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STEEL

ESTABLISHED 1882

Contents

Volume 108—No. 6 February 10, 1941

PRODUCTION • PROCESSING • DISTRIBUTION • USE

2 STRANDS IN 1938

4 STRANDS IN 1941

The installation of a second wire rod finishing train, with its coiling and conveying equipment, permitted the company to double the output of the entire mill without major change. Every part of the mill, from reheating furnace to looping stands, had been built for four-strand operation.

Morgan Continuous Rolling Mills are planned with both eyes on the future. Morgan is Prepared for Preparedness!

MORGAN
WORCESTER
ENGINEERS AND MANUFACTURERS

R-64

CONTINUOUS ROLLING MILLS

Billet • Sheet Bar • Merchant • Rod • Strip • Skelp

MORGAN CONSTRUCTION COMPANY • WORCESTER, MASSACHUSETTS

HIGHLIGHTING THIS ISSUE OF STEEL

■ UPON the automobile and automobile parts industry falls one-tenth of all national defense production (p. 21) contracted thus far. To build new plant capacity quickly many unique devices were employed. Ford (p. 23) built a 900,000-square foot fiber-board overcoat around its $21,000,000 airplane engine plant to permit work 24 hours a day. Chrysler completed steel construction for its huge tank arsenal (p. 22) in slightly more than two months. A steam locomotive supplied heat during construction. . . . Early returns from a survey of plant and machinery that might be devoted to defense material manufacture (p. 33) indicates a vast amount of such capacity is available. Preponderance of manufacturers reporting do not now have defense contracts.

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Will Broaden Subcontracting

Appointment of committees and executives at Washington (p. 31) does not necessarily mean formal application of priorities at this time. . . . Office of production management has transferred the defense contract service, formerly the office of small business activities, to OPM's production division (p. 31). Its primary function will be to broaden the subcontracting system. . . . Machine tool production in 1941 (p. 33) will total $750,000,000, or $100,000,000 more than estimated at the beginning of the year. . . . Industrial machinery exports (p. 29) last year established a record. . . . Steelworkers' weekly earnings had a higher buying power in the last quarter of 1940 (p. 29) than in boom year 1929.

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Ford in Market For Iron Ore

Majority of steel sales now being made are for late second quarter delivery (p. 95), though formal price announcements for that period are not expected for at least another three weeks. Ford Motor Co., as usual, has issued the first inquiry for iron ore, asking for prices on 295,000 net tons. Ore shipping will start early and with a rush. It is estimated 75,000,000 to 80,000,000 tons will be shipped, a new high by a large margin. Steel ingot production last week was unchanged at 97 per cent. . . . Every American industrial production record will be broken in 1941, according to International Business Machines Corp.'s general manager (p. 24). . . . National labor relations board announces (p. 29) an extensive reorganization program "to improve and speed up" its operations.

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New Device Measures Time

In the third article in his series on shellmaking, Prof. Arthur F. Macconochie, relating to the cutting of billets into lengths and heating them for forging, describes a typical well-planned setup (p. 54) used by a Canadian manufacturer. . . . Another new development (p. 67) is assisting defense work, as it gives accurate readings of gun bores, a difficult checking job. . . . Still another aid in this work is increased lighting intensities such as those employed for the first time by one steel manufacturer (p. 73) to permit billet inspection at night. . . . A new device measures periods of time from 1 to 200 thousandths of a second with an accuracy of 1 per cent (p. 73), useful in many types of ballistic studies.

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Direct Radiant Room Heating

Savings in boiler capacity up to 30 per cent (p. 78) by using heat sources embedded in floor, walls or ceiling for heating rooms by direct radiation, are reported by R. L. Hartford. . . . Hanford Eckman tells of an improved method for welding chromium-molybdenum steel (p. 80), used by Piper Aircraft Corp. with excellent results. . . . The tremendous growth of welded piping is pictured (p. 52) by a recent steel plant installation costing over $350,000. . . . The new Buick plant (p. 62) with 35 conveyor systems shows the emphasis on efficient mechanical handling in the automobile industry. . . . Gordon Fox (p. 70) describes new developments in equipment for blast furnace charging.

Ryerson Night Loading Assures Quicker Deliveries

IT'S after hours, at any of the ten Ryerson steel plants, almost any night of the year!

The Ryerson night shift is putting the finishing touches on *today's* orders; loading out the fleet of big, red Ryerson trucks for tomorrow's deliveries.

Immediate Steel is a Ryerson tradition. The entire Ryerson organization is geared up to handle *quickly* the steel requirements, simple or involved, of thousands of customers the country over. Special telephone order desks, hourly mail pick-ups at the post office, telegraph and teletype lines right into our offices—all help to speed delivery, even *before* the order reaches us.

Night loading to "clear the decks" for tomorrow's new crop of orders is the regular course of business. Every order is RUSH at Ryerson—most are shipped the day received.

Ryerson Steel Service is fast and sure: Ryerson Certified quality is your assurance of uniformity and exactness. Make the Ryerson Stock List your unfailing source for all steel requirements. If you haven't the latest Stock List we'll send one gladly.

Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON CERTIFIED STEELS

Defense Brings New Era of Expansion In Automotive Industry

Ten per cent of all arms orders now held by automobile and partsmakers . . . Contracts total $1,400,000,000, with $500,000,000 more placed under verbal agreements . . . Urgency of situation necessitates unique devices to speed construction of new plants . . . Bomber program to require 858,000 man-hours of labor daily, or about one quarter of motor industry's total employment

DETROIT

■ NOW being geared to produce parts and subassemblies for 15 bombing planes a day, the automobile industry is coming to realize the herculean task involved. C. C. Carlton, managing director of the Automotive Committee for Air Defense, speaking here at the annual meeting of the Automotive Parts and Equipment Manufacturers' association, reported that 858,000 man-hours of labor daily must be expended in the automotive industry to meet the proposed schedule. On the basis of one 8-hour shift per day, the program will require 107,250 men, or about one-quarter of total employment in the motor car industry today.

Material requirements will be equally great—137,500 pounds of aluminum and 42,200 pounds of steel daily.

Automotive and associated industries have the task of furnishing 78 per cent of the total man-hours required for building the bombers, the remaining 22 per cent being supplied by new bomber assembly plants in Omaha, Kansas City, Tulsa and Fort Worth.

Tentatively, bomber parts production has been divided up into three phases. General Motors will supply North American (B-25 design), Chrysler Corp. will supply Glenn L. Martin (B-26 design), and Ford will supply Consolidated (B-24 design), each arranging production schedules on the basis of five planes a day. As an indication of the size of the ships, the four-engine Consolidated bomber has a span of 110 feet, a length of about 63 feet and an overall height of 18 feet. Gross weight is 40.000 pounds.

General Motors, Chrysler, Ford,

■ Structural steel rises for Rolls-Royce engine test, tear-down, re-assembly, and shipping plant of Packard Motor Car Co., Detroit, about one-third completed

■ Front diagonal view of Packard's Rolls-Royce main assembly plant. Occupying a square block, this structure will house metallurgical laboratories, engineering laboratories, administrative staff and main engine assembly department. It is about two-thirds complete.

These photos were made Feb. 5

as well as Briggs Mfg. Co. and Murray Corp. of America, will call on their usual sources for materials and parts and attempt to subcontract as much of the work as is physically possible.

The auto industry already has contracts calling for $1,400,000,000 worth of defense work and another half-billion dollars worth of work has been placed under verbal agreement. Upon the motor and motor parts industries falls one-tenth of all defense work contracted for to date by the army and navy.

Already there is talk of doubling the bomber program and, in addition, displays of a liquid-cooled engine, an air-cooled engine and a pursuit ship airframe have been brought to Detroit so that parts plant representatives may inspect them and determine their ability to participate in manufacturing work.

Maj. Gen. George H. Brett, chief of the army air corps, spoke at the APEM meeting regarding personnel phases of the aircraft program. He said pilots were now being trained at the rate of 1000 per month and by July of 1942 this figure will have been stepped up to 2500 a month. Advanced phases of training, including combat and combat service, are being speeded up, with 25 combat groups now in action and 54 such groups planned by summer.

Stresses Subcontracting

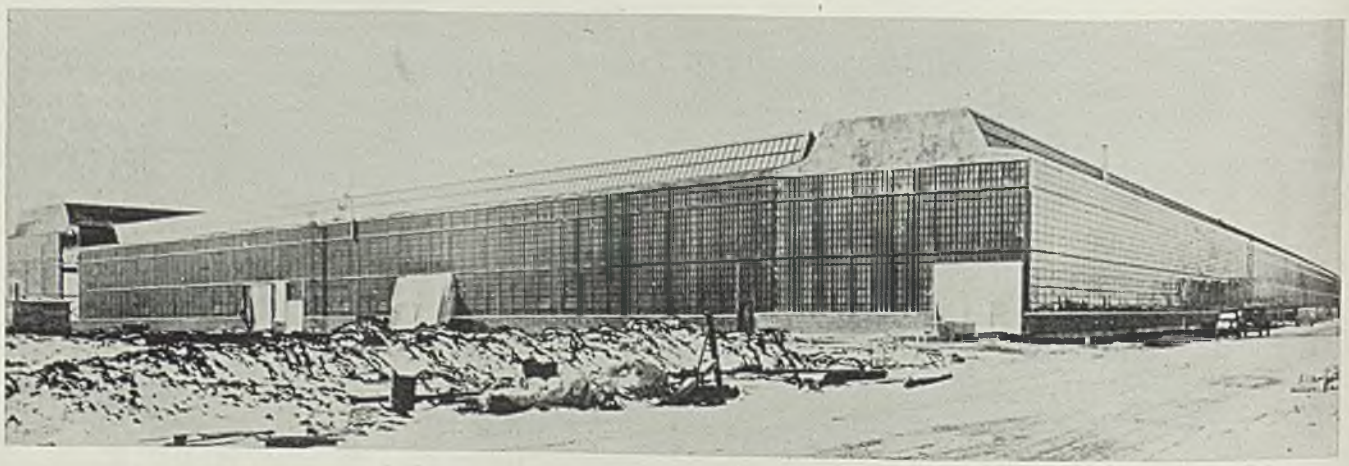
John D. Biggers, in charge of the production division of the OPM, also was present and pointed to the pioneer effort being made in subcontracting procedures in the interests of speeding up defense manufacture. Widespread subcontracting is essential, he said, for even distribution of the work involved, as well as for even distribution of opportunities for manufacturing plants.

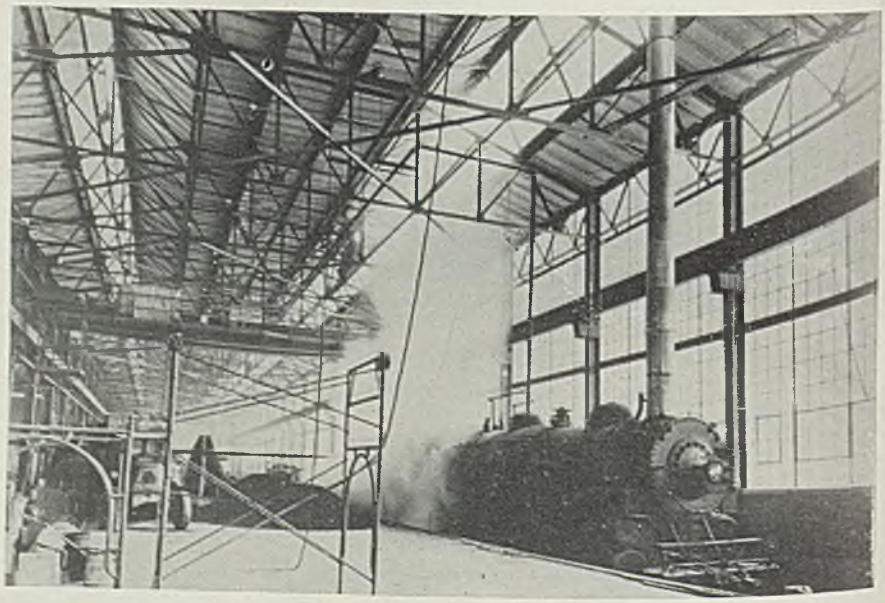
For several months the committee under direction of Mr. Carlton, has been conferring with parts suppliers at its headquarters, 8505 West Warren avenue, Detroit. So far more than 1200 representatives of 800 manufacturing plants have visited this office and inspected parts displays. Over one million dollars worth of business actually has been placed.

Reports from Ford Motor Co. indicate that conferences between company officials and air corps representatives have been held concerning Ford's activity in the bomber program. Construction of an entirely new airplane building has been discussed, supplementing the $21,000,000 airplane engine plant now nearing completion.

Meanwhile spokesmen for the entire automobile industry have announced that establishment of priorities on machine tools will not affect either 1941 or 1942 models. Naturally some of the motor companies have on order large numbers of tools for certain phases of defense manufacture, but these will have the required priorities and model change work will be carried out without necessity for obtaining further machinery.

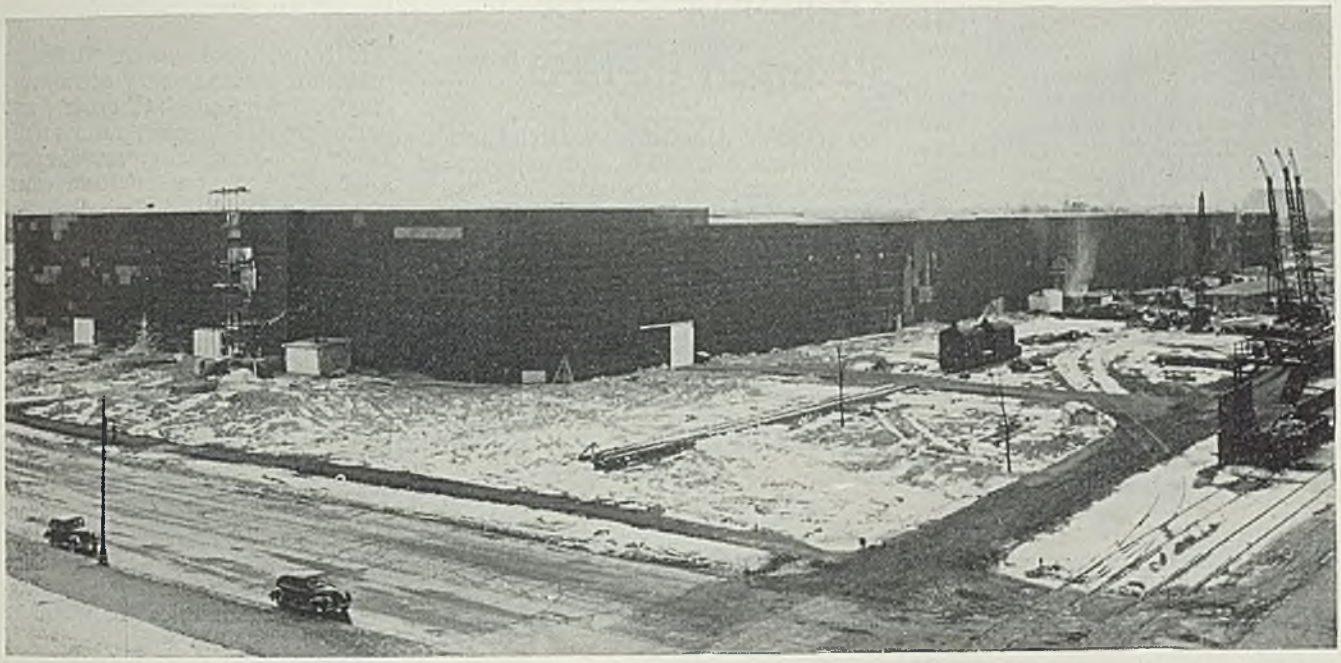
Chrysler Arsenal Nears Completion; "Iron Horse" Helps





■ Steelwork for Chrysler tank arsenal in Detroit—6500 tons—was completed Jan. 30, setting a remarkable record for speed. The building, 500 x 1380 feet, which will have 700,000 square feet floor area, was started Nov. 18. One-third of the structure is glassed in and a steam locomotive is being used temporarily to provide heat while concrete floors are laid. Machinery is to be moved in this week; the power house is expected to be ready Feb. 15. (See also Mirrors of Motordom, Feb. 3, p. 36). Wide World photos

Ford Aircraft Engine Plant Built Within Fiber-Board Overcoat



■ BOXED in by 900,000 square feet of fiber board, the $21,000,000 airplane engine plant of Ford Motor Co., Dearborn, Mich., is being rushed to completion on a 24-hour day basis. The box shelter idea was evolved by George Morgan, superintendent of construction, who worked on building projects in Russia for seven years and used the system effectively there to protect workmen from severe winter weather. The protecting enclosure, shown in the illustration, is set 10 feet away from the building walls and the interior is heated to permit pouring concrete in the coldest weather. The plant itself measures 360 by 1000 feet, and is built progressively in sections not structurally joined; one end is being completed first and probably will be occupied before the other end has been finished.

Air conditioned throughout, the shop section has no windows, being surrounded by offices and service facilities which will have windows. Outer walls carry no part of the building load and their collapse would not affect floors of the main structure. Concrete roof is 5 inches thick, ceiling of the first floor is of reinforced concrete 17 inches thick and ground floor is 12 inches thick.

Service tunnels, carrying power lines, conduits for water, steam and the like are placed underground, coming up through the floor to outlets—a practice followed in other Ford plants built in recent years.

Materials handling will be facilitated by a network of cranes traveling on ways in all sections of the plant. No manual movement of parts in process will be necessary.

Last of the 10,000 pieces of structural steel in the plant was fitted in place Jan. 24, four days ahead of schedule and just two months after the starting date, Nov. 24. A crew of 128 men, with four 20-ton crawler cranes and two 60-ton locomotive cranes, erected the 8791 tons of structurals, average craneload being 1800 pounds. American Bridge Co. handled the job.

Production on the first Pratt & Whitney airplane engines is scheduled to start shortly after completion of the building late next month.

Detroit Tool and Diemakers Organize Defense Committee

Defense committee has been organized by the Automotive Tool & Die Manufacturers' association, Detroit, for the fourfold purpose of: (1) Maintaining a continuous survey of idle capacity; (2) studying requirements of defense contractors and making such idle capacity available to them; (3)improving usefulness of present facilities by the extension of hours, combining of the facilities, and dilution of labor; and (4) aiding in elimination of efficiency loss resulting from improper channeling of blueprints and orders.

Personnel of the committee is: C. W. Davis, Davis Tool & Engineering Co.; Foster L. Fralick, Koestlin Tool & Die Corp.; William Rogers, Rogers Tool & Die Co.; Kenneth

■ Structural steel—4500 tons—is erected for North American Aviation Inc.'s new manufacturing plant near Dallas, Tex. Size of this project is indicated by comparative size of workman in circle in extreme right background. NEA photo

Spaulding, McReynolds Die & Tool Co.; J. D. Stewart, F. Jos. Lamb Co.; Otto Proefke, Enterprise Gear & Tool Co.; Edward J. Wismer, Swartz Tool Co.; H. D. Kiefer, Interstate Tool Co.; and Chester A. Cahn, secretary of the association.

Through the committee, the plan is being extended to all shops having useful equipment, and the suggestion is advanced that the tool and die industries in Cleveland, Dayton, Toledo, South Bend, Chicago and Milwaukee may be willing to join in the movement, or to set up similar co-ordinating committees.

Bullard Co. Awards Fifth Building Expansion Job

Bullard Co., Bridgeport, Conn., last week awarded a contract for a new machine tool assembly building, 180 x 500 feet, to Turner Construction Co., to provide more than two acres of additional production space. Speed again will play a dominant part in the project, schedule for completion of building July 1, with provision for beginning equipment installation June 1.

This is the fifth expansion job performed by Turner for Bullard since June, 1940. Structural steel, 1000 tons for this unit, will be fabricated by Bethlehem Steel Co.

Cleveland Graphite Bronze To Build $2,000,000 Plant

Cleveland Graphite Bronze Co., Cleveland, has announced an expansion program involving construction of a $2,000,000 plant adjacent to present facilities. New building will be steel and concrete and contain approximately 400,000 square feet of floor space.

Directors have authorized, subject to stockholders' approval, an issue of $3,000,000 par value of preferred stock to finance the program.

Maritime Commission Awards Contracts for Ten Ship Ways

Maritime commission last week awarded two contracts for construction of ten ways and other shipbuilding facilities, at a government investment of $6,462,500. They include: Alabama Drydock & Shipbuilding Co., Mobile, Ala., four ways, estimated cost, $1,322,500; North Carolina Shipbuilding Co., Wilmington, N. C., six ways, estimated cost, $5,140,000.

Shipyard facilities are to be used for construction of part of the 200 merchant ships called for by President's emergency shipbuilding program. Plant facilities will be installed at cost.

Three other contracts providing for 22 ways and involving an estimated government investment of $14,233,000 have already been announced.

"All Production Records To Be Topped in 1941"

■ EVERY American industrial production record will be broken before year's end, as the national defense program hits its stride, Maj. Frederick W. Nichol, vice president and general manager, International Business Machines Corp., New York, predicted last week.

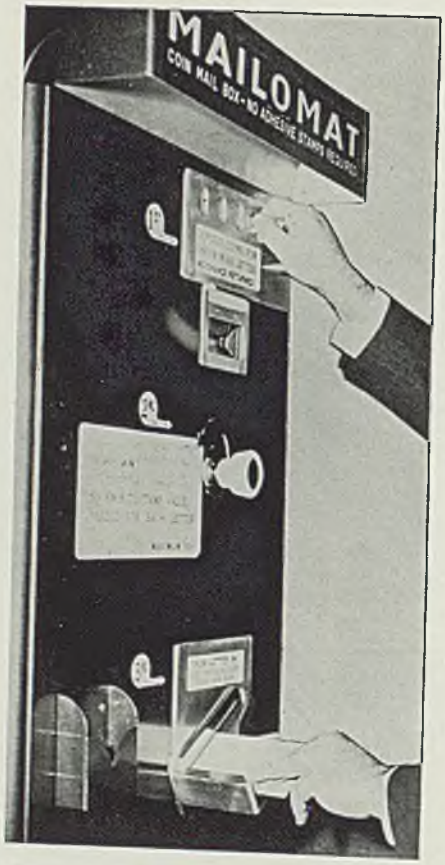
Major Nichol's forecast was made at a weekly luncheon of the Sales Executives' Club of New York at a session dedicated to the National Business Show in Grand Central Palace.

To achieve these new production records, he said, "every square foot of factory capacity must be brought into use. This means that many of our great defense contracts must be sublet, in part, and resublet, until every city and village shop which is capable of producing some one section of defense equipment, however small, is engaged to full capacity."

Major Nichol asserted that to maintain a steady flow of raw materials, semifinished goods, and parts "in the correct ratio to the assembly lines is a management job." The national defense emergency, he continued, finds the office equipment industry ready to meet the "great demands which are to be made on us, and which are, indeed, already being made in greater volume, and with more emphasis than ever before."

The office equipment industry's products last year were valued at $385,000,000 retail. Without these products, contended Major Nichol, business would become so top-heavy with overhead that all the advantages the country has gained through the introduction of machine methods in production, transportation and communication would be nullified.

While the population during the past 50 years has increased 110 per cent, the number of persons engaged in accounting work has advanced by 530 per cent, according to Major Nichol. In 1890, before the introduction of the accounting machine, there were 159,000 bookkeepers and accountants while now there are "considerably more than 1,000,000."



■ A streamlined letter to President Roosevelt was sped on its way via the Mailomat as the thirty-seventh National Business Show was opened in New York last week. The Mailomat, a steel coin-operated United States letter box and postage meter, does away with adhesive stamps. Serving as an auxiliary public postal unit, it automatically meter-stamps, postmarks and mails anything from a penny postal to an airmail "special delivery", operating on a 24-hour, self-service basis

Steel, Aircraft Firms Join in Training Plan

■ Wright Aeronautical Corp. has opened a training school for machinists in Middletown, O., in a building provided by American Rolling Mill Co. Several hundred men will be trained in this school and after two to three months those who complete their training satisfactorily will be eligible for positions in the new airplane engine plant now under construction at Lockland, O.

The idea of establishing the school was proposed by the steel company to the Wright corporation, faced with the task of selecting and training more than 11,000 skilled workers.

Changing demand for flat-rolled steel products caused Armco to undertake a program of modernization over the past several years, and with the completion of this work in sight, the company desired to assist the men affected by the changes and also to co-operate with others in defense production.

Actual production machinery is being installed on which to train the machine operators. Men will be trained in groups of approximately 50, divided into day and night sections to permit their receiving instruction in periods when they are not working on their regular jobs.

$5,000,000 Expansion for Pacific Coast Steelworks

■ Columbia Steel Co., subsidiary of United States Steel Corp., has approved a program for enlarging its Pacific coast facilities, to include additional steelmaking and finishing mills, to cost upward of $5,000,000.

This decision it was stated, "is a recognition of growing steel demands of that region, coming from manufacturers engaged in supplying directly and indirectly the needs of the national defense program, as well as from other users of steel products."

Columbia was acquired by United States Steel in 1930, is a fully integrated company owning and operating steelworks at Pittsburg and Torrance, Calif.; ore and coal mines and a blast furnace in Utah; open-hearth furnaces, rolling, wire, nail, sheet and tin mills, foundries and a wire rope and fence plant.

Republic Air Conditions Southern Blast Furnace

■ Republic Steel Corp., Cleveland, will install air-conditioning equipment at one of its blast furnaces at Thomas, Ala., to be completed before June, to increase capacity. Woodward Iron Co. has placed similar equipment in operation at three of its blast furnace stacks in the Birmingham district.

Republic will also reopen its Virginia iron ore mine, idle for several years, to increase raw material supply. The mine was operated by Gulf States Steel Corp. previous to its merger with Republic in 1936.

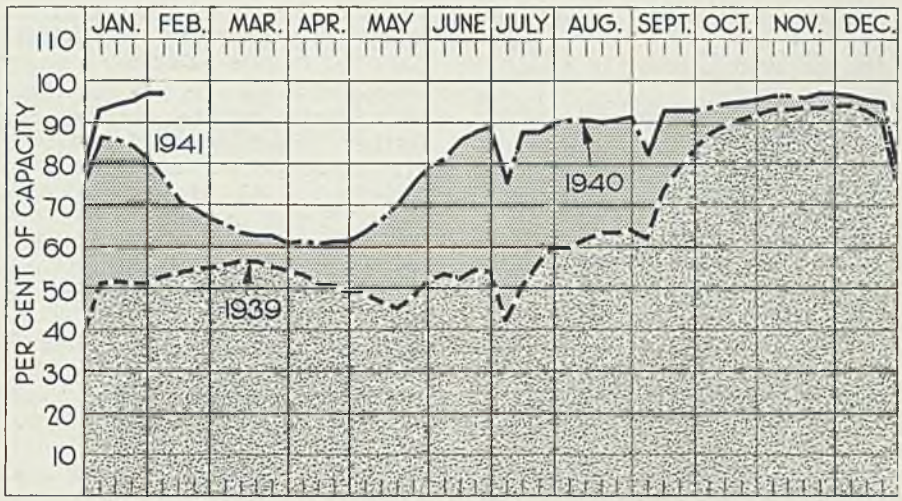
Allegheny Ludlum Adds Electric Furnaces, Mills

■ Allegheny Ludlum Steel Corp., Pittsburgh, manufacturer of alloy steels, is increasing capacity for melting special steels by approximately 4000 tons per month. Two additional electric melting furnaces will be installed at its works at Brackenridge, Pa., and contracts have been placed for additional rolling mill equipment to handle the enlarged tonnage.

Canada Reduces Shape Sections 75 Per Cent

■ Number of standard steel shapes rolled for the structural steel fabricating industry of Canada has been reduced from 267 to 70, by order of H. D. Scully, Dominion steel controller, a decrease of about 75 per cent in number of sections.

This move is to save rolling time by eliminating frequent roll changes and other delays incident to providing the normal diversity of structural shapes.



PRODUCTION . . . . Steady

■ STEELWORKS operations last week continued at 97 per cent, small gains balancing losses. Four districts advanced, two declined and six were unchanged. A year ago the rate was 71 per cent; two years ago, 54 per cent.

Youngstown, O.—Unchanged at 95 per cent, 74 open hearths and three bessemers active. The same rate is scheduled for this week, Republic Steel Corp. taking off one furnace at Youngstown and adding one at Warren, O. Expected blast furnace repairs may reduce available pig iron and cut the steel rate in the next few weeks.

Birmingham, Ala.—Unchanged at 100 per cent, 24 open hearths in production.

Cincinnati—Advanced 5 points to 95 per cent, highest since 1937, except one week in November.

Cleveland—Off 2 points to 84½ per cent.

Detroit—Increased 4 points to 96 per cent, only one of the district's 26 open hearths being idle.

Wheeling—For the fourth week, 100 per cent.

St. Louis — Lighting an open hearth idle for more than a year increased the rate to 93 per cent, best since May, 1937.

Pittsburgh—Held at 96½ per cent.

New England—Rose 4 points to 92 per cent, two interests operating at 100 per cent.

Central eastern seaboard—Continued at 96 per cent. Bethlehem Steel Co.'s January ingot production was 1,017,746 net tons, which was 100½ per cent of capacity on the new rating.

Chicago—Three producers operating at 100 per cent or better, the district rate holding at 98 per cent. Inland Steel Co. in January produced 297,381 net tons, at 108.1 per cent of rated capacity, despite recent increase of company's capacity from 3,100,000 tons to 3,300,000 tons annually.

Buffalo—Withdrawal of an open hearth by Republic Steel Corp. for repair reduced the rate 2½ points to 90½ per cent.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Feb. 8	Change	Same week 1940	Same week 1939
Pittsburgh	96.5	None	69	46
Chicago	98	None	74.5	51
Eastern Pa. ...	96	None	68	36
Youngstown ...	95	None	44	44
Wheeling	100	None	86	64
Cleveland	84.5	— 2	70	56
Buffalo	90.5	— 2.5	60.5	37
Birmingham ..	100	None	90	80
New England .	92	+ 4	63	70
Cincinnati	95	+ 5	61	55
St. Louis	93	+ 3	70	50
Detroit	96	+ 4	93	94
Average	97	None	71	54

Otis Steel Co.'s 1940 Net Income $717,007

■ Otis Steel Co., Cleveland, reports 1940 net income was $717,007, equal to $5.22 per share on the company's $5.50 cumulative convertible preferred stock. This compared with net earnings of $214,965 or $1.56 per share on the preferred stock in 1939. Net loss of $1,230,297 was incurred in 1938.

Dividend of $2.75 per share on the convertible first preferred stock was declared, payable March 15 to record of Feb. 28. This represents the quarterly dividends on this stock which accrued Sept. 15, 1938, and Dec. 15, 1938.

Finished Steel Production Up 25 Per Cent in 1940

■ Finished steel made for sale in 1940 totaled 48,584,860 net tons, an increase of 25 per cent over 38,850,404 tons in 1939, according to the American Iron and Steel institute.

Exports last year aggregated 7,693,858 tons, 15.8 per cent of production and more than three times 2,437,944 tons exported in 1939. Shipments to members of the industry for conversion into further finished products were 2,618,889 tons.

Estimated total steel finishing capacity in 1940, based on a yield from ingots of 68.9 per cent, was 53,946,300 tons; in 1939, 54,335,680 tons.

Production for sale, less shipments to members of the industry for further conversion, totaled 45,965,971 tons or 85.2 per cent of finishing capacity in 1940. It compared with 34,955,175 tons in 1939.

December production of finished steel for sale totaled 4,909,448 tons, up 3.1 per cent from November's 4,760,948 tons. Production for export was 713,802 tons, compared with 562,587 tons in the preceding month, and 14.5 per cent of total.

Shipments to other members of the industry for further conversion in December aggregated 209,244 tons, against 280,953 in November.

Following is a summary of the reports, which started on a monthly basis last April, in net tons:

1940	Output	Exported	Pct. Exported
April....	3,005,218	371,532	12.37
May.....	3,576,860	476,761	13.33
June	3,802,485	601,668	15.8
July	4,173,839	835,385	20.0
Aug.....	4,649,065	1,053,110	22.6
Sept.....	4,446,555	951,555	21.4
Oct.....	4,937,388	783,652	15.87
Nov.....	4,760,948	562,587	11.82
Dec.....	4,909,448	713,802	14.5
Year	48,584,860	7,693,858	15.8

AMERICAN IRON AND STEEL INSTITUTE
Capacity and Production for Sale of Iron and Steel Products
December - 1940

		No. of companies	Items	Annual Capacity Net tons	Production for Sale—Net Tons: Current Month: Total	Current Month: Per cent of capacity	Current Month: Shipments: Export	Current Month: Shipments: To members of the industry for conversion into further finished products	To Date (12 Months - 1940): Total	To Date: Per Cent of capacity	To Date: Shipments: Export	To Date: Shipments: To members of the industry for conversion into further finished products
STEEL PRODUCTS	Ingots, blooms, billets, slabs, sheet bars, etc.	34	1	xxxxxxx	665,829	xxx	305,149	121,095	5,725,868	xxx	2,677,936	1,193,123
	Heavy structural shapes	8	2	5,205,300	331,299	75.3	35,373	xxxxxxx	3,149,036	60.5	409,443	xxxxxxx
	Steel piling	4	3	328,000	20,296	73.2	427	xxxxxxx	215,234	65.6	19,950	xxxxxxx
	Plates—Sheared and Universal	20	4	6,095,450	447,408	86.8	65,451	4,451	4,194,932	68.8	637,637	23,774
	Skelp	8	5	xxxxxxx	80,653	xxx	10,351	37,640	845,313	xxx	174,065	317,739
	Rails—Standard (over 60 lbs.)	4	6	3,647,600	110,255	35.8	26,280	xxxxxxx	1,487,113	40.8	224,996	xxxxxxx
	Light (60 lbs. and under)	6	7	306,800	17,722	68.3	6,625	xxxxxxx	134,729	43.9	51,574	xxxxxxx
	All other (Incl. girder, guard, etc.)	2	8	118,000	2,640	26.5	918	xxxxxxx	27,893	23.6	5,539	xxxxxxx
	Splice bar and tie plates	15	9	1,300,200	26,249	23.9	1,610	xxxxxxx	481,271	37.0	11,981	xxxxxxx
	Bars—Merchant	35	10	xxxxxxx	492,437	xxx	57,036	55,490	4,760,914	xxx	721,178	395,465
	Concrete reinforcing—New billet	16	11	xxxxxxx	106,244	xxx	20,262	xxxxxxx	1,299,455	xxx	269,065	xxxxxxx
	Rerolling	18	12	xxxxxxx	9,480	xxx	1,528	xxxxxxx	142,480	xxx	10,388	xxxxxxx
	Cold finished—Carbon	18	13	xxxxxxx	86,668	xxx	3,299	xxxxxxx	724,504	xxx	24,075	xxxxxxx
	Alloy—Hot rolled	16	14	xxxxxxx	115,795	xxx	12,550	11,532	1,044,715	xxx	94,646	82,265
	Cold finished	15	15	xxxxxxx	11,131	xxx	1,046	xxxxxxx	99,589	xxx	5,624	xxxxxxx
	Hoops and baling bands	5	16	xxxxxxx	7,012	xxx	152	xxxxxxx	100,100	xxx	8,636	xxxxxxx
	TOTAL BARS	54	17	12,389,265	828,767	79.1	95,873	67,022	8,171,757	66.0	1,133,612	477,730
	Tool steel bars (rolled and forged)	15	18	110,220	8,512	91.3	807	xxxxxxx	74,176	67.3	6,720	xxxxxxx
	Pipe and tube—B. W.	13	19	1,851,860	140,043	89.4	9,737	xxxxxxx	1,157,144	62.5	81,573	xxxxxxx
	L. W.	10	20	1,246,340	34,366	32.6	3,596	xxxxxxx	360,188	28.9	34,141	xxxxxxx
	Electric weld	5	21	735,520	31,403	50.5	1,624	xxxxxxx	288,424	39.2	29,456	xxxxxxx
	Seamless	15	22	3,159,840	127,859	47.9	18,247	xxxxxxx	1,759,567	55.7	209,821	xxxxxxx
	Conduit	6	23	151,145	9,775	76.5	123	xxxxxxx	82,042	54.3	1,773	xxxxxxx
	Mechanical Tubing	13	24	554,825	40,431	86.2	4,966	xxxxxxx	313,877	56.6	27,573	xxxxxxx
	Wire rods	18	25	xxxxxxx	118,319	xxx	14,092	21,848	1,238,344	xxx	334,794	196,787
	Wire—Drawn	37	26	2,255,210	165,791	87.0	14,051	1,533	1,552,912	68.9	169,631	12,555
	Nails and staples	19	27	1,091,690	64,400	69.8	4,676	xxxxxxx	641,453	58.8	59,623	xxxxxxx
	Barbed and twisted	16	28	438,270	21,564	58.2	5,643	xxxxxxx	213,825	48.8	53,514	xxxxxxx
	Woven wire fence	15	29	772,790	22,694	34.7	136	xxxxxxx	230,278	29.8	2,079	xxxxxxx
	Bale ties	11	30	119,050	4,064	40.4	47	xxxxxxx	67,610	56.8	341	xxxxxxx
	All other wire products	5	31	27,030	435	19.0	-	xxxxxxx	5,302	19.6	-	xxxxxxx
	Fence posts	13	32	147,485	4,469	35.8	182	xxxxxxx	54,434	36.9	1,044	xxxxxxx
	Black plate	12	33	653,295	22,024	39.9	2,040	20	338,655	51.8	45,134	56,104
	Tin plate—Hot rolled	9	34	1,201,960	17,514	17.2	487	xxxxxxx	422,028	35.1	75,619	xxxxxxx
	Cold reduced	10	35	2,930,860	185,907	75.0	16,259	xxxxxxx	2,267,828	77.4	325,010	xxxxxxx
	Sheets—Hot rolled	26	36	xxxxxxx	593,321	xxx	41,512	15,770	5,756,385	xxx	518,245	160,388
	Galvanized	16	37	xxxxxxx	155,823	xxx	11,716	xxxxxxx	1,551,374	xxx	156,854	xxxxxxx
	Cold rolled	18	38	xxxxxxx	254,681	xxx	4,871	xxxxxxx	2,436,539	xxx	74,560	xxxxxxx
	All other	15	39	xxxxxxx	62,079	xxx	1,428	xxxxxxx	601,813	xxx	23,152	xxxxxxx
	TOTAL SHEETS	27	40	13,255,610	1,065,904	95.1	59,527	15,770	10,346,111	78.1	772,811	160,388
	Strip—Hot rolled	24	41	3,525,110	159,701	53.6	7,816	20,865	1,529,877	43.4	89,760	180,689
	Cold rolled	35	42	1,313,360	88,702	79.9	1,105	xxxxxxx	790,346	60.2	16,929	xxxxxxx
	Wheels (car, rolled steel)	5	43	424,385	20,093	56.0	109	xxxxxxx	191,870	45.2	2,638	xxxxxxx
	Axles	5	44	472,280	13,877	34.8	119	xxxxxxx	108,088	22.9	2,438	xxxxxxx
	Track spikes	11	45	327,275	9,374	33.9	317	xxxxxxx	107,197	32.8	4,622	xxxxxxx
	All other	3	46	9,100	1,109	144.2	39	xxxxxxx	10,138	111.4	81	xxxxxxx
	TOTAL STEEL PRODUCTS	134	47	xxxxxxx	4,909,448	xxx	713,802	290,244	48,584,860	xxx	7,693,858	2,618,889
	Estimated total steel finishing capacity based on a yield from ingots of 68.9 %		48	53,946,300	xxxxxxx	101.3	xxxxx	xxxxxxx	xxxxxxx	85.2	xxxxxxx	xxxxxxx
IRON PRODUCTS	Pig iron, ferro manganese and spiegel	26	49	xxxxxxx	699,025	xxx	66,468	247,868	6,097,353	xxx	557,529	1,755,865
	Ingot moulds	4	50	xxxxxxx	59,916	xxx	452	xxxxxxx	509,868	xxx	4,903	xxxxxxx
	Bars	10	51	160,600	3,617	26.6	2	102	33,147	20.6	366	1,874
	Pipe and tubes	3	52	109,377	4,391	47.5	219	xxxxxxx	43,926	40.2	1,227	xxxxxxx
	All other	3	53	71,180	1,028	17.1	351	-	12,635	17.8	2,874	2,326
	TOTAL IRON PRODUCTS (ITEMS 51 to 53)	12	54	276,247	9,036	38.7	572	102	89,708	32.5	4,467	4,200

Total Number of Companies Included - 153

Total steel products produced for sale, less shipments to members of the industry for conversion into further finished products: Current month 1,619,204 *N.T.;* 101.3 *% of Finishing Capacity.*
To date 45,965,971 *N.T.;* 85.2 *% of Finishing Capacity.*
The above tonnages represent 68.9 *% of the ingots produced by companies whose products are included above.*

January Pig Iron Rate 98.7 Per Cent, 4,666,233-Ton Output Is New Record

■ PRODUCTION of coke pig iron and ferroalloys in United States reached an all-time high in January, output aggregating 4,666,233 net tons as the operating rate increased 2.3 points to 98.7 per cent of capacity and daily average was up 2.7 per cent to 150,524 tons. Stacks active Jan. 31 totaled 205, up three from the previous month, according to operators of the nation's 229 potential coke blast furnaces.

Output in January was 123,369 tons or 2.7 per cent greater than in December, the previous record month. It was 15.9 per cent greater than 4,024,556 tons produced in January, 1940, nearly double output of 2,436,474 tons in the month in 1939, up 29 per cent over January, 1937, and 21 per cent higher than 3,844,991 tons produced in January, 1929.

Daily average last month was 3980 tons greater than in December, when output averaged 146,544 tons. It was 20,699 tons or 15.9 per cent greater than in January a year ago.

Operations' Rise Consistent

The industry's operating rate has risen consecutively each month since April, 1940, except in December, when it remained 96.4 per cent, as in November. Rate in April was low for the year, 68.9 per cent. Last month's rate, based on the Dec. 31, 1939, capacity of 55,628,060 tons, compared with 85.4 per cent in January, 1940, and 76.6 per cent in the month in 1937.

Production of merchant iron in January aggregated 654,091 tons, against 4,012,132 tons of the steelworks or nonmerchant classification. It compared with output of 662,520 and 3,880,344 tons respectively in December, and was 14 per cent of the total. In January a year ago, 459,127 tons of merchant iron was produced, and 3,134,227 tons of nonmerchant. Iron produced for sale in that month was 12.8 per cent of the aggregate.

Four stacks were blown in last month and one was blown out. All were of the nonmerchant classification. Furnaces placed in blast in January:

In Alabama: Ensley No. 3, Tennessee Coal, Iron & Railroad Co. In Illinois: South Chicago No. 2, Wisconsin Steel Works. In Ohio: Ohio No. 5, Carnegie-Illinois Steel Corp. In Pennsylvania: Donora No. 1, American Steel & Wire Co.

Bethlehem A, Bethlehem Steel Co., in Pennsylvania, was blown out for rebuilding.

Total of stacks active in January, 205, was highest since August, 1929, when 209 furnaces were in blast and 4,195,742 tons of iron was produced. It compared with 202 in December last year, 202 in November, 196 in October, 192 in September and 155 in March, lowest in 1940.

Twenty-nine companies, aggregating 98 furnaces, reported all their pig iron producing facilities in operation Jan. 31. Several others are rebuilding furnaces long idle.

National Tube Co., Pittsburgh, is rebuilding its No. 3 stack at Lorain, O.; Bethlehem Steel Co. is reconditioning its Bethlehem A furnace, at Bethlehem, and its Steelton E, at Steelton, Pa. The Steelton stack had been previously reported abandoned as of July 1, 1940, and had been taken off the list.

Total of potential furnaces, however, was down two from December's 231 to 229, as Carnegie-Illinois reported three stacks taken off the list at the Edgar Thomson works in Pennsylvania. Stacks reported abandoned were Edgar Thomson A, B and C, all idle many years.

Edgar Thomson A, built in 1879, first blast 1880, was last relined in 1916, shortly after which it became idle. Originally 65 x 13 feet, it was rebuilt several times, eventually was enlarged to 90 x 22 feet. Edgar Thomson B, first blown in 1880 also, was subsequently rebuilt and enlarged to 85 x 21 feet; it has been long idle. C stack, also built in 1880, was last rebuilt in 1903, last relined in 1924. It was 83 x 21 feet, had a capacity of 173,000 tons per year. All three were part of the original Edgar Thomson works.

It was reported that the two blast furnaces of Granite City Pig Iron Co., Granite City, Ill., may soon be put in blast. One stack is said to be in condition for relighting; the other may need relining. Each furnace has capacity of 224,000 tons. Granite City A was last relined in 1928; the B stack was built in 1926. Both have been idle since 1932.

Canadian Production

■ Canadian steel ingot and castings production in 1940 totaled 2,011,172 gross tons, compared with 1,384,870 tons in 1939 and 1,155,190 tons in 1938. Pig iron production was 1,168,894 tons in 1940, compared with 755,731 tons in 1939. Ferroalloy output was 135,412 tons in 1940 and 76,375 tons in 1939.

	Steel ingots, castings	Pig iron	Ferroalloys
Dec., 1940..	185,420	110,477	18,397
Nov., 1940..	176,113	109,576	11,654
Dec., 1939..	150,207	94,620	10,494
Year, 1940..	2,011,172	1,168,894	135,412
Year, 1939..	1,384,870	755,731	76,375
Year, 1938..	1,155,190	705,427	55,926

PIG IRON STATISTICS

RATE OF FURNACE OPERATION
(Relation of Production to Capacity)

	1941[1]	1940[1]	1939[2]	1938[3]
Jan.	98.7	85.4	51.0	33.6
Feb.	....	75.0	53.5	33.6
March	....	69.5	56.1	34.2
April	....	68.9	49.8	33.4
May	....	74.2	40.2	29.4
June	....	83.6	51.4	25.5
July	....	86.1	55.0	28.2
Aug.	....	89.9	62.4	34.8
Sept.	....	91.5	69.7	40.5
Oct.	....	94.2	85.2	48.0
Nov.	....	96.4	90.3	55.0
Dec.	....	96.4	88.5	51.4

[1] Based on capacity of 55,628,060 net tons, Dec. 31, 1939; [2] capacity of 56,222,790 net tons, Dec. 31, 1938; [3] capacity of 56,679,168 net tons, Dec. 31, 1937. Capacities by American Iron and Steel Institute.

JANUARY IRON PRODUCTION
Net Tons

	No. in blast last day of Jan.	No. in blast last day of Dec.	—Total Tonnages— Merchant	Nonmerchant
Alabama	18	17	129,619*	189,492
Illinois	16	15	92,911	305,774
Indiana	18	18	17,626	512,413
New York	13	13	90,050	216,989
Ohio	47	46	150,249	960,099
Penna.	68	68	127,904*	1,322,278*
Colorado	3	3		
Michigan	5	5		
Minnesota	2	2	26,535*	196,089
Tennessee	1	1		
Utah	1	1		
Kentucky	2	2		
Maryland	6	6		
Mass.	1	1	19,197*	308,998
Virginia	1	1		
West Va.	3	3		
Total	205	202	654,091*	4,012,132*

*Includes ferromanganese and spiegeleisen.

MONTHLY IRON PRODUCTION
Net Tons

	1941	1940	1939
Jan.	4,666,233	4,024,556	2,436,474
Feb.	.....	3,304,368	2,307,405
March	.....	3,270,575	2,680,446
April	.....	3,139,043	2,301,965
May	.....	3,497,157	1,923,625
June	.....	3,813,092	2,373,753
July	.....	4,060,513	2,638,760
Aug.	.....	4,234,576	2,979,774
Sept.	.....	4,172,551	3,218,940
Oct.	.....	4,437,725	4,062,670
Nov.	.....	4,397,656	4,166,512
Dec.	.....	4,542,864	4,219,718
Total	4,666,233	46,894,676	35,310,042

AVERAGE DAILY PRODUCTION
Net Tons

	1941	1940	1939	1938
Jan.	150,524	129,825	78,596	52,201
Feb.	.....	113,943	82,407	52,254
March	.....	105,502	86,465	53,117
April	.....	104,635	76,732	51,819
May	.....	112,811	62,052	45,556
June	.....	127,103	79,125	39,601
July	.....	130,984	85,121	43,827
Aug.	.....	136,599	96,122	54,031
Sept.	.....	139,085	107,298	62,835
Oct.	.....	143,152	131,053	74,697
Nov.	.....	146,589	138,883	85,369
Dec.	.....	146,544	136,119	79,943
Ave.	150,524	128,128	96,740	57,962

1940 Exports 25 Per Cent Over Best Previous Year

■ Iron and steel exports, excluding scrap, totaling 7,785,540 gross tons, valued at $476,351,104, were larger in 1940 by nearly 25 per cent than in any previous year, according to preliminary figures by the metals and minerals division, department of commerce. In 1939 exports amounted to 2,499,002 tons, valued at $180,995,835. In the record World war years, 1916, 1917 and 1918, total steel and iron exports were 5,885,946 tons, 6,268,546 tons and 5,370,265 tons, respectively.

December exports, 735,178 tons, valued at $44,259,176, slightly larger than November total, 713,827 tons, valued at $42,863,811, ended the three months decline following the August peak and compare with 394,035 tons, valued at $30,099,539, in December, 1939.

The United Kingdom, with purchases of 362,366 tons, compared with 400,953 tons in November, took 49 per cent of December shipments. Japan's purchases were second, 85,752 tons, compared with 9401 tons in November, and Canada was third with 70,774 tons, compared with 83,946 tons in November.

For all of 1940 the United Kingdom took 3,487,781 tons, 45 per cent of the year's total. Canada was second with 885,050 tons, 11.4 per cent. Japan received 388,134 tons, Argentina 362,059 tons, Brazil 254,799 tons and Union of South Africa 216,557 tons.

Exports of scrap were down, in December and in the year 1940. December shipments were 69,980 gross tons, valued at $1,293,579, compared with 74,349 tons, valued at $1,303,-

IRON AND STEEL FOREIGN TRADE STATISTICS

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	Dec., 1940	Nov., 1940	Jan. through Dec., 1940
Pig iron	70,856	27,838	555,471
Ferromanganese and spiegeleisen	203	246	13,036
Other ferroalloys	2,646	1,579	24,490
Ingots, blooms, etc.:			
Not containing alloy	240,095	226,437	2,265,064
Alloy, incl. stainless	17,979	58,404	254,961
Steel bars, cold fin.	12,844	15,669	66,609
Bars, iron	1,500	788	14,455
Bars, concrete	17,692	8,275	138,546
Other steel bars:			
Not containing alloy	28,636	37,950	468,046
Stainless steel	345	297	1,663
Alloy, not stainless	5,107	2,062	42,417
Wire rods	15,786	22,169	286,590
Boiler plate	896	983	11,170
Other plates, not fab.:			
Not containing alloy	64,517	54,440	557,588
Stainless steel	144	45	596
Alloy, not stainless	196	3,066	5,422
Skelp, iron or steel	11,134	21,547	149,383
Sheets, galv. iron	546	566	9,139
Sheets, galv. steel	12,857	9,907	155,477
Sheets, "black" steel:			
Not containing alloy	37,379	42,706	465,108
Stainless steel	167	148	1,776
Alloy, not stainless	736	1,232	9,796
Sheets, black iron	1,848	1,174	26,448
Strip sheet, cold-rolled:			
Not containing alloy	6,839	10,069	63,822
Stainless steel	24	26	655
Alloy, not stainless	49	24	527
Strip steel, hot-rolled:			
Not containing alloy	9,095	8,788	133,129
Stainless steel	5	23	211
Alloy, not stainless	38	124	1,087
Tin plate, taggers' tin	15,292	13,809	377,218
Terneplate (incl. long ternes)	519	298	6,112
Tanks, except lined	9,273	2,928	38,134
Shapes, not fabricated	40,423	36,524	407,156
Shapes, fabricated	6,160	5,587	72,286
Plates, fabricated	5,364	3,163	27,516
Metal lath	242	228	1,631
Frames and sashes	175	83	2,022
Sheet piling	218	616	12,059
Rails, 60 lbs.	19,965	15,362	203,255
Rails, under 60 lbs.	5,592	3,893	37,042
Rails, relaying	175	64	17,757
Rail fastenings	809	956	10,352
Switches, frogs, crsgs.	162	227	2,918
Railroad spikes	576	568	5,016
R.R. bolts, nuts, etc.	244	315	3,325
Boiler tubes, seamless	2,430	3,140	24,821
Boiler tubes, welded	170	224	2,069
Pipe:			
Seamless casing and oil-line	10,157	11,539	147,843
Do., welded	1,776	1,721	32,669
Seamless black	2,404	2,364	30,381
Pipe fittings:			
Mall.-iron screwed	388	352	5,007
Cast-iron screwed	190	157	2,513
Pipe and fittings for:			
Cast-iron pressure	1,711	3,156	50,746
Cast-iron soil	792	496	16,710
Pipe, welded:			
Black steel	4,135	5,863	42,881
Black wrought-iron	719	737	8,876
Galvanized steel	5,575	6,191	55,947
Galv. wrought-iron	418	855	8,184
All other pipe, fittings	3,147	1,354	17,199
Wire:			
Plain iron or steel	7,125	4,726	87,600
Galvanized	6,476	6,963	66,081
Barbed	5,063	4,125	44,205
Woven-wire fencing	591	366	4,734
Woven-wire sc'n cloth:			
Insect	86	57	803
Other	302	306	2,546
Wire rope and cable	1,153	1,273	11,936
Wire strand	60	223	1,424
Electric welding rods	324	470	4,286
Card clothing	1	2	17
Other wire	1,278	1,343	16,679
Wire nails	2,347	2,952	48,641
Horseshoe nails	194	263	1,473
Tacks	104	65	859
Other nails, staples	610	558	5,491
Ordinary bolts, machine screws	2,901	4,619	33,381
Castings:			
Gray-iron (incl. semisteel)	766	552	5,292
Malleable iron	231	241	2,466
Steel, not alloy	163	164	2,072
Alloy steel, incl. stainless	183	98	1,588
Car wheels, tires, axles:			
Wheels and tires	1,749	1,586	15,167
Axles, no wheels	796	235	2,588
Axles, with wheels	131	58	1,426
Horseshoes and calks	50	36	357
Forgings, n.e.s.:			
Not containing alloy	2,576	3,023	28,320
Alloy, incl. stainless	558	171	3,780
Total	735,178	713,827	7,785,540
Scrap, iron and steel	68,135	73,809	2,793,718
Scrap, tin plate	670	25	3,536
Tin plate circles, strips, cobbles, etc.	621	396	4,590
Waste-waste tin plate	503	97	6,091
*Terneplate clippings and scrap	51	22	15,153
Total scrap	69,980	74,349	2,823,088
GRAND TOTAL	805,158	788,176	10,608,628
Iron ore	512	127,741	1,386,304

*New class.

U. S. FOREIGN TRADE IN IRON AND STEEL, INCLUDING SCRAP

Gross Tons

	1940		1939	
	Exports	Imports	Exports	Imports
Jan.	583,521	8,274	362,672	27,664
Feb.	671,301	6,740	359,690	19,149
Mar.	663,980	5,096	474,360	25,369
April	612,906	6,674	394,008	44,083
May	783,964	7,759	532,641	28,142
June	936,047	5,505	588,856	32,587
July	1,034,938	3,542	513,664	30,851
Aug.	1,402,075	2,105	477,078	28,328
Sept.	1,221,052	2,598	575,613	29,874
Oct.	1,105,510	3,966	591,856	19,189
Nov.	788,176	980	605,555	15,216
Dec.	805,158	4,064	600,437	14,709
Tot.	10,608,628	57,303	6,076,429	315,161

ORIGIN OF DECEMBER IMPORTS

Gross Tons

	Iron ore	Manganese ore	Ferromanganese
Canada	2,780	.....	...
Mexico	438	.....	...
Cuba	17,100	5,546	...
Chile	142,600	...	...
Brazil	7,040	5,471	...
Newfoundland	3,750	...	...
Netherlands Indies	....	531	...
British India	.....	22,785	...
Soviet Russia	... ..	3,726	...
South Africa	.....	3,607	...
Gold Coast	.....	10,157	...
Phillppine Is.	.....	3,598	...
Norway	....	... ..	2
Total	173,708	55,421	2

	Sheets, skelp and sawplate	Hoops and bands
Canada	2	5
Total	2	5

UNITED STATES IMPORTS FOR CONSUMPTION OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	Dec. 1940	Nov. 1940	Jan. through Dec. 1940
Pig iron	....	98	10,242
Sponge iron	.....	.....	610
Ferromanganese (1)	2	.....	8,574
Spiegeleisen	3,692	26	15,645
Ferrochrome (2)	.....	.....	1
Ferrosilicon (3)	64	82	1,255
Other ferroalloys (4)	.....	8	223
Steel ingots, blooms, etc.	.....	.....	3
Billets, solid or hollow	.....	.....	437
Concrete reinforc. bars	.....	.....	8
Hollow bar, drill steel	... .	1	871
Bars, solid or hollow	1	53	1,853
Iron slabs	.....	.....	.....
Bar iron	.....	4	198
Wire rods	.....	.....	3,986
Boiler and other plate (including skelp)	2	1	15
Sheets, skelp, saw plate	2	4	122
Die blocks, blanks, etc.	.....	.....	12
Tin plate, taggers' tin and terne plate	22	11	137
Structural shapes	....	6	716
Sashes and frames	26	10	32
Sheet piling	.....	.....	.....
Rails and track material	5	1	1,589
Cast-iron pipe, fittings	.....	.....	419
Mall. iron pipe fittings	.....	.....	29
Welded pipe	....	82	112
Other pipe	107	140	2,964
Cotton ties	.....	.....	13
Other hoops and bands	5	.....	616
Barbed wire	.....	.....	86
Round iron, steel wire	.....	5	888
Teleg., telephone wire	...	1	1
Flat wire, steel strips	55	105	2,215
Wire rope and strand	6	13	535
Other wire	.....	.....	1
Nails, tacks, staples	3	1	112
Bolts, nuts, and rivets	1	1	131
Horse and mule shoes	... .	.....	3
Castings and forgings	23	75	612
Total	4,016	728	55,277
Iron and steel scrap	48	252	2,026
GRAND TOTAL	4,064	980	57,303

(1) Manganese content; (2) chrome content; (3) silicon content; (4) alloy content.

814, in November and 206,402 tons, valued at $4,064,358 in December, 1939. For 1940 total scrap exports were 2,823,088 tons, valued at $48,350,886, compared with 3,577,427 tons, valued at $55,810,417, in 1939.

Of the 1940 scrap exports, the United Kingdom took 969,425 tons, compared with 508,293 tons in 1939, Japan, 963,519, compared with 2,626,854 tons and Canada 380,883 tons compared with 175,496 tons. In December the United Kingdom received 55,290 tons, Canada 9933 tons and Mexico 2522 tons.

Imports of steel and iron, excluding scrap, in December totaled 4016 gross tons, valued at $206,825, highest since June. They included 3692 tons of spiegeleisen from Canada. The total for 1940 was 55,277 tons, valued at $6,097,266.

Scrap imports in December were 48 tons, valued at $624. For the year they were 2026 tons, valued at $48,291.

Industrial Machinery Exports $450,798,220

■ Industrial machinery exports last year totaled $450,798,220, an all-time high, according to report of the commerce department's machinery division. Shipments were 55 per cent greater than aggregate of $290,000,000 in 1939.

Gain of 119 per cent in exports of power-driven metalworking machinery was largely responsible for the increase. Exports of this machinery totaled $246,516,285 in 1940 against $112,571,552 in 1939. Remaining classes of industrial machinery showed a combined gain of 15 per cent.

Mining, pumping and well equipment was next in importance to metalworking machinery in point of export total; shipments last year aggregated $50,070,176, a decline of 18 per cent from $61,173,869 in 1939. Construction and conveying equipment exports increased 29 per cent in the year, from $24,303,503 to $31,370,438.

Twenty per cent gain in shipments of textile, sewing and shoe machinery was reported for the year. Increase was from $19,047,317 to $22,743,109. Exports of products classified as "other industrial machinery" totaled $67,116,891, an increase of 25 per cent over $53,514,633 the previous year.

