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STEEL

ESTABLISHED 1882

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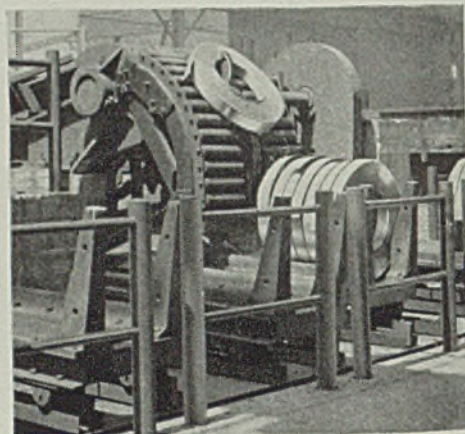
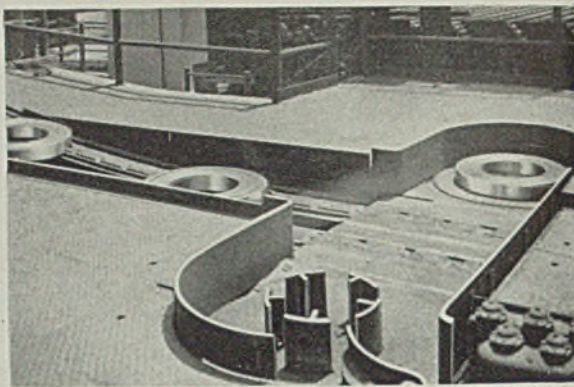
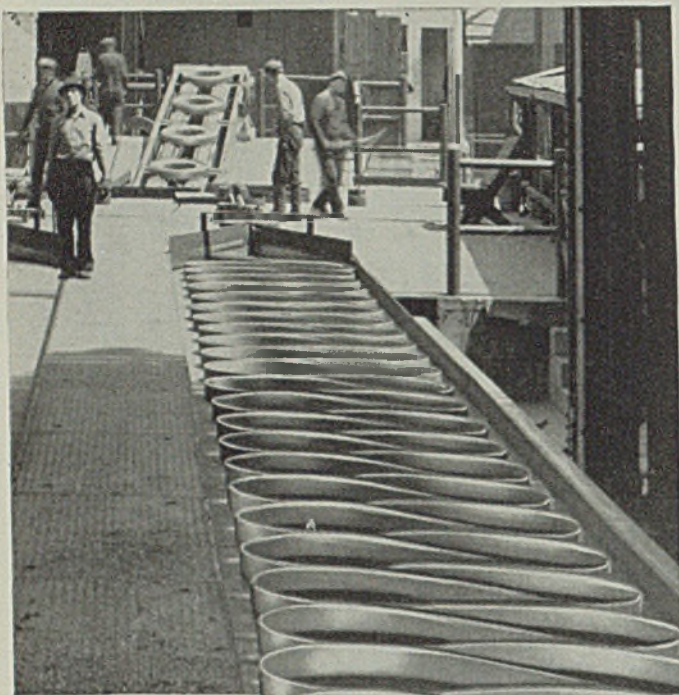
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PRODUCTION • PROCESSING • DISTRIBUTION • USE

July 29, 1940



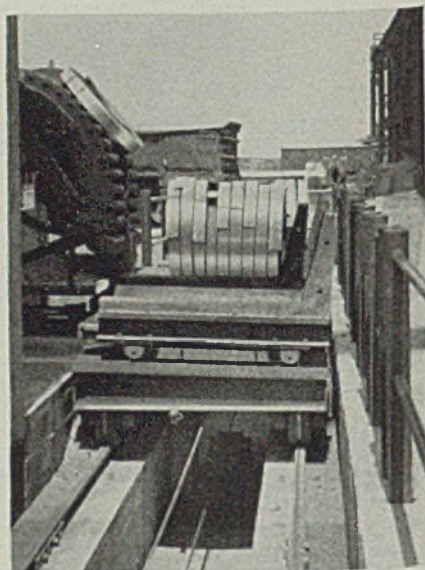
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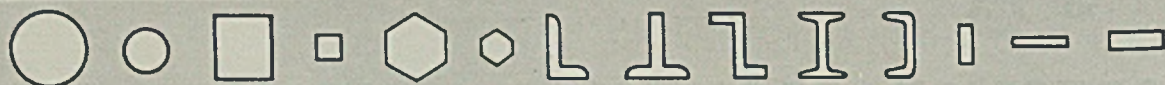
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HIGHLIGHTING THIS ISSUE

■ IN HIS REVIEW of the European situation (p. 15) Vincent Delpont, STEEL's staff representative in London, makes it clear that Germanic control now extends over 55 per cent of European steel capacity, with 46,000,000 tons annually, far overshadowing Russia's 20,000,000, and Great Britain's 13,000,000. But even if maximum output could be obtained in the reich and all the countries it has subjugated, Germany would have only 57 per cent as much steel as could be produced in the United States. With its relatively small capacity, Britain is making an heroic effort, basic industries working continuously, plant labor toiling 60 hours a week or more.

Discussing the situation in the United States (p. 13) E. G. Grace states steel capacity is sufficient, but facilities for manufacturing ordnance and building ships will have to be increased. The industry, he says, is likely to be very active for months to come. . . . Earnings of steel-

Earnings Higher

makers and consumers (p. 14) reflect higher operations of the past six months. Those of 69 iron and steel users in the first half were nearly double the comparable period last year. . . . First 1941 model automobiles (p. 27) show trend toward "symphonic styling." Builders are co-operating in efforts to simplify number and types of steels.

While spokesmen for the Institute of Scrap Iron and Steel insisted last week that scrap supplies (p. 17) are adequate for the defense program's estimated requirements, the government ordered that licenses be obtained hereafter for exports

Scrap Control

—to prevent scrap from falling into undesirable hands. . . . Mr. Kulas declares (p. 25) that congress should act immediately to roll amortization obstacles out of the way and to repeal the excess profits tax provisions of the Vinson-Trammell act. Secretary

Morgenthau rules (p. 18) that if a factory to make defense materials is built upon rented property the cost of the plant may be amortized in the same number of years as the rental contract runs.

