cannot be good for the government when they are not fair to industry as a whole."

Changes to be made will involve prin-

cipally the wording of the patent provisions. As a general rule, there will be no change in their purport and intent. Therefore, the program now in progress involves a thorough scrutiny, and some rewriting, of the clauses adopted last October when the War Department and the Navy for the first time agreed to adopt uniform patent provisions.

The article most frequently inserted in contracts to protect the government against patent risks—as set forth in its latest revised form in a directive issued by the Secretary of the Navy on Oct. 26, 1945—provides that the contractor will indemnify the government against liability for patent infringement occurring in the performance of the contract. The War Department uses this article in substantially 98 per cent of its contracts. The Navy Department, however, when circumstances justify it, adds a provision relieving the contractor of responsibility when infringements necessarily result from compliance with the government's specifications, or from compliance with written instructions from the contracting officer.

Uniformity Sought

One of the objects sought in the present study, therefore, is to secure entire uniformity on a fair basis acceptable to the majority of contractors, of the provision protecting the government against damages for infringement.

Otherwise the patent provisions of the two services at present are entirely uniform. Most of the Navy directive of Oct. 26 was devoted to protecting the government in "development contracts, the sole object of which is research and development work." For use in such contracts, individually or in combination, the two services have a number of articles.

One of these articles, frequently used in development contracts and which may also be used in addition to the patent indemnity clause if requested by the contractor, specifically relieves the contractor of the hazard of incurring damages as a result of patent infringement suits. It provides that:

" . . . the government shall . . . be deemed to have given its authorization and consent to the use and manufacture,

in the performance of this contract or of any subcontract hereunder, (1) of any patented invention embodied in the structure or composition of any article the delivery of which is accepted by the government under this contract and (2) of any patented invention utilized in machinery, tools or methods, the use of which necessarily results from compliance by the contractor or the using subcontractor with (i) specifications or written provisions now or hereafter forming a part of this contract or (ii) specific written instructions given by the contracting officer"

A second article for inclusion in development contracts gives the government "an irrevocable, non-exclusive, non-transferable and royalty-free license" under "each invention, improvement and discovery (whether or not patentable) conceived or first actually reduced to practice (i) in the performance of this contract, including any subcontract hereunder except subcontracts for standard commercial items or subcontracts which do not involve either research or development . . . or (ii) in the performance of any research or development work relating to the subject matter hereof which was done upon the understanding that this contract or any subcontract hereunder would be awarded"

Contractor Must Give Notice

A clause in the above mentioned article provides that the contractor not only will notify the contracting officer of all inventions made in the course of performing the contract, but also will notify the contracting officer of those inventions on which he proposes to file patent applications. This latter information is for the guidance of the government in applying for patent rights on discoveries on which the contractor does not intend to file patent applications.

A third article for use in development contracts under certain conditions gives the government an option to purchase a license under the contractor's "background patents"—that is, the patents held by the contractor prior to beginning work on the contract.

A fourth article is available for use in development contracts to give the government title to "foreground patents"—that is patents on inventions or discoveries occurring as a result of work under the contract. This article is included when it would be "unfair to third parties, or contrary to the public interest to permit the contractor to retain ownership of foreground patents, such as, for example, where the contractor has assembled a group of research scientists through the co-operation of



NAVY HONORS CIVILIAN EMPLOYEES: Vice Adm. E. L. Cochrane, chief of the Bureau of Ships, presents Distinguished Civilian Service Medals to ten employees of the bureau. Left to right, front row: N. L. Merriman, W. E. Stine, H. Gregory. Admiral Cochrane, W. Fifer, M. Portnoy, and J. Miedermair. Back row, left to right: L. Flaherty, J. Schombert, E. Pallange and C. Whitney. NEA photo

other manufacturers or institutions, and retention of foreground patents by the contractor would be unfair to co-operating manufacturers or institutions; where the subject matter is expected to be maintained in high classification in peacetime and no commercial applications are foreseen; or where the contractor, working in close co-operation with research personnel of the government or of another contractor, is to produce the prototype of an item of equipment differing radically in structure or mode of operation from any item previously made, which said item of equipment has already been developed largely or wholly by research personnel not connected with the contractor."

This article has a clause for use when the contracting officer determines it to be to the interest of the government to purchase the title in foreground patents. This clause provides that each invention conceived or first reduced to practice in the performance of the contract, or subcontracts, "shall be the sole and exclusive property of the government, and the contracting officer or his designee shall have sole power to determine to whom, and in what manner and form, consistent with law, title thereto shall be assigned and patent protection therefor shall be obtained in any country; provided, however (i) that as respects any subject invention made by technical personnel employed by or under contract with the contractor prior to the date of this contract . . . the foregoing and other rights hereinafter named shall be to the extent of contractor's right to assign or grant the same; (ii) that nothing contained in this sentence shall be

deemed to grant a license under contractor's patent rights; and (iii) that with respect to any subcontract hereunder, contractor's obligations under this article will be discharged upon its including in such subcontract a patent rights article not less favorable to the government than as herein provided."

A fifth article is available for use in development contracts in which it is desirable for the government to purchase a license under background patents and, in addition, obtain a royalty-free license under foreground patents developed in connection with the execution of the contract. The language in this article in large part is a duplication of that of the development contract articles.

A sixth article is used in development contracts when it "is considered probable that the contractor may wish to file patent applications disclosing top secret, secret, or confidential subject-matter of the contract." This article prescribes the course of procedure to be followed by the contractor. It provides that the contractor will, upon request of the government contracting officer, "assign and convey to the government the entire right, title and interest . . . the same to be held by the government subject to reversion . . . to contractor upon allowance of the said (patent) application . . ."

Indicating the disposition to permit a controlled flexibility in the patent policy, the Navy directive closes with a paragraph titled "Deviations." It instructs the Office of Research & Inventions to "consider and act upon requests for deviations, in special cases . . ."

Manufacturers having suggestions for

changes in the existing patent clauses should direct them to the Office of Research & Inventions, attention Director of Patents Division, Navy Bldg., Washington 25, D. C.

How Democracy Met War Need for Waste Material

Under the title *Democracy in Action* the American Industries Salvage Committee has made a report on its activities during World War II in meeting the need for iron and steel scrap, tin and other metals essential to the war effort.

A total of \$1,872,756.82 was contributed by industry to carry on the campaign. Of this total the iron and steel industry contributed \$1,481,002.89, the steel castings industry \$76,841.43, the iron and steel scrap industry \$45,000, nonferrous metals industry \$30,500 and steel warehouse distributors \$9912.50. Other industries also contributed.

The book is illustrated by reproductions of the newspaper and magazine advertising campaign, posters, store window displays, movies, radio and school programs. As a result of all these means to arouse interest the drives were successful, bringing together the largest tonnage of scrap ever available to the steel industry, enough scrap rubber to fill need for rubber reclaimers for more than a year and approximately 5,500,000 pounds of waste fats from households.

Officers of the committee were: Robert W. Wolcott, Lukens Steel Co., chairman; Charles R. Hook, American Rolling Mill Co., vice chairman; H. L. Hughes, U. S. Steel Corp., treasurer; Frank Block, secretary.

5 WAYS

MAN-AU-TROL INCREASES VERTICAL TURRET LATHE PRODUCTION

Without losing any of its versatility of manual operation, the Bullard MAN-AU-TROL Vertical Turret Lathe . . . in automatic operation . . . steps up output for 5 reasons.

1. It is cutting almost continuously . . . no stops for measuring the piece or changing feeds and speeds.
2. It is set up for maximum productivity . . . assuring continuous operation at maximum practical feeds and speeds.
3. The machine eliminates the elements of fatigue and human error.

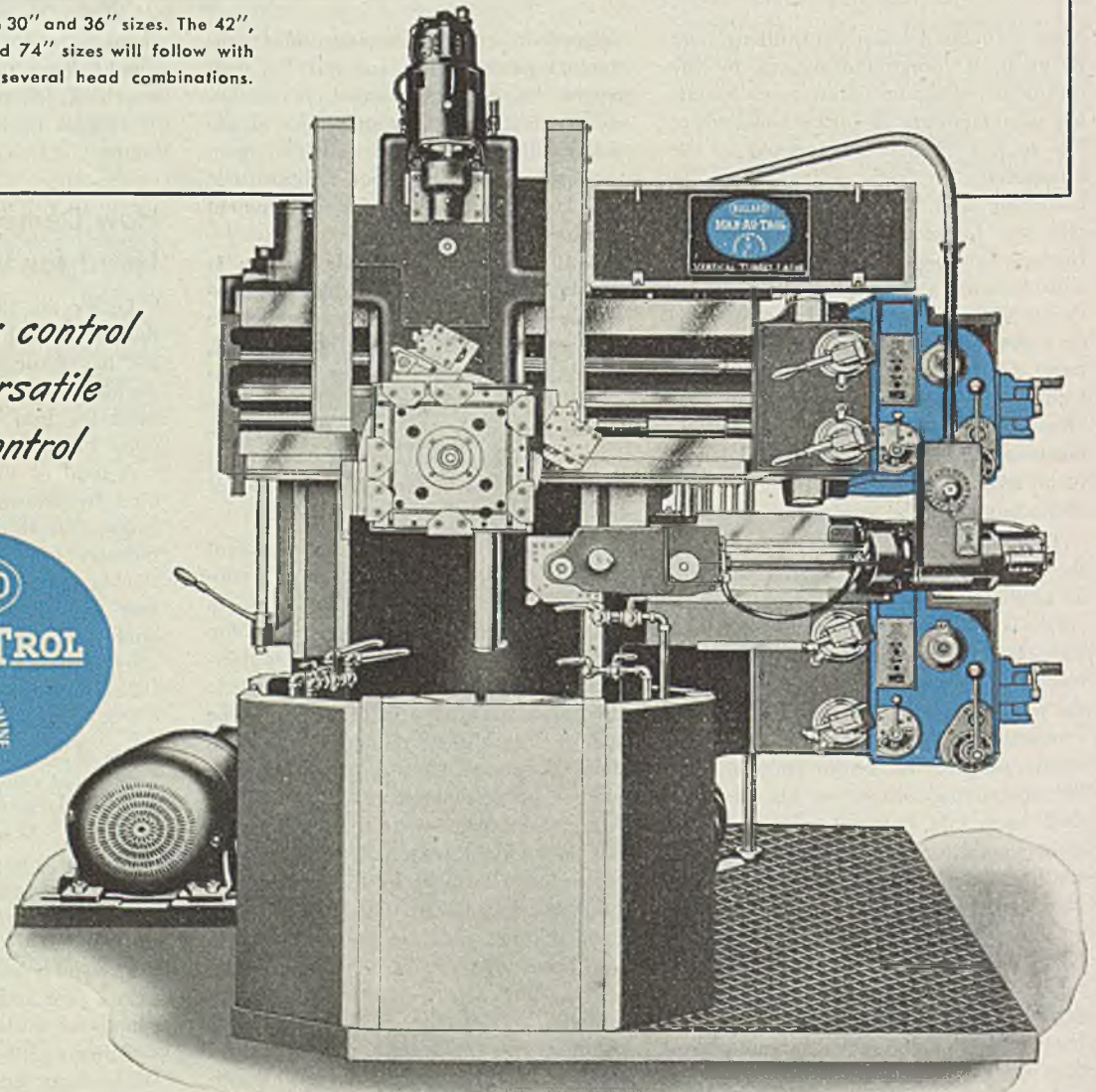
4. Its turret head permits standard simplified multiple tooling for simultaneous cutting not possible with other types of Vertical Turret Lathes.

5. It consistently works to a degree of accuracy not obtainable with manually-operated machines . . . work spoilage practically eliminated.

For full details about the unique productivity, flexibility and accuracy of Bullard MAN-AU-TROL Vertical Turret Lathes, write for your free copy of Bulletin MAV-G-1 today. The Bullard Company, Bridgeport 2, Connecticut.

Now made in 30" and 36" sizes. The 42", 54", 64" and 74" sizes will follow with selection of several head combinations.

*The automatic control
that is as versatile
as manual control*



BULLARD CREATES *NEW METHODS* TO MAKE MACHINES DO MORE

mirrors of MOTOR DOM

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

Question of adequate steel supply has automotive consumers stumped. Resort to arithmetic only confuses problem. Shortages universal though finished steel output is estimated to average 4 million tons monthly since war's end

A FAVORITE question around these parts. . . . What is happening to all the steel, and why do all the motor car builders continually complain of steel shortage? It is a fair question, since steel producers have been operating at near capacity on nonmilitary orders since last fall, with the exception of a month's loss in February because of the steel strike. And still there is the universal complaint of "no steel," or at least not enough steel.

A little simple arithmetic makes the problem even more confusing. The steel industry has been operating at roughly 4 million tons of finished steel production per month. If you start with September and figure through April, subtracting February, you arrive at a six months total of 24 million tons of finished steel. Consider 25 per cent of this total as the flat-rolled variety—sheets and strip—and you have 6 million tons. Now allocate 30 per cent of this total to the automotive industry, which is low considering the normal pattern of distribution under which the automotive industry consumes approximately 40 per cent of the flat-rolled tonnage, and you arrive at a figure of 1,800,000 tons—theoretically the amount the industry should have received since last fall. This tonnage should be sufficient to produce 1,800,000 cars and trucks, yet the production figure by the most generous estimate is about 700,000. So where are the other 1,100,000 tons of steel, or about enough for five months' production at current levels, not forgetting the CPA restrictions on inventories to a 45-day maximum?

Steelmakers Don't Have the Answer

Throw these figures at the average steelmaker and he does not know the answer. E. T. Weir, chairman of National Steel Corp., in Detroit last week to address the SAE, could not come up with any answer except to guess that the figure of 4 million tons of finished steel per month was a little high, and that approximately 10 million tons of

finished steel was lost because of the steel strike.

Mr. Weir, incidentally, acknowledges a profoundly lugubrious outlook for industry over the next year. The coal strike last week took its first major slice at steel operations, and he believes the steel industry will be closed down tight inside of three to four weeks. Questioned as to what the proper steps might be to end the miners' walkout, he said that he did not know. Perhaps like many another business man he realizes that

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Tabulated by Ward's Automotive Reports

	1946	1941
January	121,861	524,073
February	83,841	509,332
March	141,555*	533,878
Week ended:		
April 6	47,735*	116,255
April 13	49,425*	99,260
April 20	57,565*	99,945
April 27	60,000*	108,165

* Preliminary estimate.

the country is at the mercy of arrogant union leaders and simply must sit it out. Legislation requiring union accountability and responsibility is still only a distant dream, despite active denouncers like Mr. Weir.

Even though his listeners agreed with him 100 per cent, it seemed a little like a voice crying in the wilderness when the genial head of National Steel concluded his address by saying, "Anyone who advocates a return to American principles these days is branded as reactionary. He is a fellow who yearns for the good old days, who wants time to stand still. I want to point out that the concepts of human freedom on which

this nation was founded still represent the furthest advance in the political thinking of mankind. They afford the individual—and I mean the average individual—the best assurance in all history for opportunity, advancement and good living. The so-called progressive governmental ideas of our day are in reality throwbacks to autocratic and repressive forms of government which our founders rejected. He who advocates the return to American principles is not a reactionary, he is the true progressive."

Pleasant and reassuring though these words may be, they are not productive of steel for the automobile plants. George Fink, president of Great Lakes Steel Corp., joining Mr. Weir in a press conference, said he thought there would be ample steel "this year" for production of better than 3 million passenger cars, assuming some adjustment of the coal strike will not be long delayed. His plant, of course, is somewhat more fortunate than others since it has been able to maintain near-peak operations by virtue of a comfortable position on coal, comparatively speaking. The bulk of Great Lakes Steel production goes to automotive accounts, and, according to Mr. Fink, his customers are being allocated tonnage approximately on the basis of their five-year 1937-1941 buying.

More People Ordering Than Before

Other harassed steel suppliers, often nettled over questions about where all their tonnage is going, say the trouble is, in the words of Jimmy Durante, "Everybody wants to get into the act," meaning of course that all steel users are attempting to order tonnages far beyond anything they had ever used before. Steel mills have never in their history faced a situation like today when fabricators are swarming down on the market after a four-year drouth and screaming for steel in fantastic quantities. Refrigerators, washing machines, appliances and dozens of other consumer products all have their fingers in the steel pie, with the result that most sales office personnel would like to go home and crawl into bed.

There is just a suspicion that the automobile companies are not quite as bad off as they would like steel mills to be-

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HEAD CHEVROLET LIGHT CAR DIVISION: Arnold Lenz, left, is manufacturing manager, Earle S. McPherson, center, is chief engineer, and George A. Stout, right, is comptroller of the new Chevrolet light car division which will build two plants in the Cleveland area for complete manufacture and assembly of a new light-weight model. One plant will be in Brook Park, providing about 1,000,000

square feet of space for manufacture of motors, axles, transmissions and other components. The second unit will be in Parma, covering 1,500,000 square feet for pressed metal, body and final car assembly, as well as power house, administrative offices, service parts and engineering buildings. Employment at the two plants will aggregate about 10,000

lieve, from the standpoint of the available tonnage of the garden variety of steel sheet and strip. More critical are many specialties, like valve spring wire, seat cushion wire, screw machine stock and similar items. The lack of one or two of these relatively low-tonnage items can stall a plant completely, even though there are ample quantities of sheet and strip for bodies and fenders.

Expedients and conservation measures reminiscent of the wartime period are coming to be the order of the day in automotive manufacturing. Out at the Dodge main plant, for example, they are taking the flash off fender stampings, re-rolling it and press forming it again for seat backs. Pieces trimmed off fender blanks are being spot-welded together and reworked for a variety of parts such as engine compartment shields and other elements which are not visible outwardly. Dodge publicists claim a monthly saving of 300 tons of steel by such expedients which in normal times would never be condoned.

At the Fisher Body plant in Lansing, in the face of urgent demands from Oldsmobile for bodies, engineers went so far as to restrike hundreds of stampings originally made for a model not yet in production to stave off a shutdown resulting from lack of shipments from the Cleveland Fisher plant, which is still one

of the sore spots in the GM picture. Refusal of UAW workers to resume work at this plant has forced Chevrolet to re-route shipments to other assembly plants, in addition to choking off the supply of sheet metal components to other GM divisions. Ultimately the strikers may find the situation back-firing in their faces, because it is understood the management is just about fed up with the whole situation and is contemplating a permanent suspension of sheet metal fabrication at Cleveland.

Chevrolet is proceeding with expansion of its gray iron foundry at Saginaw, a program which eventually will boost capacity 50 per cent. Six new cupolas, an addition to the pattern shop, enlargement of a storage building for core and molding sand, addition to the power plant and a new craneway to handle cupola charges are now going up. Probably the largest automotive gray iron foundry in existence, the Chevrolet unit has been steadily expanded since the first iron was poured Sept. 15, 1919.

The boys in the back room tell an amusing story concerning the efforts of General Motors to buy a number of Ford and Mercury cars to take apart in laboratories. This is standard procedure among all automobile manufacturers, but it is complicated these days by the difficulty in getting delivery of any new cars. GM

wanted a dozen or so Ford models but was getting nowhere until one resourceful individual approached a Ford dealer and said that maybe Ford would be interested in getting some General Motors cars for the same purpose—to pull apart and examine in detail. The dealer contacted the Rouge plant and found such was the case, so finally a trade was arranged, with Fords, Lincolns and Mercurys being exchanged for Chevrolets, Pontiacs, Oldsmobiles, Buicks and Cadillacs. Some of the GM division chiefs were a little disgruntled over the procedure, but it went forward anyway.

Resignation of J. D. Burke as sales manager of the budding Tucker Corp. in Chicago, on the heels of the departure of E. L. Reasons, announced here last week, seems to suggest the bloom is fading from this much-touted enterprise. According to the grapevine around Detroit, Mayor Kelly of Chicago was hot-footing it to Washington to persuade the powers-that-be to let Tucker and his associates acquire the Dodge Chicago engine plant for their car-building operations, with ample financial backing from Chicago moneybags. This is the story Ray Rousch has told some of his friends around Detroit, at any rate, but the sudden departure of two top executives of the company would appear to make future progress dubious.

MORE ACCURATE HYDRAULIC PRESSURE CONTROL

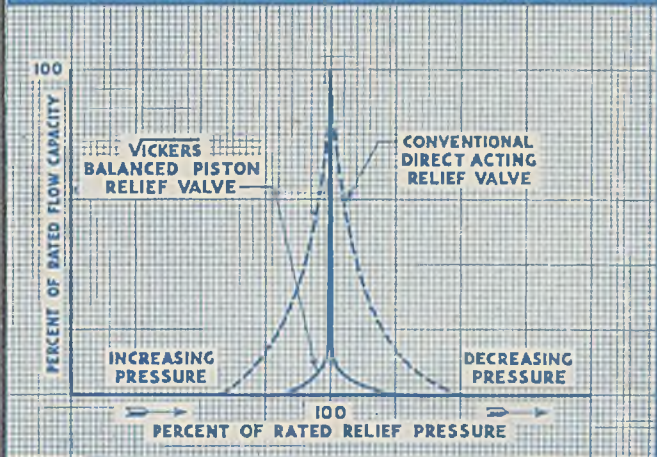
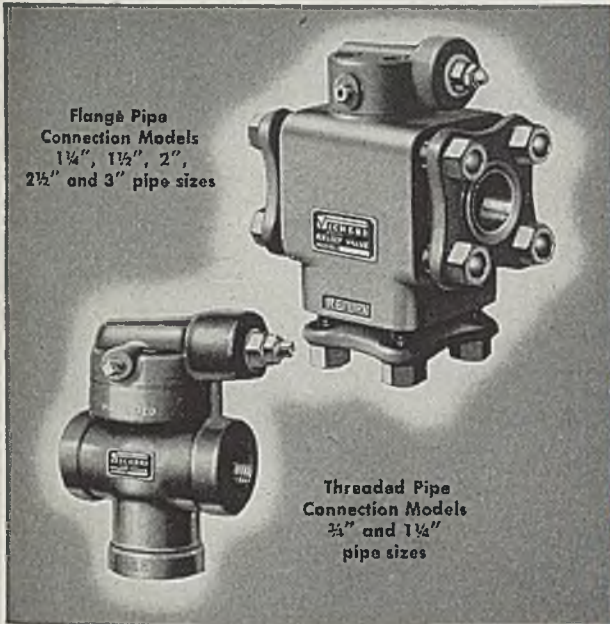


CHART SHOWS PRESSURE READINGS OBTAINED DURING A VARIATION OF FLOW RATE FROM ZERO TO MAXIMUM AND BACK TO ZERO

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As indicated by the chart above, Vickers Balanced Piston Type Relief Valves have a negligible pressure variation throughout their capacity range. In these valves a hydraulically loaded and balanced piston takes the place of the customary spring-loaded direct-acting relief mechanism. This means more sensitive operation as well as greater accuracy throughout the wide pressure range.

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Chapters of Warehousemen Elect Officers

Elections held by 13 groups of American Steel Warehouse Association Inc., President Walter S. Doxsey reports

OFFICERS for the coming year have been elected by a number of chapters of the American Steel Warehouse Association Inc., Walter S. Doxsey, president of the association, announced.

They are: Central States Chapter—President, F. C. Flosi, A. M. Castle & Co., Chicago; vice presidents, A. E. Kuby, Standard Steel & Wire Corp., Chicago, and A. J. Tanck, National Steel Co., Chicago; secretary, T. B. Daniels, Jones & Laughlin Steel Corp., Chicago; treasurer, D. F. Grace, Chicago Steel Service Co., Chicago; and chapter director, H. V. Douglas, Central Steel & Wire Co., Chicago.

Cincinnati Chapter—President, J. E. Merchant, Edgar T. Ward's Sons Co., Cincinnati; vice president and chapter director, John A. Thiele, Miami-Dickerson Steel Co., Dayton, O.; vice president, William A. Kruse Jr., Union Iron & Steel Co., Cincinnati; secretary, Wayne Dukette, Joseph T. Ryerson & Son Inc., Cincinnati; and treasurer, F. E. Morris, E. K. Morris & Co. Inc., Cincinnati.

Colorado Chapter — President and chapter director, H. V. Waterman, Hendrie & Bolthoff Mfg. & Supply Co., Denver;

vice president, J. H. Singleton, C. A. Crosta Inc., Denver; and secretary-treasurer, A. M. Hays, Hendrie & Bolthoff Mfg. & Supply Co., Denver.

Connecticut Chapter—President and chapter director, R. B. Shearer, C. S. Mersick & Co., New Haven, Conn.; vice president, S. H. Hascall, Blodgett & Clapp Co., Hartford, Conn.; and secretary-treasurer, G. S. Brouso, C. S. Mersick & Co., New Haven.

Detroit Chapter—President, T. L. Parker, Edgar T. Ward's Sons Co., Detroit; secretary-treasurer, V. R. Bates, Craine Schrage Steel Division, Detroit Steel Corp., Detroit; and chapter director, J. Ivan Fiscus, Huron Steel Co. Inc., Detroit.

Intermountain Chapter—President and chapter director, H. P. Lambrecht, Salt Lake Hardware Co., Salt Lake City, Utah; vice president, L. S. Packman, Steel-Engineers Co., Salt Lake City; and secretary-treasurer, H. C. Kimball, Z. C. M. I. Wholesale Hardware Division, Salt Lake City.

New England Chapter — President, Frederick H. Lovejoy, Wheelock, Lovejoy & Co. Inc., Cambridge, Mass.; first vice president, James A. Parsons, Ward Steel Co., Boston; second vice president, Verdi A. Dodds, Brown-Wales Co., Boston; secretary-treasurer, Carroll S. Harvey, Arthur C. Harvey Co., Boston; and chapter director, Everett F. Merrill, Merrill & Usher Co., Worcester, Mass.

Northern California Chapter—President and chapter director, Paul M. Oakley, Geo. R. Borrmann Steel Co., Oakland, Calif.; vice presidents, James D. Tayler, Tayler & Spotswood Co., San Francisco, and Wakefield Baker, Baker & Hamilton, San Francisco; and secretary,

Lyle Kindorf, Gilmore Steel & Supply Co., San Francisco.

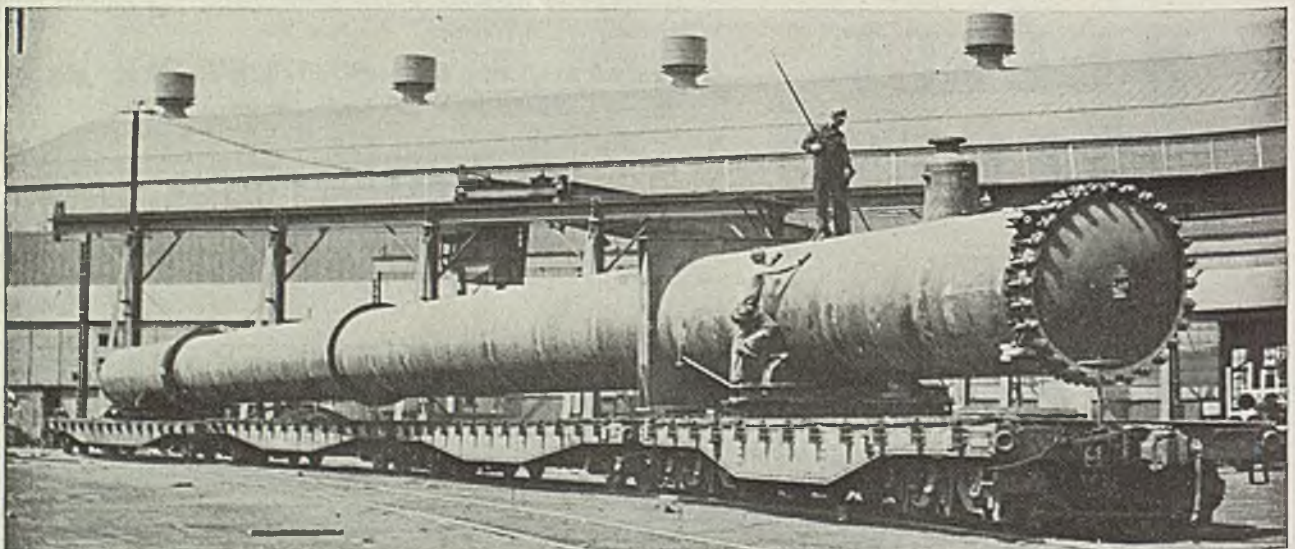
Northern Ohio Chapter—President, W. S. Bidle, SAE Steels, Cleveland; vice president, J. W. Reichert, Decker-Reichert Steel Co., Cleveland; secretary-treasurer, W. O. Springer, Joseph T. Ryerson & Son Inc., Cleveland; and chapter director, R. J. Foster, Republic Structural Iron Works, Cleveland.

Pacific Northwest Chapter—President, Fred Holcomb, Woodbury & Co., Portland, Oreg.; vice president, R. W. deWeese, Electric Steel Foundry Co., Portland; secretary-treasurer, H. F. Morrow, Pacific Metal Co., Portland; and chapter director, O. J. Ulrich, Pacific Machinery & Tool Steel Co., Portland.

Philadelphia Chapter — President, David Barbour, Barbour Bros. Steel Co. Inc., Trenton, N. J.; vice president, Thomas Callahan, Atlantic Steel Products Co., Philadelphia; vice president, Alan Ainsworth, Horace T. Potts Co., Philadelphia; vice president, J. J. Hill III, Hill-Chase & Co. Inc., Philadelphia; secretary-treasurer, Ray P. Farrington, W. F. Potts, Son & Co. Inc., Philadelphia; and chapter director, J. J. Hill Jr., Hill-Chase & Co. Inc., Philadelphia.

Washington Chapter—President, J. C. Richards, Hunt & Mottet Co., Tacoma, Wash.; vice president, John Robbins, A. M. Castle & Co., Seattle; secretary-treasurer, Arnold S. Allen Jr., Seattle Hardware Co., Seattle; and chapter director, Harold Barde, Barde Steel Co., Seattle.

Wisconsin Chapter—President, Carl Gallauer, United States Steel Supply Co., Milwaukee; vice president, George C. Heiden, Shadbolt & Boyd Co., Milwaukee; secretary-treasurer, Fred O'Dell, Edgar T. Ward's Sons Co., Milwaukee; and



SHIPPING PROBLEM: Four flat cars were required to ship this 180-foot creosoting or wood-treating vessel from the Chicago Bridge & Iron Co. plant in Birmingham to Joslyn Mfg. & Supply Co., Franklin Park, Ill.

Shortages Still Hinder Pressed Metal Industry

Labor troubles are beginning to clear away but materials and tools continue in very short supply

LABOR SHORTAGE and attendant labor difficulties in the stamping industry are beginning to clear away but materials and tools are still in very short supply, Clarence W. Custer, newly-elected president of the Pressed Metal Institute, reports.

Commenting on the important contribution made by the Pressed Metal Institute to the stamping industry, Mr. Custer, who is president of American Stamping Co., Cleveland, said that through the institute the industry has been able to cope collectively with problems that could not otherwise have been solved successfully.

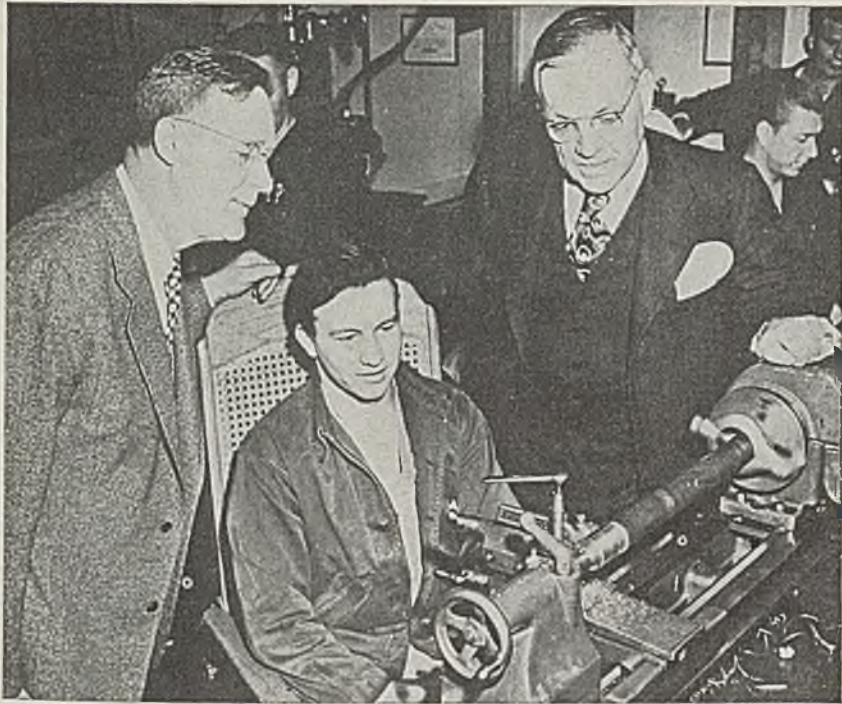
"Co-operation with the Office of Price Administration has resulted in better understanding and constructive action, making enhanced production. With the co-operation of the industry advisory committee, the institute has been able to overcome a number of handicaps due to poorly co-ordinated price controls," Mr. Custer pointed out.

"If labor and materials problems can be solved through co-operation there is little else that can deter the pressed metal industry from resuming full peacetime production, and even surpassing the astounding stamping output of the past five years," he declared.

Other newly-elected officers of the institute include: Vice president, Carter C. Higgins, vice president, Worcester Pressed Steel Co., Worcester, Mass.; secretary-treasurer, J. J. Boehm, president, Boehm Pressed Steel Co., Cleveland. Tom J. Smith Jr. was re-elected executive vice president.

Marion Steam Shovel Co. Announces Change in Name

Marion Steam Shovel Co., Marion, O., has changed its name to Marion Power Shovel Co., according to M. E. Montrose, president. The action was taken because the largest portion of production of shovels during the past 15 years has been diesel, gasoline and electric powered. The company is engaged in an extensive modernization program.



DISABLED VET DEMONSTRATES ABILITY: More than 300 Midwest industrialists met in Battle Creek, Mich., at the Percy Jones General Hospital for a conference to plan a program to help disabled veterans to find jobs. Here Pfc. Courtney Martilla, Detroit, demonstrates his ability to operate a lathe to Oscar Iber, left, president of the O. Iber Co., Chicago, and Elmer M. Jenkins, right, president of the American-Marsh Pumps Inc., Battle Creek. NEA photo

chapter director, John Pritzlaff, John Pritzlaff Hardware Co., Milwaukee.

BRIEFS . . .

Prefabricated Home Manufacturers' Institute, Washington, has published a 24-page illustrated booklet entitled "Modern Homes by Modern Methods," describing the houses which the industry is making under the Veterans' Emergency Housing Program.

Dazor Mfg. Co., St. Louis, lamp manufacturer, has been reorganized as a corporation with one of its partners, Percy L. Read, as president.

Berry Door Co., Wayne, Mich., has developed an all-aluminum overhead garage door which contains all its operating mechanism in a metal box measuring only 6 in. x 6 in. x 24 in. and weighing 18 pounds.

Bituminous Coal Research Inc., Pittsburgh, will move from 719 Oliver Bldg. to 912 Oliver Bldg., Pittsburgh 22, on May 1.

American Steel & Wire Co., Cleveland, sold the *Steel Chemist*, the last of

its fleet of four "St. Lawrence River Canal size" ships, to Inland Steel Co., Chicago. The former company's lake shipping will now be handled by the *Clifford F. Hood*, a self-unloader with a carrying capacity of 7500 net tons.

Amsler Morton, Amsler-Morton International, and Pennsylvania Industrial Engineers, Pittsburgh, divisions of Union Industries Inc., have moved to Chamber of Commerce Bldg., Pittsburgh 19.

American Society for Testing Materials, Philadelphia, has announced plans to move from 260 S. Broad St., to 1916 Race St., Philadelphia 2, shortly after May 1.

Craftsman Steel Fabricators Inc., Baltimore, newly organized, has started production at Hollins and McPhail streets. The company will fabricate steel tanks, smoke stacks, etc.

Part of the name of the Ellwood Ivins Steel Tube Works, Oak Lane, Pa., was inadvertently omitted from the report in *STEEL*, April 22, p. 55, regarding acquisition of the tube works by the recently organized Ellwood Ivins Steel Tube Works Inc.

Coast Scrap Freight To Midwest Cut

Interstate Commerce Commission allows sharp rate reduction for four months' period despite opposition of western steel mills

SAN FRANCISCO

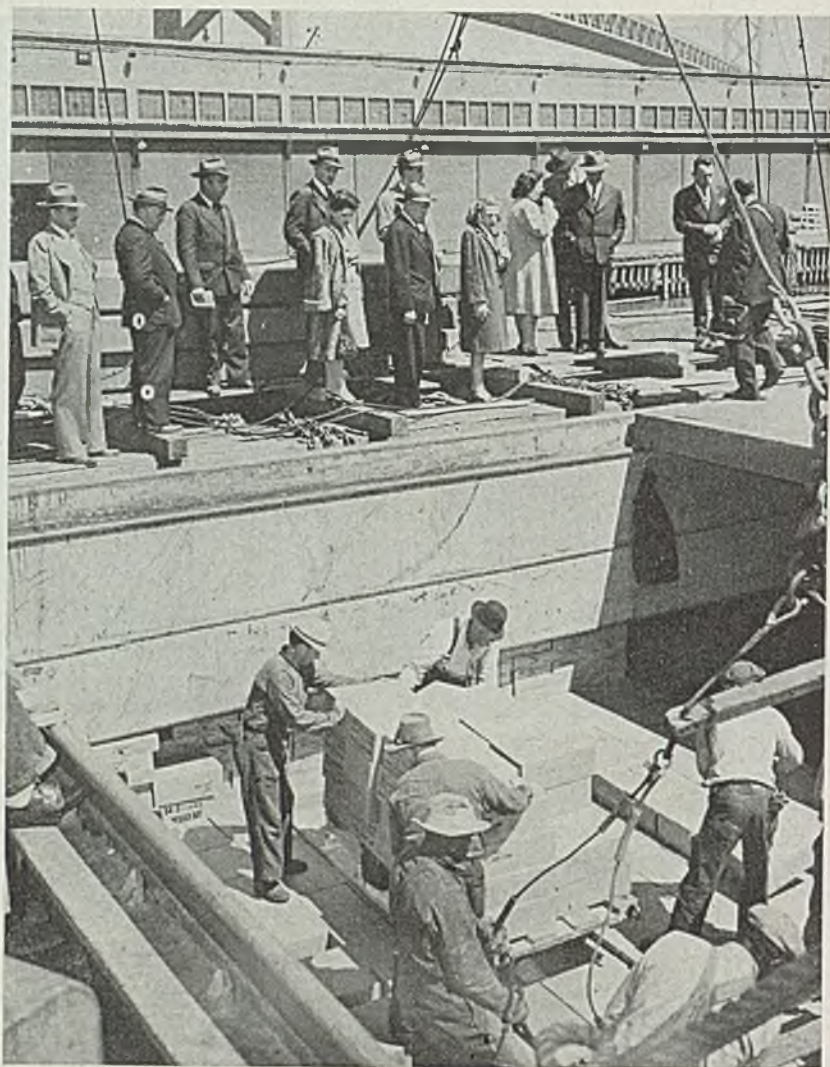
DECISION of the Interstate Commerce Commission to allow reduced railroad freight rates on scrap steel moving from the West Coast to the Middle West is expected to result in considerable purchases of scrap in the Coast area during the next few weeks. Although the coal strike currently is restricting steel operations, it is believed midwestern companies will go ahead with scrap purchases for future use.

In its ruling the ICC found that reduced schedules to Chicago and other points in the western region were reasonable and just. In so ruling the government agency overrode protest by Pacific Coast companies, chiefly Kaiser Co. and Oregon Steel Mills, that a 16 2/3 per cent reduction in rates would strip the coast of its scrap supplies. The companies were aided in their protests by chambers of commerce and other industrial groups at hearings held by the ICC earlier this year.

The new rate on shipments set by the ICC is 55 cents per 100 pounds, or \$12.32 a long ton, compared with the old rate of 66 cents per hundred, or \$14.78 per long ton. The only provision imposed by the ICC is that the rate be applied only to scrap to be used for remelting purposes. The lowered rates will be in effect for a four months' period.

The new rate was established, the ICC is reported to have said, because of the inability of midwestern steel mills to find scrap steel in the region surrounding their plants. The midwest plants said they intend to buy West Coast scrap on only a temporary basis and expect to discontinue the practice when local scrap becomes available again.

Recently scrap steel prices have shown a tendency to weaken on the West Coast. Whether the buying by midwestern plants will be sufficiently



FACT FINDING ON THE JOB: President Truman's fact-finding panel in the longshoremen's dispute watch CIO longshoremen at work in San Francisco. The board is investigating a dispute between the union and employers while a threatened strike is held in abeyance pending their report. NEA photo

large to stiffen the market remains to be seen. In protesting the action at ICC hearings, West Coast interests stated that higher prices would result from a granting of the increase in rates.

The West Coast's largest steel foundry, constructed and operated during the war by Columbia Steel Co. for the government, has been offered for sale or lease by the War Assets Administration.

The plant, which occupies a 43-acre area, has a capacity of about 30,000 tons of heavy steel castings annually.

The property includes 18 buildings with an approximate floor space of 400,000 square feet. Production equipment includes two 25-ton open-hearth furnaces, a melting furnace, two 30-ton electric transfer trucks, a 200-ton straightening press and a 5-ton charging machine. There also are an-

nealing furnaces and ovens, jibs, cranes, laboratory and testing equipment and general office furniture and fixtures.

The plant is served by the Atchison, Topeka & Santa Fe with 12 spur tracks.

Assembly operations at the Chevrolet and Fisher Body plants in Oakland will resume production of passenger cars shortly before May 15. Workers are now being recalled to the plant in preparation for reopening.

Kaiser Shows Interest in Aluminum Plant at Tacoma

Henry J. Kaiser is reported seeking information about the two-pot aluminum plant at Tacoma, operated during the war by the Olin Corp. If this plant is leased it will mean return to activity of all the

aluminum factories in the Pacific Northwest. Kaiser has taken the ingot mill and the sheet rolling plant at Spokane. The other three ingot plants in this area are Reynolds' at Longview, Wash. and Troutdale, Oreg., and Aluminum Co. of America's at Vancouver, Wash. Bids were not received for the Tacoma factory whose operating costs were said to be high.

These plants in this area now form an integrated industry except for a large scale extrusion factory needed to support a large final fabrication operation.

The Tacoma plant is the smallest in this area. Troutdale has four potlines, Longview, three and Vancouver, five. Four of the six reduction potlines at Spokane are being operated by Kaiser who is also operating the Trentwood rolling mills.

Sen. Hugh Mitchell, who has been active in efforts to revive the Northwest aluminum industry, declares:

"We now have all of the upper elements of an integrated industry. Both Kaiser and Reynolds have sources of alumina because the Reynolds company recently was granted a lease on the Hurricane Ridge, Ark., alumina plant. What we must do now is get busy with the lower levels of the industry—fabrication—which is where the high employment will lie."

The Navy has announced closing the assembly and repair plant at the Seattle Sard Point air station July 1. This will terminate about 1000 civilian employees.

Western Steel Development Held Hinging on Geneva Plant Policy

California manufacturer says what government does with its Utah steel mill will have more effect upon industrial growth of West than any other single development. Bids to be taken on plant May 1

LOS ANGELES

DEVELOPMENT of a western steel industry hinges largely upon policies of operation followed by the eventual managers of the government-owned Geneva, Utah, steel mill, upon which plant bids will be received soon.

This is the conviction expressed last week in a letter from Kenneth T. Norris, president, Norris Stamping & Mfg. Co., Los Angeles, and chairman of the Western States Steel Committee, to Harold W. Wright, steel counsel president.

"May 1 will be a red letter day for the people of the West," Mr. Norris' letter stated. "On that day sealed bids for the purchase or lease of the Geneva mill will be opened by the War Assets Administration.

"What the government does with the mill will have more effect upon the industrial development of the West than any event that ever occurred."

Mr. Norris advocated that both in the disposition of Geneva or the adjustment

of any federal loan on the Fontana mill now operated by the Kaiser interests, "the operator must be committed to prices based on cost of production plus a fair profit rather than an eastern basing point price, plus freight."

The government, according to the letter, is committed to a policy of requiring a bidder to submit his pricing policy along with his bid. The steel committee will oppose acceptance of bids not in compliance with this attitude, Mr. Norris' letter averred.

The letter was made public by the Los Angeles Chamber of Commerce.

The idea of an "industrial empire of the West" occupied a foreground position in the mind of Henry Wallace, Secretary of Commerce, on a recent visit to Los Angeles.

On three separate occasions when talking to members of the press, Mr. Wallace spoke glowingly of "an industrial world center" as a part of the certain destiny of the trans-Rocky Mountain region.

He advocated development of the steel plants at Fontana and Geneva. He asserted that only by such development can the West realize its chances to obtain steel at fair prices.

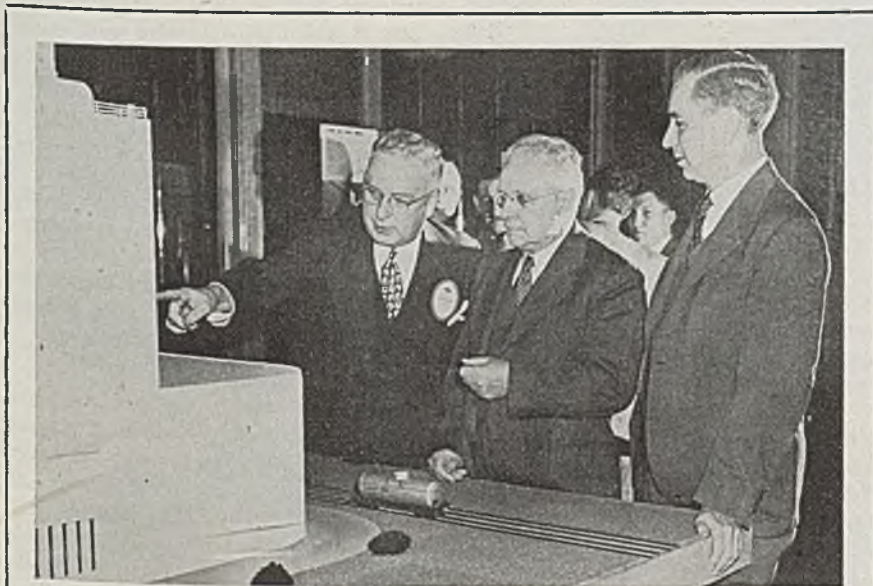
He estimated an annual production from both plants of more than 2,000,000 ingot tons. He emphatically said he favors sale of the plants to private owners at a price "below, far below, their original cost of \$300 million."

Mr. Wallace asserted that "these great modern plants can convert iron ore, coal and limestone into steel products as cheaply as the best eastern plants. Savings to westerners would be not only in cheaper steel production but in costs now included in freight from eastern mills.

The tremendous demands for steel in this new "age of alloys" will only be met by full and augmented production throughout the nation, he said.

For three days the Ford Motor Co. 1300-man plant at Long Beach, Calif., was closed recently because of a shortage of springs ordinarily obtained from the L. A. Young Spring & Wire Corp., Los Angeles.

Cause of the spring lack was a strike.



ADVANCED PRACTICE FORUM: Alfred Iddles, vice president, Babcock & Wilcox Co., center, was one of the executives who presented new industrial equipment at a forum on advanced engineering practices held in San Francisco recently under the sponsorship of the Austin Co. L. E. Cooney, left, Austin vice president and sales manager, and J. K. Gannett, right, Austin vice president in charge of engineering and research, are shown discussing the layout of a modern power plant with Mr. Iddles

MEN of industry

John F. Conroy III, discharged after serving 44 months with the Coast Guard, has resumed his position as president, National Magnesium Corp. of Maryland, New York.

Fred C. Boyce has been re-elected president, D. J. Murray Mfg. Co., Wausau, Wis. All officers of the company were re-elected and include: M. P. McCullough, Chicago, vice president, C. E. Staky, executive vice president and general manager; J. S. Alexander, treasurer; A. W. Plier, secretary and assistant manager.

Joseph M. Perrone has been appointed director of research, Watson-Standard Co., Pittsburgh. For the past three years, Mr. Perrone has been doing research and development work on protective coatings at Mellon Institute of Industrial Research.

Edward Elliot Jr., recently released from duty with the Army Air Forces, has been placed in charge of the recently opened Cleveland office, Pressed Steel Tank Co., Milwaukee.

The following have been elected officers, Alabama By-Products Corp., Birmingham: Erskine Ramsay, chairman of the board and consulting engineer; J. W. Porter, president; H. L. Morrow, executive vice president and treasurer; H. M. Cowart, vice president and assistant secretary and assistant treasurer; P. H. Neal, vice president and assistant to the president; P. H. Haskell Jr., vice president; and J. A. Shook, secretary.

Robert W. Slec, formerly sales manager, A. D. Cook Inc., Lawrenceburg, Ind., has become associated with the Hydraulics Division, A. O. Smith Corp., Milwaukee.

Grover L. Michael, Pittsburgh, recently was elected to the board of directors of the Thomas Machine Mfg. Co., Pittsburgh. Emil Rougraff, former manager of the company's contract department, has been appointed works department manager.

Hans Bohuslav, vice president and director of engineering development and

research, also is manager of the recently opened factory branch in San Francisco of the Sterling Engine Co., Buffalo. Associated with him is Al Hahn who has joined the organization recently following service with the Navy, and B. Gordon Valentine, chief engineer, who joined the company in September, 1945.

Homer W. Northrup, formerly with the melting department, Iron & Steel Foundry Division, Crane Co., at Chicago, and at its plant in Chattanooga, Tenn., has joined the Chicago technical section, International Nickel Co. Inc. He will be associated with the foundry activities of the company in the Chicago territory.

Joseph W. Cochran III has joined the sales force of the Reynolds Wire Co., Dixon, Ill., as assistant to the general manager of sales. Mr. Cochran recently returned to civilian life following four years with the First Marine Division.

SKF Industries Inc., Philadelphia, has announced the appointment of the following field representatives: J. K. Redding, Philadelphia office; L. E. Jacobs, Buffalo; W. S. Corneille, Milwaukee; F. O. Hamlet, Chicago; G. E. Mayhew, Cleveland; B. J. Fraher, Detroit; and C. L. Eberlein, Atlanta.

Fred J. Maple has been appointed manager of exhibits, John A. Roebling's Sons Co., Trenton, N. J. Albert Neroni has been named to succeed Mr. Maple as manager of advertising. Mr. Neroni formerly was assistant manager of advertising, Anaconda Wire & Cable Co. Inc.

Clyde MacCornack, vice president and general manager, Phoenix Bridge Co., Phoenixville, Pa., has been elected a director of the American Institute of Steel Construction, New York, succeeding Karl E. Vogel, formerly of the Omaha Steel Works, Omaha, Nebr.

J. S. Hollings, formerly managing director, Guest Keen Baldwins Iron & Steel Co. Ltd., Port Talbot, England, has been awarded the Bessemer gold medal for 1946 by the council of the Iron & Steel Institute. Mr. Hollings, who retired in June, 1945, as managing direc-



EARL WISEMAN

tor of the company, has been awarded the medal in recognition of his distinguished services in encouraging technical improvement in the manufacture of iron and steel.

Earl Wiseman has been named general sales manager, Protected Steel Products, Pittsburgh and Washington, Pa. Mr. Wiseman, formerly vice president and manager, Ventilating Division, Swartvout Co., Cleveland, will direct an extensive sales program of the company's newly formed Fabricating Division which manufactures industrial ventilators and building sheet metal products.

Superdraulic Corp., Dearborn, Mich., recently held its first stockholders' meeting at which the following were elected directors: Harry L. Wise, Luke C. Leonard, Lloyd I. LaDriere, Robert W. Wise, George P. Grutsis, Ted Nagle, John R. Davis and James F. Hoffer. The following were in turn elected to serve as officers: Harry L. Wise, president and general manager; Robert W. Wise, treasurer; James F. Hoffer, vice president in charge of engineering; Ted Nagle, vice president and director of sales and advertising; John R. Davis, secretary.

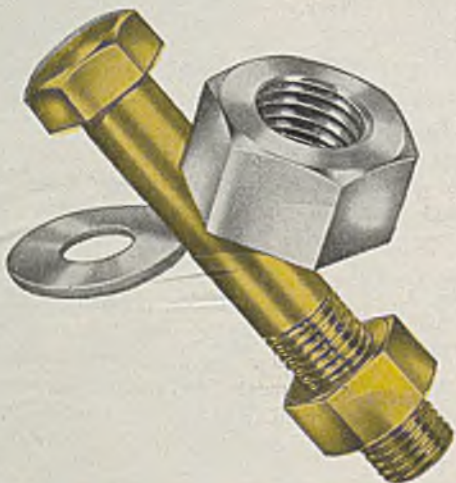
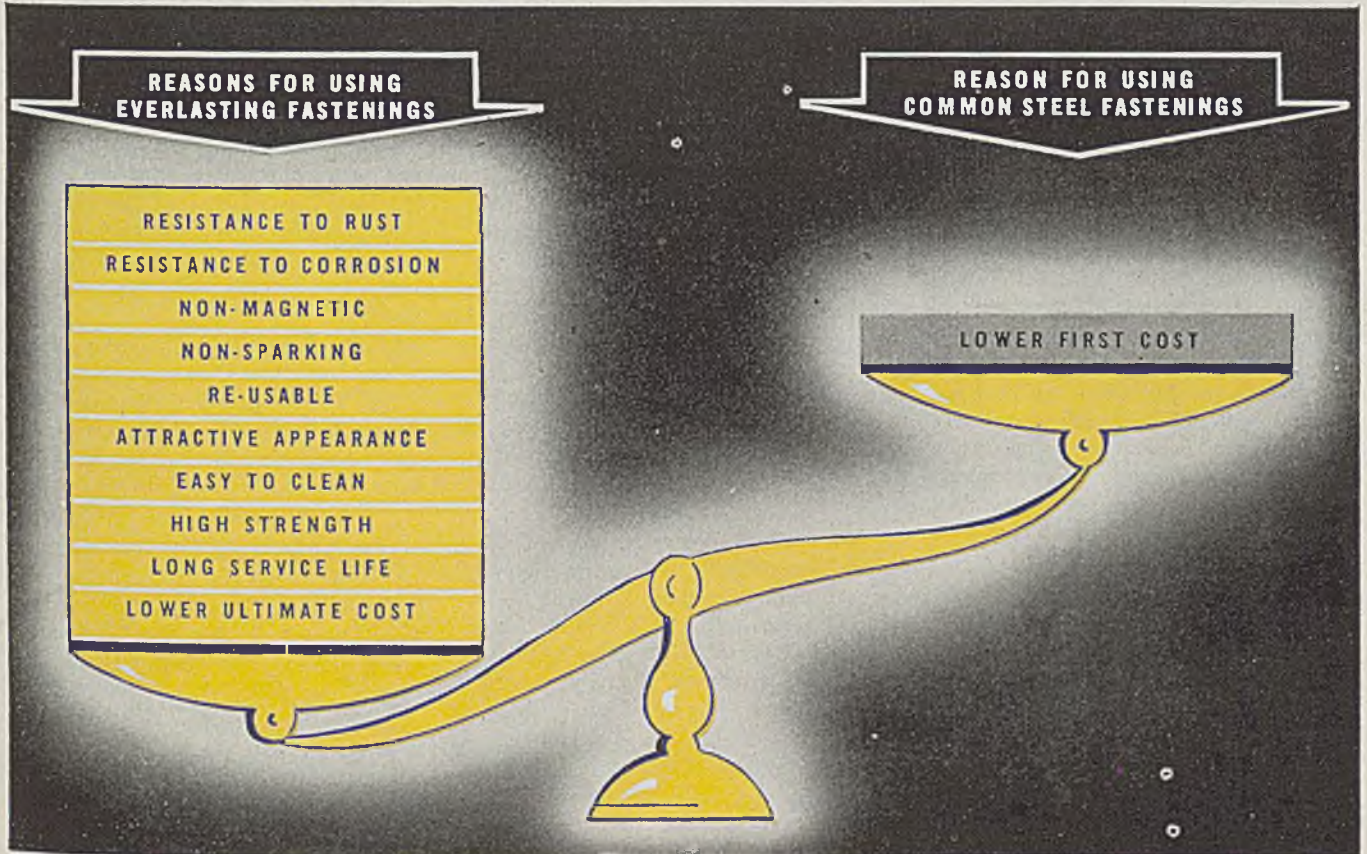
Russell Franks, for the past year chief metallurgist, Union Carbide & Carbon Research Laboratories Inc., has been appointed to the technical service and development department, Electro Metallurgical Co., both units of Union Carbide & Carbon Corp., New York. Mr. Franks will make his headquarters in Pittsburgh.

Carl S. Westerberg, Webster Groves, Mo., has been appointed to the staff of Bituminous Coal Research Inc., Pittsburgh, to succeed Ralph H. Hopp who has become librarian of Battelle Memorial Institute, Columbus, O. Mr.

10 to 1

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WILFRED C. OWEN

Westerberg has been engaged in bituminous coal activities since graduation from Knox College, Galesburg, Ill., in 1931.

Wilfred C. Owen has been named executive vice president, Detroit Steel Products Co., Detroit, manufacturer of steel windows, building panels and automobile springs. Mr. Owen has been associated with the company since 1914 and has been successively assistant shop superintendent, shop superintendent, general factory manager, vice president and director. Mr. Owen continues as a director.

C. M. Sloat, former project engineer for Curtiss-Wright Corp., has been appointed chief engineer, Lion Fastener Inc., Honeoye Falls, N. Y.

Richard F. Garretson recently was appointed eastern regional manager, Industrial Division, Ransome Machinery Co., Dunellen, N. J., a subsidiary of Worthington Pump & Machinery Corp. Mr. Garretson will be in charge of sales of welding and work positioning equipment and will have offices at 2905 North Broad Street, Philadelphia.

The following have been elected directors, Thew Shovel Co., Lorain, O.: Chauncey B. Smythe, president; Alan W. Smythe, vice president and general manager; David L. Johnson, general counsel for the company; Reuben B. Miller, secretary-treasurer; Arthur C. Lundgren, director of purchases; Everett W. Johnston, general works manager; Don G. Savage, general sales manager; Waid V. Clark, controller.

John C. Lerach, veteran of 34 years of service with American Steel & Wire Co., Cleveland, and other United States Steel Corp. subsidiaries, has been ap-



ROBERT C. PALMER

pointed district traffic manager at Pittsburgh for American Steel & Wire Co.