President Orders New Export Regulations for Iron, Steel

President Roosevelt last week issued an executive order reclassifying iron and steel exports. New order supersedes that issued Dec. 10, and includes 148 iron and steel items.

Export of steel oil drums will be subject to licensing control effective Feb. 15.

Labor Board Staff In Shake-Up for Speedier Action

■ NATIONAL labor relations board, which has been undergoing a gradual reorganization ever since Dr. Harry A. Millis replaced J. Warren Madden as chairman, last week announced important changes in its setup designed to "improve and speed up its operations."

The shake-up announcement was regarded as being especially significant in view of controversies involving vital defense industries—including the Allis-Chalmers Mfg. Co., Milwaukee, and the Ford Motor Co., Dearborn, Mich., and the jurisdictional conflicts between the American Federation of Labor and the Congress of Industrial Organizations which has threatened or caused other delays in the defense program.

The reorganization sets up a new administrative division to "direct and supervise the work of the board's 22 regional offices and to oversee the issuance of complaints and authorization of proceedings in representation cases."

Division will be headed by Garnet L. Patterson, formerly Chicago regional director. It will take over many of the duties formerly handled by Secretary Nathan Witt, long a target of sharp criticisms, and who resigned when Dr. Millis became chairman. A new secretary to be appointed soon will be virtually an office manager.

"Methods of reviewing records of hearing have been changed so as to throw greater responsibility on the trial examiners and review attorneys," the statement said.

Mr. Patterson, who will report directly to the board, will have several regional co-ordinators, each of whom will be responsible for overseeing the work of a number of regional offices. These will be selected from the more able regional directors.

Steel Wages Buying Power Higher in '40 Than in '39

■ Average weekly earnings of workers in the steel industry had a higher buying power in the last quarter of 1940 than they did in 1929, according to the American Iron and Steel institute.

In the last three months of 1940, the hourly wage rates were 32 per cent higher than they were in 1929, but pay envelopes were somewhat larger in the earlier year because the average work week was 40 per cent greater.

The slightly lower average weekly wage in 1940, however, was more than offset by the substantially lower costs of living, compared with those in 1929. According to data on the cost of living published by the National Industrial Conference board, the average cost of food, rent, clothing and other items in the final quarter of last year was nearly 15 per cent below the 1929 level.

As a result, the "real" earnings of employes, or purchasing power of their wages in the fourth quarter of 1940 were actually 7 per cent above the purchasing power of their earnings in 1929.

Wage-earning employes of the steel industry earned an average of $33.05 per week in the final three months of 1940, compared with $35.90 per week in 1929.

Hourly earnings of steel workers in October, November and December of last year averaged 86.1 cents an hour, or almost one-third more than the average for 1929 of 65.4 cents an hour. The average number of hours worked each week was 38.4 in the last quarter of 1940, compared with an average of 54.9 hours per week in 1929.

DIED:

■ **CHARLES R. MESSINGER,** 57, president, Chain Belt Co., Milwaukee, and chairman, Oliver Farm Equipment Co., Chicago, and closely identified with several other Midwest industrial enterprises, at his home in Milwaukee, Feb. 4. He was a member of the advisory council, ordnance department, United States army, for the middle western district.

Born in New Haven, Conn., in 1883, he was graduated from Sheffield Scientific school, Yale university, in 1906. He joined Chain Belt in 1917 as vice president and general manager, becoming president in 1923 and continuing in that capacity through 1930, when he resigned to become president of Oliver Farm Equipment Co., and at the same time became chairman of Chain Belt. He resumed the presidency of Chain Belt following the death of his brother, Clifford F. Messinger, in December, 1933.

♦

Warren L. Neu, a former official and director, Hanson-Van Winkle-Munning Co., Matawan, N. J., at his home in that city, Jan. 10.

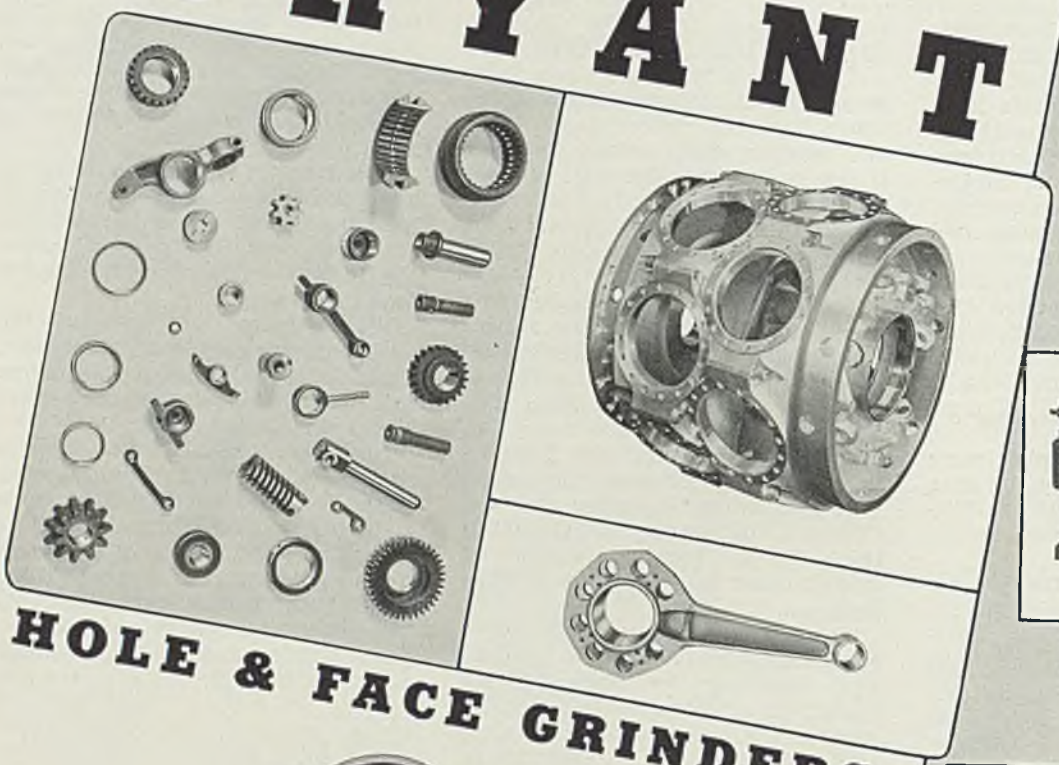
♦

H. J. Eltz, 58, since 1925 works superintendent, Brown & Sharpe Mfg. Co., Providence, R. I., in Providence, Jan. 31. He was associated with the company over 33 years.

♦

James M. Sampson, 63, metallurgical engineer, General Electric Co., Schenectady, N. Y., Jan. 31, in Niagara Falls, N. Y.

BRYANT



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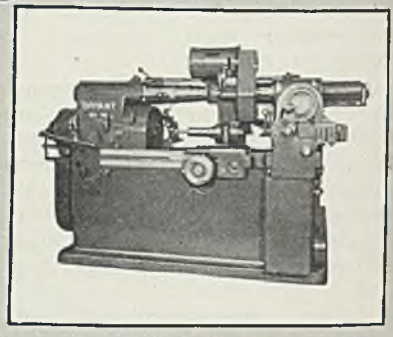

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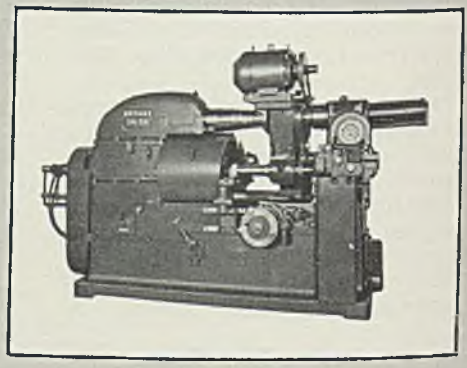

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IF your production requires ground holes and faces, then there is a Bryant Grinder to meet your requirements. Bryant Grinders are built in a wide range of sizes to grind straight, taper, a combination of straight and taper, double taper, curved, cam shaped or blind holes. This range includes machines for tool room or production work. Bryant's experience in handling thousands of internal and face grinding jobs is at your service — this service is yours without obligation.

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Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

Priorities division rounded out by appointment of more executives and advisory committees, but OPM still regards formal application as last resort . . . Defense contract service organized to promote extension of subcontracting . . . Secretary Knox tells navy to "farm out" work to speed construction, as "Dollars cannot buy yesterday" . . . Training-within-industry program extended

WASHINGTON

■ ORGANIZATION of five administrative groups within the priorities division of the office of production management was completed last week by E. R. Stettinius Jr., head of the division.

New groups were established to handle chemicals, tools and equipment and general products. Minerals and metals and commercial aircraft groups had been announced previously.

Also appointed last week were four new advisory priorities committees. These were for aluminum and magnesium, nonferrous metals and minerals, chemicals, and machine tools.

The committees will serve in an advisory capacity to the group executives, will assist in the development of factual information and the formulation of policies. Actual decisions, however, will be made by the group executives.

Mr. Stettinius pointed out that the establishment of machinery for handling priorities in specific fields does not necessarily mean that formal priorities will be established immediately on the products involved.

New group executives are: Dr. Harrison E. Howe, editor, *Industrial and Engineering Chemistry*, for chemicals; Dexter S. Kimball, retired dean of engineering, Cornell university, Ithaca, N. Y., for tools and equipment; William E. Wickenden, president, Case School of Applied Science, Cleveland, for general products.

Group executives also serve as chairmen of the advisory committees set up under their groups. Thus Dr. Ernest M. Hopkins, group executive for minerals and metals, will be chairman of the advisory committees for both aluminum and magnesium and for nonferrous metals and minerals and for steel.

Members of the aluminum and magnesium committee are: Eugene J. Barney, Frigidaire division, General Motors Sales Corp., representing industrial consumers; Col. A. J. Lyon, representing the army; and Lieut. Commander D. N. Logan, representing the navy.

Members of the nonferrous metals and minerals committee are: Irwin H. Cornell, vice president, St. Joseph Lead Co., representing the producers; H. L. Erlicher, vice president in charge of purchases, General Electric Co., representing the industrial consumers; Col. W. R. Slaughter, representing the army, and Commander W. H. Von Dreels, representing the navy.

Ralph E. Flanders
Appointed group administrator of tool and equipment section of the priorities division, office of production management

Members of the chemicals committee will be Warren Watson, executive secretary of the Manufacturing Chemists association, representing the producers; Everet T. Trigg, president, John Lucas & Co., representing industrial consumers; Maj. C. B. Morgan, representing the army, and Lieut. N. S. Prime, representing the navy.

Ralph E. Flanders, president, Jones & Lamson Machine Co., Springfield, Vt. has been appointed group administrator, tool and equipment section.

Machine tool priority committee members will be Frederick V. Geier, president, Cincinnati Milling Machine Co., representing the producers; Col. T. J. Hayes, representing the army, and Capt. E. C. Almy, representing the navy.

Mr. Stettinius also announced appointment of Dr. W. S. A. Pott, president, Elmira college, Elmira, N. Y., as secretary to the priorities division. Dr. E. S. Stratton has been named general assistant executive to Dr. Hopkins. Dr. Stratton is on leave from the Harvard university graduate school of business.

Defense Contract Service Expanded, Adds Personnel

Office of production management last week announced transfer and expansion of the office of small business activities and addition of personnel to its 36 field offices. This unit will be known hereafter as defense contract service.

For administrative purposes the office of small business activities is being transferred from the division of purchases to the division of production.

Defense contract service will be headed by Robert L. Mehornay, who

is on leave from his position as president, North-Mehornay Companies, Kansas City, Mo.

One unit of the defense contract service will pay special attention to the question of broadening the subcontracting system and attendant problems. This unit will be under the direction of Joseph L. Trecker and Francis J. Trecker, of Kearney & Trecker, machine tool builders, Milwaukee.

S. E. Hackett Named Iron, Steel Consultant to OPM

S. E. Hackett, formerly president, Jones & Laughlin Steel Corp., Pittsburgh, has become iron and steel consultant to the office of production management, replacing Walter S. Tower, president, American Iron and Steel institute, who now is serving on the steel priority advisory committee.

"Training-Within-Industry" Plan Launched by Hillman

"A training-within-industry" program to provide a steady flow of skilled men has been established on a nation-wide basis with the appointment of 16 district representatives, Sidney Hillman, associate director general, office of production management, announced.

District representatives will work with management and labor to extend the number of factories in which "on-the-job" training is being offered. They have been approved both by labor unions and by management, and are being loaned by industry to serve without pay.

The program enables workers to serve an apprenticeship in a factoy working on defense contracts, and provides for progressive upgrading of employes by insuring them jobs of higher skills as soon as they are trained for them.

Each of the new district representatives will be assisted by a council of four advisers—one from AFL, one from CIO, and two from industry. In addition, the representative and his advisers will be assisted by a panel of ten or more consultants in each district.

District offices have been set up in 22 industrial centers: Boston; Hartford, Conn.; upstate New York; New York city; Newark, N. J.; Philadelphia; Baltimore; Canton, N. C.; Atlanta, Ga.; Cincinnati; Pittsburgh; Cleveland; Detroit; Indianapolis; Chicago; St. Paul; St. Louis; Houston, Tex.; Denver; Los Angeles; San Francisco; and Seattle.

Priorities Regarded as "Last Resort" by Defense Agency

Industry priorities are regarded as the last resort by office of production management, priorities division, Blackwell Smith, assistant director, told trade paper editors last week. He indicated a policy of scheduling required materials without resort to priorities would be followed by the defense agency after reorganization now underway is completed.

S. E. Hackett

Knox Urges Subcontracting To Speed Naval Construction

Subcontracting to speed navy construction wherever possible has been directed by Secretary of the Navy Frank Knox in a letter to commandants of all naval districts, navy yards and stations and the marine corps.

"All naval work must be expedited to the maximum," stated the secretary. "Dollars cannot buy yesterday."

May Shift Orders To Make More Steel Available

William S. Knudsen, director general of the office of production management, recently was informed by leading steel producers that the steel industry is in the process of expanding its productive facilities.

The industry will study the possibility of undertaking a gradual increase in over-all steel capacity as opposed to an immediate forced expansion and will appoint representatives of large and small companies to collaborate with the office of production management in exploring this subject.

The report on steel capacity now being prepared for the President by Gano Dunn will be taken as the basis for this study.

The producers also informed the OPM that the industry is seeking to achieve full utilization of existing facilities and asked the OPM to co-operate to this end. It is considering the advisability of shifting orders where this will result in an increase in the over-all amount of steel available.

Producers who conferred with the OPM included Benjamin F. Fairless, president, United States Steel Corp.; E. G. Grace, president, Bethlehem Steel Corp., Bethlehem, Pa.; E. L. Ryerson, chairman, Inland Steel Co., Chicago; T. M. Girdler, chairman, Republic Steel Corp., Cleveland; and E. T. Weir, chairman, National Steel Corp., Pittsburgh.

Commerce Department Sets Up Service, Information Office

A service and information office has been established in the commerce department to simplify and expedite contact between businessmen who come to Washington and government officials.

Utilizing the services of men detailed from the bureau of foreign and domestic commerce and others with long experience in and association with the affairs of government, the office has been instructed to reduce wherever possible the time required by representatives of business and industry who come to Washington to transact official business.

Primary objective of the office will be to put businessmen, wherever possible, in direct touch with the government official who best can give consideration to the problem involved. It is anticipated that it will be possible to reduce the number of calls that the business visitor will have to make and also save the time of government officials who now see many persons whom they have to refer to someone else.

Find Few Trade Associations Guilty of Restraint of Trade

Relatively few of the 1500 national and regional trade associations have in recent years engaged in collusive restraints of trade, according to a monograph published by the temporary national economic committee.

Study represents more than a year's work by the committee's staff of experts.

According to the reports of the associations, relations between government and industry was their major activity. Others followed, in the order named: Trade promotion; standardization and simplification; conventions; trade practices; trade statistics; labor relations; technical research and advisory services; public relations; accounting; credit information; traffic information and assistance; price information; commercial arbitration; collection services; and registration of trademarks, designs, and patents. There is a substantial variation of activity among different industries and among groups according to income and size.

Survey Reveals Vast Idle Plant Capacity

■ Early returns from a nation-wide survey conducted by the National Industrial council, an affiliate of the National Association of Manufacturers, last week disclosed a vast amount of idle plant capacity and machinery that might be diverted to defense manufacture.

Survey also revealed a large number of plants have instituted training programs to develop skilled and semiskilled workers to cope with the growing shortage of such labor.

The study was undertaken by the manufacturers' association in cooperation with state manufacturers' associations at the suggestion of William S. Knudsen, No. 1 man in the rearmament program. Only about 10 per cent of the questionnaires sent to manufacturing plants have been returned, but these are believed to provide a fairly accurate forecast of what the final results will show.

Study of the early returns revealed a preponderance of plants do not now have defense orders.

In an effort to determine trends in the early stages of the survey, 100 returns from the state of Virginia were analyzed. Twenty-one of these manufacturers are working on defense orders, either as primary or subcontractors; 40 reported they could expand production in varying degrees, ranging from 10 to 300 per cent. Twelve have company-sponsored programs under which unskilled and semiskilled men are being trained.

Some of the reporting plants are being diverted in whole or part from their normal activities to manufacture defense material. A laundry machine manufacturer, for example, reported he is not only making laundry machines for the armed forces but also is turning out a variety of munitions as subcontractor for other manufacturers.

McKee Moves Into New Cleveland Headquarters

■ Arthur G. McKee & Co., engineers and contractors, formally opened new headquarters at 2300 Chester avenue, Cleveland, Feb. 1. Many of the company's customers and material and equipment suppliers inspected the new office, engineering and drafting room facilities.

Building has approximately 34,000 square feet of floor space on two floors and is constructed of brick, steel and concrete. Two drafting rooms on the second floor can accommodate about 80 draftsmen each.

Company officials expect the new facilities as well as the old headquarters at 2422 Euclid avenue will be fully utilized for at least the duration of the emergency period. Dollar volume of contracts taken by the company during the past year was twice that of the largest previous year and a large volume of new work is under negotiation.

1941 Machine Tool Output To Total $750,000,000

■ Machine tool production in 1941 will total $750,000,000, an increase of $300,000,000 over 1940, it was stated last week by Clayton R. Burt, chairman, defense committee of the National Machine Tool Builders' association, following an industry-wide survey of ways and means to accelerate production.

This is $100,000,000 greater than preliminary estimates for 1941 made earlier in the year.

"We are confident that the $750,000,000 goal may be reached by increased subcontracting, by working overtime, by maximum utilization of equipment, and by plant expansion where necessary," said Mr. Burt.

"The industry is in complete accord with various plans for surveying existing machine tool facilities so that all machine tools now idle, or used only part time, may be put to work to the utmost.

"The industry feels confident of its ability to meet national defense requirements as rapidly as they materialize. This is borne out by the fact that whereas the industry anticipates total production of $750,000,000 in 1941, present orders total only $423,000,000."

Handling Men, Industry's Most Difficult Problem

■ "Handling of men is the most difficult problem in industry," stated Alfred Kauffmann, president, Link-Belt Co., Chicago, at the commencement exercises of the Illinois Institute of Technology, Chicago, on Jan. 29.

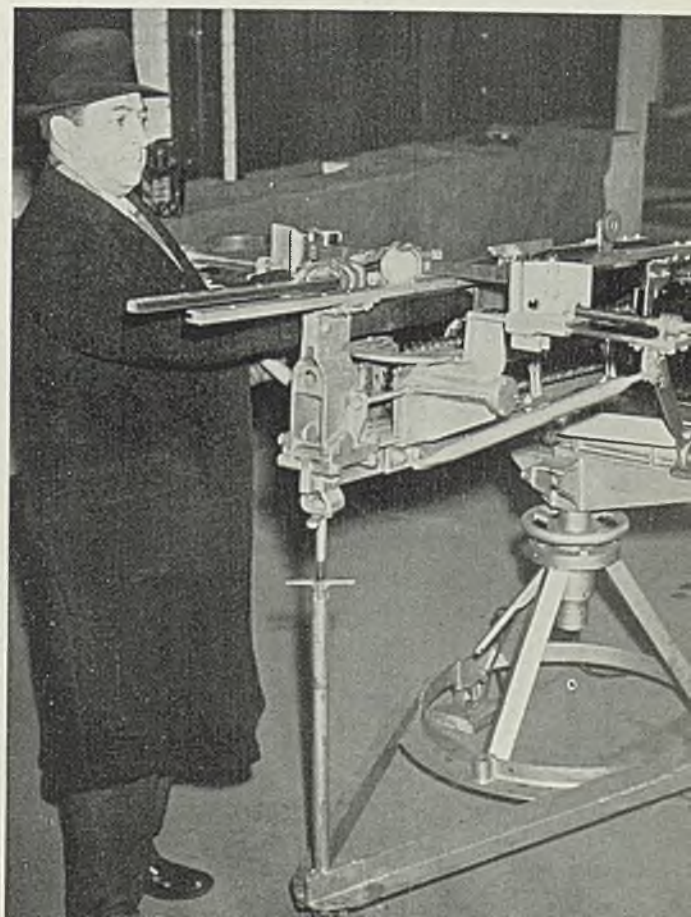
His topic was "Opportunities for Technically Trained Men in the Business Battle Ahead."

"Industry buys more labor, expressed in dollars for wages, than almost all the commodities that enter into the product that is being manufactured; and changes in labor efficiency contribute more to profit or loss than any other single factor," he stated.

"I wonder why so few engineers step from the engineering department into high sales-managerial or executive positions. It is because the engineer is first of all a student and is apt to withdraw too much from the affairs of the world. He is reticent and not given to self-exploitation. I don't mean that he must set out to advertise himself, but a pleasant personality with the power to express simply and clearly so that a layman can understand is all very helpful.

"Study the catalogs describing the products made, as you can learn a great deal there. Consider old problems or tasks from a new angle. Do not be content to solve or do them in the old conventional way. Ask questions; discuss your problems with others," Mr. Kauffmann advised the graduates.

New Steel-Man Of Baseball



■ This mechanical baseball pitching device, claimed by inventor Byron W. Moser to be capable of hurling 99 of 100 balls across the strike zone, will get a workout at the St. Louis Cardinals' training camp. The St. Louis club owns exclusive rights in the steel robot and expects it to give unlimited batting practice without the use of as many practice pitchers as ordinarily required. NEA photo

A century and a half ago Ben Franklin wrote these words. Today, in this war-torn world, Time is still too precious to squander—is our most potent ally.

* * *

MACHINE TOOLS are the timekeepers on America's production lines. Without them Time and even Life, as America understands it, may be lost.

Bullard machine tools can be vital weapons in your fight to preserve Time. A specific example: It used to take 315 minutes or 5¼ hours to turn and drill the arms of an aeroplane propeller hub spider. A Bullard Type "D" Mult-Au-Matic now does it in approximately 25 minutes.

Or, put it another way, 12 of these parts are now machined in the time it used to take to do a single one.

Perhaps you have Bullard Mult-Au-Matics or Vertical Turret Lathes now. If so, new Bullard tools and tooling layouts may help you to make them even more efficient. If you do not have our Standard Vertical Turret Lathe Catalog, send for your copy today.

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A METHOD

Mirrors of MOTORDOM

By A. H. ALLEN
Detroit Editor, STEEL

Higher engine speeds and lack of Swedish steel force development of new steels for valve spring service. Control of steel processing and wire drawing, with particular attention to surface qualities, found to be key factors . . . Steel at $4.50 a pound used in motor cars . . . Ford preforms plastic body panels before hot molding to final shape. Pine, straw, hemp, ramie and soybean resin binder combined in substitute for steel

DETROIT

■ SINCE the first of the year, supplies of Swedish steel for use in automotive valve springs have been exhausted. Anticipating this shortage, experimental work has been pushed over the past six months or more toward perfecting suitable substitutes.

Hitherto, Swedish steel rods have been considered peculiarly adapted to production of valve spring wire because of the extreme cleanliness of the steel, a result of the low amount of gangue in the Swedish iron ore. Before changing to Swedish steel, one of the large car producers used to experience about 50,000 broken valve springs out of the 10,000,000 made in a year, and while half a per cent breakage does not appear excessive, a change to the imported material reduced defective springs to an almost infinitesimal proportion.

So rare did broken valve springs come to be that when one was received here in Detroit a hurried call would be placed for the steel supplier and vociferous complaints made about *one* broken spring.

But the war put a stop to supplies of Swedish rods, as well as of Swedish sponge and powdered iron, also used to some extent in the auto industry, so attention became focused on the matter of developing substitutes. Newest edition of the *Making, Shaping and Treating of Steel* points out that, formerly, automobile engine speeds averaged about 2200 r.p.m., whereas now these speeds have been stepped up to 3800-4500 r.p.m. Any good commercial oil tempered wire with carbon content of from 0.60 to 0.80 per cent would make a properly designed valve spring for dependable service at 2400, but at the higher speeds, in the range from 3300-4500 r.p.m., there is a kind of "flutter" or spring periodicity that increases the fatigue stresses to the point where failures of ordinary wire frequently will occur in less than 1000 miles of operation. This phenomenon was discovered and proved in tests, incidentally, by George Nelson of L. A. Young Spring & Wire Co. here in Detroit.

Special Precautions Urged

Continuing, this volume states that by careful selection of material at each process in the manufacture of wire, all requirements of high-speed valve springs have been met, a statement which some metallurgists may question but nevertheless is an authoritative expression.

Some of the precautions taken with the steel are: Use of hot top ingot molds, generous cropping from both top and bottom of the ingot, overall grinding of billets, pyrometer control of rod temperatures, extra heat treatments from rod to finished wire, special heat treatment of finished wire, special twisting and bending tests, tensile tests to destruction from each end of every bundle of wire, spring winding and extension tests for uniformity of temper and vibration tests of sample springs on motors.

Mr. Nelson points out two highly important steps in processing this wire. One is the use of tungsten carbide drawing dies; the other rolling on loop mills instead of continuous mills. Looping mills, of course, permit a quarter turn of the strand as it is transferred from one roll stand to the next.

Fifteen years ago, most of the higher priced cars used chrome-vanadium electric furnace steel in valve spring wire. By 1927 or 1928, nearly all makes, excepting Ford, had switched to Swedish steel. Recently, when the latter became unavailable, some further tests were made with heats of chrome-vanadium wire. This is a high-grade material, used almost exclusively for valve springs in aircraft engines. However, aircraft spring wire is processed carefully from centerless ground rods, making it far too costly for auto engines.

One disturbing property of chrome-vanadium is the tendency of semifinished material to "open up" under heat, resulting in a seamy condition difficult to eliminate entirely, even in the finished wire.

An engineer in Detroit was convinced that the key to successful performance of valve springs was solely a matter of surface finish, that the reason the Swedish wire proved so suitable was the good finish on the hot-rolled rods. He took some samples of ordinary MB steel wire, culled from a number of different bundles, making certain that the lengths selected contained not the slightest trace of surface imperfection. These were made up into valve springs, tested and found to perform almost on a par with Swedish wire springs.

This seemed to indicate the vital importance of surface finish and it has been shown that even the tiniest flaw or discontinuity in the surface of such wire will invariably be the starting point for a fatigue failure.

All valve spring wire now is given

a shotblast or gritblast treatment which peens or cold works the surface and increases endurance limit or "fatigue value" by about 16 per cent.

The situation briefly now is that steel producers, wire suppliers and fabricators in this country have collaborated successfully in the development of a new valve spring wire for automobile engines which is equal in performance, if not entirely in production cost, to the former Swedish product. Mills aim at the Swedish analysis which is: Carbon, 0.63-0.68, manganese 0.45-0.55, phosphorus 0.025 max., sulphur 0.025 max., and silicon 0.21 per cent.

Among the 13,000 parts going into the modern automobile are many inconspicuous parts which perform vital functions and about which there is little general knowledge or appreciation. Valve springs are typical; another example is "flapper valve steel."

Each shock absorber in a car uses one washer of flapper valve steel. Another important outlet is the electrical refrigerator industry which uses steel flapper valves to control flow of refrigerant. This material is produced in strip form, 0.004 to 0.005-inch thick, and up to 2 inches in width. It is a cold-rolled spring quality steel, carefully held to specified thicknesses across the entire section and with a lapped finish. It sells for around $4.50 a pound and total consumption in a year's time is not much over 50 tons.

Flapper valves usually are in the form of washers somewhere near 1 inch in diameter and are blanked out of the strip which is bought wide enough to permit staggering the blanks so that maximum usage of the stock can be made. At that, the scrap probably amounts to more than the steel in the blanks.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1938	1939	1940
Jan.	226,952	356,692	449,492
Feb.	202,597	317,520	422,225
March	238,447	389,495	440,232
April	237,929	354,266	452,433
May	210,174	313,248	412,492
June	189,402	324,253	362,566
July	150,450	218,494	246,171
Aug.	96,946	103,343	89,866
Sept.	89,623	192,678	284,583
Oct.	215,286	324,688	514,374
Nov.	390,405	368,541	510,973
11 mos.	2,248,211	3,263,600	4,185,407
Dec.	406,960	469,120	....
Year	2,655,171	3,732,608	.....

Estimated by Ward's Reports

Week ended:	1941	1940†
Jan. 11	115,935	111,330
Jan. 18	124,025	108,545
Jan. 25	121,948	106,400
Feb. 1	124,400	101,240
Feb. 8	125,000	95,985

†Comparable week.

Ford Interrupts Production Of New 6-Cylinder Engines

With better than 9000 engines built, Ford has interrupted production of the 6-cylinder engine, reportedly because of a noise problem which developed.

Last week it was revealed that centrifugal casting may play a prominent part in construction of the new Ford liquid-cooled engine now undergoing tests. Mentioned briefly here several weeks ago, this engine is based on the Rolls-Royce design, is expected to develop 1500-1700 horsepower and is of the fuel injection type with exhaust driven supercharger. Cylinder liners produced by centrifugal casting to identical dimensions of the Pratt & Whitney forged steel liners, are claimed to show bursting strengths of around 80 per cent in excess of the forged steel liners.

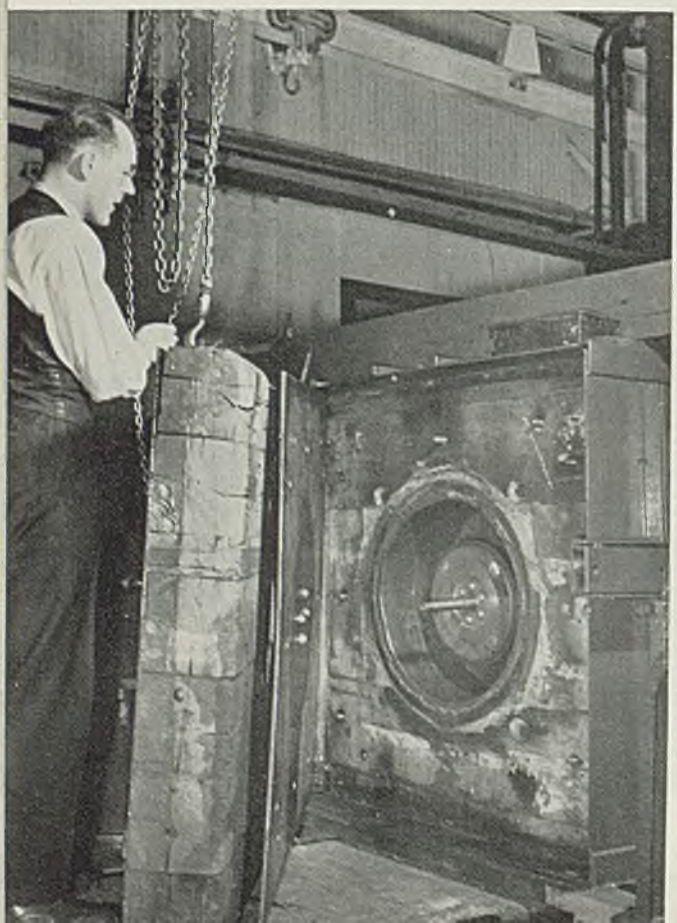
While, of course, an engine has to be designed to accommodate cast liners, cast crankshafts and the like, the advantage from a production standpoint is tremendous. For example, a press to form the rough upset forging for a liner costs around $100,000 and cannot be obtained for several months, while casting dies would cost only a few thousand dollars and could be fashioned without delay.

Plastic Car Body Expected To Make Appearance This Year

Ford's plastic car body is again in the news and the word from the River Rouge individualist is that the body will make its appearance some time this year, the entire superstructure except for tubular welded steel frame of plastic fiber.

R. A. Boyer, young research chemist in charge of experimental work on plastics, points out that plastic sheets weigh only half as much as steel panels of the same size. The company has a number of formulas for body panel plastics, the cellulose portion of a typical one comprising 50 per cent southern slash pine fiber, 30 per cent straw, 10 per cent hemp and 10 per cent ramie, the latter an Egyptian fiber from a plant which thrives in many parts of America.

Mr. Boyer who, incidentally, is doing some interesting work in the compacting and sintering of parts from powdered iron as well as with his plastics, states that materials used in earlier plastic compounds had to have a high percentage of expensive resin to permit drawing and forming between dies in a press. Now, however, a preforming process has eliminated the need for the high resin content. By this method, the fiber materials are suspended in liquid and deposited out on a screen of the approximate shape of the part to be reproduced. This preform then is impregnated with the low-cost soybean resin binder and the part put under heat and pressure in finishing dies. Studs for fastening the body panels to the framework are molded into the panels.



Extra Strength For Flywheels

Flywheel bursting chamber in Pontiac Motor division's experimental engineering department indicates Pontiac flywheels are more than twice as strong as they need be. Behind the steel panel and the 300-pound wood door flywheels are spun as high as 10,000 revolutions per minute without breaking. This corresponds to automobile speed of 170 miles an hour

A Respected Name In METAL WORKING EQUIPMENT

For over 30 years the name "YODER" has been identified with the development of metal forming machinery to increase production and lower costs.

A few items of the complete line, now widely accepted by leading organizations, are here illustrated. Literature is available describing the distinctive features and outstanding performance of each machine.

The services of Yoder Engineers are also available to aid in the solution of new and difficult metal forming problems.

ROLL FORMING MACHINES

Yoder pioneered this speedy and economical method of forming tubing, mouldings, weatherstripping, angles, channels, etc., successfully handling various metals including: hot or cold rolled steel, stainless steel, bronze, brass, copper, aluminum, high-strength alloys, etc.

Machines are available in a range of types and sizes for all purposes.

FLYING CUT-OFF MACHINES

For cutting tubing, moulding, wire, rods, strip metal, etc., with a plus or minus of $\frac{1}{64}$" at speeds up to 150 feet per minute.

The material strikes a trigger, releasing a die which cuts it instantly, clean and without burrs, and then returns to position for the next cut.

These machines are for use in line with roll forming machines and may be used with straightening rolls or with leveling rolls.

COMPLETE TUBE MILLS

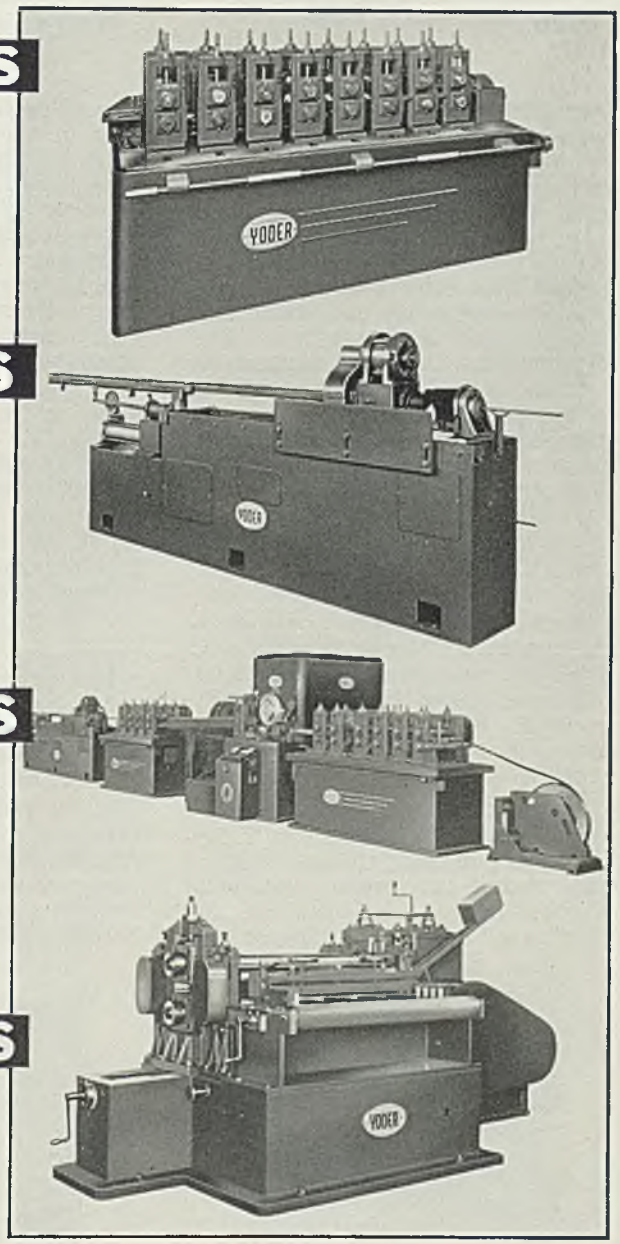
In sizes to form tubing from $\frac{1}{8}$" diameter .010" wall to 26" diameter $\frac{1}{2}$" wall; butted joint, lock seam or welded, by gas, arc or resistance.

Features include: full view and complete control from one central station, adjustment of speed and heat for various metals, high power factor and electrical efficiency, quick change for different sizes of tubes.

ROTARY GANG SLITTERS

Slitting and side trimming shears are available for handling tin plate, light sheets, brass, aluminum and zinc in widths up to 42 inches; also heavier machines for steel mills and large fabricators to handle thicker sheets and strips in widths up to 120 inches.

Yoder also engineers and builds complete slitting lines with all auxiliary equipment.



THE YODER COMPANY

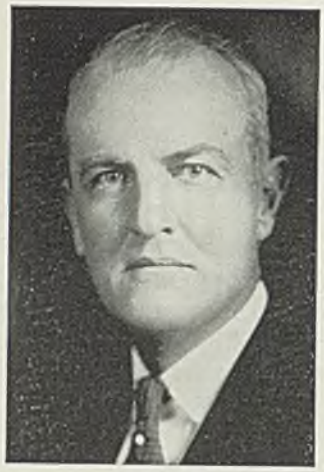
5500 WALWORTH AVENUE
CLEVELAND, OHIO

YODER ALSO MAKES:

BEADING MACHINES
BENDING MACHINES
POWER HAMMERS
BRAKE SHOE MACHINES
TENSION REELS
SCRAP CUTTERS
COILERS
UNCOILERS
SPECIAL MACHINERY.

MEN of

J. Heber Parker



Augustus Blagden

J. HEBER PARKER, the past 25 years vice president, Carpenter Steel Co., Reading, Pa., has been elected president. He succeeds the late Fred A. Bigelow. Mr. Parker began his career in the chemical laboratory of the company during his college vacations, and after graduating from Cornell university, entered the crucible department. In 1906 he was named assistant superintendent; in 1910 became chief metallurgist, and in 1916, vice president. He is a member, American Society for Metals, American Iron and Steel institute, American Institute of Mining and Metallurgical Engineers, and Iron and Steel Institute (Great Britain).

♦

Augustus Blagden has been elected president, Martin-Parry Corp., York, Pa., manufacturer of automobile metal parts. He succeeds **Frederick M. Small,** who has become chairman of the board.

♦

Arthur C. Allshul, manager of the Philadelphia plant of Joseph T. Ryerson & Son Inc., Chicago, retired Feb. 1 after 42 years of continuous service. Mr. Allshul has the distinction of having the longest continuous service record of anyone now in the Ryerson organization. After working in the Chicago sales department, he became district sales manager at Milwaukee, and in 1919, upon acquisition of the Ferguson Steel & Iron Corp., Buffalo, Mr. Allshul took charge as manager of that plant. He remained at Buffalo until 1929 when he was named manager at Philadelphia.

♦

W. E. Hedgecock, since March, 1940, acting head of the sales department of American Car & Foundry Co., New York, has been named vice president in charge of sales. **A. R. Walker,** formerly with Illinois Central railroad, has been appointed automotive sales engineer for the American company.

♦

Promotions for four operating men have been announced by American Steel & Wire Co., Cleveland, subsidiary of United States Steel Corp.

A. F. White now is assistant to manager of operations, Pittsburgh district. Succeeding him as general superintendent of Donora, Pa., steel and wire works, is **L. F. McGlincy,** heretofore division metallurgist in heating and hot rolling at the main office in Cleveland.

Richard R. Snow, assistant superintendent of open hearths and hot rolling at Worcester, Mass., succeeds Mr. McGlincy at Cleveland, and **U. F. Corsini,** assistant general foreman of Worcester rod mills, is assistant superintendent of open hearths there.

♦

W. J. Huge, assistant to superintendent of blast furnaces, Gary, Ind., works, Carnegie-Illinois Steel Corp., has been made assistant to division superintendent, coke plant and blast furnaces, quality control. **Ragnar Overberg,** former assistant to division superintendent of central mills, has been appointed assistant to division superintendent of steel production, quality control. **Ralph W. Dickson,** laboratory foreman since 1937, has been made assistant to division superintendent, central mills, quality control. **D. L. Simpson,** a metallurgist since 1939, becomes chief observer, west mills, quality control.

♦

William L. Dolle was elected presi-

Arthur C. Allshul

L. F. McGlincy

H. T. Worthington

Newly appointed New York district sales manager, Shaw-Box Crane & Hoist division, Manning, Maxwell & Moore Inc., Muskegon, Mich., STEEL, Feb. 3, p. 39

INDUSTRY

F. M. Gardner

L. D. Reed

dent and general manager, Lodge & Shipley Machine Tool Co., Cincinnati, at a recent stockholders' meeting. Other officers chosen are: **Fred Albrecht,** vice president and treasurer; **Louis L. Weber,** secretary; **Fred Schoeffler,** works manager.

♦

Bonnell W. Clark, R. A. McCarty, Frank D. Newbury, and **A. C. Streamer,** all identified with Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., many years, have been elected vice presidents.

Mr. Clark is president, Westinghouse Electric Supply Co.; Mr. McCarty, manager of the company's steam division at Philadelphia; Mr. Newbury, manager of the emergency products division, Pittsburgh, and Mr. Streamer, general manager, East Pittsburgh division.

♦

F. M. Gardner has joined the diesel and gas engine sales department of Cooper-Bessemer Corp., Mt. Vernon, O., as sales engineer. He will cover the western Ohio, Indiana, Kentucky and Tennessee territory. Prior to joining Cooper-Bessemer, Mr. Gardner held a similar position with National Supply Co.

♦

L. D. Reed, associated with the Whiting Corp., Harvey, Ill., 26 years, both as an engineer and the past 19 years as a salesman, has been placed in charge of the district sales office recently established in Philadelphia. Sales in this territory were formerly handled by **S. R. Vanderbeck** as a manufacturers' agent.

♦

Harry A. Burdorf and **Frank P. Rhame,** vice presidents, Lunkenheimer Co., Cincinnati, have been elected to the board of directors. Mr. Burdorf, associated with the company since 1905, is vice president in charge of sales, and Mr. Rhame, identified with Lunkenheimer since 1919, is vice president in charge of sales engineering.

♦

Robert Murray has been appointed superintendent, New Haven, Conn., works of American Steel & Wire Co., Cleveland, a subsidiary of United States Steel Corp. Mr. Murray, associated with American Steel & Wire since 1920, has previously been assistant superintendent of the plant.

♦

Edwin L. Dennis, since 1939 chief combustion engineer, Coppus Engineering Corp., Worcester, Mass., has been appointed to the faculty of Louisiana State university, Baton Rouge, La. Establishing headquarters in Baton Rouge, Mr. Dennis assumed his dual duties Feb. 1, retaining his connection with the Coppus corporation.

♦

R. H. Hathaway, formerly sales engineer, Production Machinery Co., Greenfield, Mass., has been named assistant to chief engineer, Hammond Machinery Builders Inc., Kalamazoo, Mich. Mr. Hathaway was educated at Technical High school, Fall River, Mass., and Tufts Engineering college, gaining his technical experience in the polishing and abrasive equipment field.

♦

Percy C. K. Harrison, vice president and general manager, Coulter & McKenzie Machine Co., Bridgeport, Conn., has been elected president. He succeeds **Andrew Berg,** who has retired after 57 years of service. Mr. Harrison will retain his post as general manager.

Henry Hart has been named vice president; **Raymond J. Witterwell,** treasurer, and **J. Arthur Fray,** secretary.

♦

James A. Drain Jr., president, Stefco Steel Co., Michigan City, Ind., has been named assistant to president, Sullivan Machinery Co., same city, effective Feb. 15. He will be succeeded by **N. A. Leist,** now vice president of the Stefco company.

♦

Robert T. Harris, manager, construction equipment department, Blaw-Knox Co., Pittsburgh, was elected a director, manufacturers division, American Road Builders association at a meeting in New York, Jan. 29.

C. G. Wollaeger
Who has been promoted to assistant general sales manager, Milcor Steel Co., Milwaukee, as noted in STEEL, Feb. 3, p. 39

R. H. Hathaway

$10,298,128 Fargo Truck Award Leads Week's Defense Contracts

■ GOVERNMENT defense contracts last week reported awarded by the departments of war and the navy aggregated $38,410,961. Few of the awards were large, and many were for small tools and equipment. War department's total again was several times the navy's.

Ordnance and quartermaster awards for the army, and bureau of supplies and accounts' contracts for the navy, comprised a large part of the total. Largest individual contract reported was awarded by the war department to Fargo Motor Corp., Detroit, for 11,781 one-half ton trucks and aggregated $10,298,128.

War department last week reported the following:

Ordnance Department Awards

Adirondack Foundries & Steel Co., Watervliet, N. Y., steel castings, $1268.57.

American Brass Co., Waterbury, Conn., brass, $892,063.20.

American Locomotive Co., New York, springs, forgings, $56,591.39.

American Steel & Wire Co. of New Jersey, Cleveland, firing pin springs, $3600.

Apex Tool & Cutter Co. Inc., Shelton, Conn., milling cutters, $1100.

Associated Spring Corp., Wallace Barnes Co. division, Bristol, Conn., springs, $1304.90.

Baird Machine Co., Bridgeport, Conn., machines, $20,205.

Baldwin Locomotive Works, Philadelphia, bearings, $1408.

Barnes, W. F. & John, Co., Rockford, Ill., drilling machines, $23,591.

Barwood & Co., Philadelphia, gages, $2479.92.

Bausch & Lomb Optical Co., Rochester, N. Y., instruments, $10,993.50.

Bendix Aviation Corp., Scintilla Magneto division, Sidney, N. Y., magnetos, $2535.

Bennel Machine Co., Brooklyn, N. Y., machinery, $1045.72.

Borg Warner Corp., Rockford Drilling Machine Co. division, Rockford, Ill., flywheel, fan and hub assemblies, $165,474.71.

Boston Gear Works Inc., Springfield, Mass., gear reducers, $1830.

Bridgeport Thermostat Co. Inc., Bridgeport, Conn., small arms materiel, $3682.56.

Brown Brockmeyer Co. Inc., Dayton, O., motors, $1065.93.

Brown & Sharpe Mfg. Co., Providence, R. I., gages, $4969.74.

Buda Co., Harvey, Ill., tools, $5093.13.

Budd Wheel Co., Detroit, discs, $4684.80

Chase Brass & Copper Co. Inc., Waterbury, Conn., brass, $95,354.04.

Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinati, milling machine arbors, $2694.

City Steel Door Corp., New York, steel chests, $2488.57.

Colt's Patent Fire Arms Co., Hartford, Conn., pistols, $41,962.50.

Commerce Pattern Foundry & Machine Co., Detroit, bronze castings, $15,750.

Continental Motors Corp. Muskegon, Mich., tools, $1376.70.

Cuyahoga Spring Co., Cleveland, small arms materiel, $4832.10.

DeLisser Machine & Tool Corp., New York, gages, $3000.

Denison Engineering Co., Columbus, O., presses, $180,525.

Detroit Broach Co. Inc., Detroit, broach sections, $1463.70.

Die Casters Inc., Ridgefield, N. J., die castings, $4925.12.

Disston, Henry, & Sons, Tacony, Philadelphia, experimental armor plates, $3168.40.

Duff Norton Mfg. Co., Pittsburgh, gear jacks, $10,442.25.

Elgin National Watch Co., Elgin, Ill., watches, $25,607.05.

Farquhar, Lynd, Co., Boston, drill presses, $5333.

Fox Munitions Corp., Philadelphia, gages, $14,290.90.

General Machinery Corp., Boston, milling machines, $3717.

Greenfield Tap & Die Corp., Greenfield, Mass., gages, $51,557.45.

Hanson Van Winkle Munning Co., Matawan, N. J., chrome plating equipment sets, $3085.05.

Hanson-Whitney Machine Co., Hartford, Conn., gages, $10,327.45.

Hanssen's, Louis, Sons, Davenport, Iowa, saws, $22,344.37.

Hebard, W. F., & Co., Chicago, industrial tractors, $1083.

Hoe, R., & Co. Inc., New York, artillery materiel, $30,990.

Holo-Krome Screw Corp., Hartford, Conn., small arms materiel, $3619.89.

International Harvester Co., Chicago, tractors, springs, $20,350.80.

Kelly, John P., Philadelphia, bronze castings, $10,500.

Laminated Shim Co. Inc., Glenbrook, Conn., shims, $1883.60.

Landis, A. B., Sons Inc., Philadelphia, dies, $1818.

Lite Mfg. Co., New York, small arms materiel, $9495.74.

Logansport Machine Inc., Logansport, Ind., presses, $250,830.

Lukens Steel Co., Coatesville, Pa., steel rings, $32,120.

Maxson, W. L., Corp., New York, tools, $14,000.

Mercury Mfg. Co., Chicago, electric shop trucks, trailers, $9752.64.

Merriman Bros. Inc., Boston, bushings, $6870.16.

Miller Mfg. Co. Inc., Richmond, Va., hand tool chests, $14,172.31.

Mines Equipment Co., St. Louis, fire control equipment, $1610.

Modern Tool & Die Co., Philadelphia, gages, $86,476.

Niles-Bement-Pond Co., Pratt & Whitney division, West Hartford, Conn., drills, $2250.

Noble & Westbrook Mfg. Co., East Hartford, Conn., marking machines, $2220.

Norton Co., Worcester, Mass., surface grinders, $8445

Otis Elevator Co., Buffalo, steel castings, $5430.08.

Peters Engineering Co., Philadelphia, case trim machines, $4000.

Poor & Co., Canton Forge & Axle division, Canton, O., forgings, $5913.92.

Precision Mfg. Co., Philadelphia, gages, $31,086.

R. & M. Mfg. Co., Royal Oak, Mich., cartridge cases, $16,081.75.

Republic Steel Corp., Cleveland, small arms materiel, $140,149.36.

Reska Spline Products Co., Detroit, gages, $3338.

Revere Copper & Brass Co., Baltimore, brass, $167,976.

Schlosser Mfg. Co., Philadelphia, gages, $50,174.

Sheffield Gage Corp., Dayton, O., machine tools, gages, $129,547.55.

Sheip, Henry H., Mfg. Co., Philadelphia, supply chests, $2892.25.

Somerville Machine & Foundry Co., Somerville, Mass., bronze castings, $20,481.60.

Standard Machinery Co., Providence, R. I., bearings, $141,120.

Standard Pressed Steel Co., Jenkintown, Pa., small arms ammunition, $564,199.50.

Steele, W. M., Co., Worcester, Mass., sanding machine equipment, $2441.

Stevens-Walden Inc., Worcester, Mass., tool chests, small arms materiel, $4589.50.

Stewart-Warner Corp., Chicago, grease compressors, $1341.

Taft-Peirce Mfg. Co., Woonsocket, R. I., gages, $4181.30.

Taylor Winfield Corp., Warren, O., welders, $5540.

Thurston Mfg. Co., Providence, R. I., cutters, $6500.

Timken-Detroit Axle Co., Detroit, artillery materiel, $120,131.

Tri-Metal Products Corp., Conshohocken, Pa., bronze castings, $2444.

Tubular Service Corp., Pittsburgh, steel tubes, $10,754.47.

Union Twist Drill Co., Athol, Mass., reamers, hobs, $8134.98.

United Precision Products, Size Control Co. division, Chicago, thread gages, $1433.85.

United Shoe Machinery Corp., Boston, dies, $2187.

Vinco Tool Co., Detroit, gages, $2240.40.

Wadell Engineering Co., Newark, N. J., tools, $4831.50.

Walker Mfg. Co., Racine, Wis., jacks, $1522.50.

Watson-Stillman Co., Roselle, N. J., hydraulic pumps, presses, $369,525.

Wiedemann Machine Co., Philadelphia, gages, $6994.

Wright Aeronautical Corp., Paterson, N. J., tools, $1918.60.

Yale & Towne Mfg. Co., Philadelphia, electric shop trucks, elevating trucks, $10,954.48.

Quartermaster Corps Awards

Aluminum Co. of America, Pittsburgh, aluminum ingots, aluminum alloy bars and sheets, $14,340.05.

Bailey, J. W., Construction Co., Seattle, headquarters building, Ft. Lewis, Washington, $24,200.

Chytraus Co., Salt Lake City, Utah, hospital buildings, Ft. Douglas, Utah, $87,763.

Diamond Truck Motor Car Co., Chicago telephone line construction trucks, $18,270.

Dowd, W. T., Portsmouth, Va., installation of sheet metal ductwork, Ft. Monroe, Virginia, $25,264.

Ehret-Day Co., Trenton, N. J., temporary housing, Ft. DuPont, Delaware, $56,274.

Federal Motor Co., Detroit, tractor-trucks, $908,428.

Foley Construction Co., Cincinnati, sanitary sewer system, Jeffersonville quartermaster's depot, Indiana, $44,450.

Fox Rig & Lumber Co., Ardmore, Okla., temporary buildings, Ft. Sill, Oklahoma, $126,158.46.

Franchini Co., Medford, Mass., overhead passageway between main hospital building and annex, Ft. Banks, Winthrop, Mass., $8300.

Fruehauf Trailer Co., Detroit, semi-trailers, $9956.

General Motors Corp., Detroit, trucks, $623.73.

Harper, C. A., Madison, Wis., underground power and light system, Jeffersonville quartermaster depot, Indiana, $234,432.

Harris-McBurney Co., Jackson, Mich., electric distribution systems, Kellogg airport, Michigan, and Ft. Custer, Michigan, $13,000.

International Harvester Co. Inc., Chicago, trucks, $668,546.

Jakobson Shipyard Inc., Oyster Bay, N. Y., single screw diesel driven utility vessel, $59,675.

LaCrosse Trailer & Equipment Co., LaCrosse, Wis., semi-trailers, $2930.40.

Light, Joseph, Construction Co., Washington, dock, Curtis bay ordnance

depot, Curtis Bay, Maryland, $249,675.
Mack Mfg. Corp., Long Island City, N. Y., tractor-trucks, $869,140.80.
Marietta Mfg. Co., Point Pleasant, W. Va., all steel, steam, twin screw, riveted and welded army mine planters; one set van dyke negatives; and one set booklet plans, $8,241,750.
Moses, Charles S., Edgewater Park, N. J., additions to sewage treatment plant, Ft. Dix, New Jersey, $81,610.
Olson Construction Co. and Dobson & Robinson, Lincoln, Nebr., steam heating plants at shell loading plant, Ogden ordnance depot, Ogden, Utah, $123,000.
Ollinger Bros., Oklahoma City, Okla., alterations and additions to sewage treatment plant, Ft. Sill, Oklahoma, $194,944.44.
Pennsylvania Engineering Co., Philadelphia, cold storage equipment, Ft. Monroe, Virginia, $13,800.
Pound, Murphy, Columbus, Ga., one guest house for infantry school, Ft. Benning, Georgia, $22,900.
Proksch, A. H., Iron River, Mich., fire and guard house and garage, Savannah ordnance depot, Illinois, $137,010.
Reo Motors Inc., Lansing, Mich., trucks, $4600.
Ritter Bros., Harrisburg, Pa., storehouses, New Cumberland general depot, New Cumberland, Pa., $42,688.
Shwayder Bros. Inc., Detroit, metal trunk lockers, $87,069.00.
Vanguard Construction Corp., New York, ordnance shop and boiler house, Ft. Story, Virginia, $50,795.
Ward LaFrance Truck Corp., Elmira Heights, N. Y., tractor-trucks, $6980.
Watson Automotive Equipment Co., Washington, semi-trailers, $10,277.
Yale & Towne Mfg. Co., Stamford, Conn., padlocks, $17,250.
Yellow Truck & Coach Motor Co., Pontiac, Mich., tractor-trucks, $19,744.64.

Air Corps Awards

Beach Aircraft Corp., Wichita, Kans., spare parts for airplanes, $1,191,639.70.
Bendix Aviation Corp., Eclipse Aviation division, Bendix, N. J., assemblies, $578,925; Pioneer Instrument division, Bendix, compass assemblies, $213,520.
Biederman Motors Corp., Cincinnati, truck-tractors, $346,080.
Chandler-Evans Corp., South Meriden, Conn., assemblies, $101,250.
Chandler-Hill Corp., Detroit, assemblies, $45,000.
Fairchild Aviation Corp., Jamaica, N. Y., cameras and miscellaneous equipment, $3,174,390.
Jaeger Watch Co. Inc., New York, tachometer assemblies, $30,669.87.
Minneapolis Honeywell Regulator Co., Philadelphia, floodlight flare stand assemblies, $25,971.84.
Parker Appliance Co., Cleveland, benders, stands, $31,590.
Pump Engineering Service Corp., Cleveland, pumps, $2,964,762.20.

Corps of Engineers Awards

Aetna Iron & Steel Co., Jacksonville, Fla., hangar doors, $45,769.
Alteneder, Theo., & Sons, Philadelphia, protractors, $48,750.
American Bridge Co., Gary, Ind., steel hangars, $117,687.
American Type Founders Sales Corp., Mt. Vernon, N. Y., rotary presses, $37,757.
Belmont Iron Works, Eddystone, Pa., steel hangars, $124,900.
Bender Body Co., Elyria, O., tilt-type trailers, $279,788.
Bethlehem Steel Co., Pittsburgh, steel hangars, $124,350.
Capital Steel & Iron Co., Oklahoma City, Okla., hangar doors, $154,585.
Caye Construction Co. Inc., New York and Longmeadow, Mass., construction of airport, Manchester, N. H., $993,000.
Chicago Bridge & Iron Co., Chicago, elevated steel water tank, Scott field, Illinois, $28,850.
Consolidated Steel Corp., Maywood, Calif., steel hangars, hangar doors, $282,991.
Davenport-Besler Corp., Davenport, Iowa, locomotives, $178,325.
Electric Wheel Co., Quincy, Ill., pole-type trailers, $166,200.
Fate-Root-Heath Co., Plymouth, O., locomotives, $125,250.
Flynn, Michael, Mfg. Co., Philadelphia, hangar doors, $59,828.
General Bronze Co., Chicago, hangar doors, $65,273.
General Electric Co., Schenectady, N. Y., locomotives, $398,700.
Gurley, W. & L. E., Long Island City, N. Y., compasses, $451,713.70.
Klein, J. B., Iron Foundry Co., Oklahoma City, Okla., steel hangars, $47,743.
Mid-West Locomotive Works, Hamilton, O., locomotives, $35,000.
Mosher Steel Co., Houston, Tex., steel hangars, $103,199.
Onan, D. W., & Sons, Minneapolis, generator sets, $323,738.55.
Rushlight, A. G., & Co., Portland, Oreg., plumbing, heating, and sheet metal, Portland-Columbia airport cantonment, Oregon, $257,500.
Southern Engineering Co., Charlotte, N. C., steel hangars, $43,819.
Trailer Co. of America, Cincinnati, semi-trailers, $497,880.
Truscon Steel Co., Youngstown, O., hangar doors, $52,861.
Vulcan Iron Works, Wilkes-Barre, Pa., locomotives, $48,750.