Standard versus special equipment is a question intimately related to national defense—A. H. Koch (p. 36) using gas-burning industrial apparatus as example shows how standardization reduces costs. . . . Continuing the discussion of chromium-nickel-iron heat and corrosion-resistant castings started last week, D. W. Talbott

Standards And Costs

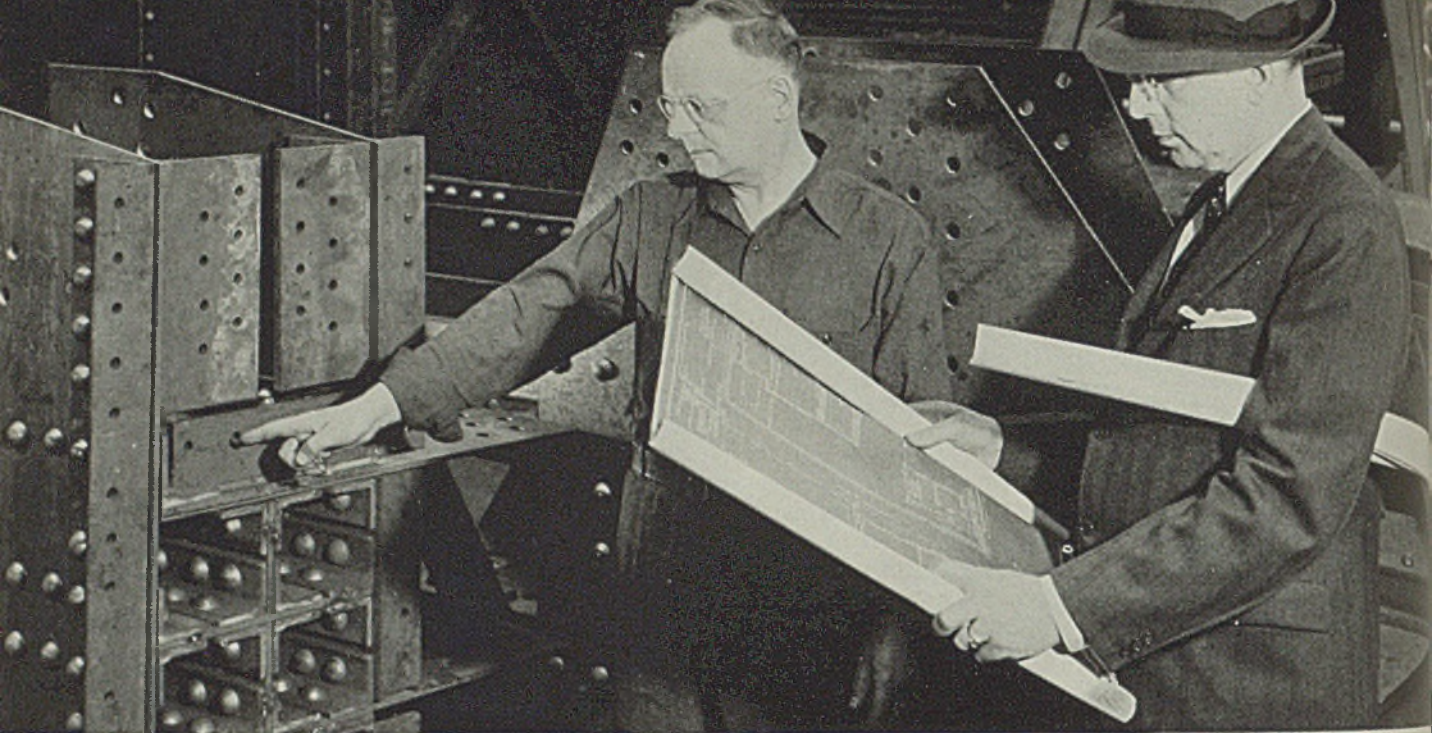
(p. 38) points out basic factors in selecting best type for corrosion resistance. . . . The extent to which tensile strength is reduced in steel bars submitted to combined tension-torsion loading, as in bolts, is not well known, thus an investigation on 0.35 per cent carbon material (p. 42) throws light on this subject.

Anticipating changes in motions and speeds in mechanical operations and correcting for them before they occur is the function of a new speed control system (p. 44).

Cold Plating Of Tin

. . . George Ralph (p. 46) describes method for efficient assembly of electric meters. . . . B. J. Higgins (p. 50) details a new process for cold-plating tin inside or outside on copper tubing. . . . F. S. Blackall Jr. (p. 54) gives timely advice on profitable use of carbide tools for machining short-run production. . . . W. J. Reagan (p. 58) continues last week's discussion of current trends in open-hearth steel practice. . . . Harold Lawrence (p. 64) cites precautions in repairing defeats in welds as revealed by X-ray.

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More Ordnance and Shipbuilding Capacity Needed, Says E. G. Grace

Government Should Aid in New Plant Construction

Bethlehem Head Believes Merchant Steel Capacity Adequate

Highly Active Market for Months Ahead Is Forecast

Producers, Consumers Show Higher First Half Profits

■ A HIGHLY active steel market for months ahead was forecast last week by E. G. Grace, president, Bethlehem Steel Corp., in releasing the company's financial statement for the second quarter. Much that he said in a press interview related to his own company's affairs, but Mr. Grace took occasion to comment significantly on industrial conditions generally, as related to the national defense plans.

Despite 99 per cent of capacity production, incoming business for Bethlehem this month is 30 to 40 per cent in excess of operations, and so far this does reflect important national defense buying, he said. There is a wide diversity of miscellaneous demand, and some rather noticeable improvement in railroad business.

Contributing to the high rate of bookings is a substantial export demand, particularly from England. Normally Bethlehem's export business does not exceed 10 to 12 per cent, but at present the proportion is considerably higher.

The immediate effects of the national defense program on steel operations of his company, Mr. Grace said, are in the building construction field. Various large government projects and increasing industrial expansion are noted. Demand likely will be given a further boost within the next few weeks when the automobile industry should enter the market for tonnage for 1941 models.

The value of orders on hand June 30, 1940—\$288,521,487—represented a new peace-time high, and Mr.

Grace pointed out that this did not include Bethlehem's latest ship order from the navy, involving more than \$195,000,000. This order, he explained, was received early in July.

Discussing demands likely to be made on the steel industry over coming months, Mr. Grace said that in merchant steels, such as plates, shapes and bars, requirements can be met without an increase of capacity and that steelmaking capacity in the main should be reasonably adequate. However, in the manufacture of ordnance, such as armor plate, guns, projectiles and the like, substantial additions will have to be made to facilities.

Will Increase Shipbuilding Capacity

He believed also that there would have to be increases in shipbuilding facilities, particularly in view of the navy's apparent policy of placing as much of its work as possible with the experienced yards. He said that Bethlehem will have to make some additions to its shipbuilding capacity to handle recent orders, but that this expansion would not be nearly as large as might be supposed. The principal expansion, he indicated, would be at the Bethlehem yard in San Francisco. Later navy awards, however, may require further increases.

Plans for enlarging the country's armor plate capacity have been fully developed, he believed, and would result in important increases in facilities at the three privately owned steel plants now capable of producing heavy armor plate. Government armor plate facilities also

would be increased, he said, referring particularly to the navy plant at South Charleston, W. Va. Expansions of this character are already under way.