Robert C. Palmer has been elected assistant vice president in charge of operations, Ingalls Iron Works Co., Birmingham. Mr. Palmer will be in charge of operations at the company's fabrication plant in Birmingham, the Verona, Pa., plant and the Birmingham Tank Division of the company. He also is works manager, Ingalls Shipbuilding Corp. yards, Decatur, Ala.

W. Bertram Weiss, recently released from service with the Army Engineer Corps, has returned to Weiss Steel Co. Inc., Chicago, after an absence of three and a half years. He will be associated with R. C. Anderson, formerly with Republic Steel Corp., South Chicago works, who joined the Weiss organization in October, 1945.

B. S. Stephenson, president, Tonawanda Iron Corp., North Tonawanda, N. Y., has resigned following two and a half years' service as chairman, Pig Iron Industry Advisory Committee, Office of Price Administration.

Lanning Roper, recently returned from service with the Navy, has been sent to London, England, to be in charge of offices there for the Rheem Mfg. Co., New York.

Charles R. Hook, James B. Doan, J. Frank Drake and Ralph L. Gray have been re-elected directors, American Rolling Mill Co., Middletown, O., to serve 3-year terms.

T. D. Hudson, assistant district purchasing agent, American Steel & Wire Co., Cleveland, has been elected president, Purchasing Agents Association of Cleveland. Other new officers are: C. L.

Lesmer, Telling-Belle Vernon Co., first vice president; F. J. DeCrane, Lamson & Sessions Co., second vice president; and A. E. Kostulski, Graybar Electric Co., secretary and treasurer.

John A. Murphy, resident partner, Reynolds & Co., has been elected chairman of the board, Airdesign Inc., Upper Darby, Pa. David Warner, also of Reynolds & Co., was elected to the board.

Thornton A. Rand recently was elected secretary and treasurer; Florence A. Aitken, assistant secretary; Theodore W. Bonnevier, controller, Acme Steel Co., Chicago. Other officers of the company were re-elected.

Jack Blake, for the past six and one-half years director of purchases, U. S. Machine Corp., Lebanon, Ind., has become associated as purchases director, Consolidated Industries Inc., Lafayette, Ind.

S. M. Spears Jr. has been promoted to assistant district manager, New York office, Tube Turns Inc., Louisville, Ky. James H. Withers has been named district manager in charge of the San Francisco and Los Angeles offices.

I. H. Mitchell recently was appointed advertising manager and public relations director, Eutectic Welding Alloys Corp., New York. Mr. Mitchell formerly was associated with Crosley Corp., Cincinnati.

J. T. Myers has been appointed assistant general manager, Davey Compressor Co., Kent, O. Mr. Myers, who first joined the Davey company in 1941, has just been released from service with the Navy.

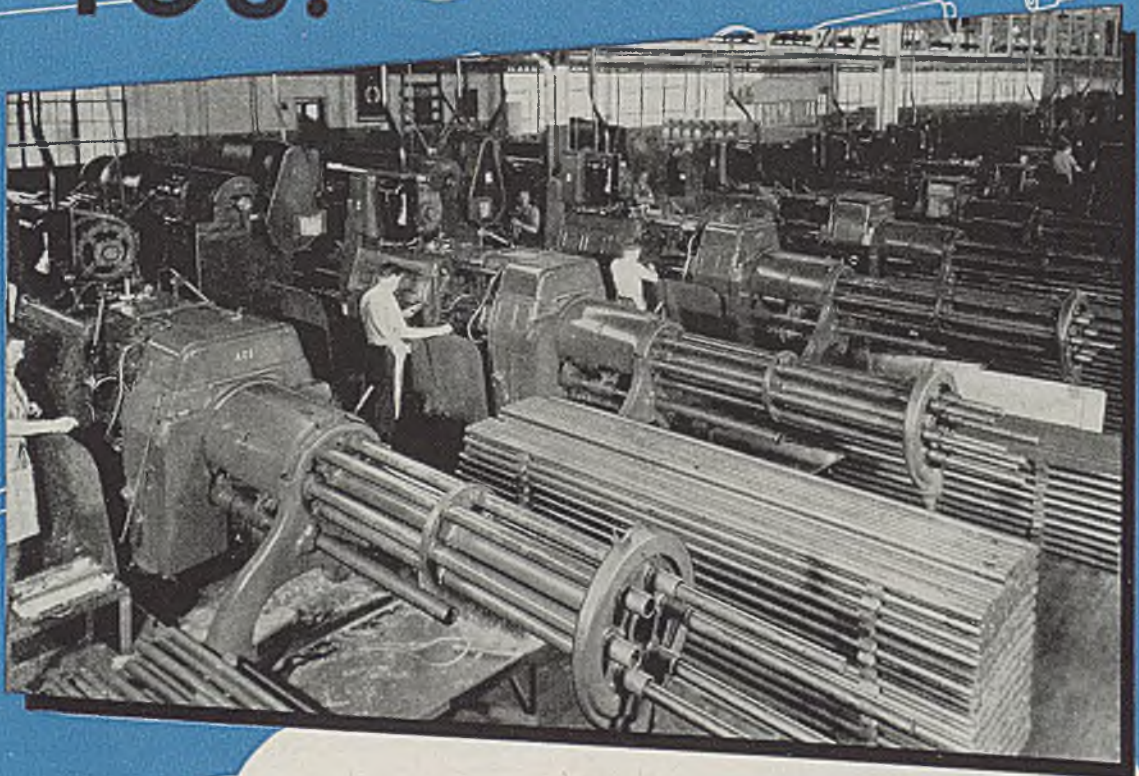
T. L. Kennedy, advertising manager, Ingersoll Steel Division, Borg-Warner Corp., Chicago, has withdrawn from the organization to establish a new manufacturing business. Lynn A. Saylor has been appointed to succeed him, effective May 1.

Carl J. Winkler, president, U. S. Machine Corp., Lebanon, Ind., recently was awarded a special citation by the War Department "for patriotic service and outstanding assistance rendered to the Ordnance Department in time of war."

Charles H. Kanavel, with the B. F. Goodrich Co., Akron, since 1933, has been named district manager in Los

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Angeles of the company's Automotive, Aviation and Government Sales Division. Mr. Kanavel succeeds Joe E. Earll, who resigned to join Pacific Airmotive Corp. C. M. Christensen, Denver district manager since 1941 for the company's Industrial Products Sales Division, has been appointed special mining representative in the Rocky Mountain area. John S. Gulledege, St. Louis district manager before entering the armed forces in April, 1942, has been named acting district manager at Denver.

Lt. Comdr. William M. Stewart, after nearly four years with the Navy, has rejoined the staff of the International B. F. Goodrich Co.

Edward J. Dudley has been appointed public relations representative, American Locomotive Co., and will have offices in Schenectady, N. Y. Mr. Dudley recently was placed on inactive duty after serving with the Bureau of Public Relations, War Department.

William S. Major, Philadelphia, has been appointed development engineer, Bituminous Coal Research Inc., Pittsburgh. Mr. Major will be responsible for promoting various of the organization's research projects which have progressed far enough to justify commercial trial or use.

Les Hunt, for the past five years research director, Automatic Temperature Control Co., Philadelphia, now is direct factory representative for the company in its home office territory.

M. E. Burkhart, formerly vice president, Key Co., East St. Louis, Ill., has been named vice president and has been placed in charge of the recently organized engineering department, K. P. Wes-seling Co., St. Louis, which represents Jones & Lamson Machine Co., John

Bath & Co. Inc., Weldon Tool Co., Love-joy Tool Co., Heppenstall Co., Accurate Brass Co. Inc., and Interstate Drop Forge Co.

Horace D'Angelo, secretary and treasurer; Harry D. Myers, vice president in charge of production; and Charles R. Vincent, assistant to the president, have been elected members of the board of directors, Harry Ferguson Inc., De-troit.

Claude A. Gates, New York, manager of zone 1, was appointed vice president; C. H. Joy, Cleveland, manager of zone 2, and a director of the company, was appointed a vice president; R. A. Schoen-feld, Chicago, manager of zone 3, and a vice president of the company, was named a director; and Charles L. Saun-ders, vice president, was promoted to executive vice president, Wheelco In-struments Co., Chicago.

E. J. Stone has been appointed man-ager of the Detroit office, succeeding A. H. Kirkpatrick, Ilg Electric Ventilating Co., Chicago. Capt. W. L. Hochs-child has become associated with the Chicago branch office as a sales engineer. John D. Briggs has been assigned to the company's branch office in Philadelphia and William S. Gorham has been named sales engineer at Los Angeles.

W. L. Shaffner, for many years as-sociated with national user sales, General Motors Corp., has been appointed direc-tor of the new fleet section organized recently. He will be assisted by F. V. Bott, who for many years was associated with the corporation's fleet service oper-ations.

W. J. Hawley, sales engineer, has been named to head machine tool sales of the Kent-Owens Machine Co., Toledo,

O., manufacturer of milling machines and special machinery for industry.

Harold Henderson, associated with the Detroit sales office, Formica Insulation Co., Cincinnati, for several years before the war, has rejoined its sales staff fol-lowing his release from the Army, and is returning to the Detroit office.

Karl J. Schmaelze, formerly New York division manager, industrial and tech-nical department, Shell Oil Co., New York, recently joined the Strainer Prod-ucts Corp., Montclair, N. J., as super-visor of sales and director of engineer-ing applications and research. The Strainer company manufactures strainers for coolants and cutting oils.

J. C. Herron, recently returned from overseas duty with the Army, has been named manager of a newly created Port-land retail department, Iron Fireman Mfg. Co., Portland, Oreg.

Ralph K. Alexander, until recently district sales manager, Ceco Steel Prod-ucts Corp., Chicago, at Oklahoma City, Okla., has been appointed the company's Texas manager and will have head-quarters in Houston. He replaces Russell L. Jolley. William A. Smith, assistant manager at Washington, has been named assistant to Mr. Alexander.

Albert J. Browning has been appointed director of purchases, Ford Motor Co., Dearborn, Mich., effective May 1, suc-ceeding Charles H. Carroll, who now is assistant general manager of the com-pany's low-priced car division. During the war, Mr. Browning was in charge of purchasing for the War Department. Upon his release from the Army in January, he accepted a 3-month appoint-ment with the Department of Commerce to assist in organizing the newly-created Office of Domestic Commerce.

Robert H. Cowdery, vice president and director, American Fork & Hoe Co., Cleveland, and manager of the com-pany's Geneva, O., works, retired Apr. 15, continuing, however, as a director of the organization. Mr. Cowdery was as-sociated with the company more than 40 years, and served as manager of the Geneva works since 1918. He is suc-ceeded in that position by G. W. Year-ley.

Burt Perry has joined the Industrial Division staff, Kerklings & Co., Burbank, Calif., and has been assigned to the Pacific Coast area. He has been western representative of various Automotive Electric Association manufacturers for



M. E. BURKHART



W. J. HAWLEY



KASIMIR OGANOWSKI

Appointed associate director of research laboratories, American Rolling Mill Co., Middletown, O., STEEL, Apr. 15 issue, p. 93.



B. E. BASSETT

Who recently was named a director of Olin Industries Inc., East Alton, Ill., noted in STEEL, Apr. 22 issue, p. 72.



CHARLES E. HEINTZ

Elected vice president in charge of sales, Elastic Stop Nut Corp. of America, Union, N. J., STEEL, Apr. 22 issue, p. 74.

the past 20 years, and for the past seven, field engineer for American Bosch Corp., and Fairbanks, Morse & Co.

Frederic W. Willard, president, Nasau Smelting & Refining Co. Inc., Totenville, Staten Island, New York, has retired upon reaching the company's retirement age of 65. Mr. Willard became executive vice president of the company in 1931 and has served as president since 1937.

Lucille Bell, formerly an assistant editor, STEEL, has been appointed advertising manager, Washington Steel Corp., Washington, Pa.

Earl C. Petrie has been appointed assistant director of research, North American Refractories Co., Cleveland. He joined the research department in 1940.

Charles F. Swency has retired as head of the company's Cleveland engineering department. He had held the position since 1929 when the company was organized, having done similar work with Crescent Refractories Co., Curwensville, Pa., one of the founder companies. Henry B. Knierim has been appointed his successor. Mr. Knierim joined the North American company in 1929, previously having served in the engineering department of the Newburgh wire works, American Steel & Wire Co.

Davis G. Taylor has been named sales representative for a newly created territory covering the San Francisco Bay area, American Foundry Equipment Co., Mishawaka, Ind. Mr. Taylor will have headquarters in San Francisco. John Getzen, with the Army seven years, and head of the Birmingham Ordnance

District, prior to which he had been associated with Stockham Pipe Fittings Co., 16 years, serving several years as assistant to its president, has joined H. C. Mouat, district sales representative, Birmingham. Troy T. Alverson will be sales representative in the newly opened Baltimore office. David E. Neustadt is the new district representative for the company in the Los Angeles area. John Nixon has been placed in charge of the sales office in Atlanta.

Dawson Winn, vice president, Green Lumber Co., Laurel, Miss., was elected president, Prefabricated Home Manufacturers' Institute, Washington, at its recent annual meeting held in Rockford, Ill. Austin Drewry, Gunnison Homes Inc., New Albany, Ind., was elected vice president; John Pease, Pease Woodwork Co., Cincinnati, secretary-treasurer.

OBITUARIES...

George E. Kreuger, 55, manager of used machinery sales for the past 12 years, Strong, Carlisle & Hammond Co., Cleveland, died Apr. 22 in that city. Mr. Kreuger joined the organization as a boy and had been associated with it for approximately 40 years. He had wide acquaintance throughout the metal-working industry.

Frank S. Lampard, 47, engineer, Mathews Conveyer Co., Ellwood City, Pa., died Apr. 16, following a heart attack. Mr. Lampard was well-known in the metal-working industry for his work in the design of many conveying systems.

Anson B. Harvey, 75, from 1918 until his retirement six years ago, advertising manager, J. E. Rhoads & Sons, Philadel-

phia, died Apr. 17 at his home in Media, Pa.

Walter G. Swart, 78, mining engineer and for many years, vice president and general manager, Mesabi Iron Co., Duluth, died Apr. 17 at his home in Alameda, Calif.

Leon A. Watson, 58, vice president, chief engineer, and one of the founders of Clark Controller Co., Cleveland, died recently at his home in that city.

Charles F. Schwep, 74, vice president and director of purchases, Ingersoll-Rand Co., with offices in New York, died at his home in Plainfield, N. J., Apr. 17. He had been associated with the company 53 years.

Orrin T. Allen, 64, former assistant

manager of the construction materials department in Chicago for the American Steel & Wire Co., died Apr. 15 at his home near Warsaw, Ind. Associated with the company since 1909, he served as assistant manager of construction materials sales from 1918 until July, 1944, when he retired.

Paul Barnhardt, secretary, treasurer and director, Riverside Metal Co., Riverside, N. J., died recently.

Ira Cummings, for more than 25 years an engineer engaged in experimental work for Westinghouse Electric Corp., Pittsburgh, died Apr. 20 at his home in Cranford, N. J. Mr. Cummings was stationed in Cleveland for several years, and was transferred to the company's plant in Cranford approximately a year ago.

With uniformity of heating and close temperature regulation, hot quenching in oil will fill a needed place in heat treatment of steel between the lower temperature oil quench and the salt quench method

Hot Oil Quenching

By D. C. MINER
E. F. Houghton & Co.
Philadelphia

DURING the war production era, there were many studies made of the science of quenching steel. These were inspired by the application of TTT curves which provided standards whereby the cooling rates of various analyses of steel could be plotted.

It was during that development work that salt bath quenching—martempering, austempering and isothermal heat treatment—came into prominence. Likewise a fast quench to exceed the critical cooling rate of low alloy steels or those having a critical rate of hardenability was a wartime accomplishment of great importance in attaining physicals for munitions steel.

Now that we are back to peacetime production, it may be of interest to discuss these processes and their purposes, and to add to the quenching procedure one new angle, the hot oil quench, which is attracting much attention and filling a hitherto unrealized need.

The objectives of thermal treatment of steel are:

1. Higher desired physicals.

2. Minimum of dimensional changes, distortion or warpage.
3. Minimum of residual changes to increase fatigue life and impact value.
4. Freedom from surface change: scale, decarb or carburization.
5. Enabling finish machining before heat treatment, without exceeding dimensional tolerances.

The first of these objectives was assured by use of quenching in treated quenching oils possessing a fast rate of cooling through the critical range.

The second involved the use of an "interrupted quench" in salt, performed by heating to form an austenitic structure, then interrupted the cooling at some temperature within the martensitic transformation range.

Water or brine provides speedier quenches, but by such procedure there is a considerable temperature difference between outside and center, which results in unstable austenite being entrapped in a case of hard, brittle martensite.

Oil at room temperatures provides a slower rate of cooling, with less severe thermal shock due to smaller temperature difference between outside and center of work.

Martempering in molten salt involves quenching from

austenitic temperature into salt maintained at 400°-600° F, slightly above the Ms point, or start of the martensite transformation. The cooling thus is interrupted, enabling the part to become uniform in temperature throughout. The final cooling in air then occurs at a uniform rate, eliminating the residual strains and stresses set up by more severe quenches. Agitated salt at 400° F has a quenching almost as fast as a conventional oil quench.

Austempering is towards the upper level of the transformation range, from austenite into bainite. Fig. 3 shows in simple diagram the essential differences between various methods of quenching, and includes at the right a modification of austempering known as "isothermal" heat treatment, utilizing a third bath to draw back after quenching at above 450° F.

In all of these forms of interrupted quenching, the freedom from quench cracks and the holding to close dimensional changes, thus permitting heat treatment after finish machining (see item five preceding), have been the motives. As an example, there is cited a recent report which seems to exemplify the peacetime problem—turning swords into plow shares.

A manufacturer of the latter item used X9115 steel, and (Please turn to Page 118)

TABLE I
PHYSICAL CHARACTERISTICS OF MARTEMPERING OIL

Color	8
Gravity	28°
Flash	530° F
Fire	590° F
Viscosity at 100° F	1050 sec
Viscosity at 210° F	95 sec
Viscosity Index	102
Pour test	25° F
Conradson Carbon	0.82%
Neutralization Number	0.06

TABLE II
ACCELERATED CONTINENTAL OXIDATION TEST OF MARTEMPERING OIL
Iron Wire Catalyst; 341° F; Air rate, 10 litres per hour

	Original Oil	48 Hr	72 Hr
Viscosity at 210° F	95 sec	109 sec	112 sec
Per Cent Increase		14%	18%
Conradson Carbon	0.823%	1.38%	2.33%
Neutralization Number	0.06	0.48	1.93
Sludge		6.7 mg	18 mg

TABLE III
COMPARISON OF VISCOSITIES

100-second Mineral Oil @ 84° F	120 sec.
100-second Mineral Oil @ 100° F	100 sec.
100-second Mineral Oil @ 120° F	72 sec.
100-second Mineral Oil @ 140° F	58 sec.
Martempering Oil @ 210° F	95 sec.
Martempering Oil @ 250° F	65 sec.
Martempering Oil @ 300° F	48 sec.
Martempering Oil @ 350° F	40 sec.

TABLE IV
QUENCHING SPEED
1/4-in. Rounds S.A.E. 1020 Quenched From 1550° F Controlled Atmosphere Furnace

	Seconds Required to Reach			
	1300° F	1000° F	700° F	400° F
Martempering Oil, 250° F	7.3	13.5	24.5	53.8
Martempering Oil, 300° F	6.0	12.5	25.0	64.0
Martempering Oil, 350° F	6.3	13.0	26.0	84.6
Martempering Oil, 400° F	6.3	11.3	24.8	...
Martempering Oil, 450° F	6.3	13.0	28.7	...
100-Second Mineral Oil, 84° F	9.1	14.5	22.5	37.5
100-Second Mineral Oil, 104° F	9.0	13.2	20.2	36.3
100-Second Mineral Oil, 140° F	8.5	13.5	21.2	38.5

TABLE V
ROCKWELL HARDNESS
S.A.E. 1340 Spline Shaft Quenched From 1550° F
Pilot End 3/4-in. Heavy Section 1 3/4-in. dia.

	Sur-face	Core	1/4-in. intervals from surface to core					
Quenching Oil at 140° F	61	58	56	56	55	54	54.5	54.5
Martempering Oil at 250° F	58	57	56	56	54.5	53.5	53.5	53
at 300° F	56	55	56	55.5	55.5	55	54	53.5

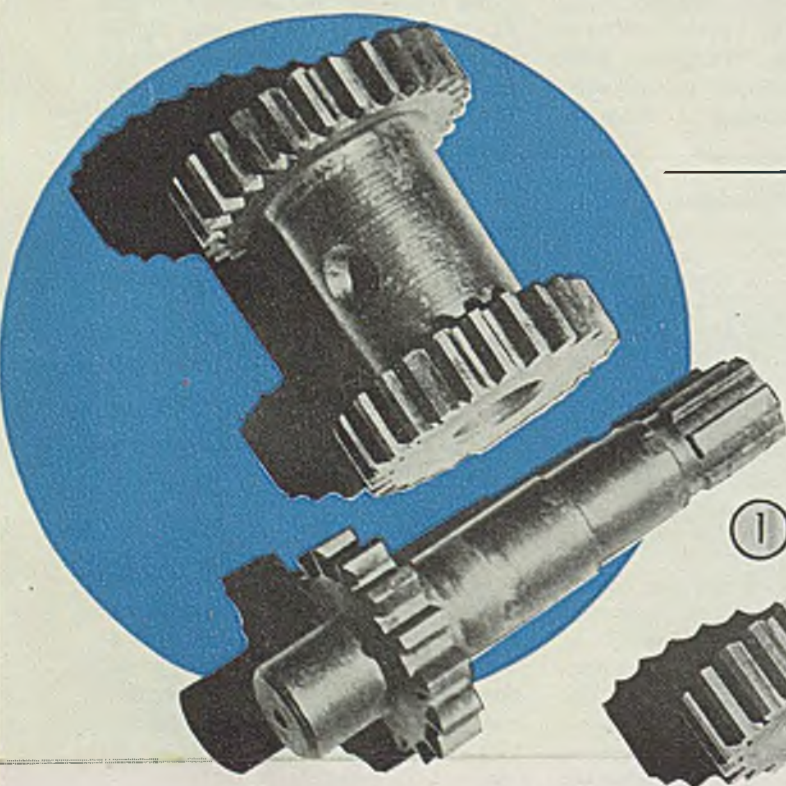


Fig. 1—Gear units from change-gear box, made of NE 8620, and hot oil quenched, demonstrate differences in section and diameter of stock successfully treated. Note gear on splined shaft in foreground

Fig. 2—Two pieces showing wide range of applicability of hot oil quench. Threaded shaft with keyway (right) has dimensions of 3/4-in. to about 1 5/32-in. Small shaft (below) has at least three different diameters, the largest being about 7/16-in. All parts in Figs. 1 and 2 are quenched directly from the carburizer at 1500° F into oil at 350° F

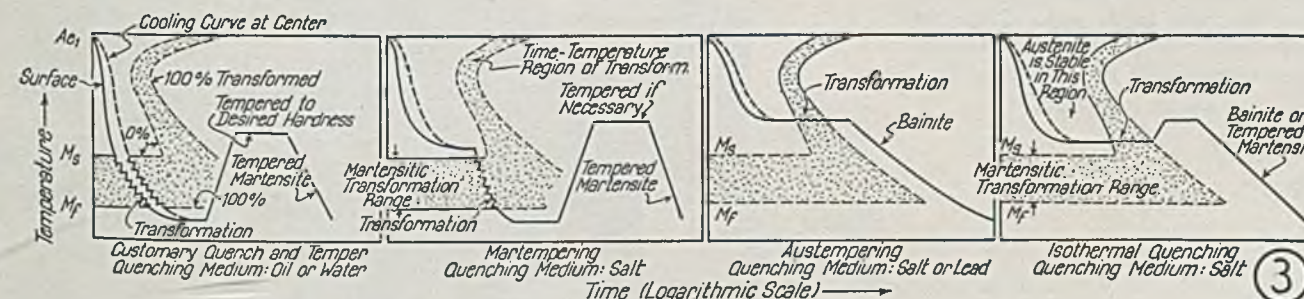


Fig. 3—Effects of four important quenching methods. From "Modern Heat Treating Practice," by A. P. Seasholtz, reprint from STEEL, Fig. 14, p. 30



Advanced METAL

PRESERVATION Methods

... employed by U.S. Navy in laying up nearly 2000 vessels for future emergencies
point to new and additional applications in industry

PRESERVATION of two huge fleets for the next possible national emergency is a gigantic task now facing the United States Navy. Fortunately, the procedures were worked out long before World War II ended and "Operation Zipper", as it is aptly called by the Sixteenth Fleet Group at Green Cove Springs, Fla., already is well under way.

The methods employed by the Navy involving the use of chemical dehumidifying agents, rust inhibitors and metal and plastic coverings undoubtedly will provide industry with many new ideas for improved packaging and storage of equipment.

Recent developments in mechanical dehumidifying machines are especially significant. These machines were designed to hold relative humidity in the interiors of vessels down to a point where rusting will not occur but the same system conceivably could be applied to areas of buildings for the storage of such items as steel sheets and machine tools. With the use of metal or plastic coverings and chemical dehumidifying agents, equipment can be stored outside for years without deteriorating.

After World War I, lack of a unified plan of preservation led to the practice of practically dismantling ships through the removal of spare parts, supplies and equipment. Heavy grease was used on exposed steel parts and

an attempt was made to air out the areas below deck on dry days. These efforts at preservation were only partially successful and considerable expense and delay were involved in returning some 400 ships to service in World War II.

In contrast, the Navy now is in the process of laying up nearly 2000 vessels of all types in a manner permitting them to put to sea in 10 to 30 days. Preservative methods employed are expected to keep the vessels in near-perfect condition. Practically all supplies remain on board. Nucleus crews are being retained—in the case of cruisers five officers and 59 men.

The vessels are being divided into two fleets, the Sixteenth and the Nineteenth. The former has berthing areas at Boston; New London, Conn.; New York; Philadelphia; Norfolk, Va.; Charleston, S. C.; Green Cove Springs, Fla. on the St. Johns River; and at Orange, Tex. The Nineteenth Fleet has berthing areas at Bremerton, Wash.; Seattle; Tacoma, Wash.; Tongue Point, Ore. near Astoria; Alameda, Calif.; and San Diego.

Some of the contracts for the \$70,000,000 program for construction of berthing facilities already have been let and the balance will be placed by early summer. Facilities include piers, quay walls, dredging and services such as water, air, power, steam and telephone lines. Largest

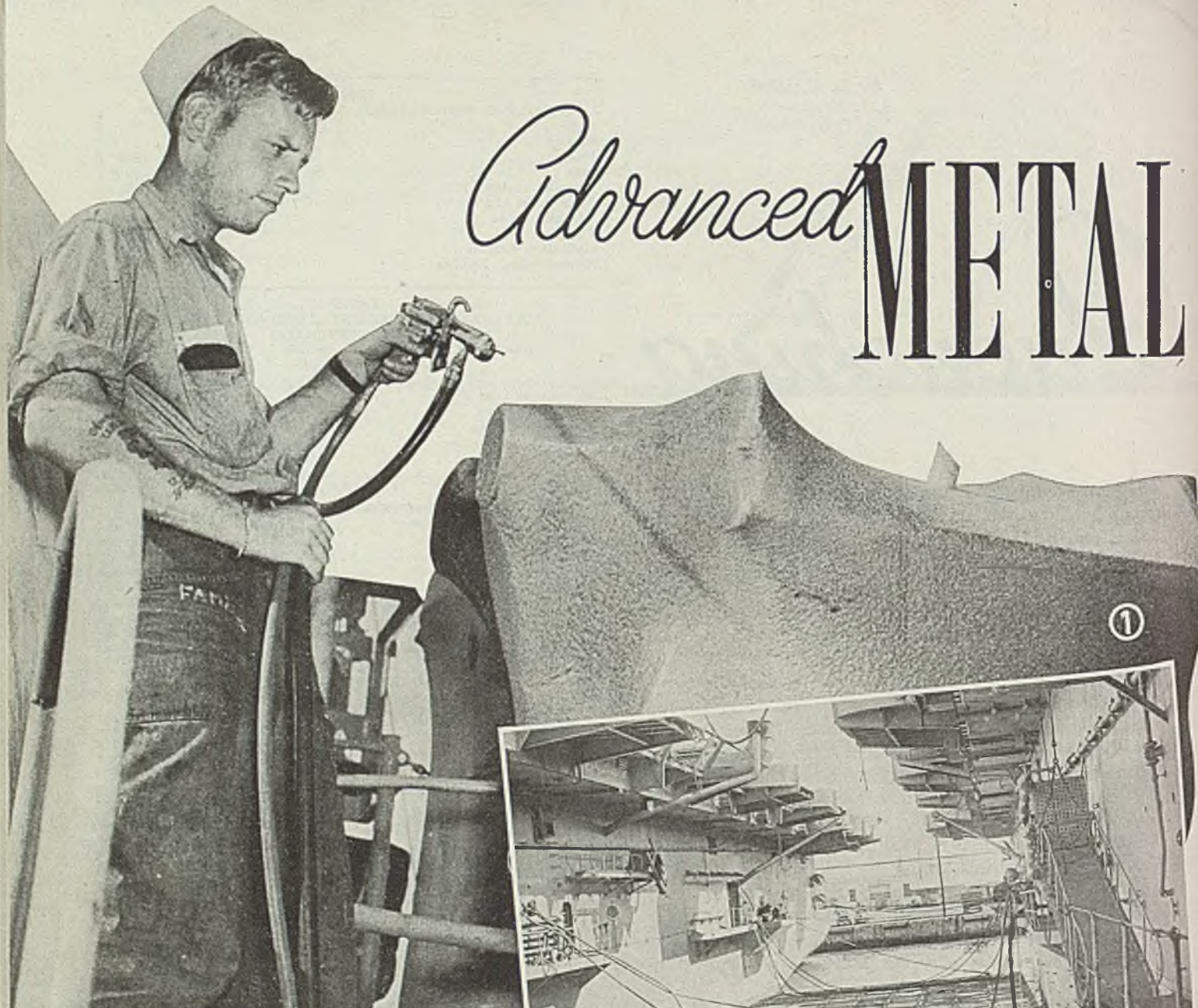


Fig. 1—Fourth and final coating over webbing is being applied to ordnance mount on APD at Green Cove Springs, Fla. Desiccant inside cover keeps humidity below 30 per cent and thus prevents deterioration. All are official U. S. Navy photographs

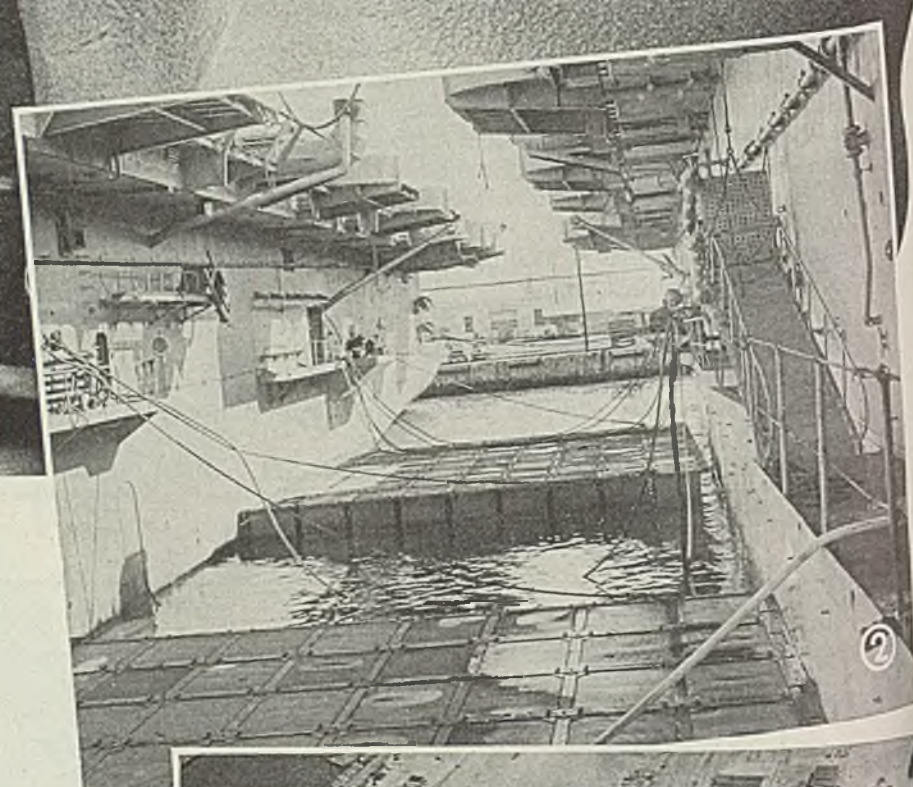


Fig. 2—Steel pontoon cells serve as spacers between escort carriers at Norfolk

Fig. 3—These escort carriers at Norfolk, Va., are being subjected to preservation methods. Note carrier third from right already has complete coat of haze gray paint, developed by the Navy



Fig. 4—More than 100 destroyer escort vessels shown here in St. Johns River at Green Cove Springs, Fla., are being preserved against corrosion for many years to come. A crew is kept aboard one of the six ships in each group to service preservation equipment

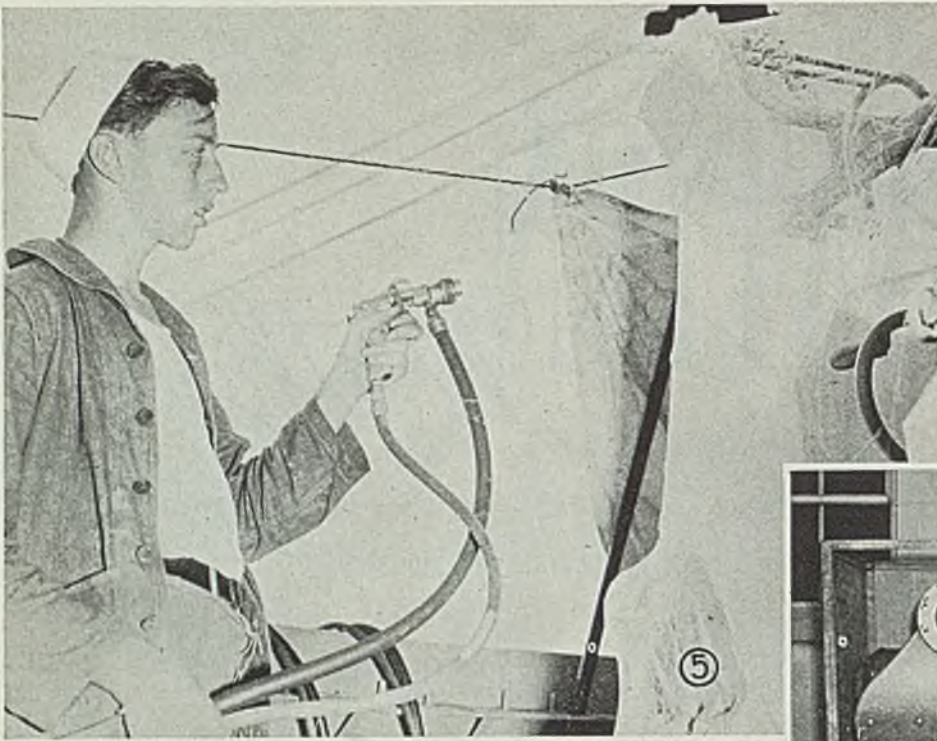


Fig. 5—First step in applying a plastic cover to guns and other exposed equipment. Plastic comes from the spray gun in spider-web which completely covers scotch tape framework. This webbing is followed by four coats of wet plastic

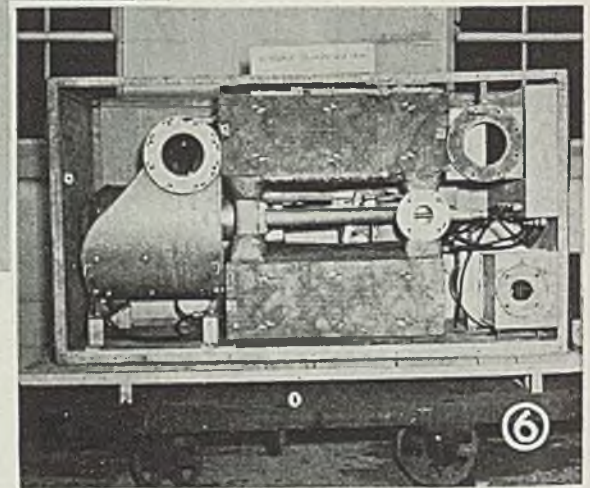


Fig. 6—This is one type of mechanical dehumidifier used to keep humidity in vessel interiors down to 30 per cent. One bed of desiccant absorbs moisture from the air while the other is being reactivated. This type of equipment may find uses on land in protecting machines and materials against oxidation. Such oxidation does not occur at 30 per cent humidity

new project is at Green Cove Springs, Fla., where bulk-heading and 11 piers will be completed some time this year at a cost of \$10,000,000. Over 350 destroyer escorts, landing craft and similar smaller vessels at anchor at this point already are undergoing preservation treatment, preparatory to being berthed in nests of four on each side of the piers. A similar number of vessels will arrive in the next few months. Sheet piling for the bulkheading, incidentally, was on the West Coast earmarked for shipment to the South Pacific before the close of the war but, as part of the Navy's current program to save money, was shipped to Florida in LSTs.

The Navy procedure for ship preservation involves the following principal steps:

- 1—Drydocking of ship at Naval Shipyard ("Navy Yard" is no longer used) for emergency repairs and painting of hull.
- 2—Transfer of ship to berthing area where ammunition, provisions, clothing and certain inflammables are removed. Spare parts, bedding and other supplies remain on board. Fuel, lubricating and hydraulic oils also are not removed.
- 3—Topside equipment, such as 20 mm guns, which may be readily dismantled, is stowed below. Balance of equipment is adjusted; bright parts are coated with rust preventive; entire piece is covered with metal housing or strippable plastic cover and protected by a desiccant.
- 4—All openings, such as stacks, ventilators and sea connections, are sealed by welding or bolting steel plate sections in place. Electrical outlets are protected

with either tape or strippable plastic coating.

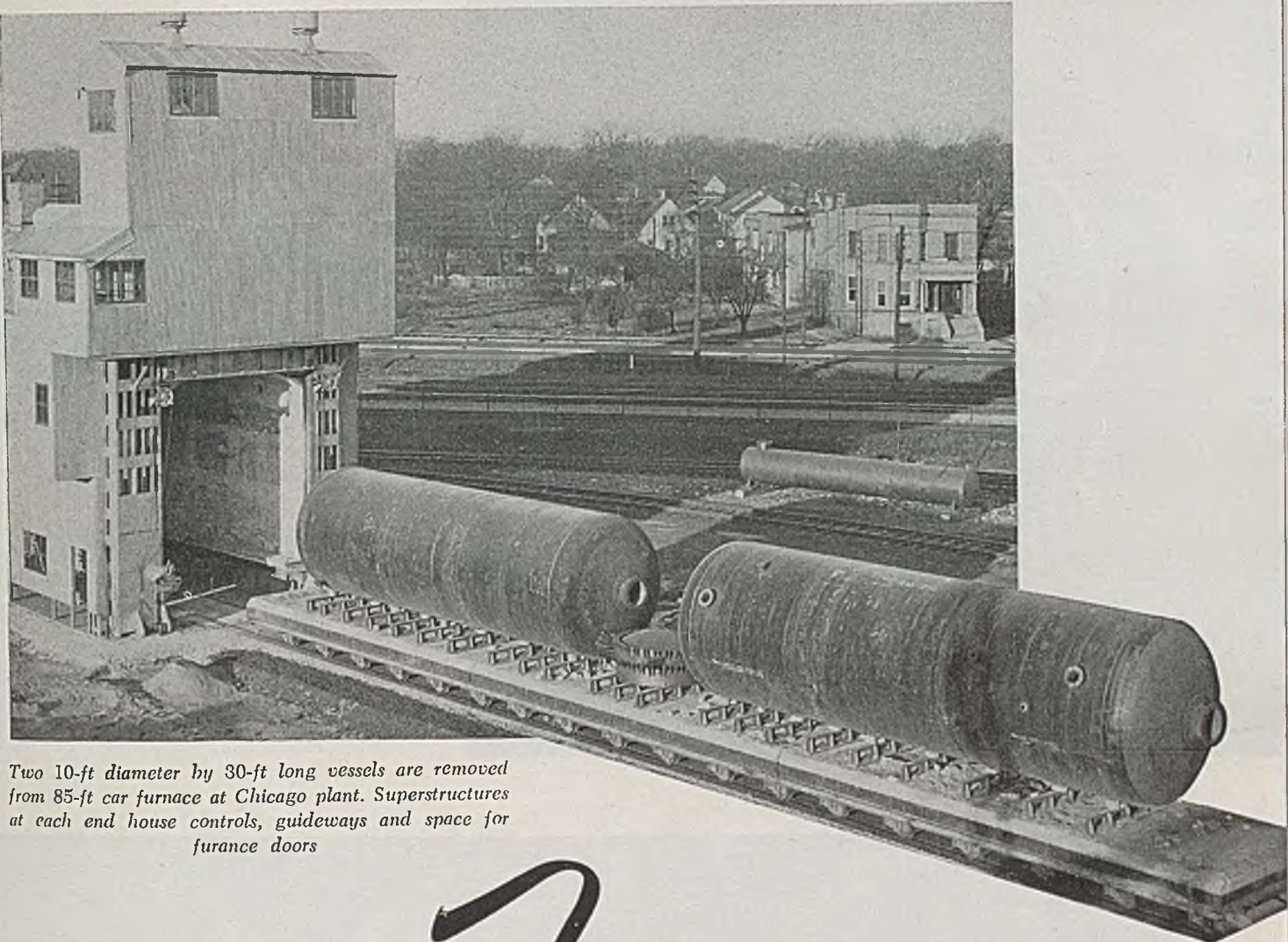
- 5—Below deck, ballast tanks, bilges, etc. are cleaned, scraped, dried and painted. All equipment such as turbines, boilers and pumps are cleaned and checked and coated with a rust preventive. Each unit is tagged to show operation performed and what is necessary to place it back in service.

- 6—Batteries are made bone-dry and stored ready for addition of electrolyte. Drying of submarine batteries costs about \$50,000 but compares with \$130,000 for new batteries. Ships' boats are stored under tar-paper covered shelters after engines and loose gear have been removed and stowed below.

In drydock, the hull area up to about 3 ft above the water line is sand blasted and spray-painted with a ground coat. This is followed by a coating of antifouling and anticorrosive hot plastic (Formula 15 HP), and a final coat of haze gray paint (Formula 5-H) to a point 10 or 12 ft below the water line.

The antifouling finish developed by the Navy goes a long way toward solving a problem which has always beset ship operators since it discourages adherence of barnacles and other under-water growth. The material costs about \$1.75 a gallon and application to a 10,000-ton cruiser, including docking charges, runs about \$4000. The antifouling medium is mercuric chloride. Vehicle usually is a copolymer of vinyl chloride and acetate which is characterized by very low water permeability. Other vehicles which could be used are phenolic varnishes or phenolic varnishes modified with alkyd resins. It is expected that

(Please turn to Page 133)



Two 10-ft diameter by 30-ft long vessels are removed from 85-ft car furnace at Chicago plant. Superstructures at each end house controls, guideways and space for furnace doors

car-type Furnaces

TANKS manufactured by Chicago Bridge & Iron Co. to serve in chemical processing, refinery equipment and as pressure vessels now are heat treated in three huge car-type furnaces located at Chicago, Birmingham, Ala., and Greenville, Pa.

The third installation, at Greenville, is scheduled for completion this month. It is identical in construction and cross section to the Chicago unit but is 65 ft long against 85 ft for the first furnace built by the company; however, provision has been made for extending its length to 85 ft at any time in the future by using standard sections of steel wall panels and standard framing members. Seventy-four steel piles were driven to support the structure.

Of car bottom type, the Greenville furnace inside is 15 ft 2 in. wide by 65 ft long, and is 18 ft 2 in. from floor of the car to top of the arch. There is a door at each end and vessels longer than those usually produced at this location can be stress relieved in multiple heats by using temporary end enclosures. The unit is gas fired and will operate at temperatures up to 2000° F, stress relieving post connections for spheres and pressure vessels meeting ASME specifications.

Three car-bottom type stress relieving furnaces serve Chicago Bridge & Iron in normalizing operations on massive pressure vessels and chemical plant equipment

The company's Chicago furnace is similar to the one that has been in operation at Birmingham since April, 1937. It is 85 ft long, with interior width and height dimensions the same as those of the Greenville unit. Vessels up to 13 ft 6 in. in diameter and 83 ft in length can be stress relieved in a single heat. Vessels longer than 83 ft are stress relieved in two or three overlapping heats. As in the other cases, this is done by allowing a portion of the tank or vessel to protrude from one of the door openings and building up a temporary closure. Vessels over 158 ft long may be stress relieved in three heats by allowing them to extend out both door openings when the center heat is made. While this furnace, like Greenville and Birmingham operations, can attain maximum temperature of 2000° F, the stress relieving normally is done at 1200° F.

Centrifugally Cast Steel

By DR. L. NORTHCOTT
and
D. McLEAN
Armament Research Department
Woolwich, England

①

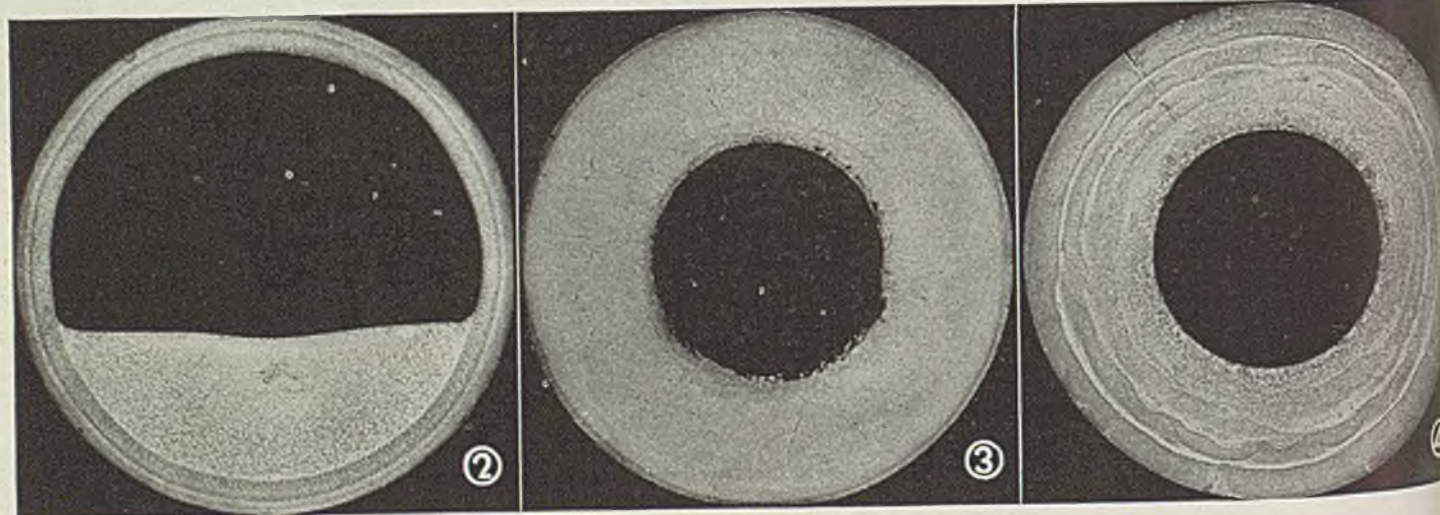


Fig. 1—Macro-study of Type 1 structure; sample TJW cast 650 rpm, 1550° C, 37 sec. 1X

Fig. 2—Macrostructure of sample TKK, 450 rpm, 1575° C, 21 sec. Casting stopped during formation of Type 1 structure. 1X

Fig. 3—Macrostudy of Type 2 structure; sample TKP cast 1450 rpm, 1565° C, 10 sec. 1X

Fig. 4—Macro-study of Type 3 structure; sample TJQ, 1700 rpm, 1490° C, 6 sec. 1X

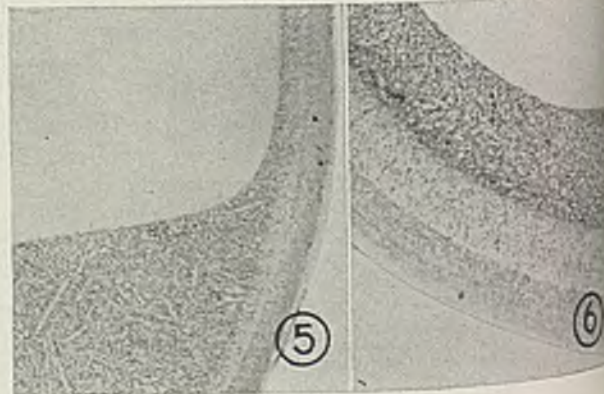
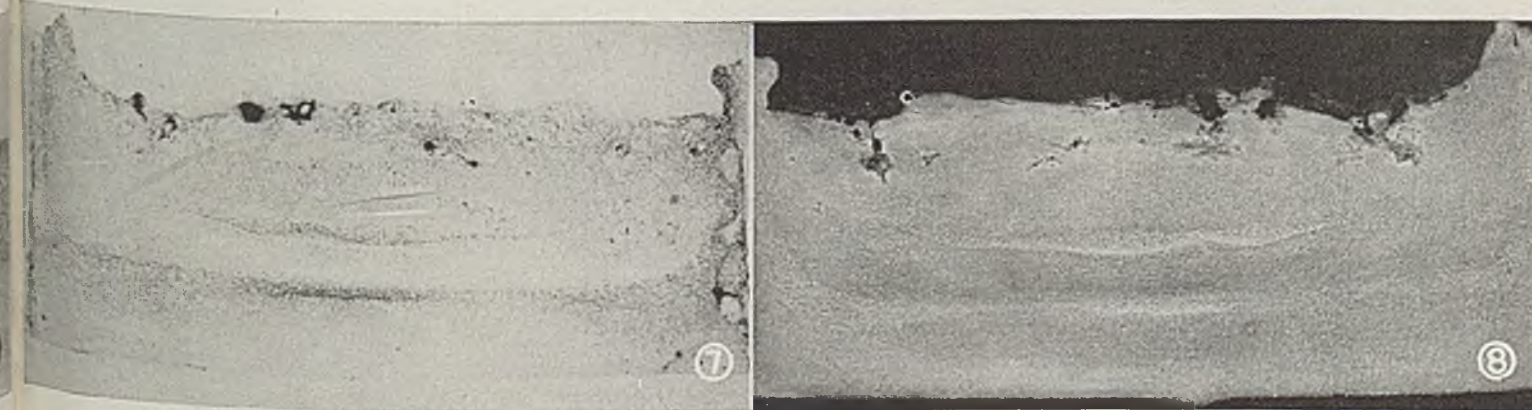


Fig. 5-6—Sulphur prints of portion of stopped castings TKN and TKL. IX

Fig. 7-8—Sulphur print and macro-print, respectively, of axial face of vibrated unrotated steel casting. 3/4X



DISTINGUISHING feature of the centrifugal casting process is the use of a rotating mold which, by reason of the centrifugal action involved, leads to a pressure on the liquid, in a direction away from the axis of rotation, of several times the gravitational force normally available for filling the mold. Hence the process can be considered as one in which the fluid pressures involved are dependent upon the mold speed and the density of the metal.

Experience with centrifugally-cast materials has shown that certain peculiarities in structure could occur owing to this special method of casting. Purpose of the investigation was to determine the influence of variations in casting temperature, mold speed, mold temperature and rate of pouring upon the structure, segregation and properties of centrifugally-cast thick cylinders with any one alloy composition.

Casting machine used in this work was one in which the mold rotated on a horizontal axis and had a range of speed from 100 to 1700 rpm. The standard procedure was to melt in a gas-fired crucible furnace a charge of from 60 to 70 lb. Castings 7.5

in. long and 6.4 in. OD were obtained. Steel castings were withdrawn from the mold at a red heat, transferred to the crucible melting furnace and slowly cooled from about 1200° C. A transverse disk 0.5-in. thick was obtained from a position half-way along the length of the cylinder, and the face nearer the pouring end was prepared for examination; the rotation of the cylinder was such that this face rotated counter clockwise. Longitudinal slices 0.5-in. thick

were cut from the remaining portions of the cylinder.

Bulk of the work on steel was carried out with a nickel-chromium-molybdenum steel of the following composition: Carbon, 0.3 per cent; silicon, 0.28 per cent; manganese, 0.64 per cent; nickel, 2.9 per cent; chromium, 0.6 per cent; molybdenum, 0.5 per cent; sulphur, 0.04 per cent; phosphorus, 0.03 per cent. The use of salamander crucibles for melting resulted in an increase in the carbon content over that given above, but this is not thought to have had any significant influence on the macrostructures.

The casting variables were controlled as follows: **MOLD SPEED**—As previous work had shown the mold speed to be the most important individual factor influencing structure and segregation, a wide range of mold speeds was studied, namely 450, 650, 1000, 1450, and 1700 rpm. These speeds were determined with a tachometer attached to the machine and were checked by a stroboscope; **CASTING TEMPERATURE**—Highest temperature obtainable was 1590° C, and this was therefore selected for the hot metal. Cold casts were poured at about 1510° C, the liquidus of the alloy being in the neighborhood of 1455° C. The casting temperature recorded for

the individual castings refers to the temperature of the steel in the crucible furnace as determined with a quick-immersion couple immediately before casting; *POURING SPEED*—Time taken for rapid pouring was normally less than 12 sec. The purpose of slow pouring was to maintain a layer of melt in the die as thin as possible, so the time was generally greater with high than with low casting temperatures, the actual times for all slow-pouring experiments usually exceeded 30 sec. Particulars of the various castings are given in Table I.

Type 1 Structures:—TKB, TJT, TJY, TKT, TKE, TKM and TJZ cast at 450 rpm and TJS and TJW at 650 rpm, (see Figs. 1 and 9). Their characteristic feature is that the structure is composed of three sharply defined zones differing in purity and crystal structure.

At the outside there is a thin layer of chill crystals merging into fine columnar crystals; this first zone is of medium purity, and periodic structures are frequently observed. The columnar crystals are not truly radial but are inclined in the direction of rotation of the mold.

The second, or middle zone, is purer than the average as judged from the sulphur print; it is composed mainly of columnar crystals which are coarser than those in the

outer zone and are slightly more inclined, although in same direction. The whole of this zone etches more darkly than the outer zone and in the sulphur prints is lighter. It is often demarcated from outer zone by a thin line of higher sulphur content followed by one of very low sulphur; this second line shows as a dark-etching line in the macrostructure (TKK, Figs. 2 and 10).

Third and impure inner zone is composed of equiaxial crystals. Second and third zones have a sharply defined common boundary, the inside one commencing with a band of especially impure material. This zone etches lighter and in the sulphur print is much darker than either of the other two zones.

Occurrence of type 1 structure is associated with splashing in the mold during casting operation. At some stage during pouring, the layer of liquid to be rotated by the mold becomes so thick that at low speeds the liquid entering last is not rotating fast enough to overcome gravitation; this liquid then tumbles about inside the mold. It is to this "pick-up" time that the column in Table I headed "Splashing" refers. A low speed, fast pouring and a high casting temperature are the conditions most favorable to prolonged splashing. In the cast-

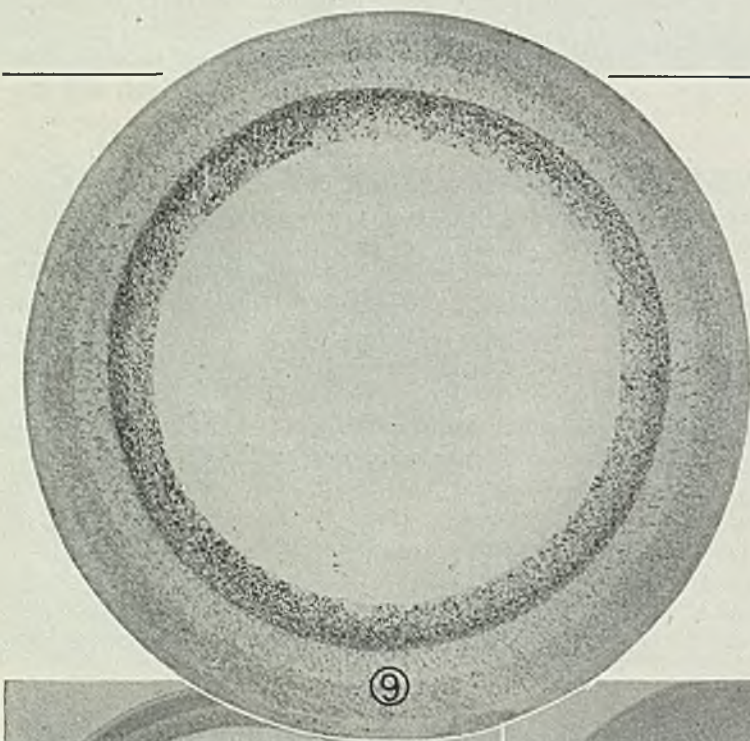


Fig. 9—Sulphur print of Type 1 structure; sample TJW cast 650 rpm, 1550° C, 37 sec. IX

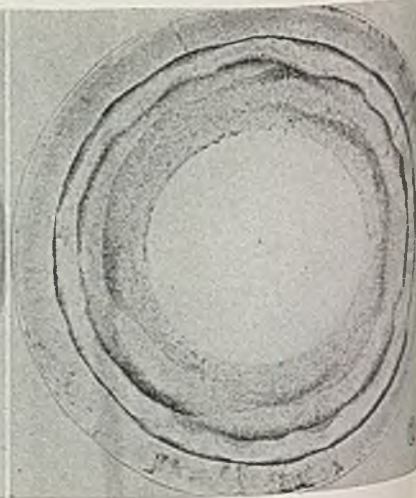
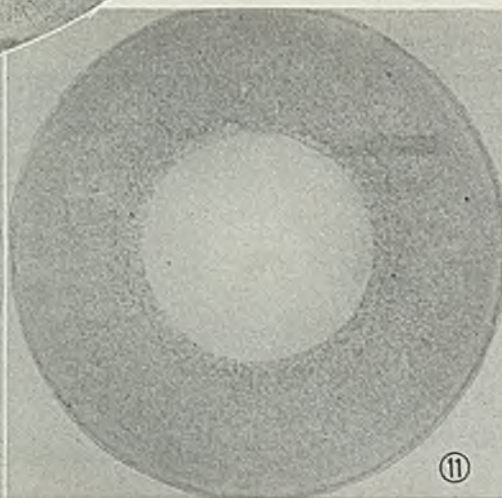
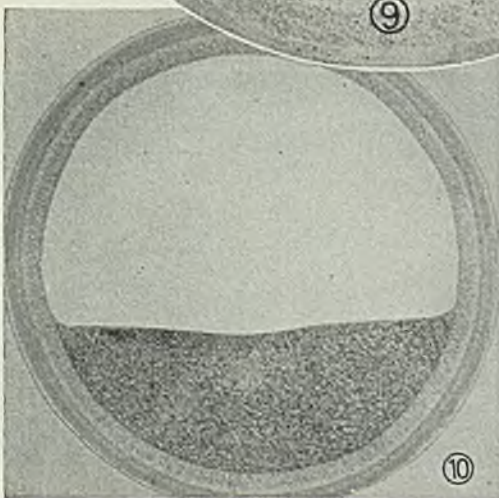
Fig. 10—Sulphur print of sample TKK, 450 rpm 1575° C. 21 sec. Casting stopped during formation of Type 1 structure. IX

Fig. 11—Sulphur print of Type 2 structure; sample TKP cast 1450 rpm, 1565° C, 10 sec. IX

Fig. 12—Sulphur print of Type 3 structure; sample TJQ, 1700 rpm, 1490° C, 6 sec. IX

Fig. 13—Variation in composition and hardness across cylinder wall of TKP-Type 2 and TJW-Type 1 structures

Fig. 14—Variation in composition and hardness across cylinder wall for TJQ-Type 3 structure



ing of one cylinder (TKO) at a higher speed (1000 rpm) some splashing was observed, although bulk of the liquid rotated with the mold, and in this instance segregation was negligible.