♦

Following awards were reported last week by the navy department:

Douglas-Loeffler Co., Detroit, one hangar, one paint and dope spray booth building and one steam plant building at naval reserve aviation base, Grosse Ile, Mich., $78,445.
Lecoutour Parsons Construction Co., St. Louis, one hangar, one assembly and repair shop building, one paint and dope spray booth building and one steam plant at naval reserve aviation base, Robertson, Mo., $108,976.
Standard Construction Co. Inc., Minneapolis, one hangar, one assembly and repair shop building, one paint and dope spray booth building and one steam plant at naval reserve aviation base, Minneapolis, $97,313.

Bureau of Supplies and Accounts Awards

Allegheny Ludlum Steel Corp., Brackenridge, Pa., C-R welding steel, $145,740.85.
Alpha Metal & Rolling Mills Inc., Brooklyn, N. Y., seal rings for waterproof protecting cap assemblies, $5600.
Aluminum Co. of America, Pittsburgh, aluminum pigment, $67,863.75.
American-La France Foamite Corp., Elmira, N. Y., fire engine, $6,[illegible].37.
American Metal Co. Ltd., New York, ingot copper, $142,780.
American Smelting & Refining Co., New York, ingot copper, $122,854.
American Steel Wool Mfg. Co. Inc., Long Island, N. Y., steel wool, $7553.53.
Anaconda Wire & Cable Co., New York, electric cable, $13,635.
Art Metal Construction Co., Jamestown, N. Y., drafting tables, $7417.65.
Atlantic Pacific Mfg. Corp., Brooklyn, N. Y., life floats, $27,320.
Bethlehem Steel Co., Bethlehem, Pa., C-R bar steel, railroad rails and fittings, $40,275.86.
Brillo Mfg. Co. Inc., Brooklyn, N. Y., steel wool, $18,614.40.
Bristol Yacht Building Co., South Bristol, Me., mine sweepers, $300,000.
Brown & Sharpe Mfg. Co., Providence, R. I., tool grinders, $13,083.
California Steel Products Co., San Francisco, peg top buoys, $149,546.
Caswell, Strauss & Co. Inc., New York, grade A pig tin, $536,149.60.
Cincinnati Bickford Tool Co., Cincinnati, upright drills, $8769.
Cincinnati Shaper Co., Cincinnati, heavy duty shapers, shear machines, $30,112.00.
Circle Wire & Cable Corp., Maspeth, Long Island, N. Y., single conductor, triplex cable, $19,482.
Collyer Insulated Wire Co., Pawtucket, R. I., electric cable, $9615.
Columbia Steel Co., San Francisco, steel wire nails, $6611.50.
Consolidated Aircraft Corp., San Diego, Calif., dynamic tank, $6538.
Consolidated Machine Tool Corp., Rochester, N. Y., boring and turning mill, $184,704.53.
Continental Motors Corp., Muskegon, Mich., generator sets, $11,967.18.
C-O Two Fire Equipment Co., Newark,

How Small Plant Can Do Its Bit

■ As essential to the armed forces as airplanes or guns are these stainless steel cups to which handles are being welded in a small Los Angeles shop. Many similar shops already are supplying defense materials, either as primary or subcontractors. Organization of the defense contract service under the production division, office of production management, will make possible participation in the program by thousands of little plants.

Acme photo

N. J., extinguishers, $10,317.60.
Crane Co., Chicago, valves, $6781.50.
Crucible Steel Co. of America, New York, C-R bar grade steel, $25,923.33.
Davidson, M. T., Co., Brooklyn, N. Y., reciprocating evaporator, oil cooler, fuel oil and air and vacuum pumps, $66,289.99.
Eastern Rolling Mill Co., Baltimore, C-R welding steel, $24,825.14.
Electro Metallurgical Sales Corp., New York, ferromanganese, $13,141.45.
Emerson Electric Mfg. Co., St. Louis, electric fans, $36,180.55.
Frick Co. Inc., Waynesboro, Pa., refrigerating equipment, $16,149.
Fyr-Fyter Co., Dayton, O., fire extinguishers, $9577.68.
General Electric Co., Schenectady, N. Y., major overhaul spares for reduction gear, motor generators, $66,144.84.
General Motors Corp., Detroit, motor trucks, $5919.39; Diesel Engine division, Cleveland, auxiliary engine, $11,083.25.
Gisholt Machine Co., Madison, Wis., turret lathes, $24,512.15.
Gould & Eberhardt, Newark, N. J., crank shapers, heavy, standard and universal shapers, $77,405.
Hardinge Bros. Inc., Elmira, N. Y., precision lathes, milling machines, $28,785.05.
Harrisburg Steel Corp., Harrisburg, Pa., gas cylinders, $55,032.50.
Hendey Machine Co., Torrington, Conn., precision lathes, $11,848.
Hydraulic Press Mfg. Co., Mt. Gilead, O., hydraulic press, $17,005.
International Minerals & Metals Corp., New York, slab (spelter) zinc, $34,128.
Jessop Steel Co., Washington, Pa., C-R bar steel, $25,009.09.
Keystone Steel & Wire Co., Peoria, Ill., steel wire nails, $21,468.46.
Kuhlman Electric Co., Detroit Electric Furnace division, Bay City, Mich., electric arc furnace, $8650.
Lionel Corp., New York, binnacles and domes, ship compasses, $46,255.
Lloyd & Arms Inc., Philadelphia, radial drills, $12,293.
Mattison Machine Works, Rockford, Ill., electric molder, $6143.15.
Michigan Tool Co., Detroit, worm gear units, $436,680.
Moeller Instrument Co. Inc., Richmond Hill, N. Y., thermometers, $41,899.90.
Moore Machinery Co., San Francisco, boring machine, $15,636.
National Tube Co., Pittsburgh, steel flasks, $75,862.86.
Niles-Bement-Pond Co., Pratt & Whitney division, West Hartford, Conn., radial drills, $16,776.
Norris Stamping & Mfg. Co., Los Angeles, ammunition boxes, $664,240.
Norton Co., Worcester, Mass., universal grinders, $19,902.25.
Okura & Co., New York, planer type miller, $52,510.
Oliver Instrument Co., Adrian, Mich., drill grinders, $6228.
Phelps Dodge Copper Products Corp., Habirshaw Cable & Wire division, New York, electric cable, triple conductor cable, $76,591.60.
Reed-Prentice Corp., Worcester, Mass., engine lathes, $11,450.
Republic Steel Corp., Massillon, O., C-R grade steel, $5088.59.
Revere Copper & Brass Inc., Baltimore, rolled naval brass, $114,681.40.
Rockford Machine Tool Co., Rockford, Ill., slotter and keyseater machines, $18,328.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., brass bolts and nuts, $179,309.76.
Schauer Machine Co., Cincinnati, speed lathes, $26,401.
Seuller Safety Corp., New York, life floats, $5601.50.
Smith, A. O., Corp., Milwaukee, torpedo air flasks, $6000.
Smith-Courtney Co., Richmond, Va., radial drills, $9194.
Sperry Gyroscope Co. Inc., Brooklyn,

(*Please turn to Page* 43)

PURCHASES UNDE

(In Week Ended Jan. 25)

Iron and Steel Products	Commodity	Amount
Aerial Machine & Tool Corp., New York	Post assemblies	$53,400.00
Aetna Iron & Steel Co., Jacksonville, Fla.	Doors	45,769.00
Air Conditioning & Refrigeration Supplies Inc., Charleston, W. Va.	Stand assemblies	17,550.38
Alco Fabricating Corp., Pawtucket, R. I.	Pipe-berth bottoms	11,900.00
American Bridge Co., Pittsburgh	Structural steel	92,523.00
American Locomotive Co., Railway Steel Spring division, New York	Springs	21,501.39
Armstrong Bros. Tool Co., Chicago	Wrenches	59,875.80
Autocar Co., Ardmore, Pa.	Mounts	40,775.90
Banner Die Tool & Stamping Co., Columbus, O.	Bomb shackles	141,750.00
Barbour-Stockwell Co., Cambridge, Mass.	Castings	11,000.00
Barnard Aviation Equipment Co., Ashley, Pa	Belt links	928,550.00
Belmont Iron Works, Philadelphia	Structural steel	124,900.00
Bethlehem Steel Co., Bethlehem, Pa.	Structural steel	124,350.00
Breeze Corp. Inc., Newark, N. J.	Flexible conduits	49,672.50
Brill, J. G., Co., Philadelphia	Pack howitzers	270,600.55
Capital Steel & Iron Co., Oklahoma City, Okla.	Structural steel	154,585.00
Carpenter Steel Co., Reading, Pa.	Steel	19,906.46
Central Steel Tube Co., Clinton, Iowa	Tripod mountings	302,315.56
Chicago Metal Hose Corp., Maywood, Ill.	Flexible conduits	46,769.14
Cleveland Welding Co., Cleveland	Casing bursters	484,330.00
Consolidated Steel Corp. Ltd., Los Angeles	Structural steel	146,098.00
Continental Can Co. Inc., New York	Gas masks	174,832.48
Crane Co., Chicago	Valves, pipe fittings	26,543.79
Crown Cork & Seal Co. Inc., Baltimore	Gun mounts	1,147,030.00
Cunningham, James, Sons & Co., Rochester, N. Y.	Carriage assemblies	2,288,220.00
Cuyahoga Spring Co., Cleveland	Tent slips	10,875.00
Draper Mfg. Co., Cleveland	Discs, tools, gages	27,146.82
Estate Stove Co., Hamilton, O.	Range parts	13,710.40
Evans Products Co., Detroit	Tripod mountings	1,278,440.88
Firestone Tire & Rubber Co., Akron, O.	Belt links, band tracks, canisters	4,129,782.52
Firth-Sterling Steel Corp., McKeesport, Pa.	Tools	35,880.00
Flynn, Michael, Mfg. Co., Philadelphia	Doors	59,828.00
General Bronze Corp., Long Island City, N. Y.	Doors, bus housings, platform assemblies	180,888.00
General Steel Castings Co., Eddystone, Pa.	Hulls	37,500.00
Globe Machine & Stamping Co., Cleveland	Cartridge cases	859,250.00
Gohmann Foundry Co. Inc., New Albany, Ind.	Range parts	19,432.50
Goodman Mfg. Co., Chicago	Yokes	591,500.00
Goodrich, B. F., Co., Akron, O.	Band tracks	7,189,539.00
Hanssen's, Louis, Sons, Davenport, Iowa	Saws	22,344.37
Hardware Supply Corp., New York	Wrenches	12,704.90
Herring-Hall-Marvin Safe Co., Hamilton, O.	Safes	16,593.52
Hobart Mfg. Co., Troy, O.	Telescope mountings	*61,377.40
Igoe Bros. Inc., Newark, N. J.	Reinforcement bars	13,700.00
International Harvester Co., Chicago	Springs	16,580.00
Jackes-Evans Mfg. Co., St. Louis	Belt links	783,000.00
Klein, J. B., Iron Foundry Co., Oklahoma City, Okla.	Structural steel	47,743.00
Lamson Co., Syracuse, N. Y.	Mounts	441,000.00
Lukens Steel Co., Coatesville, Pa.	Structural steel	10,249.90
McCord Radiator & Mfg. Co., Detroit	Helmet assemblies	958,584.12
McEvoy Co., Houston, Tex.	Mounts	759,780.03
McKay Co., Pittsburgh	Releases	28,584.80
Mills-Morris Co., Washington	Wire cutters	77,480.00
Moore Eastwood & Co., Dayton, O.	Post assemblies	58,500.00
Mosher Steel Co., Houston, Tex.	Structural steel	76,699.00
Moskowitz, Edward, Inc., Brooklyn, N. Y.	Aiming posts	16,632.00
Mullins Mfg. Corp., Salem, O.	Cartridge cases, sinks, trays	5,913,317.00
Nashville Bridge Co., Bessemer, Ala	Structural steel	21,212.56
National Cash Register Co., Dayton, O.	Fuse shells	769,919.90
Noland Co. Inc., Washington	Saws	23,535.75
Oliver Iron & Steel Corp., Pittsburgh	Fuse plugs	118,125.00
Parker Wire Goods Co., Worcester, Mass.	Bits	18,134.94
Peck Stow & Wilcox Co., Southington, Conn.	Wrenches	47,118.83
Pettibone Mulliken Corp., Chicago	Carriage parts	3,817,884.00
Republic Steel Corp., Massillon, O.	Structural steel	*10,310.41
Rockwell, W. S., New York	Furnaces	29,034.00
Rundle Mfg. Co., Camden, N. J.	Sinks, trays	44,088.00
Ryerson, Joseph T., & Son Inc., Chicago	Steel tubing	196,368.74
Sands Mfg. Co., Cleveland	Heaters	54,467.90
Scrimgeour, William, Washington	Basting spoons	37,350.00
Sheet Metal Specialty Co., Follansbee, W. Va.	Stove pipes	15,207.00
Southern Engineering Co., Charlotte, N. C.	Structural steel	43,819.00
Spriesch Tool & Mfg. Co. Inc., Buffalo	Bomb shackles	335,920.00
Star Foundry Co., Covington, Ky.	Range parts	20,169.00
Star Machine & Tool Co., Minneapolis	Brake reliners	35,100.00
Steel & Wire Products Co., Baltimore	Steel strapping	15,816.00
Steel Conversion & Supply Co., Castle Shannon, Pa.	Chisels	22,680.62
Threadwell Tap & Die Co., Greenfield, Mass.	Taps	12,263.46
Trackson Co., Milwaukee	Gun mounts	100,791.44
Truscon Steel Co., Youngstown, O.	Doors, reinforcement steel	64,987.98
U. S. Automatic Corp., Amherst, O.	Adapter-boosters	53,388.50
Union Parts Mfg. Co. Inc., Brooklyn, N. Y.	Burster casings	18,118.25
Union Spring & Mfg. Co., New Kensington, Pa.	Springs	15,678.00
United States Steel Export Co., New York	Steel piling	11,699.02
Universal Crusher Co., Cedar Rapids, Iowa	Cradle assemblies	802,410.00
Valley Iron Works Inc., Yakima, Wash.	Trashracks	30,614.00

WALSH-HEALEY ACT

Iron and Steel Products	Commodity	Amount
Vollrath Co., Sheboygan, Wis.	Kitchen utensils	$29,445.80
Walworth Co., New York	Wrenches	55,288.71
Wheeling Corrugating Co., Wheeling W. Va.	Gasoline containers	436,180.00
Wood, John, Mfg. Co. Inc., Conshohocken, Pa.	Range boiler	55,548.00
Yale & Towne Mfg. Co., Stamford, Conn.	Padlocks	17,250.00
Youngstown Sheet & Tube Co., Youngstown, O.	Steel plate	*21,555.17
Nonferrous Metals and Alloys		
Acklin Stamping Co., Toledo, O.	Eyerings, gas masks	$129,025.67
Aluminum Co. of America, Pittsburgh	Aluminum alloy	14,240.05
Aluminum Products Co., La Grange, Ill.	Aluminum pots	10,425.00
American Brass Co., Waterbury, Conn.	Brass, bronze, copper	43,655.39
Baker & Co. Inc., Newark, N. J.	Platinum gauze	199,875.00
Carter Carburetor Corp., St. Louis	Fuse parts	1,331,715.20
Caswell, Strauss & Co. Inc., New York	Tin	411,931.52
Chase Brass & Copper Co. Inc., Waterbury, Conn.	Bronze, brass	49,050.13
Cohn & Rosenberger Inc., Providence, R. I.	Insignia	24,097.28
Federal-Huber Co., Chicago	Brass fittings	61,395.40
Fulton-Syphon Co., Knoxville, Tenn.	Fuse parts	207,772.50
Globe Valve Corp., Delphi, Ind.	Brass fittings	49,257.00
Greenberg's, M., Sons, San Francisco	Firing device cases	10,450.00
Illinois Pure Aluminum Co., Lemont, Ill.	Pitchers	21,480.00
Kennecott Sales Corp., New York	Copper	36,150.00
Mueller Brass Co., Port Huron, Mich.	Brass	230,359.76
O'Neil, M., Supply Co. Inc., Brooklyn, N. Y.	Brass pipe	17,910.40
Phosphor Bronze Smelting Co., Philadelphia	Bronze	10,978.60
Quicksilver Producers Association Inc., San Francisco	Mercury	13,519.20
Reynolds Metals Co., Louisville, Ky.	Aluminum alloy	11,905.00
Tennant, C., Sons & Co., New York	Tin	412,070.40
United-Carr Fastener Corp., Cambridge, Mass.	Buttons, washers	17,280.00
Wolverine Brass Works, Grand Rapids, Mich.	Brass fittings	35,197.30
York Safe & Lock Co., York, Pa.	Fuse setters	*16,093.05
Machinery and Other Equipment		
Acme Machine Tool Co., Cincinnati	Lathes	$23,616.00
American Laundry Machine Co., New York	Laundry equipment	18,248.00
American Type Foundries, Elizabeth, N. J.	Recoil mechanisms	570,380.00
Armstrong, G. R., Mfrs. Supplies Inc., Boston	Gear jacks	10,442.25
Barnehey-Cheney Engineering Co., Columbus, O.	Whetlerite plants	145,940.00
Bates Mfg. Co., New York	Perforators for paper	12,405.00
Bay City Shovels Inc., Bay City, Mich.	Crane	11,712.50
Berger Engineering Works Inc., Seattle	Hoists	10,180.00
Borg-Warner Corp., Detroit	Refrigerators, fan and hub assemblies	178,054.71
Brown & Sharpe Mfg. Co., Providence, R. I.	Grinders	20,152.00
Brown, E. C., Co., Rochester, N. Y.	Spraying devices	253,902.14
Buffalo Forge Co., Buffalo	Shears	12,192.00
Busch Sulzer Bros. Diesel Engine Co., St. Louis	Cylinder heads	40,463.88
Caterpillar Tractor Co., Peoria, Ill.	Winches, bulldozers, tractors	81,715.25
Ceramic Machine Co., Mid-West Locomotive Works division, Hamilton, O.	Locomotive	35,000.00
Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati	Milling machines	31,929.00
Clearing Machine Corp., Chicago	Presses	27,700.00
Continental Motors Corp., Muskegon, Mich.	Engine parts	740,747.00
Crofoot, Charles E., Gear Corp., South Easton, Mass.	Gears	14,490.00
Davenport-Besler Corp., Davenport, Iowa	Locomotive	149,225.00
Ditto Inc., Chicago	Duplicating machines	96,851.20
Duriron Co. Inc., Dayton, O.	Centrifugal pumps	12,512.10
Edison, Thomas A., Inc., Ediphone division, West Orange, N. J.	Shaving machine	15,200.00
Fate-Root-Heath Co., Plymouth, O.	Locomotive	125,250.00
General Electric Co., Schenectady, N. Y.	Locomotive	398,700.00
General Engineering & Dry Dock Co., San Francisco	Winches	40,736.00
Gibbs, Thomas B., & Co., Delavan, Wis.	Regulating equipment	354,832.00
Gisholt Machine Co., Madison, Wis.	Lathes	60,881.10
Gosiger, C. H., Machine Co., Dayton, O.	Drill presses	141,500.00
Hamilton Tractor & Equipment Co., Chattanooga, Tenn.	Tractors	18,184.10
Hendey Machine Co., Torrington, Conn.	Lathes	32,223.00
Hydraulic Press Mfg. Co., Mt. Gilead, O.	Hydraulic press	27,990.00
Industrial Brownhoist Corp., Bay City, Mich.	Crane	25,950.00
International Harvester Co., Chicago	Tractors	523,582.59
Kinsey, E. A., Co., Cincinnati	Drill presses	88,369.00
Midwest Piping & Supply Co. Inc., St. Louis	Flanging machines	16,547.70
Niles-Bement-Pond Co., Pratt & Whitney division, West Hartford, Conn.	Lathes	20,676.00
Northill Co. Inc., Glendale, Calif.	Shears	15,281.91
Northwest Engineering Co., Chicago	Cranes	22,216.00
Prosperity Co. Inc., Syracuse, N. Y.	Laundry presses	18,776.50
"Quick-Way" Truck Shovel Co., Denver	Power shovel	10,971.00
St. Joe Machine Inc., St. Joseph, Mich.	Washing machines	11,022.00
Shipley, W. E., Machine Co., Philadelphia	Vertical mills	50,434.00
Spicer Mfg. Co., Toledo, O.	Transmissions	35,000.00
Tucker Aircraft Co., Detroit	Traversing mechanism	22,750.00
Tungsten Electric Corp., Union City, N. J.	Turning tools	22,840.00
Vulcan Iron Works, Wilkes-Barre, Pa.	Locomotive	48,750.00
Warner & Swasey Co., Cleveland	Lathes	46,418.00
Worthington Pump & Machine Corp., Harrison, N. J.	Centrifugal pumps	14,495.00

*Estimated.

Government Defense Contracts Awarded

(*Concluded from Page* 42)

N. Y., gyro compass equipment, $88,686.

Square D Co., Kollsman Instrument division, Elmhurst, N. Y., pitot static tubes, $63,000.

Swind Machinery Co., Philadelphia, radial drills, $71,034.

Taylor Instrument Co., Rochester, N. Y., thermometers, $17,391.

Triumph Explosives Inc., Elkton, Md., aircraft float lights, $98,168.

Weinman Pump Mfg. Co., Columbus, O., centrifugal pumps, $93,255.15.

Winner Mfg. Co. Inc., Trenton, N. J., life floats, $8421.

Worthington Pump & Machinery Corp., Harrison, N. J., air compressors, $9030.

Yale & Towne Mfg. Co., Philadelphia, truck crane, $6414.

Yates American Machine Co., Beloit, Wis., electric molders, $64,666.10.

York Ice Machinery Corp., Philadelphia, refrigerating units, $85,932.

Bureau of Yards and Docks Awards

Chicago Pneumatic Tool Co., New York, air compressor for navy yard, Washington, $35,375.

Cory & Joslin Inc., San Francisco, gasoline engine driven alternator, auxiliaries and piping at navy yard radio station, Mare Island, California, $31,500.

Martin, George C., Washington, extension of oil storage building No. 184 at navy yard, Washington, $30,200.

Means Construction Co., Jacksonville, Fla., civilian quarters at Craney Island naval supply depot, naval operating base, Norfolk, Va., $24,450.

Murphy, J. Philip, Co., San Francisco, construction of monorail system at naval net depot and strengthening outer wharf deck, Tiburon, Calif., $41,870.

Rockwood Sprinkler Co., Worcester, Mass., automatic sprinkler system at naval mine depot, Yorktown, Va., $8880.

Schaefer & Co., Philadelphia, renewal of refrigerating plant at Philadelphia naval home, $6024.

Suburban Engineering Co., New York, diesel-engine-alternator, auxiliaries and piping at naval radio station, Cheltenham, Md., $35,678.

York Ice Machinery Corp., York, Pa., air conditioning equipment at naval hospital, Pensacola, Fla., $28,213.

Canada Plans Heavy Armament Production

TORONTO, ONT.

■ Heavy armament and other equipment for the Royal Canadian navy will be produced in Nova Scotia, New Brunswick, Quebec, Ontario, Alberta and British Columbia, according to the Canadian department of munitions and supply. Existing plants will be expanded and new factories constructed to produce armaments totaling $100,000,000 per year it is reported.

Four plants will fabricate gun barrels, two in Quebec, one in Alberta and one in British Columbia. Dominion Bridge Co.'s plant at Burnaby, B. C., will be reconditioned at cost of $5,000,000. Principal Quebec plant will be at Sorel, where gun barrels have already been produced.

Ogden shops of the Canadian Pa-

(*Please turn to Page* 115)

Yes, People Do Respond To Friendly Treatment

■ STEEL asked Mr. Reiss to visit three plants where labor conditions are so good that they approach the ideal. He was asked to find out the underlying reasons for this excellent condition. The accompanying article sets forth his findings as to what makes labor relations "good". The subject is of especial interest at this time when manufacturers are disturbed over the attitude of their employes, are worried as to whether production in their plants may be affected. The methods Mr. Reiss describes are not copyrighted. They may be used—with equally good results in the course of time—in other plants.

By GEORGE R. REISS

■ MR. EMPLOYER: Give a worker these things—give him a boss who earns his respect, give him security, give him a congenial and interesting job—and you've given him Utopia. Give him and his fellows these things and you have achieved for yourself a labor Utopia.

This is a story of how three individual industrial companies found Utopia in their labor relations. Yes, these companies' labor relations methods will work in your case too; but don't expect them to end all your labor problems magically over night, and don't expect them to speed up production and improve quality of workmanship by tomorrow morning. It's a long-range job that requires planning far into the future. These companies now are reaping fruits from seeds sowed years ago.

Company No. 1—we must leave it anonymous—is a thriving machinery manufacturing concern. It employs about 350 workmen, most of them highly skilled, and is located in a bustling little mid-western city of between 15,000 and 20,000 population.

Both in its public and in its labor relations this company's position seems to be ideal, as is testified by the fact that the townsfolk swear by its management as enthusiastically as do its workmen.

No "Chips on Shoulders"

When you step into this plant, you sense something immediately. That all-too-common atmosphere of indifference or open hostility with its attitude of "I'll-dare-you-to-knock-the-chip-off-my-shoulder" is conspicuous by its absence. Instead, you sense an atmosphere of pride in workmanship, of loyalty, of friendly co-operation.

"And that," explained the vice president and general manager, Mr. Jones—we'll just call him Jones—"is no accident. It is the result of careful planning and persistent hard work on the part of both management and men.

"Long ago we woke up to the fact that we must work together and live together—and that our mutual obligations do not end at the shop gate," said Jones.

In this plant, there's no cut-and-dried labor relations program. Instead, there is an unceasing day-by-day effort to make every man appreciate that the company and its officials are vitally interested in him and his welfare, not only "on the job" but also in his outside life. They let him understand they're counting on him; and that he has an equal right to count on them.

■ Sound management realizes that industrial relations do not begin and end at the factory gate. It is necessary to take a proper, friendly interest in the worker's personal affairs, give him a helping hand when necessary. Some companies cultivate a family interest by means of "open house"

Every man, from president to night janitor, is an important personage, each with his own niche to fill.

Plant officials do innumerable things to make life smoother or easier for the men. Jones, in the course of handling details of labor relations, advises employes on buying homes or automobiles, rescues them from the clutches of loan sharks; helps untangle messed-up personal finances; has the company lawyer extricate them from tangles —in fact does anything within reason to cultivate tranquil labor relations. The company buys high-grade coal in carload lots and sells it at cost to the workmen. The men are encouraged to organize bands and orchestras; to stage benefits; to organize parties and picnics.

The men are not interested in outside unions and ignore organizers who seek to persuade them. There is a "shop committee" which was organized at the insistence of the management long before the national labor relations board came into being.

"One secret of good employe relations is to get grievances out of the way just as quickly as is humanly possible," explained Jones. "We would rather be wrong and get the grievance out of the way quickly, than be right and string out negotiations. Any petty grievance, as long as it remains unsettled, is a canker. Unimportant though it may be, those who believe they have a just grievance will think about it and brood over it, until in their minds it assumes grotesque proportions."

Aid Employes Financially

Jones' particular pride is that he has helped scores of workmen — whom he discovered to be floundering helplessly in debt—to work their way out of it, to buy homes and cars and even to accumulate substantial bank accounts.

For example, there was Wally, who too must remain anonymous. Wally was an excellent machinist with a fine record. Then all of a sudden he went into a funk. After he had made a couple of rather serious "boners", wasting much valuable material, his foreman reported the case. Jones discovered that Wally was in a serious financial jam. Buying a home, he had bitten off more than he could chew. Now his creditors were closing in, threatening to wipe him out completely.

Jones called the bank which held Wally's mortgage. He called the other creditors. He pointed out to them the hopelessness of Wally's case if they pressed him. He persuaded them to cut his indebtedness to fifty cents on the dollar. Then Wally "snapped out of it" and got busy. Today, he has a fine home and an automobile—all paid for—and about $1000 in the bank.

"Sure, it was worthwhile," said Jones. "It saved one of the most efficient workmen we ever had, it built up our labor relations inside and created some more goodwill on the outside.

"Nothing takes the heart out of a man as quickly," he explained, "as to be hopelessly in debt, to know that every week's pay is 'mortgaged' and to feel that there is no chance of getting out from under."

One of his toughest problems is keeping the men out of the clutches of "loan sharks" who charge 2 to 3 per cent per month interest.

"But these gentlemen usually back down when you 'sic' your lawyer on them!" Jones remarked.

Specialist Saves Life

It is in the event of sickness that Jones gets his real chances to make friends among the workmen. He is one of the first to visit the sick person, sends him flowers, and often helps out with the doctor and hospital bill—although the shop's hospitalization plan does its share at a cost to each man of only $5 a year.

Several years ago one of the men —we'll call him Tom—had a ruptured appendix. Peritonitis set in. The local physician threw up his hands.

"No use," he said, "there's nothing we can do but make him as comfortable as possible. He can't last the day out."

Jones rushed to a telephone. Within a few hours a Detroit specialist was at Tom's bedside. Yes, Tom pulled through.

"And so it was," said Jones, "that we saved an efficient workman."

Fourteen years ago, another workman—we'll call him Frank—suffered an attack of diabetes. He was an old timer—41 years of service in the shop.

"It's no use," said Frank, "I've got to quit work. I'm all washed up. I can't go on, don't know what to do. I've not saved up enough to quit."

"Nonsense," replied Jones, "all you need is the right doctor."

So Jones hunted up the right doc-

tor, who treated Frank with entire success. Today Frank is the oldest employe, with 55 years of service—still going strong, still producing efficiently.

Those — and innumerable other cases—naturally have taken a lot of Jones' time.

"But remember," says Jones, "it's time that I would be using anyway, trying to develop efficiency and good employe relations in some other and much less effective way.

"Sure, all these things do cost a lot of money, but so do strikes and so do attorneys' fees when you're hauled before the national labor relations board. Therefore our methods don't cost as much over a period of years as would one or two strikes or a serious set-to with the labor board. And remember too, we do get better production. And besides all that, isn't it worth a lot to know that the men in the shop regard you as a 'white man' and not as some sort of an ogre in human form? We hold our men. We've virtually no labor turnover, therefore we run into very little expense for training new men."

Keep "Ahead of Pack"

Manufacturing gears and machinery parts, another plant, employing about 250 workmen, is located in the suburb of a great mid-western industrial city. For years it has been operating without strikes, walkouts, sitdowns or any other kind of labor trouble. It also boasts an exceptionally low labor turnover.

This company, too, has made a serious effort over a long period of years to understand its workmen and in turn to give them every opportunity to understand its problems. Besides, it has kept at least two jumps "ahead of the pack" in adoption of important innovations such as: The 40-hour work-week with time-and-a-half pay for overtime; paid vacations for men in the plant; group insurance; profit-sharing bonuses; and hospitalization plans. Those things were in actual operation at this plant long before they were generally adopted.

Let's take a look at the record of this company's outstanding employe activities:

1—A profit-sharing bonus plan in which employes participate monthly when profits of the company are over a certain amount. Based on a graduated scale, this plant at times has paid each employe as much as 28 per cent of his base wage.

2—Vacations with pay.

3—Group insurance—first $1000 of insurance paid by the company, amounts above that paid jointly by the employe and the company.

4—Hospitalization plan, dues paid by employes.

5—Credit union—and an annual credit union dinner paid for by the company.

6—Christmas dinner and party for all employes and their families at which time special Christmas bonus is paid in addition to regular monthly bonus when profits justify.

7—Annual picnic for all employes and their families.

8—Notary public service gratis.

9—Medical service and eyesight examination.

10—Athletic program, including baseball, basketball, bowling and horseshoe pitching. The company furnishes uniforms, equipment and pays league dues.

11—Modern cafeteria and modern locker rooms with proper facilities.

12—One-half pint milk and coffee for every employe at noon meal without charge.

13—Shop safety program with suitable awards.

14—Open-house inspection at two-year intervals.

15—Legal advice by company attorneys without cost. (No court cases are handled, however.)

16—Educational meetings for all employes led by company executives. (Attendance optional)

17—Multiple management program based on the McCormick plan.

18—Two symphony orchestra season tickets available for office employes, enabling each office employe interested to attend at least one concert during the year. Zoo tickets also are available.

19—Lending library of magazines.

20—Broad distribution of association literature.

21—House organ.

22—Vending machines throughout the plant; profits from which are spent for benefit of employes.

23—Smoking is permitted during working hours.

Hold Economic Discussions

The pride and joy of Smith, vice president and general manager of this company, is a series of weekly economic meetings for employes. At these are discussed such subjects as foreign exchange, the gold dollar, the chain store, the Townsend plan, the Alberta plan, taxable and tax-free securities, the bonus or profit-sharing plan, law of supply and demand, credit unions, unionism, family budgets and budgeting.

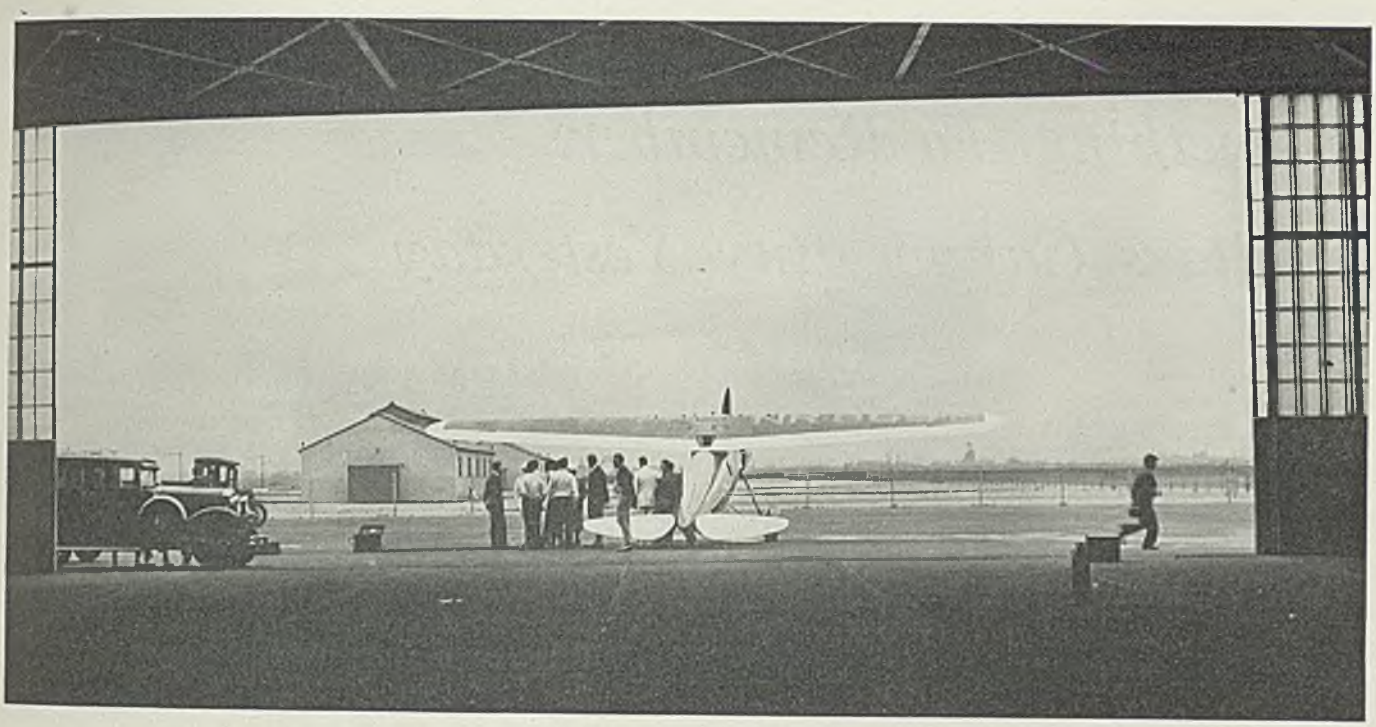
Unionism is no problem in this plant where every workman dares speak his mind freely and has this constant opportunity to do so. Virtually none of the workmen are members of outside unions; they persistently resist unionization.

The credit union has been especially valuable in this plant's employe relations program. The credit union officers—usually on company time but always willing to donate their own time—work out many employes' financial problems. They keep them out of the hands of loan sharks and give them advice on buying real estate and other property.

Other successful innovations are a "factory council" and a "junior board of directors". The "factory council" is composed of 15 factory employes—ten elected by men in the shop and five appointed by management. Its stated purpose is: "To promote better understanding, to foster a higher degree of efficiency in all company operations and contribute ideas and plans for any improvement in the business, to increase production and to reduce operating costs. It shall be a group in which company problems can be discussed frankly, without malice.

The "junior board of directors" is

■ **No man hopelessly in debt is in a mood to do good work. Many employers reap dividends in production efficiency and in labor relations by helping workers with their financial problems**



■ When one company chartered an airplane and brought in a medical specialist who saved the life of a worker who had been given up by the local physician the effect on its labor relations was incalculable. NEA photo

composed of nine junior executives —six elected by employes and three appointed by management. Its duty is to consider recommendations of the factory council and to pass on to the company executive committee any which it regards as having merit.

In six months the factory council passed on to the executive committee 85 constructive suggestions which that committee found acceptable. Typical of these were suggestions for purchasing certain types of machines, for maintenance improvements, for new types of hoists and for better working anrrangements for certain men.

By the same methods good labor relations can be developed and maintained by huge corporations with many thousands of employes.

One company, with a number of large plants scattered about the country and with a total of about 12,000 employes, has demonstrated what can be done through intelligent methods.

Years ago, this company established "job insurance"—a plan guaranteeing to each employe who participates in the program, 48 weeks of work each year until he retires on pension or so long as he lives; a 40-hour work week; a share in the company's earnings, both in stock dividends and in bonuses; and old-age, disability and death benefits in addition to those now guaranteed by social security and workmen's compensation laws.

This plan, put into effect long before the advent of social security, wages and hours and other new laws, works even more successfully today than it did when first set up. The "employe-capitalists" employed by this company have no time to listen to tirades of professional labor agitators; no wonder these workers won't stand for a strike, which may cut into their personal share of the company's profits.

Here's a typical way a worker under this unique plan becomes an employe-capitalist:

Plan Outrode Depression

At a beginning wage of about $1500 a year, he works a probationary period of two years. Then, if he elects to join the profit-sharing plan—and 97.5 per cent of the eligible employes do so elect—he contributes $75 to buy for himself some of the company's common stock the first year, with an increasing amount each successive year—his share always being only 5 per cent of his earnings. Thus at the end of six years—or eight years he has been with the company—he will own $1090 worth of stock, which cost him about $450. Then he begins to get a "cut" of the profit-sharing bonuses—about 8 per cent of his wages after six years, rising to about 15 per cent after 15 years.

During the great depression this guaranteed employment policy got its real test—and came through with flying colors. The workmen took a 10 per cent wage cut and those in the profit-sharing plan got a cut in their benefits—which was right and proper since stockholders and management had to do the same. The company stimulated "make-work" programs. The workweek was cut from 50 to 40 hours. The factories turned out products as usual, storing away the output in warehouses. Finally the management wrote off $9,000,000 in inventories, a rather hard pill to swallow. But the company and its employes outrode the storm together.

Employe benefits are numerous. Every worker, after two years service, gets a week's vacation with pay. If he gets sick, assuming he still gets the starting wage of $1500 a year or $30 a week, he gets $20 a week for a year. He can retire, if he wishes, at the age of 65, drawing a pension up to $60 a month. If he dies "in the harness" his family gets $1,000 in cash. The company pays full cost of pension and death benefits; employes contribute 1 per cent of their wages toward the disability insurance plan.

This plan hasn't been devised merely to keep the men contented. It also operates to stir their ambitions. The men are induced to study in their spare time, to improve themselves and to fit themselves for better jobs. The company recruits its executives from its own forces of workmen.

"The chief problem of big business today," says the head of this outstanding corporation, "is to shape its policies so that each workman will feel that he is a vital part of his company, with personal responsibility for its success and an opportunity to share fairly in its success."

Mr. Employer: None of these methods is copyrighted. You too may find your labor Utopia if you will adopt and follow them conscientiously and intelligently.

Something To Remember: Dollars Cannot Buy Yesterday

■ SECRETARY of Navy Knox, in a letter to commandants of navy stations and yards, closed his exhortation to them to farm out work in order to expedite naval construction with these words:

"Dollars cannot buy yesterday."

This is a slogan highly pertinent to these times and worthy of application to the entire defense effort of the nation.

Its importance will be appreciated more and more as time goes on.

♦ ♦ ♦

The tempo of defense work is increasing.

Out of a mist of confusion, the framework of a strong organization of the forces of government and business is rising.

In spite of misunderstandings, blunders and delays, production of many important items of defense is increasing.

Notwithstanding highly exaggerated suspicions of one another's motives, employers and employes, producers and consumers, government and private enterprise, politicians and laymen and others gradually are acquiring the spirit of national unity.

In short, the ponderous giant of defense is definitely on the move.

♦ ♦ ♦

But will it move fast enough to save the day?

That is a serious question. It is a question of particular significance to the proponents of private enterprise.

As things stand at present, the government, confronted with the great problems of preparedness, is ruled by a party that is none too sympathetic with business and industry. Yet the responsibility of executing the defense program has been entrusted to OPM and other agencies, the personnel of which—from William S. Knudsen down—is recruited largely from the executive ranks of industry.

To put it another way, persons favorable to the preservation of private enterprise predominate in the organizations responsible for the success of the defense program, whereas the executive branch of the government in which they work is overwhelmingly dominated by individuals who, at heart, are suspicious and scornful of private enterprise.

Meanwhile time is fleeting. In spite of the more encouraging progress in recent weeks, it is obvious to every informed person that nothing spectacular in defense achievement can be expected for some months. In fact, the visible results from now until mid-summer will be disappointing to the public.

♦ ♦ ♦

The period from now until then will be critical. If the man in the street becomes too impatient, the blame for inaction on defense can easily be placed on the shoulders of OPM's industrialists. If the clamor becomes too insistent, the anti-business element in the government will be only too glad to step into the industrialists' shoes.

Thus it is quite possible that the future of private enterprise hangs in the balance of public patience.

The least that producers and manufacturers can do in this crisis is to give OPM superhuman support and co-operation.

Remember—dollars cannot buy yesterday.

E. L. Shaner

EDITOR-IN-CHIEF

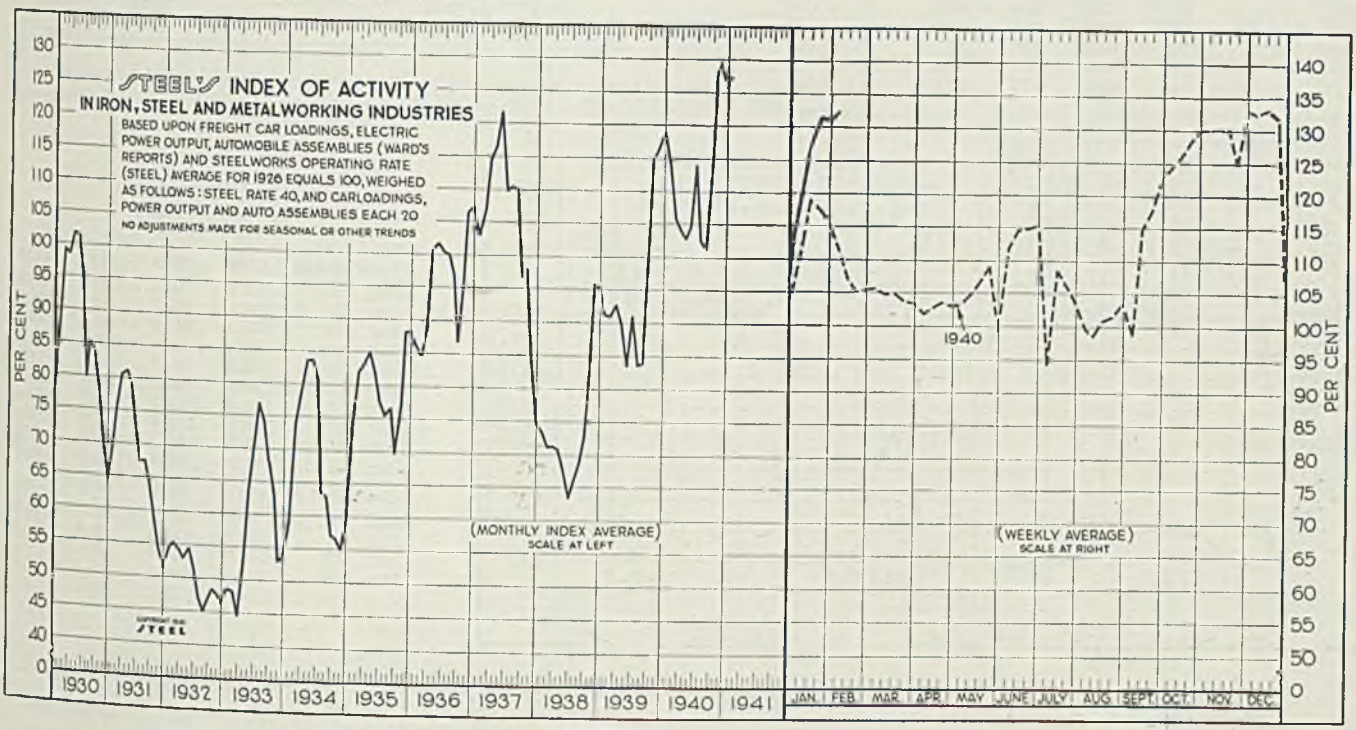
The BUSINESS TREND

Business Trend Holds To Upward Tendency

■ PACE of industrial activity continues to edge upward. Further slight gains have developed in the heavy industries, but the most pronounced improvement has occurred among the consumers goods lines. Further expansion in order backlogs has been noted. Deliveries in a number of instances are now extended well into the third quarter. Inventories are generally well above the level reported this time a year ago, but are not considered excessive in view of the sharply expanded operations in most industrial lines and prospects of further improvement.

During January, STEEL's weekly index averaged 127.3, up moderately from the 126.3 level recorded in December. In the comparable month last year the index averaged 114.7. Reflecting the moderate gains recorded in revenue freight carloadings, automobile assemblies and steelmaking operations during the week ended Feb. 1, STEEL's index moved upward to 132.1, a gain of 1.4 points over the previous week's level. In the same 1940 week the index averaged 111.6.

Steel producers report no letup in new demand with orders for most steel products exceeding output, despite record operations. Electric power consumption held substantially unchanged during the latest period. Automobile assemblies advanced to 124,400 units during the week of Feb. 1 and freight traffic totaled 714,323.

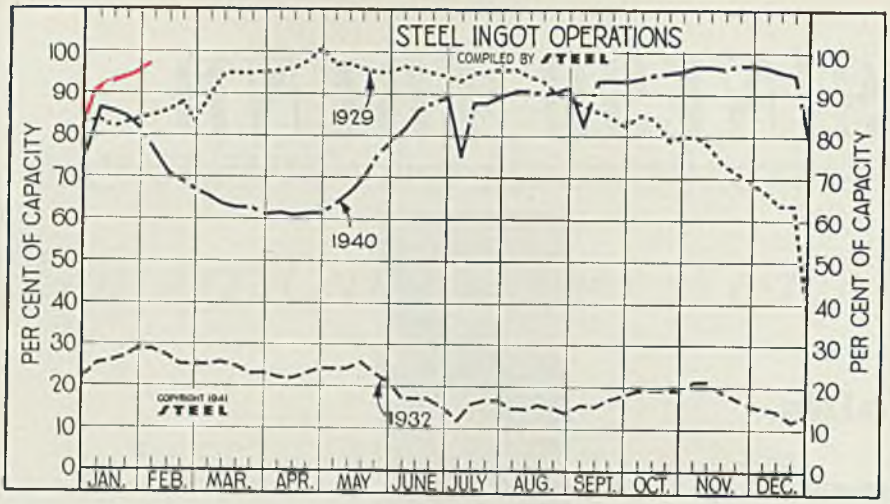


STEEL'S index of activity gained 1.4 point to 132.1 in the week ended Feb. 1:

Week Ended	1940	1939
Nov. 30	132.6	117.9
Dec. 7	132.5	123.9
Dec. 14	132.6	124.2
Dec. 21	132.4	123.4
Dec. 28	107.5	104.0
Week Ended	**1941**	**1940**
Jan. 4	114.5†	110.3
Jan. 11	128.2†	119.2
Jan. 18	130.8†	117.3
Jan. 25	130.7†	115.4
Feb. 1	132.1	111.6

Mo. Data	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930
Jan.	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6
Feb.	.....	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2
March	.....	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4	98.6
April	.....	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7
May	.....	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2
June	.....	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8
July	.....	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9
Aug.	.....	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4
Sept.	.....	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7
Oct.	.....	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8
Nov.	.....	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.9
Dec.	.....	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3

†Revised, resulting from revision in steel rate figures.



Steel Ingot Operations

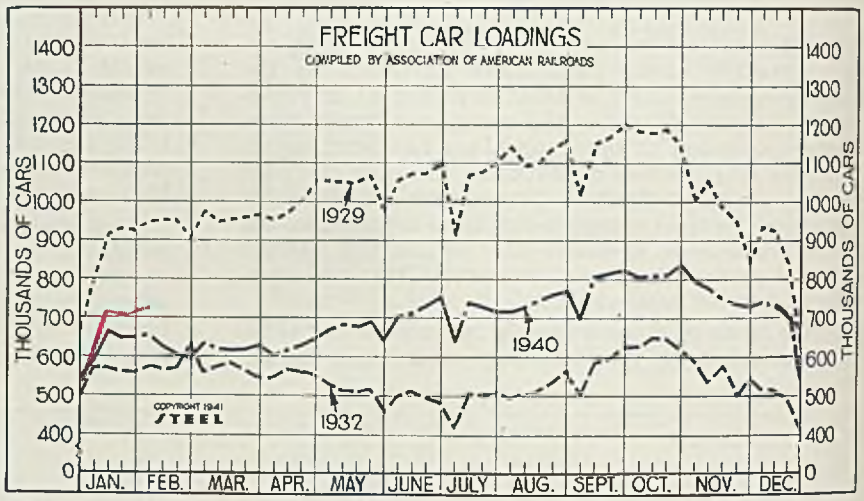
(Per Cent)

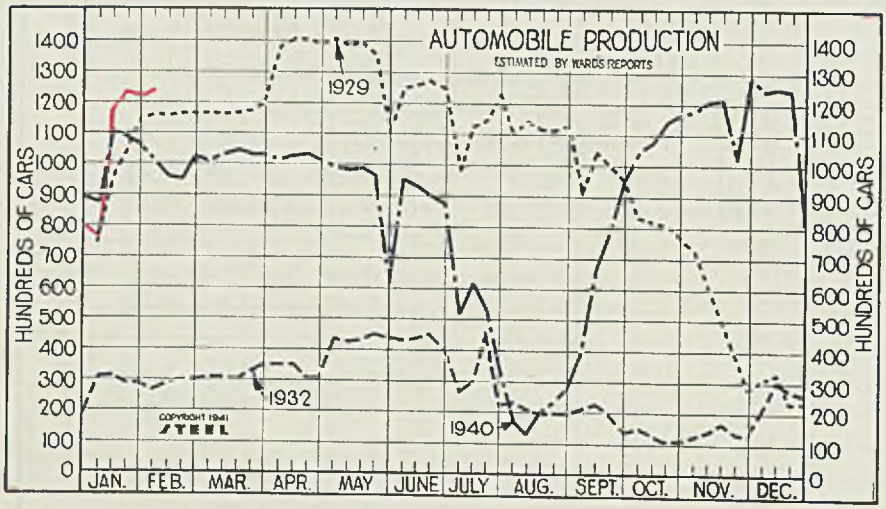
Week ended	1940	1939	1938	1937
Oct. 19....	95.0	91.0	51.5	53.0
Oct. 26....	95.5	92.0	54.5	51.0
Nov. 2....	96.5	93.0	57.5	47.0
Nov. 9....	96.5	93.0	61.5	39.0
Nov. 16....	96.0	93.5	63.0	35.0
Nov. 23....	97.0	93.5	62.0	31.5
Nov. 30....	97.0	94.0	61.0	30.5
Dec. 7....	96.5	94.0	61.0	27.0
Dec. 14....	95.5	92.5	58.0	27.0
Dec. 21....	95.0	90.5	52.0	23.0
Dec. 28....	80.0	75.5	40.0	21.0
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 4....	92.5	86.5	51.5	21.0
Jan. 11....	93.0	86.0	52.0	26.0
Jan. 18....	94.5	84.5	51.5	29.0
Jan. 25....	95.5	81.5	51.5	30.5
Feb. 1....	97.0	76.5	53.0	33.0

Freight Car Loadings

(1000 Cars)

Week ended	1940	1939	1938	1937
Oct. 26.....	838	834	709	772
Nov. 2.....	795	806	673	732
Nov. 9.....	778	786	637	690
Nov. 16.....	745	771	657	647
Nov. 23.....	733	677	562	559
Nov. 30.....	729	689	649	623
Dec. 7.....	739	687	619	622
Dec. 14.....	736	681	606	603
Dec. 21.....	700	655	574	460
Dec. 28.....	545	550	500	457
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 4.....	614	592	531	457
Jan. 11.....	712	668	587	552
Jan. 18.....	703	646	590	581
Jan. 25.....	711	649	594	570
Feb. 1.....	714	657	577	553





Auto Production

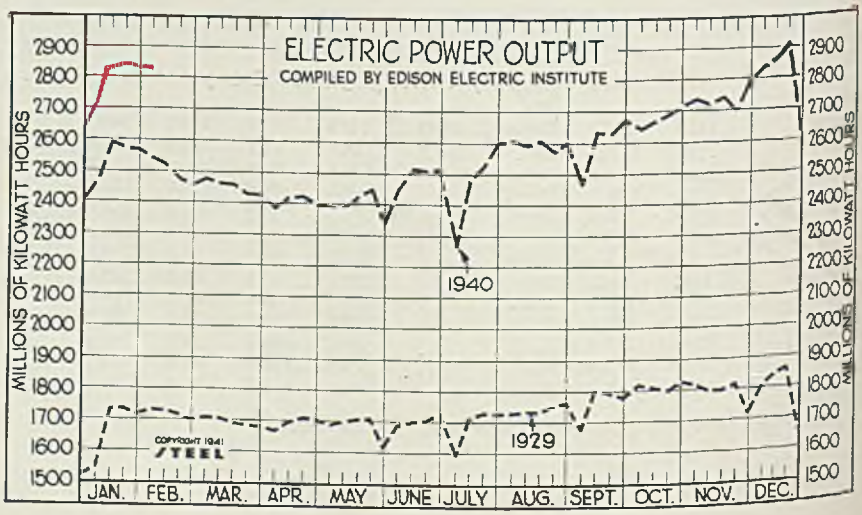
(1000 Units)

Week ended	1940	1939	1938	1937
Oct. 26....	117.1	78.2	73.3	90.2
Nov. 2....	118.1	82.7	80.0	89.8
Nov. 9....	120.9	86.2	86.3	85.3
Nov. 16....	121.9	86.7	96.7	85.8
Nov. 23....	102.3	72.5	84.9	59.0
Nov. 30....	128.8	93.6	97.8	86.2
Dec. 7....	124.8	115.5	100.7	85.8
Dec. 14....	125.6	118.4	102.9	82.0
Dec. 21....	125.3	117.7	92.9	67.2
Dec. 28....	81.3	89.4	75.2	49.6
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 4....	76.7	87.5	76.7	49.6
Jan. 11....	115.9	111.3	86.9	54.1
Jan. 18....	124.0	108.5	90.2	65.7
Jan. 25....	121.9	106.4	89.2	65.4
Feb. 1....	124.4	101.2	79.4	59.4

Electric Power Output

(Million KWH)

Week ended	1940	1939	1938	1937
Oct. 26...	2,711	2,539	2,226	2,255
Nov. 2...	2,734	2,537	2,207	2,202
Nov. 9...	2,720	2,514	2,209	2,176
Nov. 16...	2,752	2,514	2,270	2,224
Nov. 23...	2,695	2,482	2,184	2,065
Nov. 30...	2,796	2,539	2,285	2,153
Dec. 7...	2,838	2,586	2,319	2,196
Dec. 14...	2,862	2,605	2,333	2,202
Dec. 21...	2,911	2,641	2,363	2,085
Dec. 28...	2,623	2,404	2,121	1,998
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 4...	2,705	2,473	2,169	1,998
Jan. 11...	2,835	2,593	2,270	2,140
Jan. 18...	2,844	2,572	2,290	2,115
Jan. 25...	2,830	2,566	2,293	2,109
Feb. 1...	2,830	2,541	2,287	2,099

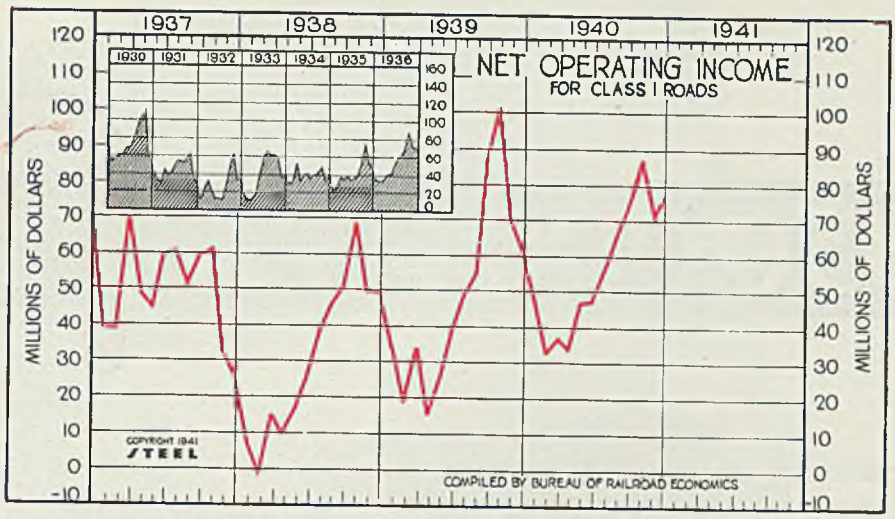


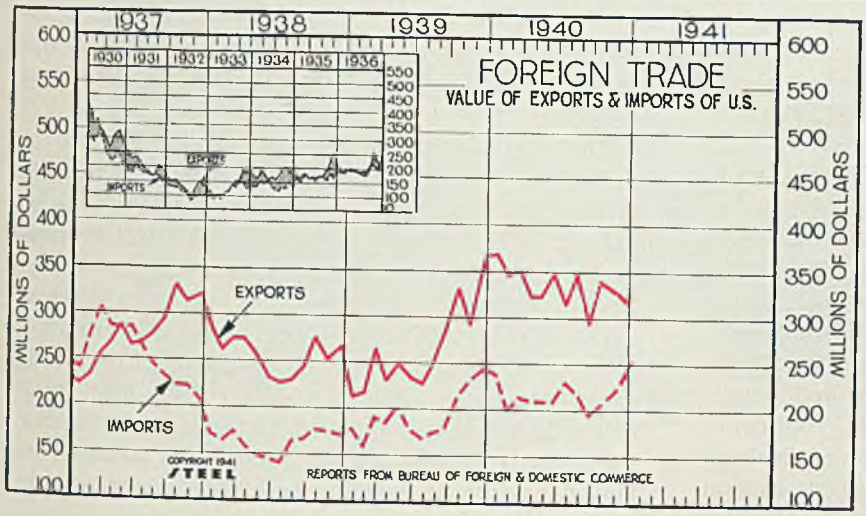
Class I Railroads
Net Operating Income

(Unit: $1,000,000)

	1940	1939	1938	1937
Jan.	$45.57	$32.89	$7.14	$38.87
Feb.	32.62	18.59	1.91*	38.78
Mar.	36.73	34.32	14.73	61.55
April	33.82	15.32	9.40	48.96
May	47.08	25.10	16.67	44.24
June	47.42	39.10	25.16	59.35
July	57.08	49.01	38.43	60.99
Aug.	66.01	54.59	45.42	50.76
Sept.	74.19	86.43	50.36	59.62
Oct.	86.99	101.62	68.57	60.86
Nov.	71.10	70.35	49.67	32.44
Dec.	78.79	60.95	49.37	25.99
Average	$56.84	$49.02	$31.02	$49.18

*Indicates deficit.