As to the financing of new facilities at private plants to meet war requirements, Mr. Grace believed that probably one or maybe both of two policies might be followed by the government. One would involve the outright ownership of the new facilities by the government and the other would involve the placing of sufficient orders at sufficient profit to liquidate the added expenditures made by the private companies in providing the necessary facilities. Mr. Grace made it clear that he was speaking of facilities that could be of no commercial use to the companies after the emergency had passed. He said that on some expansion of this character going forward at Bethlehem plants the government was assuming the ownership.

When questioned about the electric furnace capacity of the industry, Mr. Grace said that it was gradually being increased. Bethlehem, he said, was going to put two new 50-ton furnaces in operation in the near future—one in September and the other in October. Each will have an annual capacity of 120,000 tons and they will triple the company's present capacity. However, he thought such relatively small improvements would probably go a long way, and added that such installations, so far as his company was concerned, were not dictated necessarily by prospective demands for steel for making

munitions. He pointed out there was a broader demand than formerly for electric furnace steel for commercial purposes.

Mr. Grace said that the added production of heavy armor plate would be properly timed to meet the navy's expanding needs. Incidentally, he saw no difficulty ahead in obtaining sufficient labor to meet the demands of the growing shipbuilding program. He was confident that Bethlehem was not going to experience any such trouble. He pointed out this company had never let down in recruiting and training men and that it could go from a relatively low rate of operations to a high rate without any great strain.

Mr. Grace remarked that at the rate national defense plans are unfolding it will require from five to seven or eight years to complete the job. He also remarked that it appears that the taxes to be imposed for financing this heavy program will be shared by all business alike. These will not impose undue profit restrictions on companies who will be called upon to handle the emergency contracts of the government, while permitting those in other lines to remain unaffected.

A total of 112,316 were on the Bethlehem payroll in the second quarter, compared with 109,682 in the preceding period and 88,447 in the second quarter of last year. Earnings per hour were 93.1 cents, a new high, compared with 92.6 cents in the first quarter and 90.9 cents in the corresponding period of last year. Hours worked per week were 35.6, compared with 36 in the first quarter and 34.2 in the second quarter of 1939. Total Bethlehem payroll was \$48,730,575, against \$47,493,859 in the preceding period and \$36,030,968 in the corresponding quarter of last year.

Earnings Well Sustained

Bethlehem's net income for the second quarter was \$10,807,318, after provision for interest, depreciation and depletion. It was equal, after dividend requirements on the corporation's 7 per cent cumulative preferred stock, to \$3.07 per share on common, and compared with net income of \$10,891,139 or \$3.02 per common share for quarter ended March 31. Net profit in second quarter, 1939, was \$3,822,927, equal to 61 cents per common share.

Indicated net profit for six months ended June 30, computed from quarterly statements, was \$21,698,457, equal to \$6.09 per common share. In the same period last year, net income totaled \$6,231,986 or 78 cents a common share.

The corporation's directors declared a \$1.75 dividend on Bethlehem's 7 per cent cumulative preferred stock, payable Oct. 1 to rec-

ord of Sept. 6. Dividend of \$1.25 per share on common, payable Sept. 3 to record of Aug. 9 was also declared.

YOUNGSTOWN SHEET & TUBE

Youngstown Sheet & Tube Co., Youngstown, O., reports a net profit of \$1,169,283, equal to 57 cents per common share after dividend requirements on the company's 5½ per cent preferred stock, for the second quarter ended June 30. This compared with \$329,086 net income, equal to seven cents per share on common, earned in the period last year. First quarter, 1940, net profit was \$1,253,929 or 63 cents per share on common.

Net profit for first half, this year, totaled \$2,423,212, equal to \$1.20 a

common share; for six months ended June 30, 1939, net income was \$546,193 or eight cents per share on common.

KEYSTONE STEEL & WIRE

Keystone Steel & Wire Co., Peoria, Ill., reports \$1,418,200 net profit, equal to \$1.87 per share on capital stock, for fiscal year ended June 30. This compared with net income of \$897,299 or \$1.18 per share in the preceding year, and was second highest yearly net profit in the company's history. It was exceeded only in 1936, when net income totaled \$1,501,493.

Indicated net income for quarter ended June 30, computed from

(Please turn to Page 74)

Steel Consumers' Earnings Statements

■ STEEL'S tabulation of 69 iron and steel consumers' earnings in first half, 1940, shows their aggregate net profit for the six months was \$78,408,048, compared with \$41,199,442 earned in the period last year. Only two reported a net loss, against 13 that incurred deficits in first half, 1939. Twenty-six companies were listed in STEEL, July 22, p. 20, while the following table includes 43. All figures are net earnings, except where asterisk denotes loss:

	Second 1940 Quarter	Second 1939 Quarter	First 1940 Half	First 1939 Half
American Radiator & Standard Sanitary Corp., New York (b).....	\$1,095,151	\$360,469	\$1,535,905	\$53,427
American Stove Co., St. Louis.....	397,520	598,311	508,708	700,641
Atlas Tack Corp., Falmouth, Mass.....	24,449	18,340	53,186	46,384
Aviation Corp., New York†(a).....	93,377*	196,448*	289,825*	1,000,207*
Budd Mfg. Co., Edward G., Philadelphia.....	664,819	173,544	1,006,352	274,933
Budd Wheel Co., Philadelphia.....	223,050	140,768	483,245	276,274
Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.....	150,461	40,218*	369,233	38,968*
Central Foundry Co., New York.....	53,151	43,864	35,167	11,136
Checker Cab Mfg. Corp., Kalamazoo, Mich.....	286,814	82,209*	177,590	163,191*
Chicago Railway Equipment Co., Chicago.....	7,612	23,224	147,737*	12,389†
Clark Equipment Co., Buchanan, Mich.....	373,058†	256,400†	921,252	500,191
Continental Roll & Steel Foundry Co., East Chicago, Ill.....			286,157	106,586*
Cutler-Hammer Inc., Milwaukee.....	336,068†	186,711†	742,363	243,413
Doehler Die Casting Co., New York.....	290,160	123,544	593,935	263,129
Douglas Aircraft Co. Inc., Santa Monica, Calif.††	1,583,979	625,269	3,388,857	1,396,792
Electromaster Inc., Detroit.....	14,432	460	9,959	64,410*
Emco Derrick & Equipment Co., Los Angeles.....	10,863*	48,240*	69,626	98,788*
Ex-Cell-O Corp., Detroit.....	835,452	187,057	1,412,948	336,828
Fansteel Metallurgical Co., Chicago.....			126,753	100,177
Federal-Mogul Corp., Detroit.....	215,686†	176,706†	361,668	286,005
Gardner-Denver Co., Quincy, Ill.....	294,135†	232,753†	521,513	449,523
General Electric Co., Schenectady, N. Y.....	14,030,122	8,996,761	25,981,572	16,370,192
Hoskins Mfg. Co., Detroit.....	128,367†	104,607†	277,646	202,587
Houdaille-Hershey Corp., Detroit.....	711,055	356,871	1,472,711	764,010
Hubbell Inc., Harvey; Bridgeport, Conn.....			291,486	151,296
Hussman-Ligonier Co., St. Louis.....			146,229	145,204
Jackson Co., Byron; Huntington Park, Calif.....	94,185	100,156	241,318	219,227
Kelsey Hayes Wheel Co., Detroit.....	387,254†	54,923†	965,362†	379,639†
Lynch Corp., Anderson, Ind.....	96,303	141,583	216,248	228,449
Master Electric Co., Dayton, O.....	242,685	146,191	450,298	240,468
Minneapolis-Honeywell Regulator Co., Minneapolis	316,112††	287,777	603,921††	355,066
Remington Arms Co. Inc., Bridgeport, Conn.....			1,219,000	144,000
Remington Rand Inc., Buffalo.....	565,240	150,332	1,765,998	473,260
Seagrave Corp., Columbus, O.....	1,799†	7,029*†	18,140	33,434*
Signode Steel Strapping Co., Chicago.....	79,598	90,758	191,879	178,357
Simonds Saw & Steel Co., Fitchburg, Mass.....	365,050†	153,235†	758,371	371,346
South Bend Lathe Works, South Bend, Ind.....			384,197	165,418
Thew Shovel Co., Lorain, O.....			335,347	340,747
U. S. Hoffman Machinery Corp., New York.....	113,829	68,856	165,243	40,569
Victor Equipment Co., San Francisco.....	36,669††	11,469††	71,817†	10,447†
Westinghouse Air Brake Co., Wilmerding, Pa.....	1,356,860	460,926	3,204,000	859,941
Yale & Towne Mfg. Co., Philadelphia.....	210,858	5,986	424,880	12,591
Youngstown Steel Door Co., Cleveland.....			886,057	193,363