Type 2 (Unbanded) Structures:—TJX, TKO, TKA, TJP, TJM, TKP, TKS (Figs. 3 and 11). With the exception of periodicity near outer rim, segregated bands are absent in this type. The crystal structure is generally not uniform across the section, but may be composed of chill or columnar crystals at the outside, frequently showing periodicity, followed by small equi-axial crystals, large radial columnar crystals and, finally, large equi-axial crystals up to the bore of the cylinder.

Type 2 structures were observed at mold speeds of from 1000 to 1700 rpm, but at the higher speeds, where vibration is more pronounced, casting temperature must be high and rate of pouring low to avoid type 3 banding. Conditions favoring type 2 structures would appear to be freedom from vibration, high casting temperature and low pouring.

Type 3 Structures:—TJL, TJQ (Figs. 4 and 12). High-

ly segregated circumferential bands characterize these structures. Essential condition for their formation is marked vibration of the casting during solidification; low casting temperature is favorable to the formation of the structure, as is rapid pouring, but this latter was not a dominant factor over range of casting conditions investigated. The association of this type of structure with vibration of the casting has been confirmed by experiments with vibrated unrotated ingots described below. Macrostructures and sulphur prints of longitudinal sections showed the same features; the intensity of banding diminished towards the end of the castings.

The influence of any particular variable in casting conditions depends to some extent upon the other variables, but, bearing in mind that the results described are intended to refer only to centrifugal casting in a machine of the type employed, the individual effects of mold speeds, casting temperature and rate of pouring may be summarized as follows:

Mold Speed: The three types of structures described occurred at low, medium and high mold speeds respectively.

Casting Temperature: (a) Mold Speed 450 rpm—A high casting temperature accentuated the composition difference (as shown by sulphur prints) between the inner

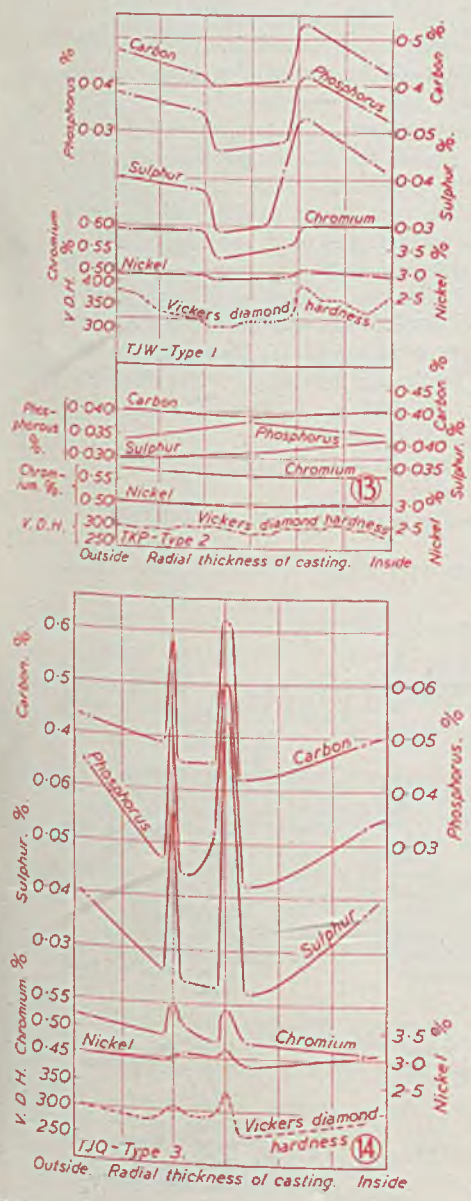


TABLE I
CASTING CONDITIONS AND STRUCTURES OF CENTRIFUGAL CASTINGS OF ALLOY STEEL

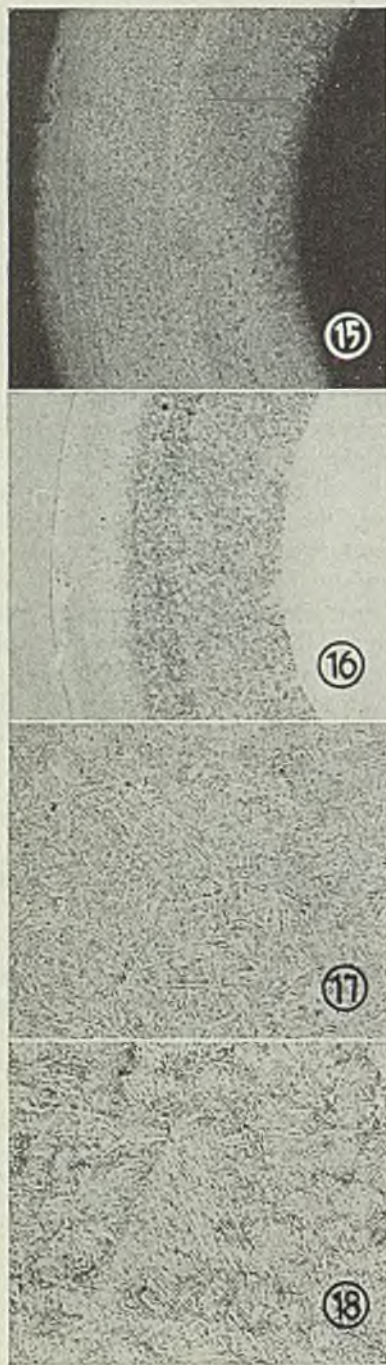
Sample	Pouring time Sec	Casting temp. °C.		Splashing† Sec	Vibration	Radial cracks	Banding	
		Hot	Cold					
Mold speed, 450 rpm								
TJZ	60	1570	.....	75	Barely perceptible	0	Resembled type 1
TKT	8	1570	.....	36		0	
TKB	12	1565	.....	34		0	Type 1
TKE	24	1565	.....	65		0	
TKM	33	1590	.....	N.o. †		0	0
TKD	32	.....	1510	39		0	
TJY	5	.....	1495	N.o. †		0	Type 1 plus another zone
TJT	16	.....	1515	N.o. †		0	
Mold speed, 650 rpm								
TJW	37	1550	67		Barely perceptible	0	Type 1
TJS	7	1550	.....	40	0		
TKC	42	.....	1490	N.o.	Noticeable	0	Trace of type 3
TJN	10	.....	1510	N.o.		0	
Mold speed, 1000 rpm								
TJX	75	1555	.....	N.o.	Noticeable	0	0
TKO	11	1565	.....	25		0	
TKA	65	.....	1515	N.o.	Barely perceptible	0	Type 2
TJP	7	.....	1495	N.o.		3	
Mold speed, 1450 rpm								
TJM	35	.....	.....	N.o.	Considerable	0	Type 2
TKP	10	1565	.....	N.o.		1	
TJU	40	.....	1520	N.o.		0	Type 3
TJR	5	.....	1510	N.o.		4	
Mold speed, 1700 rpm								
TKS	98	1570	.....	N.o.	Very considerable	0	Type 2
TJL	33	.....	1490	N.o.		2	Type 3
TJQ	6	.....	1490	N.o.		9	

†The time from beginning of pouring to end of splashing of the molten metal inside the mold. (N.o.)—No splashing observed.

‡No splashing was observed probably owing to the obscuring effect of flames and smoke, although the casting conditions were such as to favor splashing.

Table II
POURING RATES

Sample	Casting Temp °C	Pouring Time Sec	Average thickness of Outer Band In.
TKT	1570	8	0.05
TKB	1565	12	1.12
TKE	1565	24	0.31
TJZ	1570	60	0.70



impure zone and the other two zones in the type 1 structure generally formed at this mold speed.

(b) Mold Speed 650 rpm—A high casting temperature favored the formation of type 1 structures and of larger primary crystals. When the casting temperature was sufficiently low, segregation was absent, especially with slow pouring.

(c) Mold Speed 1000 rpm—The casting temperature alone had little influence on the structure or segregation apart from its effect on the size of the rim columnar crystals, which were larger at higher casting temperatures.

(d) Mold Speed 1450 rpm—At this speed there was considerable mold vibration. Type 3 banding occurred at low casting temperatures (Fig. 15) but not at high temperatures; low primary columnar crystals were present in the body of the hot-cast ingots but not in the cold-cast ones.

(e) Mold Speed 1700 rpm—At this speed the mold vibration was very considerable, and pronounced type 3 banding occurred in samples cast at low temperatures. High casting temperatures yielded coarse crystals in the middle of the cross-section, and there was much less evidence of segregation.

In general, therefore, the effect of raising the casting temperature is (a) to favor the formation of type 1 structure, (b) to hinder the formation of type 3 structure, and (c) to increase the size of the primary crystals.

Rate of Pouring: (a) Mold Speed 450 rpm—Reducing the rate of pouring increased the width of the outer band in

the type 1 structure, as shown in Table II.

Thick castings could not be prepared at high pouring rates owing to excessive accumulation in lower part of the mold of liquid metal which then ran out of pouring hole. Slow pouring, combined with low casting temperature, reduced type 1 segregation.

(b) Mold Speed 650 rpm—The two hot-cast cylinders showed a type 1 structure, the outer band being thicker in the one poured slowly. What little banding was present in the cold-cast cylinders was more noticeable in the one poured quickly.

(c) Mold Speed 1000 rpm—Pouring slowly reduced the length of the columnar crystals near the rim, but may lead to circumferential lapping near the outside at very low casting temperatures.

(d) Mold Speed 1450 rpm—Rate of pouring had little effect on structure or segregation, but rapid pouring promoted the formation of radial cracks originating at the rim.

(e) Mold Speed 1700 rpm—At low casting temperatures rapid pouring favored the formation of type 3 structures and led to radial cracking.

In general, therefore, the effect of increasing the rate of pouring is to favor the formation of (a) banded structures, both type 1 and type 3, and (b) radial cracks at high mold speeds.

Microstructures, Chemistry and Hardness

Microexamination of a large number of samples showed three main types of microstructures: (1) Fine ferrite-pearlite distribution free from segregation (Fig.

Fig. 15—Sample T1U (1450 rpm). Slight Type 3 banding. 1X

Fig. 16—Sulphur print showing Type 1 banding in outer half of sample T1T. 1X

Fig. 17—Microstructure near rim of sample T1Q. 50X

Fig. 18—Microstructure of inner zone of sample T1W. 50X

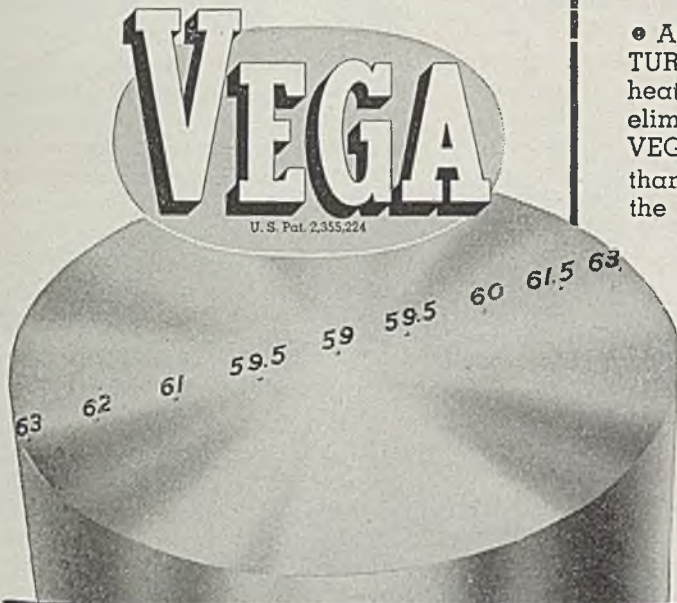
TABLE III
PARTICULARS OF STOPPED CENTRIFUGAL CASTINGS
Mold Speed, 450 rpm

Sample	Pouring time sec	Casting temp. °C	Time to stop after pouring, sec	Remarks	Zones present in ring
TKR	7	1585	0	Machine stopped 1 sec. after commencement of splashing. Still splashing when stopped.	Outer first zone and practically none of middle zone.
TKN	9	1590	0	Machine stopped 4 sec. after commencement of splashing. Still splashing when stopped.	Outer first zone and thin middle pure zone.
TKK	21	1575	17	Still splashing when stopped, therefore there had been splashing for not less than 17 sec.	Outer first zone and middle pure zone.
TKL	22	1585	30	Stopped within 2 sec. after splashing had ceased.	Outer, middle and inside zones, very little liquid metal left when stopped.
TKQ	10	1575	20		

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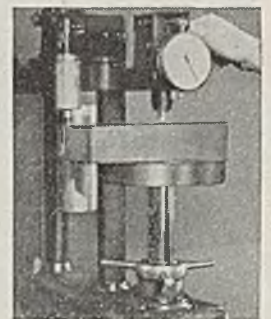
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17), occurring in the outer portion of most cylinders; (2) As above, but showing slight evidence of columnar primary structure, as in the outer two zones of type 1 castings, composed of pronounced columnar crystals; (3) Evidence of segregation of the dendritic coring type (Fig. 18) which was present in all samples near the bore, even in those free from banding; similar segregation characterized the whole of the inner zone of type 1 and of the bands in type 3 structures.

A casting representing each of the three main types of structures was selected for detailed examination. The close correlation found between the chemical analyses and the sulphur prints and macrostructures permitted some idea to be formed (by inference) of the chemical composition of the remaining castings by reference to their respective sulphur prints and macrostructures.

The three castings examined were TJW (type 1), TKP (type 2) and TJQ (type 3). Samples were obtained by means of a drill of 1/16-in. diameter, but this necessitated the use of micro-chemical methods to deal with the small samples obtained, and the number of elements determined was limited for the same reason. The results of the chemical analyses are plotted in Figs. 13 and 14; the sulphur prints were kept in mind when drawing the composition curves.

The pronounced segregating tendencies of sulphur and phosphorus are clearly demonstrated; the variations in carbon content are also quite appreciable, par-

ticularly in TJQ. The chemical analyses obtained confirm the segregation indicated by the sulphur prints and macrostructures.

Using the Vickers diamond pyramid machine, explorations of hardness were made radially across sections of representative castings. In type 1 and type 3 structures the hardness variations are considerable, the curves having the same general contour as the composition curves. By comparison the hardness of castings of the type 2 structures is very uniform across the section. Brinell hardness tests on the three zones in the type 1 casting (using a 5-mm ball) gives values of 297, 278, and 295 for the outside, middle and inside zones, respectively. Hardness results are given in Figs. 13 and 14.

Steel and Cast Iron

A few castings have been prepared of a plain carbon steel of the following composition: Carbon, 0.48 per cent; silicon, 0.16 per cent; sulphur, 0.04 per cent; phosphorus, 0.03 per cent; manganese, 1.78 per cent. The structures were similar to those of the nickel-chromium-molybdenum steels prepared under the same casting conditions. An austenitic steel (12 per cent Ni, 6 Cr and 6 Mn) when cast under conditions of considerable vibration also showed type 3 structures.

An investigation into the centrifugal casting of gray, white and malleable cast irons showed that these materials

also respond to the variations in casting conditions, but, as there are certain features peculiar to cast iron, for example, graphite form and size, nucleation number, response to malleablizing anneal, etc., this work will be reported separately.

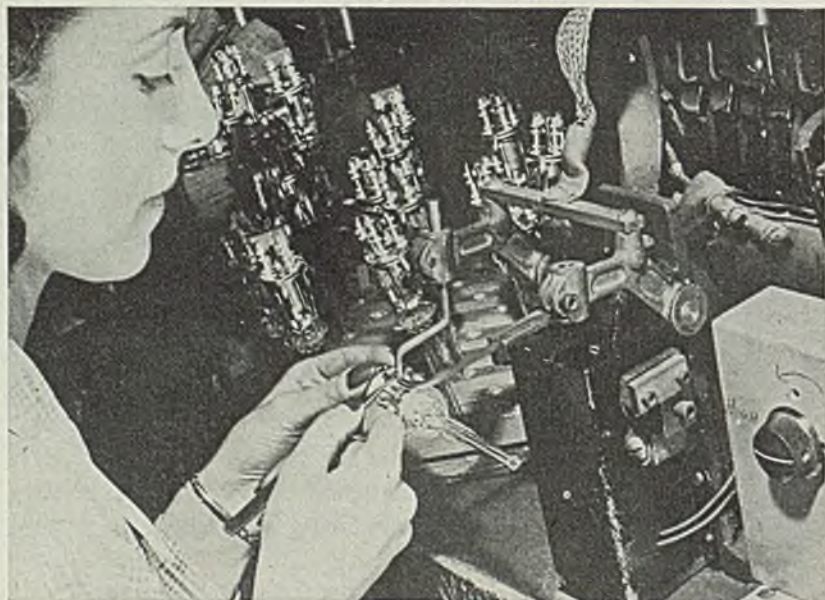
Many nonferrous alloys have now been cast by the centrifugal process and the results obtained with three alloys, namely, 6 per cent copper-aluminum alloy, 6 per cent tin-bronze and 70/30 brass, have been described in some detail in an earlier paper.⁽¹⁾ It was shown that the three main types of structures described here were also obtained in these three alloys. The only difference observed in the behavior of the different non-ferrous alloys was in the degree of segregation of which they were capable. Taken in conjunction with the results described in the present paper, the important point brought out by the work on the non-ferrous alloys that the tendency towards the formation of the different types of macrostructure is a characteristic of all alloys and is not confined to steels of any particular composition.

Radial Crystallization

In the centrifugal casting of cylinders prepared without the use of a central core, solidification proceeds radially from the outside of the cylinder in contact with the mold towards the inside. No evidence has been observed of crystals forming at the inner surface of the melt except immediately before the completion of solidification, but inward crystallization may occur discontinuously.

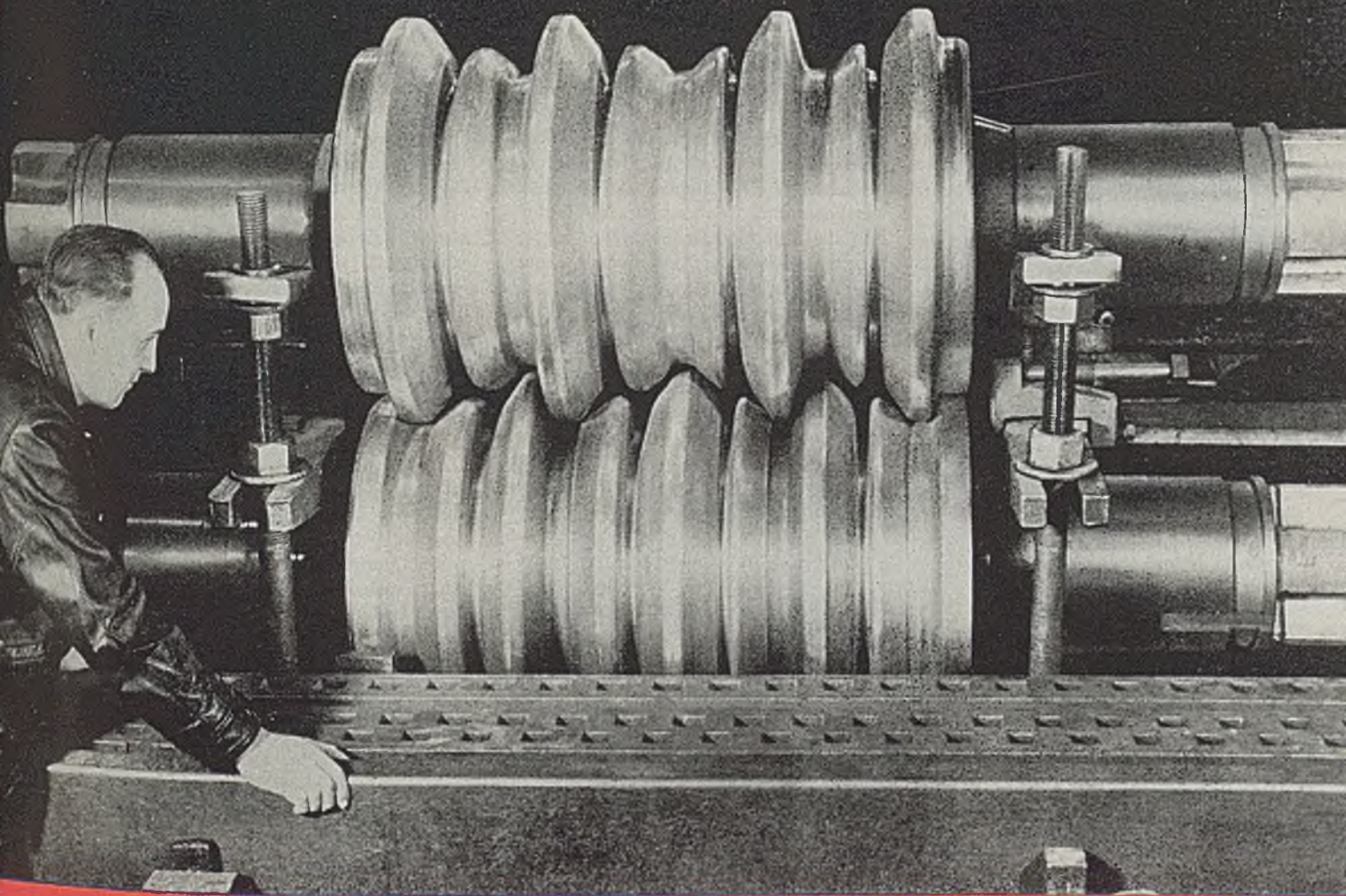
The outer columnar crystals are normally inclined at a small angle to the radius of the cylinder, as in Fig. 1. This phenomenon is not a drag effect, since the inclination is in the direction in which the mold rotates. Thus, the crystals slope to the right when the direction of rotation is counter-clockwise. According to the views previously expressed on the orientation of columnar crystals in ordinary steel ingots,⁽²⁾ a melt flowing along a cooling face gives rise to columnar crystals inclined towards the direction from which the stream comes. In centrifugal casting the liquid does not immediately attain the mold speed, so the motion of the liquid relative to the mold is in the reverse direction, and columnar crystals growing towards the approaching melt should therefore slope in the direction in which the mold is rotating. Present evidence thus confirms the observations previously put forward.

Greater inclination of the columnar crystals in the pure middle zone of the type 1 structure (Figs. 1 and 9) can be explained by the fact that tumbling increases the average relative speed of rotation of solid and liquid by continually



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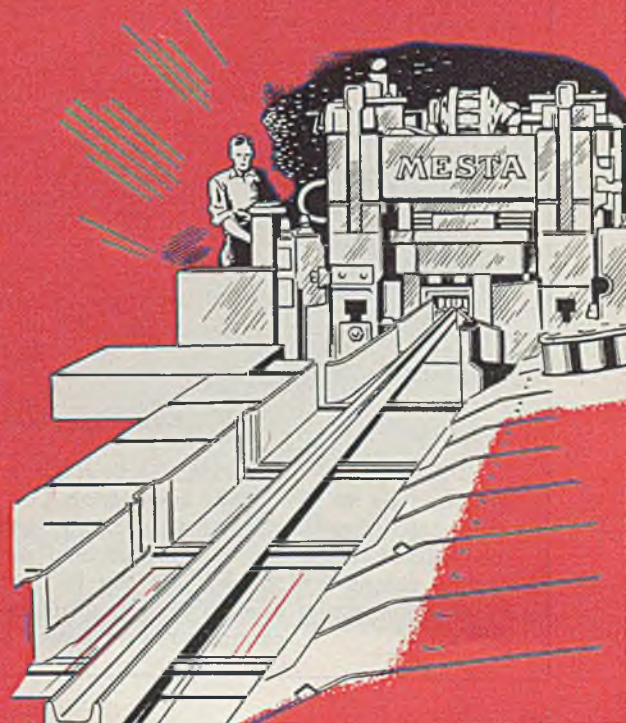


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bringing the liquid metal back to its starting condition of no rotation.

Type 1 Structures

Representative illustrations of type 1 structures are given in Figs. 1 and 9. Several castings were "bled" by stopping the machine before solidification was complete. The liquid metal remaining collected in the lower part of the mold, leaving the upper part of "casting" composed only of metal that was solid at the moment the machine stopped. Casting conditions were the same in all cases and were chosen to produce type 1 structure.

The machine was stopped (a) at the commencement of splashing (TKR and TKN^{*}), (b) after splashing had continued for a short while (TKK) and (c) immediately splashing had ceased (TKL and TKQ). Particulars of these experiments are given in Table III, and photographs of the structures and sulphur prints are reproduced in Figs. 2, 5, 6, and 10. From these it would appear that the middle zone begins to form at the commencement of splashing; it finishes forming and the inner zone commences to form before splashing ceases. It was found that splashing appears to cease at, or only slightly before, the completion of solidification.

The following tentative explanation of the formation of the type 1 structure is put forward. It has been shown that the

^{*}In the casting of TKN 4 sec elapsed between the commencement of splashing and the stopping of the machine, but, at a later attempt (on TKR), this time was reduced to 1 sec.

outer band develops up to the stage at which splashing commences; owing to rapid chilling by the mold it may be expected that its composition would be similar to, or slightly purer than, the composition of the melt. The crystal structure is similar to that of the outer rim of many castings prepared without splashing. Rapid pouring by favoring the early commencement of splashing, reduces the width of the outer zone as described earlier.

Middle zone starts to form at the commencement of splashing. From the combination of the columnar nature and the inclination of the crystals forming this middle zone, continuous growth has evidently occurred in the normal manner; it is unlikely that purer crystals could have been formed in the liquid and have been centrifuged outwards, as this process is known to give rise to random orientation of small equi-axial crystals. The greater purity may be explained by the tumbling motion ensuring a uniform composition in the liquid instead of it becoming less pure adjacent to the growing crystals. These, rotating with the mold, become cooler when out of contact with bulk of the liquid during a part of each revolution, and this condition, leading to a steeper temperature gradient, will favor continuation of columnar growth. With the crystallization and subsequent removal of purer solid during formation of the middle pure zone, it would be expected that remaining liquid would become more and more impure. Sulphur prints reveal this increasing impurity of liquid as the splashing action proceeds

(TKN, TKL, TKK: Figs. 5, 6 and 10, respectively).

It has been shown that the third or inner impure zone starts to form before the end of splashing. A study of a casting stopped during splashing showed the remaining liquid to have solidified in equi-axial form. The macrostructures and sulphur prints of this "stopped" impure liquid are identical with those of the inner zone of type 1 structure, and this suggests that formation of crystals of random orientation in the liquid was taking place during the later stages of splashing. A stage would then be reached when, in effect, a sufficient number of crystals would be present to raise the viscosity of the liquid, which then rapidly assumes the rotational velocity of the mold and solidifies without further splashing. Small size of the equi-axial crystals is suggestive of their almost complete formation in the splashing liquid before this rotates with the mold.

In casting TJT, rate of pouring was high at first (to favor splashing) and then low, the casting temperature being relatively low at 1515° C. This casting showed evidence of type 1 structure in outer portion but normal structure in the remainder; a section of the sulphur print is shown in Fig. 16.

Type 2 (Unbanded) Structures

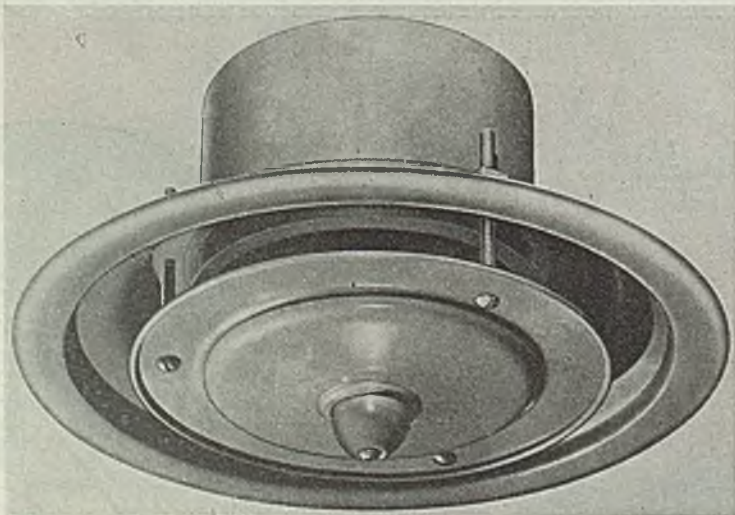
Representative illustrations of type 2 structures are given in Figs. 3 and 11. In the absence of casting conditions giving rise to either the type 1 or type 3 structures, solidification proceeds normally, free from pronounced chemical segregation.

Types of Structures

Representative illustrations of type 3 structures are given in Figs. 4 and 12. In order to obtain a better impression of the structures obtainable under conditions of pronounced vibration, reference should be made to the illustrations accompanying the paper dealing with non-ferrous alloys⁽¹⁾. In view of the close similarity between the structures of, e.g., the 6 per cent copper-aluminum alloy and of the steel when prepared under similar conditions of vibration, observations made during the examination of the non-ferrous alloys have been taken into account in explaining the banded structures in the steel castings.

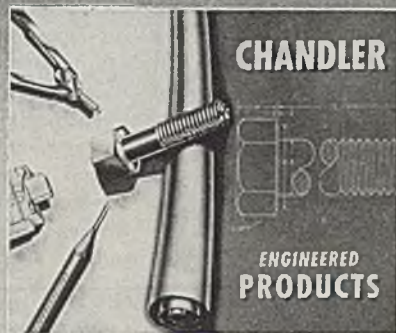
The vibration type of banding is considered to be due to the influence of vibration in limiting the undercooling which a liquid metal normally undergoes before it solidifies.

During the normal solidification of an alloy, cooling from the liquid state under conditions giving rise to a steep temperature gradient brings about a composition gradient in the liquid adjacent to the



ADJUSTABLE AIR DIFFUSER: Adjustable lower cone of this diffuser produced by W. B. Connor Engineering Co., New York, can be raised or lowered to vary angle of air discharge, insuring uniform performance for different ceiling heights. Chilled air flows parallel to ceiling during cooling season and heated air can be forced downward to prevent stratification during heating period. Tamper-proof cap covers damper control screw in center of unit

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growing crystals. The liquid zone in contact with the solid becomes more impure and, therefore, of lower freezing point than the average, so that the liquid next to it, away from the mold, reaches its freezing point and starts to crystallize⁽³⁾. A repetition of this mechanism is responsible for the normal periodic structure already described^(4, 2).

Maximum vibration occurred in the neighborhood of 1700 rpm, but there was also appreciable vibration at 1450 rpm. The tendency towards type 3 banding was consequently less at this speed, but examples were observed and a portion of a macroprint of TJU cast at this speed is reproduced in Fig. 15.

In order to demonstrate that the type 3 structure is not peculiar to the centrifugal process, tests were made to show the influence of vibration during the casting of a number of small unrotated ingots. For this purpose a machine was constructed to vibrate the mold in horizontal plane, the amplitude and speed of vibration being adjustable. To ensure conditions favoring uni-directional solidification a squat mold was used consisting of a copper base on which was fixed a warmed refractory cylinder, the height of the casting being similar to the wall thickness of the centrifugal castings. Ingots of the nickel-chromium-molybdenum steel were cast in this mold when oscillating, and control castings were obtained with the mold stationary. The examination of etched axial sections revealed an absence of segregation banding in the castings prepared in the stationary mold, but, under suitable conditions of vibration, banding was found to occur. Photographs of the sulphur print and macrostructure of the axial face of one ingot cast in a mold at amplitude of $\frac{1}{8}$ -in. at a frequency of 1100 cycles per minute are reproduced in Figs. 7 and 8.

Radial Cracks

The number of radial cracks observed in the rings prepared for examination is included in Table I, and the appearance of typical cracks will be seen from Fig. 4. High mold speed and rapid pouring are the main factors favoring the formation of such cracks. No radial cracks were observed in castings prepared at mold speeds of less than 1000 rpm, but at higher speeds cracks occurred, provided that the rate of pouring was not too slow. Similarly, at very low pouring rates, no cracks occurred even at the highest mold speeds and casting temperatures adopted.

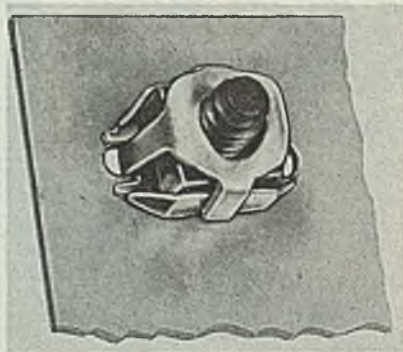
These results agree with the view that radial cracks may form in the early stages of solidification and that they are due to the centrifugal force of the rotating liquid promoting, in the thin solid shell, a circumferential tensile stress sufficiently high to crack the shell after it has contracted

away from the mold. A high mold speed conduces to the formation of cracks by increasing the centrifugal force (the latter increases as the square of speed). High pouring rates, by increasing the quantity

Anchor-Type Lock-Nut

An anchor type lock-nut for use on any and all sheet-metal installations where it is convenient or necessary to have the nut member held in place during assembly, has been developed by Kaynar Mfg. Co., 820 East Sixteenth street, Los Angeles 21.

It consists of three parts, the lower half is a "carrier" for the nut and is made of tempered spring steel with a "built-in" lockwasher; upper half is also made



of spring steel and keeps the third part, a plain square nut, contained within the assembly. Two spring ears project from lower part and are used to engage sheet of metal to which nut is to be attached.

Parts come completely assembled and ready for use. The part to receive the nut must be provided with two $\frac{3}{8}$ -in. diametrically opposed holes and spaced a specified distance from the center hole, anchor nut assembly is then merely snapped into place by hand.

of liquid in the mold in a given time and hence the total effective centrifugal pressure, also result in a higher stress in the shell and thus produce a tendency to cracking. It may be additionally effective by decreasing the rate of solidification so that a thinner shell is formed within any given time.

Circumferential cracking was only observed under conditions of very slow pouring at a low temperature. This gives rise to lapping, a process which causes cracks near the outside of the casting.

Conclusions

Present investigation describes the effect of variations in the casting conditions upon structure and segregation in thick cylinders of nickel-chromium-molybdenum steel prepared by the centrifugal casting process, using chill molds rotating about a horizontal axis. The most important individual factor appears to be

the rotational speed of the mold. Low speeds result in splashing of the metal inside the mold, owing to the delayed pick-up; the casting is then composed of three sharply defined zones, the middle one being the most pure and the innermost zone the least pure (type 1 structure).

Information on the mode of solidification of these castings has been obtained by rapidly stopping the mold at different stages of solidification during the preparation of a series of castings at a low mold speed. Castings prepared at intermediate speeds are relatively free from segregation (type 2 structure). At the highest speeds, noticeable vibration develops in the casting machine, and the resulting castings then show a circumferential line type of segregation banding (type 3 structure). Experiments with vibrated unrotated ingots have confirmed the association between vibration and segregation and have shown that the effect is not peculiar to the centrifugal casting process. The various structures and forms of segregations observed in all the centrifugal castings are discussed and explanations are put forward to account for them.

Influence of mold speed on the structure and segregation is modified by alterations in the casting temperature and rate of pouring. Apart from its normal tendency to increase the size of the primary crystals, a high casting temperature was found to favor the type 1 structure at low speeds, since it increases the time interval between the end of pouring and the completion of solidification. Rapid pouring favors the formation of the type 1 structure for the same reason. At high mold speeds rapid pouring also leads to radial cracking; on the other hand, excessively slow pouring and low casting temperatures give rise to circumferential lapping.

Hardness studies show that the hardness curve closely follows composition curve across the radial thickness of the casting, so that castings free from segregation are of uniform hardness throughout.

Results of the present investigation have been compared with those obtained in an investigation previously carried out on a series of non-ferrous alloys: close similarity in structure and segregation has been shown, and it has been found possible to duplicate the different types of structure and segregation in many different alloys.

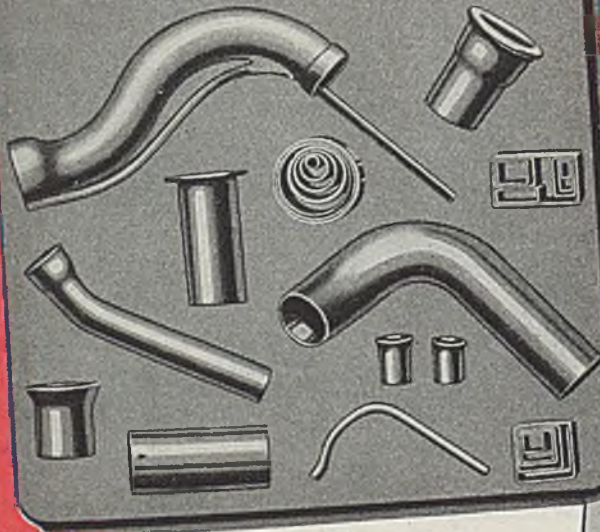
REFERENCES

- ¹Northcott and Dickin: *Journal of the Institute of Metals*, Vol. 70, p. 301, (1944).
- ²Northcott: *Journal of The Iron and Steel Institute*, No. 1, p. 49p, (1941).
- ³Northcott: *Journal of the Institute of Metals*, Vol. 62, p. 101, (1933).
- ⁴Northcott: *Journal of The Iron and Steel Institute*, No. 1, p. 171, (1934).
- Bardenheuer and Bleckmann—*Stahl und Eisen*, Vol. 61, p. 49, Jan. 16, (1941); *Mitteilungen aus dem Kaiser-Wilhelm Institut fuer Eisenforschung*, Vol. 21, No. 13, p. 201, (1939).

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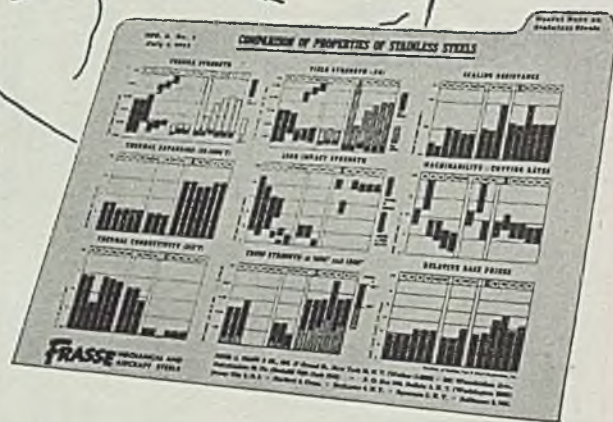
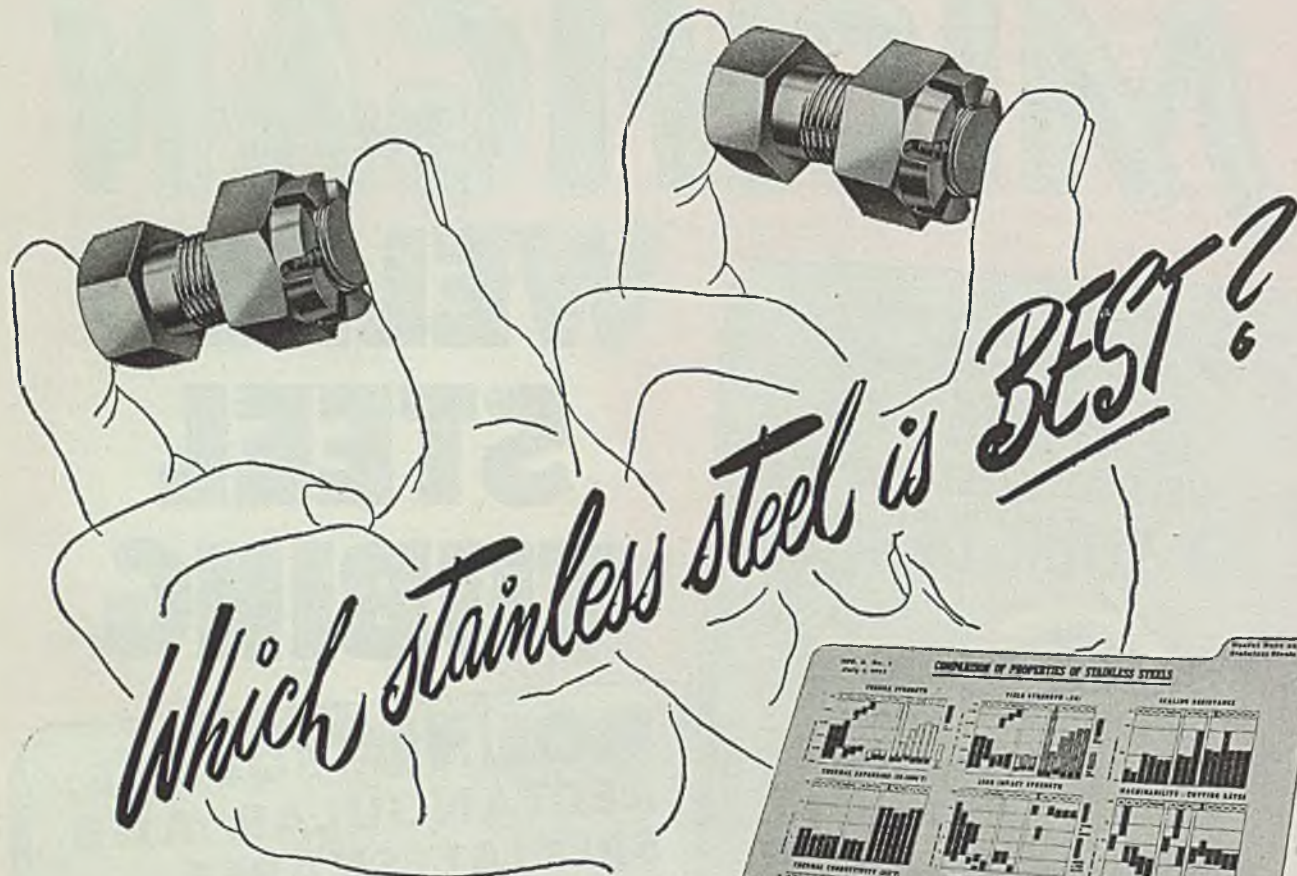
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From Philadelphia, Franklin Institute reports it is now exhibiting temporarily in its Hall of Marine Transportation, an 18-foot plastic scale model Victory ship, which was used at Bethlehem Fairfield Shipyard, Baltimore, to train the supervisory force. It provided the latter a clear three-dimensional picture of the construction methods and problems involved in putting the ships together. Model, it is said, can be separated into assemblies similar to sections built by assembly-line methods

In Bellefonte, Pa., Sutton Engineering Co. recently ran tests on a newly designed bar straightener with rolls for straightening round edge spring steel, rectangles and squares. The machine embodies outboard bearings on both top and bottom rolls. In addition, all of its adjusting screws are equipped with indicators which can be reset immediately for sizes previously straightened, after straightening a different size. According to the company, the machine is equally capable of straightening hexagons, octagons and other shapes when rolls are available

Hardinge Co. Inc. reports from York, Pa. that it has obtained manufacturing and sales rights for the BLM Auto-Centri clutch from Automatic Clutch Corp., Canada, subsidiary of British Meter Co. The clutch, when installed with an electric motor drive, allows use of a standard squirrel-cage motor with across-the-line starting equipment. As the motor approaches full-load speed and maximum torque, the clutch picks up the load gradually, eliminating shock loads

Growing conviction among members of the building industry is that one means of speeding up building and reducing costs will be the use of unit construction of subassemblies. One method to this end, according to a report made by Lead Industries Association, is the use of all lead unit plumbing. Overall speed of building construction can be accelerated because the plumbers' work is done largely in the shop. Also, the use of a single materia leliminates neces-

ENGINEERING NEWS

at a glance

sity of assembling a number of dissimilar items. Work is assembled with a minimum of joints since changes of direction are made with bends instead of fittings. Furthermore flexibility of lead permits movement or settling to occur without damaging plumbing, the Association reports

Watson-Standard Co. reports its post-war Alumcote series of aluminum finishes, incorporating latest war-proved technical refinements is now available for civilian production. According to the Pittsburgh firm, the protective coatings are being produced in nine types, each to meet specific requirements.

In an effort to make every worker aware of eye hazards, and to aid the safety engineer to do a better job, Willson Products Inc., Reading Pa., is sending users of its safety devices scientifically and psychologically worked out posters which combine the average person's desires with the fear motive, it is reported. Posters consist of two parts, one depicts the joys of life that only a person with good eyesight can experience, the other is a large patch of black—all that a blind man sees

A new use for angle iron in connection with materials handling is reported by Bassick Caster Co., Bridgeport, Conn. Guiding of dollies, trucks, assembly stands and other wheeled units to exact locations desired is provided by a flat strip of steel with and angle iron welded to one side of it, apex upward. The flat strip is laid on the floor and the angle iron becomes a sloping sided rail on which grooved wheels can run. Track of this type is said to eliminate permanent tracks in the floor, prevent ruts and other damages and cut traffic interference to a minimum. In addition, grooved caster wheels with wide threads

on both sides of the groove enable the wheeled units to be easily shunted off the track to the floor, according to Bassick

Harry A. Winne, General Electric Co.'s vice president in charge of engineering, recently predicted gas-turbine aircraft engines of as great as 10,000 horsepower, more than combined output of four B-29 engines. At present, he stated, the company is doing intensive work on the Propjet, a new power plant which uses gas-turbine force to drive a propeller and provide a jet thrust simultaneously. The gas turbine drives the propeller through reduction gears, and the gases passing through the turbine wheel discharge rearward, the resultant thrust being used in jet propulsion, providing the engine a combination of propeller and jet power, he said

Beryllium products were so scarce during the war that imports of ore by air from South America were sometimes necessary and total imports soared to 10 times the prewar figure, according to the "Industrial Bulletin" published by Arthur D. Little Inc. With the end of the war, demand slackened and producers now can seek new outlets. Considerable interest is being devoted to beryllium compounds, the first form in which beryllium was used, bulletin said

In Fort Wayne, Ind., it was learned recently, Joslyn Mfg. & Supply Co. added stainless steel channels to its regular lines of stainless steel ingots, billets, bars and shapes. According to the company, the new product was developed as a companion item for the stainless steel angles it is producing. The channels are hot rolled, annealed and pickled

New METALLURGICAL Developments

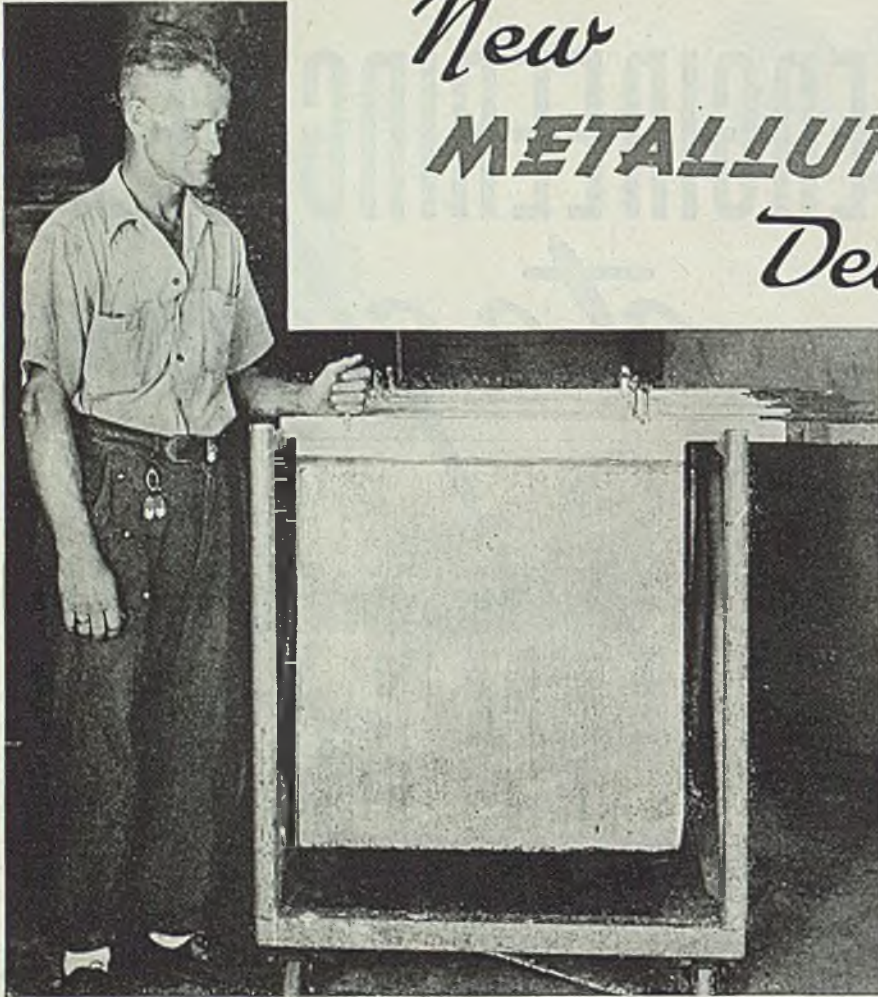


Fig. 1—Chromium cathode produced by "electrowinning" from low-grade, domestic chromite ores. Work is being done by the Bureau of Mines

... are revealed at Electrochemical Society Meeting

BY ALLEN G. GRAY
Consulting Editor, STEEL

solvent cleaning materials which leave a film of nonvolatile emulsifier render steel surfaces the least corrodible. Steel cleaned with such materials can usually be further processed by inspection, machining, bonderizing or painting, without any additional cleaning step, and may be held over for indefinite periods without corroding in an industrial atmosphere.

Passivation of Stainless Steel: E. M. Mahla and N. A. Nielsen of the Du Pont Co. Engineering Department, Wilmington, in discussing the strength and stability of passive films produced on stainless steels by various passivating treatments, brought out the fact that no passivation treatment confers lasting protection to stainless steel immersed in media which corrode the unpassivated metal. Equally effective results were obtained with stainless steel which was cleanly pickled, thoroughly rinsed, and air dried.

Theories as to the nature of passivation and its relation to the resistance of various grades of stainless steel to corrosive conditions are by no means in accord. Explanations of the phenomenon range from those based on a change in the electron configuration in the crystal structure of the metal due to the alloying of iron with chromium, nickel, or molybdenum, through those based on the protection arising from surface oxide films, to those based on the premise that passivation is due to a chemisorbed layer of oxygen or oxides on the surface.

The use of imposed controlled potentials to investigate the relative strength of surface films on metal, according to Mahla and Nielsen, appeared to offer the best method of investigation. The theory of this method is based on the assumption that the corrosion resistance of passive stainless steel is due to a

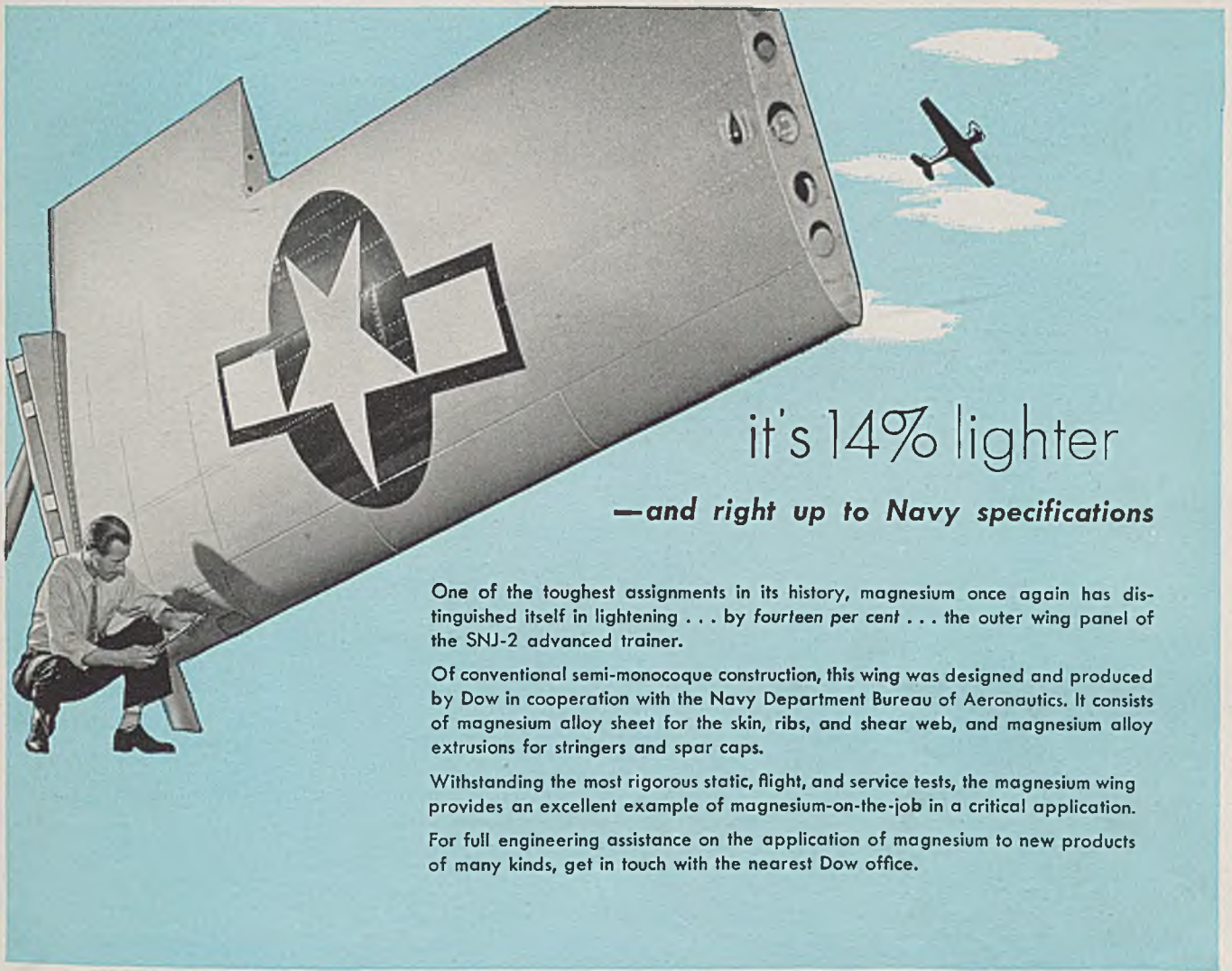
A WELL-ROUNDED agenda of technical papers in which were described many new metallurgical developments featured the eighty-ninth convention of the Electrochemical Society at Birmingham, April 11-13. Sessions on corrosion, rare metal metallurgy, and alloy plating were highlights of the meeting held in the South's "Steel City."

Cleaning Steel: At the opening session on corrosion Chester W. Smith of the Detrex Corp., Detroit, discussed the effect of cleaning methods for steel on the corrodibility of the surface when exposed to the normal elements present indoors in industrial atmospheres. In the cleaning of bright, machined steel surfaces, of bright sheet steel, and of polished iron or steel, it is highly desirable that the metal does not rust before the next operation. The succeeding operation may be inspection, further machining, assembly, painting, bonderizing, or just storage. Many times steps in processing do not follow in rapid succession after the cleaning step and consequently appreciable rusting may

occur in the industrial atmosphere which surrounds them. The rust may be injurious to the part and equally as undesirable as the original soil of dirt and oil.

"Clean" steel does not exist in ordinary atmospheres because oxidation occurs almost instantaneously. It is possible, however, according to Smith, to clean the surface of steel and leave a film of the cleaning material which will act as a diffusion barrier in preventing initial oxidation and yet fulfill the requirements for its subsequent use. Cleaning methods, using either abrasives, or alkaline compounds, or volatile or partially volatile solvents, and emulsified solvents, were compared as to effects on bright steel, when exposed in an "acidic atmosphere cell."

The "acidic atmosphere cell" devised by Smith incorporates many of the significant factors present in commonly encountered shop atmospheres, such as moisture, acidic gases, oxygen, and temperature variations. On the basis of these tests it was found that emulsified



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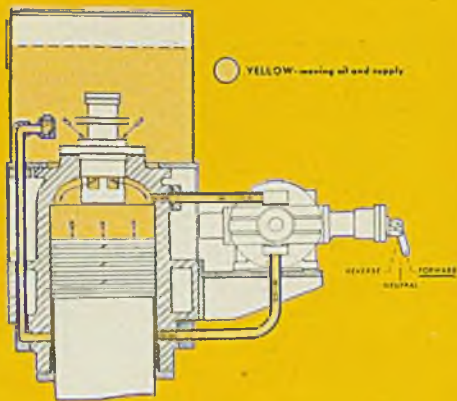


Magnesium is produced by Dow in all forms commonly adapted to manufacturing, including many fabrications and various alloys.