United States
Foreign Trade

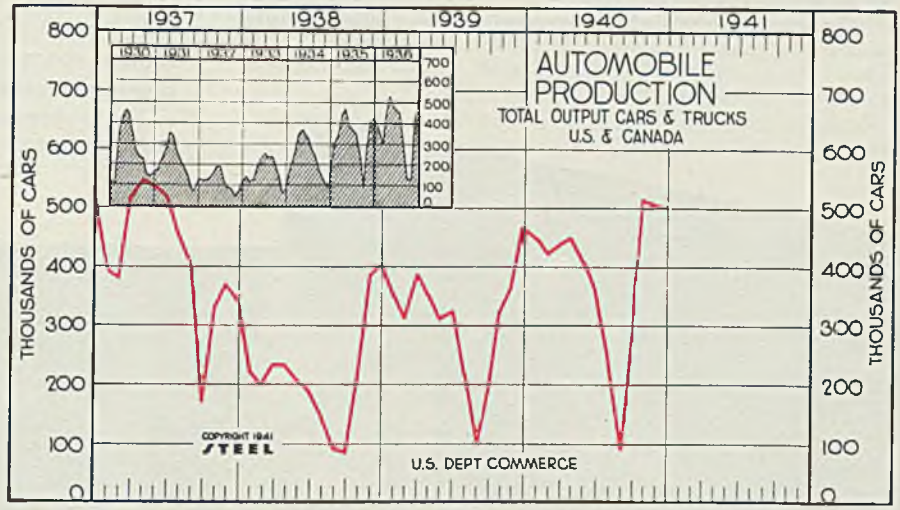
(Unit: $1,000,000)

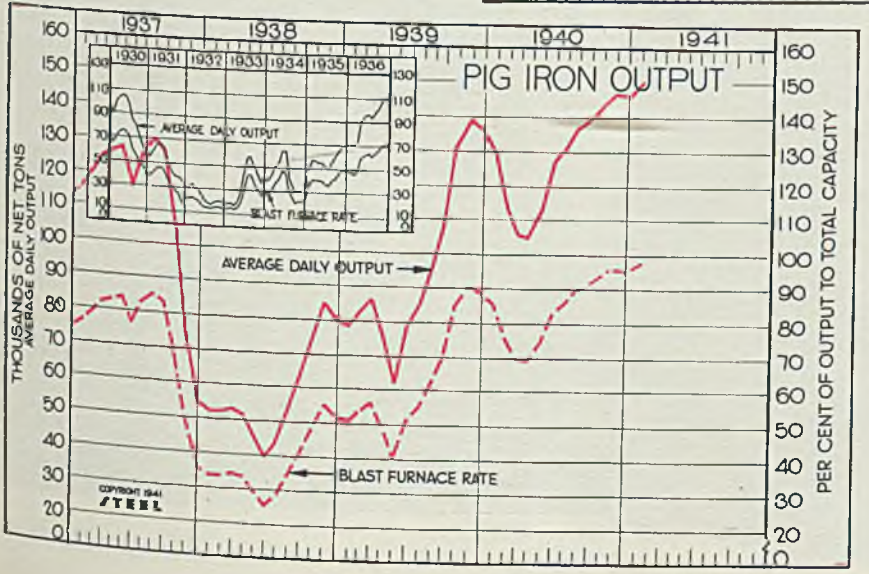
	Exports		Imports	
	1940	1939	1940	1939
Jan.	$368.6	$212.9	$241.9	$178.2
Feb.	347.0	218.6	199.8	158.0
Mar.	352.3	267.8	216.7	190.5
April	324.0	231.0	212.2	186.3
May	325.3	249.5	211.4	202.5
June	350.2	236.1	211.4	178.9
July	317.0	229.6	232.3	168.9
Aug.	349.9	250.8	220.5	175.8
Sept.	295.2	289.0	194.9	181.5
Oct.	343.5	332.1	207.1	215.3
Nov.	327.7	292.5	223.4	235.4
Dec.	322.3	367.8	253.1	247.0
Total	$4,021.6	$3,177.0	$2,625.4	$2,318.3

Automobile Production

(Unit: 1000 Cars)

	1940	1939	1938	1937	1936
Jan.	449.3	357.0	227.1	399.2	377.2
Feb.	421.8	317.5	202.6	383.9	300.8
March	440.2	389.5	238.6	519.0	438.9
April	452.4	354.3	238.1	553.4	527.6
May	412.5	313.2	210.2	540.4	480.5
June	362.6	324.2	189.4	521.1	469.4
July	246.2	218.5	150.4	456.9	451.2
Aug.	89.9	103.3	96.9	405.1	275.9
Sept.	284.6	192.7	89.6	175.6	139.8
Oct.	514.4	323.0	215.3	338.0	230.0
Nov.	511.0	370.2	390.4	376.6	405.8
Dec.	506.9	469.0	407.0	346.9	519.1
Ave.	391.0	311.0	221.3	418.0	384.7





Pig Iron Production

	Daily average Net Tons			Blast furnace Rate (%)		
	1941	1940	1939	1941	1940	1939
Jan.	150,500	129,825	78,596	98.7	85.4	51.0
Feb.		113,943	82,407	98.7	75.0	53.5
Mar.		105,502	86,465	....	69.5	56.1
Apr.		104,635	76,732	....	68.9	49.8
May		112,811	62,052	....	74.2	40.2
June		127,103	79,125	....	83.6	51.4
July		130,984	85,121	....	86.1	55.0
Aug.		136,599	96,122	....	89.9	62.4
Sept.		139,085	107,298	....	91.5	69.7
Oct.		143,152	131,053	....	94.2	85.2
Nov.		146,589	138,883	....	96.4	90.3
Dec.		146,544	136,119	....	96.4	88.5
Ave.		128,128	86,375	....	84.3	62.6

$350,000 PUT IN PIPE

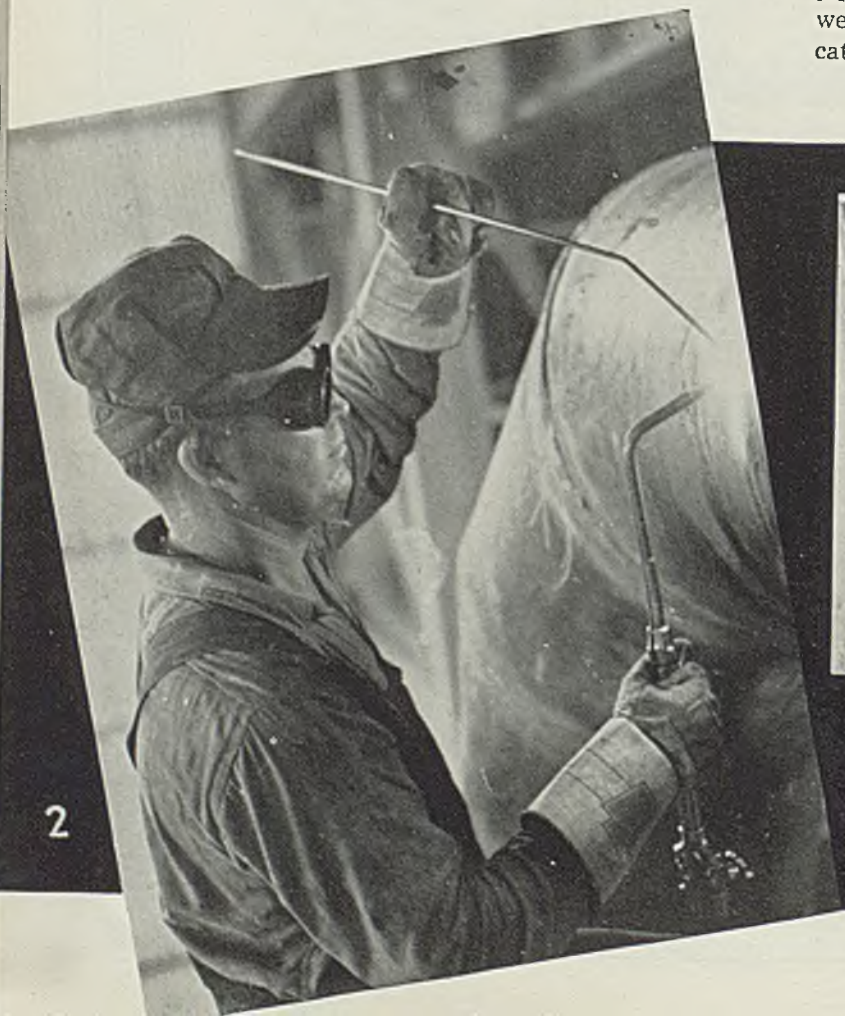
■ MANY unusual welding and fabricating problems were encountered in the piping installation for a new strip mill built recently in the Middle West. The work involved a wide variety of sizes and types of lines, since pipe was required for transmission of water, steam, air and oil. Total cost of the installation was more than $350,000.

• Pipe diameters ranged from ¼ to 24 inches, more than a mile of the latter size being used. Adding to this problem of size was the fact the steel analysis was of the grade B range, with somewhat higher carbon content than that normally employed. All of the pipe was oxyacetylene welded with Airco No. 1 rods, furnished by Air Reduction Sales Co., New York. Welds were required to meet both bend and tensile tests. In the former, the test specimen was "root bent" through 180 degrees with the weld machined flush on all sides. To pass the tensile test required the coupon to break in the parent metal.

The multilayer welding technique was successfully employed after difficulty had been encountered in meeting the bend test on 24-inch pipe that had been welded by the forehand puddle welding method. Absence of sufficient ductility in welds of the latter type made it impossible to obtain more than a 90-degree test bend without breaking.

The multilayer process, as its name implies, involved the deposition of weld metal in more than one layer. This increased the ductility of the metal by reheating and cooling it through the critical temperature ranges. Each succeeding layer was deposited after the preceding one had cooled to below the critical temperature, thereby permitting the grain structure of the unmelted weld metal to be refined, either wholly or in part, by penetration of the welding heat. In addition to providing superior physical characteristics, particularly in ductility, the multilayer technique involved savings in welding time and in rod and gas consumption.

It was necessary to group certain lines in somewhat limited space, thus preventing complete welding of the pipe in position. In such instances pipe assemblies were prefabricated before being placed in final location.



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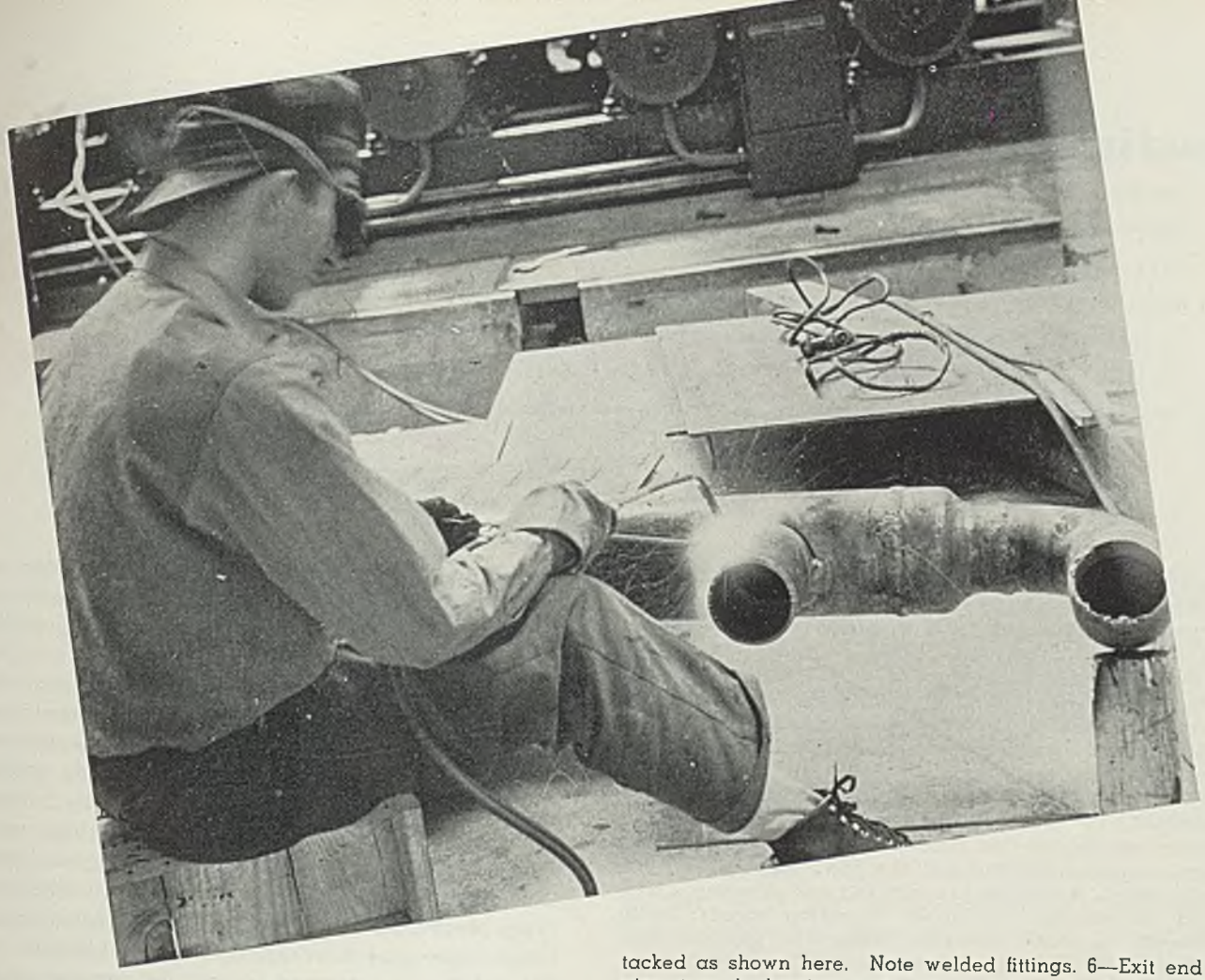
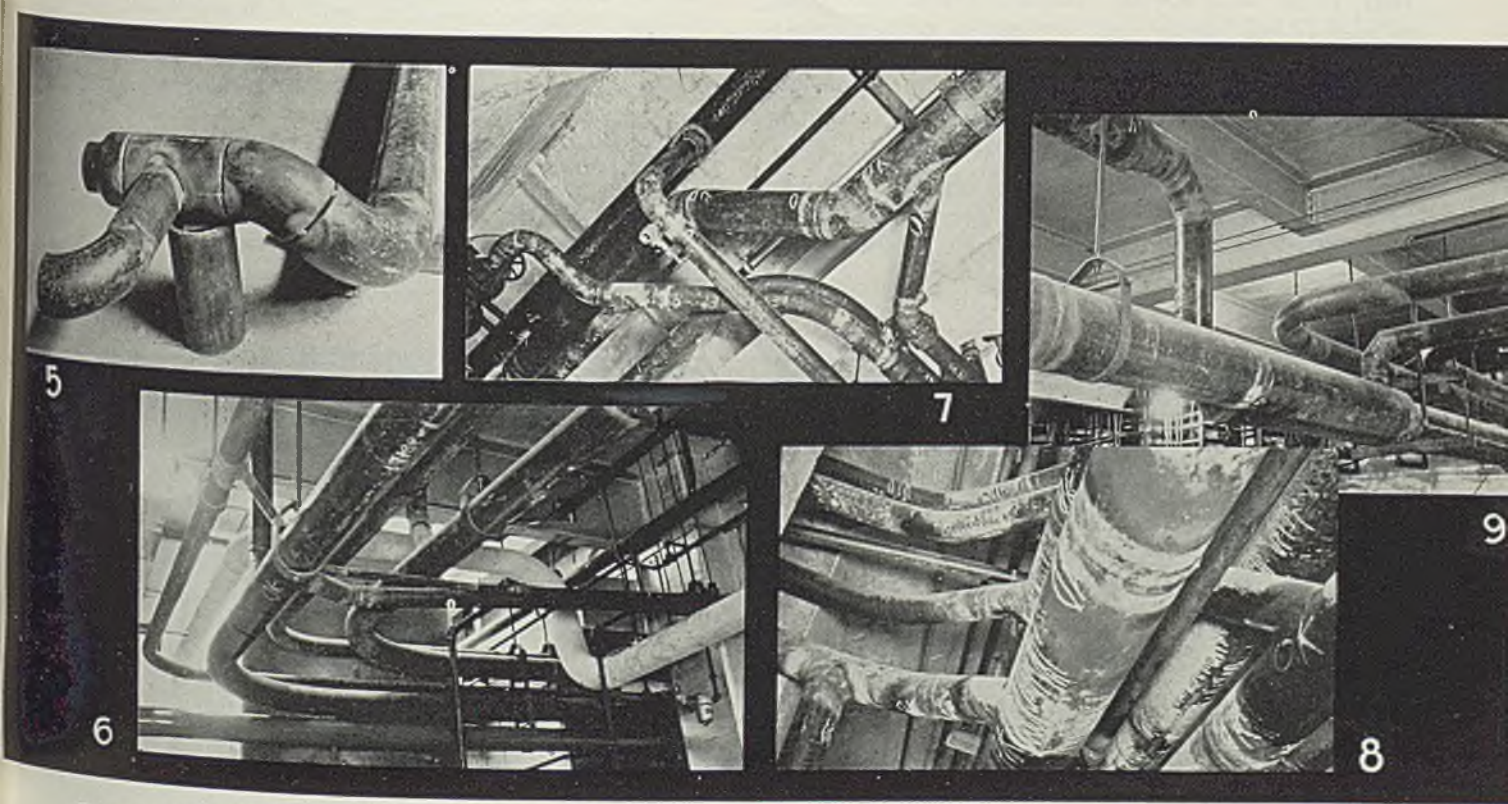


Fig. 1—Above, low-pressure steam piping tailored to fit in a centrally located point of the job. Operator is welding up an assembly. 2—Closeup of operator making position weld on 24-inch water supply line. 3—Pipe tunnel, showing water, steam, air and oil lines—all gas welded. 4—Closeup of L, part of the 24-inch manifold assembly. 5—In tailoring low-pressure steam piping, it is first cut to size and tacked as shown here. Note welded fittings. 6—Exit end of pipe tunnel showing main steam, oil and air lines. 7—Typical of the complicated assemblies that had to be made. Note smooth, uniform outlines of welded piping regardless of bends and joints. With screwed fittings, this would have been considerably more difficult. 8—Tunnel branches: Note small space taken up and "streamlined" appearance of connections. 9—Low-pressure steam for air conditioning water line going into tunnel to strip mill



Casting, Cutting Off and Heating Billets for Forging

High-Explosiv

■ *In Section I of this series,* STEEL, *Jan. 27, 1941, p. 44, Professor Macconochie presented some background information on development of various types of shell. Second section,* STEEL, *Feb. 3, 1941, p. 54, discussed types of modern shell, their composition and metallurgy. In this third article, casting or rolling the bar, cutting to length and heating up for forging are covered.*

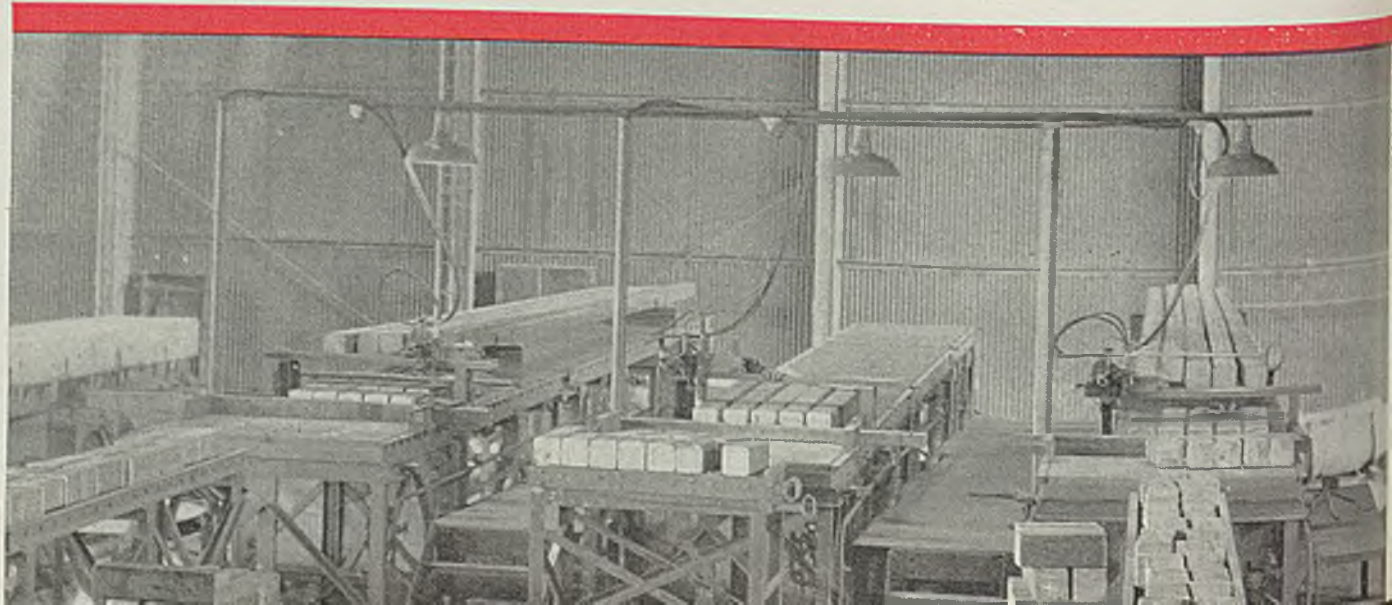
Next week, various forging methods will be presented and the basic procedures employed in shaping shell will be detailed, such as pressing versus hammering; possibility of rolling the shell carcass; piercing the blank; piercing in the inverted position with the hydraulic press; drawing out the body on a roller-type draw bench; investment in piercing and drawing equipment; possibilities of higher operating speeds; early attempts to make seamless tubes; the Mannesmann method; the Assel seamless tube mill and its advantages; the Witter shell forging process; initial investment and operating costs.

■ THE INFLUENCE of metallurgical control on the manufacture of high-explosive shell was pointed out in the preceding article in this series, STEEL, Feb. 3, 1941, p. 54, with special reference made to increase in ease of machining and elimination of heat treatment. In 1914-18, most shell steel was of low phosphorus content, from a mere trace up to 0.10 per cent, preferably about 0.02 to 0.03 per cent. The same held for sulphur, about 0.02 to 0.03 per cent being used. Carbon ran from 0.35 to 0.50 per cent. Manganese was much lower than the up-to-1.2-per-cent now used, being well below 1 per cent then. As a result, machine cuttings came off in long curly shavings, not at all like the high-sulphur-manganese steels used today which machine with small chips, almost like cast iron.

During this previous period, shellmaking from rolled bars had already been developed, although many billets were cast. For example, one Canadian manufacturer followed Royal ordnance factory casting practice which involved nothing unusual. The ladle from the converter poured the steel into cast-iron ingot molds which had a slightly tapered body and conical riser. The inside of the molds may have been washed with lamp black to help prevent sticking. After casting, billets were placed in sand beds and allowed to cool. Then they were stripped by hand by dumping out the billet which was about 33 inches long and 4⅛ inches in diameter for 4.5-inch high-explosive shell.

Furnace equipment 25 years ago was rather simple, merely a brick outer shell lined with firebrick except

Fig. 1—Oxyacetylene billet-cutting equipment in shell production at National Steel Car Corp. Ltd., Hamilton, Ont., has proved economical and satisfactory in over five years of use. Previously it was impossible to obtain the uniform square cuts required to assure perfectly concentric piercing. Note bars are pushed against stops on roller conveyors feeding each of the three cutting machines. Multiple cuts are made. Note small tables receiving cut billets have roller-conveyor tops, travel crosswise on rails in the floor to permit feeding cut billets to either of two roller conveyor lines going to heating furnaces



Shell

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After the bar or long billet is produced, it must be cut into lengths and heated for forging. Here Professor Macconochie details the factors involved in these two operations and describes the practice employed by a highly successful Canadian shell manufacturer in full swing on shell production for a number of years, the National Steel Car Corp. Ltd., Hamilton, Ont.

the arch roof which was entirely of firebrick. Roof thickness had to be kept down as radiation was depended upon to keep the roof cool enough to prevent "dripping". Gas and air entered two separate ports at one end, united and burned over the hearth on which the billets were laid. Producer gas, made from "slack" coal very cheaply, often was used and conducted under the floor of the forge to the furnace by suction of the stack.

Parting off was done at this Canadian plant in a lathe by cutting the billet down to a point where it could be broken conveniently, three 9½-inch sections being obtained from the 33-inch billet. Subsequently the small teats were machined off in a planer and after inspection the blanks were ready for heating and forging. In making United States 75-millimeter shell, one American plant used rolled bars about 3¼ inches in diameter (82 millimeters) and 10 feet long. This was open-hearth steel of low phosphorus and sulphur content, as mentioned above. The Royal ordnance factories at Woolrich arsenal, England, followed a similar procedure, purchasing rather expensive Swedish pig iron for conversion in Tropenas converters. After a complete heat of bars had been assembled in the stock yard, they were marked with a heat number for identification and started to the forge shop.

First step was to "nick and break." Bars were nicked by the oxyacetylene torch to a depth of about ⅛ to ¼-inch on one side only. Torch operator at the Canadian plant mentioned was guided by a gage frame with cross bars 9 inches apart beneath which the bar would pass, greatly facilitating this work. Subsequently, bars were broken under an alligator shear and the billets inspected for defects by rolling them down a slight incline, the inspector observing the cylindrical surface as well as the broken ends.

Surface defects are sometimes caused by blowholes breaking through. If not chipped out clean or ground out, the defects may persist through all subsequent operations. The inspector's judgment is relied upon as to whether the bar will be thrown out or treated.

Billets can be broken in a shear, hammer or a press. However, to facilitate centering of the punch in a subsequent piercing operation, a square end is greatly to be desired. Sawing is regarded as too slow. Breaking, while it shows the structure of the bar at the broken end, thus revealing any defects, cannot be relied upon to produce a square end. As far as internal defects go, the mill can break the bar near the

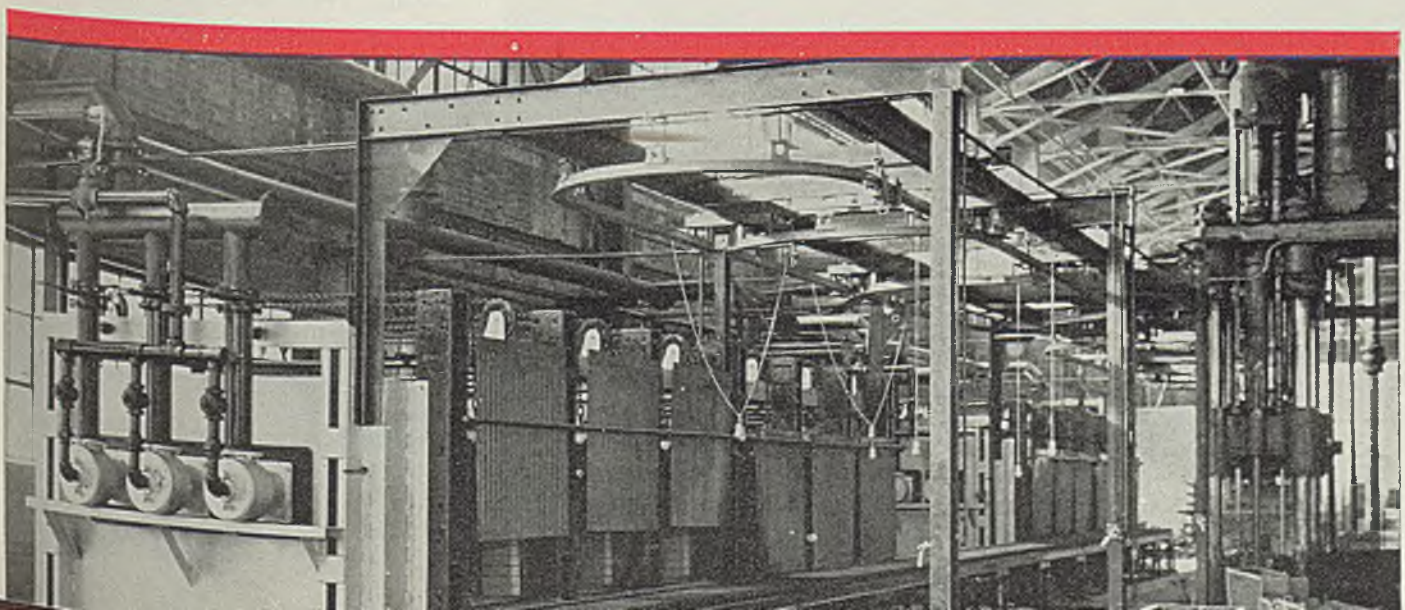


Fig. 2—Batch type furnaces made by Salem Engineering Co., Salem, O., for heating billets prior to forging at National Steel Car Corp. Note forging press, extreme right, and complete monorail handling facilities for charging and removing billets from the furnaces. Production here is 6 tons per hour per furnace. Roller conveyor bringing cold billets from cutoff line is shown extending along front of furnaces. Hot billets are handled to the forging press on the overhead monorail equipment using tongs

end and in the middle to settle that matter. One of the reasons why use of the oxyacetylene cut-off torch is favored these days is that the high-manganese steels now used are rather hard to break.

Modern practice at a well-known Canadian shell manufacturing plant, the National Steel Car Corp. Ltd., Hamilton, Ont., relies upon the mill for control of the shell stock by means of usual chemical analyses, physical tests, visual inspection and etching of specimens from the ingot, bloom and bar. The ingots are cast with a hot top in big-end-up molds. Specifications designate cropping at least 25 per cent from the top and 5 per cent from the bottom of each ingot. Big-end-up casting is supposed to give a more effective guarantee against secondary piping. As is well known, piping results from sinking of the metal in the ingot mold. Since the inside of the pipe is apt to be oxidized, it never welds shut, no matter how much the metal is rolled and worked. Ingots poured big-end-down sometimes develop a secondary pipe lower down in the ingot.

These ingots are rolled into bars with a square section and beveled edges, and with dimensions across diagonals to correspond to the diameter of the die pot to be used in forging. The purchase order to the mill specified the length of the bars, this being a multiple of the billet length plus cutting-off loss. Heat and ingot number are stamped on each bar and carried through all operations to the finished shell for identification.

This plant employs oxyacetylene cutting machine, Fig. 1, to cut the billets. The bar is preheated where adjacent edges touch each other. Approximately 10 bars are rolled from a 5 or 6-ton ingot with about 10 ingots being poured from a heat which usually runs about 50 tons.

Five to ten bars are placed on a roller cutting table so the torch can cut billets from each bar in rapid succession. This high production setup is shown in Fig. 1.

Airco No. 4 Radiographs are used with tachometer, acetylene regulator, heavy-duty oxygen regulator and torch adjusting arm. The machine runs at right angles in parallel tracks made from structural channel mounted on the cutting table directly above the bars. It is driven by a small electric motor.

To convey some idea of production rates and costs on this type of work, a cutting speed of 7 inches per minute is maintained on 3½-inch square section bars for 3.45-inch shell. Billets cut in 8 hours average 432, employing one operator and a helper. Per 8-hour shift, 880 cubic feet of oxygen and 19.7 cubic feet of propane are used. Per 100 billets, cost for 204 cubic feet of oxygen at 85 cents per 100 is $1.73; 4.55 cubic feet of propane at 12½ cents per 100 is $0.0965. Labor costs $2.60 per 100 billets. Cost of 25.5 cubic feet of oxygen for preheating at 85 cents is $0.217; of acetylene for preheating, 11.5 cubic feet at $2.25 per 100 is $0.258. Total cost for cutting 100 billets is $4.901.

The important advantage of oxyacetylene cutting is that good square ends are secured, a necessity for central piercing. Its disadvantage is that the ends of the burnt off billets do not reveal flaws as breaking the billet will do. Of course the bar could be sawed either hot or cold. Shearing certain sizes also is possible. Abrasive cutoff disks may be used. However, for a fast, cheap method of obtaining square ends, a torch cutting machine appears excellent.

Heating the Billets: The importance of this phase of shell making can hardly be overestimated, since the efficiency of the forging operation is closely related to how the billet is heated. The primary object is to raise the temperature of the billet throughout its entire section to around 2200 degrees Fahr. This temperature is about as high as the steel can be heated safely. Above it, oxidation will break up the structure of the steel which then becomes red-short and useless. National Steel Car Corp. Ltd. allows only 32 degrees Fahr. above the desired point of 2150 degrees Fahr. In addition to being uniformly heated, the billet must have a scale that can be removed easily and decarburization must be avoided—all at a reasonable cost.

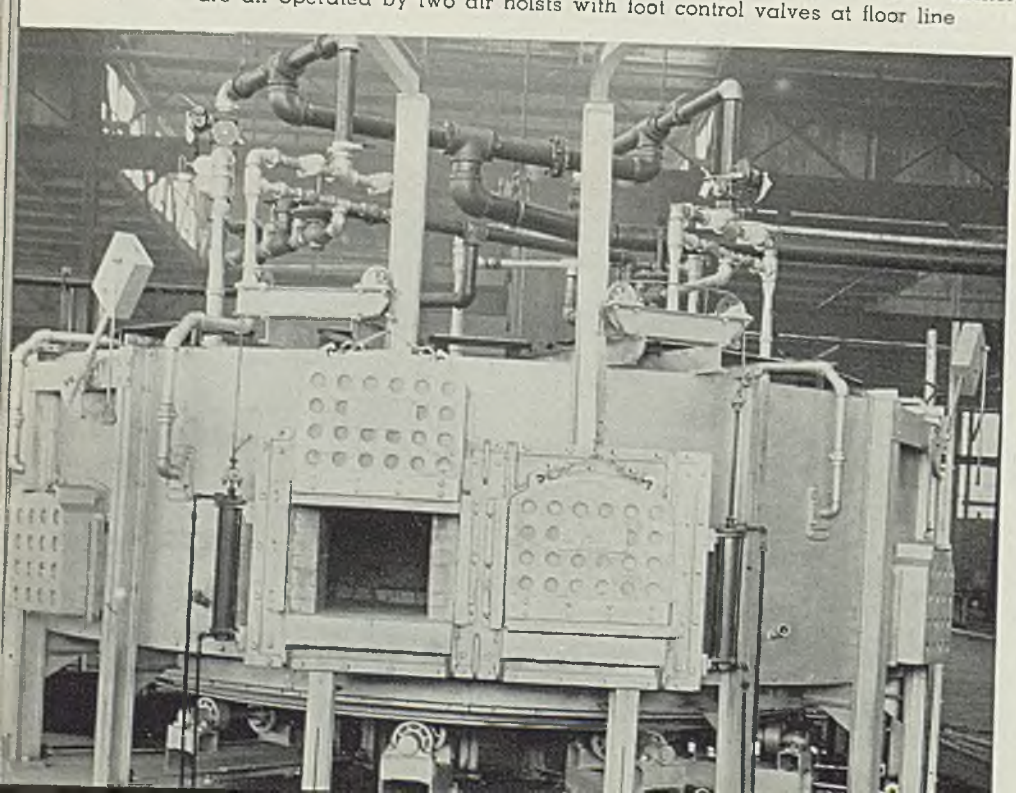
While forging can be done at temperatures down to 1800 degrees, these low temperatures cause excessive wear on the forging tools. The 2200-degree value is about as high as it is safe to heat the steel so this point is selected for maximum ease in piercing and drawing during forging.

Uniform temperature throughout the billet is of utmost importance. A difference as small as 20 degrees has been said to cause deflection of the piercing punch, giving eccentric forgings. It is quite possible that temperature differences as small as this do produce *some* effect. Uniform heating is exceedingly important and equally hard to obtain, since heat must be conducted from the exposed billet surfaces to the interior and since it is almost impossible to expose all surfaces equally to the heating medium. Heating to this high temperature, of course, entirely obliterates the original grain structure of the steel. However, if forging is continued down as near to the upper limit of the critical forging range as possible, the ill effects of heating are almost entirely avoided.

At forging heat, the metal surface oxidizes rapidly. The resulting coat of scale retards heating and may cause trouble by becoming pasty or fluid, in which condition it cements the billets together and may pick up pieces of brick, sand and the like which subsequently become rolled or forged into the metal to produce serious surface defects.

Since scaling cannot be avoided at these temperatures, even by use of inert atmospheres, and since a

Fig. 3—Gas fired rotary-hearth furnace at National Steel Car Corp. heats billets for 75, 90, 105 and 155-millimeter shells. Maximum temperature is 2190 degrees Fahr. Similar designs have production rates from 3600 to 12,000 pounds per hour can be oil or gas fired. Loading and unloading doors, front center, are air operated by two air hoists with foot control valves at floor line



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reducing atmosphere cannot be used because decarburization must be guarded against, furnace operation is aimed at producing a dry hard scale which can easily be knocked off. Complete scale removal is important because scale cannot be allowed to accumulate in the cavity of the forging dies.

The ideal way to heat a billet is to surround it with an atmosphere near the temperature desired and avoid completely any "blowpipe" action of the flame on the billet since such an action causes the scale to slag and also melts the corners of the billet. If the heating be gradual, the scale formed will not fuse, provided the fuel is gas or tar. However, if powdered coal be employed, the siliceous ash may unite with the scale to form an easily fusible slag. The answer is to use a material such as magnesite on the hearth bottom, a material that will not unite with the scale.

Mention was made of necessity of avoiding pickup of particles from the furnace hearth by slag or sticky scale on the billet. Proper firing will do much to avoid this type of scale formation and to eliminate pickup. Originally, bottoms of reheating furnaces were lined with refractory siliceous sand. Now some material such as chromite or magnesite is employed as this does not combine with the iron oxide of the scale and so is not picked up easily. Then if flame impingement on billets is avoided, only a dry scale will be left on the hearth which can be removed easily by raking or hoeing through the exit door. This may be extremely important as a sticky slag allowed to collect on the furnace hearth can cause much trouble.

From considerations outlined, certain desirable characteristics of furnace design and operation emerge. First, as large a portion as possible of the total surface of the billet must be exposed to the heat. Next, the billets should not be in contact if sticking is to be avoided. For maximum economy of time and fuel, the furnace should be capable of supplying heat to the cold billet just as fast as the billet can absorb it without cracking or overheating of edges. The desirable rate of heating sometimes given is 40 minutes per inch penetration with a furnace temperature of 1900 degrees Fahr. in the heating-up zone. This has been found by experience to give the maximum rate of heat absorption practical without cracking.

Steel while cool, will absorb heat quite fast without injury. It is when approaching maximum temperature that overheating must be watched. This is the time when the rate of heat supply should be controlled to provide a soaking zone to secure proper temperature equalization throughout the billet. Temperature in modern practice is controlled by pyrometers and governed by fuel adjustments. Furnace atmosphere depends upon fuel-air ratio—the correct mixture being determined by an Orsat analyzer or similar instruments for carbon dioxide determination in the waste gases.

To expose the largest possible portion of the total surface of the billet to heat, the billet should be placed on end. It is not practicable to use any type of fixtures in the furnace to support the billet in a horizontal position at these temperatures. Neither is it practicable to use any type of continuous moving hearth except the rotary furnace which will be described, say some furnace authorities. The reason is that any metal in the furnace at these temperatures would have to be water-cooled, which would produce cold spots on the billets—an extremely objectionable feature. It is much preferable to set the billets on the glowing hearth of the furnace.

Round Billets Climb

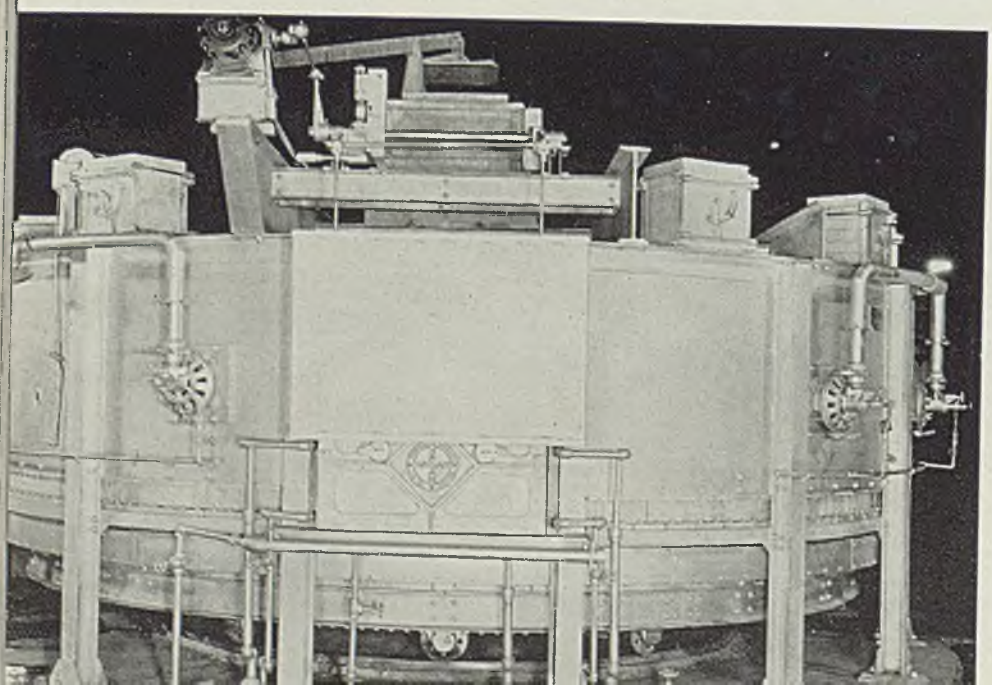
For these same reasons, use of pushers to move the billets through the furnace often leads to considerable difficulty, for round billets will climb on top of each other when they encounter the slightest irregularity in the furnace hearth. This makes it necessary to employ hand labor to move the billets forward if a recuperative or a continuous furnace is employed. Such a furnace working on the principle of counterflow of hot gases resulting from combustion on one end with the steel and air for combustion entering at the other involves moving the billets from the coolest to the hottest part of the furnace to afford gradual heating. While round billets could be laid end to end and pushed through the furnace in this position, it would be necessary to have some ways or guides on the furnace hearth to keep them in line, which is not practicable.

The batch type furnace is commonly of rectangular cross section with burners at one or both ends. These furnaces must be operated in groups—some typical types and various operating considerations being described in the article: "Recommendations for Heating Billets for Shell Forging," STEEL,

Other Articles on Production Of Ordnance

This is another of STEEL'S series of articles on ordnance manufacture. For others already published, see issue of Feb. 3, 1941, p. 54, for Composition and Metallurgy of High-Explosive Shell; Jan. 27, 1941, p. 44, for Background Information on Shell Making and p. 42 of same issue for Tooling for Machining Torpedo Parts; March 11, 1940, p. 38, for Design and Modern Methods of Making Shrapnel Shell; Dec. 2, 1940, p. 50, for Operation and Construction of Bofors Anti-aircraft Guns; Oct. 14, 1940, p. 160 and Jan. 6, 1941, p. 219, for How Technical Progress Aids Defense; Jan. 13, 1941, p. 48, for Some Typical Shell Forging Methods; Jan. 20, 1941, p. 54, for Recommendations on Heating Billets for Shell Forging; Dec. 30, 1940, p. 38, for Naval Torpedoes; Nov. 11, 1940, p. 46, for Design and Construction of Mobile Repair Shops for the Army; Jan. 20, 1941, p. 74, for Making Cylinders for Packard V-12 Torpedo-Boat Engines

Fig. 4—This is a rotary-hearth heating furnace of slightly different design but made for shell forging work by George J. Hagan Co., Pittsburgh



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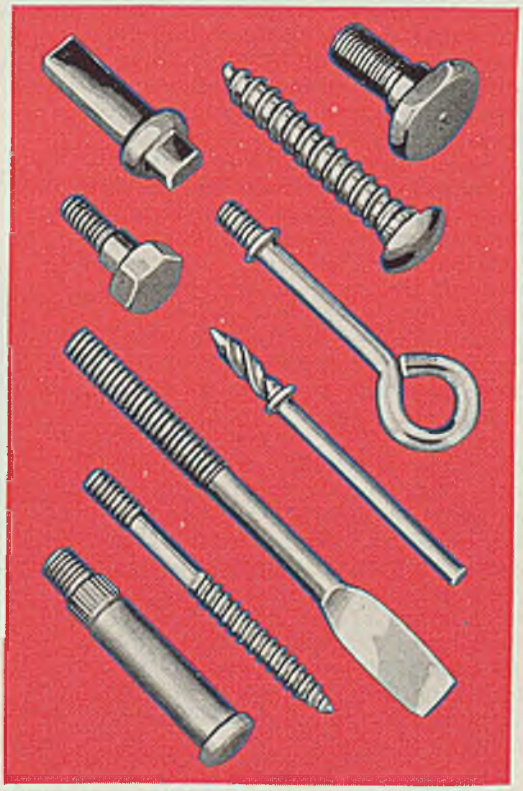

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SOLID AND TUBULAR RIVETS—SPECIAL WIRE NAILS—HEADED METAL PRODUCTS—AND WIRE SPECIALTIES—IN ALL METALS

Jan. 20, 1941, p. 54. As was pointed out there, a number of furnaces must be operated to maintain an even flow of metal to the forge. While one is being charged, another is heating up; still another is under soaking heat and a fourth is being "worked out."

Handling costs are apt to be excessive with this type of operation since the billets, instead of passing through the furnace in a continuous stream, must be laid down and picked up from all over the hearth. An advantage of the batch-type furnace is that it can be arranged for regenerative operation while heat salvage by this means is impracticable on rotary-hearth furnaces. Gas and air ports at each end of the batch furnace can be connected to refractory brick checker chambers and reversed periodically to utilize a large amount of the heat in the exhaust gases.

Simplifies Many Operations

The rotary-hearth furnace appears to be one of the most satisfactory for shell-forging work. It offers the advantage of continuous loading and unloading, has fairly high efficiency, involves a minimum amount of handling work and can be arranged to possess the required furnace heating characteristics. It does not need complicated charging and drawing machines, and the heat input can be confined largely to one end or zone of the furnace to make temperature regulation relatively easy and to make high heat input rates practicable. Where billets are of a constant length, as in the case of one particular size shell, the furnace can be so proportioned that the entire hearth is covered with the billets on end.

These are some of the reasons for the trend toward use of rotating hearth furnaces for shell forging. The practice of National Steel Car Corp. Ltd. will be cited to show typical operation. Here a rotary-hearth unit, Fig. 3, is fired with producer gas of 500 B. t. u. per cubic foot. This furnace has three heating zones, the first being set at 1900 degrees Fahr., the second at 2000 degrees and the third at 2150, motorized proportioning valves controlling the mixture of gas and air in all three zones by means of indicating and controlling potentiometers. The third zone is further provided with temperature recording arrangements.

The rotary-hearth furnace consists of a rotating ring, supported on double trunnions with friction drive revolving the hearth by means of a roller drive chain speed reducer and electric motor. Furnace casing is of heavy welded steel plate reinforced with structural steel members. Heating chamber is lined with 9-inch first-quality firebrick backed with 4½-inch insulating brick. Full arch construction is employed with gas burners firing from both sides. Venting of waste products takes place at hearth level, the vents being carried up along both inner and outer walls.

Between the loading and unloading doors there is a dividing arch which is sufficiently high to permit billets standing on end to pass below without being displaced. To the left of the unloading door there is a burner whose hot gases are diverted across the opening below the arch to prevent heat absorption by fresh billet charges from affecting the hot billets in the soaking zone nearby. Loading and unloading doors are operated by compressed air under foot valve control, billets being charged and unloaded by means of tongs suspended on overhead trolleys. Three operators are employed—one loads the furnace from the billet skids, another unloads from furnace to floor, the third descales the billets.

With this type of furnace, cold billets are inserted through the charging door, placed on end on the revolving hearth which can either be stopped while an entire row of billets is charged or which can be kept in motion while a single billet is charged. It provides for continuous loading and unloading operations in either case since fully heated billets are being removed from the unloading door while cold billets are being loaded at the same rate. This continuous operation of course can be adjusted exactly to meet forging requirements.

Billets are loaded in and removed from the furnace by means of tongs swung on a monorail. Since the motion of the hearth may either be continuous or intermittent, billets can be fed and removed steadily or the furnace can be stopped while one row is pulled out and another is charged, advanced to the next row, etc. However, the best practice consists of taking out a billet and putting one in steadily at the rate required by the forging presses.

The furnace being fired continuously, the hearth is at full temperature and so feeds heat to the base of the billets placed on it, avoiding cold spots and contributing to uniform heating. While the three zones of a rotary furnace usually are not separated in any way, it would be quite possible to bring a partition wall down to a point just high enough to let the billets pass underneath.

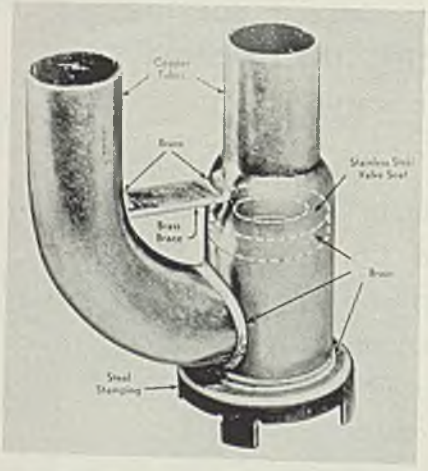
Flame Directed Over Billets

Since flame impingement on the billets would cause slagging and burning of the edges, the flame is directed over the billet tops toward the inside wall and vice versa. Waste gases are vented at hearth level, thus tending to surround the billets with an atmosphere of hot gas. What portion of the heat received by the billet is radiated from the furnace walls and what is obtained from direct contact with the hot gases is difficult to say, but the rotary-hearth furnace closely approaches the ideal because there are no mechanical parts whatsoever inside the furnace, nothing but the best refractory and a glowing mellow heat.

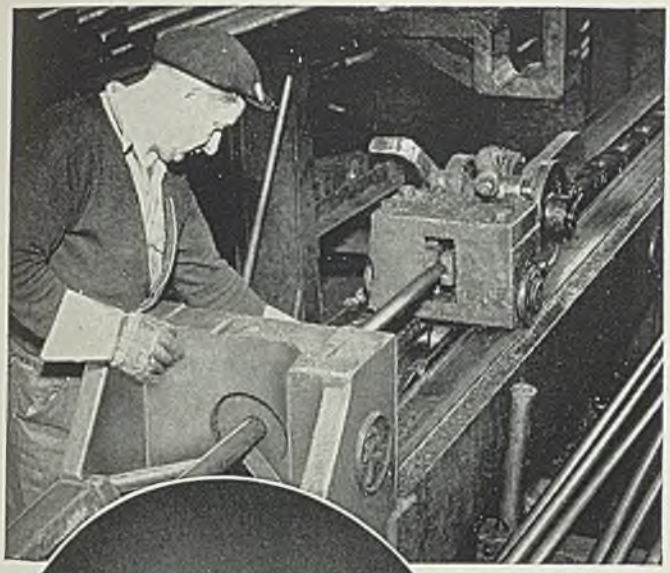
In normal operation of the Canadian installation described, heating 100 pounds of steel requires 330 cubic feet of gas per hour. An overall efficiency of about 14 per cent is obtained, figured on the basis of heat out in the steel divided by heat in from combustion of the gas, assuming complete combustion. While regarded by many as not practical for heating billets for shell-forging work, large continuous pusher-type furnaces with the flow of gases opposite to that of the steel are operated at the rate of 60 pounds of steel heated to 2300 degrees Fahr. per square foot of hearth per hour. Efficiencies of over 40 per cent have been reported.

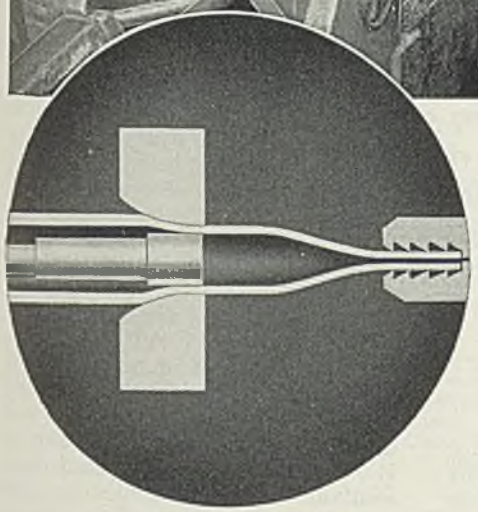
In any furnace, an important factor contributing to high operating efficiency is careful control of the air-fuel ratio. While automatic equipment for flue gas analysis may be preferable to the hand operated analyzer, its proper performance depends entirely on the instrument maintenance crew, which again brings in the human element.

One Part—Four Metals



Assembled entirely by brazing, this heater valve body consists of two pieces of copper tubing, a brass bracing piece between the curved and straight tubes, a stamping of steel at the base and a valve seat of stainless steel inserted inside the large diameter of the straight tube. The entire part was set up, fluxed, the brazing alloy preplaced and then the assembly was put in a furnace and brazed in one operation. Photo courtesy Handy & Harman, 82 Fulton street, New York





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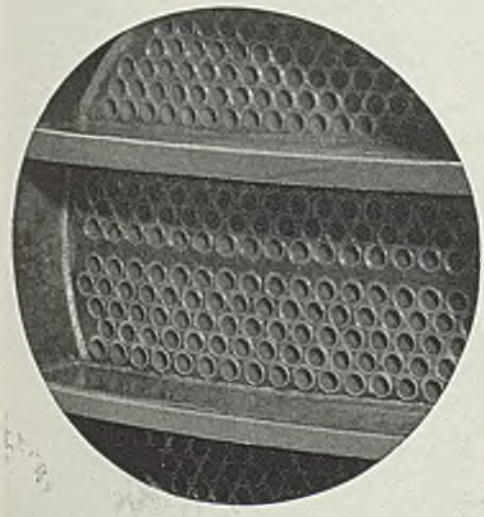

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■ TYPICAL of the highly mechanized handling incorporated in automotive plants are the handling facilities at one of Buick's plants. If the extent to which manual handling is eliminated is taken as the measure of a handling system's efficiency, as has been suggested, then the system here is certainly outstanding for its close approach to elimination of manual handling, for movement of parts and subassemblies in process of manufacturing front suspension systems and rear axle units is brought to an exceptionally high degree of refinement in the new axle plant erected for 1941 production by the Buick Motor division at Flint, Mich.

Thirty-five separate and distinct conveyor systems are synchronized and co-ordinated to handle this flow of material, in addition to a main delivery conveyor which transfers front suspension systems and rear axle assemblies from the axle plant to shipping and storage, this conveyor being well over a mile in length—6634 feet to be exact. Refer to the conveyor tabulation, Table I, for name and use of each of these conveyors. Length, speed, hook spacing and pieces per hook also are given.

Building Arrangement: To get a picture of the setup at this new plant, it may first be well to outline the size and location of the building proper. The new structure, known as building No. 66 A, is 950 feet long and 138 feet wide with 120,000 square feet of floor space. It butts squarely up against the south end of an L-shaped building known as No. 66, once used to manufacture semiautomatic transmissions and now housing equipment for fabrication of all types of tubing required in Buick cars, as well as for turning, grinding, heat treating, assembling and testing of rear axle gearing. Building No.66 likewise is 138 feet wide and each side of the L is

This general view shows about as much of the new production facilities in 66 A as can be incorporated in one illustration. Note the fluorescent lamp fixtures with plug-in cords to nearby bus duct system. Lamps being suspended on a rod, they can be moved about and plugged in to produce the light distribution needed for any arrangement of production equipment. Practically all of the conveyors are hid by machines in this view

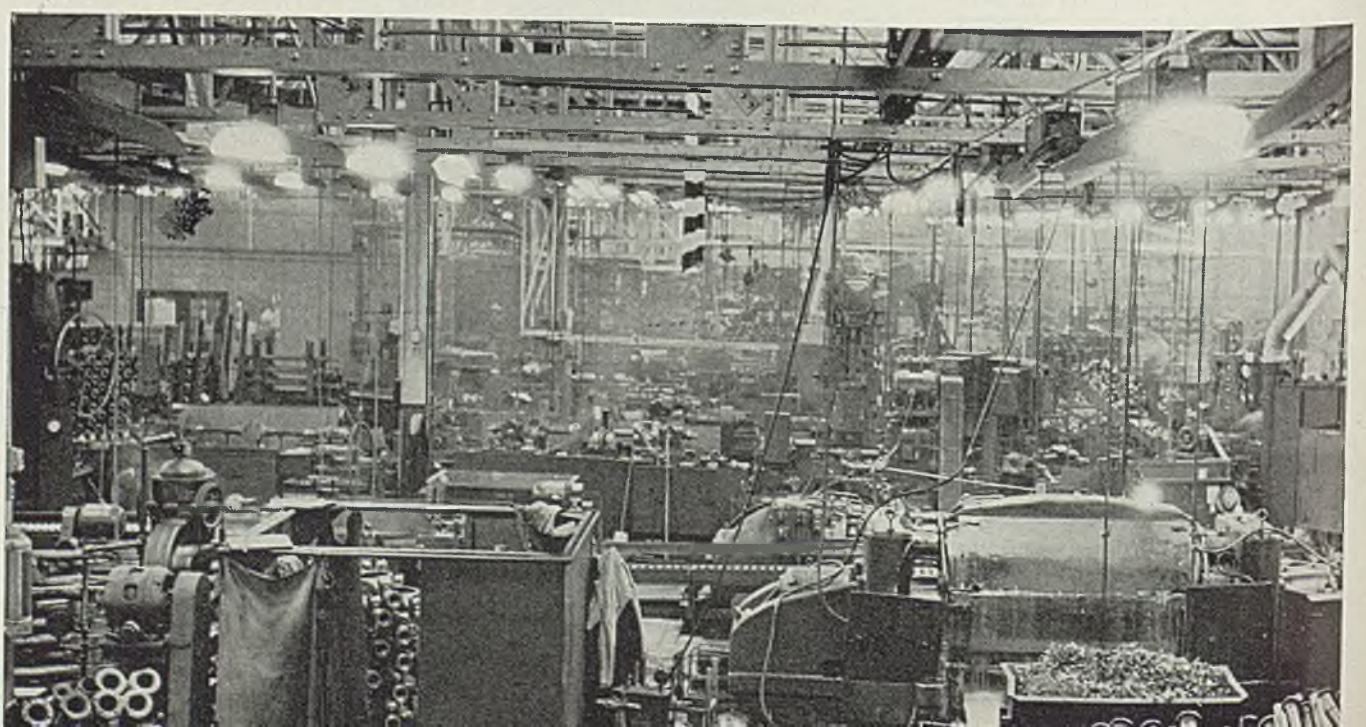
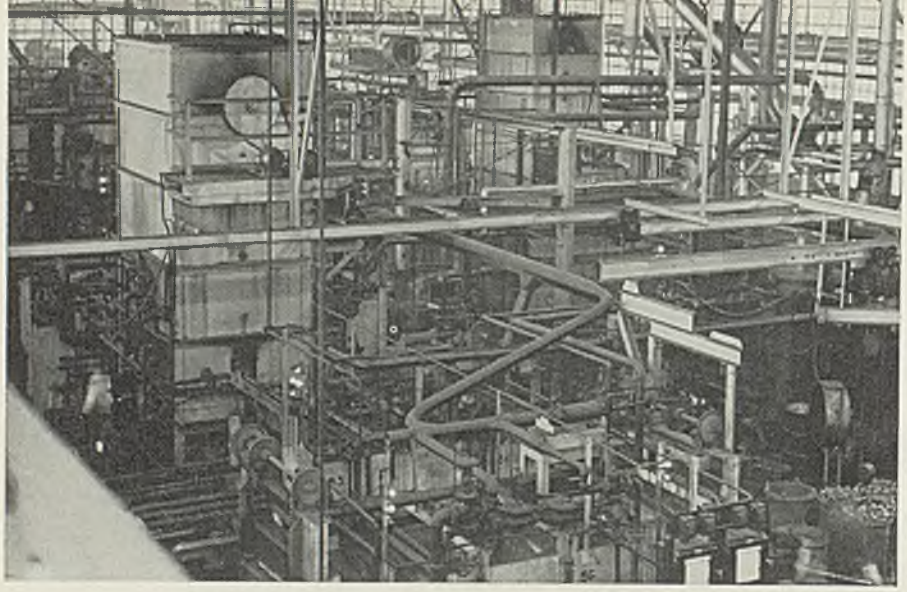


TABLE I—Tabulation of Conveyors

No.	Length Feet	Hook Spacing Inches	Pieces Per Hook	Speed Feet per Minute	Name and Use of Conveyor
1	880	16	6	5-15	Ring gear—Carries ring gears from turning and drilling to tooth cutters.
2	384	16	6	5-15	Drive pinion—Carries drive pinions from turning and boring to tooth roughers.
3	360	24	36	5-15	Side gear—Carries bevel side gears from chucking operations to tooth cutters.
4	350	24	36	5-15	Finish side gear and pinion—Carries bevel side gears and side pinions from cutters through washer to burring and inspection.
5	360	16	6	5-15	Drive pinion semi-finish—Carries drive pinions from tooth roughers through tooth finish generators.
6	480	16	6	5-15	Drive pinion finish—Carries drive pinion from tooth generator through washer to burnishing and inspection operations.
7	416	16	6	5-15	Finish cut ring gear—Carries ring gears from finish tooth cutters through washer to inspection benches.
8	1,260	16	6	5-15	Heat treat and storage—Carries finish-cut ring gears and drive pinions from burnishing and inspection to heat treat.
9	300	24	6-Rings 6-Drive pinions 36-Side gears	3-	Heat treat—Carries all hardened gears from oil quenching operations to cleaning operations. Gears then are moved by special rack trucks to grinding department. (This conveyor operates in heat treat department only.)
10	600	32	10	5-15	Differential case—Carries cases from inspection benches to ring gear and case assembly presses. Also used as a moving storage bank.
11	260	24	8	5-15	Finish-ground ring gear—Carries ring gears from grinding department to ring gear and case assembly presses.
12	296	16	1-Ring gear and case 1-Pinion	6-	Ring gear and case assembly—Carries these assemblies through ring gear and drive pinion set lapping.
13	590	24	1-Ring gear and case 1-Drive pinion		Ring gear drive pinion set—Carries these items plus side gear and side pinion from above lappers (side gears and pinion from grinders) through a washer and into final gear set matching and sound testing room; then outside to complete assembly of differential gear case (side gear, side pinions, axle pins, bushings, etc.); from here onto truck racks in sets of 50 and trucked in trains to third member subassembly line.
14	624	24	6-Knuckles 12-Arms 1-Complete subassembly	2- 6	A-frame parts stock—Carries knuckles, steering arms and A-frame subassemblies from machining floor to subassembly area, then through washer to front shock absorber subassembly.
15	260	24	6	2- 6	Front wheel hubs—Carries front hubs from machining area through washer, then to front hub and brake drum subassembly.
16	130	32	4	2- 6	Front drums—Carries front wheel drums from above hub and drum assembly presses through finish turning and balancing operations. (Turn on stub lathes, balance on dynamic balancing machines.)
17	350	32	4	6-18	Front hub and drum subassembly to front suspension assembly line from above balancing machines.
18	268	24	8		Rear axle shaft and drive assemblies from subassembly through finish turning stud lathes.
19	78	24	8		Rear axle shafts and drum from above turning lathes to balancing machine.
20	252	24	4	6-18	Brake drums—Front and rear brake drums from machining area to front hub and drum and rear axle shaft and rear drum subassemblies.
21	270	24	8	4-12	Axle shafts—Carries finished machined axle shafts through washer and inspection to rear axle shaft and drum subassembly area.
22	716	24	8	4-12	Rear axle assembly feeder—Carries rear axle and drum subassemblies from balancing machines to rear axle final assembly line.
23	280	24	8		Axle shafts from straightening machines through lathes, spline hobbers and grinders.
24	145	24	8	6-18	Axle shaft straightening—Rear axle shafts from tumbling mills (after annealing in heat treat) through straightening machines.
25	544	24	6	4-12	Propeller shaft assembly feeder—Carries propeller shafts from the proper stub and coupling assembly welder to the drive pinion subassembly.
26	152	24	1	4-12	Torque tubes from flange and tube assembly welding to radius rod clip welders.
27	138	24	1	4-12	Torque tubes from above welders to primary drilling machines.
28	304	32	6		Differential carriers from end of machining line through washer to torque tube and carrier subassembly.
29	500	16	1	4-12	Differential carrier and torque tubes from above subassembly to third member subassembly—Above tube and carrier subassembly is transferred from conveyor No. 29 to a carousel type conveyor and the propeller shaft and drive pinion subassembly is assembled, also differential gear case subassembly. This constitutes a complete third member unit which then is sound tested and finally goes to rear axle assembly line for assembly into axle housing.
30	108	8	1	8-24	Carries propeller shaft and drive pinion subassemblies through the straightening presses and dynamic balancing machines.
31	154	24	1	4-12	Third member assembly feeder—Carries above propeller shaft drive pinion subassemblies to the above third member assembly carousel conveyor.
32	144	16	1	3-10	Third member assembly from carousel conveyor through sound test room.