†Parent company only; ‡consolidated; *loss; †indicated; ††before federal taxes; ††excluding European subsidiaries; ††period ended May 31; (a) excluding Vultee Aircraft Inc., a subsidiary; (b) excluding foreign subsidiaries.

Germany Controls 55 Per Cent of All Europe's Steel Capacity

*Potential Output 46,000,000 Tons, Against Russia's 20,000,000,
Great Britain's 13,000,000.*

*Operations in Britain Continuous Over Seven Days a Week;
Men Working 60-Hours.*

*Industry Under Rigid Control. Prices Advanced Three Times
Since Outbreak of War.*

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■ DISASTER, such as that which has overcome Poland, Norway, Holland, Belgium and France, spreads quickly. It brings chaos in its wake. It has a cumulative effect—witness France, the latest and most spectacular open wound in mutilated Europe. Despite warning signs in the four years preceding the war, one unprepared nation after another has been compelled to submit to force and ultimately to authoritarian rule, partly through treachery.

Only the British commonwealth of nations remains fighting as a whole, along with remnants of the French empire, and elements of other peoples that have succeeded in escaping from the Axis grip. A few isolated nations remain, but insecurely: Sweden, Switzerland, Turkey, like islands in storm ridden seas, while others are gradually being sucked into the whirlpool. Enigmatic Russia remains, a bulky mass between the disrupted European and Asiatic continents—awaiting its time?

The European chaos is real and no connected relation can be given of economic conditions, such as they exist, between the Atlantic and the eastern Mediterranean. A few concrete facts emerging from this confusion, however, can be placed on record and may serve as a serious warning to the free men of America if they are to stem the tide, should the last encircling wall manned by British forces give way.

Irrespective of temporary conditions due to actual war interruptions, such as damage to plant or proximity to war operations, Germany at present controls either by

By VINCENT DELPORT
European Manager of STEEL

actual occupation, by constraint, or by overriding influence, a potential steel output of about 43,000,000 tons, based on the estimated 1939 output of Germany proper (including Austria), France, Belgium, Luxembourg, Italy, Moravia, Bohemia and Poland.

Whether or not the whole of this output is or can be used presently for making war material, this tonnage is the potential production of steel that Germany may be able to control later, should she be in a position to impose conditions at a peace table. This tonnage amounts to approximately 55 per cent of European production and obviously the new German Reich could rule practically all export markets and become a formidable competitor in the western hemisphere.

If Germany gets her way, she also will obtain possession of iron ore deposits in Eastern France and Luxemburg besides having access to Swedish ore. And if she wishes to import iron ore from Spain and North Africa, who will prevent her? Coal mines in Northern France and Belgium will also be at her disposal.

Even assuming Britain preserves its independence, and that Germany will not be forced to come to terms, only the British Isles with a potential output of 14,000,000 tons of steel per year, and Russia with 20,000,000 tons could attempt to counteract the influence that could be yielded by a Germany left in possession of her conquests.

The foregoing is a sombre picture to exhibit before any people wishing to preserve their independence and freedom of trade, but, admittedly, it illustrates what *may* happen if Germany were allowed to get her own way. It is also true it would take some time before she could take full advantage of the situation, for the aftermath of a destructive war is long lasting. Furthermore, while it is not known to what extent works in Belgium, Luxembourg and France were destroyed before evacuation, there is strong reason to believe some were demolished. Many coal mines in northern France, it is reported, have been flooded. Means of communication also have been disrupted and still are out of order.

A factor of considerable importance in the possible contest for world markets is that America at this moment is getting a hold on export markets. This will constitute a real handicap to any nation that would attempt to capture markets by ruthless methods. But here again warnings should not be disregarded and complacency must be ruled out. According to reports, Germany has already been offering steel in South American markets at competitive prices. This is not unlikely, but it remains to be seen how the steel would reach there.

The possibilities envisaged here certainly are based on an extreme case, where unfavorable factors only are taken into account. While the final outcome of the present struggle is still in the balance, many factors may bring about a complete reversal of the trend of the war up to the present. However, if one

lesson is being learned by the defending nations, it is that no favorable factor can be taken for granted when dealing with a system that for years has rigidly followed one single line of action aimed at world power, and helped by an astonishing genius for organization and a complete lack of scruple in employing the most ruthless methods.

This is a totalitarian war and only totalitarian methods will avail if the defenders want to win. This is a time when to preserve freedom its very principles must for the time being be set aside and replaced by cast iron leadership and obedience.

The truth of this unfortunately has been grasped late, but not too late, by the British government. One consequence is that the British iron and steel industry now is operating under a rigid control, which directs output to the war machine before any other consideration. Under orders of the ministry of supply and the ministry of labor, hours of work have been extended. In all works occupied with government contracts, or that have sub-contracted for war work, operations are continuous over seven days a week. In some cases double shifts are the rule and men may have to work 60 hours a week or more.

Minimum Steel Prices Fixed

Unemployment now is below 1,000,000 and has reached the lowest level since 1920. Arrangements are being made to allow workers periods of rest, and there is more elasticity in rules governing interplay of the different trades and categories of workers. Consequently still more men will be obtaining work, although many women also are employed in certain jobs. Adequate increases in wages have been made, and pay is provided for overtime.