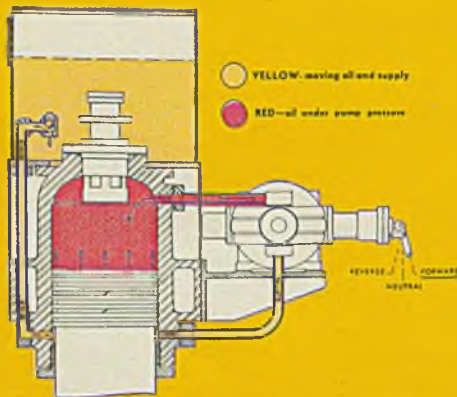


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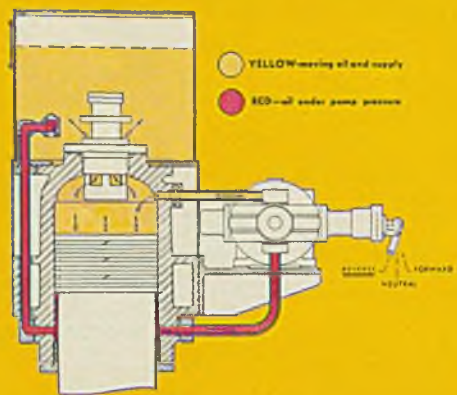
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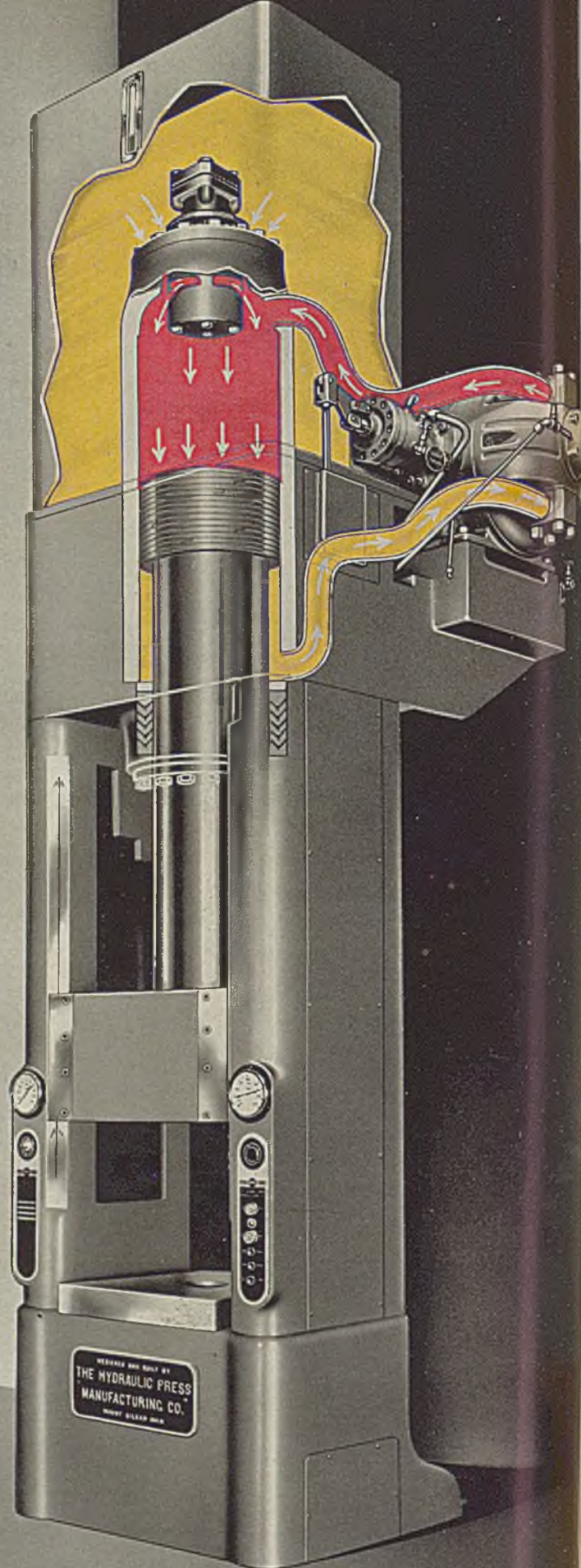
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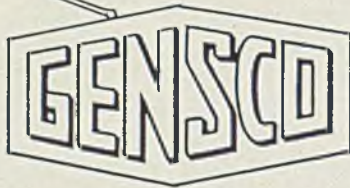
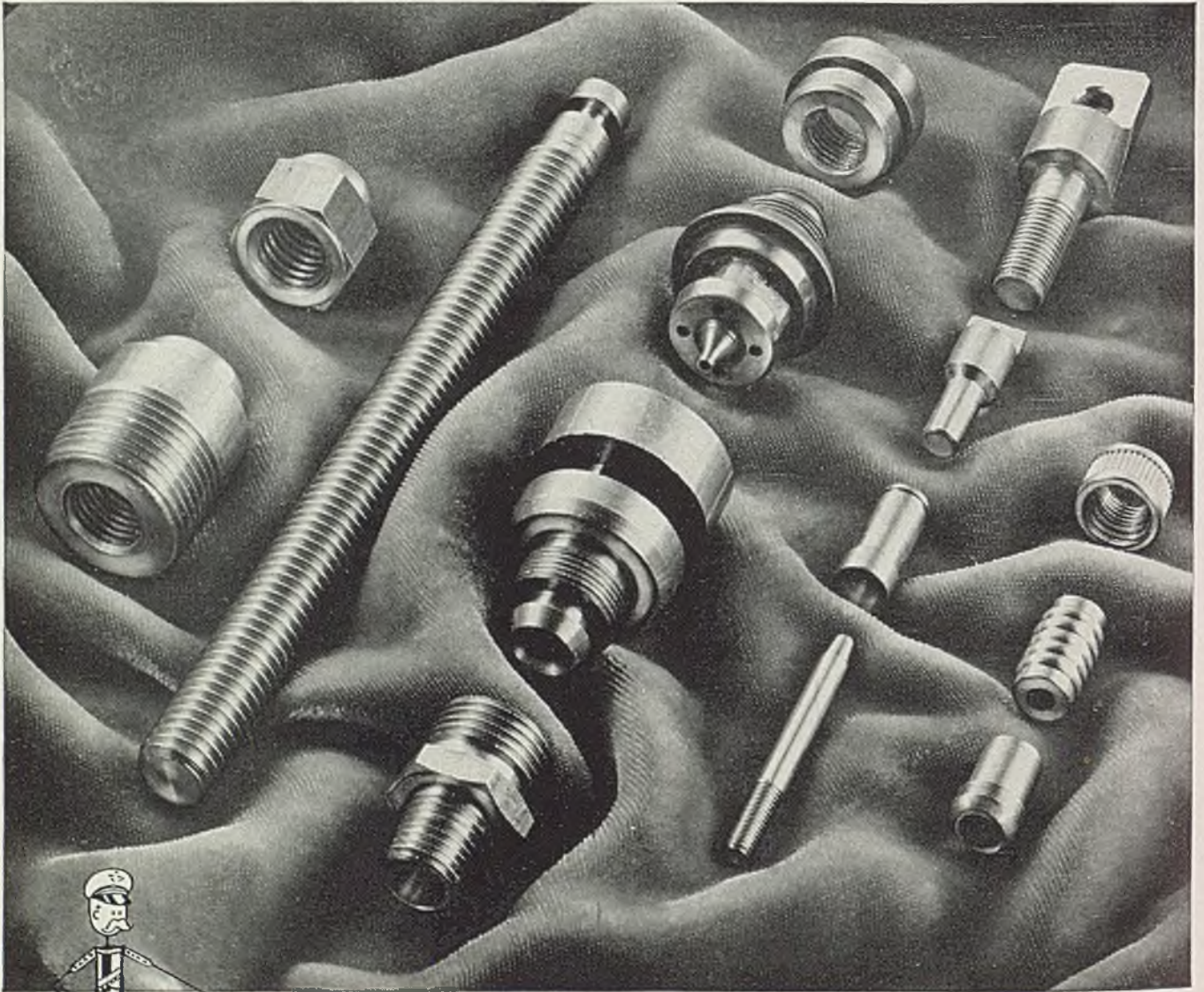
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PILOT-PLANT-CELL-OPERATING DATA
FOR CHROMIUM ELECTROWINNING.

Cathode	Aluminum plate sand-blasted with emery grit, 10 sq. ft. (93 dm. ²) area
Deposition time	48 hr.
Metal deposited	21.16 lb. (9.6 kg.)
Current efficiency	45%
Cell potential	4.6 volts
Kw.-hr./lb. of metal	7.2
Cathode current density	6.8 amp./sq. ft. (7.3 amp./dm. ²)
pH	1.86
Sulfite addition	0.7 cc. of 0.1 N/L/hr.
Temperature	32.3° C ± 0.5°

film which is sufficiently strong and continuous to prevent the metal ions underlying it from going into solution. If the solution pressure of the underlying metal ions is increased to a value where the ions break through the passive film, and if current and surface-potential measurements are made while such a process is going on, a rapid increase in corrosion current accompanied by a sudden drop in surface potential will be noticed at moment of the break-through.

Electron diffraction was applied to the study of passivated stainless steel surfaces and of the bulk oxide films. Although no definite evidence of the existence of passive films was found by reflection electron diffraction studies, bulk oxides produced by chemical or air oxidation on 18-8-S stainless steel were found to consist chiefly of Cr₂O₃ with no nickel oxide and little iron oxide present. The bulk oxides formed by air oxidation on straight chromium-iron alloys consisted of FeO, Fe₃O₄, Fe₂O₃, and mixtures of these oxides. In general, the authors concluded that careful pickling, with subsequent exposure to air, is as practical as any of the numerous passivation treatments investigated, for assuring good service life of stainless steel.

Electric Furnace Developments: In a session on Electrothermics, an improved carbon resistor furnace, which operates more satisfactorily for certain purposes than an induction furnace, was reported by W. J. Kroll, A. W. Schlechten, and L. A. Yerkes, of the U. S. Bureau of Mines. The new furnace employs a slotted tube so that the current must go up one half and down the other. Both electric connections are at the bottom of the slotted tube. The electric resistance is almost four times that of a similar unslotted tube with top and bottom clamps. The furnace operates at an estimated 38 per cent efficiency.

In a paper prepared by T. Ellefsen, Porsgrunn, Norway, a rotating arc furnace, designated as the "Elkem" rotating furnace, was described which has a number of advantages over the stationary type. Crater formation in the charge is eliminated; the electrodes more easily maintain their vertical position; operation is quiet and uniform. Furnaces of 6000 and 8000 kw have been built and put into successful use. The furnace is designated as a three-phase furnace with the electrodes suspended at the three points of an equilateral triangle. The furnace pot is round, and rotates or oscillates slowly, so that the melting zones constantly move sideways relative to the electrodes. By this rotation the whole furnace charge is successively drawn into the melting zone, and the furnace bowl is kept clean and free from craters.

Ellefsen reported that, at Porsgrunn Electrometallurgiske, an Elkem rotating furnace and an ordinary non-rotating furnace were operated simultaneously on 75 per cent ferrosilicon with the same class of raw materials. The results for 6 months' operation showed that the Elkem furnace had about 17 per cent higher production with the same consumption of power. The consumption of materials per ton of ferrosilicon was about 10 per cent less.

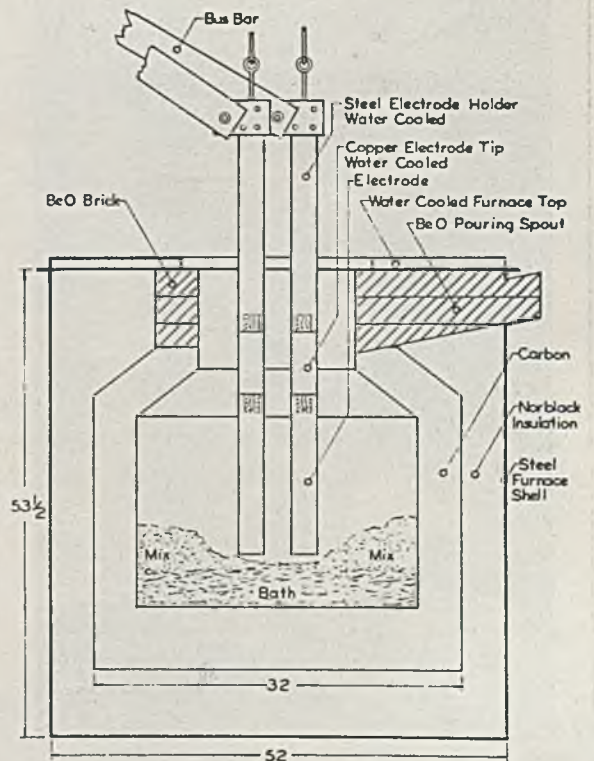
Calcium—A Scavenger for Steel: Under the pressure of war requirements a process was developed for production of metallic calcium from low cost limestone, based on thermal reduction and high vacuum distillation. Details of the process were presented by C. C. Loomis, New England Lime Co., Canaan, Conn., with the information that idle plant facilities are available for producing the metal in large quantities, along with the necessary technical know-how. Future developments will probably depend on expansion of uses for the metal as a result of research and development.

As a scavenger for steel, particularly

chromium-nickel alloy steel, calcium appears to have definite merit. It may also find an application as a scavenger for cast iron to give increased strength and to control graphitization of the carbon. According to Loomis, there is considerable data in the literature to indicate that calcium has definite merit for de-oxidizing copper in order to increase both conductivity and tensile strength. Calcium is at present used in small quantities as an alloying ingredient with magnesium and it may find a similar application with aluminum, copper, and other metals. Both calcium and calcium hydride have been used as reducing agents for the production of other metals, such as chromium, zirconium, titanium, vanadium, tantalum, thorium, uranium, and columbium.

Germanium: Recent interest in germanium has encouraged commercial production of the pure metal and its oxide as by-products in the recovery of cadmium from zinc sintering-plant Cottrell dust, according to Robert I. Jeffee, Battelle Memorial Institute, Columbus, O., in a report before the "Rare Metals" tech-

Fig. 2 — Beryllium-copper alloy is produced in this electric arc furnace by direct reduction of beryllium oxide with carbon in presence of copper



nical session of the society. Although similar to silicon in many properties, there are sufficient differences to encourage the use of the much more costly germanium in some electrical, metallurgical, and ceramic application. Chief interest, electrically, centers on the uses of germanium as a rectifier and in making high-resistance resistors. Metallurgically, the very low melting eutectic alloy of gold and germanium points the way to possible dental, jewelry, and soldering alloys, and the property of slight expansion on solidification aids in making castings of good dimensional tolerance.

With gold, germanium forms a gold-colored eutectic alloy, at 12 per cent germanium, of exceptionally low melting point, good casting properties, and good soldering characteristics for gold and copper alloys and gold-plated articles. One of the uses of the gold-germanium alloy eutectic is as a hard surfacing material for gold or gold-plated articles, because of its relatively high hardness of 200 Vickers. It is applied by dipping the article to be surfaced in the molten gold-germanium eutectic alloy at about 400 to 450° C. Pure germanium has the peculiar property of expanding on freezing, similar to bismuth. Even when alloyed with as much as 92 per cent of gold, the gold-germanium alloys still possess this property of expansion on freezing. This property is advantageous to the alloy when used for precision castings. As a gold solder, the alloy

has shown good promise, its lack of ductility being made up for by high strength, so that joints deform in the surrounding metal, rather than breaking in the solder.

Ductile Zirconium from Zircon Sand: A new process has been developed which yields pure metal ingots of zirconium that can be forged and rolled. Since embrittlement of zirconium metal is caused chiefly by oxides and nitrides dissolved in the metal, the degree of hardness and brittleness depends on the amount of these impurities introduced. The essential steps of the new process, as developed by W. J. Kroll, A. W. Schlechten, and L. A. Yerkes, of the Bureau of Mines are: (1) Production of mixed carbides from zircon sands; (2) chlorination of the carbides; (3) sublimation of the chloride under hydrogen to eliminate iron; (4) reduction of the purified chloride with magnesium in an atmosphere of a noble gas; (5) elimination of excess magnesium, magnesium chloride, and most of the hydrogen by vacuum distillation; (6) degassing of the metal, if necessary, at high temperature in a high frequency furnace; and (7) remelting the metal in a vacuum arc furnace.

The zirconium ingots obtained from the melting furnace are reported to have a bright smooth surface and a brinell hardness as low as 192. All ingots with a hardness less than 300 brinell can be rolled into sheet. They are heated to 700° C and rolled hot for the first

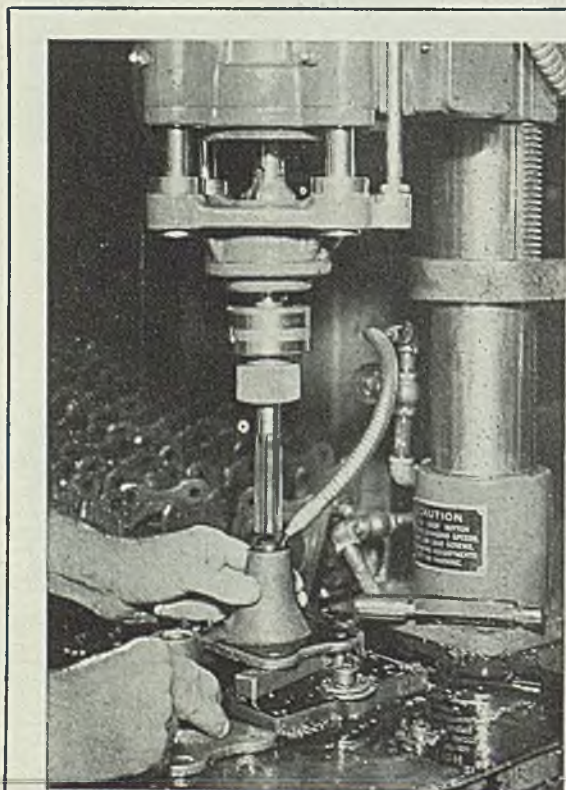
few passes; after the thickness has been reduced somewhat, the strip can be cold rolled with annealing after several passes. The resulting sheet can be bent cold 180° C without cracking. The solid zirconium can be heated to 700° C in air without burning, since a protective oxide coating forms over the surface.

Beryllium: Some of the unusual technical problems involved in the manufacture of pure beryllium and beryllium-copper alloys were presented by B. R. F. Kjellgren, vice president, Brush Beryllium Co., Cleveland. The acid-resistant crystalline beryl ore, according to Kjellgren, is converted into a reactive form by melting the ore in an electric furnace and quenching the melt. The reactive material is then treated with sulphuric acid and beryllium sulphate is produced by a crystallization process. The beryllium sulphate is converted to beryllium-copper by heating. The beryllium-copper alloy is produced in an electric arc furnace of the type shown in Fig. 2, by direct reduction of beryllium oxide with carbon in the presence of copper. The beryllium-copper produced by this process usually contains 4 to 4.25 per cent beryllium and less than 0.10 per cent iron, 0.08 per cent silicon, and 0.06 per cent aluminum.

A new method for production of high purity beryllium powder by sodium vapor reduction of beryllium chloride was described by J. M. Tien, The Texas Co. Research Laboratory, Beacon, N. Y. This process is expected to receive increased commercial interest as beryllium powder finds wider uses in the rapidly expanding field of powder metallurgy.

Electrowinning of Chromium: A process for electrowinning of chromium from domestic chromite ores, based on electrodeposition from a trivalent salt solution, was reported by the Bureau of Mines. Details of the new process, including data on pilot plant production of 50 lb per day were given before the society by R. R. Lloyd, chemical engineer, stationed at Boulder City, Nev.

Low grade Montana chromites from either the Benbow or Mouat mines were successfully used for production of the electrowinning cell liquor, which consists of a $\text{Cr}_2(\text{SO}_4)_3$ - CrSO_4 - Na_2SO_4 - $(\text{NH}_4)_2\text{SO}_4$ electrolyte. The sulphate electrolyte, containing about 15 g./L Cr^{++} , 15 g/ Cr^{+++} , 42 g./L NH_4^+ and 27 g./L Na_2 , to which a small quantity of reducing agent, such as a soluble sulphite, is continuously added proved to be the most successful composition for the electrolytic cell. The divalent chromium concentration is normally maintained at the desired point by the reducing action at the cathode; the desired pH of 1.8-2.2 is maintained by the normal buffering action sup-



PRECISION TAPPER: Threading of a new type automotive spring hanger is formed in only 8 seconds with this Detroit Tap & Tool Co. tapping machine in the plant of Chapman Products Co., Detroit. Operation consists of precision tapping to a depth of 1-54/64 in., using a standard 6-flute tap ground with a 4-thread chamfer. Tap is mounted in a floating tap holder, work being placed on simple 2-pin locating fixture without clamping. Tap life of over 5000 pieces between grinds is obtained, even at close tolerances. Hangers are said to simplify mounting of truck springs

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plied by the chromic sulphate solution.

A completely cyclic pilot plant producing 50 lb per day of chromium metal is in successful operation using chromite concentrates from the Mouat deposit. Fig. 1 shows a typical cathode deposit produced in the pilot plant, and cell data are given in the table. According to Lloyd, the metal stripped from the cathode contained 0.07 per cent sulphur, 0.77 per cent iron, and 0.03 per cent acid-insoluble Cr_2O_3 . This significant development in the production of chromium for metallurgical uses has resulted from a program the Bureau of Mines has had under way for several years for the production of metals from domestic ores, many of which are low grade in comparison with imported materials.

Lead and Lead-Tin Deposits on Steel:

Some of the factors affecting the corrosion protection of steel by lead and lead-tin alloy electroplates were presented by A. H. Du Rose, Harshaw Chemical Co., Cleveland. The rapid increase in the use of lead deposits for corrosion protection, brought about by the curtailment of the use of certain strategic metals during the war, has accelerated investigation by the plating industry. Lead and lead-tin alloy deposits are also

of interest for use on engine bearings where relatively thick deposits are required.

Based on the results of more than two years outdoor and salt spray exposure tests on lead and lead-tin alloy deposits, Du Rose stated that these electroplates could definitely be considered a good coating for protection of steel. While lead deposits do not afford the absolute electrochemical protection given by zinc and cadmium, it appears to be much better than would be thought from its position in the electromotive series. According to Du Rose, some of the corrosion data collected indicated that lead deposits and particularly lead-tin alloy deposits give as good protection as zinc. However, due to the poorer throwing power of the lead bath as compared with cyanide zinc, areas receiving low current densities in lead plating could not compete with zinc in corrosion protection. The use of a copper flash prior to the lead deposit has proven to be advantageous in some cases. In general, Du Rose showed that a copper flash (0.00005 in.) improves the corrosion resistance of lead plated steel if the lead has a thickness of 0.0001 to 0.0005-in. In some cases, a copper flash

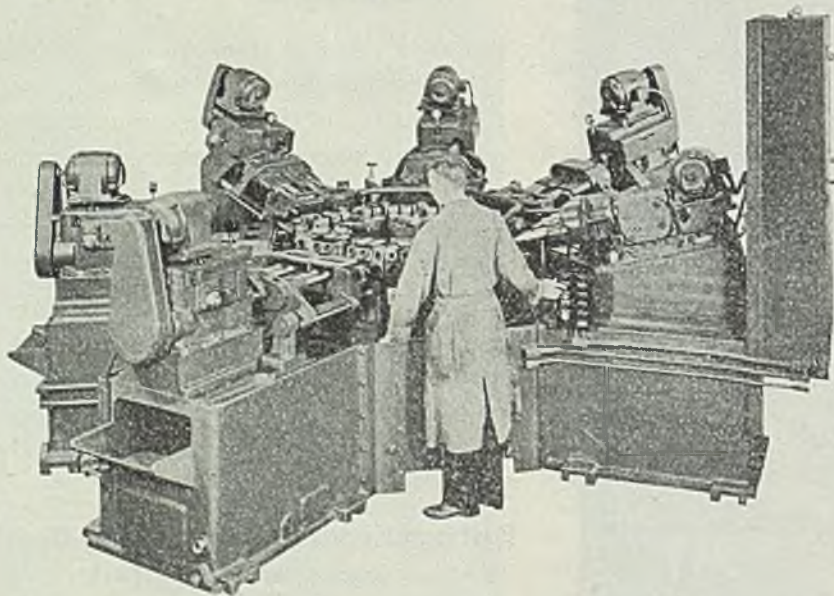
under a 0.00005-in. deposit of lead has been detrimental, and if the lead deposit is heavier than 0.0005-in. the benefit derived from the copper flash is questionable.

The data presented by Du Rose were based on deposits produced at room temperature, using a 40°Be' lead fluoborate solution containing approximately 218 g/L (29 oz/gal) of lead. Lead plating solution without addition agents have a tendency to produce treed deposits on high current density points. Du Rose brought out the fact that from the practical standpoint glue was found to be as suitable as any addition agent tested for the fluoborate bath, giving better covering and throwing power. The glue concentration was also shown to be an important factor in the corrosion protection afforded by the deposits to steel, particularly as shown by salt spray tests.

According to the corrosion tests carried out, a lead-tin alloy deposit containing 5 and 6 per cent tin exhibited corrosion protection superior to that of pure lead or to alloys of higher tin content. The lead-tin alloy deposit appears light initially and remains more uniform in color after outdoor exposure than does pure lead.

Wheel cylinders drilled, reamed, counter-bored, chamfered, tapped at one setting of

Special Purpose Machine



SPECIAL purpose machine utilizing five standard hydraulic power units and one lead screw

tapping unit has been built by LeMaire Tool & Mfg. Co., Dearborn, Mich. It drills, reams, bores,

counterbores, chamfers and taps wheel cylinders all at one setting at a rate of approximately 840 pieces an hour.

By performing all these operations while the part remains in fixed position in the fixture of the machine the manufacturer claims that greater accuracy can be achieved.

Four parts are held at one time in each fixture. These are clamped by air cylinder and released by cam rail. Brackets mounted on each end of fixture contain two bushings which nest pins on bushing plates of drill units and head of tapping unit to assure positive alignment.

Machine shown in accompanying illustration is composed of five LeMaire No. 2000 self-contained hydraulic drilling units and one LeMaire No. 150 lead screw tapping unit mounted at various angles on a base which supports a 7-station 54 in. diameter automatic index table. Cycle of operations is as follows: Station 1, load and unload; station 5, drill deep holes; station 6, combination counterbore and machine a 118° seat; station 7, tap.

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Hot Quenching In Oil

(Continued from Page 89)

desired all machining operations, including finish grinding, to be completed before heat treatment, yet had to be sure of a perfect fit without distortion or dimensional change.

By adopting the martempering process, it was found that parts could be ground to exact size then carburized and quenched. The finish grind after heat treatment, which had formerly tended to remove too much of the thin carburized case, was thus eliminated. Procedure now is to carburize at 1700° F, quench in salt at 475° F for 1½ min, air cool, then draw at 375° F. As-quenched rockwell hardness of 63-65 C was attained, which after drawing was still 60 C. Rejects were almost nil.

Where liquid carburizing is utilized, the work must be carefully cleaned and washed before they can be transferred from a cyanide-containing salt to one based on nitrates, as the two are not compatible and explosions may occur. The use of a hot oil quench, the newest addition to production heat treating, makes this cleaning operation unnecessary.

As has already been stated, martensite is not formed at any one temperature but over a fairly wide range. The purpose of martempering is to halt the transformation until there is an evenness of temperature throughout the workpiece. If cooling is stopped at a point

where only a portion of the structure has been transformed, the cushioning effect of the large amount of soft and ductile austenite will prevent setting up internal stresses, with resultant distortion and cracking.

It has been determined that martensite is only partially formed at 300° F, even less at 350 or 400° F, and that transformation is not complete (depending, of course, on analysis of the steel) until a temperature below 250° F (depending on steel analysis) is reached.

Stabilizing Quenching Medium

Therefore, if a quenching medium could be stabilized at between 300 and 350° F it would fill a useful place, particularly if oil could replace the more expensive salt-bath equipment. The problem was to find an oil which would not oxidize or sludge at continued elevated temperatures, and which would have a sufficiently rapid rate of quenching.

Although the full advantages of martempering cannot be expected at that temperature, there is a marked reduction in distortion as compared to quenching at 100 to 140° F. Therefore, in the hot oil quench, we have a compromise between conventional oil and salt results, at a low installation cost. The hot oil method may be used in a concern's present oil quenching equipment by providing a means for heating the oil and thermostatic control of temperature.

Gas burners may be installed around the outside walls, or immersed electric

heating units used. Water spray on the outside shell of the quenching tank will provide the required amount of cooling. It is not recommended that cold water pipes be immersed in the tank itself because of the danger of water leakage into hot oil, forming heavy volume of steam.

Once the oil has been brought up to heat (300-350° F is the customary range) and production has begun, little heat is required, the problem being one of cooling the tank. Adequate cooling and circulating systems with close thermostatic control should be available.

The oil itself must be of a type which has been fortified by wetting agent additions to increase quenching speed, and by anti-oxidants which will promote stability over long periods at elevated temperatures. The physicals of one such oil now proving successful, plus the results of standard accelerated oxidation test are shown in Tables I and II.

Oil baths in operation for 3 months show only 3 per cent increase in viscosity and no decrease in quenching speed.

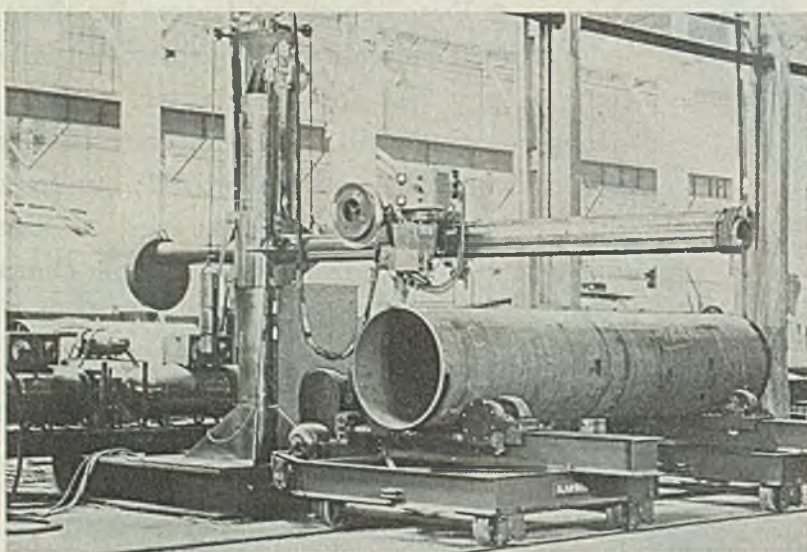
Although this martempering oil has a viscosity of about 1000 sec at 100° F, it will be noted that at the operating temperature it is very fluid (95 at 210° F), which means low drag-out and reduced consumption. Comparison of these viscosities is made in Table III.

Quenching speed of this hot oil is seen in Table IV which shows that the rate is slightly faster than for ordinary 100-sec oil in the range from 1300 to 900° F.

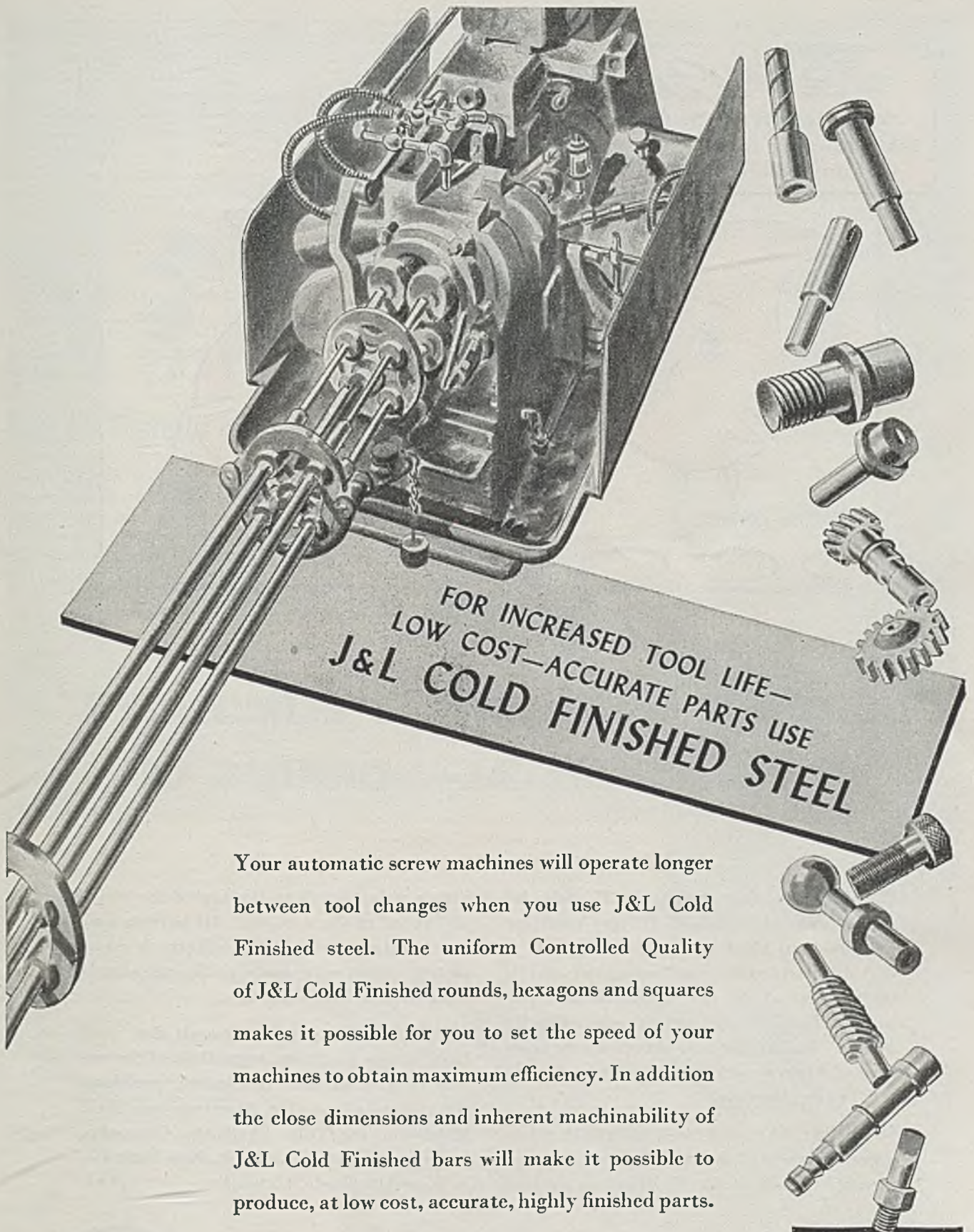
Both speed of quenching and hardness will be somewhat less than is obtained with treated oils introduced for quenching of wartime steels. But on the other hand, distortion is definitely lessened. For hardness results, reference is made to a plant test utilizing SAE 1340 spline shafts hardened in martempering oil and in 100-sec mineral oil after heating to 1550° F.

The regular practice was to follow the quench with a draw at 450° F. Before using the hot oil quench, it had been necessary to straighten each shaft to within a limit of 0.003-in. maximum. Rejects had been high. After quenching in hot oil, it was found that no cracking resulted. The greatest amount of distortion was 0.002-in., less than the limit prescribed. Hardness figures will be found in Table V.

Mention has been previously made of the advantages of oil quenching following liquid carburizing. Two examples may be cited: Portable grinder shafts 8-in. long are carburized in salt and quenched in hot oil at 350° F, with less than 0.0005-in. distortion, and a gear blank of NE 8620 steel is liquid-carburized to a depth of 0.050-in. at 1675° F,



SELF-PROPELLED TURNING ROLLS: Mounted on tracks, with automatic head in fixed position, these rolls made by Ransome Machinery Co., Dunellen, N. J., speed automatic welding of tanks and other cylindrical units at Struthers Wells Corp., Warren, Pa. Weldment is set on rolls and rotated for circular welds. For longitudinal welds, work is driven along track at desired welding speed. Circumferential speed of rollers as well as longitudinal travel of carriage is adjustable for welding speeds of 7 to 57 inches per minute



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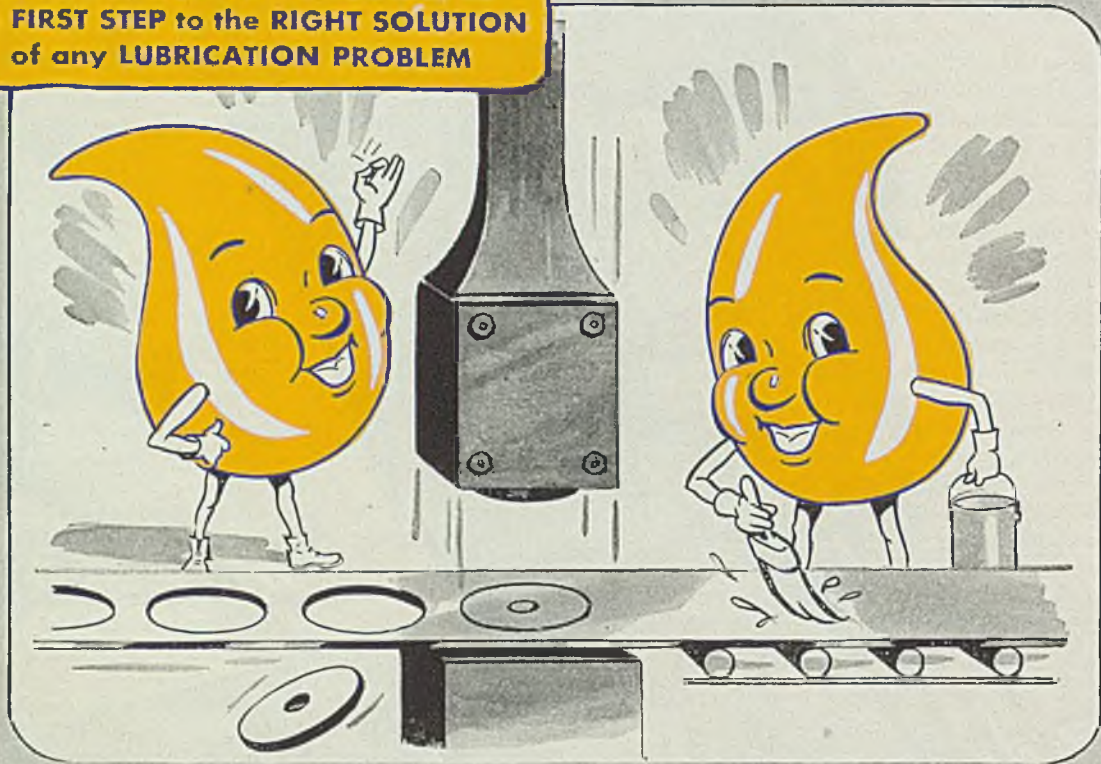
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PROBLEM: Stainless-steel strip, 3" wide, 1/4" thick (Type 4 SAE-51710), was used for simultaneous blanking and piercing butterfly valve parts with a mechanical-ram, sheet-metal press at the rate of 120 blanks per minute. *Unlubricated strip produced badly burred blanks—die was dangerously overheated.* Slower speed would solve heat problem but not burring.

SOLUTION: When the Shell Lubrication Engineer surveyed the problem he recommended a Shell Garia Oil. This was applied

with a paint brush to the top of the strip, just ahead of the stamping. All burring and overheating ceased. Manufacturer completed 60,000 valve parts, at the rate scheduled, without renewing dies.

CONCLUSION: It pays to consult the Shell Lubrication Engineer, regardless of the nature or size of your lubricating problem. Write for informative literature on Shell Metal-Working Oils. Shell Oil Company, Incorporated, 50 W. 50th St., New York 20, N. Y. or 100 Bush St., San Francisco 6, Cal.

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then quenched in oil at 350° F. Parts come out remarkably clean, cutting cleaning time a third. Rockwell hardness is 60-62 C.

Other examples will serve to point out the advantages of this hot oil quenching. A machine tool builder had a problem in heat treating guide bars about 14-in. long, varying in thickness from 3/16 to 3/4-in., and made from manganese air hardening steel. When formerly air cooled, they had to be clamped in fixtures. Now the practice is to quench in oil at 350° F, and actually less distortion is reported than when air quenched.

Samples displayed at the National Metal Exposition revealed this fact clearly.

A large machine tool manufacturer is using Mar-Temp oil for quenching various small parts, such as gears, cams and shafting and other parts which are used in the building of special high precision machines. These parts are made of the carburizing grades of steel, such as Nos. 8620, 4315 and 1020. They are finish ground to size and then carburized in a gas carburizing unit or in carburizing boxes with granular material.

The parts are quenched directly from the carburizer at 1500° F into Mar-

Temp oil at 350° F. They are held for 30 min at this temperature and then allowed to cool to room temperature. A draw is not used except for a few parts.

The shafting, gears and most of the cam shapes after this treatment are within their limits of distortion which average 0.0005 to 0.0015-in.

Thus it is apparent that with careful uniformity of heating and attention to temperature regulation, hot oil quenching will fill a needed place in heat treatment of steel, between the lower temperature oil quench and the salt quench method.

LIGHT POSTWAR GRINDERS

Have All Features of Heavier Machines

THE BROAD program of re-tooling metalworking shops for peace and competition has moved far forward in recent months because machine tool builders have had ready many new machines to meet all possible conditions as well as redesigned models which take advantage of features known to improve performance.

Cincinnati Grinders Inc., division of Cincinnati Milling Machine Co., has extended the scope of a center-type plain hydraulic grinding machine, two sizes of which were introduced during the latter part of the war, by adding two light types of the same machine, making four units in this line. The newest grinders have all the attributes and are built in the same lengths as the sizes immediately preceding them, but have extra swing capacity to accommodate a flange or projecting arm on the work. Larger illustration, below, shows a 6 x 30-in. machine. Range is from 6 to 14 in.

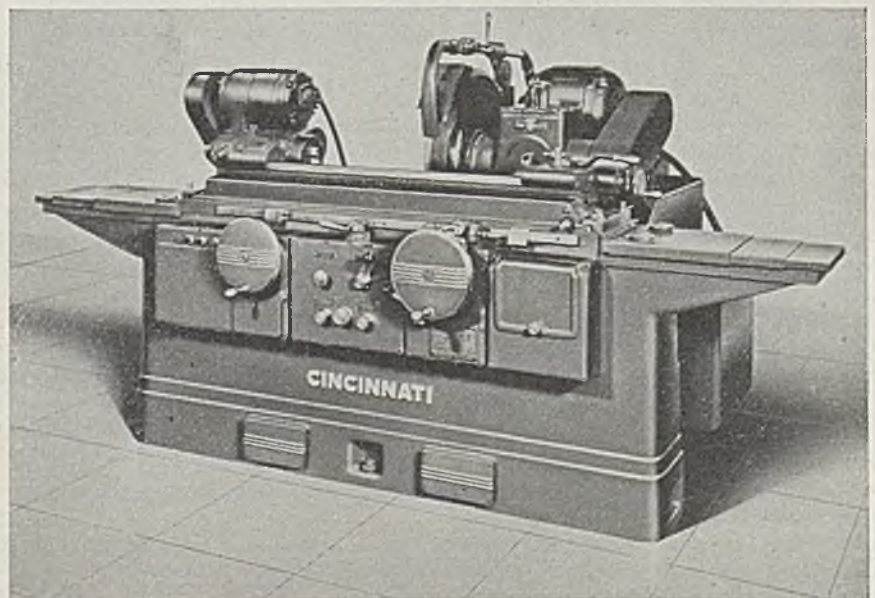
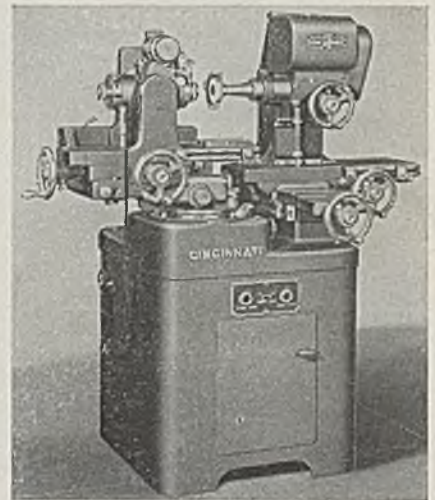
Grinding wheel spindles run on 5-segment Filmatic bearings. Tables are traversed hydraulically by an externally mounted motor-driven pump. Table traverse rates may be varied from 3 ipm for truing to more than 200 ipm. Length of table traverse and tarry at each end may be automatically controlled. Infeed or cross-traverse for wheel head is controlled from front. Headstocks for 6 and 10-in. L machines (light types) are powered by 1/2 hp ac motor. There are four spindle speeds, ranging from less than 100 to nearly 400 rpm. Headstocks for 10 and 14-in. L units are driven by 1 hp dc or variable voltage ac motor. Spindle speeds are changed by built-in rheostat. Speed ratios are about 4:1 for dc equipment and 12:1 for variable voltage. The 6 and 10-in. L machines are built in 18 and 30 in. lengths, while 10 and 14-in. L machines are built in

18, 36, 48, 72 and 96-in. lengths.

Another recently announced Cincinnati Milling Machine Co. product is the Monoset cutter and tool grinder shown in the smaller view on this page. With this unit, cutter shapes having convex or concave radii, and straight, tapered or helical teeth can be resharpened or ground from the solid. By eliminating multiple setups, cutters are resharpened quickly with excellent concentricity.

Generation of accurate radii is accomplished by large turntable base upon which is mounted the workhead. The latter swivels through 235 degrees and has adjustable stops to accurately limit its arc of travel. Built-in spiral lead mechanism provides a means of generating right- or left-hand spirals, selected by single adjustment, provided with graduated dial, without recourse to change gears, as in some machines.

Cylindrical grinding is made possible by workhead spindle motor drive. Hand-wheel control for each of three directional slides has micrometer dial for positioning grinding wheel. A 2-speed grinding wheel spindle drive assists in maintaining correct cutting speeds with different size wheels. High-speed spindle attachment for small mounted wheel provides means for accurate internal grinding operations.



FAILURE

of Autobody Sheet

... in deep drawing operations

Results in England of forming autobody steel blanks from various heats, differing only slightly in chemical makeup but widely in reaction to carburizing test for grain size, lead British metallurgist to postulation here challenged by H. W. McQuaid of Republic Steel. Control of grain size by carbide or oxide particles held of relatively remote interest

COMMENT by K. J. B. Wolfe, chief metallurgist of the British firm of David Brown Tractors Ltd., before the last annual meeting of American Society for Metals, points out the relationship between deep drawing properties of autobody sheet, its austenitic grain size and McQuaid-Ehn carburizing characteristics. With some reservations, he ascribes the splitting of the sheet on a press run—especially in intermediate forming operations on a double-action press—to the amount of carbide segregation in the ingot; that austenitic grain size and, consequently, the pressing properties of the sheets depend upon distribution of carbide particles in the product and, in addition, upon mechanical and heat treatments it receives during manufacture.

According to Mr. Wolfe, autobody sheets which possess satisfactory chemical composition and mechanical properties, yet which have poor deep drawing properties in intermediate forming, possess a large austenitic grain size. Sheets which give good deep drawing results under similar circumstances have been shown to possess a small austenitic grain size. In addition, sheets which show poor pressing properties possess a "normal" McQuaid-Ehn characteristic,

while sheets which show good pressing properties have an "abnormal" characteristic.

In conclusion, he thinks that a sheet which has a well dispersed, and consequently small sized carbide phase, will probably possess a smaller austenitic grain size than will a sheet in which this phase is not so well dispersed but is consequently larger in size.

Discussion by Mr. McQuaid*

The problem which Mr. Wolfe discusses of heats which split or act in a brittle manner in deep drawing is quite common in this country, especially in applications where requirements for deep drawing are severe. It is interesting to note that we, in this country, have been able to set up a physical test standard which can be used as a criterion for the selection of deep drawn autobody sheets. It is assumed that if a deep drawn stock has the following characteristics it should process with little difficulty on practically any deep drawing application:

Maximum Yield 23,000 psi.

* Mr. McQuaid, co-creator of the McQuaid-Ehn test, is manager, Process and Product Development Division, Republic Steel Corp., Cleveland.

Minimum Elongation 40 per cent
Maximum Rockwell B 43

These results to be obtained on a ½ by 2 in. test specimen in both the longitudinal and transverse directions. In comparing the above specifications with the physical properties which Mr. Wolfe shows, we find that only four of his heats are within the limits for maximum yield. One of these is listed as having poor drawing properties and this one would not be acceptable on the basis of a 40 per cent minimum elongation. The question of method of manufacture is important since in this country practically no sheets for these applications are furnished from other than continuous strip mill production.

Mr. Wolfe's discussion of the relative impact velocities of presses for deep drawing and Izod and Charpy test machines is interesting. His noting of the increase in impact velocity with increase in stroke and the necessity for greater die opening is important. Useful ductility of the material being formed is greatly reduced as the speed of loading is increased. In fact, under certain conditions the most ductile of steels will act as absolutely brittle members.

Many cases could be cited where soft, apparently ductile steel had acted as if extremely brittle. In the deep drawing of sheets as noted by Mr. Wolfe the load application is often at greater speeds than those of the standard impact test machine so that what we think of as a drawing operation is in reality a shock test of high velocity impact.

It is natural that he should connect the apparently radical difference in impact loading with the McQuaid-Elm test, since it has been pointed out many times that the aluminum-treated, fine-grained types are usually better as tested by the Izod or Charpy machine.

We have known for a long time that the impact value of sheets for deep drawing is a good indicator of its physical properties, but because of the difficulty in making satisfactory impact tests on this type of product very little has been done with it. The impact results are also indirectly connected with the tendency to work harden and no mention is made in this paper of the time between final rolling and subsequent use or the change in properties from the time of manufacture until the time of application.

The production of flat-rolled sheet and strip which would meet satisfactorily the requirements of the automotive world has passed through several distinct steps during the past 25 years.

When the automobile developed into volume production, the only sheet steel available was a product of the hand

(Please turn to Page 136)

AUTOMATIC MECHANICAL *Pickler*

By JOHN D. KNOX
Steel Plant Editor, STEEL

Affords from 40-60 Per Cent Savings

REMOVING scale from the surface of hot rolled bars by tumbling or rolling them in a pickling solution is being accomplished in a newly designed installation at the plant of the Superior Drawn Steel Co., Monaca, Pa.

The wooden pickling tank, 28 x 4 x 4 ft, is mounted on two concrete rails, 6 in. wide and running the full length of the vat. The rails are pitched 1/8-in. per ft to provide for drainage toward one end where a syphon can take the spent solution out over the top when necessary. No provision is made for permanent drains in the bottom of the tank thus avoiding corrosion troubles at that point.

The mechanical pickler is designed for the treatment of 5-ton loads of bars though lifts of 6 to 7 tons are being processed. Wooden bumpers are provided at intervals along the interior sides of the tank to prevent damage as the loads are handled in and out of the bath. Resting on the bottom of the tank are four triangular-shaper spreaders, as shown in Fig. 1.

Details of Pickling Machine

These spreader bars are an integral part of the mechanical pickling unit which is a product of the Youngstown Welding & Engineering Co., Youngstown, O. The unit consists of two shafts positioned one on each side of the vat just above the top edge; each carries four sheaves arranged opposite each other and spaced on the shafts a predetermined distance apart. Attached to each pair of sheaves is a chain of sufficient length to form a loop and reach to the bottom of the pickling tank. The shafts are coupled to individual speed reducers which in turn are connected through a single speed reducer to a 5-hp motor.

As a cradle of bars is lowered by the overhead traveling crane into the pickling vat, the bars are deposited on the four loops of chain, as shown in Fig. 2, just before the cradle is brought to rest on the bottom of the tank. The crane then is released for service elsewhere in the shop.

Application of power to the shafts to which the four pairs of sheaves are

Bars brought by crane to pickling tank are deposited on four loops of chain which roll or tumble them so that their entire surface is exposed to the action of the acid. Spreaders in bottom of vat aid in separating the batch of bars. Tube pickling unit now under construction

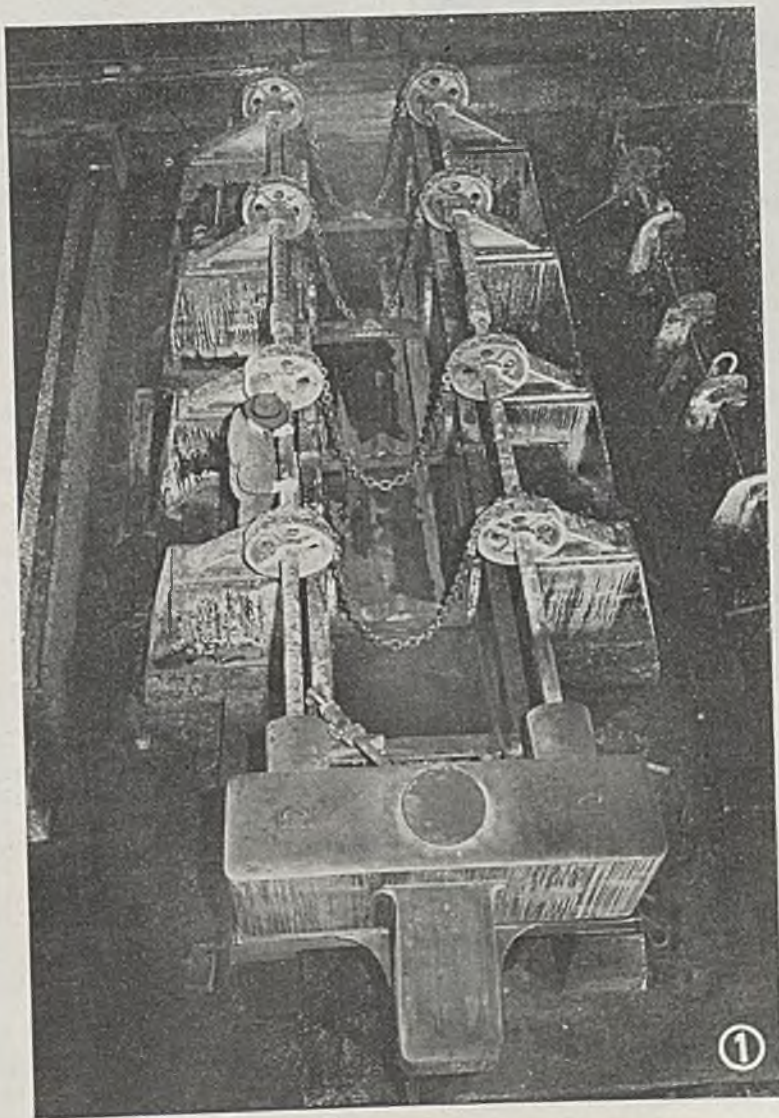


Fig. 1—Triangular-shaped spreaders installed in bottom of tank separate the bars into two batches for uniform surface exposure to acid

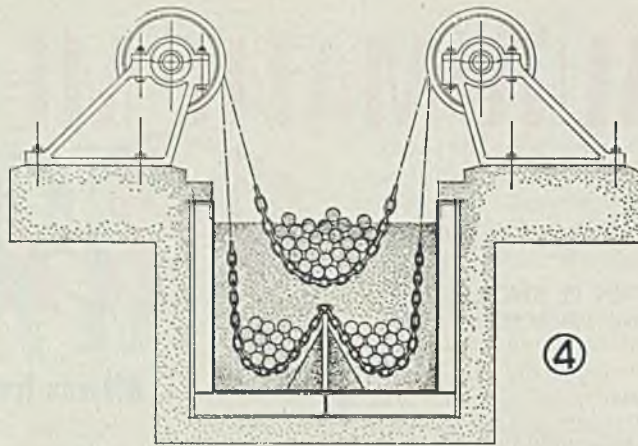
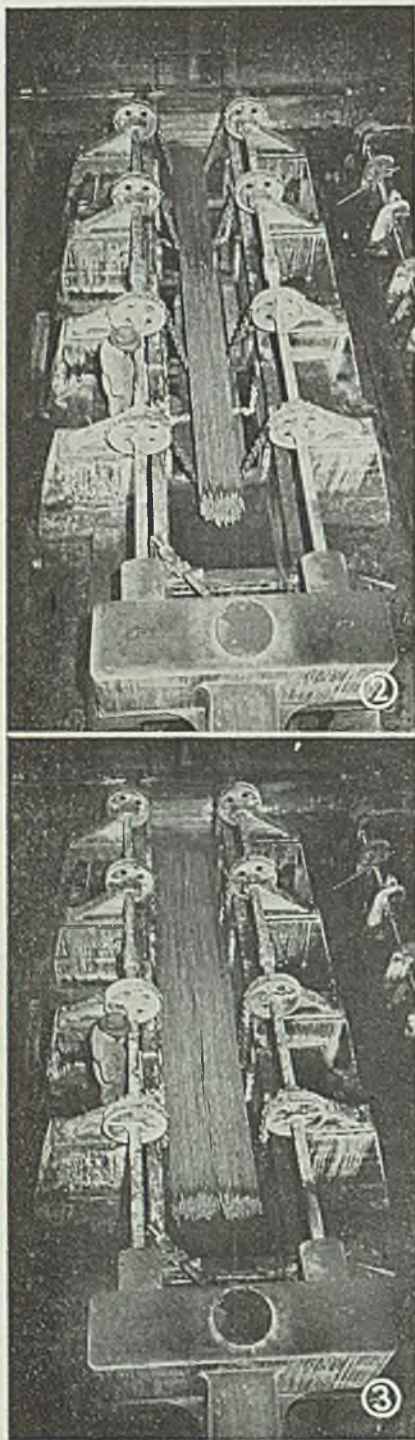


Fig. 2—Position of bars in pickling vat just before they are separated and rolled away from one another by the spreaders

Fig. 3—Bars in a spread-out condition resting on the spreader cradles

Fig. 4—Cross-sectional view of pickler showing method of tumbling or rolling the load in pickling bath to expose all surfaces of material to action of acid

keyed causes the bars to be lifted slowly by the chains above the top of the spreaders and then lowered to the bottom of the tank. This movement continues throughout the pickling cycle. On the downward course the stationary spreaders in the bottom of the tank cause the work to be divided into two piles, as shown in Figs. 3 and 4, each of which is rolled or tumbled while immersed in the pickling solution. This results in uniform exposure of the surface of each bar to the acid. A similar action occurs on the upward movement. The cycle of raising or lowering the work is regulated readily by a simple adjustment.

Temperature of the acid bath is maintained between 170 and 180°F by steam admitted to the solution at high velocity through a specially-designed nozzle. The steam expands into a bell-shaped housing, thus creating a strong suction at the rear of the bell. The pickling solution is drawn in and then expelled so that forced circulation is maintained around the tank in a continuous cycle. Moreover, the circulation and agitation keep the pickling solution at a uniform temperature throughout the length and the breadth of the vat. Details

of this jet were presented in the May 14, 1945 issue of *STEEL*, page 128.

Corrosion resisting alloy parts such as chain, bolts, nuts, sheaves, spracers, etc. are used wherever the corrosive action of the pickling solution is great, thus providing for long life of equipment in contact with acid.

The installation at Monaca, Pa. is designed for pickling rounds, flats, squares and hexagons and operation discloses a saving in pickling time ranging from 40 to 60 per cent, with resultant savings in steam, manpower and maintenance.