General view of heat-treating department. A close examination will show jib cranes and electric monorail hoists as well as various types of belt and overhead chain conveying equipment

600 feet in length—124,000 square feet of floor space in all. A dock extends along the inside of the east-and-west wing, while the heat-treating department adjoins the inside of the north-and-south wing. A dock also extends along the east side of the new building, known as No. 66A, with railroad sidings of course located to feed these docks. Truck shipments are received at a truck well adjoining the dock at the south end of the new plant.

Flow of Parts: In general, the flow of parts in process is as follows: At the north end of the 1550-foot building (950 feet new and 600 feet old) ring gears, pinions, side pinions and side gears, all elements of the differential unit, start through machining operations. This work includes going through batteries of machine tools for turning, cutting and grinding, interrupted only for a carburizing heat treatment before grinding. After careful grinding, all gears pass through a sound testing room on conveyors and then are racked in sets for trucking to the south end of the plant and subsequent assembly into rear axle housings. At the point where the new and old buildings join is located a machine repair and building maintenance department.

Going now into the new building, assemblies flow crosswise from east to west to assembly lines along the west side of the building. These lines converge at the center of the building, the south line bringing rear axle assemblies and the north line front suspension systems. At the center they are removed from the assembly conveyors and placed on the delivery conveyor, mentioned previously, which carried them upward and out of the building, then on a long-overhead path to shipping or storage in a plant some distance away, known as No. 31.

Special mention should be made of some of the constructional features of the new building. Lighting is all of the fluorescent tube type, fixtures being hung on a rod paralleling a bus duct distribution. This permits movement of the fixtures to any point between roof trusses by means of the trolley arrangement on the fixture wire. These lights are at a height of about 12 feet and are spaced closely enough to give ample glareless illumination at the working level. See accompanying illustrations.

Give Workers "Elbow" Room

Practically the entire west side of the building is glass, not the usual transparent window glass but a translucent type which admits light but keeps out direct sunlight.

Lunchrooms, washrooms, lockers and toilets are located on a balcony above the working floor and a large amount of space is provided to avoid crowding of workmen at mealtimes or when shifts are changing.

But it is from the conveyor standpoint that the new plant is most interesting. Standing at one side of the building and glancing across the working floor, the eyes meet a veritable maze of overhead conveyor systems, all in motion, and all serving to relieve workmen from difficult manual labor of transferring parts from one operation to the next. At various points along the floor are carousel-type conveyor systems for subassemblies. The different overhead systems carry different types of hooks, some accommodating only one part, others holding up to six large pieces.

The accompanying tabulation, Table I, shows 32 of the subassembly conveyor systems, identifying their function and starting length of the chain, hook spacing and number of parts carried, as well as the speed range. In addition to these, the following conveyor systems have been installed:

1—A carousel-type conveyor assembly of third members (the term "third member" connotes assembly of torque tube, flanges, propeller shaft, bearings, etc.). Capacity of this conveyor is 45 to 135 jobs per hour. It is 136 feet long and has 39 saddles or fixtures spaced at 4-foot intervals, each carrying one piece. Operators work both inside and outside the loop as it makes a circuit, speed being variable from 3 to 9 feet per minute.

2—The front wheel suspension assembly line, a power-driven conveyor with fixtures on each side. Working length is 120 feet, requiring a 240-foot chain. Fixture spacing is 24 to 30 inches, alternate left and right, of a 54-inch job space. Each fixture of course accommodates one suspension unit and the conveyor speed is variable from 3 to 9 feet per minute.

3—The rear axle assembly line also is a power driven conveyor with saddle-type fixtures, the axle riding crosswise with propeller shaft and torque tube parallel with conveyor.

The fixture spacing must be wider, naturally, so they are placed 7 feet apart. To keep pace with the front suspension assembly line a longer conveyor is required, 238 feet or 476-foot chain. Speed is increased over the front line from 5 to 15 feet per minute.

4—The mile and a quarter delivery conveyor mentioned previously. Hook spacing is irregular, 6 feet, 8 feet 4 inches and 6 feet 4 inches—a job spacing of 20 feet 8 inches. This is occasioned by the fact that the conveyor is loaded with one rear axle assembly, then two front suspension units, then another rear assembly, two fronts and so on. Thus, one after another, a complete set of axle and front suspension units follows along the delivery line. Speed of this line ranges from 6 to 36 feet per minute, with four drives provided.

With this comprehensive system of parts movement it is estimated that a saving of one-third has been effected in floor space compared with that necessary if parts were to be handled by truck, and stored on the floor between operations. How conveyors serve as storage space is shown effectively by the No. 8 heat treat conveyor, which has capacity for storing or keeping a float of 3000 ring gears and pinions. This is required because of the fact the heat treating department must operate 24 hours a day, while the machining department usually operates only two 8-hour shifts, in this time building up a sufficient float to keep the heat-treating furnaces busy for a third shift.

(Concluded Next Week)

Building Better Buses.. calls for STRONG, TIGHT FASTENINGS!

One of the bus bodies built by the J. G. Brill Co.

Five years' experience at J. G. BRILL proves the high fastening efficiency of SHAKEPROOF *Thread-Cutting Screws*

Man drilling holes preparatory to inserting and driving Thread-Cutting Screw.

The J. G. Brill Company of Philadelphia, Pa., uses Shakeproof Thread-Cutting Screws for many applications in building their bus bodies. An outstanding application (illustrated above) is in the fastening of the plywood floor to the metal understructure. Also, these screws are used for fastening interior panels and moldings.

In the five years this company has used Shakeproof Thread-Cutting Screws, they have proved highly practical from both production and performance results. These screws have saved time and money in many instances by eliminating the need for washers and nuts; and, because they actually cut their own threads, each screw produces a tight, strong fastening which assures greater product durability.

Section of [illegible] and sealing strip [illegible] metal frame of bus body.

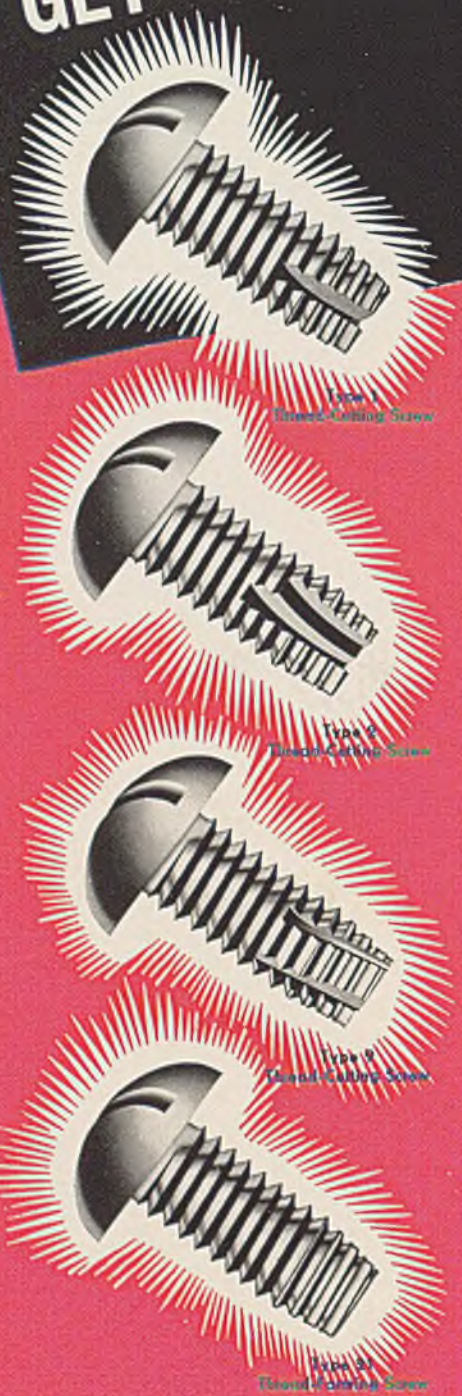
A portion of the finish assembly line where interior trim fastenings are made.

SEE OTHER SIDE FOR TYPES AND FEATURES

GET TIGHTER STRONGER FASTENINGS... reduce costs and speed-up production with...

SHAKEPROOF

Thread-Cutting Screws



ACTUALLY *Cut* THEIR OWN THREADS!

By means of the exclusive slot with its serrated cutting edge, this type of screw does not merely indent its threads in the work—it actually cuts like a tap, producing a clean, standard machine screw thread. Tapping is eliminated—you simply drill, then drive—that's all!

A TIGHTER, STRONGER FIT ASSURED

Because each screw remains in the threads it has cut itself there is a perfect fit between screw and work. The absence of "play" makes it extremely difficult for vibration to start any loosening action—thus the fastening is definitely both tighter and stronger than can be normally expected when machine screws are driven into pre-tapped holes.

SPECIAL TYPES FOR PLASTICS!

Type 2, with its double-width thread-cutting slot was specially developed for use in plastics. Type 9, which can also be used in metals, is thoroughly practical for plastic applications, too. The use of these screws eliminates the need for threaded inserts or separate tapping operations. They can be used in any type of plastic material and in laminated or molded sections without danger of fracturing.

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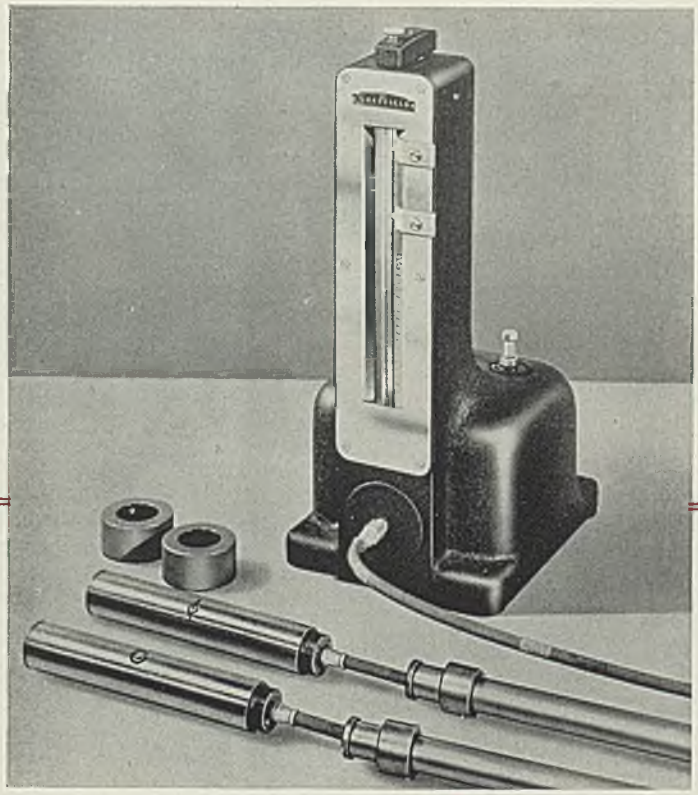


Showing the new Precisionaire gage which speeds up accurate checking of gun bores, large or small. Note the flexible tubing connection on the front

Checking the "Inside Job" on Guns

As a contribution in aiding the country to facilitate and increase production for defense, Sheffield Gage Corp. has introduced a sensitive instrument capable of checking the precision of gun bores from the smallest caliber rifle to the largest naval gun. It also is applicable to other similar inaccessible internal diameter checking

■ ATTENTION is again focused on the problem of precise checking of gun bore diameters with the current activity in the production of small arms and artillery. Although there are many ways of checking an inside diameter accurately when the ratio of bore length to bore diameter is small, the problem becomes more and more difficult and the means of checking become more limited as that ratio increases beyond unity. Therefore, gun barrel checking with conventional gages requires a high degree of skill on the part of the operator.

To eliminate this troublesome human equation, maintain maximum precision standards consistently and materially increase the speed not only of gun barrel inspection but of all relatively inaccessible internal diameter checking, Sheffield Gage Corp., Dayton, O., has developed a flow-type air gage—the Precision-aire—which checks the diameter of bores of any length and any caliber, and also the diameter of rifling grooves in the gun barrel itself. It indicates not only the interior diameter to any degree of precision desired, but also the location and the amount of out-of-round, taper or bell mouth condition that may exist.

Operation of the instrument is based on the velocity or volume of air at constant pressure flowing during the gaging operation. Unlike previous gages, it reflects the condition of every increment of length throughout the bore without necessity of taking a series of separate readings. It is much faster and eliminates human error. In some cases it may be used to check the alignment of holes, also.

In cases where the inner circumference of a bore is more critical than its actual diameter—for instance, a thin walled, easily distorted bushing which will eventually be pressed into a rigid casting or other assembly—the unit furnishes a more accurate check because it can be made to measure the average diameter of the bushing from end to end instead of the actual diameter at any given point. The use of this gage imposes no distorting pressure on the piece being gaged. It also is ideal for use in inspecting such parts as artillery recoil cylinders, the interior finish of which is so vitally important, and will not scratch the surfaces. In fact, the gaging nose may be equipped with bronze or silver rings as a further protection against surface damage.

The instrument is made in two models, A and B. Model A is constructed so that it may be presented to the work being gaged, while with model B the work part is presented to the gage. The latter is used for work parts that are well balanced and light enough to handle easily. Model A is applicable to the heavier, poorly balanced work parts and parts which must be

gaged while still on the cutting machine. Its gaging nose is connected to the gage assembly by flexible tubing of any length convenient to reach the work.

Both models, however, are set up in the same way for checking bore tolerances. With pressure on, a minimum master ring is slipped over the gage nose and air pressure is adjusted so that the indicator float will rise to a point just above the bottom of the transparent indicator tube. One of the sliding marker points is set opposite the float's position.

Substituting the maximum master ring for the minimum ring sends the float much higher in the tube. The second sliding marker is used to mark this second float position. The length of tube between the two markers represents the difference in diameter between the maximum and minimum master rings, that is, the tolerance of the work to be gaged. This length of tube can be divided or calibrated on the adjacent scale in any number of equal divisions. If the tolerance is 0.001-inch and the two markers are found to be 5 inches apart, each half inch between them would represent 0.0001-inch.

The nose takes one of several forms, depending on the inspection operation contemplated. Essentially it is a cylindrical plug having a central air channel which terminates in one or more jets in the side of the cylinder just back of its forward end. Where it is desired to check average diameter instead of the actual diameter at a given point, the air jets in the gaging nose terminate in an annular groove cut entirely around the nose cylinder. When actual diameter, out-of-round, taper or bell mouth condition is to be checked, the two opposing jets diametrically opposite open directly on the surface of the nose cylinder.

The gage consists of a recording instrument incorporating a transparent indicator tube and a gaging nose. Compressed air from the regular plant supply is the actuating medium and is always held at a constant pressure by the construction of the gage assembly. An indicator float is free to move vertically inside the indicator tube in response to the velocity of air flowing around it. A graduated scale adjacent to the indicator tube facilitates easy reading of the indicator float's position.

The volume and velocity of air flowing at any given instant in the gaging operation depends only on the clearance between the gaging nose and the sides of the bore being gaged. Because of this free flow the indicator float reacts instantly to changes in velocity. This is true regardless of the distance between the recording instrument and the part being gaged.

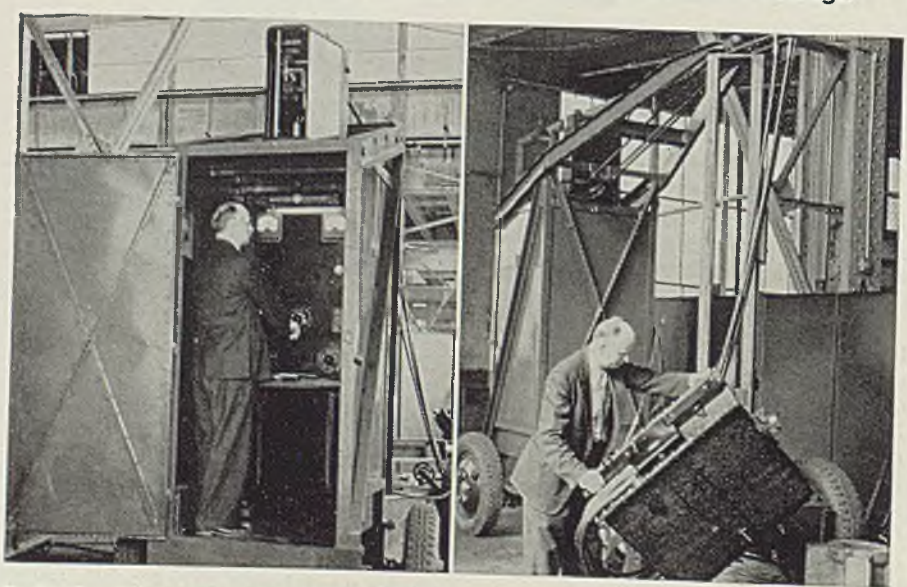
The gun bore gage is a standard model A unit with a gaging nose construction developed for that purpose. The nose itself is flexibly carried at the end of a tubular handle long enough to reach through the bore. The flexible connection between nose and handle eliminates any error which might otherwise result from misalignment of the nose in its passage through the bore. The nose actually centers itself.

The bore of the gun, before the rifling operation, is checked after the setup procedure outlined above. The inspector passes the gage nose through the bore in one continuous pass, watching the indicator float as he does so. When checking for an out-of-round condition, he turns the nose of the gage in the bore. If the float remains between the tolerance markers on the scale throughout its passage through the bore, the barrel is acceptable.

After the rifling operation a second gaging nose is used to check the diameter of the rifling grooves themselves. The jets of this nose terminate in bosses raised beyond the regular surface of the nose cylinder. These extend into the rifling grooves. The rifling nose is inserted in the bore with the raised bosses in register with two opposite rifling grooves. It is passed through the bore following these grooves. This operation is repeated using each pair of grooves in turn until all have been checked.

The gage is applicable to any bore from the smallest rifle caliber to the largest naval gun. The indicator tube is small enough so that a number of such tubes may be clustered within the vision of one operator for the gaging of many dimensions simultaneously. The design and operation of the instrument make it ideal for use in automatic gaging and in connection with a photo-electric cell for the operation of solenoid selectors.

X-Ray Unit Examines "Innards" of Castings

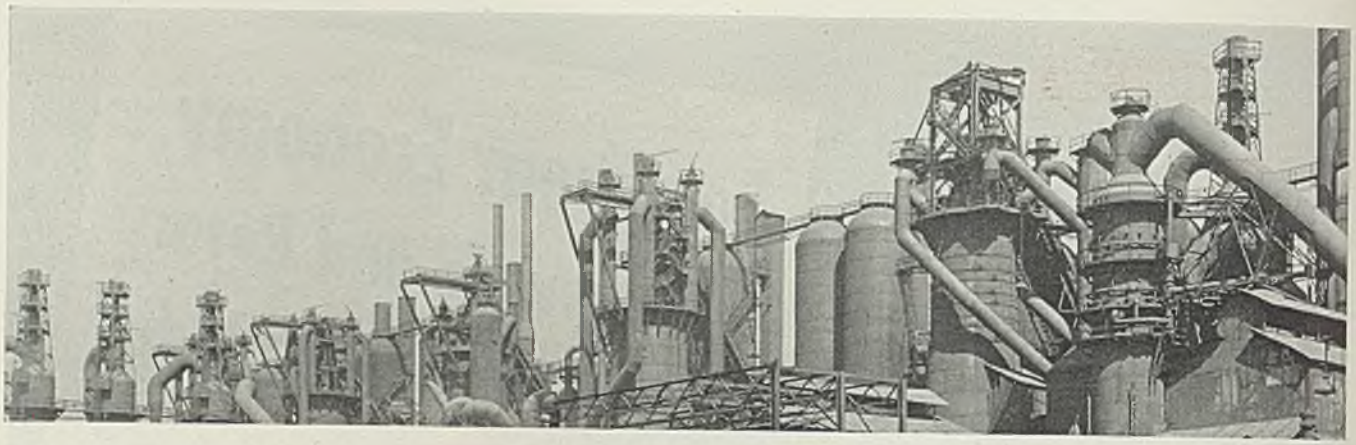


■ At the Erie works of General Electric Co., the "innards" of castings or other metal parts are radiographed by a truck-mounted X-ray machine before machining operations are started to detect concealed flaws. The machine, shown above, is completely shockproof, all high voltage equipment including the X-ray tube and high voltage transformer being oil-immersed in a grounded metal case. Mounted in a lead-lined booth, the control panel at the rear of the truck protects the operator from continual exposure to the rays. Rays of the unit will penetrate about 3½ inches in steel

Chemical Association Issues New Directory

■ Association of Consulting Chemists & Chemical Engineers Inc., 50 East Forty-first street, New York, announces the publication of the sixth edition of the "Directory of Association Members."

Issued to aid all who need chemical advice or service, it may be obtained gratis upon applying to the office of the association. The directory is divided into three parts. The first part lists the members in two sections geographically and alphabetically. The second part contains 1-page statements from each member, descriptive of his organization's qualifications, etc. The "Key Sheet" or last part records the types of work, etc., handled by members.



Skyline of a group of Carnegie-Illinois stacks where iron ore last sees the light of day. In about 12 hours after it is dumped into the receiving hopper and slides off the big bell into the throat of the furnace it emerges from the iron notch as a stream of molten iron

Things New in Blast Furnace Charging

Duties associated with the charging of blast furnaces and in insuring the accuracy of the filling operation have been greatly simplified by a number of recent improvements and variations in auxiliary equipment. Some of these including charging control, pneumatic bell hoists, distributor control, coke charging and measuring, and stock water metering are discussed in the accompanying article

GORDON FOX
Vice President
Freyn Engineering Co.
Chicago

■ MOST charging equipment for blast furnaces has been associated with conventional electrically-operated two-skip installations. During the past year three charging controls have been placed in service in connection with steam-operated skips. A control is now being built for use at a furnace having a single electrically-driven skip. Charging controls have been applied most frequently in connection with pneumatic operation of the bells, but installations have also been made where bells are steam-operated, oil-operated, or electrically-operated.

The almost universal adoption of automatic charging control equipment at new and rebuilt furnaces indicates broader acceptance of the fact that proper co-ordination of the functioning of the several mechanisms participating in the charging cycle is of greater importance than the speed of any single unit in expediting the operation as a whole.

Gravity-opened bells, operated by pneumatic bell hoists, which in turn are controlled by motor-operated valves, have now achieved almost universal acceptance. A number of mechanical refinements in design have been applied to these hoists such as an improved slack cable device which prevents the large bell hoist from paying out an appreciable amount of slack cable if the bell should be held up by gas pressure. A method has been devised to absorb and dissipate the energy released by an explosion between bells. The valving is arranged to permit independent control of the speed and time of opening, pause and closing the large bell. A fast opening speed is now possible. Some operators value this characteristic because of its influence on distribution of the stock. These and other refinements have brought the pneumatic hoists to a degree of perfection far in advance of its early beginnings.

A new and simplified type of revolving distributor has been developed. Several installations are now in service. In this control the angle of rotation of the distributor is not changed after a fixed number or group of skip or small bell discharges; it is changed in response to and in step with the discharges of the large bell. Thus all the skip loads placed on the large bell for one discharge have a given rotation. The next group of skip loads placed on the large bell for its next discharge has another rotation. Extra loads placed on the large bell have the same rotation as the regular loads in a group placed on that bell.

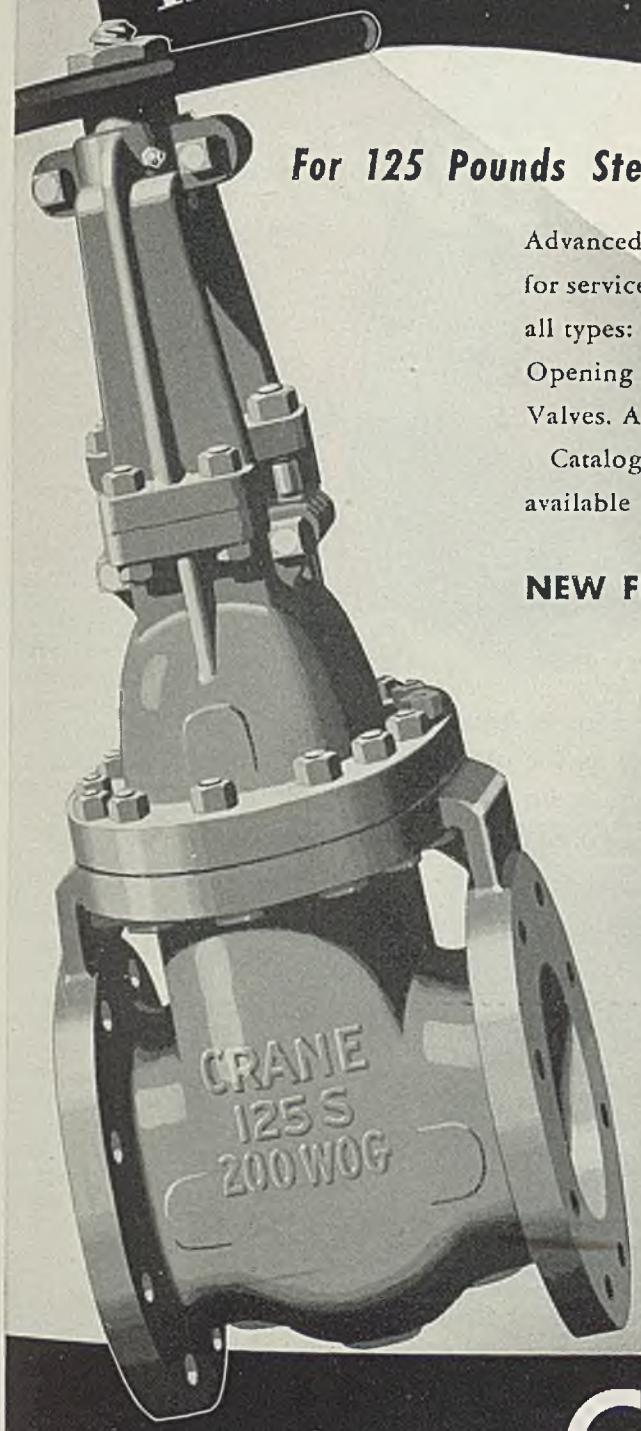
This distributor control affords a definitely regular or symmetrical distribution as compared with former practice, in which a random distribution might result if the numerical grouping of skip discharges was not kept in exact correspondence with the large bell discharges.

The new control enjoys advantages of simplicity in view of the fact that an independent mechanism for counting the skip discharges is not required. Ratchet wheels or equivalent devices for this purpose are thus eliminated. The new control is excellently adapted to incorporation as an integral part of a charging control in which both the large bell and the distributor control respond to a single program switch counting the small bell discharges.

Coke charging and coke measuring control provides for measuring the coke automatically in weigh hoppers either by weight or by volume, the choice between the two methods being optional. It also provides for automatically charging coke into skip tubs designated by the charging control so that the coke is automatically charged at definite, selected points in the round with no attention on the part of the skip operator.

In a variation of this control, preset charging of coke may be employed. This plan does not cause the coke to be charged automatically

A NEW, IMPROVED LINE OF IRON BODY WEDGE GATE VALVES



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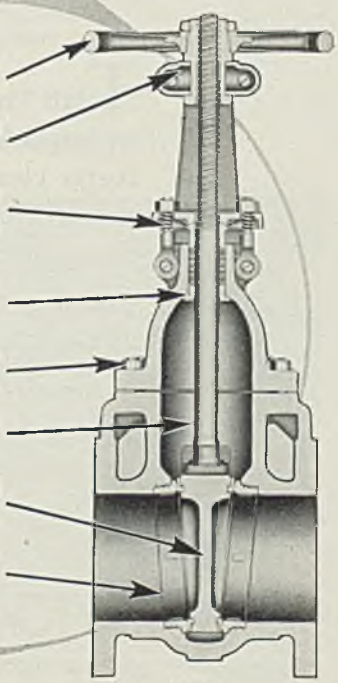

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If you are in doubt as to what kind of surface or finish is best for your particular use, it will prove profitable to you to discuss this problem with one of the Wickwire Spencer representatives. Wissco Wire affords you a wide choice with assurance of quality and uniformity.

WICKWIRE SPENCER STEEL COMPANY

500 Fifth Ave., N. Y.; Buffalo, Chicago, Detroit, Worcester. Pacific Coast Headquarters: San Francisco. Warehouses: Los Angeles, Seattle. Export Sales Department: New York

Wickwire Spencer manufactures High and Low Carbon Wire—in various tempers, grades and finishes—for your specific purpose. Hard Drawn, soft or annealed, Basic or Bessemer Wires—Steel Drawn annealed, in all tempered Spring Wire, Chrome Vanadium Spring Wire—Valve Spring—Music—Clip—Pin—Hairpin—Hook and Eye—Brass—Tapping—Embroidering—Hat Spacer Wire—Steel Wire—Cloth—Piston—Needle Rod—Screw Stock—Armature Binding—Brush—Card—Spring—Nailing—Shaped—Rope—Weaving—Flat Wire and Strip Steel. Rod in Low Carbon—Steel annealed or tempered—Cloth Spring Steel—Corrosion and Heat Resisting Wires. Consult the Wissco technical men on your wire problems however large or small.

WISSCO WIRE
BY WICKWIRE SPENCER

at a given point in the round. It does permit the scale car operator to preset a desired number of coke charges before he leaves the skip pit. These charges will then be measured and delivered to the furnace with no further attention on his part. In the next succeeding round he must again preset the control for delivery of the number of coke skips to be included in that round, etc.

Two installations have recently been made in which the coke is measured automatically in the skip tubs, by volume, no intermediate weigh-hopper being involved.

The first installation of a new stock water metering device is now being made. This comprises essentially a tank from which selectively measured quantities of water may be discharged. Inlet and discharge valves are motor-operated. The scale car operator merely pushes a button to initiate a cycle of operations which involves the discharge of the measured quantity of water into whichever skip is in the pit, and the refilling of the tank. The quantity of water to be discharged may be varied by moving a small dial switch.

Stock Watered Automatically

The water charging operation may be made automatic. In such event, predetermined quantities of water will be automatically delivered into selected skips with hardly any attention on the part of the scale car operator.

In past practice, test rods have had three shortcomings, viz.,

1. Rods of small or medium diameter have been subject to bending.
2. Rods of larger diameter, particularly have been objectional due to substantial gas leakage.
3. Rods not equipped with a foot of substantial area have been subject to settlement into the burden.

These shortcomings are all overcome in a new test rod which employs a conical weight suspended from a cable of rather moderate diameter.

The cable has special characteristics in that it is sufficiently rigid to support its own weight but, at the same time, is sufficiently flexible to be drawn taut by the suspended weight so that it will not permanently retain a bent condition. The cable is unusual in the further respect that it has a smooth cylindricay surface similar to that of a solid rod.

Because of the small cable diameter and the smooth, round exterior, gas leakage is reduced to a negligible minimum. Because of the substantial weight and ample bearing area, accurate indication is assured. Because of the semiflexibility and nonbending characteristic, the annoyance of bent rods is avoided.

The arrangement has the further advantage that, if desired, a new weight and cable can be introduced into the furnace through the opening in the hopper between the bells, the test cable being subsequently pulled into position by means of a pilot cable threaded through the test rod tube.

Some of these test rods have been in service over a year. They appear to meet admirably all the requirements of this service and to eliminate the shortcomings which characterized previous practice.

♦

Split Seconds Can Be Measured by New Device

■ Split seconds are measured as easily as a wrist watch measures the time of day by a new chronoscope developed by the Research division of Remington Arms Co., subsidiary of E. I. du Pont de Nemours & Co., Wilmington, Del. Built into a small portable cabinet, it splits the second 1000 ways and will measure from one up to 200 of these milliseconds with less than 1 per cent error.

The device is valuable for studying the effect of velocity and flight time of bullets on accuracy, range, trajectory and hitting power, but its use is not confined to ballistics. It also is applicable in science and industry.

About any operation can be clocked with the chronoscope providing an electrical impuse can be obtained at the beginning and end of the event.

The maximum swing of an indicating needle across a scale tells the operator precisely how long it takes a fuse to blow out, a photoflash bulb to light up, a telephone relay switch to snap into operating position or a blasting cap to go off.

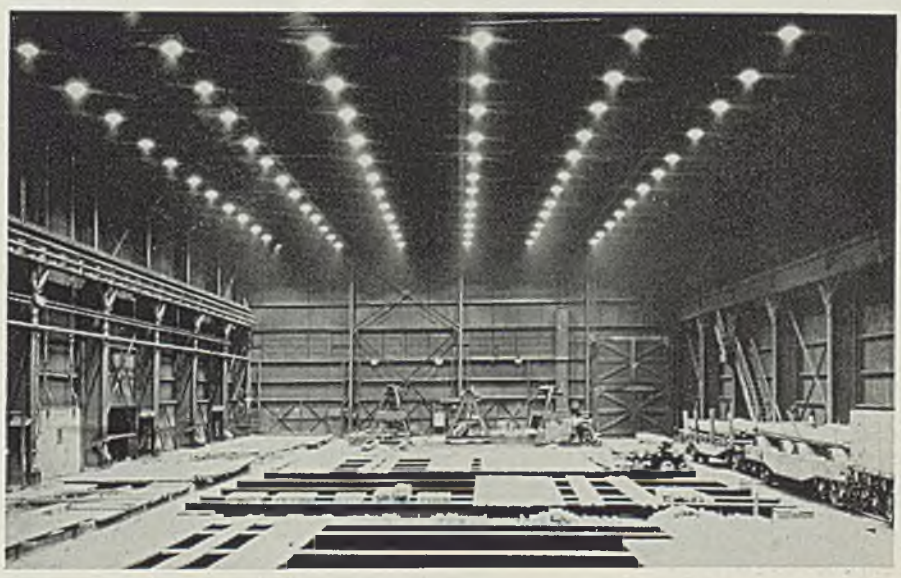
Projectile velocities can be measured accurately over distances as short as 5 or 10 feet. "Remaining velocity" can be measured after the projectile has travelled some distance. The actual velocity at 100 or 500 yards, for instance, can be measured over 10 feet.

The device indicates the time interval from a quantity of electricity which passes through a specially designed galvanometer while the measured event is taking place.

A vacuum tube switching circuit starts the current at the beginning of the interval and stops it at the end. A photo electric cell can be used to obtain the start and stop impulses. In ballistic studies, the conventional muzzle wire and target plate can be used.

The single scale from which readings are taken really serves as five scales. Selection is made with a switch, which converts the scale to any one of five time ranges. These ranges are 10, 20, 50, 100 and 200 milliseconds. The tube filaments can be energized with batteries where an alternating current of 110 volts is not available.

"Eye-Openers" for Steel Inspectors

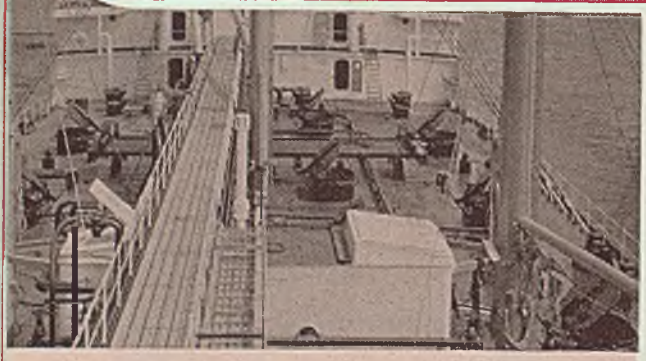


■ **Enabling night-time inspection of steel billets to be carried on for the first time, 96 Westinghouse "millites" installed in the chipping room of a large mid-western steel mill have raised the light levels in that area from 10 to 60 footcandles. Proper illumination is essential to billet inspection. The outer crusted surface of the steel is chipped off, exposing the raw inner metal to the eyes of the men whose job it is to detect flaws in the metal structure. Installed at 12 x 12-foot spacings, and mounted 40 feet above the floor of the room, each unit uses a 1000-watt incandescent lamp**

15,000 feet up... or

IN TODAY'S GREAT AIRLINERS, fuselage struts, longerons, engine mounts, landing gear, wing spars and propellers are made from SHELBY Seamless Aircraft Tubing. Aircraft builders have been quick to take advantage of the structural efficiency of the Seamless steel tube. Its superior strength, toughness, and lightweight, and the many forms in which it is available have made possible some of the outstanding developments of the aviation industry.

AS OIL WELLS GO DOWN to depths undreamed of a few years ago, drill pipe, casing, and tubing are being asked to meet racking strains far beyond the ordinary. That's why you will find NATIONAL Seamless in use where deep drilling records are being made. In "Walls Without Welds" oil men have found safety and trustworthiness in hazardous service like this.



FOR USE AFLOAT. NATIONAL Seamless is the standard specification of many marine architects and engineers. Used for masts, booms, and yardarms—in the boilers—in the high pressure steam lines, no pipe or tubing offers such safety or has shown such consistently high records for length of service and freedom from maintenance, as seamless pipe.

IN TODAY'S FINE CARS, drag links, tie rods, torque tubes, steering columns, shock absorbers, axles, brake shafts, bearings, and other vital parts are made from SHELBY Seamless Tubing. Automotive engineers have found that this tubing, because of its constant uniformity, is best adapted to the requirements of mass production.

15,000 feet down..

Wherever *safety* is vitally important America confidently relies on

NATIONAL SEAMLESS

THERE are three basic reasons why NATIONAL Seamless has earned the nation-wide preference that makes it the most widely used pipe and tubing in America.

National Seamless offers dependability in the highest degree. Among all the methods of making pipe and tubes the Seamless process is unique in that it gives you the complete security of *uniform* wall strength, both transversely and longitudinally. Only Seamless has no weld—no long line of potential weakness.

National Seamless has been constantly bettered to meet the ever more stringent requirements both of industrial fabrication and service. Forward-looking research and development have steadily improved manufacturing technique — every worthwhile advance in steel metallurgy has been incorporated, so that NATIONAL Seamless today is available in practically any required size and wall thickness and in grades and treatments of steel to suit any need.

National Seamless has been tested in 50 years of service. In steam generating systems, processing plants, in oil refineries, and in heat transfer equipment, it has thoroughly demonstrated its ability to withstand elevated temperatures and high pressures. In vital structural parts of automobiles, aircraft, and industrial machinery, NATIONAL Seamless has ensured strength and ruggedness beyond the ordinary and with the least unnecessary weight. In almost any industry you can name—fifteen thousand feet up or fifteen thousand feet down—Seamless is the first choice for jobs which must not fail.

For whatever purposes you need consistently dependable pipe and tubing, take full advantage of the proved superiority of NATIONAL Seamless — "Walls Without Welds."

NATIONAL TUBE COMPANY

PITTSBURGH, PA.

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Export Company, New York

UNITED STATES STEEL

IN POWER PLANTS EVERYWHERE, higher and higher pressures are the rule. To meet the need for the strongest and safest piping available, experienced engineers and operators unhesitatingly place seamless at the top of the list of acceptable materials; in fact, for severe or hazardous service the use of seamless is mandatory.

FOR RAILROAD EQUIPMENT, NATIONAL Seamless boiler tubes reduce installation time by an average of 15 to 20 per cent. Completely annealed, they turn over, expand, roll and bend easily. Throughout the modern train, the added stresses and vibration of hauling greater loads at higher speeds require stronger, finer pipe in all steam, water and air lines—NATIONAL Seamless fills the bill.

NATIONAL SEAMLESS derives its unsurpassed physical properties first, from the steel of which it is made; and second, from the process by which it is produced. Billets of only the finest selected, open-hearth steel go into its manufacture. These are pierced at high temperature, then precision-rolled to the correct size and wall thickness. At every stage of production, thorough tests and inspections keep quality at its peak. The result is NATIONAL Seamless as you receive it—uniform in wall strength, accurate in dimensions, and uniform in all physical properties—the finest pipe and tubes metallurgy can produce.

Simple Aluminum Surface-Treatment Method

. . . . . has important possibilities

. . . . . is easily applied

Aluminum is protected against corrosion or provided with an effective paint base by simple new chemical treatment. The process requires only 3 to 15 minutes' immersion in treating solution, followed by cold and hot rinses. Thus it is suitable for incorporation in automatic conveying setups

By TRUMAN YOUNG
Pyrene Mfg. Co.
Newark, N. J.

■ RECENTLY a new process has been found to improve the affinity of aluminum for paint, lacquer and enamel coatings and also to produce a thoroughly protected surface without additional finishes if desired. It has been widely used on such parts as microphones, transmitters, instrument panels, switchboxes, lamps, fishing reels, golf club heads, clock and radio parts. It appears extremely flexible in application and produces good results under ordinary plant production conditions.

Owing to the nature of aluminum and its alloys, the untreated surface possesses no natural affinity for paint, lacquer or enamel coatings. Such finishes will not adhere permanently, eventually flaking and cracking easily and thus failing as a protective film.

After extensive work in the metal-finishing laboratories of the Purene Mfg. Co., 560 Belmont avenue, Newark, N. J., a new process has been developed for treating aluminum. Similar to the bonderizing process for steel, it is equally efficient for protection of the metal itself and as a base for paints and enamels. The Pylumin process provides a simple, inexpensive and rapid method of producing satisfactory paint base coatings on aluminum and aluminum alloys. During treatment, a chemical action converts the surface of the parts into millions of minute molecular groups, providing interstices into which a subsequent finish will flow. Then as the finish dries, it becomes securely anchored into the treated surface.

Combining such a specially prepared surface with suitable paint coating provides a corrosion-resistant finish that adds many years of life to the article treated.

An important characteristic of such a treatment is its effectiveness in preventing the spread of corrosion around any portion of the final finish which might become accidentally injured. The confining of corrosion to the exposed area is well illustrated by tests on a standard test panel half of the surface of which was treated before the finish was applied. Corrosion spread from the scratch in the untreated section and was localized in the treated portion of the specimen.

In addition to preventing the spread of corrosion, the process preserves the finish, as the enamel over the treated portion retained its bright new appearance, while the surface of the untreated section was badly cracked and flaked. This demonstrates the effectiveness of the treatment in preventing flaking and peeling. This protection is especially valuable under severe shock or vibration.

Treatment Easy to Apply

Although the treated surface itself exhibits high corrosion-resistance value, the resistance can be further increased by subsequent application of lanolin, waxes, or oils.

The new treatment is said to be extremely simple and easy to apply. The operation involves only the immersion of the work in a heated solution in a steel tank. The processing action is extremely fast, requiring only 3 to 15 minutes immersion in the boiling solution, which is made from a mixture of several chemicals dissolved in boiling water.

Aluminum dipped in this solution quickly has its surface converted into a nonmetallic film of complex basic oxides, thereby forming a coating which is highly resistant to corrosion and which also serves excellently as a base for paint, lacquer or enameled finishes. The Pyluminized metal surface has a characteristic uniform gray to black color, depending on the composition of the metal treated.

Because of the short processing time, the method can be used efficiently in automatic conveyor setups. On the other hand, small production not warranting conveyor equipment can be handled efficiently by baskets or racks in still tanks. Large and small manufacturers thus can use the process with equally satisfactory results and comparative economy. The process itself can be operated by any ordinary workman, no chemist being necessary to test the solution and keep it in proper working balance.

After processing, the work is rinsed in cold water, then in hot water and dried, after which the parts are ready for the decorative finish if one is to be used.

The process should be applied after all other manufacturing operations prior to finishing have been completed. Work usually received in the finishing department is contaminated with grease from stamping, forming and machining operations. Where this oil or grease is excessive, it is removed by treatment with a mild alkali cleaner followed by a rinse. In event the oil or grease film is extremely light, the parts contained in baskets or racks can be immersed directly in the boiling solution and allowed to remain for the necessary time, 3 to 15 minutes according to the composition of the alloy.

The action of the process, in addition to removing any traces of oil or grease left on the parts, converts any inorganic corrosion products initially present, finally providing a corrosion-resistant coating. It is said the cost of the treatment is only a fraction of a cent per square foot of the surface treated.

The equipment required is available in almost any finishing department. Three steel tanks of sufficient capacity to handle production requirements are needed. The first tank contains the Pylumin solution, the second a circulating cold water rinse, the third a hot water rinse—either steam or gas heated. No electric equipment of any kind is necessary. It is essential that the solution be maintained at boiling temperature for best results.

Get More Comfort, Better Heating Efficiency from Direct Radiant Room Heating

Direct radiant heating of rooms by use of a heat source embedded in floor, walls or ceiling, or any combination of these locations, reduces heat loss by convection, promotes uniform heating, permits boiler installations to be about 30 per cent smaller since air does not need to be heated to provide comfortable conditions, thus decreasing total heat requirements

By R. L. HARTFORD
Pittsburgh Editor

PRIMITIVE as man's first fire in principle, yet modern as tomorrow in practice, direct radiant room heating is beginning to come into its own as an implement in the hands of designers for living.

Applications both in residential and industrial heating are becoming more numerous for this newcomer into the heating field as its potentialities are developed through experience. Basically, radiant heating makes use of the principles of heat radiation in controlling temperatures, rather than those of convection. In theory, this is similar to the principles underlying light waves. Thus surface texture reflectivity and similar factors have important bearing upon radiant heating.

The fundamental unit of a radiant heating system is a coil of pipe, embedded in wall, ceiling or floor, through which hot water or steam passes in much the same manner as the conventional hot water heating system. The basic difference is that heat is transferred not by currents of warmed air but by radiation—direct rays from the heating unit which thus becomes in effect the entire surface of the wall, floor or ceiling.

Perhaps you have noticed when sitting before a bonfire on a cold day that the parts of the body facing the fire were warm, even though the air through which the heat rays passed remained cold. A direct radiant heating system operates effectively without heating the air. It would seem that such a system could operate with surrounding air temperatures considerably lower than usual, resulting in fuel savings. This has been found true in installations already made.

Case histories assembled thus far indicate operating expense is lower with this system than with any other. Installation costs vary widely, but it may be safely assumed that the initial cost will be approximately equal to a top-grade recessed radiator steam

This article was prepared with the co-operation of the A. M. Byers Co., Pittsburgh, which shortly will publish a bulletin on the subject of direct radiant heating of buildings.

Fig. 1—Typical residential installation layout for a house with concrete slab floor is shown below. The installation uses 2-inch welded wrought iron pipe. Most of the bending was done at the shop and carried to the job

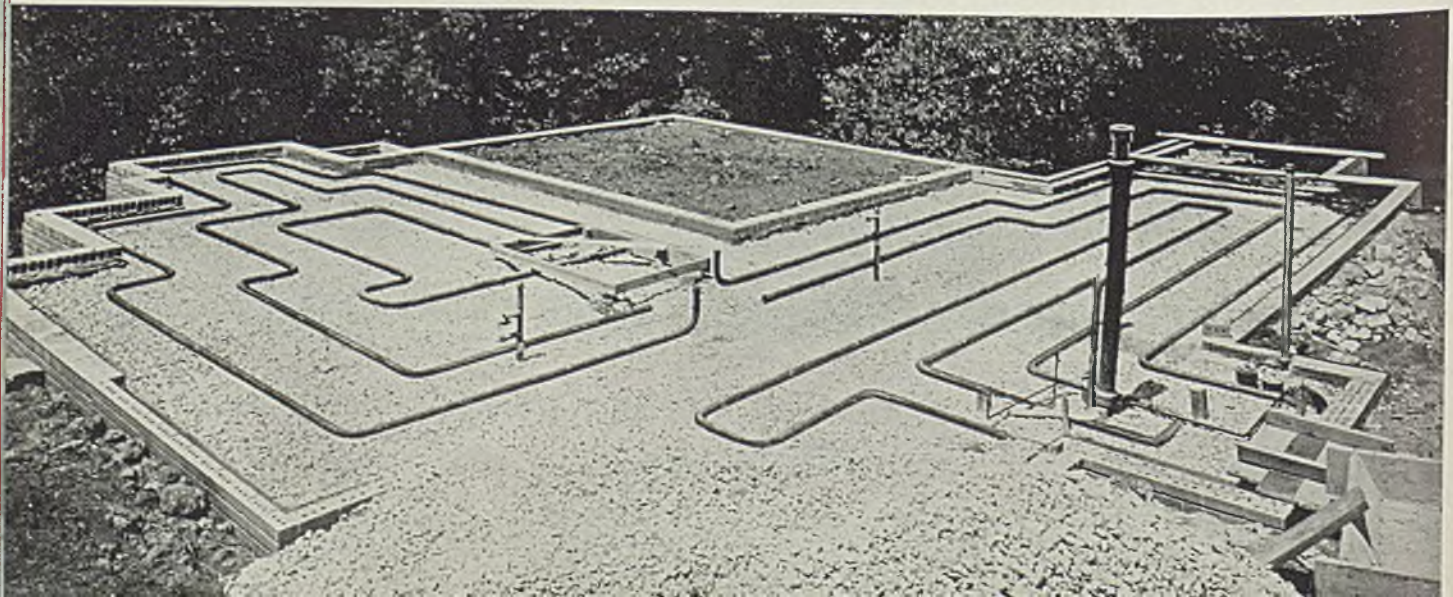


Fig. 2. (Top)—This was the first step in the installation of a radiant heating system in an office building, preparing the broken stone fill on the first floor

Fig. 3. (Next to top)—Welded grid-type installation was made here on the top of the broken stone fill using ½ and ¾-inch pipe

system. Maintenance costs, of course, are virtually nil because of the absence of joints, valves and other controls. In England, where panel heating is common in residential construction, one leading firm installs a boiler of 30 per cent less capacity for a system of this type than for a system using standard cast iron radiators. Ceiling coils are generally conceded to be the most expensive to install, while the most economical application is found in industrial or residential jobs in which the coils can be embedded in a concrete floor slab. This last feature makes the system highly desirable for the new low-cost houses without basements, which rest on a concrete slab. See Fig. 1, and series shown in Figs. 2, 3 and 4.

Although primary acceptance of this system has been mainly in residential fields, a considerably larger market exists in commercial and industrial fields. The method has inherent advantages which cannot be had in any other type of heating. For example, in industrial plants where large doors must be open often or continuously, any heating system depending on convection loses efficiency rapidly because the warm air rapidly escapes through the openings. In sections of plants near shipping docks, in passageways, theater lobbies and similar locations, this feature is important. Heated slab floors help provide a uniform working temperature regardless of the external conditions.

Radiant heat also causes relatively few air currents to be formed. This feature is valuable where dust is a menace, in chemical laboratories, process plants, food plants and in retail establishments where dust may be an important sales factor. In special locations such as explosives factories where complete absence of hot surfaces or flames is a prime requisite, this method of heating is especially suitable. An important job for radiant heating in industry is on the doors of washrooms or locker rooms, showers and the like where a warm floor contributes much to employe health and comfort. As a by-product, since there are no exposed parts, this system is ideal for psychopathic wards, prisons and the like where completely bare rooms are essential.

A feature of particular interest in residential installations is the reduction of dirt patterns on walls and ceilings because of more uniform temperature and because the surfaces are warm. Studies have shown the dirt deposits occur when currents of warm air pass over surfaces of lower temperature. Direct

(*Please turn to Page* 91)

Fig. 4—After welding the system shown in Fig. 3, the pipe was covered by an additional layer of broken stone, as shown in illustration next to bottom

Fig. 5. (Bottom)—Final step was laying a 2-inch concrete slab on top of the crushed stone

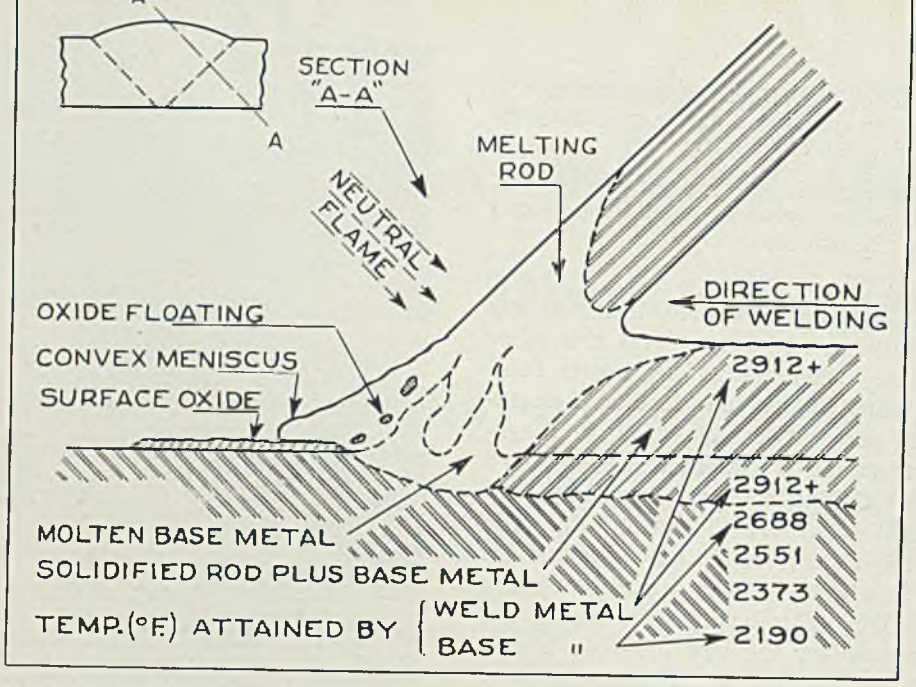


Fig. 1 — Metallurgical factors in neutral flame welding technique

An Improved Method for

Welding Chrome-Moly Steel

The metallurgy of welding low-carbon and chromium-molybdenum steels is detailed, with the differences pointed out. An improved method for welding chromium-molybdenum steels is described. It cuts decarburization and reduces grain growth, thus giving improved physicals. It permits heat treatment to produce physical properties fully equal to those of the original material

By HANFORD ECKMAN

Production Manager and Superintendent
Piper Aircraft Corp.
Lock Haven, Pa.

■ BY DEFINITION, the light plane is one that has an engine of 75 horsepower or less. It is also recognized as having a high ratio of weight to power and a low ratio of weight to wing area. In this field, perhaps even more than in the balance of the aircraft manufacturing industry, mass-production principles, as practiced for example in the automotive industry, do not generally apply. True, these principles do play an important part in many of the outside sources of supply, such as among the engine makers. And automatic machines also help to reduce hand operations. The present light plane, though, is still largely a handmade product in the creation of which welding plays a prominent part.

This discussion will be confined to the use of oxyacetylene welding in the production of light planes, designed principally for private use as differentiated from military and commercial aircraft of higher performance. In our field, the welding of thin-walled tubing is practiced most extensively in the fabrication of fuselages. Welded tubular design at present allows the most satisfactory method of construction because it permits a high rate of production with a minimum number of special tools and jigs.

Welded tubular design has a high ratio of strength to weight. Moreover, welded joints are highly efficient and rigid as well as light in weight. This type of assembly permits great flexibility of design and is economical to fabricate and to maintain.

Perhaps a review of the development of welded tubular construction in aircraft will help to indicate present trends in design and materials. When metal first replaced wood in aircraft members, carbon steels were employed. SAE 1025 or similar steels are still used. As the industry developed, higher speeds were attained in aircraft and greater stresses resulted. In the resulting search for lighter or stronger materials, SAE 4130 and X4130 or their equivalents have been widely used.