As a result of these measures the output of iron and steel in Britain has been pushed to its practical limit. While actual figures are not available, production of steel undoubtedly is now at the highest peak in history. Although the previous established record was in 1937 with 12,984,000 tons, the estimated 13,500,000 tons for 1939 can be regarded as being very near the actual tonnage produced in that year.

While every possible means is being taken for increasing production to a maximum, distribution of output to various classes of users is strictly controlled. All exceptions allowed with regulations introduced in April have been stopped since the middle of June. Now no steel can be delivered without sanction from the authorities.

No steel can be obtained by ordi-

nary users except by the authority of a license granted by the ministry of supply. No steel can be sold, except to an authorized licensed person or to persons exempted from obtaining a license by the ministry of supply.

Steel producers are compelled to keep accounts and records and produce them to the authorities. Contracts for government departments are identified by a symbol relating to the particular department, and by a contract or reference number. No delivery can be made unless symbols and reference numbers are shown on the order forms.

Imported material can be obtained only under license and is allocated by the authorities. No steel covered by the regulations can be sold below certain minimum prices. These prices occasionally are modified by the ministry of supply after consultation with the industry through the British Iron and Steel federation.

Since beginning of the war prices have increased three times, in November 1939, in February, and in July 1940. Compared with prices prevailing immediately before the war, foundry pig iron has risen from £4 19s 0d to £6 0s 0d; basic pig iron from £4 12s 6d to £5 13s 0d; billets from £7 7s 6d to £10 10s 0d; merchant bars from £10 12s 0d to £15 8s 6d; structural steel from £10 8s 0d to £13 13s 0d; plates from £10 19s 3d to £14 3s 0d; black sheets 24 B. G. from £14 15s 0d to £19 7s 6d; galvanized corrugated sheets from £17 5s 0d to £22 12s 6d.

The first two increases went to a central fund to meet the abnormal costs of imported materials. Part of the July increase goes to the manufacturer to indemnify against losses from increased wages and freight rates, and other extra costs caused by the war.

Profits, Taxes Higher

Under this rigid control system practically all steel produced is directed towards war manufactures and ordinary commercial users are having great difficulty in obtaining supplies. The export trade also is severely limited and only certain classes of material such as tinplates are available.

The invasion of Belgium, Luxembourg and France has completely eliminated a source of supply that was available to Great Britain to meet her deficiencies, particularly semifinished steel. Large tonnages that had been delivered shortly before the invasions however, are helping to carry on for a time while the shortage is being made up, mainly from the United States and Canada.

The situation in North Africa and events in southern Europe also have interfered with supplies of

iron ore, but British works are well stocked and national output has been considerably increased. Other sources are being considered and there is little anxiety on that score. Coke supplies are satisfactory.

Reports to date from leading British iron and steel companies indicate a tendency toward higher profits, but war taxation will not leave scope for higher dividends.

SAYS BRITISH AUTO SHOPS USELESS FOR AIRCRAFT WORK

DETROIT

Automotive shop manufacturing equipment cannot rapidly be converted to make aircraft and other armament material, warned A. C. Wickman, president, A. C. Wickman Ltd., a British machinery company, and president of the British Hard Metal association, now in this country to expedite delivery of special equipment.

Great Britain, said Mr. Wickman, found its automotive industry useless for the production of aircraft, aircraft engines and shells, and useful only for making such equipment as ambulances, trucks and vehicles of similar nature.

British industry has practically ceased production of consumer goods to make available manpower and raw materials for armament production.

Great Britain's armament declined to its poorest level five or six years ago, the English industrialist said. When that country's re-armament program got underway late in 1935 and 1936, 90 per cent of its production equipment was antiquated. Today not more than "30 to 40 per cent of Britain's industrial machinery is over ten years old, compared with an estimated 70 per cent or more in the United States."

The British aircraft industry, he claimed, has been built from virtually nothing to one of the world's largest he claimed. One of the keys to the industry's rapid growth, said Mr. Wickman, has been the increasing availability of carbide cutting materials. He expressed surprise these materials are not used more extensively in the United States.

■ "Alloy Steels—A Story of Their Development," a sound motion picture in 16 and 35-millimeter widths, has been produced by bureau of mines, United States department of the interior, in collaboration with an industrial concern.

Taking 20 minutes for a showing, the film traces development of steels from old hand methods to the modern steel plant. Film may be obtained for exhibition purposes by applying to Bureau of Mines, 4800 Forbes street, Pittsburgh, specifying width desired. No charge is made for use of the film, but exhibitor is expected to pay transportation charges.

Export Licensing Control

Extended to Scrap, Petroleum

■ EXPORTS of iron and steel scrap, other scrap metals and petroleum products last week were placed under rigid licensing control by Presidential proclamation.

Although regulations governing scrap export licenses had not been issued late Friday, it was generally expected these would be similar to those governing exports of machine tools and other commodities listed in the President's July 2 proclamation.

Although Mr. Roosevelt insisted the scrap and oil order is not an embargo, its effect, many believe, will be to shut off shipments to Japan, largest buyer of scrap. Japan recently purchased 300,000 tons in this country, the bulk of which has not yet been shipped. Japan's iron and steel industry has been handicapped in past months by a shortage of proper grades of scrap.

Dealers in the East believe that if all scrap exports to Japan are stopped, that country may buy more semifinished and even finished steel here. In fact, some semifinished was purchased here last week by Japan, apparently in anticipation of some such move by the government.

The President's action came as a surprise to the state department and the national defense advisory commission who were not consulted in the matter.

Iron and steel scrap exports last year were 3,577,427 gross tons, of which Japan took 2,026,854 tons. Great Britain was the second largest buyer with 508,293 tons. It is believed Great Britain's imports from this country will not be adversely affected by last week's order.

Italy also has been a heavy purchaser of United States scrap and last year took 425,896 tons. Shortly before Italy entered the war, it had bought 250,000 tons here. It was not delivered.

GERMANY TIGHTENS CONTROL OF SCRAP CONSUMPTION

New regulations for close control of foundry consumption of iron and steel scrap have been issued by the Reich Office for Iron and Steel, according to a report from the office of the American commercial attache, Berlin.

This control may be extended even to those plants and foundries which have not already been subject to a regular rationing or quota system. Enterprises which consume iron and steel scrap may not in any given month consume more than

the monthly quota as established by the Reich Office for Iron and Steel.

The same control applies to enterprises consuming raw iron for the purposes of producing gray castings, tempered castings, or steel castings. Up to 10 per cent more iron or steel scrap or raw iron may be used in any one month if this over-consumption is balanced by a corresponding under-consumption in either the preceding or following month of the same quarter.