Units for pickling tubes similar to the one just described for pickling bars now are under construction in the shops of the Youngstown Welding & Engineering Co. and will be ready for operation in a few months.

In this particular installation the sheaves for operating the chain loops are mounted off center in order to obtain a cam effect. By this arrangement, the tubes on the upward movement emerge from the solution in a tilted position. This provides for speed in draining and produces a more vigorous pickling action on the interior of the tubes.

Long-Life Dies Use Carbide Inserts

Production of Malta carbide-inserted compacting dies with the claimed advantage of reduced wear is being undertaken by Jessop Steel Co., Washington, Pa. In one case one end of a carbide die produced over 3,500,000 pieces with no noticeable sign of wear, whereas, original production ran only 150,000, using both ends, the manufacturer reports. A better surface can be obtained on the pieces, with the elimination of lubricating difficulties, it is said.

Currently dies are being made in sizes

from 1/8-in. solid drilled dies, guides, and bushing, to 36 in. inserted drawing dies.

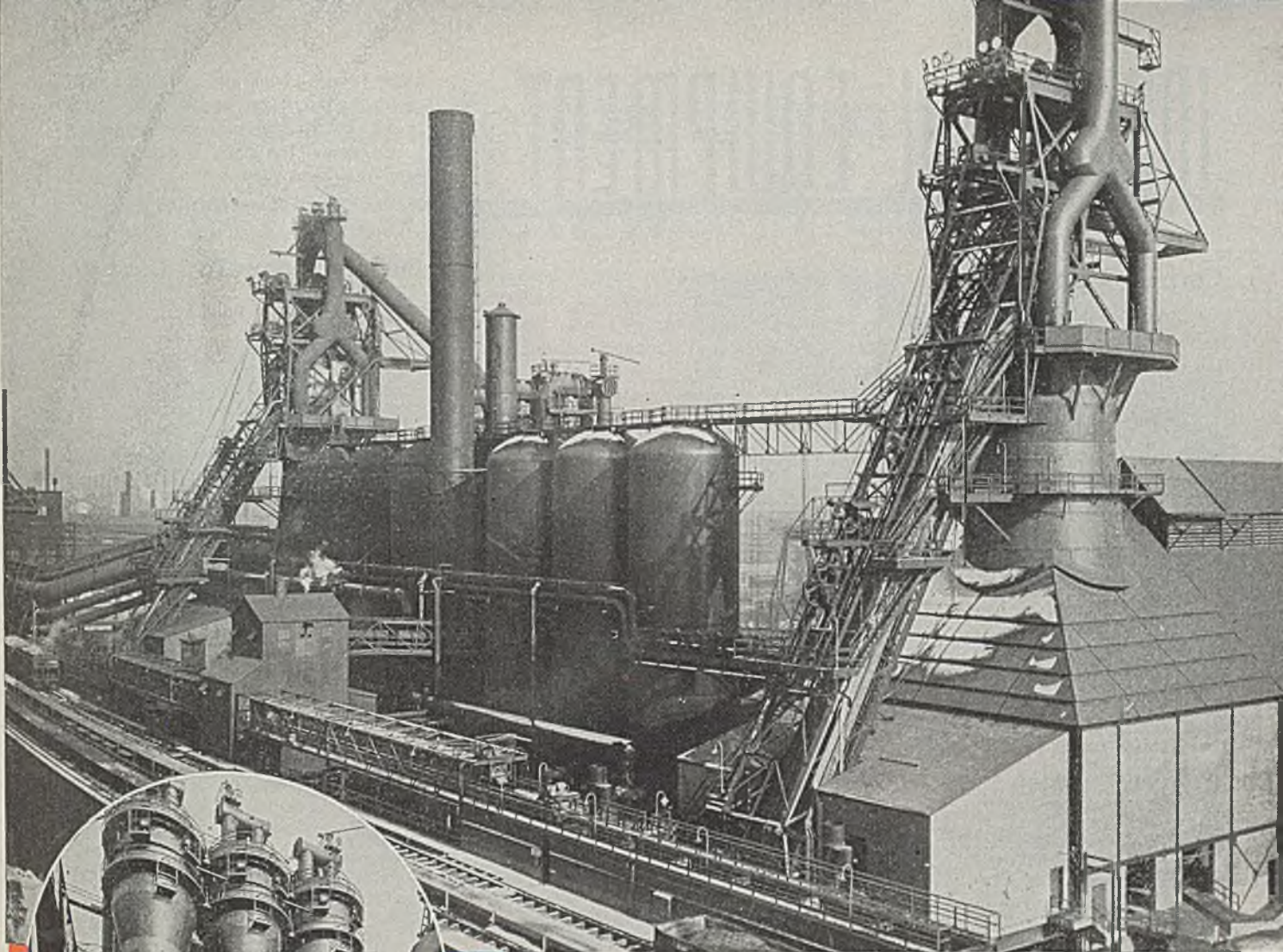
Frontier Bronze Releases Aluminum Alloy Movie

A half hour technical treatise on the new high-strength 40-E aluminum alloy is incorporated in a 16-mm sound motion picture now being distributed by Frontier Bronze Corp., Niagara Falls, N. Y. This film, called "This Is Frontier 40-E," is being handled by the advertising and sales departments.

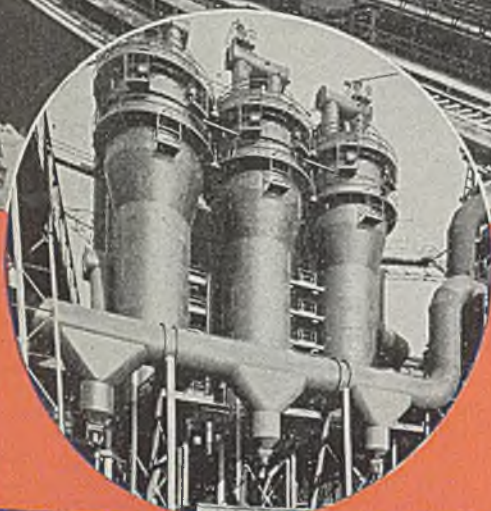
Some of the scenes were taken with

an ultra-high speed movie camera to demonstrate the shock resistance inherent in the alloy. Although taken at a speed of 3000 frames per second, these scenes are slowed down by about 200 time to permit close observation of resistance factors of the aluminum alloy by the audience.

Film is divided into three sections. The first is devoted to foundry technique and procedures, the second covers laboratory methods by which the alloy is tested and checked, including breakdown of physical and chemical properties; remainder of movie displays some applications of the alloy.



*View of complete plant showing efficient arrangement and use of space.
In Circle: Close-up of three washers with superimposed precipitators.*



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Stockhouse, showing McKee hand-operated gates.



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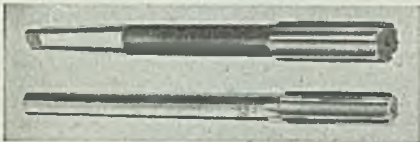
★ *Engineers and Contractors* ★

2300 CHESTER AVENUE • CLEVELAND, OHIO

INDUSTRIAL EQUIPMENT

Carbide Tipped Reamer

A solid reamer with carbide tips extending the full length of the fluted section of the tool has been developed by Super Tool Co., 21650 Hoover road, Detroit. It virtually eliminates scoring or galling, and wear on the flutes back of



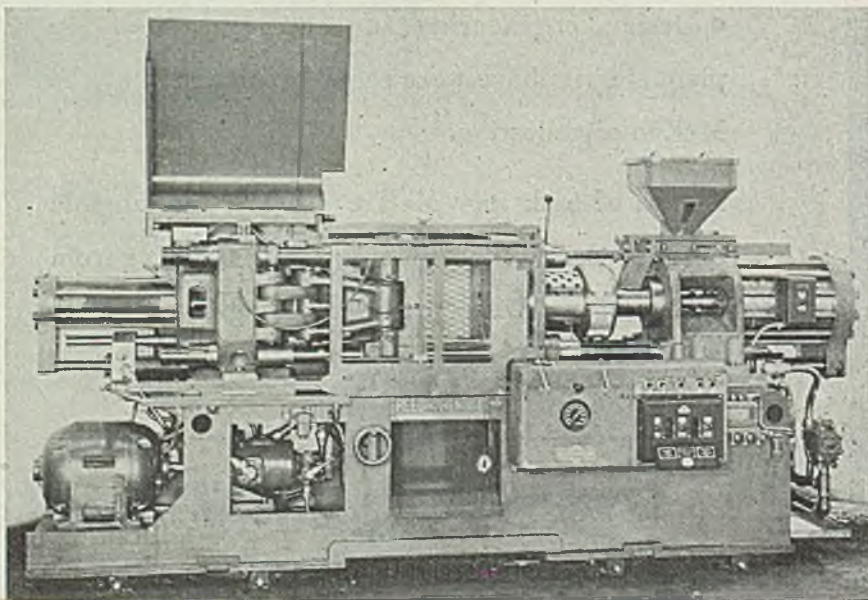
the cutting section, particularly when reaming in cast iron and other very abrasive materials.

Better finishes are obtained, as are more holes per grind. Also less time is lost in the tool room for sharpening. *Steel 4/29/46; Item No. 9338*

Plastic Molding Machine

Double shear link mechanism increasing rigidity and reducing maintenance is one of the improvements on the 6 and 8-oz capacity plastic injection molding machines announced by Reed-Prentice Corp., Worcester, Mass. A one-piece welded steel base, hydraulic piping and valves mounted outside the base for accessibility, and guards easily removed for maintenance are other improvements.

In addition, electric timing clocks in dust-tight boxes, transparent safety door



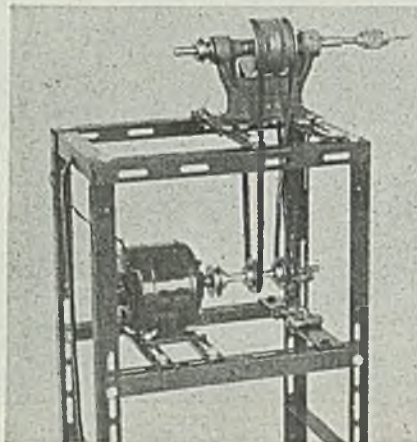
(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 130.)

windows, a plug for ease in heater disconnecting, and a means of quickly adjusting the clamp and injection units by a rack and pinion are incorporated into the design.

Steel 4/29/46; Item No. 9187

Tapping Machine

A friction drive of simple design is feature of the Star horizontal tapping machine developed by Samuel S. Gelber, 32 South Jefferson street, Chicago. A



slight pressure on work starts tap into the work by operating back driving surface, while a slight pull on work revolves the front drive surface faster to reverse tap instantly.

The machine is equipped with a $\frac{3}{8}$ -in.,

3-jaw keyless chuck along with the necessary belts, motor, toggle switch and cord. Its spindle runs in two bronze bearings, and the stand is adjustable to keep the belts tight.

Steel 4/29/46; Item No. 9188

Bumper Clamp Tow Cable

The light-weight bulldozer tow cable announced by Wire & Cable Division, Wind Turbine Co., West Chester, Pa., can be clamped on any truck instantly without tools. Sturdy jaws secured by cold-forged, rust-resisting, cable connectors are secured simply by tightening a single wing nut to a snug hand fit. Three types, with minimum breaking strength of 2000, 2700, and 8000 lb are offered.

Steel 4/29/46; Item No. 9147

Vapor Cleaning Unit

To meet demands for faster, better cleaning at lower cost, Oakite Products Inc., 32 East Thames street, New York, developed a new, multiple-duty Oakite-vapor steam cleaning unit. It is a self-contained, oil-fired, enclosed coil-type steam generator that delivers hot vaporized cleaning solutions under selective pressures up to 200 lb.

A wide range of fuel oils such as No. 1, 2 or 3 fuel oil, kerosene or gasoline may



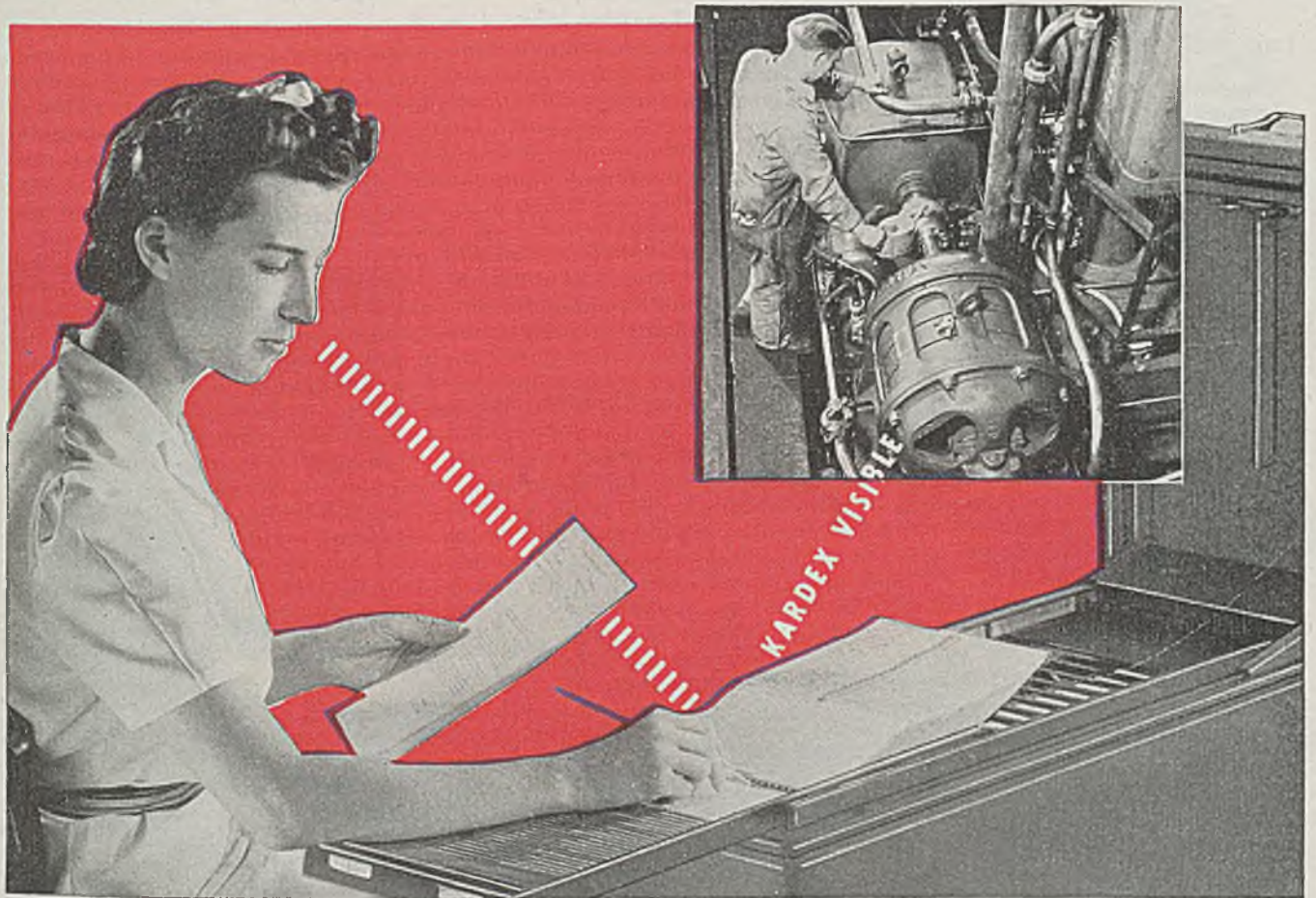
be used to operate the unit. Due to flexibility of steam pressures, unit may be used for light and heavy-duty cleaning.

Steel 4/29/46; Item No. 9150

Process Timer

An electronic process timer, designed to close or open an electric circuit for an adjustable time interval in industrial processes, is announced by Photovolt Corp., 95 Madison avenue, New York. It can be used in timing short intervals such as a few seconds or fractions of a second. Operated on 100-130 v ac current of any frequency and also on 100-130 v dc, the timer can be used in sequence timing recycling operations, in a remote-control

Keep motors running **SWEET** so production won't go **SOUR**



NORDBERG lowers Maintenance Costs with **KARDEX VISIBLE** Control

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tion of major repairs. Kardex SIGNALS the next date for inspection or preventive maintenance on each motor.

2. *Efficient rotation of inspections and tests on the basis of experience.* Kardex reveals comparative data for instantaneous reference.

3. *More efficient use of maintenance man-hours.* This is automatic because with Kardex their work can be scheduled a week in advance.

4. *The fixing of responsibility for motor wear.* Kardex reveals whether unnecessary failures are due to abuse by operators or to

careless maintenance.

5. *Reduction of maintenance costs.* This followed when Kardex gave Nordberg (a) pre-scheduling of maintenance time, (b) less loss of machine time and (c) reduced maintenance cost through *preventive inspections.*

Says Carl Lau, Nordberg Chief Electrician, "This record, so simple to operate and maintain, will rapidly repay its cost in direct savings and indirectly will lead to very large economies by preventing interruptions in production."

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SYSTEMS DIVISION

Remington Rand

315 Fourth Avenue, New York 10, N. Y.

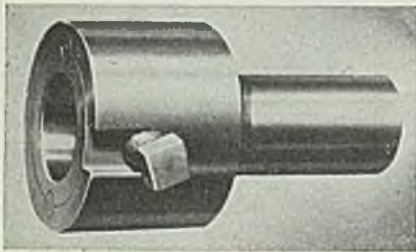
position, if desired. It is being offered in three timing ranges of 0.05 to 0.5 sec, 0.5 to 5.0 sec, 5.0 to 50 sec, as well as a double-range timer in 0.05 to 5.0 sec and 0.5 to 50 sec ranges.

Steel 4/29/46; Item No. 9136

Tap Holder

Of rugged construction designed to monitor severest tapping operations without sticking or jamming is the new draw-out style tap holder announced by Barnaby Mfg. & Tool Co., Bridgeport 8, Conn.

A small amount of float is incorporated into the design to correct any misalign-



ment in the machine, and two free-sliding cylindrical guide keys do much to assure trouble-free operation. The heavy set screw will withstand long use without stripping. All parts are precision-made and hardened for maximum service life. These new jam-proof non-releasing tap holders are offered in three sizes, with shank diameters of $\frac{3}{8}$, $\frac{1}{2}$ and 1 in.

Steel 4/29/46; Item No. 9216

Industrial Trucks

Designed for convenient loading and handling of coil steel and carboys, two new trucks are announced by Palmer-Shile Co., 796 South Harrington avenue, Detroit.

Coil steel is rolled into the rear loading end of truck, a 1-in. dip in floor



holding it in place. The all-welded truck has heavy channel side members, one 2 x 6 in. steering caster and two 2 x 8-in. roller bearing wheels. Weight is approximately 250 lb.

Automatic loading of carboy truck is attained by merely rolling truck up

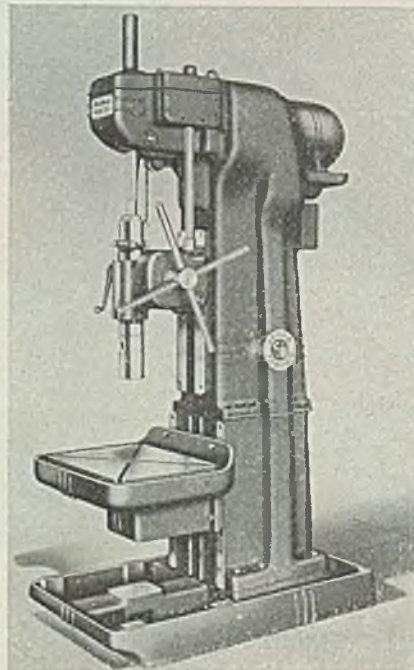
against carboy and dropping gripping yoke over the top, the hardened steel studs on truck frame holding it in place. Unloading is by tipping truck forward and releasing gripping yoke.

The overall width of this steel truck is 20 in., permitting passage through narrow doors and crowded aisles. It is equipped with two 2 x 8-in. roller bearing wheels. It has a capacity of 500 lb although it weighs only 75 lb.

Steel 4/29/46; Item No. 9214

Upright Drill

A new line of general purpose upright drilling machines is announced by Cincinnati Bickford Tool Co., 3228 Forrer street, Cincinnati, O. These ma-



chines, built in 21, 24 (illustrated), and 28 in. sizes, have driving motors from 3 to 10 hp with speeds of 1200 rpm, unless higher or lower speeds are desired.

Motors have magnetic reversing starters unless no tapping or spindle reverse is contemplated. Sixteen speeds and eight feeds are available without major changes through pick-off gears in top of machine.

Chrome-nickel, multiple-splined spindle is mounted on anti-friction thrust-radial-bearings. Spindle and sleeve are counterbalanced by an easily accessible weight inside machine column.

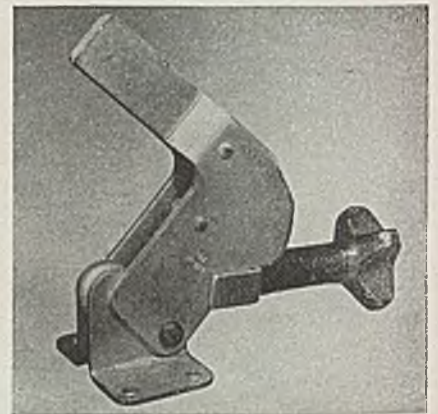
For use on certain materials a cutting lubricant system is offered, as are an adjustable automatic tapping reverse arrangement and a dwell attachment. Table is of adjustable type with hand

crank screw. Machines are also offered in 2, 3, or 4-spindle gang drill construction.

Steel 4/29/46; Item No. 9339

Toggle Clamp

A toggle clamp adjustable to any dimension by a quick turn of the handle, is announced by Mechanics Engineering Co., Box 243, Jackson, Mich. Called the Mech-Master, it features a clamping range of $22\frac{1}{2}^\circ$ above horizontal to $22\frac{1}{2}^\circ$ below horizontal. No bolt retainer and hold-down is needed. A threaded adjust-



ing handle permits pressure to be applied anywhere within the 45° arc.

Two models are offered, having a clamp bar reach of $2\frac{1}{2}$ and 3 in., a vertical clamp bar clearance of $2\frac{1}{2}$ and 3 in. horizontal position, and base dimensions of $1\frac{1}{4} \times 2\frac{1}{4}$ in. and $1\frac{3}{4} \times 2\frac{3}{4}$ in.

Steel 4/29/46; Item No. 9120

Soldering Iron

An automatic-feed electric soldering iron is being introduced by Multi-Products Tool Co., 123 Sussex avenue, Newark, N. J. Called the Eject-O-Matic, it is trigger operated, ejecting a meas-



ured amount of solder from a reel concealed in the handle.

A retracting feature prevents melting of excess solder on the heating tip, actual amount deposited being regulated by a micrometer adjusting wheel in the

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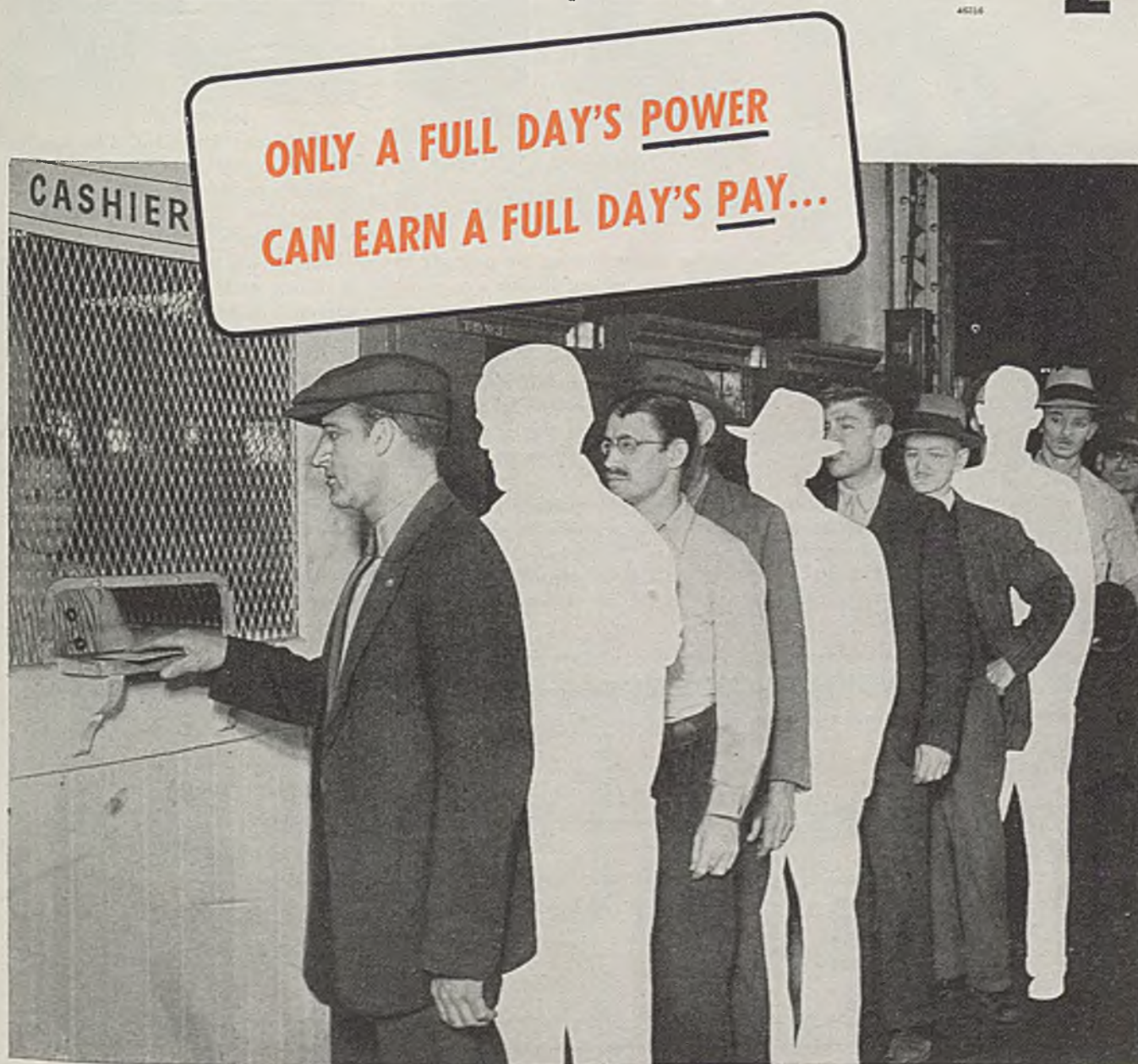
For, when power fails, the productivity of the most ambitious, the most conscientious,

the most skilled workmen you have must drop accordingly.

Talk over your wiring problem *now* with your plant power engineer, your consulting engineer, electrical contractor or power salesman. It may save expensive alterations later.

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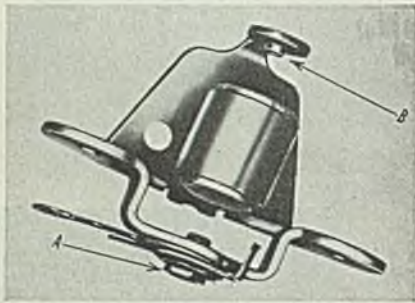
handle accessible to operator's thumb. A trigger extension is available to enable the operator to work the iron on the stand leaving both hands free to hold the work.

Steel 4/29/46; Item No. 9138

Jewel Bearing Assembly

A new type of jewel bearing assembly for D'Arsonval type instruments is announced by Marion Electrical Instrument Co., Manchester, N. H. It is composed of metallized boro-silicate glass, V-jewel induction soldered into place with special equipment.

Bearing assemblies simplify line procedure, eliminate a number of tedious



assembly operations, yet permit jewels to be positioned with great accuracy. Overall size of the bearing assembly is considerably decreased, and fabrication made more simple.

Steel 4/29/46; Item No. 9154

Renewable Switch

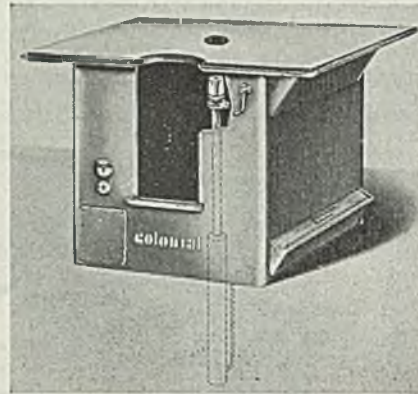
A new 15-amp 110 v ac renewable switch for either motor or restrictive loads is now offered by Robert Hetherington & Son Inc., Sharon Hill, Pa. It has two flat studs which protrude out the back

and which slide between two contact bars built in the back of a cradle. The front of switch slides down through a slot in the front of cradle, which is attached to any flat surface by counter sunk screws. The complete switch is slightly over 3/4-in. long.

Steel 4/29/46; Item No. 9249

Broaching Machine

A utility pull-down broaching machine is announced by Colonial Broach Co., Detroit. Its primary purpose is to handle



large work, eliminating the necessity of special work-holding fixtures.

With machine's horizontal platen, large bulky parts can be slid onto the table and manually positioned without other support. Broach is pulled through work by a hydraulic pull-mechanism which extends 36 in. below the floor. The machine automatically stops at completion of stroke.

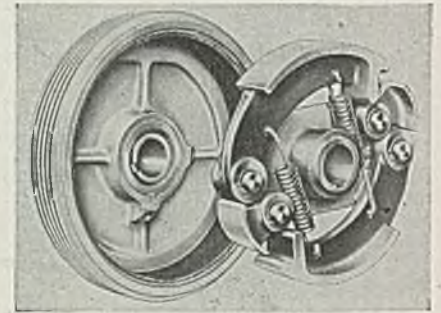
All operating mechanisms are concealed within the base where an opening provides for chip disposal. Machine illustrated is of 4-ton capacity with 30 in. stroke. It requires a floor area of only

42 x 65 in. Table measures 24 x 60 in. and is 48 in. above the floor.

Steel 4/29/46; Item No. 9145

Automatic Clutch

To eliminate the sudden shock of starting machinery or moving equipment, an automatic clutch has been developed to be installed directly on the shaft of any engine or electric motor. Manufactured by Salsbury Motors Inc.,



4464 District boulevard, Los Angeles, the device, by centrifugal action, progressively applies the power to the driven machine, engaging and disengaging without human control.

This clutch permits complete disengagement while idling and positive engagement when driving, with no possibility of slippage. Elimination of overload stresses while overcoming inertia is also attained.

Two models—one for the range from fractional to 3 hp, and one for up to 6 hp are available. V-belt or flat belt pulley, gear, sprocket, coupling, or a variable speed transmission drive can be mounted on the shaft. The 3 hp model has a drum diameter of 7 1/4-in. and length of 4 1/2-in.

Steel 4/29/46; Item No. 9203

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:

9338	9136	9138
9187	9216	9154
9188	9214	9249
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9150	9120	9203
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Uniform Forging Characteristics from

If any one reason for preferring Timken Alloy Forging Steels stands out in the minds of our customers more than any other, it is *uniformity from one lot to the next*.

This means consistently good behavior in forging, fewer delays, fewer rejects and better quality in the finished product.

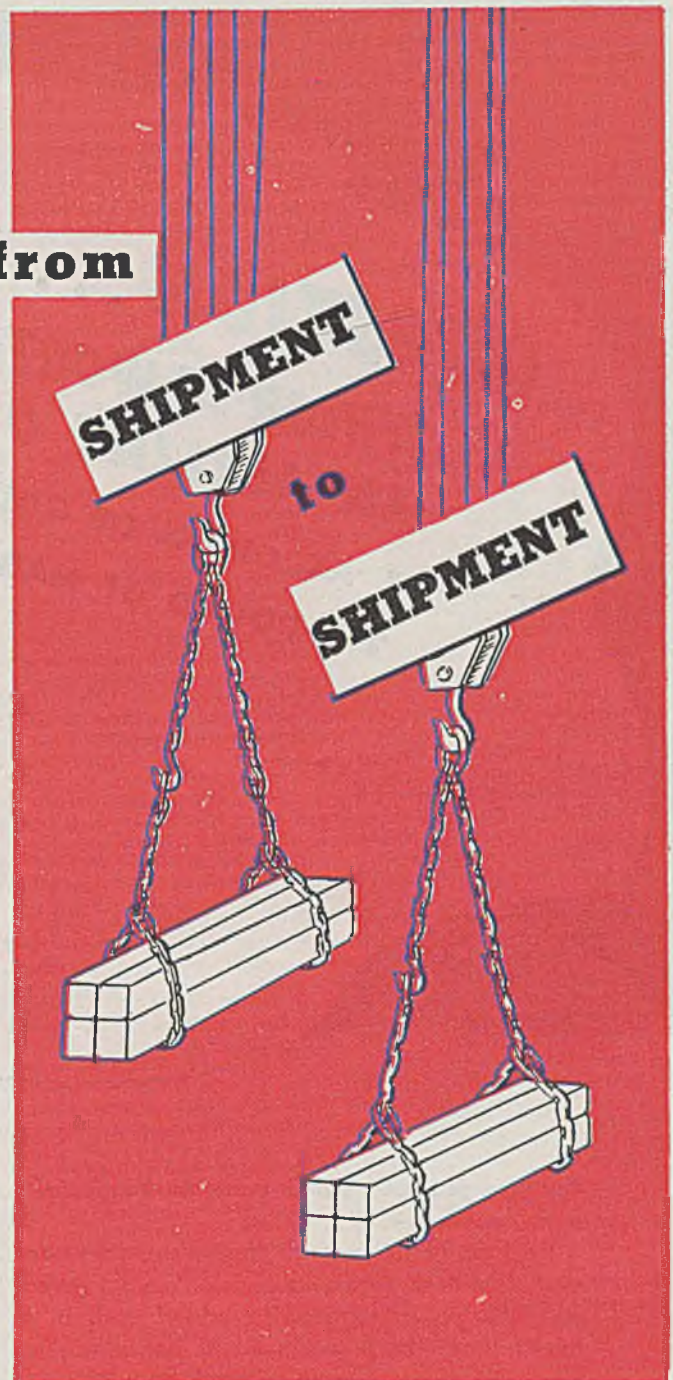
The uniformity of Timken Alloy Steels comes from special practices, many of which are practical only in a large flexible specialty mill.

It comes from the particular skill which metallurgists and workmen develop through years of concentration on alloy steels exclusively.

It comes from the most precise control methods known to steel making.

And it comes from leadership in research which has paced the new developments of the industry for many years.

A member of our Technical Staff will be glad to give you the benefit of our experience in recommending an analysis for your particular application. Our 72 page book, "Evaluating the Forgeability of Steels" may prove helpful. Write Steel and Tube Division, The Timken Roller Bearing Company, Canton 6, Ohio.



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SPECIALISTS in hot rolled and cold finished Alloy Steel Bars for forging and machining applications as well as a complete range of Stainless, Graphitic and Standard Tool Steel analyses; also Alloy and Stainless Seamless Steel Tubing for mechanical and pressure tube applications.

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Payload is the pay-off in the airline operator's business. A pound of dead weight saved means a pound of payload added and, in a year's time, that's worth \$100 per plane to him*. An ounce of gold is worth only \$35.

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Whether you're moving materials, have products

that must be moved, or machines with moving parts, you can doubtless employ American Magnesium products to similar advantage. Our engineers will gladly help you determine where and how.

Then, get in touch with American Magnesium for dependable magnesium castings, forgings, shapes, and sheet. Call the near-by Alcoa office, or write:

Aluminum Company of America, Sales Agent for American Magnesium products, 1721 Gulf Building, Pittsburgh 19, Pennsylvania.

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MAGNESIUM



PRODUCTS

AMERICAN MAGNESIUM CORPORATION

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Metal Preservation

(Continued from Page 92)

the finish will extend necessary docking intervals to more than 5 years in salt water and to about 15 years in fresh water. Experiments are now under way with DDT in antifouling paint but results so far indicate that it works well against fouling by barnacles and other animal life but is not effective against marine vegetable growth.

Sides of the hull above the water line, decks and upper works which show rusting are thoroughly cleaned and touched up with two coats of zinc chromate primer (Formula 84, Navy Department Specification 52-P-18). A third coat is applied to plate edges and weld beads. Entire surface then is finished with two coats of haze gray paint.

For guns larger than 20 mm, gun directors and the like, the Navy has developed two types of protective shelters. One of these is a vinyl resin plastic known as OS 3602 which may be sprayed on a scotch tape framework. The other is a prefabricated sheet steel shelter which ultimately may be adapted for protecting all topside gun mounts and directors. The metal coverings for gun directors are of the inverted wastebasket type and those for gun mounts are half spheres. Six sections prefabricated from 16 to 24 gage sheets are required for twin 40 mm guns and eight for the quads. Sections are bolted together and sealed by means of gaskets, sealing compound and a sprayed-on "Liquid Envelope" plastic coating. Edges in contact with the deck are flanged to permit fastening.

Preparing Equipment For Coating

In preparing the equipment for OS 3602 coatings, all sharp corners are padded, a steel base ring is tack welded to the deck and a scotch tape framework vertically and horizontally is built up. The basic material, OS 3602 as developed by the Navy, is vinylite chloride plus vinylite acetate and ordnance oil. When mixed with a webbing solution in the ratio of 4 to 1, this plastic leaves the spray gun in long spidery threads which quickly bridge the openings in the scotch tape framework to form a complete covering. It is applied at a distance of 3 to 4 ft and pressure of 30 to 40 lb at the gun.

The web-coat is followed by four coats of OS 3602 brought to a wet spraying consistency by the addition of a thinner (methyl ethyl ketone) or a retarder (methyl isobutyl ketone), depending upon the temperature. The retarder usually is used when temperature is above 85° F. First of these coatings is dyed yellow, the second red and the third blue for the purpose of providing un-

mistakable visual evidence as to when each individual coating has been completed. A fourth and final coating is made up by adding 6 oz of aluminum paste per gallon. These four coatings are applied at a distance of 6 to 8 in. and gun pressure of 60 to 80 lb.

Port openings are provided in both the metal and plastic shelters so that silica gel may be placed inside to reduce moisture content to a minimum of 30 per cent. One charge of silica gel lasts about 6 months in maintaining relative humidity at 30 per cent or lower. Cost of the vinylite material is about \$2.50 per gallon or about 40 cents per sq ft of area covered. Mobile spray unit costs between \$450 and \$500 and two men can enclose a 3-in.—50 cal. gun in about 6 hr.

Air Circulated Through Ducts

In the case of larger gun turrets, dry air is circulated through ducts from the interior of the vessel. A small portable machine utilizing alternate layers of silica gel and activated alumina also has been developed by C. M. Kemp Mfg. Co., Baltimore. This unit is capable of removing 5 lb of water a day.

Dehumidification of ship interiors is accomplished through the use of automatically controlled machines. These machines have two beds of desiccants, either silica gel or activated alumina. Silica is made by treating sodium silicate with sulphuric acid and in a dry state closely resembles rock salt. It has a remarkable affinity for moisture, adsorbing up to a third of its own weight. It may be readily reactivated by drying at a temperature of about 300° F. One cu in. of the material has about 50,000 sq ft of moisture holding surface. Activated alumina also is an effective adsorbent, consisting essentially of aluminum trihydrate.

The machines are fitted with blowers which take the air from the ship, drive it through one of the beds of desiccant and return the dry air to the lower levels of the ship through specially installed duct work, portable spiral wound flexible ventilation hose or fire mains. Usually a combination of all three is employed. When the bed in use is saturated, the path of the air through the machine is automatically shifted to the other bed. The first bed then undergoes reactivation by heating with electric heater elements and driving the moist air to the outside.

The machines are controlled automatically by a temperature and humidity recorder-controller made by the Friez Instrument Division, Bendix Aviation Corp., Baltimore. Eight control humidistats are located at strategic points. The controller-recorder averages the humidity

readings of all stations and starts and stops the dehumidifier at the average demand rather than the demand of any single control station. Temperature and humidity at each of the eight stations is recorded on a tape every 15 min.

For smaller vessels, one installation usually is sufficient. Larger vessels are divided up into zones, the cruiser Brooklyn, as one example, having three zones. The battleship Idaho has six. Cost of maintaining 30 per cent humidity averages less than 20 cents per 100,000 cu ft of space per day at a power cost of 1 cent per kwh. Cost of preserving a destroyer escort with about 160,000 cu ft of space thus is only about 32 cents a day. Initial cost of equipment ranges from 1/3 to 3/4-cent per cu ft. Two sizes of machines are specified, one with a capacity of about 400,000 cu ft and costing \$1300 and the other with a capacity of 150,000 cu ft and costing \$1000. Suppliers of the machines include the C. M. Kemp Mfg. Co., Baltimore; the Pittsburgh Lector-Dryer Corp., Pittsburgh; Cargocaire Engineering Corp., Seattle; and the Davison Chemical Corp., Baltimore.

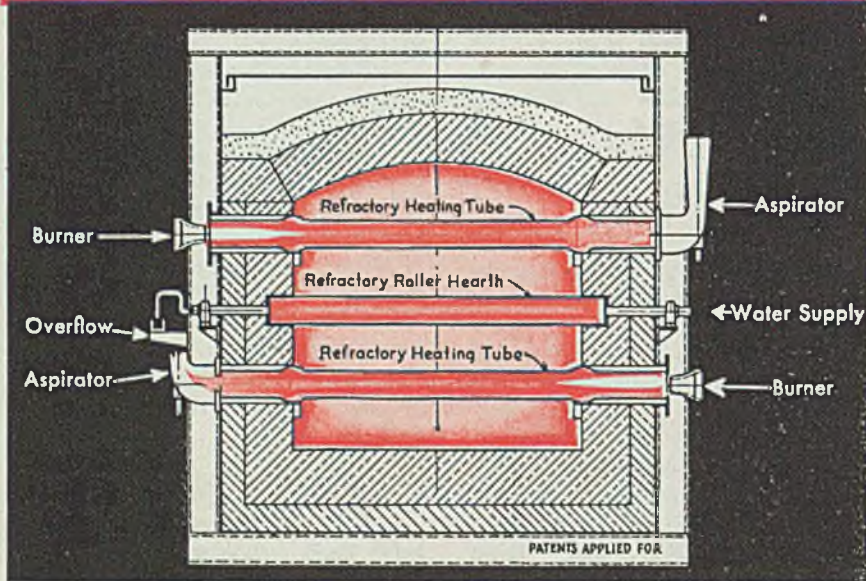
Servicing Areas Below Deck

It is difficult to service certain areas below decks such as water, ballast, gasoline and alcohol tanks and chain lockers. These areas are dehumidified by perforated metal containers of silica gel called "desicans" holding about 5 lb of silica gel and capable of handling 175 cu ft of space during the initial drying period. After humidity has been lowered to 30 per cent, one can will serve 525 cu ft of space. Special electric ovens are made for reactivating these cans but armature or core drying ovens may be used.

The 30 per cent humidity figure was determined after extensive tests at the Philadelphia yard in which materials were subjected to humidity at 15, 30, 45, 65 and 90 per cent, respectively. There was no discernible difference in bright steel samples at 15 and 30 per cent and only slight discoloration at 45 per cent. In order to provide a margin of safety, the Navy settled on 30 per cent. It is not necessary to control temperature closely.

All corrodible surfaces not protected by paint, galvanizing or plating are given additional protection through the application of thin film rust preventive compounds which must meet Navy Specification 52-C-18 on a performance basis. These are essentially a combination of paraffin wax, litharge and sulphonated oil with a solvent of the light kerosene type which permits distribution over the surface by spraying, fogging, dipping or brushing. The films may be readily re-

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moved by any hydrocarbon solvent but such removal is not necessary when placing equipment back in service.

Grade I analyses about 45 per cent paraffin wax and litharge and 55 per cent kerosene. It provides a film about 0.002-in. thick and one gallon covers 800 to 1000 sq ft. It is the heaviest grade and is intended for use on ferrous and other metal surfaces exposed to the weather, as well as for certain applications below deck. It must be reapplied after 1 year when exposed to weather and 2 years when under cover. Cost is 97 cents per gallon. It is soluble in fuel oil and diesel oil.


Grade II is made up of about 35 per cent wax or wool grease and 65 per cent kerosene. Film thickness is 0.001-in. and coverage averages 1000 to 1600 sq ft per gallon. It is used on corrodible metal surfaces where undercover storage is provided, on interior and exterior surfaces, except where Grade III is specified. It requires reapplication in about 2 years. Cost also is 97 cents a gallon. It is soluble in fuel, diesel and lubricating oils.

Compound 75 Per Cent Kerosene

Grade III comprises 25 per cent wax or wool grease and sulphonated oil, plus 75 per cent kerosene. Film thickness is only 0.0003-in. but it will cover 8000 to 16,000 sq ft. This compound is intended for corrodible metal surfaces which are normally in contact with water or steam. Included are interiors of boilers, turbines, piping, and water jackets. The compound displaces residual moisture, forms an emulsion with the water and lays down a protective film. In placing equipment back in service, the compound emulsifies with steam or water and may be readily flushed out. Cost is 71 cents a gallon.

All of the preservation work is carried out under direction of key personnel, including officers and enlisted men, trained at Philadelphia and San Diego. Three courses of instruction are given. One has as its purpose the training of officers for general administrative and advisory duties. The second is for training enlisted and civilian personnel in specific methods and procedures but includes only a minimum of instruction on application of strippable film OS 3602. The third is a specialists course in application of OS 3602. Courses convene every Monday and last 10 days.

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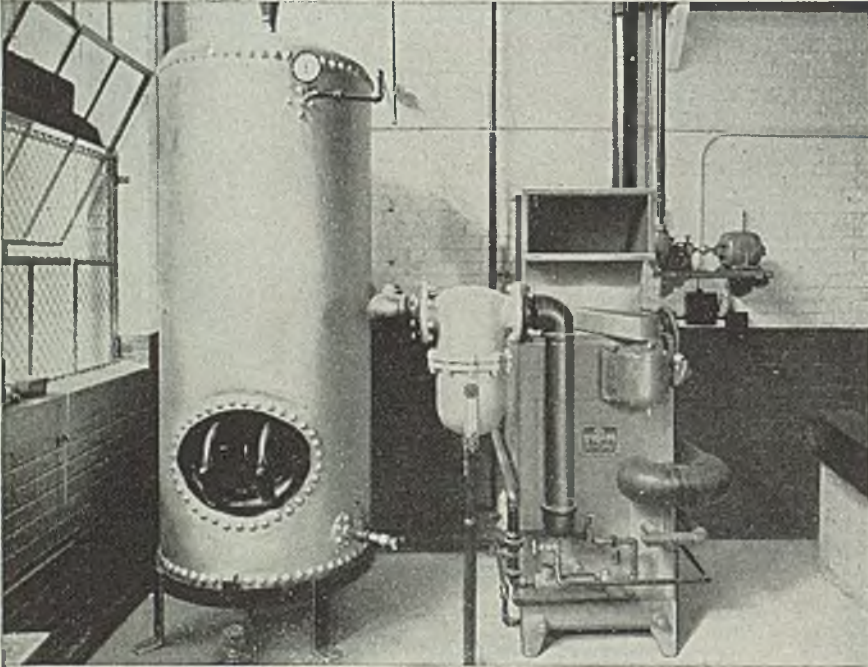


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Failure of Autobody Sheet

(Continued from Page 122)

mill which was hot-rolled in packs which were semi-welded together so that considerable effort was required to separate the sheets in their final form. It was necessary in order to facilitate the opening of the hot-rolled pack that the phosphorus content of the steel be high by our present standards, but with the advent of the charcoal dip the surface adherence decreased to a point where it was possible to reduce the phosphorus content with improved ductility and surface.

The first real improvement in the pro-

AUTOBODY STEEL

The term autobody steel, as used by Mr. Wolfe, is applied to low carbon steel sheet and strip. Width of such material is usually greater than 36 in., and is 0.036-in. thick, though occasionally thinner sections are used. The surface is highly polished so that it can be painted to give a glossy appearance. It is now generally manufactured in England and the United States in the form of strip by a heavy cold reduction process, followed by a low temperature annealing operation.

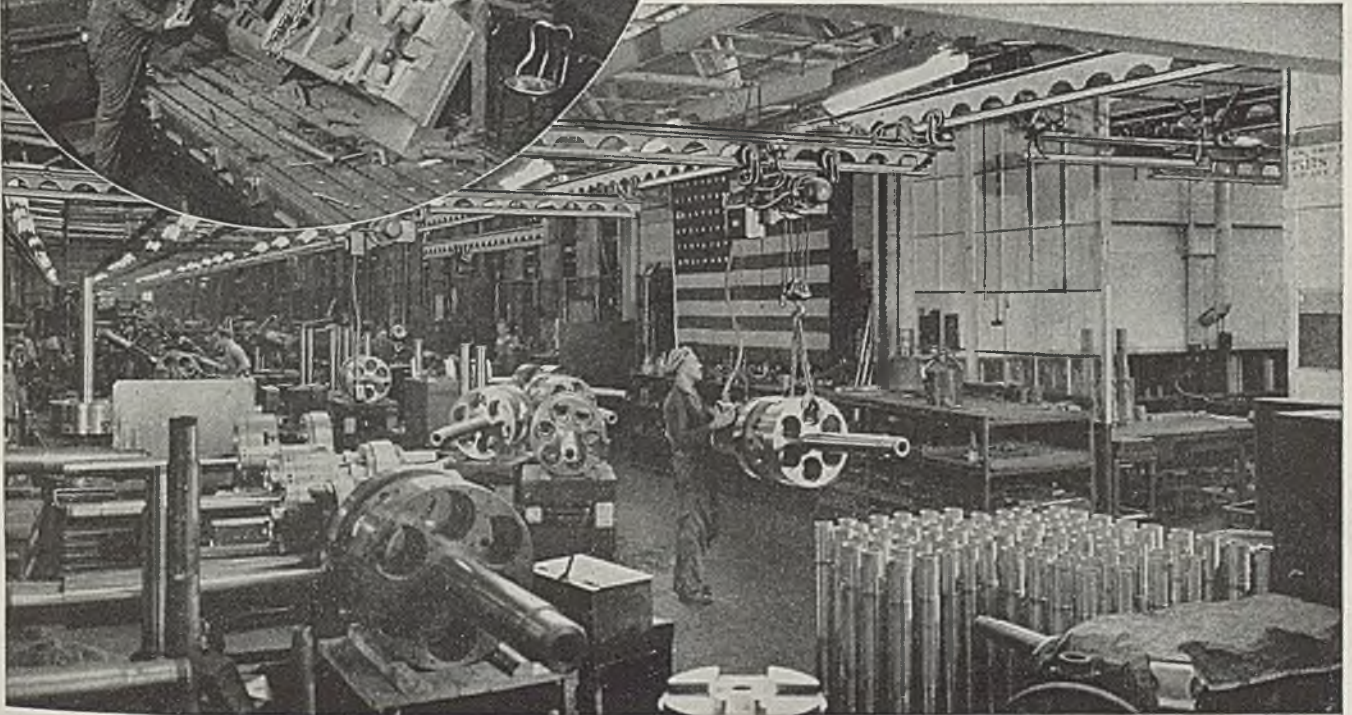
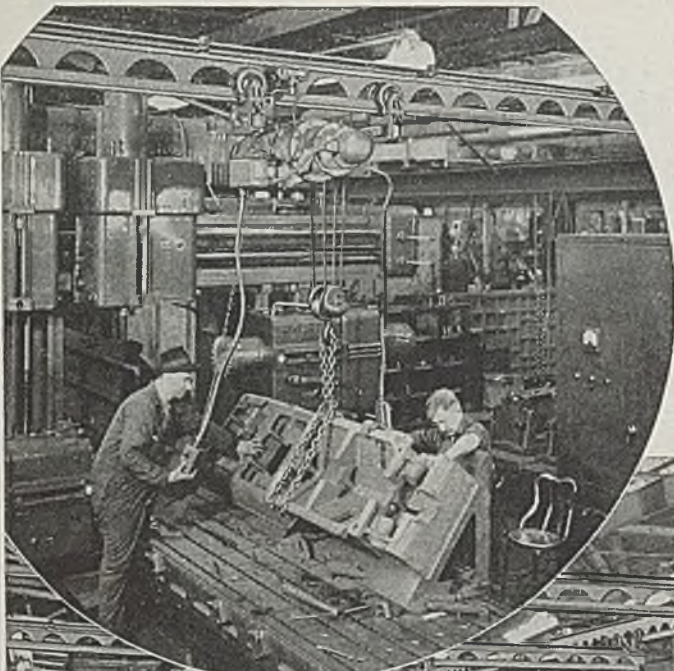
Usual range of chemical composition is as follows: Carbon 0.02-0.08 per cent; silicon, trace—0.05; manganese 0.25-0.35; sulphur 0.01-0.04; phosphorus 0.01-0.04; and nickel, trace—0.10 per cent.

duction of deep drawing cold-rolled steel by the hand mill process was in the introduction of the normalizing operation in 1925. This permitted the production of uniform grain structure and a marked reduction in the tendency to embrittlement due to subcritical annealing after cold working in certain ranges.

The next basic improvement was the introduction of continuous rolling equipment which resulted in greatly increased reductions and eliminated the necessity of normalizing by cold working beyond the range resulting in grain growth on subcritical annealing.

The third important step in the improvement in cold-rolled steel for extra deep drawing was the change from the rimmed steel practice to the so-called stabilized full aluminum-killed practice. In this practice the aluminum was added not only for complete deoxidation but in sufficient quantities so that there

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Because Cleveland Tramrail is a big factor in lowering production costs and improving safety, many installations of it are scattered through the large plant of The National Acme Co., Cleveland, builder of fine machine tools.

Safety is stressed so strongly that cranes are installed even where needed only two or three times a week for handling parts weighing only 75 to 150 pounds. This has resulted in the reduction of hernia cases, smashed fingers, toes, by a large percentage. National Acme officials explain that a man may be able to lift 150 pounds regularly, but in some positions it may be harder and more dangerous for him to lift 75 pounds.

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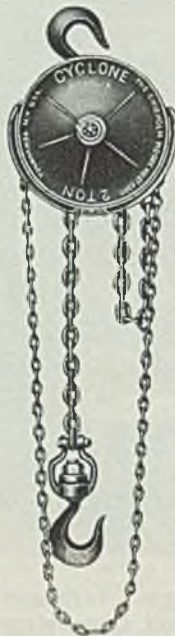
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was an excess of metallic aluminum in solution in the ferrite.

A great deal of thought has been given in this country by some of us to the primary requisite for steel which will satisfactorily deep draw. We believe that one of the first requirements is as near uniform properties in all directions as possible. This means the minimum tendency to band and the proper distribution of carbides in the ingot as cast and in the sheet as finally rolled. It is my belief that in any steel which has as low carbon as is usual in deep drawing sheets, every effort should be made to insure that any boundary carbides present have a strong tendency to spheroidize. In other words, every effort should be made to prevent intergranular envelopes of carbide around the as-rolled ferrite grain.

Abnormal Type Steel

The characteristics of steel below 0.10 per cent carbon depend, to a great extent, upon the method of making the steel and the subsequent treatment. With the usual sulphur and nitrogen content it has been found that the addition of aluminum in quantities of 1 lb per ton or more has a very marked effect on breaking up of the continuous network of the grain boundary so that on carburizing it naturally follows that this type of steel would be of the so-called abnormal type. By abnormal we mean that when a steel has added to it enough carbon to form a hypereutectoid composition, upon slow cooling from 1700° F (925° C) the excess will form envelopes which will be precipitated from solution at a high enough temperature so that resistance to coalescence is greatly reduced.

The slow cooling which takes place in the carburizing compound permits the carbide precipitation and coalescence to take place readily so that the result is a boundary consisting of excess ferrite and coalesced or semispheroidized carbide. In the "normal" type of steel the precipitation of the carbide takes place at a definitely lower temperature at which coalescence is restricted by the more rigid ferrite so that the carbide envelope tends to be continuous with little indication of free ferrite.

Very little work has been done on the actual relation between the carbide distribution in the very low carbon steels and their ability to distribute suddenly applied loads.

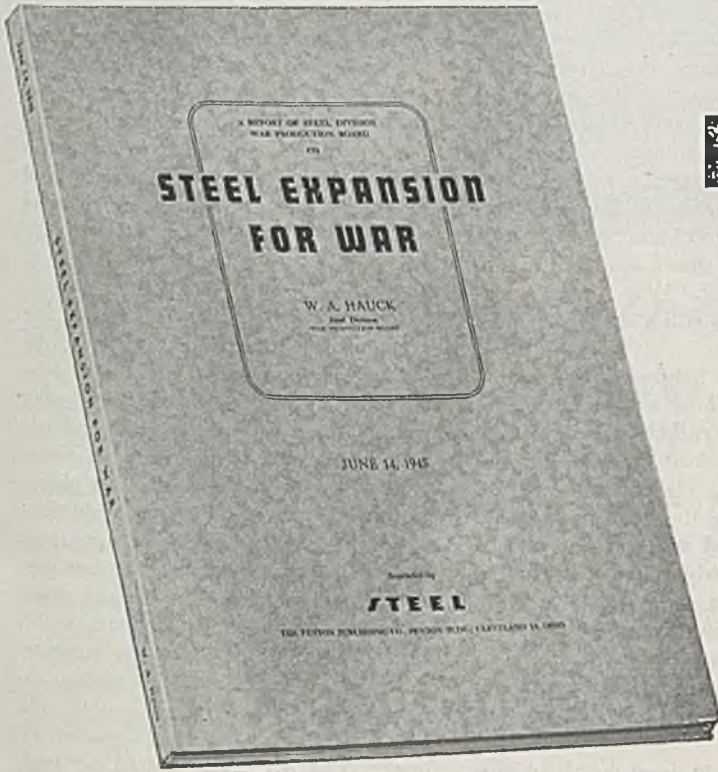
Some study has been made of this in connection with the deep drawing properties of sheets and there is apparently a close relation between the type and distribution of envelope carbides in deep drawing sheet stock and its performance. Very fine continuous carbide

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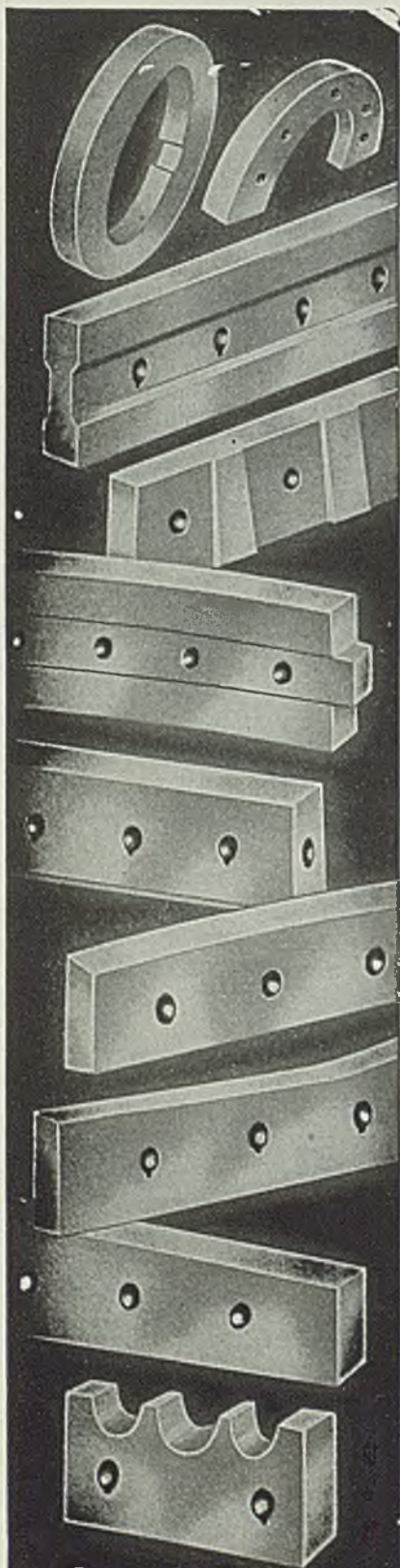
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boundaries even if discernible under the microscope at the junction of the ferrite grains are unfavorable toward meeting the best drawing requirements. It is the object of American steel making practice and processing to reduce this type of carbide to a minimum in special deep drawing grades.