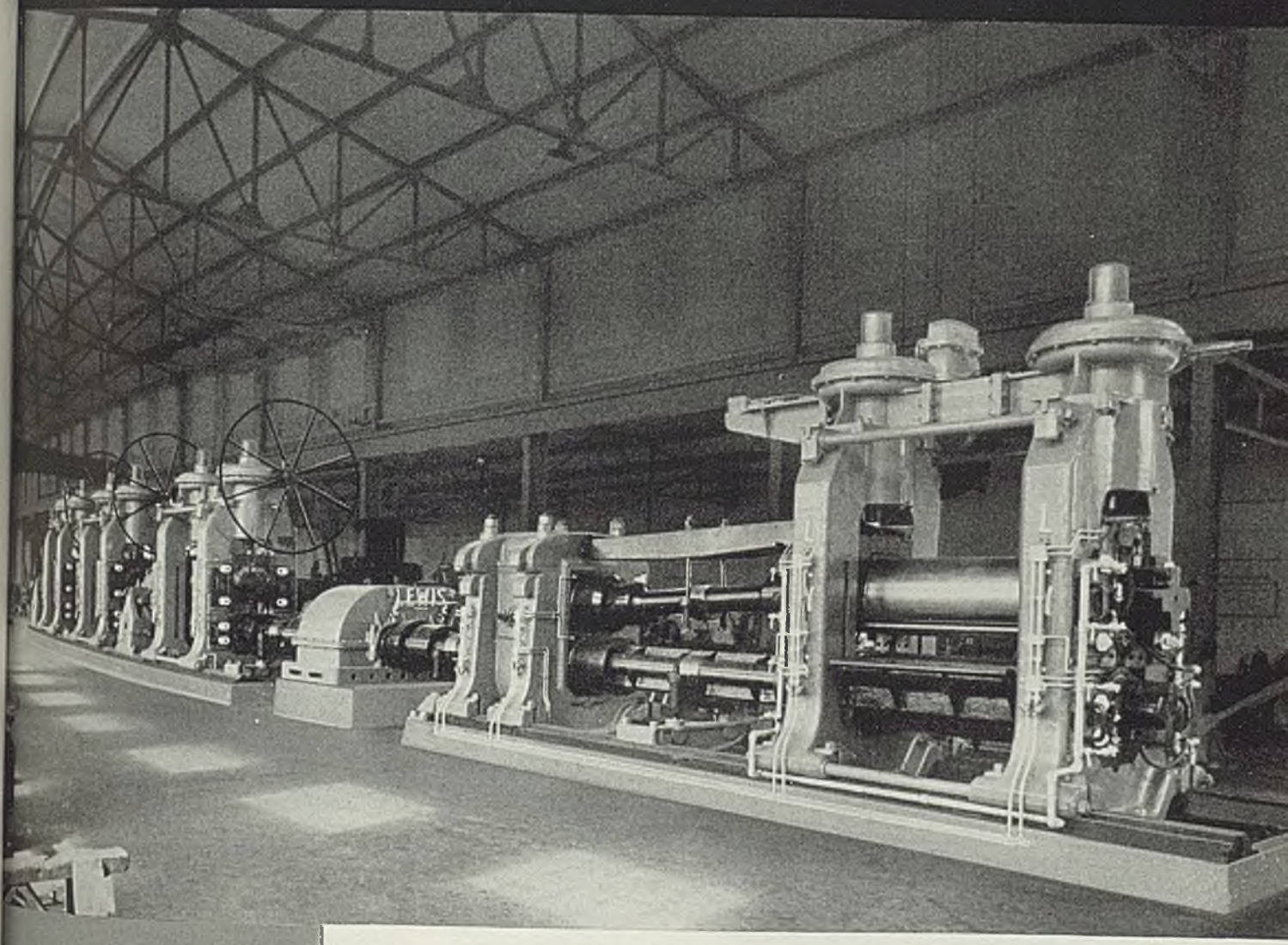
There are a number of specifications written to cover low carbon steels and chromium-molybdenum steels in the aircraft industry. Table I is representative and may assist in making a comparison of the physical properties of the chromium-molybdenum and the carbon steels.

The most noticeable differences in physical properties between chromium-molybdenum steels and plain carbon steels are found in the relative values of tensile strength and ductility. The chromium-molybdenum steels, because of their greater strength and ductility, are highly suitable for use in aircraft construction. These alloy steels also offer greater possibilities of heat treatment. This, and the fact that they air-harden, necessitate certain changes in welding technique. A discussion of some of the significant factors in welding, which are common to welding both plain carbon steel and chromium-molybdenum steel, will help to trace the development and to show the advantages of present-day technique.

Plain Carbon Steel: As steel is

From paper presented at twenty-first annual meeting of the American Welding society, Oct. 20-25, 1940, Cleveland.

LEWIS ALUMINUM ROLLING MILLS



LEWIS ROLLS STEP UP TONNAGE

One hot and three cold Aluminum Mills, 26" x 62", driven from a common gear drive, equipped throughout with Lewis alloy iron rolls.

The hot mill is driven from gear drive and pinion stand through universal spindles, and is equipped with motor operated worm driven screwdowns.

Both hot and cold mills are furnished complete with fore plates and strippers and complete automatic lubrication.

The cold mills have hand wheel operated screws through worms and worm wheels with provision made for future motors so that any one of the cold mills can be readily converted into a hot mill with a change in rolls.

Two top roll drives are used to supply power to the three top rolls of the cold mill.

Machinery for lower production costs is developed at Lewis. Experienced engineers, capable of understanding and solving your problem, are at your disposal.

LEWIS FOUNDRY & MACHINE

DIVISION OF BLAW-KNOX CO.

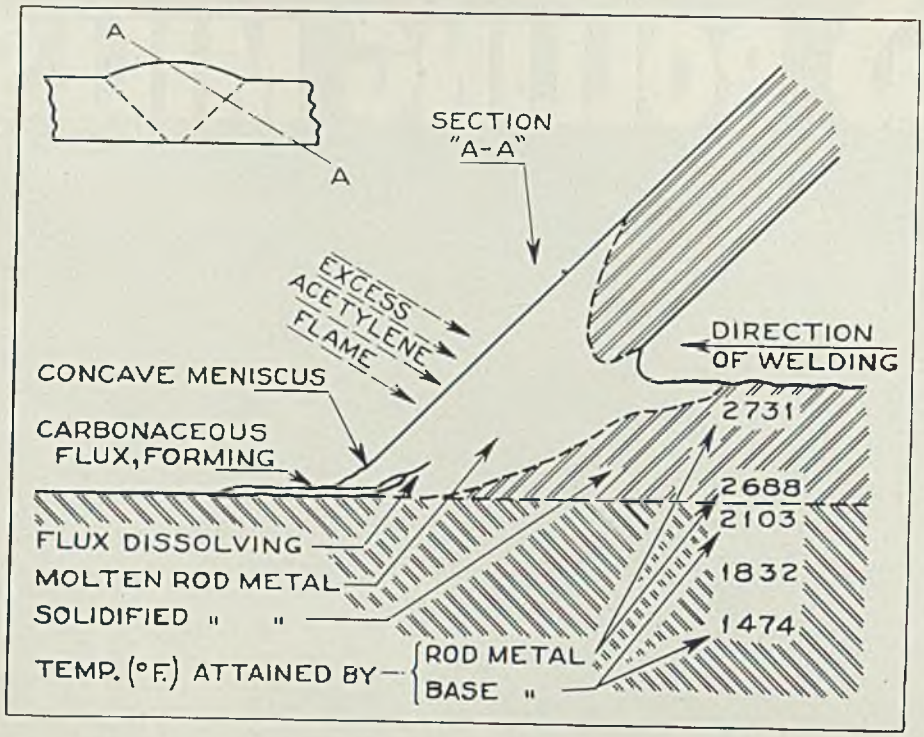


Fig. 2—Compare the metallurgical factors for excess acetylene welding with those shown in Fig. 1

heated it undergoes several alterations of physical properties. When the temperature is increased, the steel expands, becomes softer and more ductile and becomes weaker from the standpoint of tensile strength, particularly at elevated temperatures. It is fortunate from the viewpoint of the fabricator that these changes in physical characteristics are coincidental, because the collective phenomena make possible the joining of several members into a high-strength structure by means of fusion welding. When heat is applied locally, expansion takes place in the heated zone; but because the ductility is increased, the area over which the stresses are distributed is increased, and the material does not rupture. Of course the piece should be free to move sufficiently to absorb expansion and contraction so no undue stress is put on the hot, low-strength material.

When heat is applied continuously, the temperature rises to a series of recalescence points. In plain carbon steels, these start at about 1360 degrees Fahr. The metallurgical changes that take place here have a very practical significance. The carbon, which at lower temperatures has existed as discrete particles of iron carbide mixed with pure iron, goes into solution in the iron and remains in solid solution at temperatures above this point. On cooling slowly through this temperature, the carbon is again precipitated or thrown out as iron carbide. More rapid cooling tends to retard the reaction and to retain the carbon in solution.

Recrystallization takes place at about the same temperature as recalescence. When heated much above the critical point, steel crystals tend to grow in size to an extent depending on the length of time at the temperature and the amount the temperature exceeds the critical point. The shorter the time that the steel is held above the critical point and the lower the temperature, the finer the crystals will be and the better the physical properties.

That steel reacts with oxygen at all temperatures is illustrated by the rusting action at ordinary room temperatures and by the adherent oxide scale that is found on hot-rolled or forged stock. When work is reheated, the carbon in the adjacent steel begins to react with the iron oxide. The oxide is reduced and the products of the reaction escape as a gas. Migration of carbon is rapid and decarburization may proceed to a considerable depth. The reaction is accelerated as the steel becomes molten.

In oxyacetylene welding, the surface of both the base metal and the welding rod become coated with iron oxide or scale while heating up to welding temperature. Further, the iron oxide has a lower melting point than steel and must be removed to secure a sound weld.

Chromium-Molybdenum Tubing: These physical, metallurgical and chemical factors in welding become more significant with the wider use of alloy steels. They are of considerable importance in welding light-walled chromium-molybdenum tubing. The air-hardening qualities and resulting high tensile strength and reduced ductility indicate that more attention has to be given to expansion and contraction of the steel, and to insuring that undue stress is not placed on the hot metal. Though molybdenum is present to inhibit grain growth, it is desirable to reduce to a minimum both the temperature and the time that the steel is held above the critical point.

Furthermore, with thin-walled tubing, decarburization of a very small portion of the wall thickness affects an appreciable percentage of the metal in cross section. To obtain efficient joints in the alloy steel, the welding rod must have a tensile strength comparable to that of the chromium-molybdenum tubing and welds made with it must react favorably to heat treatment.

Welding Rods: The first oxyacetylene welding rods which gave good quality welds were low in carbon and contained a minimum of other elements. This was reflected in the welding technique used. To obtain adhesion between the added metal and the base metal, a considerable amount of the latter was melted to make sure the oxide was removed. To eliminate the iron oxide from the weld, the weld metal was heated well above melting temperature to obtain fluidity. As a result the weld was reduced in carbon and was low in tensile strength as compared with the results obtainable today. The carbon content of the rod had to be low to avoid excessive reaction between it and the large amounts of iron oxide that were present.

As the welding industry developed and knowledge of the needs and problems increased, new welding rods have been devised in which manganese and silicon have been added to reduce the iron oxide. With these, the products of the reaction are solids which form a fluid slag that floats to the top of the molten puddle. This effectively cleans the weld metal and protects it from further oxidation. The elimination of the carbon-iron-oxide reaction in the weld makes it possible to increase the carbon content of this type of rod. Consequently the strength of the weld metal is increased and a sounder deposit is obtained. The active reducing agents readily remove the oxides, thereby making unnecessary excessive melting of the base metal or temperatures much above the melting point. The welding technique, though, is still very similar and a neutral flame adjustment is used.

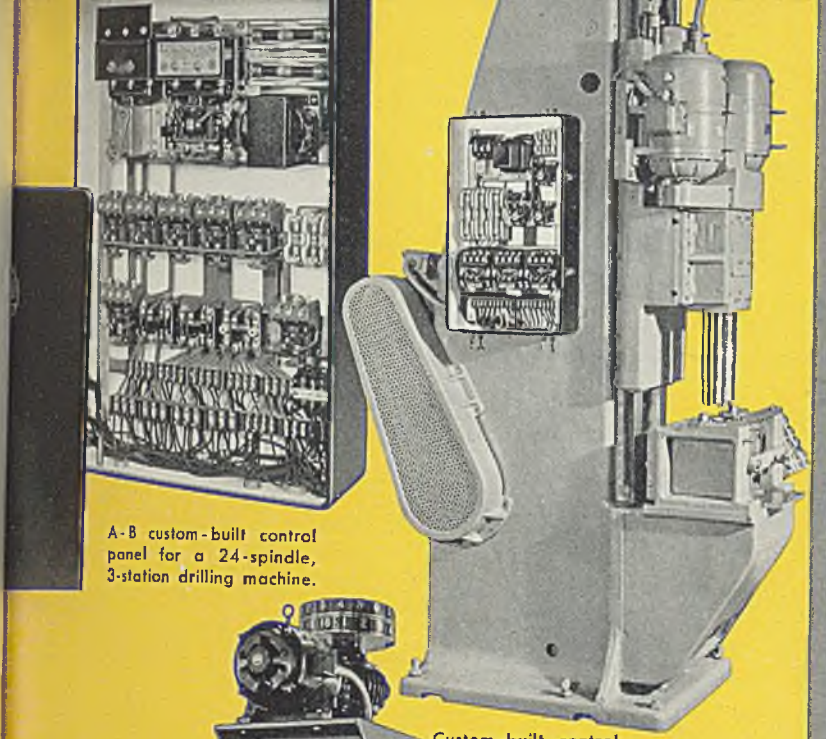
Fig. 1 illustrates the action of the welding puddle. The temperatures are representative of those obtained in a cross section of a weld. This type of welding rod and welding technique is widely used in the fabrication of tubular members. It is very satisfactory when used on

CUSTOM-BUIL
CONTROLS

for multi-motor machine

Multi-motor machines usually require accurate and c
sistent control of sequence operations. Allen-Brad
custom-built control panels meet these specificati

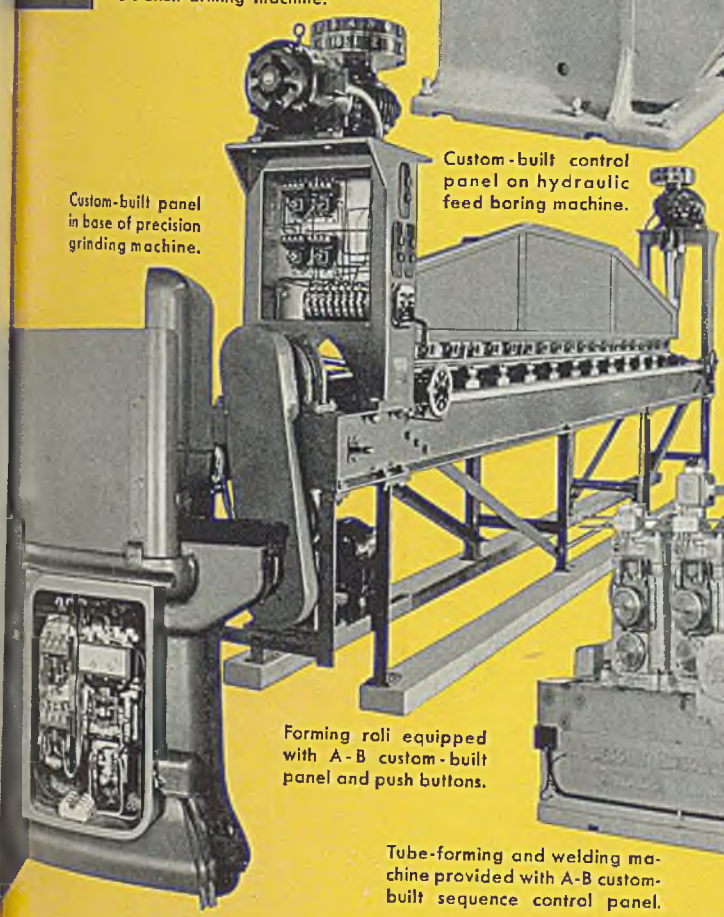
Allen-Bradley panels can be built to meet
machine control requirement, no matter how simple
complex the sequence. Since solenoid contactors
used, quick opening and closing of circuits as well
precise timing of operation are guaranteed. Furth
more, their simple construction and double bre
silver alloy contacts assure trouble-free operati



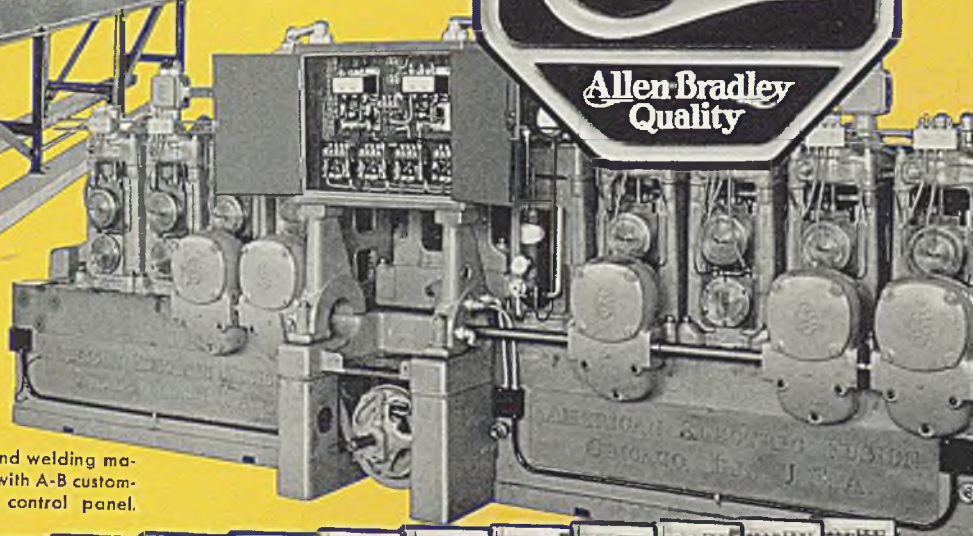
A-B custom-built control panel for a 24-spindle, 3-station drilling machine.

Custom-built control panel on hydraulic feed boring machine.

Custom-built panel in base of precision grinding machine.



Forming roll equipped with A-B custom-built panel and push buttons.



Tube-forming and welding machine provided with A-B custom-built sequence control panel.

Typical production order of custom-built control panels for machine tool manufacturer. Save money by using A-B controls on your machines.

A-B
Allen Bradley Quality

ALLEN-BRADLEY
SOLENOID MOTOR CONTROL
QUALITY

ALLEN-BRADLEY
SPECIAL CONTROL PANEL
are built with these STANDARD UNITS

Save time . . . avoid costly experimenting... enjoy the benefits of reliable motor controls by using A-B panels, built to your special requirements, with standard A-B solenoid controls and accessories. They assure freedom from every control trouble.

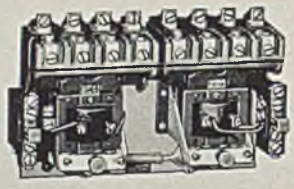
Across-the-Line Starters
Bulletin 709 — For across-the-line squirrel-cage motors. Simple, rugged construction.

Disconnect Switch Unit
Hand-operated safety switch or circuit breaker. Safety switch has silver alloy contacts.

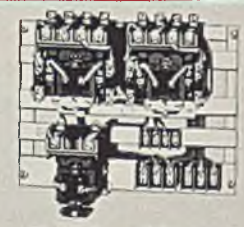
Solenoid Relays
Bulletin 700 — Furnished in over 300 types. One to eight poles. Compact and reliable.

Hand-Operated Switches
Bulletin 609 — A quick action switch. Push-button control and overload protection.

Solenoid Contactors
Bulletin 702 — Sturdy construction. Available with 2 to 4 poles — ratings 10 to 100 amp.



Reversing Switches
Bulletin 705 — For reversing squirrel-cage motors. Provides solenoid reliability and speed.



Multi-Speed Starters
Bulletin 715 — For 2, 3, and 4-speed across-the-line motors. Also in the resistance type.

Terminal Blocks
The convenient terminal blocks of Allen-Bradley custom-built panels assure correct wiring and save installation time.

ACCESSORIES

Push Button Stations
Bulletin 800 — For surface and flush mounting, in a large variety of button combinations.

Limit Switches
Bulletin 801 — Furnished in 253 different types. Limit switches for any machine tool.

A-C and D-C Solenoids
Bulletin 860 — Quiet operation. In 8 sizes and various mountings. Thrusts to 16 lbs.

Allen-Bradley Co., 1320 S. Second St., Milwaukee, Wis.

ALLEN-BRADLEY
SOLENOID MOTOR CONTROL
QUALITY

straight carbon steels as with SAE 1025 and good results are obtained with some chromium-molybdenum steels, particularly if care is taken to allow for expansion stresses and if heating is held to a minimum to inhibit grain growth. A later advance in welding procedure, however, has further assisted in the welding of chromium-molybdenum tubing.

Excess Acetylene: The newer process for oxyacetylene welding utilizes certain distinct but co-operating properties of carbon and iron. The underlying principle of the process is comprised of the following relations: Carbon is soluble in iron; carbon lowers the melting point of the mixture; this melting point is in the feasible welding temperature range; carbon reduces iron oxide; the nonmetallic product of the reaction is gaseous and escapes.

If a piece of steel is heated to somewhat below welding temperature and is exposed to a carburizing influence, the surface layer of the white-hot metal will absorb carbon and will melt spontaneously as the carbon approaches the eutectic mixture of 4½ per cent. This carbonaceous film does three things essential in welding. It prevents oxidation and reduces oxides. It promotes intimate contact by acting as a flux and causing the molten metal to run out over the melted surface. It acts as a temperature indicator denoting by its formation the proper time to add weld metal.

Fortunately from the standpoint of commercial feasibility, the carburizing agent is available in the standard oxyacetylene welding equipment by proper adjustment and manipulation of the flame itself. As a weld progresses, carbon is absorbed to a depth of one or two thousandths of an inch on the surface of the steel, which then melts spontaneously. The blowpipe is manipulated so the carbonaceous film covers the base metal adjacent to the welding puddle.

This film has certain unique features. It is metallic. It is produced automatically. It melts spontaneously, and it disappears by dissolving into the weld metal as soon as its functions are fulfilled. The action may be termed "self-fluxing".

The process is known descriptively as "excess acetylene" welding. Considered in terms of its application to welding on chromium-molybdenum tubing, this process offers a number of advantages over the neutral flame method. It is faster. The indication of proper welding temperature by the spontaneous formation of the carbonaceous film permits more attention to be given to rod manipulation, and the rod may be deposited more rapidly. Welding is carried on at a lower temperature.

Fig. 2 shows representative temperatures of various sections of a weld when this technique is employed. The combination of faster welding and welding at a lower temperature reduces the tendency towards grain growth, as the time and the temperature at which the steel is held above the critical point are both reduced to a minimum. Reduced grain growth means improved physical properties.

The amount of expansion varies with the speed of welding. In general, the faster the weld the less the expansion that takes place, and the lower the resulting stresses. In general, a backhand technique will result in slightly less expansion stresses than a forehand technique.

Decarburization Cut: The carburizing or reducing atmosphere properly controlled by the excess acetylene flame tends to eliminate a decarburized surface on the tubing at the weld. The external supply of carbon tends to maintain the carbon in equilibrium in the steel, as it is not required to reduce the surface oxides. Carbon loss by migration thus is avoided.

This welding process reduces the probability of disturbing the chromium-manganese-carbon ratio of the steel immediately adjacent to the weld. The balanced composition proportioned to give optimum relationship between strength and ductility is maintained. With a suitable rod and the excess acetylene method, physical properties may be obtained by heat treatment equivalent to those of the original material. On fittings and small assemblies, heat treatment is desirable with the chromium-molybdenum steels. On larger assemblies it is often impracticable. In either case the excess acetylene welding process assists in obtaining better welds.

Still another item might be mentioned. Due to the semiautomatic features of this process, it can be used readily with either a forehand or backhand technique. The physical properties of chromium-molybdenum tubing in the normalized condition vary somewhat. Very light-walled tubing tends to cool rapidly and a higher tensile strength and lower ductility is obtained with the air-hardening properties of the steel. A backhand technique may be utilized to reduce this quenching effect where it is desirable to do so.

(*Concluded Next Week*)

TABLE 1—Chemical Composition in Per Cent

	Carbon	Manganese	Chromium	Molybdenum
SAE 1025	0.20–0.30	0.30–0.60	.....	.....
SAE X4130	0.25–0.35	0.40–0.60	0.80–1.10	0.15–0.25

Physical Properties

	Approx. tempering temperature, deg. Fahr.	Minimum Tensile Strength, pound per square inch	Elongation, per cent in 2 inches
SAE 1025		55,000	22
SAE X4130		*90,000–95,000	*5–15
SAE X4130, oil-quenched	1,100	*123,000	*11
	900	*150,000	*9
	800	*175,000	*7
	600	*200,000	*5

*Light—minimum ductility—maximum tensile strength.

Reclaims Babbitt During Broaching Operations

■ By incorporating an unusual design variation in its standard drum type L magnetic separator, Stearns Magnetic Mfg. Co., 650 South Twenty-eighth street, Milwaukee, has made it possible to reclaim babbitt from oily chips and turnings left from a rod broaching operation. The successful operation of the separator is due to an arrangement of riffles designed into an elongated spout between the hopper and the magnetic drum. Now the metal and babbitt scrap is disintegrated before the material is passed over the magnetic drum where the powerful magnetic field facilitate the separating and reclaiming work.

The separator itself is 59 inches high, 29 inches wide, 31 inches deep and weighs 727 pounds. Its separating mechanism is completely enclosed by a structural steel frame and can be equipped with casters for moving about where necessary.

Seek Approval of Industry on Fittings

■ In its standardization procedure, American Society for Testing Materials, 260 South Broad street, Philadelphia, recently issued to industry for approval, tentative specifications for factory-made wrought carbon-steel and carbon-molybdenum-steel welding fittings (ASTM A 234-40T). The society is desirous of securing comments and criticisms of the standard before it is formally adopted.

The Square D Co.'s new 125,000 square foot Milwaukee plant is characterized by modern architectural details and a highly efficient power distribution system which utilizes the company's own products. It was designed and built by the Austin Co., Cleveland

Modern Square D Plant Increases Production Capacity 50 Per Cent

PRODUCTION capacity has been increased about 50 per cent since Square D Co. consolidated its Controller division with its Milwaukee offices in a new 125,000-square-foot plant on North Richards street, Milwaukee. The manufacturing area, laid out for straightline production in two 60-foot monitor bays and three 40-foot low bays with columns on 40-foot centers lengthwise of the building, extends a distance of 380 feet beyond the offices.

The offices are air-conditioned and equipped with indirect lighting fixtures and skylights having concealed bulbs which are turned on by an electric eye to insure a minimum of 35 foot-candles at desk level when natural light falls below a given intensity. A basement under the entire office section will be utilized as a cafeteria for employes and for the storage of files and records.

Forty-two hundred lineal feet of square-duct has been used throughout the structure, including 500 feet in the office building where one installation serves the telephone system and another the lighting connections and office equipment. Use of the square-duct simplified distribution of power to more than 275 individual motor-driven machines. The ducts are at a uniform height of 13 feet, so located that in no instance is the distance from the duct to any individual motor more than 25 feet, which makes it possible to hold the size of copper required to one-third the size of the main cable.

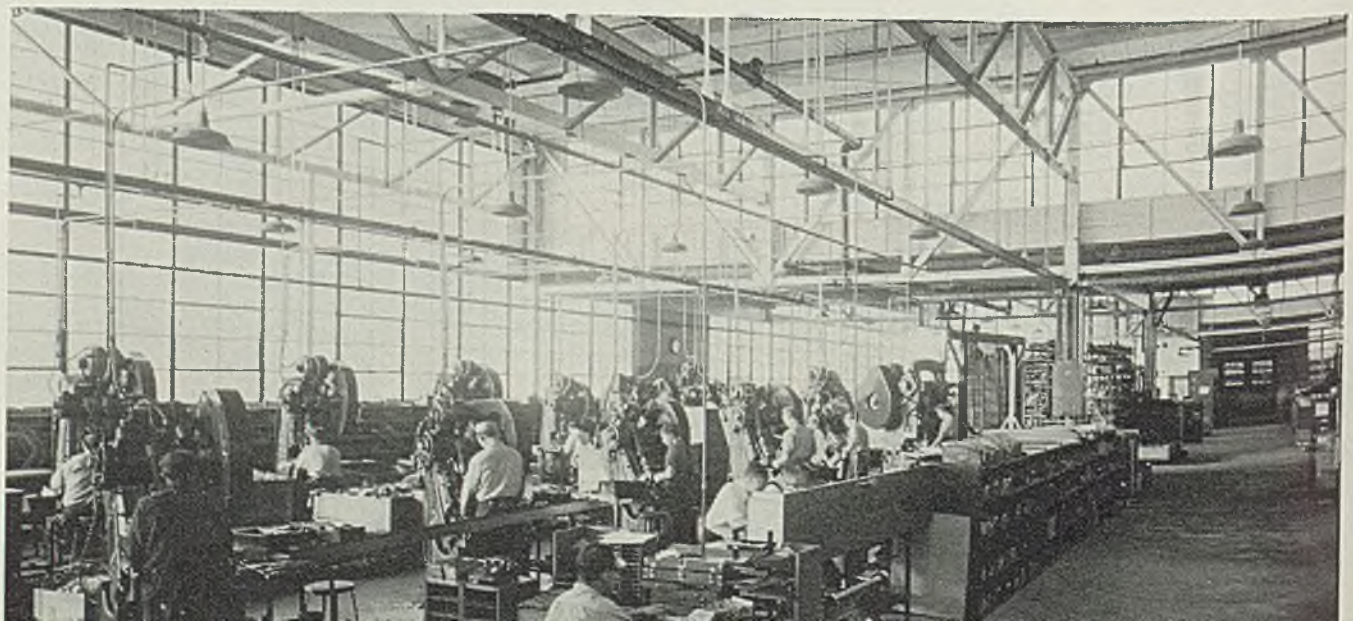
With all of the square-duct equally distant from the plant floor, changing of connections is a simple matter in case of plant expansion or any other situation which would make it necessary to relocate equipment. One 350-foot run of 2½-inch square-duct has been installed in the 40-foot center bay, where it rests on roof beams. Four-inch square-duct has been used throughout the rest of the installation and is suspended from the roof by universal drop hangers. Wiring for all electrical controls serving the automatic boiler equipment is carried in 4-inch square-duct, which eliminated the need for a maze of rigid steel conduit, and provides ready access to all of the motors and control units that have been compactly nested behind the boilers. Oil for boiler operation is stored in two 10,000-gallon tanks underground.

Two air-conditioning units, each of 9000 cubic feet per minute capacity, serve the office section. They use water pumped from a deep well at 50 degrees for cooling.

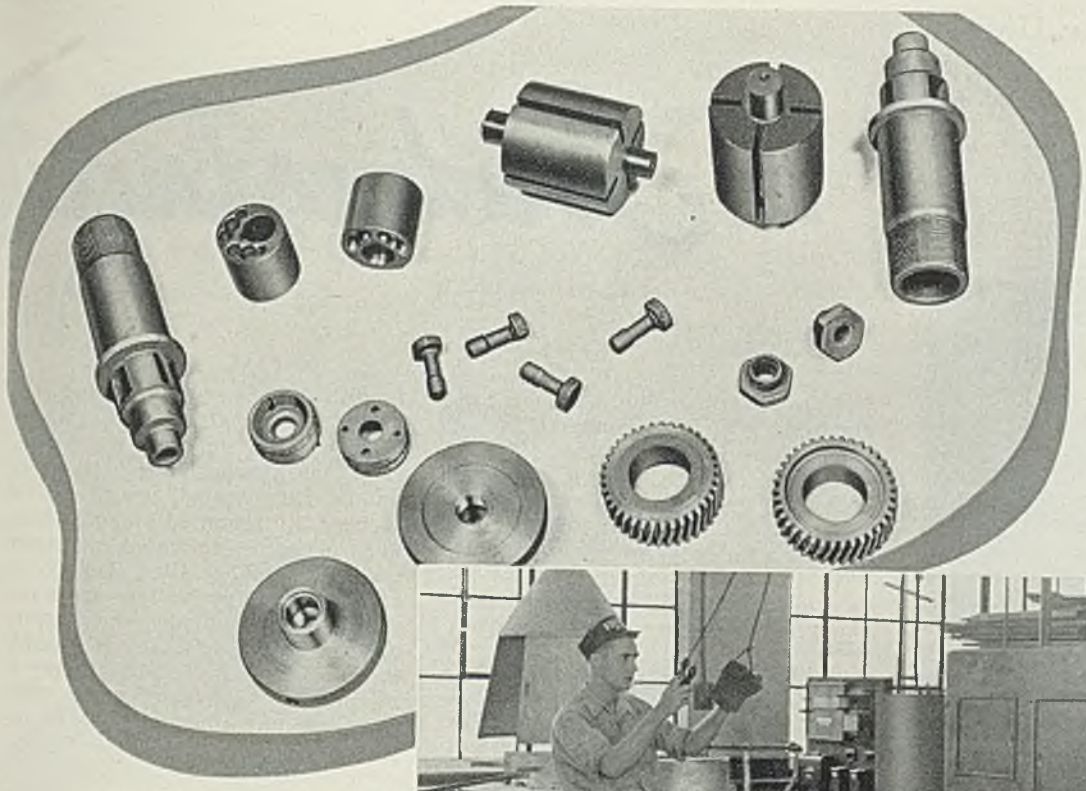
Wide column spacing was facilitated by the use of welded trusses throughout the building. Incoming materials are received over a siding on the north side of the plant at the rear, directly adjacent to the boiler room, so that any type of fuel would be easily handled.

Steel for use in the manufacture of controller cabinets, switchboards and other equipment, is stored directly adjacent to the receiving dock at a point also accessible for unloading of steel received by truck. Production departments have been located with a view to minimum handling so that steel can move directly from storage to press and cabinet departments and then to the assembly departments which are adjacent to the coil winding and inspection area.

Other materials and small assembly parts are concentrated in a special storage department convenient to the coil winding and assembly area. The enameling room, 40 x 120 feet, and a degreasing room have equipment ventilated direct to the outside. Also located along the north side of the plant are testing department, compact experimental laboratory and blueprint room.



Punch presses, concentrated at rear of plant, are motor driven and are served directly from square-duct which has been utilized for power distribution to more than 275 individual machine locations. Note the abundance of daylight in this area. Storage of dies and other tools has been provided in bins built directly beneath the windows along the outer wall



Rotor Tools AND HEVI DUTY FURNACES

For carburizing the important parts of their portable tools, The Rotor Tool Co. use a Hevi Duty Electric Vertical Carburizer. Its flexibility and adaptability in consistently producing controlled uniform cases on a variety of parts is making possible economical and dependable heat treating with a maximum of speed. *Send for Descriptive Bulletin HD-940 for details on this furnace.*

HEVI DUTY ELECTRIC COMPANY

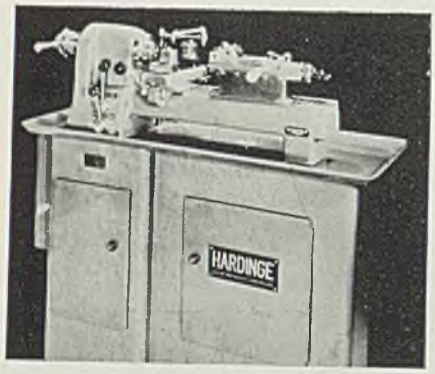
HEAT TREATING FURNACES HEVI DUTY ELECTRIC EXCLUSIVELY

MILWAUKEE, WISCONSIN

Industrial

Second Operation Unit

■ Hardinge Bros. Inc., Elmira, N. Y., announce a high speed precision second operation machine to meet modern demands and those of the defense effort. It features a machine bed that is amply proportioned and rests on three spheres for 3-point suspension to guard against any distortion. Its headstock incorporates a preloaded ball bearing spindle, the bearings of which are fully enclosed in an inner chamber. Rear of spindle carries a double V-pulley for two endless V-belts from the driving unit. The automatic collet closer permits rapid opening and closing of the collets or step chucks while the spindle is in motion or stopped. Collets or step chucks are easily opened by moving the lever from left to right. The closer is adjustable so that any desired collet or step chuck tension may be applied on the part being machined. Positive stops assure accurate cross slide forming. The 6-position turret head is automatically indexed and locked into position by moving the operating lever to the extreme right. It adapts standard turret tools. The two levers at the headstock end control spindle speeds through the operation of electrical motor controls which are located to the left of the pedestal and enclosed by the cover. The machine features eight forward and eight reverse speeds ranging from 230 to 3900 revolutions per minute. The pedestal has a built-in coolant system and encloses the motor and driving unit. It also has ample cabinet storage space with two shelves for tools and attachments. The machine has a 1-inch collet capacity, 6-inch step capacity and 9-inch swing.



Arc Welders

■ Emerson Electric Mfg. Co., 1824 Washington avenue, St. Louis, announces a line of alternating current arc welders which includes four models with maximum capacities of 75, 150, 200 and 300 amperes. Each is equipped with an inclined selector panel for selection of heats from an erect position. The welders also feature a heavy-duty "on-and-off" line switch, protected plug and jack connections, with the connections all located inside the cabinet. Ample drip-proof storage space is provided between the selector panel and cabinet front. The transformer coils wound with copper magnet wire have flexible, double-spun glass insulation that will withstand temperatures in excess of 1000 degrees Fahr. The unit illustrated is a type AW-200-AF with a selection of 18 welding heats, and a range of 20 to 200 amperes. It operates on 220 volts. The cabinet is of heavy gage metal with easy grip handles incorporated on the sides.

Transfer Truck

■ Lewis-Shepard Sales Corp., 295 Walnut street, Watertown, Mass., has introduced a No. 1917 battery transfer truck designed to transfer heavy storage batteries for electric trucks to the charging board. It consists of a heavy arc-welded steel frame, roller top, simple winch-operated 2-speed crank and 1-inch height adjustment at one end, combined to form an efficient machine. Running gear consist of 8-inch semi-steel main wheels and plate-type ball-bearing swivel casters (6 inches), all mounted on roller bearings, pressure lubricated, and equipped with rubber tires. Celoron or other floor protective industrial wheels are available. The capacity of this truck is 2500 pounds. Its deck is 30 x 49 inches wide, making it adaptable for transferring other compact but unusually heavy objects.

Light-Weight Drills

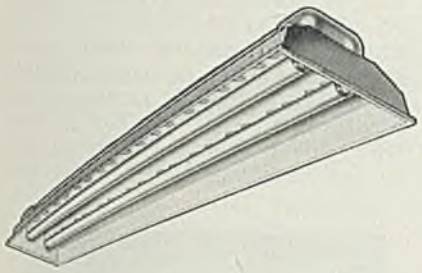
■ Ingersoll-Rand Co., Phillipsburg, N. J., announces the addition of sizes 00 and 0 to its line of Multi-Vane drills. These are extremely light in weight, ranging from 1½ to 2⅞ pounds. Numerous attachments can be furnished for adapting them for light screw driving, nut running, close-quarter drilling, wire brushing and sanding. Three different types of handles—straight, lever throttle or pistol-grip are available.

Lighting Unit

■ Benjamin Electric Mfg. Co., Des Plaines, Ill., announces a new fluorescent lighting unit for use with the new 60-inch fluorescent lamps. Known as the RLM Stream-Flo 60, it has all the operating and design advantages of the Stream-Flo 48. In addition, the unit is available with a series of apertures located in the top of the reflector directly over each fluorescent lamp. These openings permit approximately 2½ per cent of light output to pass upward to relieve contrast between lighted areas of the room and the ceiling background. The new unit provides adequate levels of lighting for those industrial locations which require

Equipment

higher mounting and wider spacing than has heretofore been considered practical for fluorescent units. It provides nearly 50 foot candles of general fluorescent lighting from in-



stallations with 10 x 10 foot spacing. Protection against glare is provided by a shielding angle of 14 degrees and closed-end reflector construction. Utilizing the same fused porcelain enamel reflecting surfaces as other units, the unit has a reflection factor of 79 per cent or more.

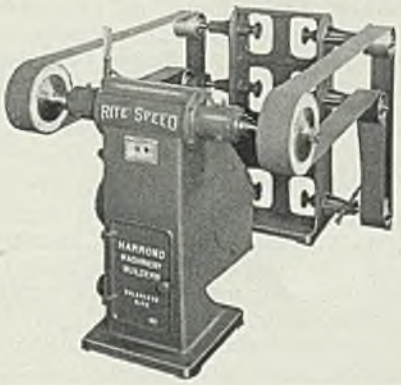
Speed Tester

■ Commonwealth Engineering Co. of Ohio, Dayton, O., has developed a Soren Varitime—an instrument used to vary the speed of synchronous electric motors, and also to test such motors as to their speed. It is particularly adaptable for accelerating or decelerating speed of syn-

chronous electric motors used in connection with various types of clock systems and the like. The instrument supplies voltage of a controllable variable frequency and also supplies power to operate electrical devices. It provides an adjustable frequency range of from 18 to 240 cycles. Housed in a steel cabinet, the 30-watt model weighs about 20 pounds. It is capable of adjusting the speed of synchronous electric motors over a 5:1 range. Although available in 30-watt sizes at present, the unit can be produced for different power requirements.

Abrasive Belt Stand

■ Hammond Machinery Builders, 1605 Douglas avenue, Kalamazoo, Mich., have introduced an abrasive belt stand to be used in conjunction with polishing and buffing lathes. The illustration shows this stand with a model 7-CH Rite-Speed lathe. Here the stand and lathe are equipped with 5-inch belts, however,



wider or narrower belts can be furnished to suit the application. Proper tension of the belts is maintained by an adjustable tightner pulley, the belts being readily removable and replaceable.

Surface Grinder

■ Doall Co., 1301 Washington avenue, South, Minneapolis, announces a new precision surface grinder for handling fine precision work. Its design has been carefully worked out to give maximum rigidity and minimum vibration. The ribbed and reinforced base of the machine weighs 815 pounds. The column which carries the spindle has a 30-inch bearing surface in the base which holds it rigidly in any position. Of box construction the column is made of alloyed cast iron containing both chromium and nickel. All ways sliding surfaces are scraped to insure perfect accuracy and long wear. The wheel spindle is supplied to use standard 7½-inch diameter by ½-inch face wheel. Table movements both longitudinal and cross are hydraulically driven. A built-in dial indicator registering in tenths of thousandths augments the hand wheel feed. It is coupled directly between the wheel head and table, thus giving a direct reading of any movement of the grinding wheel. The

table travel is infinitely variable from 0 to 50 feet per minute, and the cross feed from 0 to 150 thousandths. A built-in cold fluorescent lamp provides illumination to the table. Automatic lubrication by means of forced feed filtered oil is provided to all moving parts. Coolant piping, splash guards and coolant return systems are furnished as standard equipment.

Fireless Locomotive

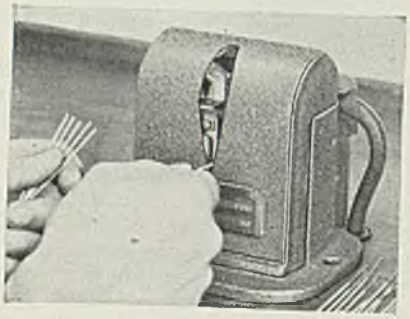
■ H. K. Porter Co. Inc., 4975 Harrison street, Pittsburgh, has placed on the market a fireless steam locomotive of special design for use in plants where fire and explosion hazards exist. Because of its narrow width, it can enter many restrict-

ed areas. The locomotive is equipped with a large storage tank or reservoir which is charged from a stationary boiler through a flexible charging connection. The tank, well insulated by means of a 3-inch thick lagging of 85 per cent magnesia, is built for 425 pounds pressure per square inch, and has a capacity of

41.6 cubic feet. It is fitted with both a drainage and safety valve. The locomotive may require one or more full charges per day, depending upon the operating cycle and amount of work to be done. Time for charging varies from ten to 20 minutes. The special steam engine for furnishing the power is located between the frames, and is connected to the rear axle by a chain drive. Side rods drive the forward axle. The engine has a traction force of 1333 pounds. Special asbestos lining on the brake shoes prevents sparking.

Wire Stripper

■ Ideal Commutator Dresser Co., 5076 Park avenue, Sycamore, Ill., has introduced a new wire stripper that burns insulation cleanly and quickly. Known as a Hot Blade stripper, it is especially suited for stripping cotton, silk and rubber coverings from fine stranded or solid wires without injuring strands or the wire in any way. Its operation is simple. Wires are first inserted between the electrically heated blades in the stripper head. Then the manipulation of the foot pedal brings the blades against the insulation, burning instantly two parallel grooves right down to the conductor. The grooves are completed with a slight twist to right or left, a pull removing the insulation. Each blade embodies an individual heat control and transformer so that the burning temperature of each can be raised or lowered separately. Distance between blades, and length of stripping is adjustable. Parts furnished include standard head, control box with transformer, water drawer, foot rest, pedal and connecting rod. It can be plugged in on a 110-120 volt, 50-60 cycle alternating current. Other voltages and frequencies are available.

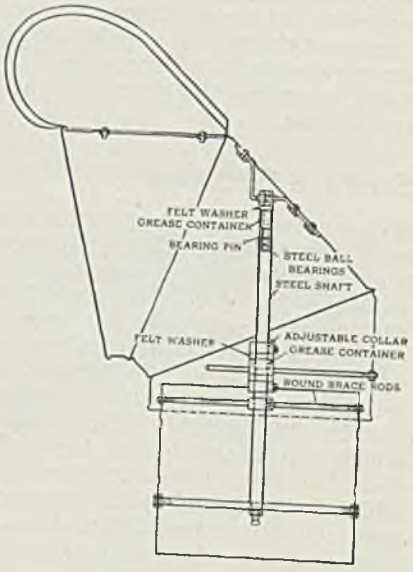


Program Clock

■ Zenith Electric Co., 845 South Wabash avenue, Chicago, has placed on the market two new synchronous program clocks for operating time signals. Known as type P 512 and type PD 124, the former will operate a signal at any five-minute period while the latter will operate a signal at any one-minute period. Both have a large, legible 24-hour dial and a one-hour dial cam. Pointers, connected to a contact arm, ride the dials and permit the contact arm to fall only when preset time is reached. These units are operated by heavy duty synchronous motors. Contact can be arranged to operate a signal either in one ring or a coded ring, or for a definite duration of time, from 2 to 6 seconds. The units are compact and enclosed in a dustproof case. They can be built to operate for many different purposes such as daily siren testing, timing industrial processes, etc.

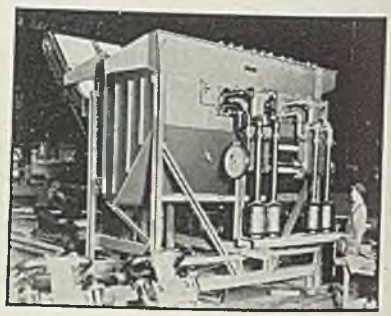
Ventilator

■ Milcor Steel Co., South Forty-first, West Burnham street, Milwaukee, has introduced a redesigned ventilator for manufacturing plants and industrial buildings. It operates on the air-siphon principle, utilizing outside wind currents to draw impure air from building interiors. A wind vane at the top of the ventilator turns the revolving head so that the flue opening is always facing away from the wind. This eliminates down-drafts and creates a natural vacuum. The revolving head of the ventilator is suspended on a ball-bearing pivot, rendering the ventilator sensitive to changes in wind direction, and increasing its exhaust output.



Ore Concentrating Jig

■ Allis-Chalmers Mfg. Co., Milwaukee, announces a new Conset Jig, or an ore concentrating jig operating on the principle of controlled settling for the beneficiation of low grade iron ore. This is done through accurate control of the stroke cycle to produce a differential pulsion and suction permitting a longer period of settlement or "differential settling." The pulsion member consists of a rubber envelope actuated by the entrance and egress of low pressure air. The air flow is controlled by a valve device which can be manually operated to alter the air flow cycle. The new jig inherently is a water saver operating on a minimum of hutch water. Its distinctive control makes possible increased hourly tonnages and high metallurgical efficiency. A unit is available also for use in closed circuit in conjunction with the grinding mills. The Conset principle applied to the jigging of fine unsized material in the mill discharge produces a high grade concentrate of valuable sulfides and fine gold before further grinding may slime or alter the valuable mineral.



Fluorescent Lamps

■ Westinghouse Lamp division, Bloomfield, N. J., announces a new 100-watt Mazda fluorescent lamp, the largest yet made for commercial and industrial purposes. Measuring 5 feet long and 2⅛ inches in diameter, it will be available in the 3500-degree white color.

Allowing much higher mounting heights, the lamp will reduce the size and number of fixtures necessary to supply a given amount of light. It has a rated initial output of 4400 lumens and a rated life of 2000 hours.

Direct Radiant Heating

(*Concluded from Page* 79)

radiant heating avoids currents of hot air.

Design and locating of heating coils within the walls has been studied at considerable length. It is possible to determine within reasonable limits the amount of a given size pipe required to provide the necessary heat loss leading to a satisfactory surface temperature. Radiation is a function of the material of which the radiating surface is constructed, whether it be wood, metal, plaster or concrete, and design of the heating system depends on the construction of the building as well as the amount of area to be heated. Current practice recommends spacing 1-inch pipe on 12 to 16-inch centers, ¾-inch pipe on 9 to 12-inch centers, and ½-inch pipe on 6 to 8-inch centers.

Selection of the pipe is based on four primary factors. First, the pipe must transfer heat with the smallest possible difference in temperature. Second, it should be mechanically strong and it must expand at the same rate as surrounding materials, particularly if it is to be embedded in concrete or plaster. Third, it must resist corrosion in actual service. Fourth, it must be readily fabricated since the work is primarily done on the job.

Because of the first and second factors, radiant heating installation is best suited to ferrous pipe. The heat loss factor is considerably higher for ferrous pipe than for nonferrous. As the coefficient of expansion is virtually the same as concrete and plaster, ferrous pipe will expand and contract with the wall material as heated and will not cause cracking. The third factor must involve a consideration of the corrosive properties of the water in the locality of the installation.

The most successful installations both from cost and performance standpoints to date have been continuous pipe units. Under this method, the coil is constructed of full lengths of pipe, bent and welded together, instead of using threaded joints. Accepted bending practice on wrought iron pipe shows U-bends can be made cold with diameters ranging from 2.8 inches center to center on ½-inch pipe, to 11 inches center to center on 2-inch pipe.

Actual design of the system can vary widely. Coils can be of the continuous type, or they can be welded in the form of grids. In some cases, the coils have been spotwelded to steel sheets to provide a flat radiation surface, while in others corrugated steel sheets have been fastened to the coils to increase the radiation surface. These types are largely of value where the coils are not embedded in concrete or plaster. It has also been found that metal expanded lath, used in place of conventional wood lath construction, improves heat transfer by increasing the radiating surface.

Control of systems of this type does not necessarily require the use of air thermostats in the room. Some systems have relied on automatic control of water temperature, and in at least one case the water temperature is controlled by outdoor temperature.

Installations where heating coils are placed in the floor require lower operating temperatures than ceiling or wall installation. Research has shown that floors above 85 degrees Fahr. become too hot for comfort, although ceilings and walls can be much higher because there is no body contact with them. One possible method is to put the coils in the ceiling of the first floor, and lay a reflecting material on the under side of the second floor to reflect the heat downward, thus directing most of the radiant rays through the ceiling rather than allowing the floor covering above to become overheated. Thus, if the room to be heated is too large or not well enough insulated to be heated by the transfer of heat from a floor at 85 degrees, it is necessary to use wall or ceiling heating instead, or in addition.

Offers Two New Tools For Facing Operations

■ McKenna Metals Co., Latrobe, Pa., announces two new styles of tools for facing operations in turret lathes. These are for machining steel and other metals, and are known as style Nos. 21 and 22. The tools have 6-degree side and front clearance angles, 8-degree end cutting edge angles, 6-degree side rake and 2-degree negative back rake. Style 21 tool has a 20-degree side cutting edge angle which results in longer tool life. It should be used where a 90-degree shoulder on the work is not required. For facing to a 90-degree shoulder, style 22 tool, which has a zero side cutting edge angle, should be used.

Use of the negative back rake has the effect of imparting greater strength to the carbide tip. The tools also are supplied with chip breakers. Style 21 tool has a groove-type chip breaker ground parallel to the side cutting, while style 22 has a shelf-type chip breaker ground 5 degrees from side cutting edge angle.

ASTM Issues Latest Coal, Coke Standards

■ A book recently issued by the American Society for Testing Materials, 260 South Broad street, Philadelphia, combines in convenient form all ASTM tests, definitions, and specifications for coal and coke, and meets the widespread demand for these standards used in connection with the evaluation of these materials. It is issued under the auspices of committee D-5 on coal and coke.

The first four items in the book cover sampling—coals for analysis, coal classed according to ash content, and sampling and fineness tests for powdered coal. Following these are two grindability tests and other procedures for drop shatter, tumbler test, designating the size of coal from its screen analysis, test for size (anthracite), sieve analysis (crushed bituminous), cubic foot weight (crushed bituminous) and a proposed test for agglutinating value of coal. Specifications for coals by rank and by grade also are included.

In the section devoted to coke there are two methods covering coke for analysis and volume of cell space of lump coke. Following these are specifications for sieves for testing purposes (wire cloth sieves, round-hole, and square-hole screens or sieves) and foundry coke. Also included are definitions of terms relating to coal and coke and gross and net calorific value of fuels, besides commercial varieties of bituminous and subbituminous coals. Copies of this 135-page publication may be obtained for $1.25 per copy.

Markets Castolin Products in This Country

■ Low-temperature welding alloys now are being manufactured and distributed in this country by Eutectic Welding Alloys Inc., 40 Worth street, New York. This company has acquired exclusive license in the United States to commercialize the Castolin low-temperature welding and brazing products formerly imported into this country from Switzerland.

Principal difference between the practice employed in application of these alloys and the commoner forms of welding is that the base metal does not become molten in the case of the former, due to the low operating temperature.

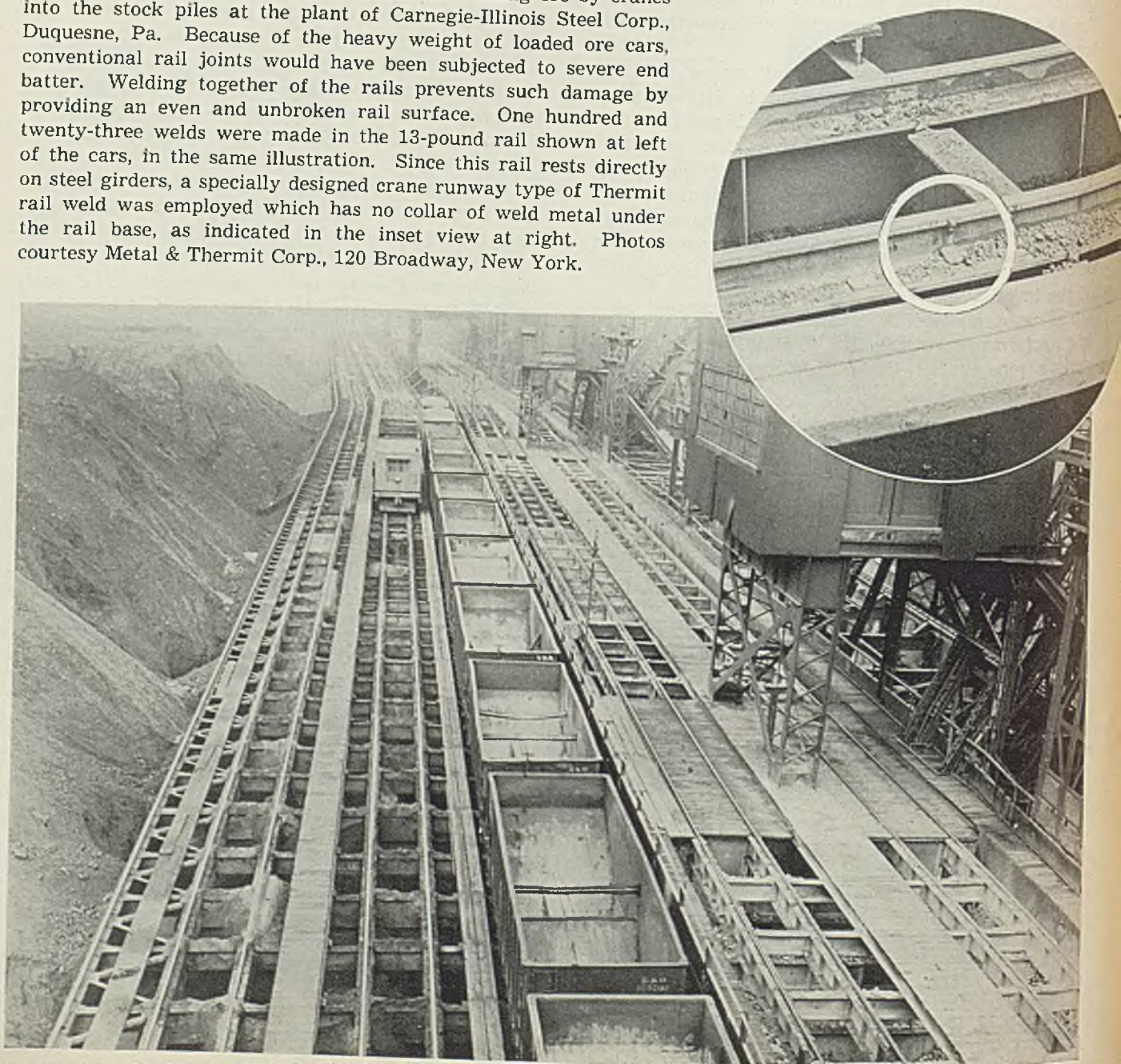
In making the weld the flux, which is in paste form, is applied by a brush to the sections to be joined. It then is heated by the torch flame, and as soon as it becomes molten the rod is applied. The latter spreads evenly over the preheated area, a characteristic of the alloys being their ability to flow easily into various types of joints.

Fusion of the molten rod with the heated surface and complete penetration and diffusion by capillarity inside the welded metal are claimed for this type of weld. High tensile strength; reduction in warpage and elimination of oxidation of the parent metal, increased welding speed and low gas consumption because of low temperatures employed, and a smooth joint which requires little cleaning and permits faster production are other advantages.

The synthetic alloy rods and fluxes are offered in different analyses according to the type of parent metal to be welded. All of the well-known ferrous and nonferrous metals and their alloys are said to be welded successfully by means of these rods, including joints between parts of dissimilar metals. Color of the weld in each case is designed to match that of the parent metal. Rods also are available for filling up blow-holes, etc., in castings.

Welds Rails To Resist End Batter

■ One hundred and seventy-seven Thermit welds were made in the rail laid on the elevated structure, shown in the view below, where iron ore cars are dumped in preparation for loading ore by cranes into the stock piles at the plant of Carnegie-Illinois Steel Corp., Duquesne, Pa. Because of the heavy weight of loaded ore cars, conventional rail joints would have been subjected to severe end batter. Welding together of the rails prevents such damage by providing an even and unbroken rail surface. One hundred and twenty-three welds were made in the 13-pound rail shown at left of the cars, in the same illustration. Since this rail rests directly on steel girders, a specially designed crane runway type of Thermit rail weld was employed which has no collar of weld metal under the rail base, as indicated in the inset view at right. Photos courtesy Metal & Thermit Corp., 120 Broadway, New York.



<< HELPFUL LITERATURE >>

1. Paste Solder

Wayne Chemical Products Co.—Illustrated folder on "Meltomatic Paste Solder" shows typical applications of this product for tinning, production soldering, and other uses. Material is brushed on part to be soldered or tinned, and heat source is applied. It melts at slightly over 400 degrees Fahr.

2. Lathes

South Bend Lathe Works—104-page illustrated catalog No. 100A presents complete descriptions and specifications for series S precision lathes in floor leg and bench types. In addition to information given on these back-geared screw cutting machines, metric lathes, attachments, and tools are described.

3. Resin Cements

Pennsylvania Salt Manufacturing Co.—8-page illustrated booklet No. 5 outlines properties and shows applications of "Asplit" and "Causplit" synthetic resin cements in steel and process industries. Former is resistant to acids and neutral salt solutions and latter is unattacked by alkaline conditions and by some acid conditions.