SCRAP SHORTAGE CURTAILS JAPAN'S STEEL INDUSTRY

Activities of certain Japanese iron and steel producers are reported as being curtailed as the result of the scarcity of scrap iron, according to a report from the office of the American commercial attache, Tokyo. It is believed producers of specific steel are receiving scrap quotas which will only allow them to operate at about 50 per cent of capacity. Reports have been published in Japan during recent weeks to the effect that the quality of the scrap now available in Japan is considerably below the standard of that formerly used.

During June four tin plate scrap

licenses were issued totaling 182 tons and valued at \$2977.32, according to the state department. During six months ended in June, 47 such licenses were issued, totaling 2966 tons and valued at \$56,457.70. In all cases, Japan was the country of destination.

SCRAP AMPLE FOR DEFENSE, INSTITUTE SAYS

More than 6,700,000 tons of scrap is available for national defense purposes, Edwin C. Barringer, executive secretary, Institute of Scrap Iron and Steel Inc., told members at the institute's midyear meeting in Buffalo last week. He said the supply is adequate for the defense program's estimated requirements and that the campaign proposed in Washington to round up scrap metal is not necessary.

Joseph E. Jacobson, institute president, declared that regardless of export demand, it never will be allowed to deplete this country's supplies. Mr. Jacobson said that while "not a dime's worth of scrap is going to countries controlled by the axis powers, dealers in this country are again selling to Japan. If, however, there should appear to be a need in this country for the scrap being exported, the government is in a position—and is watching closely—to immediately put a stop to export shipments."

Domestic consumption now is about 3,500,000 tons a month; exports about 275,000 tons.

Uncertainty on Amortization Policy Slows Defense Program

■ THE FLOOD of defense orders is awaiting congressional action determining the government's amortization policy. High officials of the national defense advisory commission last week pointed to the uncertainty on the part of industrialists as to the speed with which they can write off expenditures for plant expansions as a major deterrent to the armament program.

The semiofficial announcement made from the White House recently that agreement has been reached on a five-year amortization plan was encouraging, but most businessmen want to see it "in writing." Many are reluctant to spend huge sums on the basis of such a statement as was issued by a White House secretary.

Impetus to the defense program also would be given by congressional action to repeal the profit

limitation provisions of the Vinson-Trammell act.

Industrialists working with the defense commission, as well as others, believe congress should act on both these matters now and not delay action until the new excess profits tax bill comes up for vote.

Men working in the steel division at the commission believe it will be unnecessary to establish priorities in the steel industry. Up to this time, at least, there has been no difficulty in this connection and those in charge feel that the steel industry will co-operate closely with the government. Consensus is that co-operation between industry and government on the priority question should be thoroughly tried before any executive order is issued.

Reports were current in Washington last week that the army is considering 90-ton tanks. Information

available, however, is that at the present time the general staff is not considering tanks of more than 50 to 60 tons. United States highways, it is said, would not support 90-ton tanks and it is a question in the minds of many as to whether 50 or 60-ton tanks could run on our present roads. Army engineering corps has made a survey of certain key highways and their capacity for handling heavy tanks with special emphasis on the bridges. Result of this survey has not been made public.

It is reported here also that even if 50 or 60-ton tanks are put into service that special freight cars would probably have to be built for their transportation. This question is being taken up by the defense commission, the railroads, and the army.

It is generally felt among officials of the defense commission that it will be much wiser to extend the production capacity of present armor plate plants rather than to build new ones. One of the recent emergency defense laws provided an appropriation of \$50,000,000 to either enlarge present armor plate plants or to build new ones or both.

Defense officials say it would take two years to build a new armor plate plant from the ground up, and an additional two years to get the plant

into production. To increase capacity of present facilities would be comparatively easy and the existing personnel would be a nucleus around which to build for the increased capacity.

RENTAL CONTRACT MAY DETERMINE AMORTIZATION

Treasury secretary Henry Morgenthau last week said that if a factory to make defense materials is built upon rented property, the cost of the plant can be amortized in the same number of years as the rental contract runs. Department already has approved one such contract where the reconstruction finance corporation leased a tract of land to an unnamed company for eight years. The treasury promised the company it may amortize the factory in the same eight years.

In the face of rising demands for early congressional action on amortization policies, both Mr. Morgenthau and President Roosevelt last week declared their belief amortization and repeal of the profit limitation provisions of the Vinson-Trammell act should be considered simultaneously with the new excess profits tax law which is not expected to come to a vote before September or October.

rines. Congressional sources estimate it will cost about \$2,000,000,000 a year for the next seven years to construct the fleet and maintain the ships and facilities already in existence, and about \$1,800,000,000 annually thereafter to support it.

Some of the cruisers in the new program are expected to be much larger than any now in the fleet—possibly as large as 28,000 tons, compared with the present maximum "treaty cruiser" of 10,000 tons. The new type would have greater range and striking power and would be designed for duty in the South Atlantic or far Pacific.

ARMOR PLATE UNDER WALSH-HEALEY ACT

Armor plate is included in the labor department's definition of the steel industry for the purpose of administering the Walsh-Healey act, L. Metcalfe Walling, administrator of the public contracts division of the labor department, has ruled. The question had been raised by the navy department and the Midvale Co., Nicetown, Philadelphia.

Mr. Walling explained the original minimum steel wage decision had been interrupted to cover armor plate, and that he had sent a notice of this to procurement directors. Both forged and rolled armor plate is included.

President Signs Bill Providing 200 More Warships in Seven Years

■ TWO-OCEAN navy bill was signed by the President last week. This is an authorization bill but also carries certain appropriations and it has been announced that further appropriations will be asked in the near future. The law authorizes expenditures of about four and a half billion dollars and the President already has asked congress to provide \$83,000,000 to start work on the program.

In addition to about 200 new surface ships and submarines to cost \$4,010,000,000 the new law authorizes the navy to acquire for \$600,000,000 a total of 15,000 airplanes, 50 per cent more than previously authorized. If the President deems them necessary, even more may be ordered.

To expedite construction of the mammoth fleet, the new act authorizes an appropriation of \$150,000,000 for essential equipment and facilities at either private or naval shipyards, an additional \$65,000,000 for expansion of facilities for the production of ordnance and munitions

at either government or private factories and \$35,000,000 to expand the nation's limited armor-making plants.

Besides the 200 combat ships, the law also authorizes construction or conversion of 100,000 tons of auxiliary vessels such as tanks, sea-plane tenders and repair ships, and a \$50,000,000 fleet of small patrol and escort vessels and motor torpedo boats.

The authorized 70 per cent expansion of the fleet would add 1,325,000 tons of combatant ships to the navy. For reasons of military secrecy, the exact number of each type of ship in the new program was not disclosed.

By tonnages, however, the increase in each major category would be as follows: Battleships, 385,000 tons; aircraft carriers, 200,000 tons; cruisers, 420,000 tons; destroyers, 250,000 tons and submarines, 70,000 tons.