Certain combinations of aluminum, sulphur and perhaps nitrogen result in an important reduction in continuous carbide boundaries and a long enough subcritical anneal is another important factor in this direction.

It is easy to visualize how the carbide network contributes to low ductility under high speed loading, and to give examples of it. Why it is so variable in its effect is still a matter of some study.

In my opinion, it takes little imagination to visualize how a microscope film of hard, brittle carbide acts under a suddenly applied load. At 4000 ft per sec velocity it is claimed that a lead bullet will pierce the best armor plate like a heat treated steel projectile. Thus under a tension which builds up to the breaking point of the extremely brittle carbide a load may easily be transferred to the ferrite at such a rate that it also acts like a brittle material with an extremely fine notch at the point of load application.

The tendency to form brittle microscopic films of carbide in a very low carbon steel is greatly increased by the addition of carbide stabilizers such as molybdenum, chromium, vanadium, etc., to the analysis. Digges has shown quite conclusively, in my opinion, that a combination of iron and carbide only, one free from any carbide stabilizers, is in the hypereutectoid ranges very "abnormal." This is a good argument for a pure iron carbon alloy for deep drawing if such were commercial.

In connection with the deep drawing sheet stock this showing of an abnormal grain structure after carburizing and slow cooling is an indication of the tendency of the carbide in the low carbon sheet to precipitate out of solution and break up the continuous network which is locally detrimental to ductility.

The combination of sulphur, aluminum and perhaps nitrogen which, in the steel making, affects the boundary carbide solubility in the low carbon steel, is the primary cause of the abnormal structure shown after carburizing, but it is also the cause of the more ductile structure obtained after subcritical annealing. In the rolling and subcritical annealing of deep drawing sheet stock, an attempt is made to get a certain type of grain and incidentally a certain type of carbide distribution in the grain boundary. This grain is identified

in the rolled sheet by its tendency to flatten out in the direction of rolling. This is believed due to the reduced interference of the carbide in the boundary to deformation of the grain as compared to those grains in which the carbide envelope is more continuous. Also, in the annealing, the temperature is sufficient to accelerate the spheroidization of the better deep drawing type as compared to that of the less ductile type.

As mentioned before, this characteristic type of structure is greatly facilitated by the addition of aluminum and the production of what we would term an abnormal steel.

Carbide In Solution

In my opinion, the question of fine grain as determined or controlled by the carbide or oxide particle is of relatively remote interest, and I feel quite certain that neither the oxide particle nor the carbide particles are, in themselves, factors in the production of the properties which insure good ductility in deep drawing sheets. I am quite certain that in a steel of the low carbon content which we are discussing, the carbide is completely in solution at the time of the formation of the austenite grain and its effect after precipitation on the grain itself must be relatively small. In any steel having a carbon content as analyzed of only 0.02 or 0.03 per cent we would usually expect the temperature on cooling to be far below the austenite ferrite transformation range before carbide precipitation is started.

As far as the oxide content of the steel being a factor, these heats are all made with an extremely high iron oxide slag and hence a high iron oxide content in the steel itself. In fact, the iron oxide content of this type of steel is probably as high as any other commercial grade. The addition of aluminum to a steel of this type will undoubtedly produce the maximum of aluminum oxide particles which should affect the grain size to a maximum. We find, however, that while in a steel of this type not much more than 1 lb of aluminum per ton is sufficient to practically complete deoxidation, at least 2 lb per ton are necessary to obtain the maximum results in deep drawing and in some cases as much as 5 lb of aluminum or more are required. A large percentage of this is probably lost in the extremely high iron oxide slag on heats of this type, but it is quite definitely necessary to provide excess aluminum over and above that required for complete deoxidation and hence maximum amount of contained aluminum oxide, if the greatest improvement of deep drawing properties is to be obtained.

Experience has indicated that resid-

ual acid soluble aluminum to the extent of 0.04 to 0.05 per cent seems to give the best results in processing. The addition of this much aluminum to the molten steel requires special open-hearth practice to insure uniform diffusion and distribution which, of course, is extremely important. The addition of aluminum to the molten steel requires the use of hot topped big-end-up ingots or a consequent loss in yield so that in addition to requiring special open-hearth practice the comparative yield of the extra deep drawing sheet may be low.

It is interesting to note that to develop the best deep drawing characteristics in this steel, it is also necessary to limit treatment after hot rolling to annealing temperatures very close to but under the critical range, and the hot rolling finishing temperatures must be very carefully controlled so that the proper type of as-rolled grain structure can be obtained. This type of as-rolled grain structure, known in the mill as the "pancake" type, is identified by a relatively large grain considerably elongated in the direction of rolling with parallel sides and rounded ends.

In my opinion, the paper by Mr. Wolfe is very timely and of the greatest interest to all users of cold-rolled steel for deep drawing application.

Tri-Core Solder Offered In All Alloys and Gages

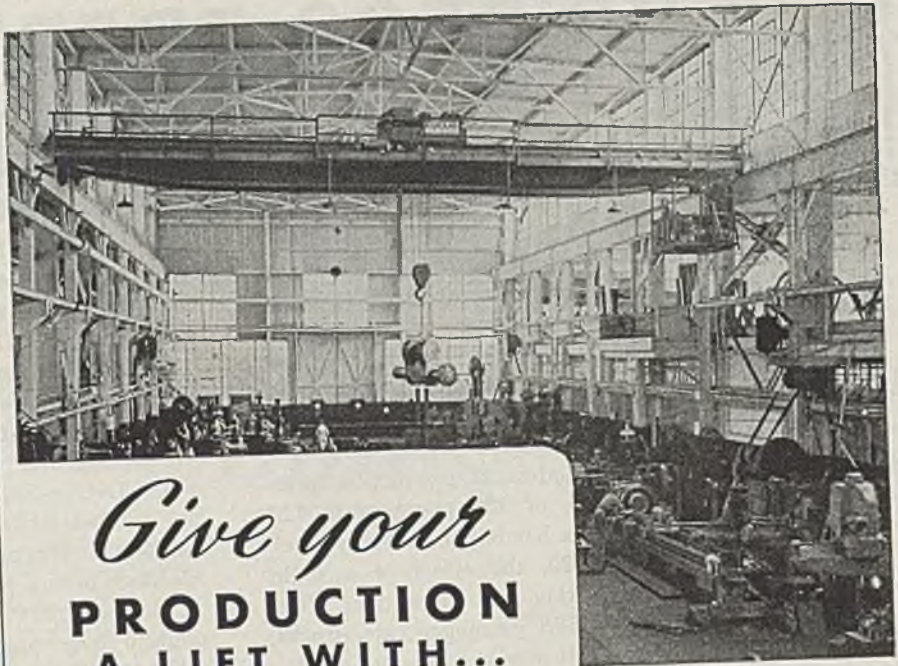
Tri-Core, a solder with three filled cores of pure rosin flux is latest development of Alpha Metals Inc., Brooklyn, N. Y. It is said to allow faster soldering and elimination of dry joints, in addition to savings in tin.

The product offers the proper fluxing vital to good soldering, it is claimed, because arrangement of three cores places them closer to surface, allowing solder to melt more quickly and enabling flux to flow freely. The solder is said to exceed ASTM Class A specifications.

Bulletins Describe Handling Magnets

Two new bulletins describing plate handling and billet and rail magnets have been published by Electric Controller & Mfg. Co., 2700 E. 70th street, Cleveland.

Simple tables to determine lifting capacities, data regarding construction, weights and current requirements are included in bulletin No. 903 on plate-handling magnets. Bulletin No. 901 describes billet and rail magnet features and applications in detail.



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the BUSINESS TREND

INDUSTRIAL activity has resisted well the effects of the current strike of bituminous coal miners, but this resistance is nearing the weakening point as depletion of coal stocks continues.

STEEL's industrial production index at 121 per cent (preliminary) in the week ended Apr. 20 showed no change from the preceding week's figure. Greatest effect of the coal strike was registered in the first week of the strike, when STEEL's industrial production index dropped from a postwar high of 132 per cent to 123 per cent. Since then the index has remained fairly level.

In the week ended Apr. 20, the effect of a slight decline in steel ingot production was more than offset by automobile output of 57,565 passenger cars, trucks, and busses, an increase of 8140 over the previous week.

COAL—Reflecting the effect of the first two weeks of the miners' strike, 1946 bituminous coal production through Apr. 13 had fallen 5.3 per cent, or 9,112,000 tons, behind that of the corresponding period of last year. At the beginning of the strike, the 1946 cumulative output was 4.7 per cent ahead of the corresponding 1945 production.

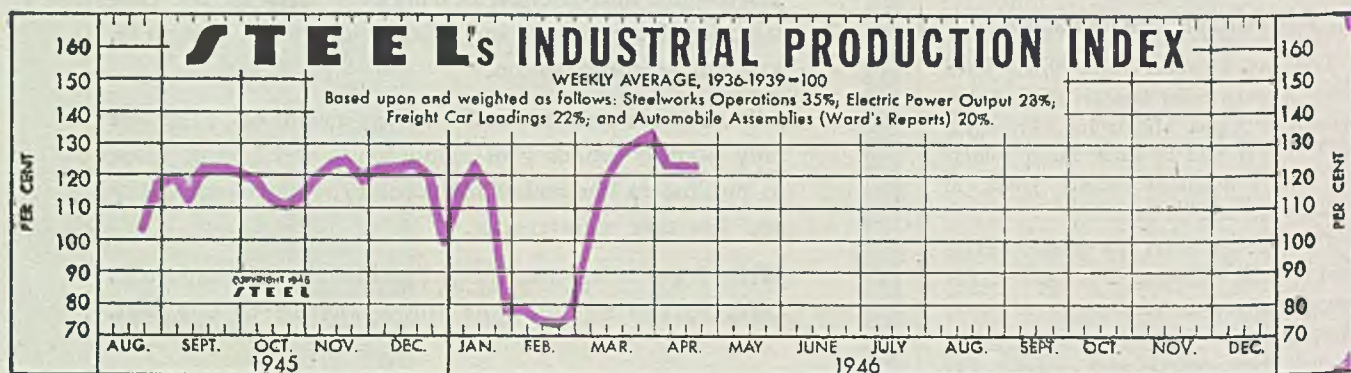
PRICES—Rise in prices continues, and the Bureau of Labor Statistics wholesale price index in the week ended Apr. 13 registered 109.3 per cent of the 1926 average. This was 0.2 per cent above the previous week, 0.8 per

cent above mid-March, 1946, and 3.6 per cent above a year ago. Largely responsible for the 0.2 per cent rise in a week were nonagricultural commodity prices.

MACHINE TOOLS—March shipments of the machine tool industry increased slightly to an estimated \$27,077,000, compared with \$26,949,000 in February. Unfilled orders reported at the end of March totaled \$175,148,168, up slightly over the backlog at the end of February.

FORGINGS—Shipments of steel forgings during February totaled 84,166 tons, a 28 per cent decrease from January. This decline resulted largely from strikes. Unfilled orders for steel forgings for sale to the trade at the end of February amounted to 531,650 tons, up slightly over January.

BUILDING—Resulting from the huge demand for all types of construction, the value of building permits issued in the United States during March exceeded all previous monthly records, except April, 1929, according to Dun & Bradstreet Inc. Volume of March permits for new residential buildings, new nonresidential buildings, additions, alterations and repairs in 215 cities rose 114.8 per cent to \$426,864,210, from \$198,686,543 in February. The March upswing brought the cumulative 1946 total of contemplated building expenditures in 215 cities up to \$829,602,835, the highest for any similar period since 1929.



The Index (see chart above):

Latest Week (preliminary) 121

Previous Week 121

Month Ago 131

FIGURES THIS WEEK

INDUSTRY

	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	74.5	75.5	88.5	92
Electric Power Distributed (million kilowatt hours)	3,987	4,015	4,017	4,411
Bituminous Coal Production (daily av.—1000 tons)	106	142	2,197	1,704
Petroleum Production (daily av.—1000 bbls.)	4,686	4,691	4,431	4,798
Construction Volume (ENR—Unit \$1,000,000)	\$154.7	\$118.9	\$105.9	\$22.2
Automobile and Truck Output (Ward's—number units)	57,565	49,425	37,285	20,335

*Dates on request. †1946 weekly capacity is 1,762,381 net tons. 1945 weekly capacity was 1,831,686 net tons.

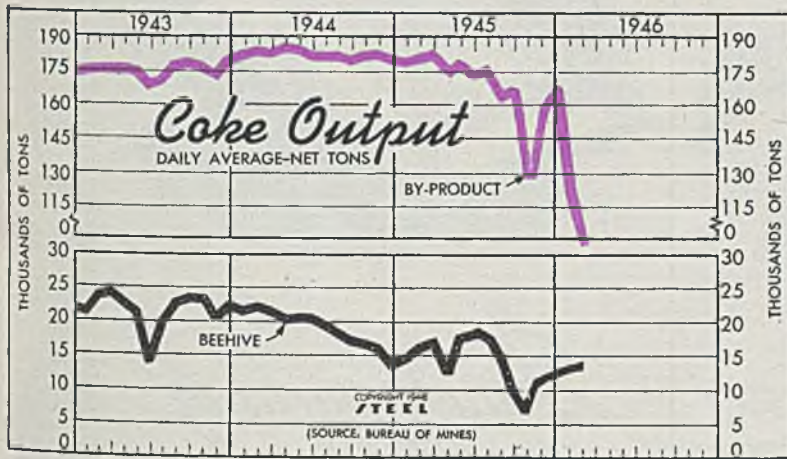
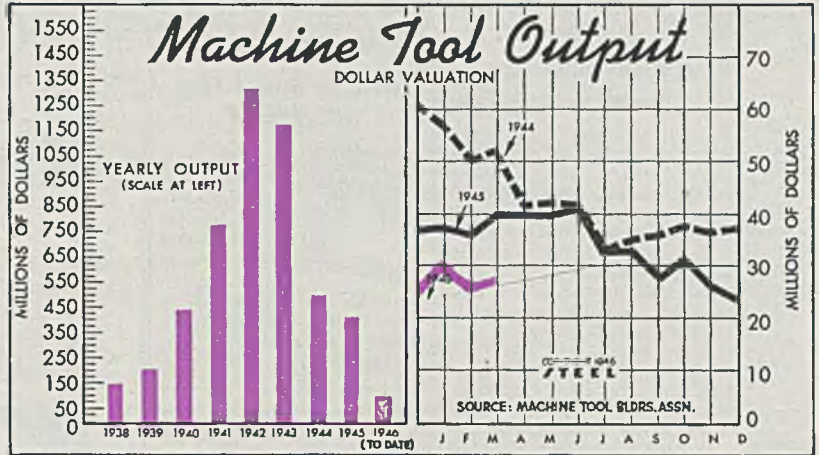
TRADE

	Latest Week	Prior Week	Month Ago	Year Ago
Freight Carloadings (unit—1000 cars)	648†	649	805	864
Business Failures (Dun & Bradstreet, number)	16	24	22	24
Money in Circulation (in millions of dollars)‡	\$27,948	\$27,953	\$27,689	\$26,068
Department Store Sales (change from like wk. a yr. ago)‡	+81%	+50%	+13%	+3%

†Preliminary. ‡Federal Reserve Board.

Machine Tool Shipments
(000 omitted)

	1946	1945	1944	1943
Jan.	\$30,263	\$37,353	\$56,363	\$117,384
Feb.	26,949	36,018	50,138	114,504
Mar.	27,077	40,045	51,907	125,445
Apr.	40,170	41,370	41,370	118,024
May	39,825	41,819	41,819	113,859
June	41,040	41,471	41,471	108,736
July	32,504	32,753	32,753	97,541
Aug.	32,500	35,177	35,177	87,805
Sept.	27,300	35,889	35,889	85,842
Oct.	31,200	37,518	37,518	78,302
Nov.	26,000	36,277	36,277	71,811
Dec.	23,200	36,784	36,784	60,873
Total	\$407,155	\$497,464	\$1,180,216	

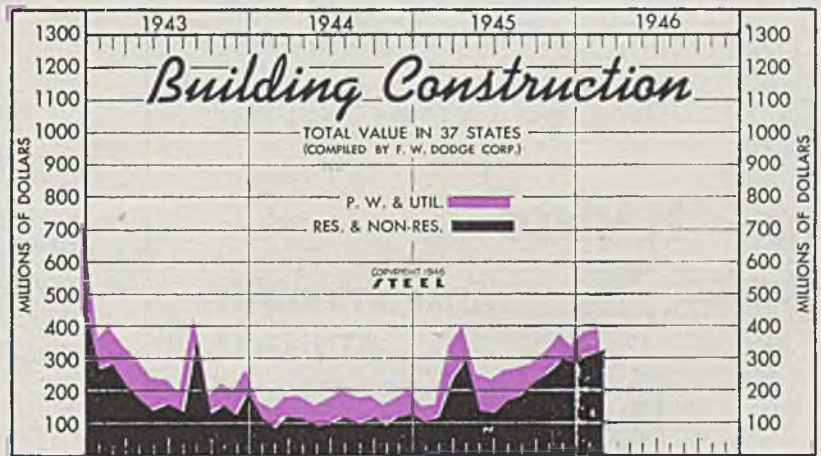


Coke Output
Bureau of Mines
(Daily Average—Net Tons)

	By-Product		Beehive	
	1946	1945	1946	1945
Jan.	122,370	179,879	13,069	14,745
Feb.	93,985	180,727	13,402	16,210
Mar.	182,120	182,120	17,115	17,115
Apr.	174,239	174,239	12,554	12,554
May	178,338	178,338	17,963	17,963
June	172,201	172,201	18,616	18,616
July	175,163	175,163	17,682	17,682
Aug.	163,567	163,567	14,669	14,669
Sept.	166,559	166,559	9,924	9,924
Oct.	127,173	127,173	6,407	6,407
Nov.	159,646	159,646	12,218	12,218
Dec.	166,648	166,648	12,659	12,659
Ave.	166,855	166,855	14,230	14,230

Construction Valuation in 37 States
(Unit—\$1,000,000)

	Public Works-Utilities		Residential and Non-Residential	
	1946	1945	1946	1945
Jan.	857.5	50.2	307.3	101.2
Feb.	387.4	64.7	322.7	115.0
Mar.	90.8	90.8	238.9	238.9
Apr.	111.9	111.9	283.9	283.9
May	107.9	107.9	131.0	131.0
June	89.9	89.9	167.8	167.8
July	77.5	77.5	186.1	186.1
Aug.	54.6	54.6	223.8	223.8
Sept.	61.1	61.1	255.5	255.5
Oct.	74.0	74.0	296.0	296.0
Nov.	51.0	51.0	279.7	279.7
Dec.	885.3	885.3	2,414.0	2,414.0
Total	885.3	885.3	2,414.0	2,414.0



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	\$12,288	\$11,828	\$13,060	\$10,108
Federal Gross Debt (billions)	\$274.3	\$273.8	\$276.7	\$235.5
Bond Volume, NYSE (millions)	\$19.6	\$30.8	\$24.0	\$69.5
Stocks Sales, NYSE (thousands)	6,430	7,501	6,370	9,634
Loans and Investments (billions)†	\$63.3	\$63.2	\$67.7	\$57.4
United States Gov't. Obligations Held (millions)†	\$46,689	\$46,538	\$49,088	\$43,327

†Member banks, Federal Reserve System.

PRICES

	Latest Period*	Prior Week	Month Ago	Year Ago
STEEL's composite finished steel price average	\$69.74	\$69.54	\$67.54	\$57.55
All Commodities†	109.3	109.1	108.4	105.5
Industrial Raw Materials†	122.8	122.3	121.0	117.3
Manufactured Products†	104.8	104.6	104.3	102.0

†Bureau of Labor Statistics Index, 1926 = 100.

Hose Racks and Reels Reach Remote Fires

Supplied with hose up to 150 feet in length connecting carbon dioxide cylinders with discharge horn, Kidde Hose Racks and Reels offer a highly effective means of fighting fires over a wide area.

They are particularly useful in fighting flammable liquid or electrical fires too large for hand portables, but not large enough to require a built-in system.

Kidde Hose Racks and Reels can be furnished with one or more 50-pound cylinders of carbon dioxide. In addition to the release valves on the cylinders, a temporary shut-off valve is furnished on

How to Make Fire KILL ITSELF

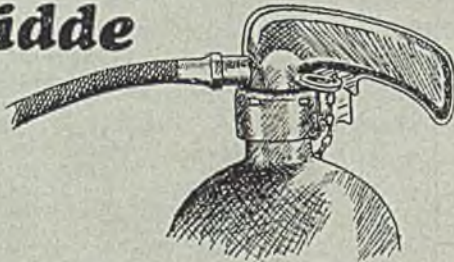


See how easily electrical and flammable liquid fires can be extinguished — completely automatically.

Write for free 12-page bulletin, "How to Make Fire Kill Itself." Walter Kidde & Company, Inc. 545 Main Street, Belleville 9, N. J.

the discharge horn. Full details are available from Walter Kidde & Company, Inc.

Kidde



THE SIMPLEST WAY TO FIGHT A FIRE!

With a Kidde Hand Portable, you just aim at the fire and pull the trigger.

Carbon dioxide capacities from 2 to 20 pounds.

Mail and Phone Orders Filled

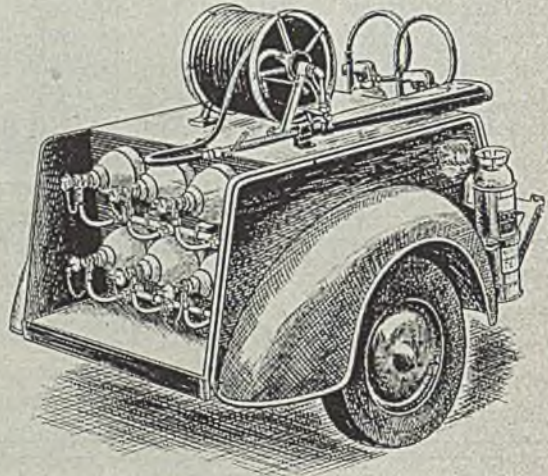
Kidde



AIMS STRAIGHT AT HEART OF FIRE

To kill flames fast, Kidde "local application" nozzles—supplied as part of built-in systems—aim the carbon dioxide discharge straight at the danger spot.

Kidde



Punch-packing Trailer

FOR INDUSTRIAL FIRE BRIGADES

Here's plenty of fire-fighting wallop in a compact unit that can be maneuvered through factory aisles. Just hook a Kidde Trailer Unit to a light truck—or even a motorcycle—and you're ready to fight fires practically anywhere in the plant!

Built to specification. A typical unit carries a hose reel with 300 pounds of carbon dioxide; two 15-pound carbon dioxide portables; two Kidde water extinguishers. Write for details.



The word "Kidde" and the Kidde seal are

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Walter Kidde & Company, Inc.

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Strikers Snub 15-Cent

General output at factories and mines decreased 4 per cent in October, while in the first half of November...

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stationed in a little town in France for several months, wooed a French girl by telling her about...

HELPFUL LITERATURE

1. Testing Facilities

Pittsburgh Testing Laboratories—28-page illustrated brochure is photographic study of company's facilities for laboratory testing of materials; field inspection and testing of equipment, structures and materials; and testing the performance of fabricated or manufactured products.

2. Aluminum Alloy

Reynolds Metals Co.—4-page bulletin No. 55-A contains data on R 317 aluminum alloy which is available in rod and bar form. Temperatures, mechanical properties, corrosion resistance, heat treatment and forging temperatures are covered.

3. Industrial Equipment & Supplies

Precision Equipment Co.—36-page illustrated spring-summer catalog lists complete line of mill supplies as well as fans, steel shelving, lockers, electric tools, filing cabinets and slide rules accurate to five places.

4. Packing Case Liner

Protective Coatings Corp.—16-page illustrated brochure describes application of Aquastop synthetic impregnated, waterproof, sealed case liners for shipping case panels. Physical characteristics, methods of sealing and ordering procedure are explained.

5. Hydraulic Pump

Pesco Products Co.—2-page illustrated bulletin No. 101 is descriptive of model No. 051001-010-01 high pressure gear pump for use in industrial tractors, hydraulic lifts, conveyors, farm and roadbuilding machinery and similar units.

6. Lift Trucks

Towmotor Corp.—Illustrated product data file covers company's line of lift trucks and lift truck accessories which include extension back rests, extension forks and crane arms. Specifications and operating data of these units for use in factories, warehouses and terminals are included.

7. Electronics

Westinghouse Electric Corp.—50-page illustrated booklet No. B-3726 explains electron theory and basic electronic devices and includes articles on Stratovision, Mot-O-Trol, fluorescent lighting, electrolytic tin plating, x-ray inspection and electrostatic air cleaning.

8. Steel Castings

Vanadium Corp. of America—28-page illustrated booklet "Vanadium Steel Castings" contains data on compositions of various vanadium casting steels and their advantages as well as examples of applications.

9. Tachometers

Herman H. Sticht Co.—4-page illustrated bulletin No. 1045 describes nine types of tachometers including portable and stationary models, single and multiple ranges, domestic and imported Swiss tachometers.

10. Live Centers

Sturdimate Tool Co.—4-page illustrated bulletin No. 146 gives specifications and prices of standard and special types of live centers. Cross-sectional drawings show construction features.

11. Locomotive Cranes

Orton Crane & Shovel Co.—16-page illustrated catalog No. 77 covers construction features, dimensions and capacities of air-controlled Orton locomotive cranes incorporating diesel and gasoline motors. All models have three speed and reverse transmission allowing lowering of loads against engine compression.

12. Power Brushes

Osborn Mfg. Co.—24-page illustrated booklet entitled "A Report on How to Select Power Brushes for Manufacturing Operations" contains fifteen separate tables which give detailed information on factors entering into efficient power brushing operations.

13. Belt Conveyor Furnaces

W. S. Rockwell Co.—6-page illustrated bulletin No. 421 discusses oil or gas fired or electrically heated belt conveyor furnaces for annealing, hardening, drawing, normalizing, copper brazing, silver soldering and sintering operations.

14. Valves

Vickers, Inc.—4-page illustrated bulletin No. 40-22 is descriptive of flow control and overload relief valves with automatic pressure compensator and overload pressure relief adjustment. Ordering and performance data, features, applications, specifications and installation data are included.

15. Cutting Tools

Staples Tool Co.—64-page illustrated catalog No. 46 gives specifications and prices of company's line of reamers, spotfacers, counterbores, milling cutters and end mills. Data on reamer usage, sharpening, reconditioning and other engineering information are included.

16. Rust & Corrosion Preventive

Valvoline Oil Co.—Folder covers characteristics and advantages of Tectyl which can be applied by spraying, dipping, brushing, or flushing and leaves transparent film which seals metal surfaces against damage by rust or corrosion for maximum of two years.

17. Cutting Fluids

D. A. Stuart Oil Co.—20-page illustrated pocket-size booklet entitled "Water-Mixed Cutting Fluids" contains information on cutting fluids for drilling, sawing, rough turning and grinding operations. Handling, mixing, stability, rancidity, gumming and foaming of cutting fluids are covered.

18. Flexible Metal Hose

Pennsylvania Flexible Metallic Tubing Co.—12-page illustrated bulletin No. 52-9 contains data on Penflex flexible metallic interlocked galvanized steel hose and bronze steam hose. Typical installations are shown.

19. Hydraulic Pump

Superdraulic Corp.—8-page illustrated folder is descriptive of Superdraulic radial type plunger pump which is available in constant delivery and variable delivery models that develop pressure of 5000 pounds per square inch and 40 horsepower.

20. Grinding Wheels

Safety Grinding Wheel & Machine Co.—104-page illustrated catalog No. W-45 discusses manufacture, proper selection and ordering procedure, specifications, handling and storage of grinding wheels. Various types of grinders are covered also.

21. Welding Data

Page Steel & Wire Div., American Chain & Cable Co.—8-page booklet entitled "Guide to Everyday Welding" is offered as reference in selection of proper type of Page electrode or gas welding wire to use for welding various types of materials, structures and equipment.

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22. Hydraulic Planers

Rockford Machine Tool Co.—4-page illustrated bulletin No. 417 presents data on motor drive, features of construction, lubrication, safety features and specifications of double-housing Hy-Draulic planers.

23. Feed Water Heaters

Swartwout Co.—8-page illustrated bulletin No. S-18-E describes line of deaerating and standard open feed water heaters. Cutaway drawing shows construction features of this unit which removes oxygen and other gases from feed water.

24. Billet Shears

Thomas Machine Mfg. Co.—4-page illustrated bulletin No. 311 gives general specifications on heavy duty billet shears with ram pressures from 500 to 2000 tons. Twelve-foot power-operated reversing feed table is covered briefly.

25. Industrial Floor Machines

G. H. Tennant Co.—2-page illustrated bulletin describes self-propelling model J electric floor machine with 12-inch drum type accessories. Applications include removing incrusted grime, dry cleaning, sweeping, polishing, burnish and sanding industrial floors.

26. Plating Rectifier

Udylite Corp.—4-page illustrated booklet contains specifications on Udylite-Mallory Rectoplatters which are available in Senior and Junior models. Former has output of 750 to 1500 amperes and latter's output is 400 amperes. Regulator which adjusts Rectoplatter output by controlling alternating current input is also covered.

27. Car Shakeout Unit

Robbins Conveyors, Inc.—8-page illustrated bulletin No. 128 discusses Car Shakeout which empties hopper bottom railroad cars of coal, coke, ore, minerals and other free flowing bulk materials by means of seismic action.

28. Case Hardening

Surface Combustion Corp.—4-page illustrated bulletin No. SC-127 discusses application of pack, liquid and gas carburizing and types of furnaces for various methods are shown together with illustrations of case-hardened steel parts and furnace installations. Table of pot recommendations, including pot materials, maximum bath temperatures, and type and composition of salt baths is included.

29. Dust Collectors

W. W. Sly Mfg. Co.—4-page illustrated bulletin No. 100 contains data on company's line of dust filters for suppression and collection of dust from abrasive grinding and polishing, cleaning and sweeping, cutting, shaping, threading and similar machine tool operations. Sandblast equipment and tumbling mills are described briefly also.

30. Fastening Devices

Simmons Fastener Corp.—28-page illustrated catalog No. 845 contains design, construction, engineering and installation data on company's line of quick lock, spring lock and dual purpose safety nuts. High speed serrating equipment and facilities are covered also.

31. Contour Grinding

Thompson Grinder Co.—8-page illustrated booklet entitled "Why Didn't You Tell Me About This Process Before?" discusses Truform grinders and Truforming process which afford automatic size compensation, crushing and truing limits, grinding and interlocked grinding and truing cycles. Eight questions and answers pertaining to crush form grinding contours are included.

32. Swivel Pipe Coupling

Snyder Sales Corp.—4-page illustrated bulletin No. SSC-1 is descriptive of All-Flex ball bearing swivel pipe coupling. Cutaway drawing shows construction features. Engineering and procurement data are covered.

33. Stainless Strip Steels

Superior Steel Corp.—28-page illustrated brochure covers chemical, physical and mechanical properties and treating and finishing of stainless strip steel which is available in three types— austenitic, martensitic and ferritic. Typical applications are listed.

34. Steam Detergent Cleaning

Oakite Products, Inc.—28-page illustrated pocket-size booklet describes applications of steam-detergent cleaning methods for cleaning machinery and parts for subsequent repair, overhaul, reassembly or reconditioning; preparing equipment surfaces for repainting or refinishing; cleaning of equipment too large for tank immersion and for paint stripping. Data on solution-lifting steam guns for removing dirt, oil, grease, grime and similar deposits are given.

35. Liquidizer

Pittsburgh Metals Purifying Co.—4-page pocket-size folder describes Soffel's carbon free liquidizer for steel, gray iron, monel, bronze, copper castings and ingot molds. Application of liquidizer on feeder heads or risers is discussed.

36. Carbon Graphite

United States Graphite Co.—40-page illustrated catalog contains data on physical and chemical properties, operating conditions and assembly methods of Graphitar which is used in manufacture of piston rings, seals, caps, valves, funnels, bearings and cores for metal castings.

37. Swaging Machines

Standard Machinery Co.—20-page illustrated catalog section SM contains data on assembly, performance, advantages and features of regular and special swaging machines. Typical applications, feeding fixtures, die construction, care and operation, dimensions and parts lists are covered.

38. Surface Hardening

Stainless Surface Hardening Co.—4-page illustrated folder entitled "Surface Hardening of Stainless Steel Parts" describes Malcolmizing process of imparting glass-hard, wear-resistant surface to stainless steel parts for use in valves and valve parts, plungers, sealing rings and aircraft instruments.

39. Structural Material

Haskelite Mfg. Corp.—12-page illustrated bulletin "Plan With Plymet" shows how this material can be adapted for product design and fabrication. Material combines lightness in weight and stiffness of plywood with strength of metal. Several types are available with plywood or insulating material cores and zinc coated steel, aluminum sheet, stainless steel or other metal bonded to one or both faces. Properties, fabrication procedures, finishing and other data are presented.

40. Welding Positioners

Cullen-Friestedt Co.—16-page illustrated bulletin No. WP-22 describes C-F positioners which afford fast, economical welding. Large cumbersome weldments can be positioned easily so that each weld can be made by down-hand method. Sizes are available for every need, with capacities ranging from 1200 to 14,000 pounds.

41. Crank Shapers

Smith & Mills Co.—24-page illustrated catalog No. 45 contains data and specifications covering 12, 16, 20, 25, 28 and 32-inch heavy duty crank shapers. Operating instructions and repair parts list are given also.

42. Adjustable Speed Drives

Reliance Electric & Engineering Co.—8-page illustrated bulletin No. 311 describes All-Electric adjustable speed drive for alternating current circuits. Available functions include starting, quick stopping, jogging, inching or creeping, reversing and controlled acceleration and deceleration. Typical installations are shown.

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MARKET SUMMARY

Steelmakers Resist Fuel Shortage Drag on Output

Sharper drop imminent . . . Sheet production begins to feel steel shortage . . . Scrap and pig iron supply critical

STEEL production continues to decline and with no indication of early settlement of the coal strike it will go substantially lower, trade predictions now being for a loss in tonnage in May far greater than the million tons estimated for April.

Some districts, in sharp contrast to others, have been able to maintain exceptionally high operations during April but fuel supply is being exhausted and unless there is early adjustment of the coal dispute average steel production rate will drop to a point where a greater loss in output next month is inevitable.

Decline in production of light flat-rolled steel, a most critical product, is beginning to reflect more seriously the reduction in ingot output. Until recently the reduction of steel ingots has been most noticeable in bars, plates and rails, among the major products. Under present circumstances sheetmakers operating on a quarterly quota basis, are unable to set up new quotas, though the time for such action has arrived. Those not on a quota system are sold through the year and an increasing carry-over into 1947 is definitely in prospect.

Pressure for sheets is heavier than ever, as fabricators have been able to attain the highest schedule of operations since the end of the war, but prospects for maintaining these rates are threatened by the coal interruption. Small carbon bars are also in heavy demand, with the situation in small cold-drawn bars now almost as critical as in hot-rolled. Various sellers are sold for the remainder of the year, on small sizes, with little available in larger diameters.

In spite of severe shortage of coal steelmakers have been able to maintain better operations than had been thought possible, at the expense of fuel inventories. The retreat from the high rate attained after the steel strike has been gradual, every effort

DISTRICT STEEL RATES

(Percentage of Ingot Capacity Engaged in Leading Districts)

	Week Ended		Same Week	
	Apr. 27	Change	1945	1944
Pittsburgh	57	-8.5	90.5	94.5
Chicago	71	-4	98.5	102.5
Eastern Pa.	79	-2	90	94
Youngstown	60	None	94	96
Wheeling	86	-4.5	92.5	98
Cleveland	95	-2	97	97.5
Buffalo	88.5	-1.5	90.5	90.5
Birmingham	64	-21	95	95
New England	88	None	90	85
Cincinnati	79	None	94	89
St. Louis	54	None	80	77
Detroit	90	+2	86	88
Estimated national rate	70	-4.5	94	99.5

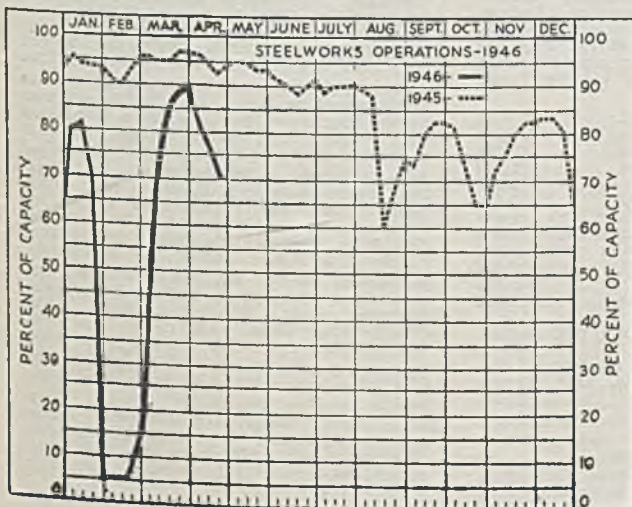
Based on weekly steelmaking capacity of 1,762,381 net tons for 1946; 1,831,636 tons for 1945; 1,791,287 tons for 1944.

being made to maintain output as high as possible. The drop is expected to be more precipitate from now on. Last week the estimated national rate fell $4\frac{1}{2}$ points to 70 per cent of capacity, lowest since the end of the steel strike. Detroit was the only district to show a gain, moving up 2 points to 90 per cent. Pittsburgh dropped $8\frac{1}{2}$ points to 57 per cent, Chicago 4 points to 71, Cleveland 2 points to 95, eastern Pennsylvania 2 points to 79, Buffalo $4\frac{1}{2}$ to $88\frac{1}{2}$, Wheeling $4\frac{1}{2}$ to 86, Birmingham 21 points to 64. Rates were unchanged as follows: Cincinnati 79, New England 88, Youngstown 60, St. Louis 54. West Coast mills average $81\frac{1}{2}$ per cent.

Consumption of Lake Superior iron ore in March regained practically the level of prestrike months, reaching 6,021,018 gross tons, compared with only 1,748,469 tons in February. Effect of the steel strike is reflected in first quarter consumption of 11,488,445 tons, against 20,435,199 tons in first quarter of 1945. Great Lakes shipping is in an uncertain position because of the coal strike, vessel operators being short of coal, and strikes at iron ore mines limiting tonnage of ore at upper lake docks. However, stocks of 27,601,106 tons of ore at furnaces and on Lake Erie docks provide plenty for present needs. A year ago similar stocks were only 17,303,561 tons.

Continuing fuel shortage is taking toll of blast furnaces and pig iron is correspondingly reduced. Melters have been using reserves and have managed to get along without much reduction in castings output. Producers are rationing tonnage thinly to give as good supply as possible and are meeting emergencies when possible. Continuance of the coal strike promises greater curtailment of iron production in the next fortnight as more stacks are slated to be banked.

Scrap shortage continues and is increased by enlarged use in open hearths as pig iron supply dwindles and steelmakers seek to keep up production. Low phos scrap is being taken freely for use in the open hearth, regardless of the differential over heavy melting steel. Springboards and high freight charges are being paid in the effort to obtain material sorely needed. Diminished supply of steel to consumers limits production of industrial scrap. Granting of a lower freight rate on shipyard scrap from the West Coast promises relief to consumers in the Midwest as surplus from the Coast can be made available.



COMPOSITE MARKET AVERAGES

	Apr. 27	Apr. 20	Apr. 13	One Month Ago Mar., 1946	Three Months Ago Jan., 1946	One Year Ago Apr., 1945	Five Years Ago Apr., 1941
Finished Steel	\$63.54	\$63.54	\$63.54	\$63.54	\$58.27	\$57.55	\$56.73
Semifinished Steel	40.60	40.60	40.60	40.60	37.80	36.00	36.00
Steelmaking Pig Iron	25.50	25.50	25.50	25.125	24.75	24.00	23.00
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for last Month, Three Months and One Year Ago
Finished Material and wire rods, cents per lb.; coke, dollars per net ton; others dollars per gross ton.

Finished Material	Apr. 27, 1946	Mar., 1946	Jan., 1946	Apr., 1945	Pig Iron	Apr. 27, 1946	Mar., 1946	Jan., 1946	Apr., 1945
Steel bars, Pittsburgh	2.50c	2.50c	2.35c	2.15c	Bessemer, del. Pittsburgh	\$27.69	\$27.315	\$26.94	\$28.19
Steel bars, Philadelphia	2.82	2.82	2.57	2.47	Basic, Valley	28.00	25.625	25.25	24.80
Steel bars, Chicago	2.50	2.50	2.25	2.15	Basic, eastern del. Philadelphia	27.84	27.465	27.09	26.34
Shapes, Pittsburgh	2.35	2.35	2.10	2.10	No. 2 fdry., del. Pgh. N. & S. sides	27.19	26.815	26.44	25.68
Shapes, Philadelphia	2.485	2.485	2.215	2.215	No. 2 foundry, Chicago	26.50	26.125	25.75	25.00
Shapes, Chicago	2.35	2.35	2.10	2.10	Southern No. 2, Birmingham	22.88	22.505	22.13	21.38
Plates, Pittsburgh	2.50	2.50	2.25	2.20	Southern No. 2, del. Cincinnati	26.94	26.565	26.19	25.44
Plates, Philadelphia	2.55	2.55	2.30	2.25	No. 2 fdry., del. Philadelphia	28.34	27.965	27.59	26.84
Plates, Chicago	2.50	2.50	2.25	2.20	Malleable, Valley	26.50	26.125	25.75	25.00
Sheets, hot-rolled, Pittsburgh	2.425	2.425	2.20	2.20	Malleable, Chicago	26.50	26.125	25.75	25.00
Sheets, cold-rolled, Pittsburgh	3.275	3.275	3.05	3.05	Lake Sup., charcoal del. Chicago	37.34	37.340	37.34	37.34
Sheets, No. 24 galv., Pittsburgh	4.05	4.05	3.70	3.65	Gray forge, del. Pittsburgh	26.69	26.315	25.94	25.19
Sheets, hot-rolled, Gary	2.425	2.425	2.20	2.20	Ferromanganese, del. Pittsburgh	140.00	140.000	140.00	140.33
Sheets, cold-rolled, Gary	3.275	3.275	3.05	3.05	Scrap				
Sheets, No. 24 galv., Gary	4.05	4.05	3.70	3.65	Heavy melting steel, No. 1, Pittsburgh	\$20.00	\$20.00	\$20.00	\$20.00
Hot-rolled strip, over 6 to 12-in., Pitts.	2.35	2.35	2.10	2.10	Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Cold-rolled strip, Pittsburgh	3.05	3.05	2.80	2.80	Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Bright bess., basic wire, Pittsburgh	3.05	3.05	2.75	2.60	Rails for rolling, Chicago	22.25	22.25	22.25	22.25
Wire nails, Pittsburgh	3.25	3.25	2.90	2.80	No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Tin plate, per base box, Pittsburgh	\$5.25	\$5.25	\$5.00	\$5.00	Coke				
Semifinished Material					Connellsville, furnace ovens	\$7.50	\$7.50	\$7.50	\$7.00
Sheet bars, Pittsburgh, Chicago	\$38.00	\$38.00	\$36.00	\$34.00	Connellsville, foundry ovens	8.25	8.25	8.25	7.75
Slabs, Pittsburgh, Chicago	39.00	39.00	38.00	34.00	Chicago, by-product fdry., del.	13.75	13.75	13.75	13.35
Rerolling billets, Pittsburgh	39.00	39.00	36.00	34.00	Steel, Iron, Raw Material, Fuel and Metals Prices				
Wire rods, No. 5 to 1/4-inch, Pitts.	2.30c	2.30c	2.15c	2.00c					

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA schedules, except those for stainless steels which are now exempt from price control. Price schedule No. 6 covers semifinished and finished iron and steel products; by-product foundry coke, No. 29; relaying rails, No. 46; beehive open coke, No. 77; bolts, nuts and rivets, No. 147; coke by-products, GMPR, except sulphate of ammonia, No. 205. Finished steel quoted in cents per pound and semifinished steel in dollars per gross ton, except as otherwise noted. Pricing on rails was changed to net ton basis as of Feb. 15, 1946.

Semifinished Steel

Carbon Steel Ingots: Fob mill base, rerolling quality, standard analysis, \$33.

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncorp, \$46.80.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, \$39; Detroit, del., \$41; Duluth (billets), \$41; Pac. ports (billets), \$51. (Andrews Steel Co., carbon slabs, \$41; Northwestern Steel & Wire Co., \$41, Sterling, Ill.; Granite City Steel Co. \$47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co. \$53.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, \$47; Detroit, del., \$49; Duluth, billets, \$49; forging billets fob Pac. ports, \$59.

(Andrews Steel Co. may quote carbon forging billets \$50 gross ton at established basing points; Follansbee Steel Corp., \$49.50 fob Toronto, O. Geneva Steel Co. \$64.64, Pacific ports.)

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, \$56.16; del. Detroit \$58.16; eastern Mich. \$59.16.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, \$38. (Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, \$39, fob mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb, 2.05c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—1/4 in. inclusive, per 100 lb., \$2.30. Do., over 1/4—1/2 in., incl., \$2.45; Galveston, base, \$2.40 and \$2.55, respectively. Worcester add \$0.10; Pacific ports \$0.50.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham base, 20 tons one size, 2.50c; Duluth, base, 2.60c; Detroit, del., 2.60c; eastern Mich., 2.65c; New York, del., 2.84c; Phila., del., 2.82c; Gulf ports, dock, 2.85c; Pac. ports, dock, 3.15. (Sheffield Steel Corp., 2.75c, fob St. Louis; Joslyn Mfg. & Supply Co., may quote 2.55c, fob Chicago.)
Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.81c; Detroit, del., 2.91c. (Texas Steel Co. may use Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	\$0.104	4300	\$1.768
2300	1.768	4600	1.248
2500	2.652	4800	2.236
3000	0.52	5100	0.364
3100	0.884	5130 or 5152	0.468
3200	1.404	6129 or 6152	0.988
3400	3.328	6145 or 6150	1.248
4000	0.468	8612	0.676
4100 (15-.25 Mo)	0.728	8720	0.728
(.20-.30 Mo)	0.78	9830	1.352

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.10c; Detroit, 3.15c; Toledo, 3.25c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 3.43c; Detroit, del., 3.58c; eastern Mich., 3.63c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.35c; Detroit, del., 2.45c; eastern Mich. and Toledo,

2.50c; Gulf ports, dock, 2.70c; Pacific ports, dock, 2.75c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.35c; Detroit, del., 2.45c; eastern Mich. and Toledo, del., 2.50c; Gulf ports, dock, 2.70c.

Iron Bars: Single refined, Pitts., 4.76c; double refined, 5.84c; Pittsburgh, staybolt, 6.22c; Terra Haute, single ref., 5.42c; double ref., 6.76c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base, 2.425c; Granite City, base, 2.525c; Detroit, del., 2.536c; eastern Mich., del., 2.575c; Phila., del., 2.593c; New York, del., 2.665c; Pacific ports, 2.975c. (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 2.60c on hot carbon sheets, nearest eastern basing point.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.275c; Granite City, base, 3.375c; Detroit, del., 3.375c; eastern Mich., del., 3.425c; New York, del., 3.615c; Phila., del., 3.593c; Pacific ports, 3.925c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 4.65c; Granite City, base, 4.15c; New York, del., 4.29c; Phila., del., 4.22c; Pacific ports, 4.60c.

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29-gage, per square, 3.73c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16-gage not corrugated, copper alloy, 4.15c; Granite City, 4.25c; Pacific ports, 4.60c; copper iron, 4.50c; pure iron, 4.50c; zinc-coated; hot-dipped, heat-treated, No. 24, Pittsburgh, 4.60c.

Aluminized Sheets, 20 gage: Pittsburgh, hot-dipped, coils or cut to lengths, 9.00c.

Enamelling Sheets: 10-gage: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.20c; Granite City, base 3.30c; Detroit, del., 3.30c; eastern Mich., 3.35c; Pacific ports, 3.85c; 20-gage: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.80c; Detroit, del., 3.90c; eastern Mich., 3.95c; Pacific ports, 4.45c.

Electrical Sheets No. 24:

	Pittsburgh	Pacific	Granite
	Base	Ports	City
Feld grade	3.90c	4.65c	4.00c
Armature	4.25c	5.00c	4.35c
Electrical	4.75c	5.50c	4.85c
Motor	5.425c	6.175c	5.525c
Dynamo	6.125c	6.875c	6.225c
Transformer			
72	6.625c	7.375c	.....
65	7.625c	8.375c	.....
58	8.125c	8.875c	.....
52	8.925c	9.675c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middle-town, base, 6-inch and narrower, 2.45c; Detroit, del., 2.55c; eastern Mich., 2.60c; Pacific ports, 3.10c; over 6-inch, base, 2.35c; Detroit, del., 2.45c; eastern Mich., 2.50c; Pacific ports, 3.00c.

Cold-Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less, 3.05c; Chicago, base, 3.15c; Detroit, del., 3.15c; eastern Mich., del., 3.20c; Worcester, base, 3.25c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland, base, 0.26-0.50 carbon, 3.05c. Add 0.20c for Worcester.

Tin, Terne Plate

(OPA ceiling prices announced March 1, 1946.)
Tin Plate: Pittsburgh, Chicago, Gary, 100-lb base box, \$5.25; Granite City, Birmingham, Sparrows Point, \$5.35.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb base box, 0.25 lb tin, \$4.60; 0.50 lb tin, \$4.75; 0.75 lb tin, \$4.90; Granite City, Birmingham, Sparrows Point, \$4.70, \$4.85, \$5.00, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29-gage and lighter, 3.30c; Granite City, Birmingham, Sparrows Point, 3.40c; Pacific ports, boxed, 4.30c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted, 4.05c; Pacific ports, 4.80c.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-base box, \$4.55; Granite City, Birmingham, Sparrows Point, \$4.65.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I. C. 8-lb \$12.50; 20-lb \$15.50 (nom.); 40-lb \$20.00 (nom.).

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.50c; New York, del., 2.69c; Phila., del., 2.55c; St. Louis, 2.74c; Boston, del., 2.82-3.07c; Pacific ports, 3.05c; Gulf ports, 2.85c.

(Granite City Steel Co. may quote carbon plates 2.65c fob D.P.C. mill; Geneva Steel Co., Provo, Utah, 3.20c fob Pac. ports; Central Iron & Steel Co., Harrisburg, Pa., 2.80c, basing points.)

Floor Plates: Pittsburgh, Chicago, 3.75c; Pacific ports, 4.40c; Gulf ports, 4.10c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.75c; Gulf ports, 4.20c; Pacific ports, 4.40c.

Clad Steel Plates: Coatesville, 10% cladding; nickel-clad, 19.72c; inconel-clad, 26.00c; monel-clad, 24.96c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.35c; New York, del., 2.52c; Phila., del., 2.463c; Pacific ports, 3.00c; Gulf ports, 2.70c.

(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, 2.65c; Pacific ports, 3.20c.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham, per 100 pounds)

Wire to Manufacturers in carloads			
Bright basic or bessemer		\$3.05	
Spring (except Birmingham)		\$3.65	
Wire Products to Trade			
Nails and staples			
Standard and cement-coated		\$3.25	
Galvanized		\$2.50	
Wire, Merchant Quality			
Annealed		\$3.50	
Galvanized		\$3.85	

(Fob Pittsburgh, Chicago, Cleveland, Birmingham, per base column)
 Woven fence, 1 1/2 gage and heavier .. 72
 Barbed wire, 80-rod spool .. 79
 Barbless wire, twisted .. 79
 Fence posts .. 74
 Bale ties, single loop .. 72 1/2

*Add \$0.10 for Worcester, \$0.05 for Duluth and \$0.50 for Pacific ports.
 †Add \$0.30 for Worcester, \$0.50 for Pacific ports.
 ‡Add \$0.50 for Pacific ports.
 §Add \$0.10 for Worcester, \$0.70 for Pacific ports.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about \$200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

In.	Steel			In.	Iron		
	Blk.	Galv.			Blk.	Galv.	
1/4	58	30	1/2	21	0 1/2		
1/2	56	37 1/2	3/4	27	7		
3/4	60 1/2	48	1-1/4	31	13		
1	63 1/2	52	1-1/2	35	15 1/2		
1-3	65 1/2	54 1/2	2	34 1/2	15		

In.	Steel			In.	Iron		
	Blk.	Galv.			Blk.	Galv.	
2	58	46 1/2	1 1/4	20	0 1/2		
2 1/2-3	61	49 1/2	1 1/2	25 1/2	7		
3 1/2-6	63	51 1/2	2	27 1/2	9		
7-8	62	49 1/2	2 1/2-3 1/2	28 1/2	11 1/2		
9-10	61 1/2	49	4	30 1/2	15		
11-12	60 1/2	48	4 1/2-8	29 1/2	14		
			9-12	25 1/2	9		

Roller Tubes: Net base prices per 100 feet fob Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D.	E.W.G.	Hot		Cold	
		Rolled	Drawn	Rolled	Rolled
1"	13	.....	\$9.90	\$9.36	\$9.65
1 1/4"	13	.....	11.73	9.63	11.43
1 1/2"	13	\$10.91	12.96	10.63	12.64
1 3/4"	13	12.41	14.75	12.10	14.37
2"	13	13.90	16.52	13.53	16.19
2 1/4"	13	15.50	18.42	15.06	18.03
2 1/2"	12	17.07	20.28	16.57	19.83
2 3/4"	12	18.70	22.21	18.11	21.68
3"	12	19.82	23.54	19.17	22.95
3 1/2"	12	20.79	24.71	20.05	24.02
3 3/4"	11	26.24	31.18	25.30	30.29
4"	10	32.56	38.68	31.32	37.52
4 1/2"	9	43.16	51.29	.....	.....
5"	9	49.96	59.36	.....	.....
6"	7	76.71	91.14	.....	.....

Pipe, Cast Iron: Class B, 6-in. and over, \$54 per net ton, Birmingham; \$59, Burlington, N. J.; \$62.80, del., Chicago; 4-in. pipe, \$5 higher. Class A pipe, \$3 a ton over class B.

Rails, Supplies

Standard rails, over 60-lb, fob mill, net ton, \$43.40. Light rails (billet), Pittsburgh, Chicago, Birmingham, net ton, \$49.18.

*Relaying rails, 35 lb and over, fob railroad and basing points, \$31-\$33.
 Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates \$51 net ton, base. Standard spikes, 3.65c.

*Fixed by OPA Schedule 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb: Reg. carbon 15.15c; extra carbon 19.48c; special carbon 23.80c; oil-hardening 25.97c; high carbon-chromium 46.53c.

W	Cr	V	Mo	Base, per lb.
18.00	4	1	.....	72.49c
1.5	4	1	8.5	58.43c
.....	4	2	3	58.43c
6.40	4.15	1.90	5	62.22c
5.50	4.50	4	4.50	75.74c

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham
 Structural .. 3.75c
 1/2-inch and under .. 65-5 off

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, 1cl .. \$2.75-\$3.00 off

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago. Additional discounts: 5 for carloads; 10 for full containers, except tire, step and plow bolts.

(Ceiling prices advanced 7 per cent, effective Apr. 1, 1946; discounts remain unchanged.)

Carriage and Machine	
1/2 x 6 and smaller	65 1/2 off
Do., 3/4 and 1/2 x 6-in. and shorter	63 1/2 off
Do., 3/4 to 1 x 6-in. and shorter	61 off

1 1/2 and larger, all lengths .. 59 off
 All diameters, over 6-in. long .. 59 off
 Tire bolts .. 50 off
 Step bolts .. 56 off
 Plow bolts .. 65 off

Stove Bolts

In packages, nuts separate, 7i-10 off, nuts attached, 7i off; bulk, 80 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

	Nuts	
	U.S.S.	S.A.E.
Semifinished hex	.....	84
1/2-in. and smaller	62	.....
1/2-in.-1-in.	57	60
3/4-in.-1-in.	59	58
1 1/4-in.-1 1/2-in.	57	58
1 1/2-in. and larger	56	.....

Additional discount of 10 for full kegs.

Hexagon Cap Screws
 Upset 1-in., smaller .. 64 off
 Milled 1-in., smaller .. 60 off

Square Head Set Screws
 Upset 1-in. and smaller .. 71 off
 Headless, 1/4-in. and larger .. 60 off
 No. 10 and smaller .. 70 off

Stainless Steels

(Open market prices. OPA price control suspended Oct. 11, 1945.)