4. Scrap Handling

Owen Bucket Co.—12-page illustrated bulletin, "Put Scrap Handling Into High Gear," explains features of line of grapples. Actual scrap handling operations are shown and described. Case studies show results of tests of this equipment in contrast with conventional handling method. Specifications are given.

5. Sheet Metal Machines

Niagara Machine & Tool Works—24-page illustrated booklet, "Machines and Tools for Sheet Metal Shops" gives descriptions and specifications on folders, brakes, edgers, beaders, crimpers, grooovers, squaring shears, bench tools, presses, and similar equipment.

6. Corrosion Resisting Steel

Bethlehem Steel Co.—32-page illustrated catalog No. 156 gives complete specifications and shows typical applications of "Mayari R" low alloy steel for applications requiring light weight, high strength, and corrosion resistance. Fabrication is discussed.

7. Air Filters

American Air Filter Co.—16-page illustrated bulletin No. 250-C gives complete details of model C "Electromatic" self cleaning air filters. These units combine electrical precipitation as integral part of automatic viscous type air filter for maximum air cleaning effect.

8. Pot Furnaces

A. F. Holden Co.—6-page illustrated bulletin, "Holden Pot Furnaces," describes method of firing in which direct circulation is obtained, and outlines advantages of this system. Sectional drawings show general assembly details of these pot type gas furnaces.

9. Switchgear

I-T-E Circuit Breaker Co.—6-page illustrated bulletin No. 4009 is entitled "Air Switchgear for 2500-5000 Volt Duty, Utilizing Type HV Circuit Breakers." These breakers and switchgear employ air as medium for current interruption. Ratings and dimensions are given.

10. Porous Bronze Bearings

Bound Brook Oil-Less Bearing Co.—8-page illustrated stock list No. 1 on "Compo" porous bronze, oil retaining bearings lists available sizes and their prices. Engineering design data is given on permissible loads, shaft clearances and installation.

11. Refractories

General Refractories Co.—48-page illustrated export catalog No. 40 is printed in both English and Spanish. Thirty technical drawings show brick shapes and sizes. Major types of refractories and their uses are covered. Tables list sizes, weights, volumes and general data required in use, application and purchase of refractories.

12. Gear Finisher

Michigan Tool Co.—4-page illustrated bulletin No. 860B gives specifications and outlines features of series 860-B gear finisher in which work is reciprocated axially during cutting cycle, while cutters are fed into work table predetermined amount for each stroke of head.

13. Metal Treating

Mathieson Alkali Works, Inc.—48-page illustrated handbook is devoted to "Ammonia in Metal Treating." Metal treating furnaces recommended by leading manufacturers are shown. Case hardening processes in atmosphere furnaces are described. Applications are given, with discussion of important types of materials and metal parts to which treating processes are applied.

14. Grinding Machine Drives

Berkeley Equipment Co.—Illustrated bulletin No. 65 discusses "Berkeley" motor drives for application to all types and makes of grinding machines. Modernization of machines is shown with illustrations of typical installations.

15. Chain Drives

Link-Belt Co.—4-page illustrated bulletin No. 1894 gives complete data on 3/16-inch pitch "Silverstreak" silent chain drives for fractional horsepower duty. Horsepower per inch of chain width, pitch diameters of wheels, and list prices of chain and wheels are included.

16. Industrial Carburetor

Kemp of Baltimore—6-page illustrated bulletin No. LC-021 gives installation plans, capacity chart and dimensions of series T industrial carburetor for precise control of premixing gas and air for industrial burners of all types.

17. Safety Guard

Junkin Safety Appliance Co.—8-page illustrated folder on "Triple Interlock" safety guard outlines protective features of this device which insures safety to operators of stamping presses. Operation of unit is explained in detail.

18. Belts & Sheaves

W. A. Jones Foundry & Machine Co.—8-page illustrated bulletin No. 58-B is price list covering standard V-belt sheaves, light duty V-belt sheaves and standard V-belts. Data includes horsepower of V-belts, sheave diameters, and arc of contact.

19. Agitators

Eclipse Air Brush Co.—4-page illustrated bulletin on "Pneumix Agitators" shows available types and sizes in line of air motored agitators. These mixers are splashproof and explosionproof, and have variable speeds from 30 to 6000 revolutions per minute.

20. Capacitor Motors

Century Electric Co.—4-page illustrated bulletin No. BCA-120 is descriptive of line of capacitor single phase electric motors in sizes ranging up to 20 horsepower. Characteristics and features of these motors are discussed.

21. Industrial Ladders

Aluminum Ladder Co.—44-page illustrated catalog No. 4 describes aluminum ladders of all types and sizes, as well as aluminum gangways, stages, scaffolding, conveyors, and special ladders. General information is included on strength and utility of these products.

22. Industrial Crane

Osgood Co.—16-page illustrated booklet, "Crane on Rubber for Industrial Use," explains economies to be effected in materials handling through use of wheel mount cranes which combine advantages of crawler and truck cranes.

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(Continued)

23. Conveyor Furnaces

Electric Furnace Co.—12-page illustrated reprint, "Chain Belt Conveyor Furnaces—Their Design, Construction and Application," describes and shows electric and fuel fired chain belt furnaces, including radiant tube and atmosphere types for continuous heat treatment of small and medium size parts and products.

24. Boiler Water Treatment

Allis-Chalmers Manufacturing Co.—16-page illustrated bulletin No. B6633 is entitled, "Feedwater Facts—The Story of Allis-Chalmers Akon Service." Scale and corrosion prevention are told pictorially and in text, as is control of carryover, foaming and priming.

25. Special Steels

Allegheny Ludlum Steel Corp.—124-page spiral-bound illustrated "Handbook of Special Steels" covers properties, uses and lists of fabricators of tool, stainless, electrical and carbon steels in various forms produced by this company. Tables facilitate quick reference.

26. Gas Cutting Machine

Air Reduction Sales Co.—8-page illustrated bulletin No. ADC-627 is descriptive of No. 4 "Radiagraph" portable, motor driven gas cutting machine. Construction, operation, and performance of this tool are shown for all types of flame cutting and machine operations.

27. Tempering Furnace

Despatch Oven Co.—4-page illustrated bulletin No. 83 shows details and applications of "Despatch" tempering and drawing furnaces for machine tools and dies. These utility furnaces are available in gas and electric heated types for maximum temperatures of 1200 degrees Fahr.

28. Industrial Painting

New Jersey Zinc Co.—16-page illustrated publication, "Paint Progress," includes 7-page article entitled, "Painting for Defense." It covers volume of paint involved, what paints will be used and where they will be applied. Other articles deal with industrial painting problems.

29. Synchronous Generators

Burke Electric Co.—4-page illustrated bulletin No. 310 outlines features of line of alternating current synchronous generators for application with diesel engines. Cross section shows method of anchoring pole. Direct current exciters are also shown.

30. Industrial Pumps

American Manganese Steel division, American Brake Shoe & Foundry Co.—24-page illustrated bulletin No. 940 gives specifications of line of horizontal and vertical shaft pumps in five types and 18 sizes ranging from ¾ to 6 inches.

31. Molydenum

Climax Molybdenum Co.—16-page illustrated engineering treatise, "Molybdenum Fundamental Effects in Steel," gives major and minor effects of addition of molybdenum to steel. Making of additions, mechanical properties, fabrication and heat treatment, and other information are given in detail. Charts and tables amplify text.

32. Cab Carrier

Cleveland Tramrail division, Cleveland Crane & Engineering Co.—4-page illustrated bulletin No. 2006-A presents details of "Raise-Lower Cab Carrier" with lifting fork attached for handling heavy kegs, sacks, and other products, as well as units for all types of materials handling.

33. Pyrometers

C. J. Tagliabue Manufacturing Co.—32-page illustrated catalog No. 1101F describes complete line of "Celectray" pyrometers which incorporate photocell and light ray for actuation. Operating details, specifications, applications and descriptions of various types are included.

34. Maintenance Painting

American-Marietta Co.—120-page illustrated "Maintenance Painting Handbook" includes findings in more than 20,000 analyses of painting problems, compiled in condensed form. Surface preparation, correct paints for various conditions, and other practical information are included for industrial painting guidance.

35. Broaching Machine

Cincinnati Milling Machine Co.—16-page illustrated bulletin No. M-894 discusses features of line of duplex vertical hydro-broach machines. Operating cycle is explained and complete specifications of various models are given.

36. Power Tools

Delta Manufacturing Co.—44-page illustrated catalog No. IND-40 is descriptive of line of power tools for industry. Single and multiple drill presses, grinders, band saws, arbor saws, jointers, shapers, scroll saws, sanders, lathes and motors are some of the products covered.

37. Safety Tools

Ampco Metal, Inc.—8-page illustrated folder on "Non-Sparking Safety Tools" outlines features of these "Ampco" metal and beryllium-copper tools which provide protection against fire and explosion resulting from sparks.

38. Shovels

Byers Machine Co.—14-page illustrated catalog No. 640 gives operating ranges, lifting capacities and specifications on "Byers 83" ¾ yard shovels which are convertible as cranes, clamshells, draglines and trench hoes. Operating ranges are readily obtained from unique shovel model chart.

39. Pyrometers

Brown Instrument Co.—36-page illustrated catalog No. 1104 is devoted to line of indicating, controlling and recording potentiometer pyrometers. Also described are "Radiamatic" pyrometer, auxiliary switches, control accessories, thermocouple installations, and list of chart and scale ranges.

40. Shop Equipment

Atlas Press Co.—72-page illustrated catalog No. 41 includes complete information on lathes, drill presses, arbor presses, shapers, bench miller, and multiple spindle drilling machines. Details of equipment, specifications, and list prices are given.

41. Insulating Fire Brick

Armstrong Cork Co.—8-page illustrated bulletin No. I-196 explains applications, features and properties of five types of insulating fire brick. Special shapes are shown. Data are included on characteristics of insulating cements.

42. Portable Electric Tools

Black & Decker Manufacturing Co.—64-page illustrated catalog on "Portable Electric Tools" presents full data and prices on portable electric drills, screw drivers, nut runners, tappers, saws, hammers, shears, grinders, vacuum cleaners, valve tools, heat guns, surfacers, sanders and buffers.

43. Automatic Valves

Golden-Anderson Valve Specialty Co.—96-page spiral-bound illustrated catalog No. 26 is descriptive of line of automatic control valves, designed for steam and water service. Non-return, throttle and stop, emergency trip, pressure reducing, pressure relief, altitude and float valves are some of the types covered.

44. Electric Heating

Cooley Electric Manufacturing Corp.—8-page illustrated catalog No. 40 gives complete information on laboratory electric heating equipment, including furnaces, hot plates, rheostats and pyrometers. Specifications are given for each.

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Steel Sales Made for Late Second Quarter

However, naming of prices for that period is not expected for three weeks. Ford Motor Co. issues first 1941 iron ore inquiry.

MARKET IN TABLOID ★

Demand
Unabated.

Prices
Firm.

Production
Unchanged at 97.

BULK of steel sales are now for late second quarter delivery, with some for early third quarter, though prices for second period will probably not be named for at least three weeks. Sales volume continues to increase though not as rapidly as previously. Typical is a well-rounded company whose January sales were 3 per cent greater than December and whose sales so far in February are running slightly ahead of the same January period.

A few instances where orders have leveled off are still the exception. Additional orders frequently come from consumers who had been considered as well supplied. Other surprises are further plant expansions by companies whose extensions presumably had been completed.

An increasing proportion of orders are received bearing an A-1 priority rating from Washington, though civilian needs so far are much in the ascendancy. Though an administrative organization on priorities has been set up at Washington, rationing would be undertaken only as a last resort, it has been said officially.

Many instances of deliveries earlier than expected are reported, particularly in fabricated structural steel, fabricators not having space for storage. Labor supply is a problem. Fabricators at Cleveland have hired riveters from Chicago. Construction of ordnance plants drains the supply.

However, mill steel items which still carry prompt delivery can be counted on fingers of one hand, among them being a few wire products, such as rope, nails and manufacturers' wire; also merchant pipe and tinplate. Wide plates are usually at the other end of the scale. Even narrow plates, which have been used as a substitute, are becoming scarce. A comparatively new outlet for plates are wind tunnels in connection with aeronautical laboratories, such as at Dayton and Cleveland. The Middle West is needing more plates because of more extensive shipbuilding on the Great Lakes, four ocean-going trawlers just having been awarded a Cleveland shipbuilder.

Great Britain is negotiating with American steelmakers for the purchase of 30,000 tons of shell steel, it being possible that final purchases will far exceed that tonnage.

Nickel has been added to zinc and other nonferrous metals, as to scarcity, stainless steel manufacture having been hindered in some districts because of tightness in this alloying element.

Galvanized sheet production has gained the point it lost the preceding week, general average being 81 per cent of capacity.

Naval releases on steel for 200 ships placed last fall are now beginning to come through, it being expected that the peak will be reached in April.

January production of coke pig iron in the United States at 4,666,233 net tons established a new all-time record. The operating rate gained 2.3 points to 98.7 per cent of capacity. Average daily production was 150,524 tons, an increase of 3980 tons over December. Active stacks Jan. 21 were 205, a gain of 3.

The Ford Motor Co., as usual, proves the first inquirer for iron ore for the new season, asking for 295,000 tons as against its 1940 inquiry for 280,000 tons. Some predict well over 75,000,000 tons of Lake Superior iron ore will be shipped in 1941, record being 65,204,600 tons by lake vessels in 1929.

Scheduled automobile production for the week ended Feb. 8 was 125,000 units, up 600 for the week, comparing with 95,985 for the like week of 1940.

Steel ingot production for the country was unchanged at 97 per cent last week. Increases took place as follows: New England, up 4 points to 92; Cincinnati, up 5 points to 95; St. Louis, up 3 points at 93 and Detroit, up 4 points to 96. Declines were 2 points at Cleveland to 84½ and 2½ points at Buffalo to 90½. Unchanged were: Pittsburgh at 96½, Chicago at 98, eastern Pennsylvania at 96, Wheeling and Birmingham at 100 per cent, and Youngstown at 95 per cent.

Steel prices for second quarter hinge entirely on wages at this juncture since scrap prices have declined close to the $20 per ton basis for No. 1 heavy melting steel at Pittsburgh. Continuing reductions in scrap caused further lowering of two composite groups of STEEL. Steelworks scrap dropped 18 cents to $19.91 and iron and steel fell 2 cents to $38.20. Finished steel was unchanged at $56.60.

COMPOSITE MARKET AVERAGES

	Feb. 8	Feb. 1	Jan. 25	One Month Ago Jan., 1941	Three Months Ago Nov., 1940	One Year Ago Feb., 1940	Five Years Ago Feb., 1936
Iron and Steel....	$38.20	$38.22	$38.24	$38.38	$38.08	$37.21	$33.48
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.50	53.70
Steelworks Scrap..	19.91	20.09	20.42	20.88	20.72	16.98	13.83

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week: Average for Last Month, Three Months and One Year Ago

Finished Material

	Feb. 8, 1941	Jan. 1941	Nov. 1940	Feb. 1940
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
Iron bars, Chicago	2.25	2.25	2.25	2.15
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.17	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	Feb. 8, 1941	Jan. 1941	Nov. 1940	Feb. 1940
Bessemer, del. Pittsburgh	$25.34	$25.34	$24.34	$24.34
Basic, Valley	23.50	23.50	22.50	22.50
Basic, eastern, del. Philadelphia	25.34	25.34	24.34	24.34
No. 2 foundry, Pittsburgh	25.21	25.21	24.21	24.21
No. 2 foundry, Chicago	24.00	24.00	23.00	23.00
Southern No. 2, Birmingham	19.38	19.38	19.38	19.38
Southern No. 2, del. Cincinnati	23.06	23.06	23.06	23.06
No. 2X, del. Phila. (differ. av.)	26.215	26.215	25.215	25.215
Malleable, Valley	24.00	24.00	23.00	23.00
Malleable, Chicago	24.00	24.00	23.00	23.00
Lake Sup., charcoal, del. Chicago	30.34	30.34	30.34	30.34
Gray forge, del. Pittsburgh	24.17	24.17	23.17	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	105.33

Scrap

Heavy melt. steel, Pitts.	$20.75	$22.15	$21.50	$17.75
Heavy melt. steel, No. 2, E. Pa.	18.50	19.30	19.75	16.30
Heavy melting steel, Chicago	19.25	20.25	20.25	15.75
Rails for rolling, Chicago	23.25	24.70	24.55	18.25
Railroad steel specialties, Chicago	23.50	24.05	23.25	18.50

Coke

Connellsville, furnace, ovens	$5.50	$5.50	$4.75	$4.75
Connellsville, foundry, ovens	6.00	6.00	5.75	5.75
Chicago, by-product fdry., del.	11.75	11.75	11.75	11.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.10c
Chicago, Gary	2.10c
Cleveland	2.10c
Detroit, del.	2.20c
Buffalo	2.10c
Sparrows Point, Md.	2.10c
New York, del.	2.34c
Philadelphia, del.	2.27c
Granite City, Ill.	2.20c
Middletown, O.	2.10c
Youngstown, O.	2.10c
Birmingham	2.10c
Pacific Coast ports	2.65c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast ports	3.70c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast ports	4.05c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.55c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.40c	4.00c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 303	No. 304
Bars	24.00	26.00	25.00
Plates	27.00	29.00	29.00
Sheets	34.00	36.00	36.00
Hot strip	21.50	27.00	23.50
Cold strip	28.00	33.00	30.00

Straight Chromes

	No. 410	No. 416	No. 430	No. 442
Bars	18.50	19.00	19.00	22.50
Plates	21.50	22.00	22.00	25.50
Sheets	26.50	27.00	29.00	32.50
Hot strip	17.00	18.25	17.50	24.00
Cold stp.	22.00	23.50	22.50	32.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29-2.44c
Philadelphia, del.	2.15c-2.30c
Boston, delivered	2.43c-2.57c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.10c
Sparrows Point, Md.	2.10c
Claymont, Del.	2.10c-2.25c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast ports	2.65c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	4.00c

Structural Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast ports	2.75c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Roofing Ternes

Pittsburgh base, package 112 sheets 20 x 28 in., coating I.C.

8-lb.	$12.00	25-lb.	$16.00
15-lb.	14.00	30-lb.	17.25
20-lb.	15.00	40-lb.	19.50

Bars

Soft Steel

(Base, 20 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Rail Steel

(Base, 5 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Detroit, delivered	2.25c
Cleveland	2.15c

Buffalo	2.15c
Birmingham	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Iron

Chicago	2.25c
Philadelphia, del.	2.37c
Pittsburgh, refined	3.50-8.00c
Terre Haute, Ind.	2.15c

Reinforcing

New Billet Bars, Base

Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Rail Steel Bars, Base

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birm.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails	$2.55
(Per Pound)	
Polished fence staples	2.55c
Annealed fence wire	3.05c
Galv. fence wire	3.40c
Woven wire fencing (base C. L. column)	67
Single loop bale ties, (base C.L. column)	56
Galv. barbed wire, 80-rod spools, base column	70
Twisted barbless wire, column	70

To Manufacturing Trade

Base, Pitts. - Chicago Birmingham (except spring wire)	
Bright bess., basic wire.	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh, keg..$3.85

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.70c	*3.45c
Cleveland	2.65c	3.35c
Buffalo	2.65c	3.35c

*Delivered.

Alloy Bars (Hot)

(Base, 20 tons or over)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.70c

Detroit, delivered 2.80c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.70	3300	3.80
2500	2.55	3400	3.20

4100 0.15 to 0.25 Mo.	0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.20
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring flats	0.15
6100 bars	1.20
6100 spring flats	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Electric furnace up 50 cents.

Alloy Plates (Hot)

Pittsburgh, Chicago, Coatesville, Pa. 3.50

Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.10c
Detroit, del.	2.20c
Philadelphia, del.	2.42c
New York, del.	2.46c
Pacific Coast ports	2.75c
Cooperage hoop, Young., Pitts.; Chicago, Birm.	2.20c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c

Carbon	Cleve.,	Pitts.
0.26—0.50		2.80c
0.51—0.75		4.30c
0.76—1.00		6.15c
Over 1.00		8.35c

Worcester, Mass. $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.35c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills.	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham.	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	68 off
Do., ⅞ and ⅝ x 6-in. and shorter	66 off
Do., ¾ to 1 x 6-in. and shorter	64 off
1⅛ and larger, all lengths	62 off
All diameters, over 6-in. long	62 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts separate 73-10 off; with nuts attached 73 off; bulk 81 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Plow bolts	68.5 off

Nuts

	U.S.S.	S.A.E.
Semifinished hex. ½-inch and less.	66	70
⅝-1-inch	63	65
1⅛-1½-inch	61	62
1⅝ and larger	60	

Hexagon Cap Screws

Upset 1-in., smaller 68 off

Square Head Set Screws

Upset, 1-in., smaller	74.0 off
Headless set screws	64.0 off

Piling

Pitts., Chgo., Buffalo 2.40c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural	3.40c
⅞-inch and under	65-10 off

Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitt., Lorain, O., to consumers in carloads, Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

In.	Steel Blk.	Steel Galv.
½	63½	54
¾	66½	58
1—3	68½	60½

In.	Iron Blk.	Iron Galv.
¾	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

In.	Steel Blk.	Steel Galv.
2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½

In.	Iron Blk.	Iron Galv.
2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

	Steel Blk.	Steel Galv.
1 to 3, butt weld	67½	
2, lap weld	60	
2½ to 3, lap weld	63	
3½ to 6, lap weld	65	
7 and 8, lap weld	64	

	Iron Blk.	Iron Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut-lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½"O.D.	13	$ 9.72	$23.71
1¾"O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼"O.D.	13	13.79	21.68
2¼"O.D.	12	15.16	...
2½"O.D.	12	16.58	26.57
2¾"O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½"O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	...

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O.D.	13	$ 7.82	$ 9.01
1¼"O.D.	13	9.26	10.67
1½"O.D.	13	10.23	11.79
1¾"O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼"O.D.	13	14.54	16.76
2¼"O.D.	12	16.01	18.45
2½"O.D.	12	17.54	20.21
2¾"O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½"O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½"O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Pet Net Ton

6-in., & over, Birm.	$45.00-46.00
4-in., Birmingham	48.00-49.00
4-in., Chicago	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy.	49.00
Do., 4-in.	52.00

Class A Pipe $3 over Class B Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Youngs., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young, Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅝-inch incl. (per 100 lbs.)	$2.00
Do., over ⅝ to ¾-in. incl.	2.15

Worcester up $0.10; Galveston up $0.25; Pacific Coast up $0.50.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt.	1.90c

Shell Steel

Pittsburgh, Chicago, base, 1000 tons of one size, open hearth

3-12-inch	$52.00
12-18-inch	54.00
18-inch and over	56.00

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$5.00- 5.75
Connellsville, fdry.	5.25- 6.00
Connell, prem. fdry	6.00- 6.60
New River fdry.	6.50- 7.00
Wise county fdry	5.50- 6.50
Wise county fur.	5.00- 5.25

By-Product Foundry

Newark, N. J., del.	11.85-12.30
Chicago, outside del.	11.00
Chicago, delivered	11.75
Terre Haute, del	11.25
Milwaukee, ovens	11.75
New England, del.	13.00
St. Louis, del.	11.75
Birmingham, ovens	7.50
Indianapolis, del.	11.25
Cincinnati, del.	11.00
Cleveland, del.	11.55
Buffalo, del.	11.75
Detroit, del.	11.50
Philadelphia, del.	11.63

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	14.00c
Toluol, two degree	27.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.)	13.75c
Do. (1000 lbs. or over)	12.75c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	7.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$30.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$24.00	$24.50	$23.50	$25.00
Birmingham, Ala.‡	20.38	.....	19.38	25.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.00	25.50	24.50	26.00
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	.....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	.	.	.
Sharpsville, Pa.	24.00	24.00	23.50	24.50
Sparrow's Point, Md.	24.00	.....	23.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00	24.00	23.50	24.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham	25.78	.....	24.66	.....
Boston from Birmingham	25.12	.....	.....	.....
Boston from Everett, Mass.	25.50	26.00	25.00	26.50
Boston from Buffalo	25.50	26.00	25.00	26.50
Brookyln, N. Y., from Bethlehem	26.50	27.00	.....	.....
Canton, O., from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†25.22	.....	.....	.....
Cincinnati from Hamilton, O.	24.44	25.11	24.61	.....
Cincinnati from Birmingham	24.06	.....	23.06	.....
Cleveland from Birmingham	24.32	.....	23.82	.....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	25.44
Milwaukee from Chicago	25.10	25.10	24.60	25.60
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	26.69	27.69
Newark, N. J., from Birmingham	26.15	.....	.....	.....
Newark, N. J., from Bethlehem	25.53	26.03	.....	.....
Philadelphia from Birmingham	25.46	.....	24.96	.....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....
Pittsburgh district from Neville Island	‡ Neville base, plus 69c, 84c and $1.24 freight.			
Saginaw, Mich., from Detroit	26.31	26.31	25.81	26.81
St. Louis, northern	24.50	24.50	24.00	.....
St. Louis from Birmingham	†24.12	.....	23.62	.....
St. Paul from Duluth	26.63	26.63	.....	27.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50, base; $30.74 delivered Philadelphia.

Gray Forge

Valley furnace $23.50
Pitts. dist. fur. 23.50

Charcoal

Lake Superior fur. $27.00
do., del. Chicago 30.34
Lyles, Tenn. 26.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $29.50; 6.51-7—$30.00; 7-7.50—$30.50; 7.51-8—$31.00; 8-8.50—$31.50; 8.51-9—$32.00; 9-9.50—$32.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky. $60.80

First Quality

Pa., Ill., Md., Mo., Ky. ... 47.50
Alabama, Georgia 47.50
New Jersey 52.50

Second Quality

Pa., Ill., Ky., Md., Mo. ... 42.75
Georgia, Alabama 34.20
New Jersey 49.00

Ohio

First quality 39.90
Intermediate 36.10
Second quality 31.35

Malleable Bung Brick

All bases $56.05

Silica Brick

Pennsylvania $47.50
Joliet, E. Chicago 55.10
Birmingham, Ala. 47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press $28.00
Wire cut 26.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk 22.00
net ton, bags 26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick $50.00
Chem. bonded chrome ... 50.00
Magnesite brick 72.00
Chem. bonded magnesite 61.00

Fluorspar

Washed gravel, duty pd., tide, net ton $25.00-$26.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail. 20.00-21.00
Do. barge 20.00
No. 2 lump 20.00-21.00

Ferroalloy Prices

Ferromanganese, 78-82%, carlots, duty pd. $120.00
Ton lots 130.00
Less ton lots 133.50
Less 200 lb. lots 138.00
Do., carlots del. Pitts. 125.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot .. 36.00

Ferrosilicon, 50%, freight allowed, c.l. 74.50
Do., ton lot 87.00
Do., 75 per cent 135.00
Do., ton lots 151.00
Spot, $5 a ton higher.

Siliconmanganese, c.l., 3 per cent carbon 113.00
2½% carbon 118.00
2% carbon, 123.00; 1%, 133.00
Contract ton price $12.50 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.90-2.00

Ferrovanadium, 35 to 40%, lb., cont. .. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.i., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electric furn., per ton, c. i., 23-26% f.o.b. Mt. Pleasant, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 11.00c
Do., ton lots 11.75c
Do., less-ton lots 12.00c
less than 200 lb. lots. 12.25c

67-72% low carbon:

	Carloads	Ton lots	Less ton
2% carb.	17.50c	18.25c	18.75c
1% carb.	18.50c	19.25c	19.75c
0.10% carb.	20.50c	21.25c	21.75c
0.20% carb.	19.50c	20.25c	20.75c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. tl., f.o.b. Niagara Falls, ton lots ... $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do., less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls ... $2.25
Do., less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, tl., 6-8% carb., carlots, contr., net ton .$142.50
Do., spot 145.00
Do., contract, ton lots 145.00
Do., spot, ton lots 150.00
15-18% tl., 3-5% carbon, carlots, contr., net ton 157.50
Do., spot 160.00
Do., contract, ton lots. 160.00
Do., spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do., ton lots 8.00c
Do., less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, freight allowed, lb. carlots, bulk 7.00c
Do., ton lots 7.50c
Do., less-ton lots 7.75c
Do., less 200 lbs. 8.00c
Spot, ¼c higher.

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.50
Do., smaller lots 2.60

Vanadium Pentoxide, contract, lb. contained $1.10
Do., spot 1.15

Chromium Metal, 98% cr., contract, lb. con. chrome, ton lots 80.00c
Do., spot 85.00c
88% chrome, cont. tons. 79.00c
Do., spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.50c
Do., 2% 13.00c
Spot ¼c higher

Silicon Briquets, contract carloads, bulk, freight allowed, ton $74.50
Ton lots 84.50
Less-ton lots, lb. 4.00c
Less 200 lb. lots, lb. .. 4.25c
Spot ¼-cent higher.

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.50c
Ton lots 6.00c
Less-ton lots 6.25c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton 102.50
Do., ton 108.00
35-40%, contract, carloads, lb., alloy 14.00c
Do., ton lots 15.00c
Do., less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do., 100-200 lb. lots .. 2.75
Do., under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-In. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: S.A.E. 2300	Cold Drawn Bars: S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.48	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	4.65	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.05	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.22	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.20	3.80	8.70	7.05
Omaha	3.90	4.00	4.00	3.95	3.95	5.55	3.65	....	5.50	....	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.62	4.00	4.92	3.47	4.00	8.75	7.10
Chicago	3.50	3.40	3.40	3.55	3.55	5.15	3.25	4.10	4.60	3.30	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.35	5.00	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.18	4.23	4.73	3.54	3.88	8.38	6.88
St. Louis	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.12	4.87	3.61	4.02	8.77	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.68	3.70	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.49	4.49	6.09	4.19	....	5.54	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.88	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	3.50	5.95	5.95	3.85	3.85	5.50	4.20	....	5.25	....	6.60	....	....
Seattle	4.00	4.00	5.20	4.00	4.00	5.75	4.00	6.50	5.00	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	....	5.75	....	....
Los Angeles	4.15	4.60	6.45	4.15	4.15	6.40	4.30	6.50	5.25	....	6.60	10.55	9.80
San Francisco	3.50	4.00	6.00	3.50	3.50	5.60	3.40	6.40	5.15	....	6.80	10.65	9.80

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	..
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	5.85	....	8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	9.05
San Francisco	5.00	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland; 300-9999 Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in B'ham.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 1500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH Gross Tons f.o.b. U.K. Ports	£ s d
Merchant bars, 3-inch and over	$66.50	16 10 0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20 0 0
Structural shapes	2.79c	15 10 0
Ship plates	2.90c	16 2 6
Boiler plates	3.17c	17 12 6
Sheets, black, 24 gage	4.00c	22 5 0
Sheets, galvanized, corrugated, 24 gage	4.61c	25 12 6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.29	1 11 4

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

		£ s d
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$25.79	6 8 0(a)
Basic pig iron	24.28	6 0 6(a)
Furnace coke, f.o.t. ovens	7.15	1 15 6
Billets, basic soft, 100-ton lots and over	49.37	12 5 0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14 10 6
Merchant bars, rounds and squares, under 3-inch	3.17c	17 12 0††
Shapes	2.77c	15 8 0††
Ship plates	2.91c	16 3 0††
Boiler plates	3.06c	17 0 6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22 15 0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26 2 6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	23 15 0
Bands and strips, hot-rolled	3.30c	18 7 0 ††

(a) del. Middlesbrough 5s rebate to approved customers. ††Rebate of 15s on certain conditions.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	18.00
Bos. dock No. 1 exp.	15.50-16.00
New Eng. del. No. 1	16.50-16.75
Buffalo, No. 1	20.50-21.00
Buffalo, No. 2	18.50-19.00
Chicago, No. 1	19.00-19.50
Chicago, auto, no alloy	18.00-18.50
Cincinnati, dealers	18.25-18.75
Cleveland, No. 1	20.00-20.50
Cleveland, No. 2	19.00-19.50
Detroit, No. 1	†16.50-17.00
Detroit, No. 2	†15.50-16.00
Eastern Pa., No. 1	20.00
Eastern Pa., No. 2	18.50
Federal, Ill., No. 2	16.50-17.00
Granite City, R. R. No. 1	17.50-18.00
Granite City, No. 2	16.50-17.00
Los Ang., No. 1 net	14.50-15.00
Los Ang., No. 2 net	13.50-14.00
N. Y. dock No. 1 exp.	†16.50
Pitts., No. 1 (R. R.)	21.00-21.50
Pittsburgh, No. 1	20.50-21.00
Pittsburgh, No. 2	19.50-20.00
St. Louis, No. 1	17.50-18.00
St. Louis, No. 2	16.50-17.00
San Fran., No. 1 net	15.00-15.50
San Fran., No. 2 net	14.00-14.50
Seattle, No. 1	15.00
Toronto, dirs., No. 1	11.00-11.25
Valleys, No. 1	21.00-21.50

COMPRESSED SHEETS

Buffalo	18.50-19.00
Chicago, factory	18.50-19.00
Chicago, dealers	17.00-17.50
Cincinnati, dealers	17.00-17.50
Cleveland	20.00-20.50
Detroit	†17.25-17.75
E. Pa., new mat.	20.00
E. Pa., old mat.	17.00
Los Angeles, net	12.50-13.00
Pittsburgh	20.50-21.00
St. Louis	14.00-14.50
San Francisco, net	13.00-13.50
Valleys	20.50-21.00

BUNDLED SHEETS

Buffalo, No. 1	18.50-19.00
Buffalo, No. 2	17.00-17.50
Cleveland	15.00-15.50
Pittsburgh	19.50-20.00
St. Louis	13.00-13.50
Toronto, dealers	9.75

SHEET CLIPPINGS, LOOSE

Chicago	13.50-14.00
Cincinnati, dealers	12.50-13.00
Detroit	†13.50-14.00
St. Louis	12.00-12.50
Toronto, dealers	9.00

BUSHELING

Birmingham, No. 1	16.00
Buffalo, No. 1	18.50-19.00
Chicago, No. 1	18.00-18.50
Cincin., No. 1 deal.	14.25-14.75
Cincin., No. 2 deal.	7.75- 8.25
Cleveland, No. 2	14.00-14.50
Detroit, No. 1 new	†16.50-17.00
Valleys, new, No. 1	20.50-21.00
Toronto, dealers	5.50- 6.00

MACHINE TURNINGS (Long)

Birmingham	9.50
Buffalo	14.00-14.50
Chicago	13.75-14.25
Cincinnati, dealers	10.00-10.50
Cleveland, no alloy	13.50-14.00
Detroit	†11.00-11.50
Eastern Pa.	14.50
Los Angeles	4.00- 5.00
New York	†10.50-11.00
Pittsburgh	15.00-15.50
St. Louis	11.50-12.00
San Francisco	5.00
Toronto, dealers	†7.75- 8.00
Valleys	15.50-16.00

SHOVELING TURNINGS

Buffalo	15.50-16.00
Cleveland	14.50-15.00
Chicago	14.25-14.75
Chicago, spcl, anal.	15.50-16.00
Detroit	†12.00-12.50
Pitts., alloy-free	17.00-17.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†8.50- 9.25
Buffalo	14.50-15.00
Cincinnati, dealers	9.25- 9.75
Cleveland	14.50-15.00
Eastern Pa.	14.00
Detroit	†12.00-12.50
New York	†10.00-10.50
Pittsburgh	15.00-15.50
Toronto, dealers	†7.75- 8.00

AXLE TURNINGS

Buffalo	16.50-17.00
Boston district	†12.50-13.00
Chicago, elec. fur.	20.00-20.50
East. Pa. elec. fur.	19.50-20.00
St. Louis	13.50-14.00
Toronto	†7.75- 8.00

CAST IRON BORINGS

Birmingham	8.50
Boston dist. chem.	†10.75-11.25
Buffalo	14.50-15.00
Chicago	13.75-14.25
Cincinnati, dealers	9.25- 9.75
Cleveland	14.50-15.00
Detroit	†12.00-12.50
E. Pa., chemical	15.50-16.00
New York	†11.50-12.00
St. Louis	11.00-11.50
Toronto, dealers	†7.75- 8.00

RAILROAD SPECIALTIES

Chicago	23.25-23.75

ANGLE BARS—STEEL

Chicago	22.50-23.00
St. Louis	21.25-21.75

SPRINGS

Buffalo	25.00-25.50
Chicago, coil	24.00-24.50
Chicago, leaf	23.50-24.00
Eastern Pa.	26.00-26.50
Pittsburgh	26.50-27.00
St. Louis	22.50-23.00

STEEL, RAILS, SHORT

Birmingham	20.00
Buffalo	26.00-26.50
Chicago (3 ft.)	23.25-23.75
Chicago (2 ft.)	23.75-24.25
Cincinnati, dealers	25.25-25.75
Detroit	†22.50-23.00
Pitts., 2 ft. and less	26.00-26.50
St. L. 2 ft. & less	23.50-24.50

STEEL RAILS, SCRAP

Birmingham	18.00
Boston district	†15.75-16.00
Buffalo	22.00-22.50
Chicago	19.00-19.50
Cleveland	24.00
Pittsburgh	23.00-23.50
St. Louis	19.50-20.00
Seattle	18.00-18.50

PIPE AND FLUES

Chicago, net	14.00-14.50
Cincinnati, dealers	13.25-13.75

RAILROAD GRATE BARS

Buffalo	14.50-15.00
Chicago, net	13.75-14.25
Cincinnati, dealers	12.75-13.25
Eastern Pa.	19.00-19.50
New York	†13.00-13.50
St. Louis	14.00-14.50

RAILROAD WROUGHT

Birmingham	16.00
Boston district	†11.75-12.25
Eastern Pa., No. 1	20.50-21.00
St. Louis, No. 1	14.00-14.50
St. Louis, No. 2	16.50-17.00

FORGE FLASHINGS

Boston district	†13.25-13.50
Buffalo	18.50-19.00
Cleveland	18.50-19.00
Detroit	†16.50-17.00
Pittsburgh	20.00-20.50

FORGE SCRAP

Boston district	†12.75-13.00
Chicago, heavy	23.50-24.00

LOW PHOSPHORUS

Buffalo, plates	26.50-27.00
Cleveland, crops	26.00-26.50
Eastern Pa., crops	25.50-26.00
Pitts., billet, bloom, slab crops	27.00-27.50

LOW PHOS. PUNCHINGS

Buffalo	25.50-26.00
Chicago	23.00-23.50
Cleveland	22.00-22.50
Detroit	†18.75-19.25
Eastern Pa.	25.50-26.00
Pittsburgh	26.00-26.50
Seattle	15.00

RAILS FOR ROLLING

3 feet and over

Birmingham	19.00
Boston	†18.50-19.00
Chicago	23.00-23.50
New York	†19.50-20.00
Eastern Pa.	26.00-26.50
St. Louis	22.00-22.50

STEEL CAR AXLES

Birmingham	18.00
Boston district	†20.00-20.50
Chicago, net	24.75-25.25
Eastern Pa.	27.50-28.00
St. Louis	25.00-25.50

LOCOMOTIVE TIRES

Chicago (cut)	23.50-24.00
St. Louis, No. 1	19.50-20.00

SHAFTING

Boston district	†19.50-19.75
New York	†21.00-21.50
Eastern Pa.	25.00-25.50
St. Louis, 1¼-3½"	19.50-20.00

CAR WHEELS

Birmingham iron	18.00
Boston dist., iron	†16.50-17.00
Buffalo, steel	25.00-25.50
Chicago, iron	20.50-21.00
Chicago, rolled steel	23.25-23.75
Cincin., iron deal.	19.50-20.00
Eastern Pa., iron	23.00-23.50
Eastern Pa., steel	26.00-26.50
Pittsburgh, iron	22.00-22.50
Pittsburgh, steel	26.50-27.00
St. Louis, iron	21.00-21.50
St. Louis, steel	21.50-22.00

NO. 1 CAST SCRAP

Birmingham	18.50
Boston, No. 1 mach.	†17.50-18.00
N. Eng., del. No. 2	18.25-18.75
N. Eng. del. textile	22.00-23.00
Buffalo, cupola	20.50-21.00
Buffalo, mach.	22.00-22.50
Chicago, agri. net	16.00-16.50
Chicago, auto net	18.50-19.00
Chicago, railr'd net	17.50-18.00
Chicago, mach. net	18.50-19.00
Cincin., mach. deal.	21.50-22.00
Cleveland, mach.	24.00-24.50
Detroit, cupola, net	†17.50-18.00
Eastern Pa., cupola	24.00-24.50
E. Pa., No. 2	20.50
E. Pa., yard fdry.	20.50-21.00
Los Angeles	
Pittsburgh, cupola	21.50-22.00
San Francisco	14.50-15.00
Seattle	14.00-15.00
St. L., agri. mach.	19.50-20.00
St. L., No. 1 mach.	20.50-21.00
Toronto, No. 1 mach., net dealers	†19.75-20.00

HEAVY CAST

Boston dist. break.	†16.50-16.75
New England, del.	20.00-20.50
Buffalo, break.	18.00-18.50
Cleveland, break, net	18.50-19.00
Detroit, auto net	†18.00-18.50
Detroit, break.	†16.00-16.50
Eastern Pa.	22.50
Los Ang., auto, net	13.00-14.00
New York break	†17.00

STOVE PLATE

Birmingham	13.50
Boston district	†14.50-15.00
Buffalo	16.50-17.00
Chicago, net	13.50-14.00
Cincinnati, dealers	13.00-13.50
Detroit, net	†11.00-11.50
Eastern Pa.	19.00-19.50
New York fdry.	†14.00-14.50
St. Louis	15.00-15.50
Toronto dealers, net	†13.75-14.00

MALLEABLE

New England, del.	22.00-23.00
Buffalo	23.00-23.50
Chicago, R. R.	23.50-24.00
Cincin. agri., deal.	18.00-18.50
Cleveland, rail	25.00-25.50
Eastern Pa., R. R.	23.00-23.50
Los Angeles	
Pittsburgh, rail	25.50-26.50
St. Louis, R. R.	21.50-22.00

Ores

Lake Superior Iron Ore

Gross ton, 51½ %

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	10.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore 45-55% Fe., 6-10% Mang.	Nom
N. African low phos.	nom
Spanish, No. African basic, 50 to 60%	nom.
Chinese wolframite, net ton, duty pd.	$23.50-24.00
Brazil iron ore, 68-69%, ord.	7.50c
Low phos. (.02 max.)	8.00c
F.O.B. Rio Janeiro.	
Scheelite, lmp.	23.50-24.00
Chrome ore, Indian 48% gross ton, cif.	$36.00-37.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	
So. African, 48%	57.00-60.00
Indian, 49-50%	60.00-63.00
Brazilian, 46%	53.00-54.00
Cuban, 50-51%, duty free	67.50

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

Sheets, Strip

Sheet & Strip Prices, Pages 96, 97

Pittsburgh — Incoming business continues to run ahead of shipments. Output is at virtual capacity, with several local units running far ahead of rated output. All available semifinished tonnage is being rolled and it may be with adjustments in semifinished output, it will be possible to increase sheet tonnage later. Galvanized operations regained the point lost last week and are at 81 per cent of capacity.

Cleveland — Sales increase but less rapidly, with bookings centering in late second quarter or early third. Deliveries are somewhat erratic, in some cases much earlier than wanted by users and in others much later. Consumers keep in constant touch with producers to expedite deliveries. All grades are about equally tight.

Chicago—Current orders show no large increases over recent weeks, nevertheless are in excess of production capacity and serve to swell backlogs. Hot-rolled 18-gage and heavier sheets are offered for late July and 20-gage and lighter for late June. Enameling iron and cold-rolled are late July. Galvanized sheets are at about 18 weeks, with output restricted because of zinc shortage. Both narrow and wide strip deliveries range from 12 to 13 weeks.

Boston — Narrow cold strip buying is not slackening, incoming tonnage being booked ahead of shipments, although current orders are for May and June delivery on some finishes with first quarter capacity sold out. Deliveries are more extended, the situation on stainless being the most pressing, due to limited supplies of nickel. Priorities are also prevalent on stainless orders, but not on straight carbon on the general run of tonnage.

New York—Late May appears to be the best most producers can do on hot, cold-rolled and galvanized sheets, the June minimum apparently not far off. Some are out of the market for entire first half and some producers refuse to accept tonnage for delivery beyond, even on the basis of prices ruling at time of shipment.

Philadelphia—Orders have been less active in some directions recently, following rather broad coverage by buyers through first half. Mills are heavily booked for this quarter, with April and May the earliest delivery available on new business in most grades. Shipments on stainless sheets are even further extended.

Buffalo—Orders for sheet and strip steel continue to exceed shipments. Besides heavy demand from

defense industries, numerous consumers not linked with armament work are endeavoring to create an inventory supply to be safe against priorities cutting off future supplies.

Cincinnati — Sheet buying for second quarter is unabated. Steady demand for automobile manufacture, the trend being contrary to seasonal influences, increased mill burdens and has resulted in closer rationing. Orders are being compared to 1940 requirements.

St. Louis — Makers of sheets and strip report shipments at a heavy rate, but some decline in new orders, as most users are covered for the next two or three months. Mills report some protective orders, all of which specify prices at time of delivery. Production continues at or near capacity.

Birmingham, Ala.—Sheet production continues at virtual capacity. Bookings remain on a par with shipments in all major items. Strip output is on a relatively small scale.

Toronto, Ont.—Mills report heavy commitments on sheets with persistent flow of new orders in heavy volume, and still further heavy buying in prospect in connection with large war contracts now being placed. Producers experience difficulty in meeting all demands from tin plate mills.

Plates

Plate Prices, Page 96

Pittsburgh — Incoming specifications on plates, both alloy and carbon steel, continue to exceed shipments. Releases on wide plates show no signs of slackening. Deliveries are further behind, although this condition is partially offset by the fact that buying is being done further in advance than previously. There is little current business which does not carry priority.

Cleveland — Even narrow plates are scarce as two narrow plates are being used in place of one wide plate in many applications. American Shipbuilding Co. will build four trawlers, requiring 1200 to 1500 tons of steel, mostly plates, for General Sea Foods Corp., two to be built at Lorain and two at Cleveland. A wind tunnel for an aeronautical laboratory at Cleveland will require several thousand tons. It is probable that more sheet mills will turn to plate manufacture.

Chicago—Late June is being quoted on plates as the heavy construction industry continues to place heavy orders. Deliveries on 30 to 84-inch sheared plates and universal plates have been moved back three weeks. Car building and repair shops are well engaged on defense orders, and fabricators of tanks, boilers and heavy machinery are booked three to four months ahead.

Boston — Heavy and growing demand for plates required in ship building is accompanied by fair miscellaneous buying, precluding any immediate improvement of deliveries. For ship construction, buyers in some instances have definite specifications in with mills with delivery specified into the last quarter. Marine boiler plate needs are mounting and floor plate inquiry is maintained.

New York—Twelve to 14 weeks can still be done on sheared plates, and in at least one instance a little tonnage appears available within 10 weeks. However, mill backlogs are accumulating, with some producers practically out of the market for first half. Releases for the 200 navy ships placed last September are beginning to appear and will probably reach their peak around April. Rollings on this tonnage will begin shortly as space on mill schedules have been tentatively provided for for some time.

Philadelphia — Plate deliveries hold around three to four months, although heavy demand for some large sizes is deferring shipment as much as six months. Some producers who recently were able to give relatively early delivery now are in a less favorable position as a result of heavier bookings.

Birmingham, Ala. — Mills are heavily booked on plates and delivery is increasingly difficult. Most business is from shipbuilding and car manufacturing, with demands for tanks and miscellaneous uses.

Seattle—Heavy tonnages for shipbuilding predominate, additional orders being placed as construction proceeds. Associated Shipbuilders, Seattle, is reported to have divided 3500 tons of shapes and plates between the two leading steel interests. Albina Engine & Machine Works, Portland, which will construct five naval tankers, will require 5000 tons of plates and 4000 tons of shapes.

Toronto, Ont.—Further improvement in plate demand is indicated in the government's announcement that orders will be placed immediately for 3000 war tanks, early awarding of contracts for 750 freight cars for Canadian National railways, and further expansion of shipbuilding. It is stated that the output of the new plate mills, now nearing completion at Hamilton, will be fully absorbed for government work.

Plate Contracts Placed

3996 tons, two C-2 type cargo vessels for United States maritime commission, to Western Pipe & Steel Co., San Francisco.

3600 tons, five submarine rescue vessels for the navy, to Moore Drydock Co., Oakland, Calif.

400 tons, peg top buoys for the navy, to California Steel Products Co., San Francisco.

250 tons, water pipe line, Bremerton, Wash., to Hydraulic Supply Mfg. Co., Seattle.

100 tons, filter tanks for Puget Sound Pulp & Timber Co., Bellingham, Wash., to Hydraulic Supply Mfg. Co., Seattle.

100 tons, or more, 7500-barrel spheroid water tank, United States engineer, Tulsa, Okla., to Chicago Bridge & Iron Co., Chicago.

Plate Contracts Pending

27,318 tons, fabricated plates, also 460 tons steel bolts and washers, Panama, schedule 4762; bids Feb. 10, Washington; mostly three-inch plates, tensile strength, 70,000 lbs. per square inch minimum; deliveries April 1 and to Jan. 15, 1942; to be awarded in 11 groups; drawings now available for first three with drawings to follow on others.

3500 tons, penstocks for Pacific Gas & Electric Co., San Francisco; bids Feb. 10.

1672 tons, two lots fabricated high-strength low-alloy steel plates, partly three-inch, machinery room deck, Panama, schedule 4787, bids Feb. 14, Washington; delivery within 160 days after award.

1200 to 1500 tons, four ocean-going trawlers, American Shipbuilding Corp., Cleveland, for General Sea Foods Co.; two to be constructed at Lorain, O., and two at Cleveland.

200 tons, bureau of supplies and accounts, navy schedule 5234, delivery Mare Island, Calif., bids Feb. 21.

Unstated, pipe and fittings for Coulee power plant; bids to Denver, Feb. 26.

Unstated, four gas storage tanks at Portland, Oreg., and Boise, Idaho; bids in to United States engineer, Portland.

Bars

Bar Prices, Page 96

Pittsburgh — Specifications are heavier than shipments. There has been better tonnage release on export business, principally British, a large part of which is cold-finished material. Current bookings cannot expect delivery much before June, particularly if there is no defense priority.

Cleveland — Producers are selling mostly into late second quarter or early third. Alloy bars carry more extended deliveries than carbon grades. New business does not abate though increasing less rapidly, with some companies believing the volume is about to level off.

Chicago—Bar orders flow into mills at a rate exceeding production and deliveries move farther. On carbon bars, the range is late March to August, depending upon size and grade. Alloy bars are in the neighborhood of 16 to 20 weeks, heat treated material 20 to 25 weeks, and electric furnace grades up to 38 weeks. Within the next two or three months, new shell capacity will go into production.

Boston—Forging shop needs for alloy stock are heavy and maintained substantial volume of fabri-

cated parts going to the aircraft industry increasingly. Forgers are covered well ahead, as are other suppliers of aircraft parts. Consumption of alloy bars in other directions is tending upward, notably on defense work. More and more current bar volume revolves around defense requirements on which voluntary preference is given. Less protected forward buying of hot carbon and cold-drawn bars is heavy.

New York—Great Britain is figuring actively on some shell tonnage for the first time in several weeks, about 30,000 tons, with a possibility that it may run much heavier. The delivery situation continues to concern consumers, who are trying to anticipate requirements as much as mills will allow. However, few consumers in this district have suffered because of delay in contract deliveries.

Philadelphia—Sustained buying of merchant bars is having little effect on deliveries. So long as consumption maintains its current active pace producers expect continuation of extended forward buying. Warehouses are furnishing a large part of present bookings.

Birmingham, Ala.—Bar production is above 85 per cent. Merchant bars are in wide demand and current bookings equal shipments, which, with backlogs, assure steady production indefinitely. Gratifying tonnages of concrete reinforcing bars also are being booked.

Buffalo — With bar backlogs already of record size and buying continuing, mills seek first to supply consumers in need of stock for immediate use. Carbon bar deliveries now stretch into late May or June and heat-treated alloy stock into October or November.

Toronto, Ont.—Orders for merchant bars in January passed the heavy volume of December and orders and inquiries indicate continued buying. Mills are practically sold for first half and some orders run into third quarter. The automotive industry continues to take large tonnages, while heavy call is reported from implement makers, war industries and building trades.

Pipe

Pipe Prices, Page 97

Pittsburgh—Normal seasonal increase in oil country business is beginning to appear, which, added to the heavy demand for standard pipe, keeps the operating rate high. Buying of pressure tubing is off somewhat, although January bookings were heavy. Releases on mechanical tubing continue high.

Cleveland — Merchant pipe demand continues beyond all expectations. What had been large stocks

in producers' warehouses a few weeks ago are now too low for comfort. Line pipe is the most active in several months as consumers place usual spring orders early. Casings are slow.

New York — Merchant pipe is one of the few major products in which there is no particular tension in deliveries. Except in mechanical tubing, steel pipe shipping schedules are not much beyond normal. However, as spring approaches this situation is expected to tighten. Line pipe tonnage is moving slowly, although several sizable projects are being tentatively considered here for action within another month or so.

Boston — Distributor stocks of merchant steel pipe are generally well balanced and in some instances slightly above normal for this period, in view of expected seasonal improvement in industrial and miscellaneous demand. Replacement deliveries are near normal and mill prices firmer, which is being increasingly reflected in resale quotations.

Birmingham, Ala. — Most pipe plants are operating regularly on a five-day schedule. Individual orders are not large, but aggregate tonnage is satisfactory. An occasional six-day week is reported.

Seattle—New projects are developing and immediate prospects have improved. Hillsboro, Oreg., has awarded 8300 feet of steel pipe to Consolidated Supply Co., Portland, Oreg., and fittings to miscellaneous firms. Tacoma has opened bids for an unstated tonnage of 6 and 12-inch cast iron pipe alternates for transite.

San Francisco — Only one cast iron pipe inquiry of size is in the market, 2000 tons of 14 and 16-inch pipe for McMinnville, Oreg., bids on which have been accepted on various types of pipe and no award has yet been made. Demand for small lots continues to hold up well. Awards so far this year aggregate 4063 tons, compared with 1027 tons for the corresponding period last year.

Cast Pipe Placed

750 tons, 4 to 20-inch, Hartford, Conn., to United States Pipe & Foundry Co., Burlington, N. J.

667 tons, various sizes, water lines, Fort Sam Houston, Tex., to United States Pipe & Foundry Co., Birmingham, Ala.; Trueheart & Caldwell, San Antonio, Tex., contractors.

100 tons, 8-inch, Everett, Mass., to Warren Pipe Co., Everett.

Cast Pipe Pending

165 tons, 6-inch, cement-lined, Panama, schedule 4794; bids Feb. 14, Washington; also 1200 feet, 12-inch black welded steel pipe, schedule 4796, same date.

Wire

Wire Prices, Page 97

Pittsburgh — Deliveries are running somewhat behind on certain manufacturers' wire items for which specifications have been unusually heavy in recent weeks. Merchant buying continues on the same basis, with jobbers' orders fairly heavy, although the total does not run ahead of shipments. Deliveries are being made as promised, with merchant items approximately two months ahead.

Cleveland — Wire rods are still scarce. Manufacturers' basic wire can still be had in three weeks. Farm demand for spring will assert itself soon and make the situation tenser. Nails are in free supply despite heavy sales in recent months.

Chicago — Wire orders are strong, with manufacturers' grades well ahead of merchant products. It is expected increased government orders for fencing, nails and staples, will reach a peak in April or May. Production is limited by availability of semifinished material.

Boston — With protective orders for third quarter appearing, wire

mill backlogs are heavy, with incoming tonnage still ahead of shipments in the aggregate. Production continues at practically capacity, but is kept down in some cases by the lack of rods. Demand is widely diversified, a long range of specialties being included, and shipments to the automotive trade are heavy. Capacity for current quarter is sold on most items.

New York — Wire orders are heavy with backlogs still mounting, although in most instances at a less accelerated pace. Volume is ahead of shipments, but mills are scrutinizing tonnage more carefully and covering regular customers on current needs. Slight progress is being made in reduction of wire rope backlogs, mills operating at capacity.

Birmingham, Ala.—Wire capacity is largely taken up for first quarter. Releases from manufacturers probably were somewhat higher in January than in December, and backlogs have shown little decline.

Rails, Cars

Track Material Prices, Page 97

Car and locomotive buying, which has been active for several weeks, has diminished and last week saw no large purchases. In addition to freight car and locomotive orders on builders' books considerable business has been taken for defense work well suited to carbuilding equipment. This has added considerably to activity in this industry.

Domestic freight car awards last month, involving 15,169 units, were the heaviest since October, 1939, when 19,634 cars were placed. They exceeded the 12,195 cars placed in October, 1940, which was the largest total last year. Further comparisons follow:

	1941	1940	1939	1938
Jan.	15,169	360	3	25
Feb.		1,147	2,259	109
March		3,104	800	680
April		2,077	3,095	15
May		2,010	2,051	6,014
June		7,475	1,324	1,178
July		5,846	110	0
Aug.		7,525	2,814	182
Sept.		9,735	23,000	1,750
Oct.		12,195	19,634	2,537
Nov.		8,234	2,650	1,232
Dec.		7,181	35	2,581
Total		66,889	57,775	16,303

Car Orders Placed

Chicago & North Western, 500 fifty-ton box cars to Pullman-Standard Car Mfg. Co., Chicago; 200 seventy-ton ore cars to Bethlehem Steel Co., Bethlehem, Pa.; 250 gondolas to Bethlehem Steel Co., formerly reported in error to American Car & Foundry Co., New York.

Car Orders Pending

Atchison, Topeka & Santa Fe, ten to

twelve 50-ton light-weight box cars; bids asked.

Bureau of supplies and accounts, navy department, Washington, 15 flat cars, delivery Brooklyn; bids Feb. 14, schedule 5231.

Chicago, St. Paul, Minneapolis & Omaha, 700 cars; bids asked.

Norfolk & Western, 15 passenger coaches; bids Feb. 25.

Rail Orders Pending

Quartermaster, Fitzsimons general hospital, Denver, 175 tons, open hearth rails; bids Feb. 18.

Locomotives Placed

Detroit, Toledo & Ironton, four 2-8-2 freight engines, to Lima Locomotive Works, Lima, O.

United States army engineers, Washington, five 20-ton and two 30-ton diesel mechanical locomotives to Davenport-Besler Corp., Davenport, Iowa, and one 30-ton to Midwest Locomotive Works, Hamilton, O.

Locomotives Pending

Bureau of supplies and accounts, navy department, one 50-ton diesel-electric locomotive with spares, delivery White Plains, Md.; bids Feb. 18, sch. 5262.

Bureau of supplies and accounts, navy department, one diesel-electric locomotive and spare parts, delivery Dahlgren, Va.; bids Feb. 18, schedule 5261.

Grand Trunk Western, several steam locomotives; bids asked.

Shapes

Structural Shape Prices, Page 96

Pittsburgh—It is now virtually impossible to place shape tonnage for delivery during first half unless it is for the defense program. The result has been a swing in new inquiries to defense needs only. Tonnages during January ran around 60 per cent direct defense material.

Cleveland — Promised deliveries continue to slip behind, though not so rapidly. Fabricators lack sufficient labor in many cases. Recently a national fabricating company secured riveters from Chicago to do work in the Cleveland area. In several cases fabricators have delivered steel long ahead of consumers' needs, lacking storage space.

Chicago—Only a few orders for structural shapes have been placed in this district in the last week and no inquiries of importance have come out. In spite of this fabricators are operating at nearly full capacity on orders already booked and experience difficulty in obtaining material from mills. Deliveries on standard shapes range from 13 to 18 weeks.

Boston—Construction involved in defense, expansion of shipbuilding facilities, industrial plant additions and affiliated projects account for most structural activity. Also included are hangars at Manchester, N. H., and Bangor, Me., 700 tons.

Philadelphia—Occasional large orders for fabricated material are being placed, most being for defense projects. While considerable work is in prospect, volume is expected to fall short of the recent rush in acquiring facilities for armament production.