The completed navy of 701 fighting ships would include 35 battleships, 20 aircraft carriers, 88 cruisers, 378 destroyers and 180 subma-

Advises Learner Programs To Meet Emergency Needs

■ Most effective single method of attacking the emergency training problem is the "learner" programs, Warner Seely, secretary, Warner & Swasey Co., Cleveland, declared before a sectional meeting of the Silver Bay Industrial Conference in Silver Bay, N. Y., July 25.

"Regardless of how much others do in preparing men for industry or how much we, ourselves, do in other directions—much as these efforts are extremely important, as we have seen—it is the quick training of new men in our own shops that will mean most in solving the present labor-shortage problem."

Most important factors in a successful learner program, said Mr. Seely, are: Careful initial selection of trainees; getting foremen in the shop training conscious; frequent and accurate checkup of individual learner's progress.

Other types of labor training programs—apprentice training, vocational high schools, adult training of unemployed, the further shop training of experienced men and the new government training programs launched under the works progress administration and the national youth administration—were evaluated by Mr. Seely. Most satisfactory for the long pull, he believes, is the

apprentice program. However, such a program requires too much time to meet the present emergency.

Mr. Seely urged that industry immediately attack the labor-training problem intelligently and aggressively.

"The supply of men who have had any considerable experience as mechanics has now been absorbed. Henceforth in this era, skilled men will be available to industry only to the extent that employers themselves train them. We cannot wait 'just a little longer' until men are released from some other plant, nor can we raid other plants for trained personnel."

Defense Contracts Total \$1,728,195,678

WASHINGTON

■ William S. Knudsen, member of the National Defense Advisory commission in charge of industrial production, told a press conference last Friday that a total of \$1,728,195,677.87 was contracted for from June 6 through July 25, of which \$1,412,907,677.87 was for the navy and \$315,288,152.08 for the army.

He said the problem of machine tools, which is fundamental to the entire defense program, is a point where basic design must be carried on, and to those unacquainted with this fact it may seem that little or nothing is being done. Very definite progress is being made, however, he said, and no actual delay exists.

Mr. Knudsen told the conference that it would be impossible for the United States to manufacture 3000 military planes a month by Jan. 1. This number could not be reached before the middle of 1942.

He said that he had no trouble getting either steel or aluminum and there had been no actual hold up on machine tools to date. He said no priorities are needed for machine tools at this time. Five ship yards will be enlarged on the west coast and the gulf.

R. E. Flanders Candidate For United States Senate

■ Ralph E. Flanders of Springfield, Vt., president, Jones & Lamson Machine Co. and Bryant Chucking Grinder Co., has announced his candidacy for the United States senate as successor to the late Ernest W. Gibson whose unexpired term still has about four years to run.

Although he never before has sought public office, Mr. Flanders, who has won wide recognition as an economist, for a number of years has been an influential factor in the Republican party. He was an author

of the 1936 national platform, and as a delegate from Vermont he went to the convention in Philadelphia pledged to support Wendell Willkie, with whom he had become well acquainted when both were participants in *Fortune's* round table discussions about a year ago.

An early and vigorous advocate of the Flanders candidacy, columnist

Dorothy Thompson of Barnard, Vt., recently said: "Ralph Flanders should be drafted for the United States senate. I know almost no man from Vermont or anywhere else who has a better, deeper, truer understanding of the problems of the United States—economically, socially or politically—or who has a better grasp of foreign policy."

Canada Spending \$80,000,000 To Expand Machine Tool Plants

TORONTO, ONT.

■ THIRTEEN plants, costing \$30,000,000, will be built in Canada to manufacture chemicals and explosives, C. D. Howe, minister of munitions and supply, announced last week. Largest of these will be constructed "somewhere in western Canada" and will produce large tonnages of ammonia and ammonium nitrate.

Mr. Howe also announced that a plant for the manufacture of gas masks, and another for making bombs, and a third to produce special glass and fire control instruments are being built. Capacity of three plants producing anti-aircraft, field and Bren guns will be doubled.

Machine tool plant expansions, underway or projected, financed in whole or part by the Canadian and British governments, involve more than 50 companies and will cost about \$80,000,000. Production by these plants may exceed \$400,000,000 annually.

Canadian Car & Foundry Co. Ltd., Montreal, Que., is making preparations to speed up production of Hurricane fighter planes. Plans call for a large expansion to supply orders from Britain and eventually will require the participation of one or two other aircraft producing companies to supply parts. Canadian Car & Foundry also is tooling up for the production of certain accessories such as landing gear parts, tank treads and aircraft propellers.

Dominion Engineering Works Ltd., Montreal, working on large contracts for the Canadian government, is building a large addition to its plant. Rapid expansion of the heavy and secondary machine industries is being daily reflected in demands made on the company.

Canada's production of motor vehicles in June was 17,930 units against 21,277 in May and compares with 14,515 in June, 1939. For the six months ended with June production totaled 110,912 motor vehicles against 93,759 for the first half of 1939 and 102,158 in the cor-

responding period of 1938.

Department of munitions and supply, Ottawa, Ont., last week placed 1029 contracts valued at \$3,556,823 on behalf of the Canadian government. Contracts included:

Machinery and tools—Lincoln P. Jay Equipment Co. Ltd., Montreal, \$82,110; Canadian Marconi Co. Ltd., Montreal, \$27,635; Canadian Ingersoll-Rand Co. Ltd., Montreal, \$17,142; E. W. Bliss Co. of Canada Ltd., Toronto, \$35,604; Ontario Hughes-Owens Co. Ltd., Ottawa, \$16,756.

Shipbuilding — Star Shipyards (Mercer's) Ltd., New Westminster, B. C., \$88,348; A. Linton & Co. Ltd., Vancouver, B. C., \$8956.

Aircraft supplies—British Aero-plane Engines Ltd, Montreal, \$5736; British air ministry, \$9315; Ontario Hughes-Owens Co. Ltd., Ottawa, \$211,403; Ottawa Car & Aircraft Ltd., \$11,000; Fleet Aircraft Ltd., Fort Erie, Ont., \$200,853.

Mechanical transport — Martin-Parry Corp., West York, Pa., \$102,766; Ford Motor Co. of Canada Ltd., Windsor, Ont., \$10,960.

Munitions—Algoma Steel Corp. Ltd., Sault Ste. Marie, Ont., \$223,522; F. Bacon & Co., Montreal, \$6340; Stanley Steel Co. Ltd., Hamilton, Ont., \$47,850.

Miscellaneous — J. J. Turner & Sons Ltd., Peterboro, Ont., \$23,984; Weldon Worth, Dayton, O., \$13,320; Duplate Safety Glass Co. of Canada Ltd., \$42,000; Metal Stampings Ltd., Toronto, \$6600; Renfrew Electric & Refrigerator Co. Ltd., Renfrew, Ont., \$19,100.