Base, Cents per lb

CHROMIUM NICKEL STEELS		H. R.	C. R.
302	304	Strip	Strip
25.96c	28.21c	36.79c	23.93c
29.21c	31.38c	38.95c	29.21c
28.13c	31.38c	38.95c	29.21c
27.05c	31.38c	38.95c	29.21c
31.58c	36.79c	44.36c	30.84c
38.96c	43.28c	50.85c	40.03c
53.02c	58.26c	57.35c	52.74c
38.95c	43.28c	53.02c	.....
43.28c	47.61c	51.94c	43.28c
31.38c	36.79c	44.36c	31.65c
35.71c	41.12c	48.69c	35.71c
20.56c	23.80c	31.38c	18.94c

STRAIGHT CHROMIUM STEEL			
403	404	408	409
23.93c	26.51c	31.92c	22.99c
28.21c	29.67c	36.79c	23.80c
28.21c	29.67c	36.79c	23.80c
28.21c	29.67c	36.79c	23.80c
28.21c	29.67c	36.79c	23.80c
28.21c	29.67c	36.79c	23.80c
28.21c	29.67c	36.79c	23.80c
28.21c	29.67c	36.79c	23.80c
28.21c	29.67c	36.79c	23.80c
28.21c	29.67c	36.79c	23.80c

STAINLESS CLAD STEEL (20%)
 (Fob Pittsburgh and Washington, Pa., plate prices include annealing and pickling.)
 304 .. 19.48
 410 .. 17.31
 430 .. 17.85
 446 .. 19.48

* With 2-3% molybdenum. † With titanium. ‡ With columbium. ** Plus machining agent. †† High carbon. ††† Free machining.

Metallurgical Coke

Price Per Net Ton	
Beehive Ovens	
Connellsville, furnace	\$7.50
Connellsville, foundry	8.00-8.50
New River, foundry	9.00-9.25
Wise county, foundry	7.75-8.25
Wise county, furnace	7.25-7.75

By-Product Foundry

Kearney, N. J., ovens	13.05
Chicago, outside delivered	13.00
Chicago, delivered	13.75
Terre Haute, delivered	13.90
Milwaukee, ovens	13.75
New England, delivered	14.85
St. Louis, delivered	11.75
Birmingham, delivered	10.98
Indianapolis, delivered	13.50
Cincinnati, delivered	12.25
Cleveland, delivered	13.20
Buffalo, delivered	13.40
Detroit, delivered	13.75
Philadelphia, delivered	12.25

* 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 .. 27.00c
 Solvent naphtha .. 26.00c
 Industrial xylol .. 26.00c

Per pound fob works
 Phenol (car lots, returnable drums) .. 10.50c
 Do., less than carlots .. 11.25c
 Do., tank cars .. 3.50c
 Eastern plants, per pound
 Naphthalene flakes, balls, bbl, to jobbers .. 8.00c
 Per ton, bulk, fob port
 Sulphate of ammonia .. \$29.20

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras. Quotations based on OPA mill prices announced March 1, 1946.

	Hot-rolled bars	Structural shapes	Plates	Floor plates	Hot-rolled sheets (10-gage base)	Hot-rolled strip (14-gage and lighter, 6-in and narrower)	Hot-rolled strip (12-gage and heavier, wider than 6-inch)	Galvanized flat sheets (24-gage base)	Cold-rolled sheets (17-gage base)	Cold finished bars	Cold-rolled strip
Boston	4.294 ¹	4.162 ¹	4.162 ¹	5.977 ²	3.999 ¹	5.456 ¹	4.356 ¹	5.674 ¹⁴	4.969 ¹⁴	4.594 ¹¹	4.865
New York	4.103 ¹	4.008 ¹	4.018 ¹	5.824 ¹	3.813 ¹	4.324 ¹	4.224 ¹	5.460 ¹⁵	4.838 ¹⁴	4.553 ¹¹	5.024
Jersey City	4.103 ¹	3.997 ¹	4.018 ¹	5.824 ¹	3.813 ¹	4.324 ¹	4.224 ¹	5.460 ¹⁵	4.838 ¹⁴	4.553 ¹¹	5.024
Philadelphia	4.072 ¹	3.916 ¹	3.855 ¹	3.768 ¹	3.743 ¹	4.622 ¹	4.172 ¹	5.468 ¹⁵	5.097 ¹⁴	4.022 ¹¹	5.022
Baltimore	4.052 ¹	4.009 ¹	3.844 ¹	5.502 ¹	3.619 ¹	4.602 ¹	4.152 ¹	5.344 ¹	5.077 ¹⁴	4.502 ¹¹	...
Washington	4.191 ¹	4.180 ¹	4.048 ¹	5.591 ¹	3.821 ¹	4.741 ¹	4.291 ¹	5.646 ¹⁷	5.066 ¹³	4.491 ¹¹	...
Norfolk, Va.	4.315 ¹	4.252 ¹	4.221 ¹	5.715 ¹	3.996 ¹	4.865 ¹	4.415 ¹	5.821 ¹⁷	4.490 ¹⁴	4.615 ¹¹	...
Bethlehem, Pa.		3.70 ¹									
Claymont, Del.			3.70 ¹								
Coatesville, Pa.			3.70 ¹								
Buffalo (city)	3.60 ¹	3.65 ¹	3.88 ¹	5.51 ¹	3.575 ¹	4.189 ¹	4.069 ¹	5.20 ¹⁵	4.625 ¹³	4.20 ¹¹	4.919
Buffalo (country)	3.50 ¹	3.55 ¹	3.55 ¹	5.15 ¹	3.475 ¹	3.85 ¹	4.060 ¹	5.10 ¹⁵	4.525 ¹³	4.10 ¹¹	4.60
Pittsburgh (city)	3.60 ¹	3.65 ¹	3.85 ¹	5.25 ¹	3.575 ¹	3.95 ¹	3.850 ¹	5.20 ¹⁵	4.625 ¹³	4.20 ¹¹	4.70
Pittsburgh (country)	3.50 ¹	3.55 ¹	3.55 ¹	5.15 ¹	3.475 ¹	3.85 ¹	3.750 ¹	5.10 ¹⁵	4.525 ¹³	4.10 ¹¹	4.60
Cleveland (city)	3.60 ¹	3.838 ¹	3.65 ¹	5.438 ¹	3.575 ¹	3.95 ¹	3.850 ¹	5.327 ¹⁵	4.625 ¹³	4.20 ¹¹	4.70
Cleveland (country)	3.50 ¹	3.55 ¹	3.55 ¹		3.475 ¹	3.85 ¹	3.750 ¹		4.525 ¹³	4.10 ¹¹	4.60
Detroit	3.70 ¹	3.911 ¹	3.859 ¹	5.531 ¹	3.675 ¹	4.050 ¹	3.950 ¹	5.450 ¹⁵	4.725 ¹³	4.25 ¹¹	4.909
Omaha (city, del.)	4.293 ¹	4.343 ¹	4.343 ¹	5.943 ¹	4.018 ¹	4.498 ¹	4.393 ¹	5.965 ¹⁵	5.668 ¹³	4.893 ¹¹	...
Omaha (country)	4.193 ¹	4.243 ¹	4.243 ¹	5.843 ¹	3.918 ¹	4.398 ¹	4.293 ¹	5.865 ¹⁵		...	...
Cincinnati	3.861 ¹	3.941 ¹	3.911 ¹	5.541 ¹	3.650 ¹	4.025 ¹	3.925 ¹	5.275 ¹⁵	4.700 ¹⁴	4.461 ¹¹	4.961
Youngstown											
Middletown, O.					3.475 ¹	3.85 ¹	3.750 ¹	4.85 ¹⁵			
Chicago (city)	3.75 ¹	3.80 ¹	3.80 ¹	5.40 ¹	3.475 ¹	3.95 ¹	3.850 ¹	5.10 ¹⁵			
Milwaukee	3.887 ¹	3.937 ¹	3.937 ¹	5.537 ¹	3.612 ¹	4.087 ¹	3.987 ¹	5.722 ¹⁵	4.425 ¹⁴	4.20 ¹¹	4.90
Indianapolis	3.83 ¹	3.88 ¹	3.88 ¹	5.48 ¹	3.743 ¹	4.118 ¹	4.018 ¹	5.722 ¹⁵	4.562 ¹⁴	4.337 ¹¹	5.037
St. Paul	4.01 ¹	4.06 ¹	4.06 ¹	5.66 ¹	3.735 ¹	4.21 ¹	4.110 ¹	5.368 ¹⁵	4.793 ¹⁴	4.43 ¹¹	5.030
St. Louis	3.897 ¹	3.947 ¹	3.947 ¹	5.547 ¹	3.622 ¹	4.097 ¹	3.997 ¹	5.622 ¹⁵	4.572 ¹⁴	4.481 ¹¹	5.181
Memphis, Tenn.	4.265 ¹	4.315 ¹	4.315 ¹	6.03 ¹	4.190 ¹	4.565 ¹	4.465 ¹	5.715 ¹⁵	5.005 ¹⁴	4.78 ¹¹	5.463
Birmingham	3.65 ¹	3.80 ¹	3.80 ¹	6.153 ¹	3.875 ¹	4.05 ¹	3.950 ¹	5.20 ¹⁵	5.077 ¹⁴	4.99 ¹¹	5.679
New Orleans (city)	4.35 ¹	4.15 ¹	4.15 ¹	6.10 ¹	4.283 ¹	4.55 ¹	4.450 ¹	5.70 ¹⁵	5.304 ¹³	5.05 ¹¹	...
Houston, Tex.	4.00 ¹	4.50 ¹	4.50 ¹	5.73 ¹	3.988 ¹	4.668 ¹	4.563 ¹	5.763 ¹⁵	5.819 ¹³	4.10 ¹¹	...
Los Angeles	4.85 ¹	4.90 ¹	5.20 ¹	7.45 ¹	5.225 ¹	7.10 ¹	5.200 ¹	6.45 ¹⁵	7.425 ¹³	6.033 ¹¹	5.863
San Francisco	4.40 ¹	4.80 ¹	4.90 ¹	6.60 ¹	4.775 ¹	6.10 ¹	4.750 ¹	6.80 ¹⁵	7.525 ¹³	5.783 ¹¹	7.583
Portland, Oreg.	4.70 ¹	4.70 ¹	5.00 ¹	6.75 ¹	4.875 ¹	6.85 ¹	5.000 ¹	6.20 ¹⁵	6.825 ¹³	5.983 ¹¹	...
Tacoma, Wash.	4.60 ¹	4.70 ¹	5.00 ¹	6.75 ¹	4.875 ¹	5.80 ¹	4.500 ¹	6.40 ¹⁵	7.825 ¹³	6.238 ¹¹	...
Seattle	4.70 ¹	4.70 ¹	5.00 ¹	6.75 ¹	4.875 ¹	5.80 ¹	4.500 ¹	6.40 ¹⁵	7.275 ¹³	6.233 ¹¹	...

*Basing point cities with quotations representing mill prices, plus warehouse spread. NOTE—All prices fixed by Office of Price Administration in Revised Price Schedule No. 49, as amended. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

—400 to 1999 pounds; —400 to 14,999 pounds; —any quantity;
 —300 to 1999 pounds; —400 to 8999 pounds; —300 to 9999 pounds;
 —400 to 39,999 pounds; —under 2000 pounds; —under 4000 pounds;
 —500 to 1499 pounds; —one bundle to 39,999 pounds; —150 to 2249 pounds; —150 to 1499 pounds; —three to 24 bundles; —450

to 1499 pounds; —one bundle to 1499 pounds; —one to nine bundles;
 —one to six bundles; —100 to 749 pounds; —300 to 1999 pounds;
 —1500 to 39,999 pounds; —1500 to 1999 pounds; —1000 to 39,999 pounds; —400 to 1499 pounds; —1000 to 1999 pounds;
 —under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; —300 to 4999 pounds.

Ores	Indian and African	Rhodesian	Utah, and Pueblo, Colo., 91c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 248, effective May 15, 1944. Price at basing points which are also points of discharge of imported manganese ore is fob cars, shipside, at dock most favorable to the buyer. Outside shipments direct to consumers at 10c per unit less than Metal Reserve prices.
Lake Superior Iron Ore	48% 2.8:1 \$39.75	45% no ratio \$28.50	Molybdenum Sulphide conc., lb, Mo cont., mines \$0.75
Gross ton, 51½% (Natural)	48% 3:1 \$41.00	48% no ratio \$1.00	
Lower Lake Ports	48% no ratio \$1.00	48% 3:1 lump \$41.00	
Old range bessemer \$4.95	South African (Transvaal)	Domestic (seller's nearest rail)	
Mesabi nonbessemer 4.55	44% no ratio \$27.40	48% 3:1 \$43.50	
High phosphorus 4.55	45% no ratio 28.30	less \$7 freight allowance.	
Mesabi bessemer 4.70	48% no ratio 31.00	Manganese Ore	
Old range nonbessemer 4.80	50% no ratio 32.80	Sales prices of Office of Metals Reserve, cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85c; Fontana, Calif., Provoo,	
Eastern Local Ore	Brazilian—nominal		
Cents, units, del. E. Pa.	44% 2.5:1 lump \$33.65		
Foundry and basic 56-	48% 3:1 lump 43.50		
63% contract 13.00			
Foreign Ore			
Cents per unit, cif Atlantic ports			
Manganiferous ore, 45-55% Fe, 6-10% Mn, Nom.			
N. African low phos. Nom.			
Swedish basic, 60 to 63% Nom.			
Spanish, N. African basic, 50 to 60% Nom.			
Brazil iron ore, 68-69% fob Rio de Janeiro 7.50-8.00			

NATIONAL EMERGENCY STEELS (Hot Rolled)

		Chemical Composition Limits, Per Cent						Basic open-hearth Electric furnace			
	Designation	Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Bars per 100 lb.	Billets per CT	Bars per 100 lb.	Billets per CT
Chinese Tungsten Ore	NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	\$0.780	\$15.80	\$1.300	\$26.00
Wolframite, per short ton unit, duty paid \$24.00	NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.780	15.60	1.300	26.00
Chrome Ore (Equivalent OPA schedules):	NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.832	16.64	1.352	27.04
Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash.	NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.676	13.52	1.196	23.92
(S.S. paying for discharge; dry basis, subject to penalties if guarantees are not met.)	NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.248	24.96	1.612	32.24
	NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.248	24.96	1.612	32.24

Extras are in addition to a base price of 2.808c, per pound on finished products and \$56.16 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximum fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, Oct. 23, 1945, and March 15, 1946. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	\$27.50	\$27.00	\$28.50	\$28.00
Newark, N. J., del.	29.03	28.53	30.03	29.53
Brooklyn, N. Y., del.	30.00	29.50	31.00	30.50
Birdsboro, Pa., base	27.50	27.00	28.50	28.00
Birmingham, base	22.88	21.50	27.50	27.00
Baltimore, del.	28.11			
Boston, del.	27.64			
Chicago, del.	26.72			
Cincinnati, del.	26.94	26.06		
Cleveland, del.	26.62	25.74		
Newark, N. J.	28.64			
Philadelphia, del.	27.96	27.46		
St. Louis, del.	26.62	27.54		
Buffalo, base	26.50	25.50	27.50	27.00
Boston, del.	28.00	27.00	29.00	28.50
Rochester, del.	28.03	27.00	29.03	28.53
Syracuse, del.	28.58	27.58	29.58	29.08
Chicago, base	26.50	28.00	27.00	26.50
Milwaukee, del.	27.60	27.10	28.10	27.60
Muskegon, Mich., del.	27.69	27.19	28.19	27.69
Cleveland, base	26.50	28.00	27.00	26.50
Akron, Canton, del.	27.89	27.39	28.39	27.89
Detroit, base	26.50	26.00	27.00	26.50
Saginaw, Mich., del.	28.81	28.31	29.31	28.81
Duluth, base	27.00	26.50	27.50	27.00
St. Paul, del.	29.13	28.63	29.63	29.13
Erie, Pa., base	26.50	26.00	27.00	26.50
Everett, Mass., base	27.50	27.00	28.50	28.00
Boston, del.	28.00	27.50	29.00	28.50
Granite City, Ill., base	26.50	26.00	27.00	26.50
St. Louis, del.	27.00	26.50	27.50	27.00
Hamilton, O., base	26.50	26.00	27.00	26.50
Cincinnati, del.	27.61	27.11	28.11	27.61
Neville Island, Pa., base	26.50	26.00	27.00	26.50
*Pittsburgh, del. N. & S. sides	27.19	26.69	27.69	27.19
Provo, Utah, base	24.50	24.00	25.00	24.50
Sharpsville, Pa., base	28.50	28.00	29.00	28.50
Sparrows Point, base	27.50	27.00	28.00	27.50
Baltimore, del.	28.49			
Steeltown, Pa., base	27.00	26.50	27.50	27.00
Swedeland, Pa., base	27.50	27.00	28.00	27.50
Philadelphia, del.	28.34	27.84	28.84	28.34
Toledo, O., base	26.50	26.00	27.00	26.50
Youngstown, O., base	26.50	26.00	27.00	26.50
Manfield, O., del.	28.44	27.94	28.94	28.44

*To Neville Island base add: 55 cents for McKees Rocks, Pa.; 84 cents, Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Allquippa; 97 cents (water), Monongahela; \$1.11, Oakmont, Verona; \$1.24, Brackbridge.

Exception to Ceiling Prices: Struthers Iron & Steel Co., Struthers, O., may charge 50 cents a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable pig iron.

Ceiling Prices are aggregate of (1) governing basing point, (2) differentials, and (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in lowest delivered price for the consumer.

High Silicon, Silvery

6.00-6.50 per cent (base)	...\$32.00
6.51-7.00	..\$33.00
7.01-7.50	..34.00
7.51-8.00	..35.00
8.01-8.50	..36.00
8.51-9.00	..37.00
9.01-9.50	..38.00
9.51-10.00	..39.00
10.01-10.50	..40.00
10.51-11.00	..41.00
11.01-11.50	..42.00

Fob Jackson county, O., per gross ton. Buffalo base \$1.25 higher, whichever is most favorable to buyer.

Electric Furnace Ferrosilicon: Si 14.01 to 14.50%, \$45.50 Jackson co.; each additional 0.50% silicon up to and including 18% add \$1; low impurities not exceeding 0.005 P, 0.40 Si, 1.0% C, add \$1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus \$1 per gross ton.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn. \$33.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa.\$26.00
Valley base 28.00

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo, N. Y., \$32.00 base; \$33.24, del. Philadelphia. Intermediate phosphorus, Central Furnace, Cleveland, \$29.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge not to exceed 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge not to exceed 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for

nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, \$2 a ton; for each additional 0.25% nickel, \$1 a ton.

Refractories

Per 1000 pieces, fob shipping point. Net prices

Fire Clay Brick	
Super Duty	
Pa., Mo., Ky.	.....\$76.05
High Heat Duty	
Pa., Ill., O., Md., Mo., Ky.	60.40
Ala., Ga.	.....60.40
N. J.	.....65.90

Intermediate Heat Duty	
Ohio	.....50.60
Pa., Ill., Md., Mo., Ky.	.....54.80
Ala., Ga.	.....49.15
N. J.	.....54.80

Low Heat Duty	
Pa., Md., Ohio	.....42.35

Malleable Bung Brick	
All bases	.....70.45

Ladle Brick	
(Pa., O., W. Va., Mo.)	
Dry Press	.....36.45
Wire Cut	.....34.15

Silica Brick	
Pennsylvania	.....60.40
Joliet, E. Chicago	.....69.30
Birmingham, Ala.	.....80.40

Magnesite	
Domestic dead-burned grains, net ton fob Chewelah, Wash., net ton, bulk	.....22.00
net ton, bags	.....26.00

Basic Brick	
Net ton, fob Baltimore, Plymouth Meeting, Chester, Pa.	.....54.00
Chrome brick	.....54.00
Chem. bonded chrome	.....75.00
Magnesite brick	.....66.00
Chem. bonded magnesite	.....65.00

Fluorspar

Metallurgical grade, fob Ill., Ky., net tons, carloads, CaF² content, 70% or more, \$33; 65 but less than 70%, \$32; 60 but less than 65%, \$31; less than 60%, \$30. After Aug. 29, 1944, base price any grade \$30.00.

Ferroalloy Prices

Ferromanganese, standard: 78-82% c.i. gross ton, duty paid, \$135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Rockdale or Rockwood, Tenn. (where Tennessee Products Co. is producer), Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); \$140 fob cars, Pittsburgh (where Carnegie-Illinois Steel Corp. is producer); add \$6 for packed c.i., \$10 for ton, \$13.50 for less ton; \$1.70 for each 1% or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: Special, 21.50c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.55c; regular, 21.05c; medium, 13.75c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Spiegeleisen: 19-21% carlot per gross ton, Palmerton, Pa., \$36; Philadelphia, \$40.50; Chicago, \$40.60.

Electrolytic Manganese: 99.9% plus, less ton lots, per lb 37.6c.

Chromium Metal: 87% min. chromium, max. 0.50% carbon, eastern zone, per lb contained chromium bulk, c.i., 79.50c, 2000 lb to c.i. 80c; central 81c and 82.50c; western 82.25c and 84.75c; fob shipping point, freight allowed.

Ferrocolumbium: 50-60% per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed. eastern zone, \$2.25; less-ton lots \$2.30. Spot prices 10 cents per lb higher.

Ferrochrome: High carbon, eastern zone, bulk, c.i., 13c, 2000 lb. to c.i. 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.i. 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.i., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 2.00% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add 0.4c for bulk, c.i. and 0.65 for 2000 lb to c.i.; western, add 1c for bulk, c.i. and 1.85c for 2000 lb c.i.; carload packed differential 0.45c; fob shipping point, freight allowed. Prices per lb contained Cr, high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each 0.25% of nitrogen over 0.75%.

Special Foundry Ferrochrome: (Cr 62-68%; C approx. 5-7%.) Contract, carload bulk 13.50c, packed 13.95c, ton lots 14.40c, less 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome, high carbon: (Cr 60-65%, Si 4-6%, Mn 4-6% and C 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium; 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) per lb of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

Silicz Alloy: (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%), per lb of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed, 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

Silvaz Alloy: (Si 35-40%, Va 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%) per lb of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern freight allowed; 58.00c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up .4c.

CMZ Alloy 4: (Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75% and C 3.00-4.50%). Contract carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c.

CMZ Alloy 5: (Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%) per lb of

alloy. Contract, carlots, bulk, 10.75c, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c, 12.50c, 13.00c central; 13.25c, 13.75c, 14.50c and 15.00c, western; spot up 0.25c.

Ferro-Boron: (B 17.50% min., Si 1.50% max., Al 0.50% max. and C 0.50% max.) per lb of alloy contract ton lots \$1.20, less ton lots \$1.30, eastern, freight allowed; \$1.2075 and \$1.3075 central; \$1.229 and \$1.329, western; spot add 5c.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) per lb of alloy. Contract ton lots, \$1.89, less \$2.01, eastern; freight allowed; \$1.903 and \$2.023, central; \$1.935 and \$2.055 western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance), per lb of alloy. Contract, 5 tons or more \$1.90, 1 ton to 8 tons, \$2.00, less than ton \$2.10, eastern, freight allowed; \$1.9125, \$2.0125 and \$2.1125, central; \$1.9445, \$2.0445 and \$2.1445, western; spot same as contract.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide approx. 2%, or Red Cake; Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity, \$1.10 eastern, freight allowed per pound vanadium oxide contained; contract carlots, \$1.105, less carlots, \$1.108, central; \$1.118 and \$1.133, western; spot add 5c to contracts in all cases. **Calcium metal; east:** Contract ton lots or more \$1.35, less, \$1.60, pound of metal; \$1.36 and \$1.61 central, \$1.40 and \$1.65, western; spot up 5c. **Calcium-Manganese-Silicon:** (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up 0.25c. **Calcium-Silicon:** (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb of alloy. Contract, carlot, lump 13.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up 0.25c. **Briquets, Ferromanganese:** (Weight approx. 3 lb and containing exactly 2 lb Mn) per lb of briquets. Contract, carlots, bulk 0.0605c, packed 0.063c, tons 0.0655c, less 0.068c eastern freight allowed; 0.063c, 0.0655c, 0.0755c and 0.078c, central; 0.066c, 0.0685c, 0.0855c and 0.088c, western; spot up 0.25c. **Briquets, Ferrochrome:** Containing exactly 2 lb Cr, eastern zone, bulk, c.l., 8.25c per lb of briquets, 2000 lb to c.l., 8.75c; central, add 0.3c for c.l. and 0.5c for 2000 lb to c.l.; western add 0.70c for c.l. and 0.2c for 2000 lb to c.l.; **silicomanganese,**

eastern, containing exactly 2 lb Mn and approx. 1/2 lb Si, bulk, c.l., 5.80c, 2000 lb to c.l., 6.35c; central add 0.25c for c.l. and 1c for 2000 lb to c.l.; western, add 0.55c for c.l. and 0.2c for 2000 lb to c.l.; **ferrosilicon,** eastern, approx. 5 lb, containing exactly 2 lb Si, or weighing approx. 2 1/2 lb and containing exactly 1 lb of Si, bulk, c.l. 3.35c, 2000 lb 'o c.l., 3.80c; central, add 0.15c for c.l. and 0.40c for 2000 lb to c.l.; western, add 0.30c for c.l. and 0.45c for 2000 to c.l.; fob shipping point, freight allowed. **Ferromolybdenum:** 55-75% per lb contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c. **Ferrophosphorus:** 17-19%, based on 18% P content, with unitage of \$3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price \$58.50, spot \$62.25. **Ferroilicon:** Eastern zone, 90-95%, blk, c.l., 11.05c, 2000 lb to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000

lb to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 lb to c.l., 8.75c; fob shipping point, freight allowed. Prices per lb contained Si. **Grainal:** Vanadium Grainal No. 1 \$7.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance. **Silicon Metal:** Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l., 12.90c; 2000 lb to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; mln. 96% Si and max. 2% Fe, eastern, bulk, c.l., 12.50c, 2000 lb to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c fob shipping point, freight allowed. Price per lb contained Si. **Manganese Metal:** (96% mln. Mn, max. 2% Fe), per lb of metal, eastern zone, bulk, c.l., 30c, 2000 lb to c.l., 32c, central, 30.25c, and 33c; western, 30.55c and 35.05c. **Ferrotungsten:** Spot, 10,000 lb or more, per lb contained W, \$1.90; contract, \$1.88; freight allowed as far west as St. Louis. **Tungsten Metal Powder:** Spot, not less than 97%, \$2.50-\$2.60; freight allowed as far west as St. Louis. **Ferrotitanium:** 40-45%, R.R. freight allowed, per lb contained Ti; ton lots \$1.23; less-ton lots \$1.25; eastern. Spot up 5c per lb. **Ferrotitanium:** 20-25%, 0.10 maximum carbon; per lb contained Ti; ton lots \$1.35; less-ton lots \$1.40 eastern. Spot up 5c per lb. **High-Carbon Ferrotitanium:** 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight al-

lowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C \$142.50; 3-5% C \$157.50. **Carbotam:** B 0.90 to 1.15% net ton to carload, 8c per lb fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium. **Bortam:** B 1.5-1.9%, ton lots, 45c lb; less-ton lots, 50c lb. **Ferrovandium:** Va 35-55%, contract basis, per lb contained Va, fob producers plant with usual freight allowances; open-hearth grade \$2.70; special grade \$2.80; highly-special grade \$2.90. **Zirconium Alloy:** Zr 12-15%, per lb of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads, bulk, per gross ton \$102.50; packed \$107.50; ton lots \$108; less-ton lots \$112.50. Spot up 1/4c per ton. **Zirconium Alloy:** Zr 35-40%, eastern, contract basis, carloads in bulk or package, per lb of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot up 1/4c. **Alsiifer:** (Approx. 20% Al, 40% Si, 40% Fe) contract basis fob Niagara Falls, N. Y., lump, per lb 5.50c; ton lots 6.00c. Spot up 1/4c. **Siminal:** (Approx. 20% each Si, Mn, Al) Contract, freight not exceeding St. Louis rate allowed, per lb alloy; carlots 8c; ton lots 8.75c; less-ton lots 9.25c. **Borasil:** 3 to 4% B, 40 to 45% Si, \$6.25 lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to maximum price regulation No. 4. Quotations are on gross tons.

PHILADELPHIA: (Delivered consumer's plant)		MACHINE TURNINGS		NO. 1 COMP. BUNDLES		STREET CAR AXLES	
No. 1 Heavy Melt. Steel	\$18.75	Short Shovel Turnings	16.25	No. 2 Comp. Bundles	19.50	Steel Rails, 3 ft.	21.50
No. 2 Heavy Melt. Steel	18.75	Mixed Borings, Turnings	14.25	Machine Turnings	10.50-11.00	Steel Angle Bars	21.00
No. 2 Bundles	18.75	Cast Iron Borings	15.25	Shoveling Turnings	12.50-13.00	Cast Iron Wheels	20.00
No. 3 Bundles	16.75	Low Phos.	21.75	Cast Iron Borings	11.50-12.00	No. 1 Machinery Cast	20.00
Mixed Borings, Turnings	13.75	PITTSBURGH: (Delivered consumer's plant)		Mixed Borings, Turnings	10.50-11.00	Railroad Malleable	22.00
Machine Shop Turnings	13.75	Railroad Heavy Melting	\$21.00	No. 1 Cupola Cast	20.00	Breakable Cast	16.50
Billet, Forge Crops	23.75	No. 1 Heavy Melt. Steel	20.00	Breakable Cast	16.50	Stove Plate	19.00
Bar Crops, Plate Scrap	21.25	No. 2 Heavy Melt. Steel	20.00	Low Phosphorus	21.00-22.00	Gate Bars	15.25
Cast Steel	21.25	No. 1 Comp. Bundles	20.00	Scrap Rails	20.50-21.00	Brake Shoes	15.25
Punchings	21.25	No. 2 Comp. Bundles	20.00	Stove Plate	18.50-19.00	BIRMINGHAM: (Delivered consumer's plant)	
Elec. Furnace Bundles	19.75	Short Shovel Turnings	17.00	DETROIT: (Delivered consumer's plant)		Rillet Forge Crops	\$22.50
Heavy Turnings	18.25	Mach. Shop Turnings	15.00	Heavy Melting Steel	\$17.32	Structural, Plate Scrap	19.00
CAST GRADES (Fob Shipping Point)		Mixed Borings, Turnings	15.00	No. 1 Busheling	17.32	Scrap Rails Random	18.50
Heavy Breakable Cast	16.50	No. 1 Cupola Cast	20.00	Hydraulic Bundles	17.32	Rerolling Rails	20.50
Charging Box Cast	19.00	Heavy Breakable Cast	16.50	Flashings	17.32	Angle Splice Bars	20.50
Cupola Cast	20.00	Cast Iron Borings	16.00	Machine Turnings	12.32	Solid Steel Axles	24.00
Unstripped Motor Blocks	17.50	Billet, Bloom Crops	25.00	Short Shovel, Turnings	14.32	Cupola Cast	20.00
Malleable	22.00	Sheet Bar Crops	22.50	Cast Iron Borings	13.32	Stove Plate	19.00
Chemical Borings	16.51	Plate Scrap, Punchings	22.50	Low Phos. Plate	19.82	Long Turnings	8.50-9.00
NEW YORK: (Dealers' buying prices)		Railroad Specialties	24.50	No. 1 Cast	20.00	Cast Iron Borings	8.50-9.00
No. 1 Heavy Melt. Steel	\$15.33	Scrap Rail	21.50	Heavy Breakable Cast	16.50	Iron Car Wheels	16.50-17.00
No. 2 Heavy Melt. Steel	15.33	Axles	26.00	LOS ANGELES: (Delivered consumer's plant)			
No. 2 Hyd. Bundles	15.33	Rail 3 ft. and under	23.50	No. 1 Heavy Melt. Steel	\$14.00	No. 1 Heavy Melt. Steel	13.00
No. 3 Hyd. Bundles	13.33	Railroad Malleable	22.00	No. 2 Heavy Melt. Steel	18.75	No. 1, 2 Dir. Bundles	12.00
Chemical Borings	14.33	*Shipping point.		No. 2 Heavy Melt. Steel	18.75	Machine Turnings	5.50
Machine Turnings	10.33	CLEVELAND: (Delivered consumer's plant)		No. 1 Ind. Bundles	18.75	Mixed Borings, Turnings	5.50
Mixed Borings, Turnings	10.33	No. 1 Heavy Melt. Steel	\$19.50	No. 2 Dir. Bundles	18.75	No. 1 Cast	20.00
No. 1 Cupola	20.00	No. 2 Heavy Melt. Steel	19.50	Baled Mach. Shop Turn.	18.75	SAN FRANCISCO: (Delivered consumer's plant)	
Charging Box	19.00	No. 1 Comp. Bundles	19.50	No. 3 Galv. Bundles	16.75	No. 1 Heavy Melt. Steel	\$15.00
Heavy Breakable	16.50	No. 2 Comp. Bundles	19.50	Machine Turnings	13.75	No. 2 Heavy Melt. Steel	14.00
Unstripped Motor Blocks	17.50	No. 1 Busheling	19.50	Mix. Borings, Sht. Turn.	13.75	No. 1 Busheling	15.50
Stove Plate	19.00	Mach. Shop Turnings	14.50	Short Shovel Turnings	15.75	No. 1, No. 2 Bundles	13.00
BOSTON: (Fob shipping points. Boston differential 93c higher, steelmaking grades; Providence, \$1.09 higher)		Short Shovel Turnings	16.50	Cast Iron Borings	14.75	No. 3 Bundles	8.50
No. 1 Heavy Melt. Steel	\$14.06	Mixed Borings, Turnings	14.50	Scrap Rails	20.25	Machine Turnings	7.00
No. 2 Heavy Melt. Steel	14.06	No. 1 Cupola Cast	20.00	Cut Rails, 3 feet	22.25	Billet, Forge Crops	15.50
No. 1 Bundles	14.06	Heavy Breakable Cast	16.50	Cut Rails, 18-inch	23.50	Bar Crops, Plate	15.50
No. 2 Bundles	14.06	Cast Iron Borings	13.50-14.00	Rerolling Rails	22.25	Cast Steel	15.50
No. 1 Busheling	14.06	Billet, Bloom Crops	24.50	Angles, Splice Bars	22.25	Cut, Structural, Plate, 1", under	18.00
Machine Shop Turnings	9.06	Sheet Bar Crops	22.00	Plate Scrap, Punchings	21.25	Alloy-free Turnings	7.00
Mixed Borings, Turnings	9.06	Plate Scrap, Punchings	22.00	Railroad Specialties	22.75	Tin Can Bundles	14.50
Short Shovel Turnings	11.06	Elec. Furnace Bundles	20.50	No. 1 Cast	20.00	No. 2 Steel Wheels	15.50
Chemical Borings	13.31	VALLEY: (Delivered consumer's plant)		R.R. Malleable	22.00	Iron, Steel Axles	23.00
Low Phos. Clippings	16.56	No. 1 R.R. Heavy Melt.	\$21.00	ST. LOUIS: (Delivered consumer's plant; cast grades fob shipping point)			
No. 1 Cast	20.00	No. 1 Heavy Melt. Steel	20.00	Heavy Melting	\$17.50	No. 2 Cast Steel	15.50
Clean Auto Cast	20.00	No. 1 Comp. Bundles	20.00	No. 1 Locomotive Tires	21.00	Uncut Frogs, Switches	15.00
Stove Plate	19.00	Short Shovel Turnings	17.00	Misc. Rails	19.00	Scrap Rails	15.00
Heavy Breakable Cast	16.50	Cast Iron Borings	16.00	Railroad Springs	22.00	Locomotive Tires	15.50
BUFFALO: (Delivered consumer's plant)		Machine Shop Turnings	15.00	Bundled Sheets	17.50	SEATTLE: (Delivered consumer's plant)	
No. 1 Heavy Melt. Steel	\$19.25	Low Phos. Plate	22.50	Axle Turnings	17.00	No. 1 Heavy Melt. Steel	\$12.50
No. 2 Heavy Melt. Steel	19.25	MANSFIELD: (Delivered consumer's plant)		Machine Turnings	10.50	No. 2 Heavy Melt. Steel	12.50
No. 1 Bundles	19.25	Machine Shop Turnings	\$15.00	Shoveling Turnings	12.50	Heavy Railroad Scrap	14.50
No. 2 Bundles	19.25	CINCINNATI: (Delivered consumer's plant)		Rerolling Rails	21.00	(Fob shipping point)	
No. 1 Busheling	19.25	No. 1 Heavy Melt. Steel	\$19.50	No. 1 Cupola Cast			
		No. 2 Heavy Melt. Steel	19.50	20.00			

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½c, refinery; dealers may add ¼c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1¼c; 0-499 2c. 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) 18.50c; 80-10-10 (No. 305) 15.75c; No. 1 yellow (No. 405) 10.00c.

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, 6.45, 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., plus 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ¼c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 10.50-11.00c; No. 12 foundry alloy (No. 2 grade) 10.50-10.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97¼%) 11.75-12.00c; grade 2 (92-95%) 10.25-10.75c; grade 3 (90-92%) 8.50-9.00c; grade 4 (85-90%) 8.25-8.50c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 1000-10,000 lb; 1c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lb) 20.50c per lb, carlots; 22.50c 100 lb to c.l. Extruded 12-in. sticks 27.50c, carlots; 29.50c 100 lb to c.l.

Tin: Prices ex-dock, New York in 5-ton lots, Add 1 cent for 2240-11,199 lbs., 1¼c 1000-2239, 2¼c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Stralts), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87¼c; Grade C, 99.65-99.79% incl., 51.62¼c; 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 fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224 lb.; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ¼c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, fob refinery 25.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c.

Mercury: Open market, spot, New York, \$103-\$107 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., \$14.75 lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, \$1.50 lb., for 550 lb. (bbl.); \$1.52 lb. for 100 lb. (case); \$1.57 lb. under 100 lb.

Indium: 99.9%, \$2.25 per troy ounce.

Gold: U. S. Treasury, \$35 per ounce.

Silver: Open market, N. Y. 70.625c per ounce.

Platinum: \$35 per ounce.

Palladium: \$24 per troy ounce.

Iridium: \$165 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 22.08c; yellow brass 20.81c; commercial bronze, 90% 22.40c, 95% 22.61c; red brass, 80% 21.48c, 85% 21.69c; phosphor bronze, grades A and B 5%, 38.77c; Everdur, Herculey, Duronze or equiv., 27.33c; naval brass 25.83c; manganese bronze 29.33c; muntz metal 24.08c; nickel silver 5% 28.62c.

Rods: Copper, hot-rolled 18.60c, cold-drawn 19.60c; yellow brass 16.04c; commercial bronze 90% 22.35c, 95% 22.56c; red brass 80% 21.43c, 85% 21.64c; phosphor bronze grades A and B 5% 39.02c; Everdur, Herculey, Duronze or equiv., 26.53c; naval brass 20.15c; manganese bronze 23.53c; muntz metal 19.90c; nickel silver 5% 20.87c.

Seamless Tubing: Copper 22.42c; yellow brass 23.55c; commercial bronze 90% 24.79c; red brass 80% 24.12c, 85% 24.33c.

Extruded Shapes: Copper 22.10c; architectural bronze 20.15c; manganese bronze 25.03c; muntz metal 21.13c; naval brass 21.40c.

Angles and Channels: Yellow brass 29.31c; commercial bronze 90% 30.90c, 95% 31.11c; red brass 80% 29.98c, 85% 30.19c.

Copper Wire: Soft, fob eastern mills, carlots 15.37¼c, less-carlots 15.87¼c; weatherproof, fob eastern mills, carlots 17.00c, less-carlots 17.50c; magnet, delivered carlots 17.50c, 15,000 lb 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	35.80c
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 fob mill, 13.15c; 36,000 lbs. and over deduct 7%; Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

PLATING MATERIALS

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c fob Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c fob Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c fob Grassell, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 35.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c fob Niagara Falls.

Scrap Metals

Brass Mill Allowances: Prices for less than 15,000 lbs. fob shipping point. Add ¼c for 15,000-40,000 lbs.; 1c for 40,000 or more.

	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	8.625
Phos. br., A, B, 5%	11.000	10.750	9.750
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 fob shipping point; add ¼c for shipment of 60,000 lbs. of one group and ¼c 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) Admiralty condenser tubes, brass pipe, 7.25c; muntz metal condenser tubes 6.75c; old rolled brass 6.75c; manganese bronze solids; (lead 0.00%-0.40%) 5.50c; (lead 0.41%-1%) 4.50c; manganese bronze borings; (lead 0.00%-0.40%) 4.00c; (lead 0.41%-1%) 5.00c.

Aluminum Scrap: Price fob point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb., 11, 14, etc., \$ to 3.50c lb. All other high grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb. borings and turnings one cent less than segregated.

Lead Scrap: Prices fob point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings 6.50c, old zinc 4.75c, fob point of shipment, add ¼c for 10,000 lb or more. New die cast scrap 4.45c, radiator grilles 3.50c, add ¼c for 20,000 lb or more. Unsweated zinc dross, die cast slab 5.30c, any quantity.

Nickel, Monel Scrap: Prices fob point of shipment; add ¼c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ¼% copper 23.00c; 90-98% nickel, 23.00c per lb nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 148

Sheet production is being maintained at a better rate than other major steel products but continuance of the coal strike threatens curtailment within a short time. Consumers have been able to increase their operations after settlement of their labor troubles and pressure for sheets and strip is growing. Producers are filled for the remainder of the year and in some cases into next year.

New York — With consumers stepping up their production, pressure for sheets is more intense. A number of large metalworkers are now operating at the highest rate this year, and should the coal strike be terminated shortly, this pressure will become even greater. However, should soft coal operations continue suspended much longer, the trend in metalworking operations will drop sharply. Certain plants already are beginning to feel the pinch of a lack of fuel, although operations have not been affected so far.

Under present circumstances sheet producers are unable to make firm commitments. So far most have not had to curtail production because of shortage of fuel, but this possibility hangs over them heavily. Another week or so of the coal strike should see an appreciable decline in sheet production, a decline that has already taken place in certain major products such as bars, plates and rails.

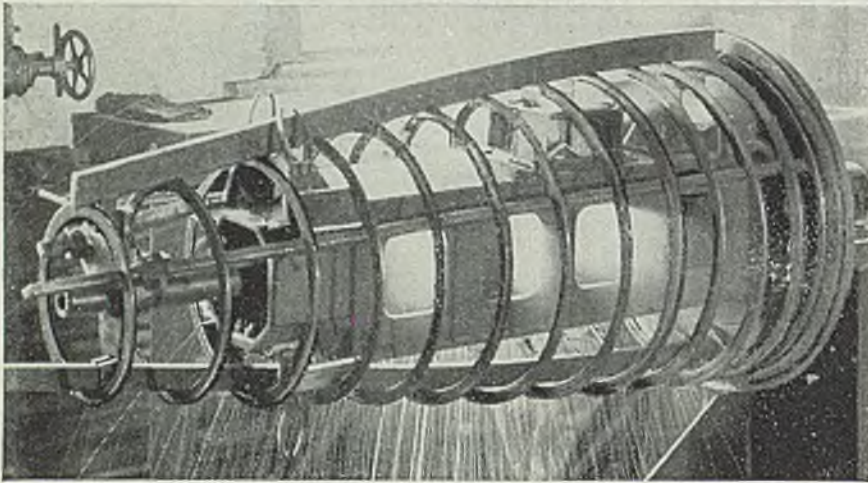
Although technically producers who are scheduling their output on a quarterly quota basis, have not opened books for third quarter, or, in some cases for fourth quarter, buyers other than regular customers appear to have little chance of getting tonnage on books for shipment over the remainder of this year.

In general, producers have not opened books for next year, but the situation for at least the first few months of 1947 appears to be about as tight. Certain producers who had practically sold out production for this year before the steel strike will have a substantial carry-over into 1947, and it is doubtful that when they do open books for next year they will be able to do so on sheets for delivery much before the first of March; if the coal strike continues long it will be still later.

Cincinnati — Sheet mills have avoided a cut in schedules, but the fuel situation will approach the critical stage soon after the first of the month. In addition to dependence on coke, one district interest relies on coke oven gas. Uncertainty hanging over production in the next few weeks has brought delay in making up third quarter schedules. Inquiries disclose the desperate situation for many fabricators because of tight supply of sheets and strip.

Cleveland — Sheet and strip mill operations are holding at a steady rate and likely will continue to do so for three or four weeks after shipments of slabs from the mills are halted, since most can operate that long on reserves of material. Deliveries are holding close to revised schedules. Sellers are not making delivery promises on new business, mills being well filled for the balance of this year.

Boston — There is no easing in de-



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Our thanks to L. O. Koven and Brother, Inc., a good and valued King customer, for the use of the photo.

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mand for flat-rolled products with mills filled for the year on most grades, revising and reducing allotments in some instances. Narrow cold strip suppliers are hampered by lagging deliveries of hot-rolled; production has declined in spots. Fabricators of both sheets and strip have small inventories as a rule and are pressing for stock; more post-war production programs have been scaled down. Interwoven with revisions in planning is the pricing policy of OPA which has forced producers to drop numerous lines or produce only goods permitting profit. Report selling some products below cost or at break-down prices to maintain market position. Because of lack of tenders considerable cold strip is up for rebids at the Springfield arsenal.

Chicago — Thus far, the coal strike has affected sheet and strip production in only one district mill, but curtailment is likely to occur from this point on as dwindling fuel stocks force conservation. Consumers continue to press for sheets and strip, both for material already on mill books and to enter new tonnage. Most producers maintain they are booked solid for the balance of the year and decline future commitments.

Birmingham — Demand for sheets greatly exceeds supply. Farm users of sheets are insistent upon deliveries that cannot be made and processors are given only a small part of their requirements.

Steel Bars . . .

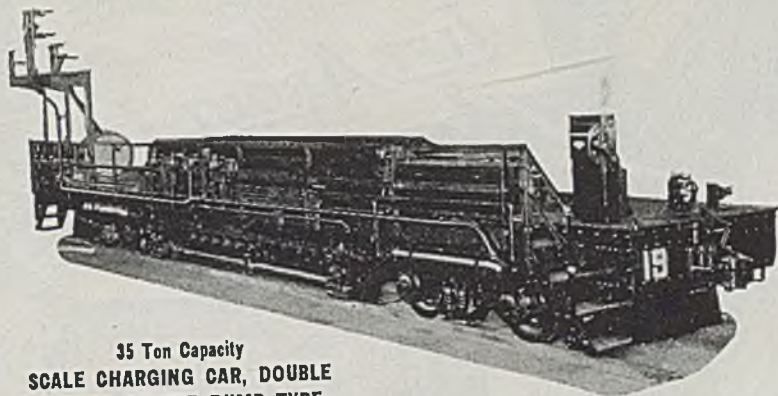
Bar Prices, Page 148

Reduced production of steel bars results in tightening of supply to consumers, several bar mills now being idle from lack of fuel, which has cut down supply of steel for finishing mills. Fabricators using bars have been able to increase operations but find supply of material decreasing. Especially in small sizes it is difficult to place orders for delivery before the end of the year.

New York—Decline in production as a result of the coal strike, combined with heavier consumption since consumers have been able to increase operations, has resulted in greater tightness in carbon bars. So far this month average shipments have been heavier than last month, reflecting good operations late in March and for a while this month, but the trend in output at mills is now down, because of curtailment in metal due to the coal strike; at the same time, operations at consuming plants have been generally higher, although this will not last unless there is early relief in coal supply. Those not protected by orders or quota arrangements are finding it virtually impossible to get hot carbon bars before late this year, and then only in larger sizes. Much of this same situation is also true in cold-drawn carbon bars.

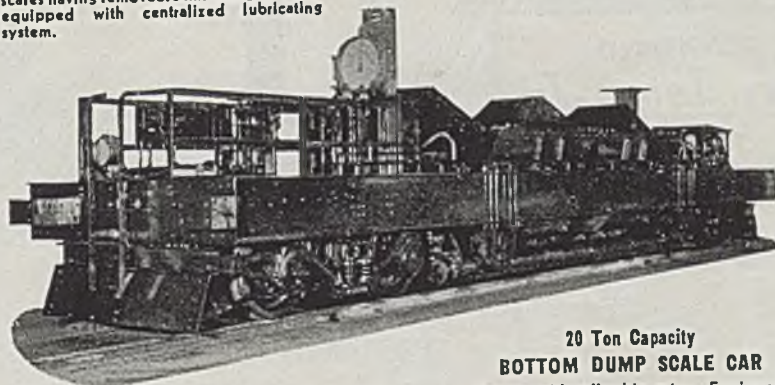
Pittsburgh — Some bar mills have been shut down and intermittent operations are reported at other plants, due to the coal strike. One interest reports current production is less than 25 per cent of previously planned output. By mid-May many steel consumers will either be forced to shut down plants or curtail production schedules unless the coal strike ends. Cold finishers already have been forced to taper production in line with reduction in mill shipments

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of carbon bars. Some interests in this field state that they have sufficient stock for a week to 10 days' balanced operations. A critical supply situation is reported in smaller bars in particular, with mills booked through this year.

Cleveland—Hot-rolled bar mills which require coke gas are curtailing operations gradually and by the end of this week will be well below the pre-coal-strike level. Cold rollers will be able to maintain operations for several weeks after steelmaking has ceased, by drawing on reserve stocks. All mills are booked well into first quarter of 1947 and there may be little available for that period if the coal strike lasts a week or so longer. Hot-rolled bar shipments now average about ten weeks behind schedule as a result of the steel and coal strikes. Alloy bars still being sold on old price basis, with provision that there will be a subsequent upward revision in prices.

Chicago — Return of farm implement plants to production after a strike shutdown of nearly 90 days is placing considerable pressure on bars, which will become more acute as operations step up to full output. Other bar consumers in this district profited by the implement plant tieup, but from now on the situation will grow tighter. Most barmakers are booked through the balance of the year and there is serious question as to whether commitments can be filled because of loss of steel production from the coal strike. Already consumers are showing interest in substituting for open-hearth carbon bars the electric furnace low alloy and carbon grades, since this capacity has not been running full.

Boston — Only hot-rolled alloy bars are obtainable on an early delivery basis, some mills promising June in both open-hearth and electric furnace grades. Cold-drawn alloys in small sizes have joined hot and cold-drawn carbon bars, sold through this year. Most forge shops are in need of bars and are adjusting schedules accordingly. More consumers are forced to buy from surplus; St. Pierre Chain Corp., Worcester, Mass., took 180 tons; Detroit Nut Co., Detroit, 242 tons. Close to 1000 tons were removed from surplus recently.

Steel Plates . . .

Plate Prices, Page 149

Plate consumers continue to inquire for tonnage but most producers are well sold through the year, especially in view of limited production because of the coal strike. Demand for boilers and tanks is heavy, replacement needs and new work bringing much work to fabricators.

Philadelphia — Plate demand continues active and with production adversely affected by the coal strike little tonnage is available before late in the year. At least two district producers have no tonnage available for this year. This situation promises to become still tighter if the coal strike continues long. Some eastern plate mills have been little affected by the strike and claim they probably could go on at the present rate for another week or ten days. Others active in this district have had to curtail or are making plans to do so immediately. One large seller in the Philadelphia district, with plants elsewhere, has been hard hit almost from the first. Boiler and tank fabricators are being

confronted by the heaviest demand in peacetime history, due not only to expanding requirements for new work, including the housing program, but to heavy replacement needs accumulated during the war.

Boston — Plate tonnage open for fourth quarter is small in sizes wanted by most fabricators, namely light gages for welded tanks under 5000-gallon capacity and boiler shops; for heavier plate weldments material is less tight, although some mill schedules are losing ground because of the coal strike. Fabricators are slowing down because of unbalanced inventories or lack of steel; Gilbert & Barker Mfg. Co., West Springfield, Mass., large producer of gasoline pumps, is curtailed because of material shortages. Except for shipyards, demand for plates is active; reconversions for commercial service require small tonnages, including the Yarmouth and Evangeline, Eastern Steamship Co., for the Maritime Province run. Bath Iron Works still has a backlog approximating \$21 million, but delays in steel have set back production about two months behind schedule. Several water tanks and standpipes, taking around 500 tons, are being estimated. Bradley Works, Pullman-Standard Car Co., Worcester, Mass., has booked 100 air-conditioned trolley cars for Atlanta, Ga.

Cleveland—Although some plate mills have been closed since the beginning of the coal strike, delivery in the fourth quarter is being promised by some sellers. Tonnage lost during the steel and coal strikes represents nearly one-fourth of the year's potential output.

Birmingham — Plates are being allocated on as an equitable basis as possible. Plate bookings are unusually heavy, with deliveries generally into fourth quarter and next year in some instances. While output has not been cut due to the coal strike, that move is seen as an early probability.

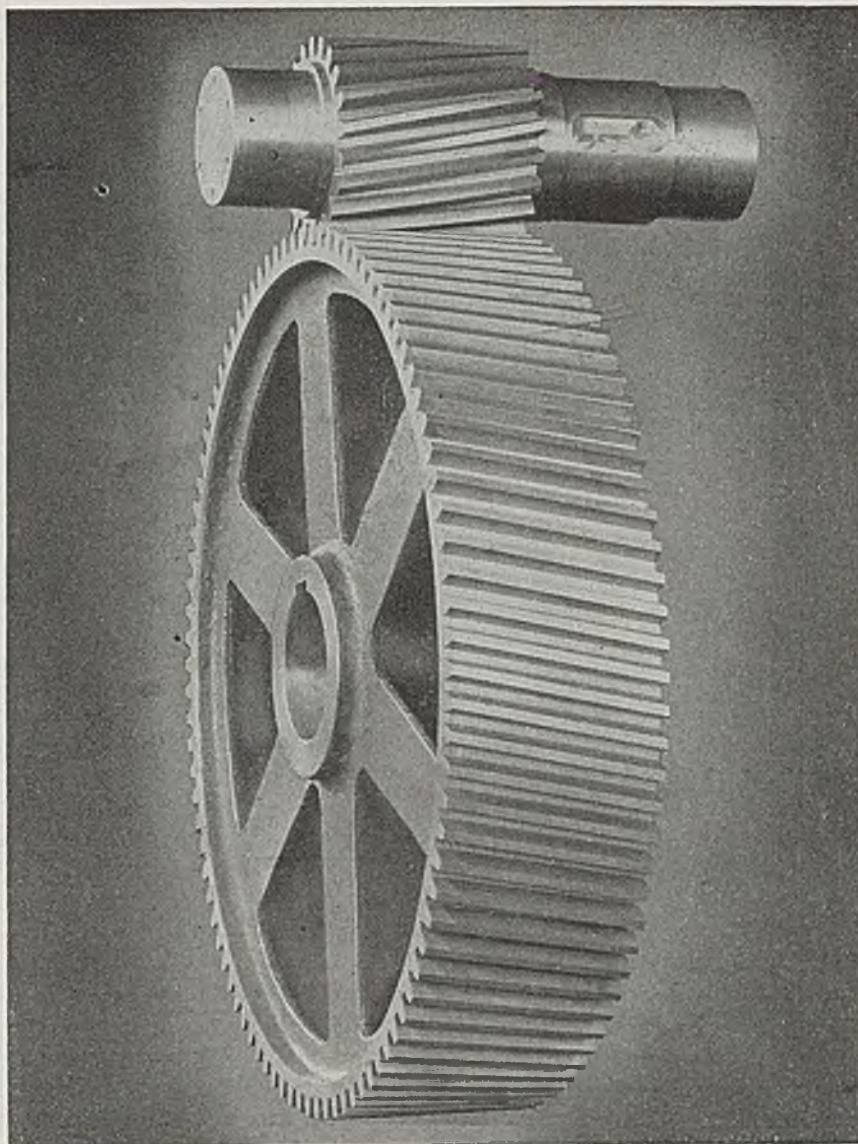
Seattle — More than 2000 tons of plates are required for a 10½-mile 18-inch water line for Hillsboro, Oreg., for which P. S. Lord & Co. have the general contract. Fabrication of the pipe has not been awarded. Commercial Point Shipyards, Bellingham, Wash., has launched the first welded steel power barge built in this area, for service at an Alaskan cannery plant. The same plant is building three 85-foot welded tank barges for Taku Vessels Co., near Wrangel, Alaska.

Wire . . .

Wire Prices, Page 149

Boston — Wire mills are filled on high carbon specialties into next year and some are tentatively booking volume so extended. Selectivity in scheduling orders is growing, but tight and uncertain rod supply hampers most. Few rod producers are selling on the Worcester base and inventories are low. Demand for valve spring wire is heavy, also other spring wire and screw stock. Some additional spring wire is made available by lower demand for rope wire capacity, aiding slightly pressure for upholstery spring material. In some sizes music wire is available in third quarter. Patenting is a choke point with most producers.

New York — Manufacturers of upholstery springs who have been caught



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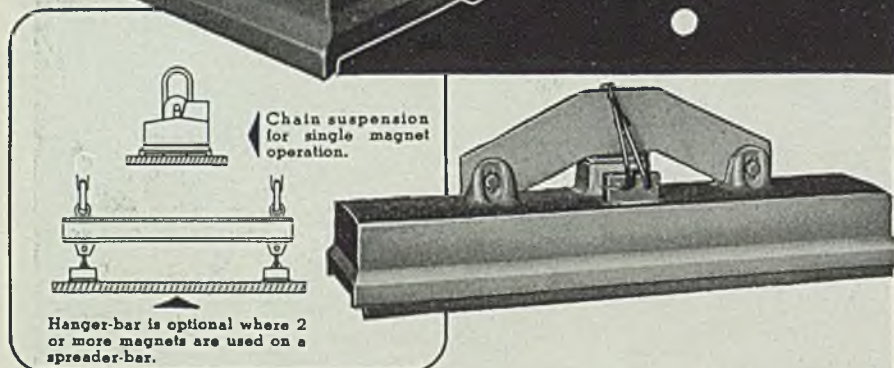
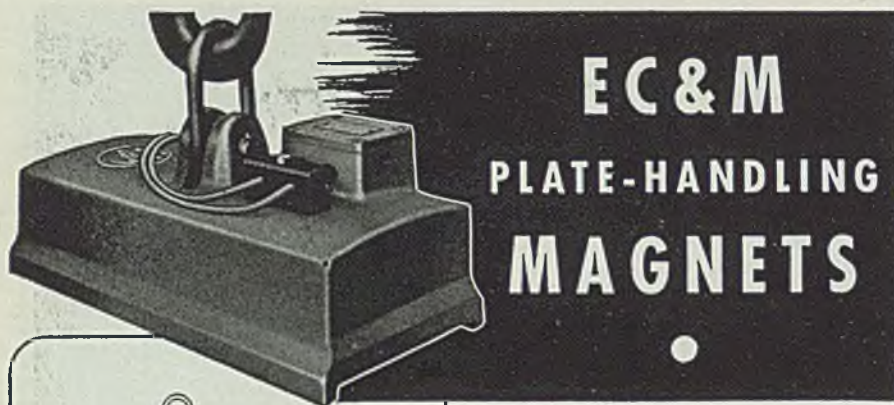
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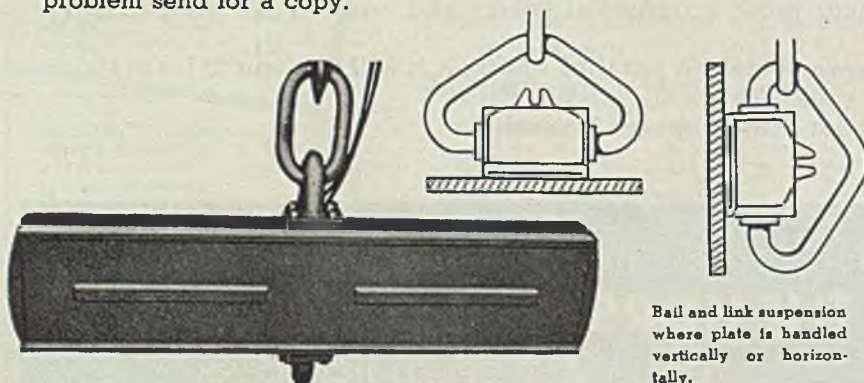
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New Bulletin 903 gives complete information,—lifting-capacity tables, weights, dimensions, etc. If you have a plate-handling problem send for a copy.



in a squeeze since the advance in wire prices have been given an increase of 8 to 10 per cent in dollars and cents ceilings, effective Apr. 25.