Seattle—Fabricators have so much work in hand that they are not interested except for especially attractive projects. No large tonnages were reported placed this week but small jobs are numerous and add considerably to the total. The two large steel interests are furnishing important tonnages to shipbuilding plants in Oregon and Washington and additional contracts are pending.

Toronto, Ont. — Recently announced expansion in Canada's war

Shape Awards Compared

	Tons
Week of Feb. 8	31,960
Week ended Feb. 1	24,081
Week ended Jan. 25	98,582
This week, 1940	18,917
Weekly average, 1941	48,006
Weekly average, 1940	28,414
Weekly average, Jan.	51,215
Total to date, 1940	82,084
Total to date, 1941	288,033

Includes awards of 100 tons or more.

industry is reflected a new flood of large orders for structural steel. Among the larger orders pending are 7000 tons for ammunition plants in Quebec.

Shape Contracts Placed

4500 tons, factory, North American Aviation Corp., Kansas City, Kans., to Muskogee Iron Works, Muskogee, Okla.

4000 tons, bridge requirements, second and third quarters 1941, various locations, Great Northern railroad, to American Bridge Co., Pittsburgh.

3600 tons, 40 inert storage buildings, Kingsbury ordnance plant, La Porte, Ind., for government, to American Bridge Co., Pittsburgh; Bates & Rogers Contracting Co., contractor.

2664 tons, two C-2 type cargo vessels, United States Maritime Commission, to Western Pipe & Steel Co., San Francisco.

2400 tons, five submarine rescue vessels for navy, to Moore Drydock Co., Oakland, Calif.

2200 tons, power plant, Consolidated Gas, Electric Light & Power Co., Baltimore, to Belmont Iron Works, Philadelphia.

1500 tons, armor tempering plant, Midvale Co., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

1269 tons, plant, Continental Can Co., St. Louis, Austin Co., Chicago, contractor, to Joseph T. Ryerson & Son Inc., Chicago.

1220 tons, plant addition, American Radiator and Standard Sanitary Corp., Trenton, N. J., to Bethlehem Steel Co., Bethlehem, Pa., through Eastern Construction Co., Trenton, N. J.; bars to Truscon Steel Co., Youngstown, O. and 300,000 square feet mesh to American Steel & Wire Co., Cleveland.

1200 tons, buildings, navy yard, Mare Island, Calif., specification 10221, allocated as follows: 500 tons each to Herrick Iron Works and Independent Iron Works, Oakland, Calif., and 200 tons to Judson-Pacific Co., San Francisco.

850 tons, airplane hangar and office building, Cleveland, for government, to American Bridge Co., Pittsburgh; R. P. Carbone Contracting Co., contractor.

723 tons, hangars, United States navy, Robertson, Mo., Lecoutour-Parsons Construction Co., St. Louis, contractor, to Bethlehem Steel Co., Bethlehem, Pa.; bids Jan. 7.

700 tons, Adams City bridges, Denver, for state, to American Bridge Co., Pittsburgh; A. S. Horner, contractor.

525 tons, Touhy avenue underpass, Park Ridge Ill., Cook county, Illinois, to American Bridge Co., Pittsburgh.

514 tons, miscellaneous state bridges, Denver, to American Bridge Co., Pittsburgh; bids Jan. 24.

476 tons, state highway bridge, RC-41-1, Warrensburg-Thurman station, Warren county, New York, to Phoenix Bridge Co., Phoenixville, Pa.; Green Island Construction Co. Inc., Green Island, N. Y., contractor; Albany Steel & Supply Co., Albany, 39 tons, reinforcing bars.

375 tons, launchway girders, New York Shipbuilding Corp., Camden, N. J., to American Bridge Co., Pittsburgh; Merritt-Chapman & Scott, contractor.

350 tons, boiler supports, Birmingham, Ala., to Virginia Bridge Co., Roanoke, Va., through Combustion Engineering Co., New York.

314 tons, factory building BB, Caterpillar Tractor Co., Peoria, Ill., Fred Harbers Sons, Peoria, Ill., contractor, to Joseph T. Ryerson & Son Inc., Chicago.

300 tons, mechanical engineering building, Worcester Polytechnical Institute, Worcester, Mass. to Stafford Iron Works, Worcester, Mass.

202 tons, state highway bridge, Fort Riley, Kans., to St. Joseph Structural Steel Co., St. Joseph, Mo.

200 tons, cold storage building, project 37, naval station, Quonset Point, R. I., to Belmont Iron Works, Eddystone, Pa.; Merritt-Chapman & Scott and George A. Fuller Co., New York, contractors.

155 tons, Tower road grade separation, Winnetka, Ill., for Cook county, Illinois, to American Bridge Co., Pittsburgh.

150 tons, booster loading line, Kingsbury ordnance plant, war department, Union Center, Ind., Bates & Rogers Construction Corp., Laporte, Ind., contractor, to Mississippi Valley Structural Steel Co., Decatur, Ill.

135 tons, beams for gate tracks, Delhi, O., for war department, to American Bridge Co., Pittsburgh.

118 tons, physics and biology laboratory, Oberlin college, Oberlin, O., to Ingalls Iron Works, Birmingham, Ala.

100 tons, boat house, project 40, naval station, Quonset Point, R. I., to Belmont Iron Works, Eddystone, Pa.; Merritt-Chapman & Scott and George A. Fuller Co., New York, contractors.

Unstated tonnage, additional factory unit, Remington Arms Co., Ilion, N. Y., to Utica Structural Steel Co., Utica, N. Y.; Morton C. Tuttle Co., Boston, contractor.

Shape Contracts Pending

10,000 tons, ordnance plant, Denver, Colo., for war department.

3930 tons, bridge over Miraflores Locks,

including swing spans and east approach swing superstructures, Panama, schedule 4659, bids March 12, Washington: details, 2525 tons fabricated structurals for approach viaduct; 1225 tons, fabricated structurals for movable bridge and appurtenances; 190 tons, machinery and electrical equipment; third locks project.

3500 tons, plant, Thompson Products Inc., Cleveland; bids Feb. 12, Albert Kahn Inc., Detroit, engineer.

2300 tons, car storage and drive-away building, Buick Motor division, General Motors Co., Flint, Mich.

1800 tons, power house extension, Public Service Electric & Gas Co., Burlington, N. J.

1600 tons, Ninth street bridge, over Pennsylvania and Baltimore & Ohio railroads, Washington, for Pennsylvania railroad.

900 tons, shop, Boston, for navy.

815 tons, ramp connection, board of transportation, Brooklyn, N. Y., Rusciano Construction Co., New York, low; bids Feb. 4.

800 tons, machine shop, Bethlehem Steel Co., shipbuilding division, Fore River yards, Quincy, Mass.

750 tons, warehouse, Henry Ericsson Co., Chicago.

750 tons, buildings for municipal airport, Mills Field, San Francisco; bids opened.

750 tons, power station, Philadelphia Electric Co., Chester, Pa.

675 tons, No. 10 building and west leanto, General Steel Castings Corp., Granite City, Ill.

500 tons, storehouse, South Boston, Mass., for navy.

500 tons, building, Chrysler Corp., San Leandro, Calif.; bids opened.

450 tons, building, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

350 tons, government buildings, Pittsburgh and Pottsville, Pa.

350 tons, hangar, boiler house and other buildings, Bangor, Me.; D. A. Sullivan & Sons, Northampton, Mass., low; bids Jan. 23, U. S. engineer, Boston, inv. 47.

350 tons, hangar, boiler house and other buildings, Manchester, N. H.; D. A. Sullivan & Sons, Northampton, Mass., low; bids Jan. 23, U. S. engineer, Boston, inv. 48.

315 tons, bridge over Neosha river, Erie, Kans., Missouri, Kansas & Texas railway.

300 tons, storage building addition, Sinclair Refining Co., Wellsville, N. Y.

275 tons, factory addition, Caterpillar Tractor Co., East Peoria, Ill.

250 tons, state bridge, Petersburg, W. Va.

225 tons, bolt and nut plant, Upson works, Republic Steel Corp., Cleveland.

225 tons, car repair shop, Atchison, Topeka & Santa Fe railway, West Wichita, Kans.

215 tons, ten railroad bridges, ordnance plant, Elwood, Ill.

190 tons, Parr's Restaurant Corp., Kresge store No. 56, Louisville, Ky.

175 tons, additions, National Aniline & Chemical Co., Buffalo.

161 tons, one lot fabricated structural steel grillage, machinery room deck, Panama, schedule 4787; bids Feb. 14, Washington; delivery within 160 days after award.

157 tons, two bridges, Bakersfield, Calif., for state; bids opened.

150 tons, axle shop addition, American Locomotive Co., Schenectady, N. Y.

150 tons, store to be leased by W. T. Grant Co., Buffalo.

135 tons, additions, Puget Sound navy yard, Wash.; bids in.

115 tons, extension docking gear building, requisition NSA 9/10879, Bremerton, Wash.; bids opened.

115 tons, cooling bed building extension, Standard Steel Works division, Baldwin Locomotive Works, Burnham, Pa.

105 tons, transformer testing building, Cornell university, Ithaca, N. Y.

100 tons, cyclotron building, University of California, Berkeley, Calif.; bids in.

Unstated tonnage, TNT plant, government, Sandusky, O.

Reinforcing

Reinforcing Bar Prices, Page 97

Pittsburgh—Inquiries are somewhat lighter, regarded as a temporary situation. It is apparent from the number of projects still in prospect that there will be considerable business through at least first half in connection with the defense program and the attending expansion in industry. Prices are strong.

Cleveland — Some claim that concrete bars are firmer and scarcer, with some jobbers clamoring for tonnage. Leading maker sells firmly at 1.90 cents, base, 20 tons or more, and 2.05 cents for smaller lots.

Chicago — Inquiries for reinforcing steel are coming out faster than orders. Many jobs, particularly those involving government contracts, are slow in closing. Little shading of price is noted, with rail

steel bars commanding the same figure as billet steel.

Boston—While the larger concrete bar tonnages have been placed, small-lot buying is maintained at a good rate. Housing projects account for most large inquiry.

New York—Contract for 1200 tons, Coney Island sewer contract 5, is outstanding among reinforcing bar awards, which are lower, with inquiry less active. Export demand for Panama and naval bases under construction is brisk. Despite extended deliveries and low nearby stocks, prices continue to be shaded in some instances, although distributors are more cautious in taking on tonnage for the far future.

Philadelphia — Fairly large tonnages are expected out for bids the next few weeks. Recent awards, however, have been confined principally to small lots. Prospective business consists largely of defense plants and public projects.

San Francisco—Although demand for reinforcing bars is strong most inquiries are in lots of less than 100 tons. Awards totaled only 505 tons and this brought the year's aggregate to 7407 tons, compared with 11,831 tons for the same period last year.

Reinforcing Steel Awards

4000 tons, ordnance storage depot, project 2, Ravenna, O., to Republic Steel Corp., Cleveland, through Hunkin-Conkey Co., contractor.

2580 tons, warehouses, Elwood ordnance plant, war department, Wilmington, Ill., to Carnegie-Illinois Steel Corp., Chicago; Sanderson & Porter, Joliet, Ill., contractor; bids Jan. 22.

1200 tons, contract 5, sewage plant, Coney Island, Brooklyn, N. Y., to Joseph T. Ryerson & Son Inc., Chicago; E. W. Foley Inc., Brooklyn, N. Y., contractor.

735 tons, building for production of superchargers, General Electric Co., Everett, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., Boston, contractor.

620 tons, reconstruction after fire, technological institute, Northwestern university, Evanston, Ill., to Joseph T. Ryerson & Son Inc., Chicago.

500 tons, Elmwood Place and Pyramid Court housing, Cairo, Ill., to Truscon Steel Co., Youngstown, O.

450 tons, plant, Coca Cola Bottling Co. of Chicago, Fullerton and Narraganset avenues, Chicago, to Bethlehem Steel Co., Bethlehem, Pa.

362 tons, Panama schedule 4756, to Bethlehem Steel Export Corp., New York; bids Jan. 30.

300 tons, highway department, Brockton, Mass., to Northern Steel Co., Boston; bids Jan. 7.

300 tons, store, Sears, Roebuck Co., Pittsburgh, to Bethlehem Steel Co., Bethlehem, Pa.; J. M. Baldwin, contractor.

300 tons, factory, Bohn Aluminum & Brass Co., Detroit, to Jones & Laughlin Steel Corp., Pittsburgh, through Taylor-Gaskin Inc.; Kreighoff Co., contractor.

250 tons, shop unit, Bullard Co., Bridgeport, Conn., to Bethlehem Steel Co., Bethlehem, Pa., through Turner Construction Co., New York.

243 tons, factory, Johnson Wax Co., Racine, Wis., Lockwood-Greene, engineers, to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, elevated highway section, contract B-10, Triborough bridge authority, Brooklyn, N. Y., to Truscon Steel Co., Youngstown, O., through Ross Galvanizing Co., Brooklyn, N. Y.

175 tons, addition, launchways, Electric Boat Co., Groton, Conn., to Truscon Steel Co., Youngstown, O.

163 tons, highway bridge 2070, Pulaski county, Indiana, Stuntz-Yeoman Co., Frankfort, Ind., contractor, to Olney J. Dean Steel Co., Cicero, Ill.

160 tons, viaduct, Eleventh avenue, New York, New York Central railroad, to Bethlehem Steel Co., Bethlehem, Pa.; Elmhurst Contracting Co., contractor.

152 tons, building, Frantz Mfg. Co., Sterling, Ill., to Calumet Steel Co., Chicago.

150 tons, naval depot project, Keyport,

Concrete Bars Compared

	Tons
Week of Feb. 8	13,771
Week ended Feb. 1	6,976
Week ended Jan. 25	12,523
This week, 1940	7,320
Weekly average, 1941	10,855
Weekly average, 1940	9,661
Weekly average, Jan.	10,272
Total to date, 1940	53,491
Total to date, 1941	65,130

Includes awards of 100 tons or more.

Wash., to Truscon Steel Co., Youngstown, O.; Nelse Mortensen & Son, Seattle, contractor.

150 tons, WPA project, Omaha, Neb., to Sheffield Steel Corp., Kansas City, Mo., through Pittsburgh-Des Moines Steel Co., Pittsburgh.

130 tons, bridge 2069, Reelsville, Ind., R. L. Schutt Co., Indianapolis, contractor, to W. J. Holliday & Co., Indianapolis; bids Dec. 3.

125 tons, test cells, Wright Aeronautical Corp., Paterson, N. J., to Truscon Steel Co., Mahoney-Toast Construction Co., Paterson, contractor.

114 tons, also 14 tons miscellaneous, Deschutes irrigation project, Oregon state; Sam Orino, Portland, contractor; materials furnished by reclamation bureau.

112 tons, project R-2039, Greendale, Ind., to Truscon Steel Co., Youngstown, O.

100 tons, miscellaneous buildings, war department, Camp Grant, Rockford, Ill., to Calumet Steel Co., Chicago.

100 tons, library, St. Olaf's college, Northfield, Minn., Midwest Construction Co., Minneapolis, contractor, to Hustad Co., Minneapolis.

100 tons, grade crossing elimination PSC 6582, Erie county, New York, to American Steel & Wire Co., Cleveland; Elis G. DeLia & Co., New Hartford, N. Y., contractor.

Reinforcing Steel Pending

5000 tons, housing project, New Haven, Conn.; bids Feb. 26.

1499 tons, 151 powder storage igloos, proving ground, war department, Savanna, Ill.; bids Feb. 7.

1200 tons, 137 underground magazines, Savannah, Ill.; bids Feb. 7.

900 tons, conveyor ramp, ordnance plant, Elwood, Ind.; bids Jan. 31.

721 tons, Panama Canal schedule 4794 bids Feb. 14.

700 tons, rounds, 30-foot lengths, also 21 tons, 1¼-inch squares, Panama schedule 4794; bids Feb. 14, Washington.

575 tons, bureau of reclamation, invitation 48-759-A, Friant, Calif.; bids Feb. 12.

441 tons, Panama Canal schedule 4815; bids Feb. 19.

400 tons, ordnance plant, Westinghouse Electric & Mfg. Co., Canton, O.

400 tons, inspection shed, Brooklyn, N. Y., board of transportation, New York; bids Feb. 10.

400 tons, housing project, Hartford, Conn. 3-4; Cauldwell-Wingate Co., New York, low, $3,597,000, base proposal No. 1; bids Feb. 3.

350 tons, bridge, Halfway creek, pro. 1D-4, Colonial Historical National Park, James City county, Virginia; bids Feb. 21, public roads administration, Washington.

270 tons, city purchasing department, Cincinnati; bids Feb. 18.

260 tons, coal storage building, Emge Packing Co., Ft. Branch, Ind.

255 tons, twisted square bars, diversion tunnel, Neversink, N. Y.; bids Feb. 18, board of water supply, New York.

230 tons, procurement invitation 38261, San Juan, Porto Rico; bids Feb. 6.

213 tons, parking deck, Boston store, Milwaukee; bids Jan. 31.

150 tons, building, Bell Telephone Co., Flint, Mich.

146 tons, two bridges, Bakersfield, Calif., for state; bids opened.

142 tons, arch viaduct, Lewis county, Washington for bureau public roads; bids opened.

140 tons, plant, Franz Mfg. Co., Sterling, Ill.

137 tons, bureau of reclamation, invitation 32,988-A, Tucumari, New Mex.; bids Feb. 12.

130 tons, three pumping stations, Kansas City, Kans., army engineers.

113 tons, physics and biology laboratory, Oberlin college, Oberlin, O.; bids last week.

100 tons, sewer project, Saginaw, Mich.

Unstated, Alcoa control house for Bonneville project; Viesko & Hannaman, Salem, Oreg., low.

Unstated, garage and warehouse, Pacific Telephone & Telegraph Co., Portland; bids Feb. 18; A. E. Doyle and Associates, Portland, architects.

Pig Iron

Pig Iron Prices, Page 98

Pittsburgh—According to pig iron interests here, maintenance will be the principal problem from now on. Apparently the output of iron, which in January hit a new high for the district of approximately 1,300,000 tons, will be sufficient to maintain steelworks operations and supply foundry needs at present capacity rates. However, iron producers do not expect to maintain this rate. First change in blast furnace output came last week with one stack at Jones & Laughlin Steel Corp.'s Aliquippa works down for repairs. The coke situation has eased considerably, with much addi-

tional beehive capacity going into operation during January.

Cleveland — Moderate activity is noted, with shipments running smoothly. Second quarter books will not be opened for another month. Producers insist that all current quarter scheduled deliveries be specified in time by consumers; otherwise second quarter prices will be charged, though at the moment no higher prices are in prospect. Producers no longer guarantee strict analyses of former days when stocks on yards were more complete. Some melters, particularly steel foundries, work seven days a week. Many foundries generally work six days, with practically none under five.

Chicago — Some pig iron sellers are virtually out of the market, with blast furnaces almost completely booked for first quarter. Gray iron foundries are working at high capacity and are fairly well covered. Furnaces have been able to accommodate customers without too much delay, but the situation is getting tighter.

Boston — Pig iron shipments are closer aligned to current melt than usual, due largely to scrutiny of releases which amounts to rationing. Melt continues high by foundries supplying castings for the machine tool trade.

New York—Pig iron specifications are expanding, following a slight contraction last month. Whether this increase will offset the fewer working days this month and send February ahead of January remains to be seen. Meanwhile, new orders are light, inasmuch as producers have little iron available for shipment this quarter and refuse to accept tonnage for second quarter.

Philadelphia — Inquiries are fairly numerous despite extensive coverage by consumers. Buyers are seeking second quarter contracts, but sellers generally are unwilling to accept bookings for that period and in no instances have prices been named. Attempts of some users to supplement previous orders in certain cases result from heavier consumption than had been anticipated.

Buffalo—Shipments of merchant iron are kept on a spot basis, but sellers refuse to accept additional tonnage for current quarter. Efforts of consumers to build reserve supplies are stemmed by sellers who are trying to check too extensive forward buying by keeping second quarter books closed.

Cincinnati — Shipments of pig iron, both Northern and Southern, continue heavy. Although a tight situation exists, melters do not face immediate shortage. No orders are being taken for second quarter and books of some furnaces were not opened this quarter. Fill-in buying, for a small aggregate tonnage, showed general acceptance of the $1 increase over fourth quarter prices.

St. Louis — Sellers of both northern and southern pig iron report further expansion in shipments. Preliminary reports indicate that the total for January will exceed that of any single month in 1940. There is some current buying, mainly small lots for prompt shipment or delivery over the balance of the first quarter. Generally melters are well covered for the first quarter.

Birmingham, Ala.—One pig iron producer has sold small tonnages for second quarter delivery at an advance of $1 per ton, without formal announcement. Other makers are not quoting or have no tonnage for sale.

Toronto, Ont.—Demand for merchant iron is heavier and producers scan specifications to prevent overbuying and accumulation of stocks. Deliveries are being made in sufficient tonnage to take care of current needs.

Tin Plate

Tin Plate Prices, Page 96

Pittsburgh — Specifications on general line and packers' cans are

Behind the Scenes with STEEL

7c For 1000 Hours

■ STEEL's editors have just about decided the proverbial one-armed paper hanger is nothing but a good-for-nothing lowdown loafer who never did a day's work in his life. Of course, these 22 gentlemen and one attractive young lady (count 'em!) wouldn't very well fill the role of paper doll editors, lounging comfortably in their swivel chairs and dummying up stale news with their pastepot and shears. A minimum of 1000 man hours of editorial working time goes into every issue of STEEL—working hours spent out digging for news that's *fresh*. We claim the 7c you or your company pays each week for the full time services of these 22 gentlemen (and one attractive young lady) is the world's greatest investment. Does anyone want to argue the point?

Raise You One

■ And maybe we should raise the ante one because E. C. Kreutzberg, who incidentally has accumulated over 30 years' experience in this field, just wired us from Washington that he has increased your staff there to improve even further the job of reporting the present beehive of government activity. Lynn Lamm, STEEL's head man at the capital, has been at double time for months, seven days a week. For a respite last Sunday he managed to squeeze in a flying trip to Cleveland and back.

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■ Incidentally, Editor Kreutzberg will undoubtedly have his expense voucher thoroughly scrutinized for splurging over his allotted ten words in that telegram to tell us that OPM is also commonly known in Washington as *Other People's Money*.

Every Man's Friend

■ If you don't already, we'd like for you to know Emil Ducommun, genial head of Ducommun Metals & Supply Co., 'way out in Los Angeles. That's where his very successful business is but it's always just as good a bet that he will be visiting a steel or brass mill down East, or a manufacturer of drills, screws, leather belting or what have you. With both a remarkable business acumen and a spirit of neighborliness, Emil believes in going out and finding out what his suppliers are doing. Occasionally, he makes us feel good by dropping in and talking things over. We remember back here a year or so ago when he opened a large plant addition he entertained over ten thousand people to commemorate the event, and not a few of them journeyed all the way from the Atlantic coast to

attend. Shown here with a couple of friends during the 1939 Mill Supply convention in Bermuda, Emil is on the left and under the cap. In the center is David Findlay, President of L. S. Starrett Co., and on the right with the cigar, Dave Davis, vice-president of Continental Screw Co.

Phoney Golf

■ The height of something or other is achieved by the proposal to camouflage a vast airplane assembly plant at Dallas, Tex., by installing a small golf course on the roof. When a squadron of Dorniers comes over in echelon of V's and sees a bunch of tired business men whopping the white pill around, little will they know that beneath tee and green thousands are furiously riveting together the fuselage members of a fleet of chasseurs. Other good disguises for airplane plant roofs might include football stadia, second-growth timber, outdoor roller rinks, or a desert waste full of transient Okies.

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coming in at an increased rate. To meet this, producers have increased output and the average is now estimated at 60 per cent of capacity. Part of this material is undoubtedly for inventory as buyers are beginning to stock up as insurance against demands arising out of the war. Normal expectation for this year places the amount of business at about the same as last year.

Scrap

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Pittsburgh — Notification of the scrap industry by the railroads of fixed minimum prices immediately placed all Pittsburgh quotations on a purely nominal basis. No. 1 railroad steel, which is being sold to brokers at $21 by railroads will bring $21.50 at mills, and that is the quoted spread. Dealers No. 1 is quoted at 50 cents less, and No. 2 at $1 less than the railroad figure, respectively. This situation has frozen the market into immobility, with the greatest concern being shown by consumers, who have approached brokers in an attempt to buy additional supplies and have been told that available quantities are insufficient and new supplies virtually impossible to obtain.

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50 cents and is still paying $16.50 and $15.50 for the two grades while others quote a dollar lower. As a result the higher price is attracting practically all the tonnage, with shipments to eastern Pennsylvania steelworks accounting for most tonnage for domestic melt. Demand for foundry grades is strong at firm prices, with supplies limited. No. 1 machinery cast is up 50 cents.

Philadelphia — Better weather has aided the flow of scrap slightly, but supplies still are limited, partly because of circumstances growing out of the recent move by the government to depress prices. With stocks of dealers and mills relatively light, any appreciable reduction in shipments through lack of sufficient tonnage would prove a handicap to steelworks. Most prices are unchanged, including heavy melting steel, but cast grades continue strong and active.

Buffalo—Cross-currents dominate a rather nervous scrap market. Agitation for a 50-cent cut in the current range of $20.50 to $21 for No. 1 heavy melting is without basis, so far, as recent small sales warrant the quoted range. The leading buyer of the area, however, is bidding 50 cents a ton below the inside figure of the range.

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San Francisco — The tendency in the San Francisco area is toward somewhat higher prices and quotations on No. 1 heavy melting steel, f.o.b. cars, metropolitan district hold at $15.00 to $15.50 a net ton, with No. 2 at $14.00 to $14.50 a net ton, compressed sheet at $13.00 to $13.50 a net ton and turnings and borings at $5.00 to $5.50 a net ton. Those in the Los Angeles metropolitan area are priced at $14.50 to $15.00 a net ton for No. 1, $13.50 to $14.00 a net ton for No. 2 heavy melting steel, $12.50 to $13.00 a net ton for compressed sheets and borings and turnings at approximately $4 a net ton.

Warehouse

Warehouse Prices, Page 99

Cleveland — Not for many years have distributors experienced such a long, steady drain on stocks, during most of which outgo from warehouses has exceeded receipts from mills. Some, however, report receipts from mills are improving. August is about the earliest now that mills will promise deliveries on current orders from warehouses. Plates are the tightest item.

Chicago — With orders heavy warehouses are beginning to experience a pinch in replenishing stocks, on account of lengthening mill deliveries. All warehouse materials, particularly bars, plates and structurals, are moving rapidly.

Boston—Except for a few products, warehouse steel prices are firm and unchanged. Demand is heavy with buying widely diversified. Problem of servicing regular customers from broken stock sizes with replacements delayed and difficult is a major factor, rather than selling. Demand for tool steels and alloys is strong, with inquiry from small manufacturing interests broadening.

Philadelphia — Business is heavy and well ahead of the volume a year ago although little changed from the average of the past 60 days. Prices generally are firm, though an occasional exception is noted.

Detroit—Sales from warehouse are

steady from widely diversified buyers. Stocks in most cases are in good shape, although there is some concern over the position of warehouses in the event of priorities being established on mill shipments of steel.

Cincinnati — Warehouse sales are heavy, about on a par with December. Demand for structurals continues a feature. On other standard items supplies are adequate.

St. Louis — Warehouses are still accommodating a large volume of business. January volume was reported the largest for the month since 1929. Plates are relatively the scarcest commodity.

Nonferrous Metals

New York—Priorities for zinc and copper continue to be actively predicted. Government officials so far have concentrated their actions in markets to an effort to bring about a reduction in scrap metal prices.

Lead—Sales remained heavy with the January turnover estimated some 10,000 tons in excess of domestic refined production and some 5000 tons over estimated shipments. Prices remained steady at 5.35c, East St. Louis.

Copper—Metals Reserve Co. has announced that the 200,000 tons of Latin American copper which will be received at the rate of 25,000 tons a month will be released to all consumers unable to get metal at 12.00c, Connecticut. This resulted in freer offerings and an accompanying increase in product sales. Prices remained steady.

Zinc—With producers' stocks negligible, common grade sellers are able to ship about 600 tons per week, all out of current production. No appreciable reduction in zinc scrap prices has developed and prime western has held at 7.25c, East St. Louis.

Tin—A reaction in the Far Eastern market allowed importers to lower their prices in the domestic market fractionally, Straits spot closing at 50.25c, New York.

Steel in Europe

Foreign Steel Prices, Page 99

London — (*By Cable*) — Steelmaking and pig iron output in Great Britain are expanding. Hematite pig iron is scarce and severely controlled, owing to the ore situation. Steel output continues intense and works on war contracts are obtaining reasonable deliveries. Heavy steel is mainly directed to shipyards. Plate mills are working to

Nonferrous Metal Prices

Feb.	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
1	12.00	12.00	12.25	50.50	50.37½	5.50	5.35	7.25	17.00	14.00	35.00
3	12.00	12.00	12.25	50.35	50.25	5.50	5.35	7.25	17.00	14.00	35.00
4	12.00	12.00	12.25	50.35	50.25	5.50	5.35	7.25	17.00	14.00	35.00
5	12.00	12.00	12.25	50.35	50.25	5.50	5.35	7.25	17.00	14.00	35.00
6	12.00	12.00	12.25	50.35	50.25	5.50	5.35	7.25	17.00	14.00	35.00
7	12.00	12.00	12.25	50.25	50.05	5.50	5.35	7.25	17.00	14.00	35.00

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	8.75
Zinc, 100 lb. base	12.50

Tubes

High yellow brass	22.23
Seamless copper	21.37

Rods

High yellow brass	15.01
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.73

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York	8.00-8.25
Cleveland	9.25-9.50
Chicago	8.62½-8.87½
St. Louis	8.37½-8.50

Heavy Copper and Wire

New York, No. 1	9.62½-9.87½
Cleveland, No. 1	10.00-10.50
Chicago, No. 1	9.75-10.00
St. Louis	9.62½-9.75

Composition Brass Turnings

New York	7.62½-7.87½

Light Copper

New York	7.62½-7.87½
Cleveland	8.00-8.25
Chicago	7.75-8.00
St. Louis	7.62½-7.75

Light Brass

Cleveland	5.00-5.50
Chicago	5.87½-6.12½
St. Louis	5.00-5.25

Lead

New York	4.60-4.70
Cleveland	4.50
Chicago	4.50-5.00
St. Louis	4.25-4.50

Zinc

New York	6.50
Cleveland	5.00-5.50
St. Louis	4.50-4.75

Aluminum

Mis., cast, Cleveland	14.00
Borings, Cleveland	8.50
Clips, soft, Cleveland	16.50
Misc. cast, St. Louis	13.25

SECONDARY METALS

Brass ingot, 85-5-5-5, l.c.l	13.25
Standard No. 12 aluminum	17.00

capacity. Special steels are in demand and output is increasing. Restrictions by government on steel supplies holds back further tin plate export trade.

Iron Ore

Iron Ore Prices, Page 100

Cleveland — Ford Motor Co. has inquired for 295,000 tons of ore for 1941 delivery, consisting of 100,000 tons of low alumina basic, 45,000 tons of manganiferous and 150,000 tons of high phosphorus ores. Shippers plan early resumption of shipping, with ice breakers ready to keep the Soo canal open. Prediction of shipments of 75,000,000 to 76,000,000 tons in 1941 are being made. It is estimated that ore at lower lake docks and furnaces May 1 will be 12,000,000 tons.

Ferroalloys

Ferroalloy Prices, Page 98

New York—In view of the particularly early action taken last time by ferroalloy producers it would not prove surprising to many in the trade if books were opened shortly for second quarter. Books for the current quarter, it is recalled, were opened by one leading interest early in November, more than a month ahead of the usual time, with others following shortly thereafter.

Upon this last occasion prices generally were reaffirmed and early action was taken principally, it was believed, to discourage undue speculative buying which might have developed if the opening of books had been delayed until two weeks or so before the beginning of the quarter as usual.

Meanwhile, specifications continue heavy, with movement largely limited to sellers' ability to produce. Sellers' reserve stocks, which less than a year ago were considered heavy, have been worked off to a considerable degree, it is said. The situation in most respects is becoming so tight that it would not surprise consumers if rigid priorities were put into effect fairly soon, ahead of any such action as might possibly be taken in steel products generally.

Ferromanganese is holding at $120, duty paid, Atlantic and Gulf ports; and spiegeleisen, 19 to 21 per cent, at $36, Palmerton, Pa.

To Manufacture Heavy Naval Guns in Canada

(*Concluded from Page* 43)

cific Railway Co., Calgary, Alta., are being extended to produce guns and mountings, latter also to be fabricated at one plant in Quebec. Depth charges, fire control gear and gun barrels will be produced at Burnaby. Gun mountings, gun forgings and naval shells will be manufactured in Nova Scotia; naval gun overhaul and naval projectiles in New Brunswick; and naval gun mountings at three plants, fire control gear, torpedo equipment and nautical instruments in Ontario.

Canadian Car & Foundry Ltd., Montreal, Que., last week reported order for 560 Hurricane planes, to be manufactured at Ft. William, Ont. Company recently completed its first contract for 40 planes, is now producing 10 machines daily. This rate is scheduled to be doubled soon, according to H. V. Drury, president.

Munitions and supply department reported 1788 new orders last week, totaling $12,557,722. Two 9300-ton steel cargo ships were placed with Burrard Dry Dock Co., Vancouver, B. C., at $3,600,000. United States firms received orders totaling $1,289,068. Awards included:

Dockyard supplies: B. Greening Wire Co. Ltd., Hamilton, Ont., $7083; Harley-Kay Co., Georgetown, Ont., $10,925.

Instruments: British Air Ministry, England, $8301; British Admiralty, England, $5600; Ontario Hughes-Owens Co. Ltd., Ottawa, Ont., $13,777; Research Enterprises Ltd., Toronto, $230,980.

Electrical equipment: British Air Ministry, England, $100,000; Canadian General Electric Co. Ltd., Ottawa, $13,708; Northern Electric Co., Ottawa, $11,351; Canadian Telephone & Supplies Ltd., Toronto, $22,442; Northern Electric Co. Ltd., Toronto, $5019.

Machinery: Canadian Fairbanks-Morse Co. Ltd., Ottawa, $29,293; International Harvester Co. of Canada Ltd., Ottawa, $16,717; A. R. Williams Machinery Co. Ltd., Toronto, $7144; Canadian Ramapo Iron Works Ltd., Niagara Falls, $8441; Brown Boggs Foundry & Machine Co. Ltd., Hamilton, $10,616.

Aircraft: Northern Electric Co. Ltd., Ottawa, $7155; Aircraft Supply Co., Toronto, $14,081; DeHavilland Aircraft of Canada Ltd., Toronto, $44,496; National Steel Car Corp. Ltd., Malton, Ont., $5112; Canadian Westinghouse Co. Ltd., Hamilton, $5593.

Ordnance: Research Enterprises Ltd., Toronto, $501,915.

Munitions: Canadian Wire Bound Boxes Ltd., Toronto, $6046; Canadian Westinghouse Co. Ltd., Hamilton, $66,484.

Capital Expenditure: Brennan Paving Co. Ltd., Hamilton, $45,674; Firestone Tire & Rubber Co. Ltd., Hamilton, $6100.

Miscellaneous: Empire Brass Mfg. Co. Ltd., Toronto, $16,470; General Steel Wares Ltd., Toronto, $134,627; Howard Furnace Co. Ltd., Toronto, $92,847; Iron Fireman Mfg. Co. of Canada Ltd., Toronto, $97,862; Dominion Sheet Metal Corp. Ltd., Hamilton, $5391; Graham Nail & Wire Products Ltd., Toronto, $7552; V. H. McIntyre Ltd., Toronto, $9404; Metal Stampings Ltd., Toronto, $5830; Steel Co. of Canada Ltd., Toronto, $7548; Canadian Blower & Forge Co. Ltd., Kitchener, Ont., $5655; Bird Construction Co. Ltd., Winnipeg, Man., $15,000; P. W. Graham & Sons Ltd., Dauphin, Man., $15,000; Howard Furnace Co., Toronto, $108,000; Williams Bros., Ottawa, $15,000; Clare Bros. Ltd., Preston, Ont., $29,000.

Construction projects: R. Timms Construction Co. Ltd., Welland, Ont., $338,216; Johnson Bros. Co. Ltd., Brantford, Ont., $384,491.

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Chicago — With orders heavy warehouses are beginning to experience a pinch in replenishing stocks, on account of lengthening mill deliveries. All warehouse materials, particularly bars, plates and structurals, are moving rapidly.

Boston—Except for a few products, warehouse steel prices are firm and unchanged. Demand is heavy with buying widely diversified. Problem of servicing regular customers from broken stock sizes with replacements delayed and difficult is a major factor, rather than selling. Demand for tool steels and alloys is strong, with inquiry from small manufacturing interests broadening.

Philadelphia — Business is heavy and well ahead of the volume a year ago although little changed from the average of the past 60 days. Prices generally are firm, though an occasional exception is noted.

Detroit—Sales from warehouse are

Construction and Enterprise

Ohio

AKRON, O.—Millheim Die Casting Co., George Emmett, manager, which recently completed a foundry addition, plans further expansion this spring.

AKRON, O.—Atlantic Foundry Co., 182 Beaver avenue, will build an addition 40 x 80 feet, costing about $10,000, to increase manufacturing space.

CINCINNATI—American Tool Works Co. has bought a site 132 x 247 feet adjoining its plant and will build a one-story addition for the manufacture of heavy lathes. Ferro Concrete Construction Co. has been given the general contract.

CLEVELAND — Cleveland Graphite Bronze Co., B. F. Hopkins, president, manufacturer of bearings and parts, 880 East Seventy-second street, will build a plant at St. Clair avenue and East 168th street, about 400,000 square feet, to cost $2,000,000.

CLEVELAND—Locke Machine Co., 976 East Sixty-third street, Elbert H. Baker Jr., vice president, will let contract soon for one and two-story addition to manufacturing space, through H. Dercum, architect, 4500 Euclid avenue.

CLEVELAND—General Day-Lite Corp., Paul Wintner, 1011 Huron road, president, has been incorporated with $100,000 capital to manufacture fluorescent lighting fixtures and will establish plant here or nearby.

CLEVELAND—John Harsch Bronze & Foundry Co., 12502 Berea road, will add a heat treating room for which bids will be called soon. Is part of a general expansion program.

CLEVELAND—Monarch Cap Screw & Mfg. Co., 5906 Park avenue, F. J. Andel, vice president, will build a one-story addition 80 x 120 feet to expand its production facilities. Construction is in charge of Joseph Humel, 3124 Albion road.

CLEVELAND — Decker-Reichert Steel Co., Arthur J. Decker, president, 4500 Train avenue, will build a warehouse building, two stories 50 x 90 feet and one-story wing 30 x 30 feet. H. L. Vokes Co., 5300 Chester avenue, has general contract.

CLEVELAND—Peninsular Engineering Inc., 5716 Euclid avenue, Paul Maenner, president, has opened an office for design of machine tools, dies, jigs and similar products.

CLEVELAND—Electric Controller & Mfg. Co., 2698 East Seventy-ninth street, will build an addition 27 x 88 feet, connecting two existing buildings. Bids are being taken by George S. Rider Co., Terminal Tower, Cleveland.

CLEVELAND—A. C. Rose Mfg. Co., 3115 West Thirty-eighth street, manufacturer of steel stampings, will build addition 61 x 66 feet, to house tool and die department, to cost about $5500.

LORAIN, O.—American Crucible Products Co., 1305 Oberlin avenue, has asked war department for certificate to allow 5000-foot expansion for enlarged production of bronze alloy bearings. George L. Smith is secretary-treasurer.

Connecticut

BRANFORD, CONN.—Atlantic Wire Co., 1 Church street, will build plant additions to cost about $40,000. L. F. Caproni, 1221 Chapel street, New Haven, is engineer.

HARTFORD, CONN.—Veeder Root Inc., 20 Sargeant street, will let contract soon for a one-story 100 x 125-foot plant addition on Garden street, to cost about $40,000. Buck & Buck, 650 Main street, are engineers.

HARTFORD, CONN.—Henry & Wright Mfg. Co., 760 Windsor street, has let general contract for two-story 40 x 60-foot addition on Windsor street, to Bartlett-Brainerd Co., 103 Woodbine street, to cost about $40,000. Mylchreest & Reynolds, 238 Palm street, are engineers.

Massachusetts

BOSTON — Navy department, Eighteenth street and Constitution avenue N. W., Washington, will build additional shipways, extensions to piers, buildings, etc., at Boston navy yard, to cost about $5,000,000.

INDIAN ORCHARD, MASS.—Shawinigan Resins Corp., 644 Monsanto avenue, will build a machine shop, general contract being let to Adams & Ruxton Construction Co., 1387 Main street, Springfield, Mass., costing about $45,000.

Rhode Island

PROVIDENCE, R. I.—Brier Mfg. Co., 222 Richmond street, will let contract soon for a three-story 80 x 95 and 42 x 58-foot plant at Tallman and Eddy streets, to cost over $40,000. Barker & Turoff, Grosvenor building, are engineers.

New York

BUFFALO—Hewitt Rubber Corp., 240 Kensington avenue, will build a factory building 100 x 100 feet, to cost about $40,000, with equipment. General contract let to John W. Cooper Co., 775 Main street. H. E. Plummer & Associates, 775 Main street, are architects.

RENSSELAER, N. Y.—Survey has been completed for a water supply system to cost about $600,000 and bids will be taken about April 1. Barker & Wheeler, State street, Albany, N. Y., are engineers.

New Jersey

HARRISON, N. J.—Otis Elevator Co., 260 Eleventh avenue, New York, will build a one-story addition 449 x 483 and two-story 51 x 283 feet. Plans are by Epple & Kahrs, 17 Washington street, Newark. (Noted Jan. 27.)

NEWARK, N. J.—Eisler Engineering Co., 760 South Thirteenth street, has had plans prepared by Wolf & Glucksman, 850 Broad street, for a one-story 45 x 80-foot electric spot welding machinery plant on South Thirteenth street.

Pennsylvania

GROVE CITY, PA.—Cooper Bessemer Corp. has let contract to Austin Co., 16112 Euclid avenue, Cleveland, for a diesel engine assembly and testing building addition to cost $250,000, as part of $750,000 modernization program.

HATBORO, PA.—Brensler Aeronautical Corp., 34-01 Thirty-eighth avenue, Long Island City, N. Y., will build an airplane assembly plant on a 367-acre site at cost of about $5,000,000.

IRVINE, PA.—National Forge & Ordnance Co., manufacturer of steel forgings, R. E. Ludwig, general superintendent, will build a one-story 60 x 200-foot addition. H. Swartzfeger, Irvine, Pa., is engineer.

Michigan

ANN ARBOR, MICH.—Aircraft Parts Production Corp., 200 Hill street, has been incorporated with $25,000 capital to do a general manufacturing business, by Buhr Machine Tool Corp., 839 Green street.

DETROIT—Albert Kahn Associated architects, New Center building, is making plans for an ordnance plant to cost $11,000,000, to be erected for Hudson

■ Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 107 and Reinforcing Bars Pending on page 110 in this issue.

Motor Car Co. in southern Macomb county. Consists of six main buildings, each with five smaller buildings in connection.

DETROIT — Pioneer Engineering & Mfg. Co. has given general contract to Clausen Co., Detroit, for a $60,000 shop and office building.

DETROIT—Ford Motor Co. has given general contract to J. A. Utley, Detroit, for an eight-bay extension to its cold mill building at Dearborn, Mich. Giffels & Vallet Inc., Detroit, is architect.

DETROIT—B. E. & T. Gage & Tool Corp., 4663 St. Jean avenue, has been incorporated with $25,000 capital to deal in dies, patterns and gages by Emil C. Hopp, 10732 East Jefferson street.

DETROIT—Northeastern Tool & Die Corp., 3125 East Larned street, has been incorporated with $65,000 capital to deal in tools, dies and jigs by John Drazick, 8565 Stelle avenue.

DETROIT — Simplex Precision Gage Co. has been incorporated with $1000 capital to manufacture precision parts and tools by Thomas S. Shaw, 6671 Field avenue.

DETROIT—LaSalle Tool & Gauge Co., 2830 Seven-Mile road, will build a one-story tool shop addition to cost about $40,000.

DETROIT—Metal Parts Tool & Die Co., Grinnell avenue, will build a plant, general contract to Stibbard Construction Co., 3000 Grand River avenue, to cost about $45,000, H. Kohner, 515 Murphy building, is architect.

Illinois

DECATUR, ILL.—Water works plant will be improved by an addition and installation of a high-pressure boiler, at cost of about $50,000. Warren & Van Pragg, Decatur, are engineers.

HARVEY, ILL.—Ingalls-Shepard division Wyman Gordon Co. has started construction of one-story forge shop addition 100 x 260 feet. Madory Bros., 15521 Myrtle avenue are general contractors. R. H. Mavity, 53 West Jackson boulevard, Chicago, is architect. (Noted Jan. 6.)

MACOMB, ILL.—McDonough power co-operative, G. Wayne Welsh, president, has let contract for 226 miles rural transmission line to C. A. Cater Construction Co., Blue Springs, Mo. E. G. Mull, Blandinsville, Ill., is engineer.

MOUNT ZION, ILL.—City has applied for WPA funds to finance municipal waterworks system costing about $46,000. Warren & Van Pragg, Decatur, are engineers.

NORTH CHICAGO, ILL.—Bell & Gossett Co., 3000 South Wallace street, Chicago, manufacturer of case hardening compounds, will build a one and two-story plant addition and make improvements to present plant. Royer, Danley & Davis, Urbana, Ill., are architects.

O'FALLON, ILL.—Independent Engineering Co. has received war department contract for two mobile helium purification units for air corps as tenders for observation balloons, each unit about 20 feet long, aluminum enclosed.

ROCKFORD, ILL.—E. W. Schmeling & Sons Inc. will build a one-story machine shop addition.

SPRING VALLEY, ILL.—Sampsel Time Control Co. Inc., Arthur V. Sampsel, president, will build an addition 80 x 300 feet. M. R. Beckstrom, Moline, Ill., is architect and F. A. Krehbiel, Chicago, consulting engineer.

Indiana

ELKHART, IND.—Elkhart Tool & Die Inc., 2314 Decamp avenue, has been incorporated with 100 shares, par value $100, to manufacture tools, dies and trailer parts, by Albert W. McDonald and James L. Harmon.

Maryland

BALTIMORE—Rustless Iron & Steel Corp., Biddle street and Edison highway, will build a one-story storage building, general contract to Cummins Construction Co., 803 Cathedral street, at about $175,000.

BALTIMORE—American Brake Shoe & Foundry Co., 2001 Laurens street, will build a one-story foundry 80 x 320 feet, to cost about $50,000.

RELAY, MD.—Calvert Distillery will let contract soon for a 50 x 200-foot barrel cooperage building to cost over $40,000.

District of Columbia

WASHINGTON — Potomac Electric Power Co., Tenth and E streets N. W., has construction budget of about $10,000,000 for 1941.

Florida

LAKELAND, FLA.—Food Machinery Corp., Dunedin, Fla., will build plant for manufacture of machinery for packing and canning plants.

North Carolina

WILMINGTON, N. C.—Newport News Shipbuilding & Dry Dock Co., Newport News, Va., Homer L. Ferguson, chairman, has formed subsidiary, North Caroline Shipbuilding Co. to build 25 of government's 200 emergency cargo ships.

Virginia

NORFOLK, VA.—Virginia Electric & Power Co. plans to increase generating capacity at its Reeves avenue power station, at cost of $4,190,000.

Missouri

BRENTWOOD, MO.—Wright Specialty Mfg. Co., Denver, M. Wright, president, 633 Del Monte way, is taking bids on a two-story factory building of about 15,000 square feet, costing about $60,000.

CARROLLTON, MO.—City has awarded contract to Worthington Pump & Machinery Co., 401 Worthington avenue, Harrison, N. J., for first unit of municipal light and power plant, including three 525-horsepower diesel engine generator sets.

CARROLLTON, MO.—Ray-Carroll county grain growers' association, Richmond, Mo., has let contract to Tillotson Construction Co., 720 Grain Exchange building, Omaha, Nebr., for a grain elevator of 65,000 bushels capacity.

CARUTHERSVILLE, MO.—City, D. D. Pinion, mayor, will hold election March 3 on $200,000 bond issue to finance municipal light and power plant.

JEFFERSON BARRACKS, MO.—War department has announced plans for 10,000-man capacity reception center for army air corps, including shops and garages as well as barracks, electrical facilities, etc., to cost about $5,000,000.

ST. LOUIS—Broderick & Bascom Rope Co., 4233 Union boulevard, has let general contract to Gamble Construction Co., 620 Chestnut street, for an addition 24 x 60 feet, to cost about $10,000.

ST. LOUIS—Columbia Iron Works, 4256 Vista avenue, is building a one-story plant addition 50 x 133 feet at 4141 Hunt avenue, costing about $8000.

ST. LOUIS—General Engineering & Mfg. Co., Tenth and Carroll streets, will let contracts soon for two-story addition 30 x 114 feet.

Wisconsin

MILWAUKEE—McCulloch Engineering Co., Robert P. McCulloch, president, manufacturer of superchargers and automobile accessories, plans construction of a new plant.

MILWAUKEE—Nordberg Mfg. Co., 3073 South Chase avenue, is having plans prepared by Austin Co., Chicago, for a new plant, consisting of nine buildings, with 20,000 square feet floor space, for manufacture of torpedo tubes for defense.

MILWAUKEE—Nordberg Mfg. Co., Robert E. Friend, president, manufacturer of engines, compressors, hoists and similar products, plans plant addition

for manufacture of torpedo tubes.

NIAGARA, WIS.—Village, Olaf Hildahl, clerk, will open bids March 3 for waterworks plant extensions and improvements, including 100,000-gallon steel tank on tower and watermain extensions. Federal Engineering Co., Central Office building, Davenport, Iowa, is engineer.

RHINELANDER, WIS. — Rhinelander Paper Co. will build a boilerhouse addition 27 x 64 feet and will install additional equipment.

RIVER FALLS, WIS.—City council, F. V. Williams, clerk, will open bids Feb. 14 for power plant equipment and improvements to municipal light and power plant, including diesel engine, generator, exciter and auxiliaries.

Minnesota

BAUDETTS, MINN.—North Star electric co-operative, Clarence Peterson, manager will open bids Feb. 13 for construction of 234 miles of rural lines for which REA has allotted $196,000. General Engineering Corp., 2944 Cedar avenue, Minneapolis, is engineer.

Kansas

KANSAS CITY, KANS.—North American Aviation Corp., J. H. Kindelberber, president, Inglewood, Calif., will build one-story airplane bomber plant, including main assembly plant 950 x 954 feet and office and administration building 50 x 150 feet, to cost about $8,000,000. Allen & Kelly, Builders building, Indianapolis, are architects and Col. Gordon Trumbull, Indianapolis, is consulting engineer.

WICHITA, KANS.—Farmers' Co-operative Grain Co., W-K-H building, Wichita, has let contract for reinforced concrete grain elevator, including storage tanks, head house, etc., to Chalmers & Borton Co., Hutchinson, Kans., to cost about $150,000.

North Dakota

GLENFIELD, N. DAK. — Tri-County electric co-operative, F. H. Stafford, manager, will take bids soon for 206 miles of rural lines for which REA has allotted $153,000. Ellerbe & Co., First National Bank building, St. Paul, are engineers.

South Dakota

BRITTON, S. DAK.—City has started preliminary action toward construction of municipal light and power plant to cost about $200,000.

Iowa

CEDAR RAPIDS, IOWA — LaPlant-Choate Mfg. Co., Roy E. Choate, president, manufacturer of road-building machinery, has given general contract to Loomis Bros. for one-story factory buildings 30 x 260, 50 x 180 feet, with five-ton traveling crane and 80 x 220 feet with 10-ton crane.

DUBUQUE, IOWA—Dubuque bridge commission, C. T. Landon, chairman, will take bids late in February or early in March for the proposed $2,300,000 bridge across the Mississippi river. Bridge will be steel on concrete pier about 6500 feet long, with 24-foot roadway. Main channel span will be 845 feet. Bridge design is by Ash-Howard-Needles & Tammen, 1012 Baltimore street, Kansas City, Mo.

GRIMES, IOWA—City will vote Feb. 10 on proposed $48,000 improvement for the municipal light and power plant.

MUSCATINE, IOWA—City will take bids Feb. 19 on power plant improvements, including steam generating unit and pulverized coal equipment. Stanley Engineering Co., Muscatine, is consulting engineer.

OSAGE, IOWA—F. L. Cromer, city clerk, will take bids Feb. 18 on municipal light and power plant building, equipment and distribution system, to cost about $300,000. Hubbard Engineering Co., 415 North LaSalle street, Chicago, is engineer.

SIOUX CITY, IOWA—Sioux City Gas & Electric Co., 517 Fifth avenue, will expend about $50,000 for 300-foot brick smokestack and dust control system.

Montana

WHITEFISH, MONT.—City will hold special election on construction of municipal light and power plant costing about $250,000. Dan Auken is city clerk. H. L. Gray, Seattle, is consulting engineer.

California

ALHAMBRA, CALIF.—Southwest Welding & Mfg. Co., 3201 Mission road, will build shipyard with six 500-foot ways on Los Angeles harbor.

LOS ANGELES—Columbia Stamping & Mfg. Co., 2936 South Western avenue, will build new plant at 8825 Avalon boulevard, 83 x 100 feet, costing about $12,000.

LOS ANGELES—Keystone Tool & Supply Co., 7720 Male avenue, will build shipyard on 18-acre site on main channel, with four 500-foot shipbuilding ways, to cost about $500,000.

ONTARIO, CALIF.—Timm Aircraft Corp. will build a new factory building costing about $75,000.

SAN LEANDRO, CALIF. — Chrysler Corp. will build warehouse at 1950 Davis street, one story 266 x 321 feet and 80 x 228 feet.

Washington

BELLINGHAM, WASH. — Berg Hard Metals Corp., C. C. Berg, chief engineer will add two cupolas, doubling present capacity.

BELLINGHAM, WASH. — Bellingham Plywood Co. p., Cecil Morse, president, will build a $600,000 plant, including $400,000 worth of equipment, two 15-ton driers, two 75-ton hot presses, glue spreaders and 48-ton lathe.

BREWSTER, WASH. — Washington Chemical Co., Spokane, is erecting a sodium refining plant at Monse, 50 x 250 feet, which will require evaporating vats and equipment.

SEATTLE—National Steel Construction Co., 425 Frontenac street, will add to its plant to fill defense contracts.

SEATTLE—Col. O. F. Ohlson, general manager, Alaska railroad, Anchorage, Alaska, will undertake a $250,000 building program, including $185,000 depot and offices 48 x 182 feet and $55,000 freight terminal, terminal tracks and coal bunkers.

Canada

MERRITTON, ONT.—Hayes Steel Products Ltd., is having plans made by A. E. Nicholson, architect, 46 Queen street, St. Catharines, Ont., for a plant addition to cost about $50,000.

OSHAWA, ONT.—General Motors of Canada Ltd., William street East, has given general contract to C. McGregor Ltd., 96 Bloor street west, Toronto, for three plant additions, two stories, 80 x 80 feet and 80 x 100 feet and one story 50 x 60 feet, to cost about $100,000.

TORONTO, ONT.—Link-Belt Ltd., 791 Eastern avenue, is having plans made by Ewart, Armer & Byam, 36 Toronto street, for a plant addition to cost $100,000. Eugene C. Burton is manager.

TORONTO, ONT.—John Inglis Co. Ltd., 14 Strachan avenue, has given general contract to A. W. Robertson Ltd., 57 Bloor street, for ordnance building to cost $300,000.

WOODSTOCK, ONT.—Truck Engineering Ltd., 667 Dundas street, has given general contract to James A. Vance, 283 Light street, for a plant addition to cost $100,000, with equipment.

HALIFAX, N. S.—Halifax Shipyards Ltd., Yonge street, has started drydock addition to cost about $50,000. Daniel Scouler is general superintendent.

LONGUEUIL, QUE.—Dominion Engineering Works Ltd., First avenue, Lachine, Que., manufacturer of heavy machinery and tools, has given general contract to Atlas Construction Co. Ltd., 679 Belmont street, Montreal, for a steel mill building to cost about $100,000 with equipment.

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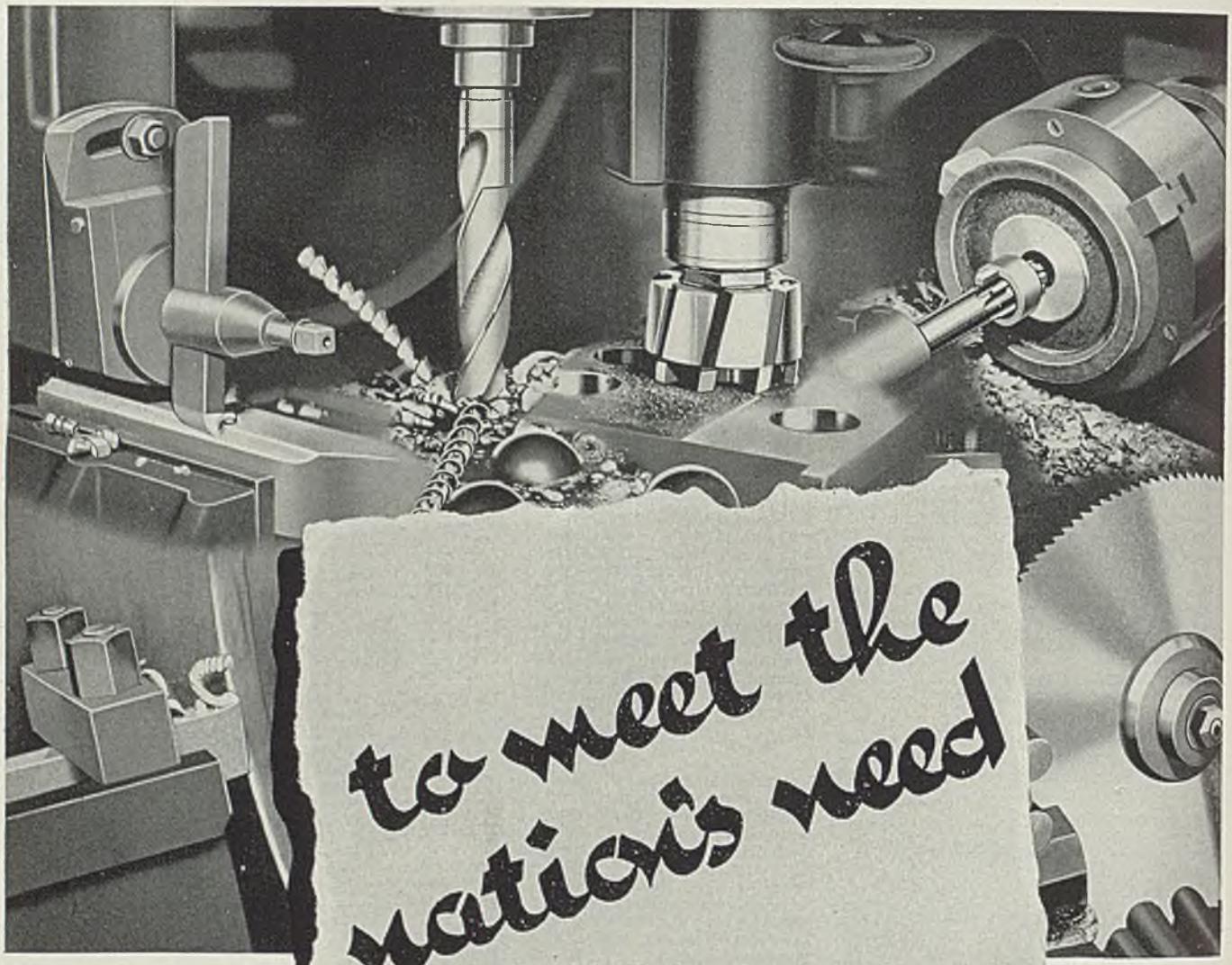
◆ ◆ ADVERTISING INDEX ◆ ◆

Where-to-Buy Products Index carried in first issue of month.



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