Birmingham — Mill output of wire, thus far unaffected by reduction in ingot supply, is considerably behind current needs. The shortage not only is acute in drawn wire but in fencing and nails, now largely in demand from agricultural interests.

Tubular Goods . . .

Tubular Goods Prices, Page 149

Cleveland — May pipe quotas have been set by some producers which show an increase of 50 per cent for butt-weld over those for April, which were low, due to the heavy carryover resulting from the steel strike. Fulfillment of the quotas is dependent upon operations during the month. Many butt-weld mills have been operating at 20 turns a week for over a month. Pipe demand is especially heavy for 1-inch and smaller, required for essential plumbing and heating and industrial plant expansion and remodeling. Line pipe has increased sharply also since the end of the war due to increased use of oil and gas for home heating and extension of gas service to new communities.

Manufacturers of rigid conduit, electrical metallic steel tubing and flexible conduit have been granted a price increase factor of 13 per cent over present ceiling prices, effective Apr. 23 and exclusive of any increases established by individual producers.

Seattle—Cast iron pipe agencies are making every effort to obtain shipments on contracts for water pipe but deliveries are three to six months forward. This reduces incentive to bidding on new business, of which a large amount is offered. Curtailed production and threatened interruption of water shipment have aggravated the already tight situation. Helena, Mont., V. N. Kessler, clerk, opened bids Apr. 22 for about 100 tons of 6 and 8-inch pipe and accessories.

Structural Shapes . . .

Structural Shape Prices, Page 149

New York—Structural inquiry has declined appreciably as a result of the CPA building restriction order. Various projects are being held up pending approval by CPA. However, as precedents become established there should be much less delay; also, it is believed, a number of jobs now in question will be permitted to go ahead. Some large fabricators report that inquiry is down 50 per cent or more from the rate of a few weeks ago, before issuance of the order.

Meanwhile, both fabricators and shape mills, particularly the latter, are booked well ahead, with business that is apparently exempt from the order, structural work on which building had been sufficiently started to make it exempt and other jobs which had been placed before and since the issuance of the order and which are in no way affected because of character of the work involved. So far there have been relatively few cancellations, district fabricators declare.

Boston — American Bridge Co., Pittsburgh, is low on the steel bridge superstructure, Penobscot river, Howland-Enfield, Me., 865 tons, at \$144,304.84 or

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\$30,528.69 under Phoenix Bridge Co., second low. Relatively little structural tonnage on books has been affected by the construction limitation order; some new inquiry has been held back while there are scattered new authorizations. Vermont has bids on a 475-ton bridge and estimates are in on several small structures, including beam spans. Three bridge contracts are inactive in Connecticut, one due to lack of steel. Bids on federal aid projects not exceeding 1940 price levels by more than 35 per cent are approved; between 35-50 per cent joint approval by state and federal officials are required while above 50 per cent reconsideration of the entire project by the federal agency is necessary.

Philadelphia—Although structural demand is off there still is enough to sustain backlogs of most district fabricators and the situation in shapes appears about as tight as ever, with both fabricators and producers still highly selective in acceptance of tonnage.

Chicago — Fabricators are apathetic on new business because of inability to obtain material. New inquiry for fabricated structural steel has dropped sharply.

Cleveland — No construction project involving any sizable amount of structural steel has been postponed so far in this district under the government's building limitation order. Most structural orders are for essential and non-deferrable construction, indicating there will be only slight revision in fabricating schedules. Mill deliveries of plain material are slowing and will drop sharply in May if the coal mines remain closed. Little railroad or highway department business has been booked recently, the latter having difficulty in finding bidders. Fabricators are selective in accepting business and are promising November-January delivery. Detailing and estimating departments have improved their positions during the last three months.

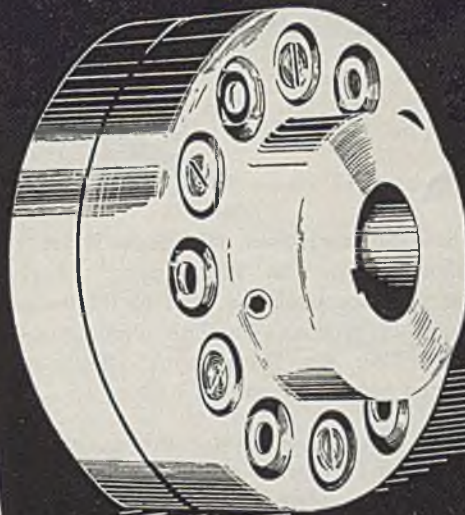
New York — American Institute of Steel Construction reports March bookings of 164,568 tons and shipments of 86,872 tons, compared with 121,574 tons and 50,265 tons, respectively, for February. First quarter bookings of 511,179 tons compared with 328,416 tons, the average for 1936-40.

Birmingham — Fabricators are in difficulty on shapes. Mills are unable to put through enough tonnage to meet current needs. Substitutes are being used where possible and some construction requiring structural shapes has been deferred.

Seattle — Fabricating plants are marking time except for small jobs, mainly industrial. Due to lack of shapes little interest is shown in major projects, including the Narrows bridge, bids for which have been postponed until the situation is cleared. District office of CPA has approved a number of industrial projects, exceeding \$5 million in cost. Included is a \$941,000 wallboard plant for Simpson Logging Co. at Shelton, Wash., 90 x 900 feet and a sulphite and pulp plant at Longview, Wash., for Weyerhaeuser Timber Co. Also favorably recommended is a 210 x 250-foot hangar, offices and shops at Seattle, for Northwest Air Lines. Manson Construction Co. and Sound Construction & Engineering Co., Seattle, submitted the joint low bid at \$2,850,000 for navy piers for the idle ship base at Tongue Point, Oreg.



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Reinforcing Bars . . .

Reinforcing Bar Prices, Page 149

Pittsburgh — Reinforcing bar production by a leading mill here was curtailed further last week and similar reduction by other interests is probable unless the coal strike ends soon. Due to the uncertain outlook one interest here is not accepting business. Industry-wide output of reinforcing bars currently is estimated at about 30 per cent of fourth quarter last year. Inquiry has been little affected by recent housing regulations. Pending work involves nearly 20,000 tons for the New York Housing Authority, for which a number of projects are to be bid over the next two months.

Chicago — New reinforcing steel business goes begging, as suppliers are forced to confine activities within the range of mill allocations. In the past two weeks most business booked has been under 100 tons as these can be fitted into schedules. Producers are booked virtually through the balance of the year.

Pig Iron . . .

Pig Iron Prices, Page 151

Continued shortage of pig iron threatens closing of foundries, although up to this time most castings producers have been able to carry on in spite of lack of iron and scrap, using inventories, which now are approaching depletion. Lack of fuel will cause more blast furnaces to bank during the next two weeks.

Pittsburgh — No foundry in this area has yet been forced to curtail operations due to shortage of pig iron and coke, but unless the coal strike is terminated soon, many will probably have to begin reducing production early in May. In most instances pig iron is more critically short than coke. The lone merchant pig iron producer here plans to maintain near capacity output through the middle of May. However, shipments of iron into this area from merchant producers in Cleveland, Erie and Toledo are well below former volume, and foundries are steadily eating into limited inventories. The coal strike already has forced banking of 26 blast furnaces in the Pittsburgh district, with further reduction indicated over the next two weeks.

New York — District foundries have weathered the coal strike so far in fairly good shape, in spite of the growing shortage of pig iron and coke. In fact, the melt for April, it is believed, will actually exceed that for March, during which blast furnaces were still slow in getting into production after the steel strike. So far in April furnaces supplying this district have been able to maintain a higher average rate of production. However, should the coal strike continue much longer, the melt will be off sharply in May. Various furnaces not yet affected will be banked and consumers, having relatively little pig iron and coke on hand, will be forced to curtail.

Philadelphia—Some eastern blast furnace operators have continued production up to the present, a longer period than they had thought possible when the coal strike first developed, but are nearing the end of their reserves. Continuation of the strike over the next week or



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two should see them curtailing, as has been the case with some others serving this district. Most foundries so far have received enough iron, with scrap, to keep going at as high, if not higher, rate than in March, but the outlook is less promising for May, with settlement of the coal strike uncertain and most grades of foundry scrap scarce. Use of alloys in briquets and other forms, however, has helped meet the situation so far but principal worry at present is continuation of adequate amount of metal.

Chicago — Numerous foundries are forced to curtail operations from shortage of materials. In some instances, lack of coke and scrap is almost as critical as pig iron. Currently only 21 of 34 blast furnaces active before the strike are now running. All of these have been banked by Carnegie-Illinois Steel Corp., but within the next week or two bankings by other furnace interests will be forced by shrinking coal supply and for at least a month or six weeks foundries face discouraging prospects.

Cincinnati—Foundries in this district are on the verge of curtailments due to shortage of pig iron. Shipments, especially of northern iron, have been sagging but reserve stocks helped to make up the deficit and enable production not far below previous levels.

Boston — Pig iron shipments are falling and with reserves small, additional foundries revising production schedules downward. Available iron is being distributed as thinly as possible to cover emergency cases, but this is becoming more difficult. Meanwhile producers of castings are turning away considerable volume and are behind on deliveries to most industries. Steelworks are maintaining operations, but with no iron to spare in practically every case.

Buffalo — Two more blast furnaces were banked last week as a result of the coal strike, bringing the pig iron rate to 62½ per cent for this district. Other stacks have slowed production. Diminishing output is being allocated but is far short of meeting increased foundry demand.

Birmingham — Pig iron supply is increasingly precarious. Demand is unprecedented and production is much reduced, not only in merchant iron but also for steelmaking. Tennessee Coal, Iron & Railroad Co. is operating only three blast furnaces. Sloss-Sheffield Steel & Iron Co. has one stack on ferromanganese and may be forced to take off one of its three on merchant iron by May 1.

Scrap . . .

Scrap Prices, Page 152

Scrap demand is heavier than ever and supply shows no improvement. Shortage of pig iron as a result of the coal strike causes use of more cold scrap in open hearths as steelmakers strive to continue production at as high rate as possible. Dealers in many cases bid high for unprepared scrap, which is sold at ceiling, by sacrifice of part of the differential for preparation in yards. High freight charges are paid to obtain scrap from a distance.

Boston — High bids for unprepared open-hearth steel scrap in open sales reflects shortage of that grade and yard dealers' absorption of part of the \$3.50 per ton for preparing. Around 1200



WHAT ARE WE PAYING FOR?

The other day a friend of mine said he was beginning to think about taxes. Here's what he said:

"I just wrote a sizable check to finish paying my 1945 federal income tax. I don't have a big money income, but last year I paid about \$4,000 tax on it. I pay state and local taxes besides.

"That \$4,000 is the salary of a pretty good man, and I'm paying it all.

"What is my 'bureaucrat' doing for me?

"When I buy a car of steel or coal, or a machine, or a new suit of clothes, I try to get my money's worth or I don't buy.

"What kind of value do I get from the federal employee whose entire wages I pay? Is he doing anything for me, or is he just living off of me?

"Maybe our painless method of paying taxes has made me forget some of my responsibility for making things better. It's easier to criticize than to correct. I'm going to talk it over with my congressman."

I believe that most of our troubles—production, labor, prices, black markets and all—start at home. Perhaps we should do more toward curing them at home. Some of us have too often dropped the difficulties in government's lap, and then we've kicked about the results.

Let's talk things over among ourselves, as well as with our congressmen.

Geo. T. Trundle Jr.
President



This organization of over a hundred trained engineers has twenty-seven years of consulting management engineering experience. We invite you to write for more information, or to request a personal interview in your office.

THE TRUNDLE ENGINEERING COMPANY

Cleveland, Ohio, Bulkley Building
CHICAGO, City National Bank Building, 208 S. LaSalle Street
NEW YORK, Graybar Building, 420 Lexington Avenue

tons at naval shipyards brought better than the \$11.55 unprepared ceiling and unprepared arsenal scrap as high as \$12.38 per gross ton. Bids on 2400 tons of steel scrap accumulations at Boston navy yard to June 30 are also in the high range. Demand is active, also for cast and shortage in that grade offers slight chance of compensating for lack of iron for any increase in foundry melts. Machine shop turnings and borings, notably short turnings, are not coming out in heavy volume; industrial material for bundles is also limited.

Cleveland — Continued heavy demand for scrap for steelmaking marks the situation as a larger proportion is used in open-hearths to make up for lack of pig iron. Supply is not improved

and high freight charges are paid to obtain remote material. Low phos grades continue to be bought for open-hearth use, limiting supply for electric furnace melting.

Cincinnati—Prospects of a decrease in steelmaking and foundry melt, due to the coal strike, have failed to dent demand for iron and steel scrap. On the contrary, inquiries are increasing in apparently futile efforts to balance scarcity of pig iron. Production scrap has been coming out more liberally, but this trend may be checked. High freight charges are no bar to purchase of cast scrap.

New York — Pressure on scrap continues strong with supplies of melting steel moving a little freer, but with de-

mand for all offered. Pittsburgh consumers, as well as those along the seaboard, are specifying actively, paying substantial springboard prices in some cases. Cast scrap continues most critical of all grades, there being no improvement in supply. Demand for cast has increased because of shrinkage in pig iron supply.

Philadelphia — Movement in scrap continues somewhat freer, although there is demand for all available, with some limited tonnages of steel scrap moving from this district to the Pittsburgh area. Despite lack of indications of settlement of the coal strike consumers of steel scrap are still buying actively and in the case of turnings there is greater scarcity than at any time in recent weeks, second only to that in scrap grades.

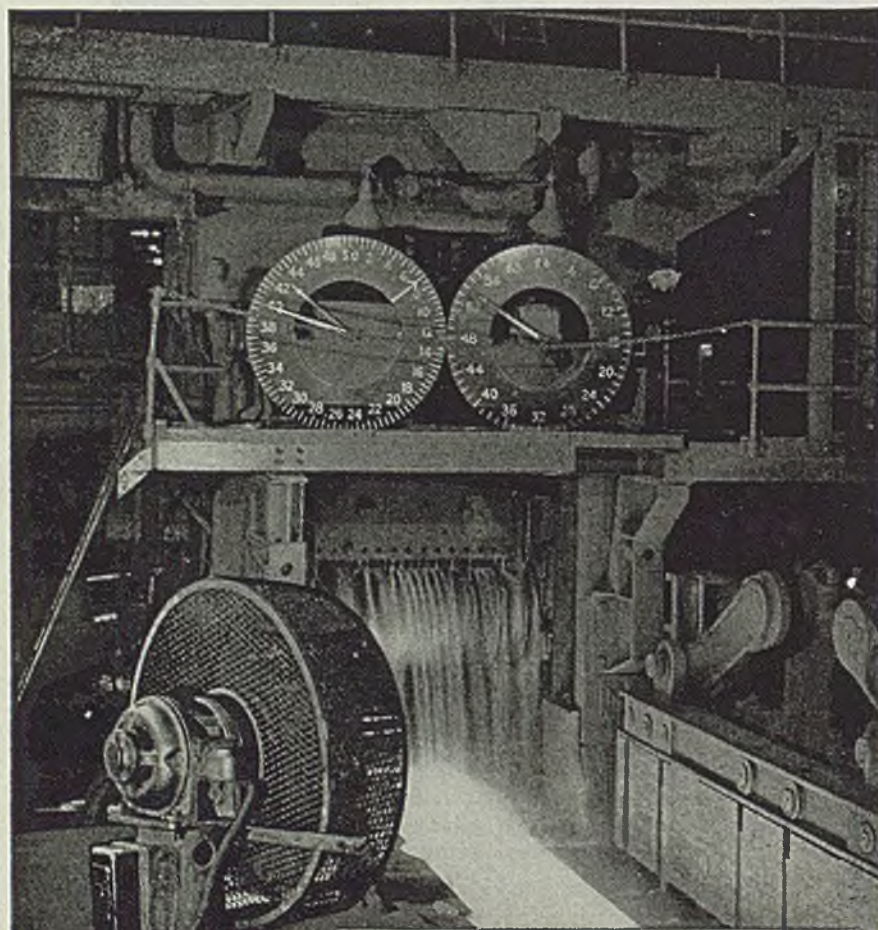
Recent offering of 4000 tons of unprepared scrap at Frederick, Md., attracted more bidders than usual, 20 in all, with 18 bidding above the ceiling level of \$13.03, which applies to consumers. Highest bidders were J. Breman & Sons, Palmyra, Pa., who took 500 tons at \$15.17; second highest were B. Abrams & Sons, Harrisburg, Pa., who took the remaining 3500 tons at \$15.13. On 3000 tons of unprepared submarine scrap at the Philadelphia Navy Yard Bethlehem Steel Co., Bethlehem, Pa., and Luria Bros., Philadelphia, were high at the consumer ceiling price of \$14.01 and on 1000 tons of machinery Michael Flynn, New York, was high at \$21.61.

Pittsburgh — Despite gradual tapering in foundry, steel and blast furnace production scrap stocks are not being built up sufficiently for expected needs. Only one interest here has a sizable stockpile, due largely to recent reduction in operations. Consumers continue to accept all good quality scrap, including low phos grades for open-hearth operations, and are not so critical as to proper segregation in respect to alloys. Industrial scrap is scarce as many metalworking companies have been unable to increase production. The fact that consumers still are meeting springboards up to \$2.50 per ton on heavy melting steel, and are paying higher freight equalization (now \$2.50 per ton in contrast to \$1.50 until recently) on turnings, indicates the keen interest in limited scrap available. War surplus material has been a helpful factor in aiding dealers and brokers meet the heavy scrap requirements. However, shortage of pig iron has accentuated the tight cast scrap supply.

Chicago — Although the steelmaking rate has dropped from 92 to 71 per cent of capacity, scrap consumption has declined little. Reason is that Carnegie-Illinois is the only producer which has curtailed ingot output and it is more or less self-contained on scrap. Throughout the strike, demand for scrap has exceeded supply. Offerings are small and material is sought in outside districts, springboards notwithstanding. Ceiling prices prevail on all except alloys. Shortage of foundry and cast scrap is critical, when pig iron is insufficient.

Washington — Approximately 40,000 tons of steel and iron scrap at Makalaps dump, Pearl Harbor navy yard, has been awarded to the Learner Co., Oakland, Calif., following opening of bids Apr. 15.

Buffalo — Consumer scrap stocks have been reduced sharply as larger proportions are used in steelmaking, to replace scarce pig iron. A full cargo of 5000



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tons, first of the season, has arrived from Duluth. Approximately 40,000 tons have been contracted for shipment here from the upper lakes. The canal season has been opened by receipt of 2000 tons of scrap.

Birmingham—General tightening is evident in scrap, attributable in large part to pig iron shortage. Scrap users are taking what they can get but there is not enough. The shortage has not thus far worked undue hardships but supply must improve shortly to prevent that result.

Seattle—Scrap supply continues satisfactory, with ample supply of good material. The principal mill consumer is buying to equal consumption, holding inventory even. Material from shipyards is being used but a large tonnage of similar scrap from the Portland, Oreg., area is being shipped east. Prices are steady. War Assets Administration has sold for scrapping 15 army narrow-gage locomotives for \$7695. Original cost was nearly \$500,000. Three 110-ton units went to Dulein Steel Products Co., Seattle and thirteen 60-ton units to M. Bloch & Co., Seattle.

Warehouse . . .

Warehouse Prices, Page 150

Pittsburgh — Steel distributors report a flurry of new inquiries resulting from gradual reduction in mill finishing operations. Most of these inquiries, however, are being rejected, as warehouse inventories are well below normal and unbalanced. In popular items, such as nails, wide flange structurals, galvanized sheets and light-gage sheets and strip, stocks are nearly depleted.

Seattle — Warehouses report strong demand for all steel items but inventories are at low level, the situation being reportedly worse than during the war. War agencies are being urged to release surplus holdings of nails, which are critical, retarding construction. Sheets are practically unobtainable. Bars, plates and shapes are somewhat improved, due to supplies from Coast mills, which, however, can not meet demand.

Cincinnati—Mill shipments to warehouses have declined abruptly in the last two weeks, creating a critical situation. Sheets and structurals are almost unobtainable, other items scarce.

New York — Warehouse inventories are more out of balance with replacements in smaller sizes and gages required. Mill shipments of heavier types are relatively fair, but demand for this class of material is not brisk. Alloys also lag behind carbon products in pressure for steel. Jobbers are unable to place new orders for most wanted materials for delivery over the balance of this year and with replacements behind schedule and losing ground, no early relief is in sight.

Chicago — Warehouses have no opportunity to even hold their own in view of restricted mill receipts and tremendous consumer demand. The drain on stocks which expanded during the recent steel strike has continued at a high level, and now the coal strike is interfering with flow of steel from mills.

Philadelphia — Jobbers report substantial increase in business for April because of increased mill shipments. One leading distributor estimates the April gain at about 15 per cent on a daily tonnage basis. However, the prospect for May is less promising.

Nonferrous Metals . . .

Nonferrous Prices, Page 153

New York—Pending expected increases in ceiling prices for copper, zinc and lead, producers have been conservative in offering these metals for delivery in May on a flat price basis. Predictions are that copper will go to 14 cents, zinc to at least 9 cents and lead probably to 8.50 cents. These are guesses, however.

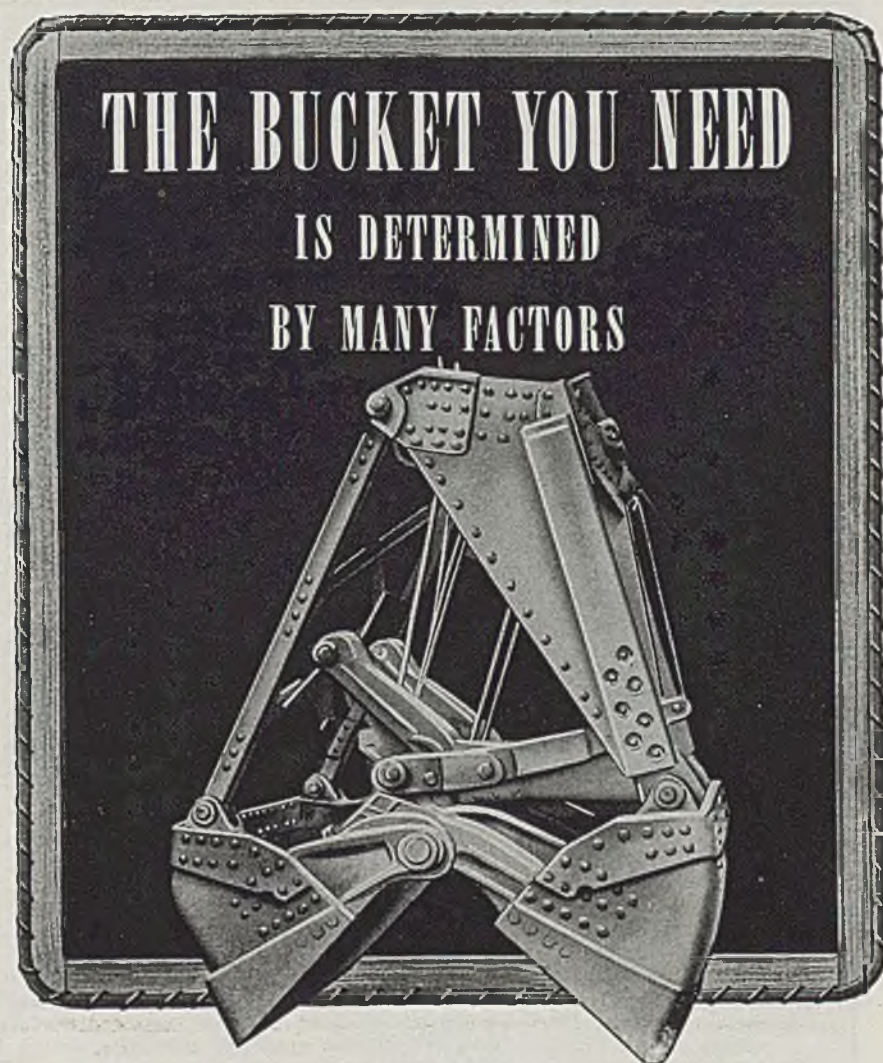
Production and distribution of major nonferrous products have been interrupted by strikes since January, but settlements appear near in most cases. Voluntary rationing of copper and lead again is requested by CPS. There are shortages in some wire forms, wire bars es-

pecially, although the stockpile of copper at the beginning of April was 444,-402 tons. Brass special and regular high-grade zinc are expected to become more active when stoppages end at major brass mills. Stockpile of tin is close to 54,000 tons, about 22,000 tons in the form of pig tin and the remainder in ore and concentrates.

Iron Ore . . .

Iron Ore Prices, Page 150

Consumption of Lake Superior iron ore in March snapped back to practically normal after the low figure in January and February, while the steel strike was on, according to the Lake Superior Iron



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BLAW-KNOX BUCKETS

Ore Association, Cleveland. March consumption was 6,021,018 gross tons, compared with 1,748,469 tons in February and with 7,082,076 tons in March, 1945. For the first three months this year consumption was 11,488,445 tons, against 20,435,199 tons in the comparable period in 1945. Stocks at furnaces and Lake Erie docks as of April 1 totaled 27,601,106 tons, compared with 17,303,561 tons a year ago.

Strikes at iron mines and effects of the steel strike resulted in a 61 per cent decline in iron ore production during February, according to the Bureau of Mines. Output totaled only 768,387 gross tons, compared with 1,973,692 tons in January and 2,397,097 ton in February, 1945. Shipments from mines in February were

472,641 tons, a decrease of 39 per cent from January. In February, 1945, shipments were 1,139,434 tons.

According to the Bureau of the Census iron ore imports in February totaled 75,259 tons, Chile providing 44,200 tons, Algeria 19,050 tons, Tunisia 4616 tons, French Morocco 3000 tons and France 2269 tons, the remainder being scattered small tonnages.

Metallurgical Coke . . .

Coke Prices, Page 149

Pittsburgh — With exception of the Clairton Works of Carnegie-Illinois Steel Corp. by-product coke operations have not yet been curtailed. However, un-

less the coal strike ends soon other producers will begin tapering production early in May. Wheeling Steel Corp. was forced to stop coke production at its Portsmouth, O., plant last week, resulting in sharp curtailment in finishing operations; and a similar reduction was made in the Youngstown area. All bee-hive operations are at a standstill. By-product foundry coke sellers continue to book new business one month ahead, and are carefully rationing current output to regular customers. Many foundries are operating on a hand-to-mouth basis on coke, but most are more concerned about pig iron and cast scrap supply.

Canada . . .

Toronto, Ont. — Demand for steel shows no indications of abating. Buying is growing and steel producers fall farther behind in deliveries. Some mills are carrying large tonnage orders from last year and with uncertainty regarding filling of this business efforts are being made to have these commitments canceled and replaced by new orders which might be filled on a quota basis.

Recent advances in a number of manufactured products including agricultural implements, and a wide range of steel items, have given new impetus to manufacturing and a fresh outpouring of orders for steel has developed. Implement makers, rolling stock builders and electrical equipment makers have been pressing for increased deliveries, but meet only minor success. On practically all steel lines Canadian mills are booked solid through second quarter, and while some are accepting orders for delivery beyond June, others endeavor to hold commitments to this quarter. Continuation of the coal strike in the United States is now causing uneasiness among some steel producers, owing to the fact that coal supplies are sufficient only for about a month and unless relief is forthcoming it is stated that curtailment in steelmaking operations will be necessary within the next couple of weeks. Dominion Steel & Coal Corp., Sydney, N. S., with its coal supply in Nova Scotia is about the only company not affected. Both Algoma Steel Corp., and Steel Co. of Canada Ltd., depend on United States sources for coal.


Any curtailment in steel production in the United States will create further problems in the Canadian market. Steel imports from the States have not fully recovered from the steel strike and with slowing in steelmaking operations there deliveries to Canadian consumers may again drop off.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

- 4400 tons, fabricated piling, Toledo, O., to Carnegie-Illinois Steel Corp., Pittsburgh.
- 4000 tons, rebuilding blast furnace No. 6, Gary, Ind., for Carnegie-Illinois Steel Corp. to John Mohr & Sons, Chicago.
- 1400 tons, power plant for Metropolitan Edison Co., Middletown, Pa., to Belmont Iron Works, Eddystone, Pa., through Gilbert Associates, Reading, Pa.
- 1400 tons, apartment house, 300 East 57th St. Inc., New York, to American Bridge Co., Pittsburgh.
- 620 tons, addition, Bristol Laboratories, Syc-

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ARE EASILY OPERATED



Above, is pictured a 6,000 pound Brosius Auto Floor Manipulator serving a 1,000-ton forging press in the Timken Roller Bearing Company plant at Canton, Ohio.

This machine manipulates the hot blank while it is being forged under the press, and also charges and draws the heating furnaces—a multiple service with one machine.

The power for these machines is received, either from the plant supply through a flexible cable and a rotating collector mounted on the mast of the machine, or from a machine mounted gasoline engine driven generator, where the floor area may be too great for cable operation. Being self-contained, no tracks or expensive runways are needed—just a smooth reinforced concrete floor is sufficient. Write for descriptive folder on this equipment.

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Designers & Manufacturers of Special Equipment for Blast Furnaces & Steel Mills
SHARPSBURG, Pittsburgh (15) PENNSYLVANIA

- cuse, N. Y., to Fort Pitt Bridge Works, Pittsburgh.
- 560 tons, 1946 bridge requirements, various locations, for Chicago, Rock Island & Pacific railroad, to American Bridge Co., Pittsburgh; bids April 1.
- 525 tons, bridge, RC-46-3, Whitney Point, N. Y., for Howes Farrell Inc., to American Bridge Co., Pittsburgh.
- 475 tons, manufacturing building, Kankakee, Ill., for Gaines Food Co. Inc., division of General Foods Corp., to International Steel Co., Evansville, Ind.
- 350 tons, hangar, Crestview, Fla., for U. S. Engineer, to Virginia Bridge Co., Roanoke, Va.
- 335 tons, DPG span bridge, Cherokee, Iowa, for Illinois Central railroad, to American Bridge Co., Pittsburgh; bids April 4.
- 300 tons, addition for Atlas Powder Co., Atlas Point, Del., to Belmont Iron Works, Eddystone, Pa.
- 300 tons, face caissons for spillway maintenance, Grand Coulee dam, Odair, Wash., for U. S. Bureau of Reclamation, to Consolidated Steel Co., Los Angeles.
- 300 tons, factory building, Clearing Industrial District, Chicago, for De Luxe Check Printers Inc., to Mississippi Valley Structural Steel Co., Decatur, Ill.
- 290 tons, addition for Real Estate Trust Co., Philadelphia, to American Bridge Co., Pittsburgh.
- 275 tons, plant addition for P. V. Engineering Co., Upper Darby, Pa., to Robinson Steel Co., Philadelphia.
- 280 tons, power plant addition, Public Service Corp. of New Jersey, Newark, N. J., to American Bridge Co., Pittsburgh.
- 200 tons, sheet piling, dam No. 2, Hastings, Minn., for U. S. Engineer, to Inland Steel Co., Chicago; United Construction Co., Winona, Minn., contractor; bids April 9.
- 125 tons, buildings, Monsanto Chemical Co., Springfield, Mass., to Belmont Iron Works, Eddystone, Pa.
- 100 tons, shipping building addition for Philco Corp., Philadelphia, to Robinson Steel Co., Philadelphia.

STRUCTURAL STEEL PENDING

- 10,000 tons, office building for Louis W. Abrons, 39th St. and Broadway, New York.
- 3000 tons, H-piling, diesel engine plant, Peoria, Ill., for Caterpillar Tractor Co.
- 2500 tons, bridge for Reading railroad over Schuylkill river, in Reading, Pa.
- 1100 tons, plant addition for du Pont interests, Parkersburg, W. Va.; bids Apr. 26.
- 899 tons, bridge, Sec. 421-F, Fayetteville, Ill., for state highway commission; bids April 23.
- 865 tons, steel superstructure, Penobscot river bridge, Enfield-Howland, Me., American Bridge Co., Pittsburgh, low \$144,304.84; Phoenix Bridge Co., Phoenixville, Pa. \$174,883.53; Harris Structural Steel Co. Inc., New York, \$176,054.20, and Pittsburgh-Des Moines Steel Co., Pittsburgh, \$196,792.20; bids April 17, Augusta; Walter V. Matton Inc., Augusta, Me., low on concrete portion, \$230,952.10.
- 515 tons, bridge superstructure, project VA. DA-WR-8; also 85 tons reinforcing steel; bids May 7 to division engineer, public roads administration, Arlington, Va.
- 500 tons, manufacturing building, Detroit, for Cycle-Weld Co.
- 400 tons, several state bridges in Northumberland county, Pennsylvania; bids May 17.
- 400 tons, warehouse, Aswaubenon, Wis., for Joannes Bros.
- 240 tons, H-piling, Garrison dam, N. Dak., for U. S. Engineer, Omaha; bids April 16.

- 230 tons, Damon avenue shops, Chicago, for General American Transportation Corp.
- 225 tons, DPG span, No. W-354-8, Webster City, Iowa, for Illinois Central railroad; bids April 15.
- 212 tons, bridge, Sec. F-2, Carbondale, Ill., for state highway commission; bids April 23.
- 200 tons, highway overpass over Union Pacific railroad, Topaz, Idaho, for state.
- 200 tons, power house, Cartersville, Ga., for U. S. Engineer.
- 190 tons, bridge, Sec. 6-VF, Murrayville, Ill., for state highway commission; bids April 23.
- Unstated, two 250-ton cranes for Grand Coulee power plant; Morgan Engineering Co., Alliance, O., low at \$252,750.
- Unstated, material for warehouse and other

- items for Anderson Ranch dam, Idaho; bids to Denver May 3, Spec. 1298.
- Unstated, hangar for Northwest Airlines, Seattle; recommended by C. P. A.
- Unstated, sulphite and pulp plant for Weyerhaeuser Timber Co., Longview, Wash.; recommended by CPA.
- Unstated, wallboard plant for Simpson Logging Co., Shelton, Wash., recommended by CPA.

**REINFORCING BARS . . .
REINFORCED BARS PLACED**

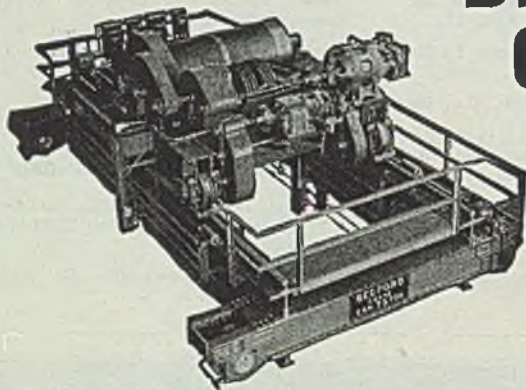
- 1200 tons, building, Louisville, for *Louisville Courier-Journal*, to American Builders Supply Co., Louisville.
- 500 tons, plant, Brecksville, O., for B. F.



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Gray
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Goodrich Rubber Co., to Carnegie-Illinois Steel Corp., Pittsburgh.

375 tons, highway construction, Kentucky, for state highway commission, to Carnegie-Illinois Steel Corp., Pittsburgh.

300 tons, warehouse buildings, Louisville, Ky., for Bellnap Hardware & Mfg. Co., to Carnegie-Illinois Steel Corp., Pittsburgh.

150 tons, grain elevator, Hillsdale, Mich., to Carnegie-Illinois Steel Corp., Chicago.

REINFORCED BARS PENDING

750 tons, wire mesh, highway construction, various locations, Illinois, for state highway commission; bids April 23.

500 tons, milling plant, Huron, O., for Eastern Mill Co-operative Association; James Stewart Corp., Chicago, contractor; bids April 27.

200 tons, Sunnyside sanitarium, Ottumwa, Iowa, for Wapello county.

200 tons, building, Wichita, Kans., for Western Tire Auto Stores.

180 tons, building, Burlington, Iowa, for Raytheon Mfg. Co.

165 tons, three bridges, Natchez Trace Parkway, Wayne county, Tenn.; bids May 7 to office of public roads administration, Florence, Ala.

130 tons, Riverdale dike and pumping stations, West Springfield, Mass.; also 48,000 square feet steel sheet piling; bids May 16 to U. S. engineer, Providence, R. I.

PLATES . . .

PLATES PLACED

300 tons or more, including shapes, four barges for Alaska operators, by Commercial Point Shipyards, Bellingham, Wash.

PLATES PENDING

2000 tons or more, 10½ miles 18-inch, water supply line for Hillsboro, Oreg.; general contract to P. S. Lord & Co., Portland, Oreg.

200 tons, standpipe, Groton, Conn.

170 tons, elevated water tank, Wenham, Mass.

135 tons, inverted pipe siphon, Northboro, Mass., water division, Metropolitan District Commission, Boston.

CAST IRON PIPE PENDING

100 tons or more, 6 and 8-inch, for Helena, Mont.; bids in.

RAILS, CARS . . .

RAILROAD CARS PLACED

Akron, Canton & Youngstown, 25 covered hoppers, to American Car & Foundry Co., New York.

Atchison, Topeka & Santa Fe, 750 fifty-ton box, to Pullman-Standard Car Mfg. Co., Chicago; 100 cabooses to our shops.

Chicago Great Western, 25 seventy-ton hoppers, to Pullman-Standard Car Mfg. Co., Chicago.

Detroit & Mackinac, 150 box cars, to General American Transportation Co., Chicago.

Great Northern, 25 seventy-five ton hoppers, to American Car & Foundry Co., New York.

Minneapolis & St. Louis, 250 fifty-ton box cars, to General American Transportation Co., Chicago.

CAR ORDERS PENDING

New York City Board of Transportation, 100 to 200 trolley coaches; bids May 3.

Philadelphia Transportation Co., 115 street cars; bids early in May.

Ann Arbor, 50 box cars.

Atchison, Topeka & Santa Fe, 350 refrigerators

Central of Georgia, 100 to 300 freight cars.

Central Railroad of New Jersey, 125 covered hoppers.

Central Supply Co. of Virginia.

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. . . specially processed rod
. . . cold drawn to exact
size . . . furnished with
smooth bright polished surface. So diversified are the
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Illinois Terminal, 100 box cars.
Interstate Railway, 200 hoppers; inquiry through and 10 aluminum box cars.
Missouri-Kansas-Texas, 100 covered hoppers.
Pere Marquette, 25 cabooses.
St. Louis Refrigerator Car Co., 100 refrigerators.

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Chicago, Milwaukee, St. Paul & Pacific, five 6000-horsepower diesel-electric passenger locomotives, to Fairbanks Morse & Co., Chicago.

**Record Attendance Seen
For AFA Congress, Show**

(Concluded from Page 65)

Control, and sessions will be devoted to aluminum and magnesium, malleable iron, brass and bronze, steel and gray iron castings.

Two separate shop operation courses will be offered, one on gray iron and one on sand practice in various types of foundries.

In addition to the technical sessions there will be general interest sessions, an inspection session, one on training and education, and a panel discussion on refractories.

Indicative of the postwar character of the meeting is the fact that at the various sessions a wide range of exchange papers presented by foreign visitors is scheduled.

The Foundry Show will be held in the Public Auditorium, where the majority of technical sessions also will be held. Over 260 companies will exhibit at the show.

Dr. Guillian H. Clamer, president and general manager, the Ajax Metal Co., Philadelphia, will present the 1946 AFA Foundry Lecture. He will speak on "Test Bars for 85 Copper, 5 Tin, 5 Lead, 5 Zinc Alloy-Design and Some Factors Affecting Their Properties."

A feature of the convention will be awarding of citations and medals for outstanding service to the industry. The William H. McFadden Gold Medal will be awarded Hyman Bornstein, director, Testing & Research Laboratories, Deere & Co., Moline, Ill., and past president of the AFA. The John H. Whiting Gold Medal will go to Peter Blackwood, who started the foundry for the Ford Motor Co. of Canada Ltd., at Windsor, Ont., and still is located there. The Peter L. Simpson Memorial Medal will be awarded Howard F. Taylor, formerly of the Naval Research Laboratory, Washington, and now research associate, Massachusetts Institute of Technology. Honorary life memberships in the association will be conferred on Harold James Roast, vice president, Canadian Bronze Co. Ltd., and William J. Coane, vice president, Ajax Metal Co., Philadelphia.

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"IF IT'S AN ALLOY—
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CLEANING

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CALIFORNIA

BAKERSFIELD, CALIF.—McCarthy Tank & Steel Co. is building a warehouse structure at 3119 Jewett Ave., to cost about \$15,000.

BURBANK, CALIF.—Tiplor Engineering Co., 2902 Los Feliz Blvd., will build a machine shop 35 x 57 feet, to cost about \$8000.

EMERYVILLE, CALIF.—Shell Development Co., 100 Bush St., San Francisco, plans construction of three plant buildings and remodeling of laboratory, at cost of about \$3,500,000. Allison & Ribble, 650 South Grand Ave., Los Angeles, are architects.

LOS ANGELES—Neil Martin is building a machine shop at 1601 East 90th St., Florence district, 3600 square feet floor space, to cost about \$10,000.

LOS ANGELES—Dulien Steel Products Co. is building a warehouse structure at 11611 South Alameda St., Willowbrook district, to contain 24,600 square feet floor space, costing about \$45,000.

LOS ANGELES—Western Iron & Metal Co., 2500 Santa Fe Ave., will build a warehouse at 2417 East 25th St., 51 x 262 feet, to cost about \$24,000.

MAYWOOD, CALIF.—California Metal Enameling Co., 2151 East 51st St., plans a one-story 180 x 200-foot plant, to cost about \$150,000. Murray Erick Associates, 811 West Seventh St., Los Angeles, are engineers.

POMONA, CALIF.—Pomona Machine Works, is building a shop structure at 163 East Commercial St., 40 x 80 and 26 x 40 feet, to cost about \$12,000.

SAN DIEGO, CALIF.—Solar Aircraft Corp. is erecting a plant addition at 2161 Harbor Drive, to cost about \$250,000.

SAN DIEGO, CALIF.—Universal Engineering Co. is building a manufacturing plant at 2165 Newton Ave., to cost about \$35,000.

SAN FRANCISCO—Reliance Trailer & Truck Co., 2765 27th St., has let contract to A. T. Morris & Sons, 5400 Fulton St., for two one-story plant buildings, 200 x 245 and 20 x 50 feet, to cost about \$150,000.

VERNON, CALIF.—Norris Stamping & Mfg. Co. is building a plant structure at 5215 South Boyle Ave., 128 x 320 feet, to cost about \$125,000.

CONNECTICUT

DANBURY, CONN.—Danbury & Bethel Gas & Electric Light Co., and Derby Gas & Electric Light Co., J. L. Stone, president, 238 Main St., plans eight miles of cast iron pipeline, and a 64-foot diameter spherical gas tank, to cost about \$500,000.

HARTFORD, CONN.—Hartford Gas Co., 235 Pearl St. has let contract to United Engineers & Constructors Inc., 1401 Arch St., Philadelphia, for compressor house, to cost about \$95,000.

NAUGATUCK, CONN.—Formatic Co., Maple St., has let contract to W. L. Megin Inc., 51 Elm St., to cost about \$40,000.

WATERBURY, CONN.—Heminway Press Corp., 155 South Leonard St., will let contract soon for a four-story 150 x 200-foot plant addition and alterations, to cost about \$400,000. L. F. Caproni, 1221 Chapel St., New Haven, Conn., is architect.

WATERBURY, CONN.—Connecticut Mfg. Co., 25 Benedict St., has let contract to W. G. Megin Inc., 51 Elm St., Naugatuck, Conn., for a plant building, to cost about \$60,000.

WEST HAVEN, CONN.—New England Products Co., Sawmill Rd. has let contract to Kelley-Wood Co., 76 Center St., New Haven, Conn., for a one-story 90 x 115-foot plant, to cost over \$45,000. D. E. Smith, 956 Chapel St., is architect.

ILLINOIS

CHICAGO—Atlantic Brass Works, 2035 Harrison St., has let contract to L. Rubin,

4956 North St. Louis Ave., for a one-story 209 x 444-foot plant, to cost about \$125,000. B. Goldberg, 721 North Michigan Ave., is architect.

CICERO, ILL.—Socony-Vacuum Oil Co., 59 East Van Buren St., Chicago, will let contract soon for a gasoline blending plant 150 x 700 feet, to cost about \$1 million.

CUBA, ILL.—City is considering construction of an electric generating plant and distribution system to cost about \$350,000.

MANTENO, ILL.—Village plans construction of a sewage treatment plant to cost about \$140,000. Warren & Van Praag Inc., Standard Office Bldg., Decatur, ILL., are consulting engineers.

MELROSE PARK, ILL.—Arrow Match Corp., 30001 West Grand Ave., Chicago, has let contract to Nathan Flyer Construction Co., 59 West Hubbard St., for a one-story 200 x 220-foot plant, to cost about \$130,000. E. H. Nordlie Co., 111 West Washington St., Chicago, is architect.

WAUKEGAN, ILL.—Johnson Motors Co. will let contract soon for a two-story 50 x 150-foot plant addition costing about \$150,000. Eschweiler & Eschweiler, 720 East Mason St., Milwaukee, are architects.

WOOD RIVER, ILL.—Shell Oil Co. Inc., 50 West 50th St., New York, will let contract soon for a two-story laboratory and other buildings. Jamieson & Spearl, 812 Olive St., St. Louis, are architects. D. L. Falvey, 316 North Eighth St., St. Louis, is mechanical engineer.

INDIANA

INDIANAPOLIS—Indianapolis Power & Light Co., Electric Bldg., has let contract to Carl M. Guepel Construction Co., for a one-story 102 x 190-foot power house, to cost about \$350,000.

INDIANAPOLIS—Citizens Gas & Coke Utility, 47 South Penn St., has let contract to Wilputte Coke Oven Corp., 40 Rector St., New York, for additions to gas producer plant, to cost over \$1 million. United Engineers & Constructors Inc., 1401 Arch St., Philadelphia, are engineers.

RUSHVILLE, IND.—Southeastern Indiana Power Co., E. L. Cater, president, plans installation of diesel electric generating unit, high-voltage power lines and substations, to cost about \$500,000.

THORNTOWN, IND.—H. A. Henry, chairman of town board, plans sewage treatment plant, to cost about \$90,000. R. B. Moore Co., 1456 North Delaware St., Indianapolis, is engineer.

IOWA

CEDAR RAPIDS, IOWA—Link-Belt Speeder Corp., 1201 Sixth St. SW, has let contract to Loomis Bros., 509½ Third Ave. SE, for additional buildings and alterations, estimated to cost about \$1 million. M. S. Carstens, 1 North LaSalle St., Chicago, is architect.

MASSACHUSETTS

IPSWICH, MASS.—First selectman, Town Hall, plans a sanitary sewage system, pumping station and treatment plant, to cost about \$600,000. M. Inman, Massachusetts Institute of Technology, Cambridge, Mass., is consulting engineer.

LAWRENCE, MASS.—City, City Hall, plans an incinerator plant, to cost about \$125,000, with equipment. Pearson, Alter & James, 351 Essex St., are architects.

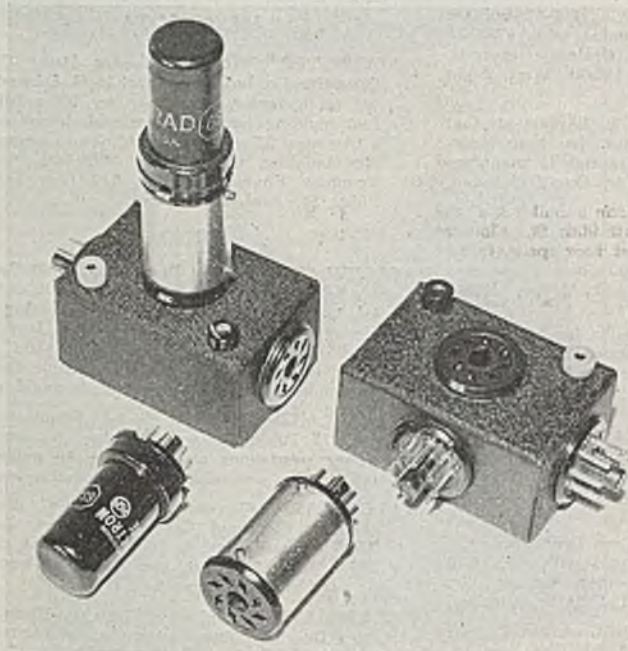
WORCESTER, MASS.—J. H. Brooks, superintendent of sewers, plans a sewage disposal plant, to cost about \$2 million.

WORCESTER, MASS.—Worcester Pressed Steel Co. will build a plant addition 90 x 140 feet, to cost about \$60,000.

WORCESTER, MASS.—Warren Telechron

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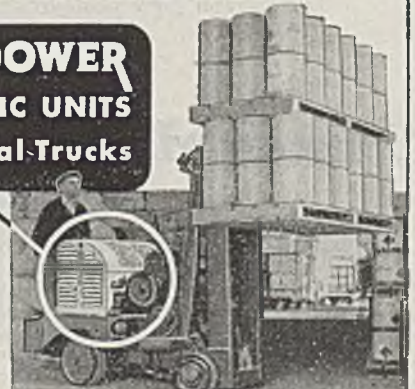


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Co., Asland, Mass., has bought car barn property here of Worcester Street Railway Co. and has let contract to J. W. Bishop Co., Worcester, to renovate buildings into modern factory.

MICHIGAN

BIRMINGHAM, MICH.—Freeport Industries Inc., 26571 Monon Court, has been incorporated with \$10,000 capital to manufacture pneumatic and other machinery, by Walter F. Seifert, same address.

CENTERLINE, MICH.—Centerline Tool & Die Co., 28661 Van Dyke Ave., has been incorporated with 50,000 shares no par value to manufacture tools, dies and jigs, by William Marks, 1719 Stanhope Ave.

CLINTON, MICH.—Clinton Machine Co. has been incorporated with \$500,000 capital to manufacture tools and machinery, by Donald D. Thomas, Clinton.

DETROIT—Chevrolet Gear & Axle Division, 1840 Hollbrook Ave., has let contract to Darin & Armstrong, 2041 Fenkell Ave., for a laboratory and office building, to cost about \$200,000.

DETROIT—Campion-Detroit Inc., 9084 Alpine Ave., has been incorporated with \$50,000 capital to manufacture instruments and apparatus, by Donald C. Campion Sr., 14554 Grandmont Ave.

DETROIT—Detroit Metal Industries Inc., 5 West Larned Ave., has been incorporated with \$50,000 capital to manufacture metal stampings, by Jack T. Beck, 2170 East Jefferson Ave.

DETROIT—Metal Mouldings Tool Engineering Inc., 1010 Beaubien St., has been incorporated with \$50,000 capital to manufacture metal moulding dies and tools, by John J. Burns, 429 East Jefferson Ave.

DETROIT—Metal Furniture Distributors Inc., 321 West Lafayette Blvd., has been incor-

porated with \$10,000 capital to manufacture metal furniture, by Roger W. Young, 1204 Bishop Rd., Grosse Pointe Park, Mich.

DETROIT—Motor City Mfg. Co., 1072 Balmoral Ave., has been incorporated with \$20,000 capital to manufacture hardware products, by Chester Gorczyca, 7256 Kentucky Ave.

DETROIT—Weltronic Co., 2046 Penobscot Bldg., has been incorporated with \$75,000 capital to manufacture electronic controls, by Cletus J. Collom, 19500 West Eight Mile Rd.

DETROIT—Redford Iron & Equipment Co., 21315 West McNichols Rd., has been incorporated with \$150,000 capital to manufacture foundry equipment, by Otto Ostermann, same address.

DETROIT—Redford Screw Products Co., 15495 Winthrop Ave., has been incorporated with \$50,000 capital to manufacture screw machine products, by Harold McFee, 18946 Oakfield Ave.

DETROIT—U. S. Metal Molds Inc., 6432 Cass Ave., has been incorporated with \$32,600 capital to manufacture articles made of powdered metals, West H. Gallogly, same address.

DETROIT—Handy Tool & Die Co., 5460 Hecla Ave., has been incorporated with \$25,000 capital to manufacture tools, dies and jigs, by James Murray, 15 Waverly Ave., Highland Park, Mich.

FILER CITY, MICH.—Falleen Drop Forge Co. Inc. has been incorporated with \$750,000 capital to manufacture drop forgings, by A. T. Reeve, 120 South LaSalle St., Chicago.

LINCOLN PARK, MICH.—Crescent Tool & Die Co., 1780 Southfield Rd., has been incorporated with \$200,000 capital to manufacture tools, dies, jigs and fixtures, by John Hancock, 979 Kings St., Lincoln Park.

SAUGATUCK, MICH.—Pershing Products Co.

has been incorporated with \$50,000 capital to manufacture machine products, by Irving K. Pershing, Saugatuck.

STURGIS, MICH.—Guy-LeRoy Engineering Co., 107 South Monroe St., has been incorporated with \$100,000 capital to operate a tool and pattern works, by Guy E. Laughlin, 401 South Fourth St.

MINNESOTA

ROCHESTER, MINN.—Rochester Dairy Co-Operative Co. has let contract to G. Schwartz & Co., Rochester, for a one-story 100 x 242-foot building for warehouse and dryers and a two-story 37 x 100-foot addition to evaporator building, to cost over \$300,000. Fuel Economy Engineering Co., 510 New York Bldg., St. Paul, is architect.

OHIO

CLEVELAND—Premier Burner Co., 1880 Carter Rd., has been formed with \$25,000 capital to manufacture gas appliances and gas converter burners. Operations will be located at 8816 Harkness Ave., where a plant is being equipped. I. L. Rosen, of Eagle Coal & Supply Co., 1880 Carter Rd., is president.

CLEVELAND—Cleveland Electric Illuminating Co., 75 Public Square, has plans for seven power substations as part of a \$9 million construction program to be started this year.

CLEVELAND—Cleveland Foundry Co., division of Cleveland Cooperative Stove Co., 2818 Harvard Ave., is building a plant addition 85 x 245 feet, two stories, to house its core oven department.

CLEVELAND—Cleveland Electric Illuminating Co., 75 Public Square, has let contract to Hunkin-Conkey Construction Co., 1740 East Twelfth St., for alterations to steam generator building, estimated to cost about \$750,000.

CLEVELAND—Master Anodizers & Platers Inc. is being organized with \$25,000 each of common and preferred stock by Milton C. Portmann, statutory agent, 1668 Union Commerce Bldg.

CLEVELAND—Par Machine Co. has been formed by Clarence Vank, 3777 Washington Park Blvd., and will establish a machine shop at 7210 Worley Ave. to manufacture machinery, tools and industrial equipment.

EAST LIVERPOOL, O.—O. Earl Greenwalt, mayor, has authorized Felix S. Barchhoff, 999 South Lincoln Ave., Salem, O., to prepare plans for a proposed \$633,000 sewage disposal plant, part of a \$1 million postwar program.

LIMA, O.—C. Ash, Municipal Bldg., plans an incinerator costing about \$1,500,000. Jones & Henry, Security Bldg., Toledo, O., are consulting engineers.

SALEM, O.—C. B. Hunt & Co. Inc., 1913 East Pershing St., N. A. Pederson, president, manufacturer of valves, will build an addition of 2000 square feet to increase production.

YOUNGSTOWN, O.—City plans a sewage treatment plant, to cost about \$200,000. Jones & Henry, Toledo, O., are engineers.

PENNSYLVANIA

LOGANSPOUT, PA.—Logansport Distilling Co. has let contract to H. K. Ferguson Engineering Co., Hanna Bldg., Cleveland, for design and construction of a two and three-story 50 x 60-foot industrial waste treatment plant, to cost about \$200,000.

MIDLAND, PA.—Crucible Steel Co. of America, has let contract to Fort Pitt Bridge Co., Pittsburgh, for a one-story building to house bar and billet mill, to cost about \$6 million, with equipment.

WASHINGTON

SPOKANE—Keehn Trailer Co., Warner L. Keehn, president, has been incorporated and plans plant and machine shop 60 x 150 feet at 125 East Mission St., for manufacture of a self-steering trailer with dual axle.

This advertisement is not, and is under no circumstances to be construed as, an offering of this stock for sale, or an offer to buy, or as a solicitation of an offer to buy, any of such stock. The offering is made only by the Prospectus; the Prospectus does not constitute an offer by any dealer to sell this stock in any State to any person to whom it is unlawful for such dealer to make such offer in such State.

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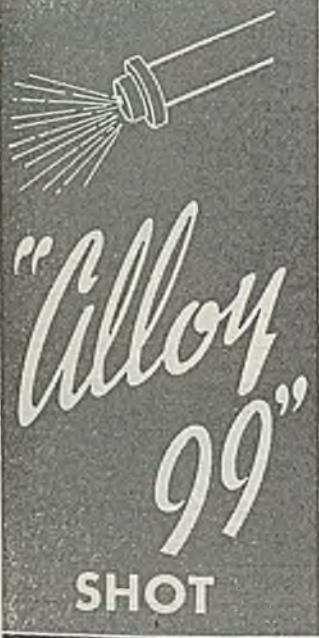
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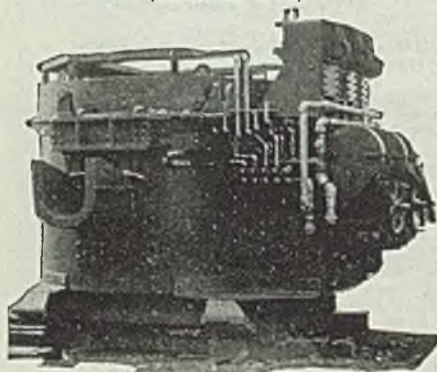
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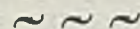


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