Construction — Foundation Maritime Ltd., Halifax, N. S., \$127,834; Sutherland Construction Co. Ltd., Montreal, \$108,188; Smith Bros. & Wilson Ltd., Regina, Sask., \$88,962; Bennett & White Construction Co., Calgary, Alta., \$732,000; Piggott Construction Co., Hamilton, Ont., \$390,000; R. Timms Construction Co., Welland, Ont., \$306,000; Storms Construction Co., Toronto, \$860,000; H. Dagenais, Ottawa, \$123,000; Canadian Comstock Co. Ltd., Toronto, \$80,000.

Purchases Under Walsh-Healey Act

(In week ended July 13)

Iron and Steel Products

	Commodity	Amount
American Bridge Co., Denver	Radial gates	\$42,580.00
Pacific Wire Rope Co., Los Angeles	Wire rope	10,080.00
Pullman-Standard Car Mfg. Co., Pittsburgh	Forgings for shell	81,990.80
Pullman-Standard Car Mfg. Co., Pittsburgh	Machined shell	171,997.00
National Stamping Co., Detroit	Angle tubes	14,850.00
American Bridge Co., Denver	Bulkhead gate	34,615.00
Pittsburgh Steel Co., Pittsburgh	Chain-link fence	36,454.44
Lake Washington Shipyards, Houghton, Wash.	Tank baulks	394,250.00
Greenville Steel Car Co., Greenville, Pa.	Buoys	42,750.45
Allegheny Ludlum Steel Corp., Watervliet, N. Y.	Steel rods	60,730.54
Universal-Cyclops Steel Corp., Bridgeville, Pa.	Steel rods	61,262.76
Reeves Steel & Mfg. Co., Dover, O.	Buckets, cans	14,226.25
Steacy-Schmidt Mfg. Co., York, Pa.	Material for locking devices	17,573.00
United States Pipe & Foundry Co., Philadelphia	Cast iron pipe	77,750.00
Western Pipe & Steel Co. of California, Los Angeles	Outlet pipes	47,875.00
Bethlehem Steel Co., San Francisco	Reinforcement bars	11,025.00
John A. Roebling's Sons Co., Trenton, N. J.	Wire cloth	21,267.60
J. C. Pitman & Sons Inc., Lynn, Mass.	Deep fat fryers	Indefinite
Doehler Die Casting Co., Pottstown, Pa.	Die castings	50,087.50
Joseph T. Ryerson & Son Inc., Cambridge, Mass.	Sheet steel	22,277.62
Stupp Brothers Bridge & Iron Co., St. Louis	Bridge parts	24,320.00
Decatur Iron & Steel Co., Decatur, Ala.	Structural steel	*35,000.00
Sheffield Steel Corp., Kansas City, Mo.	Reinforcing bars	12,972.31
Struthers Wells-Titusville Corp., Titusville, Pa.	Breech rings	23,156.00
Worden-Allen Co., Milwaukee	Seet. steel bldgs.	*106,478.50
The Columblana Boiler Co., Columblana, O.	Chemical containers	368,000.00
American Welding Co., New York	Chemical containers	186,000.00
Republic Steel Corp., Cleveland	U-bolts, saddles	*36,294.50
National Tube Co., Washington	Boiler tubes	17,332.91
John A. Roebling's Sons Co., Trenton, N. J.	Wire rope	66,339.50
Pacific Wire Rope Co., Los Angeles	Wire rope	33,254.99
Walter Kidde & Co. Inc., New York	Steel cylinders	15,051.87
The Edwards Mfg. Co., Cincinnati	Practice bombs	53,100.00
Merit Supply Co. Inc., New York	Chock assemblies	31,248.00
Wadell Engineering Co., Newark, N. J.	Maintenance equip.	41,490.80
TOTAL		\$2,263,682.34

Nonferrous Metals and Alloys

Aluminum Co. of America, Washington	Aluminum forgings	\$35,967.95
C-O-Two Fire Equipment Co., Newark, N. J.	Fire extinguishing systems	13,121.55
The Riverside Metal Co., Riverside, N. J.	Bronze blanks	78,750.00
Larson Tool & Stamping Co., Attleboro, Mass.	Brass eyerlings	11,796.00
Anaconda Sales Co., New York	Copper ingots	49,324.00
Pennsylvania Smelting & Refining Co., Philadelphia	Pig lead	16,676.00
Federated Metals division, American Smelting & Refining Co., San Francisco	Solder, wire	11,025.50
General Bronze Corp., Long Island city, N. Y.	Cradle assemblies	29,044.50
Phelps Dodge Refining Corp., New York	Copper	115,915.75
North American Smelting Co., Philadelphia	Solder	*9,316.70
Federated Metals division, American Smelting & Refining Co., San Francisco	Lead	14,772.82
Aluminum Co. of America, Washington	Aluminum	79,143.54
TOTAL		\$494,854.31

Machinery and Other Equipment

Bay City Shovels Inc., Bay City, Mich.	Shovel	\$13,750.00
Caterpillar Tractor Co., Peoria, Ill.	Tractor-crane	11,202.36
The G. A. Gray Co., Cincinnati	Planer	21,040.00
Gleason Works, Rochester, N. Y.	Gear cut. machine	17,984.00
Kearney & Trecker Corp., Milwaukee	Threading machines	49,000.00
Pratt & Whitney division, Niles-Bement-Pond Co., Hartford, Conn.	Tool room machine	13,745.00
Kearney & Trecker Corp., Milwaukee	Millers	15,859.20
The Insinger Machine Co., Philadelphia	Washing machines	11,625.00
Farrel-Birmingham Co. Inc., Ansonia, Conn.	Rolling mill unit	23,396.00
Brown & Sharpe Mfg. Co., Providence, R. I.	Milling machines	23,516.00
Northwest Engineering Co., Chicago, Ill.	Shovels	43,690.00
Brown & Sharpe Mfg. Co., Providence, R. I.	Milling machines	44,175.00
Carrier Corp., New York	Refrigerating plants	51,232.70
Monarch Machine Tool Co., Sidney, O.	Lathes	54,681.00
The Ellis Drier Co., Chicago	Laundry machinery	12,545.00
Schutte & Koerting Co., Philadelphia	Oil pumps	14,565.18
Universal Stamping Machine Co., Stamford, Conn.	Canceled machines	Indefinite
Brown & Sharpe Mfg. Co., Providence, R. I.	Milling machines	13,740.26
The Austin-Western Road Machinery Co., Aurora, Ill.	Machinery parts	Indefinite
Northwest Engineering Co., Chicago	Power shovel	12,852.00
Caterpillar Tractor Co., Peoria, Ill.	Tractors	24,635.80
The E. A. Kinsey Co., Cincinnati	Milling machines	25,917.00
Kay Products Co., Detroit	Engine holsts	\$31,800.00
The Yale & Towne Mfg. Co., Stamford, Conn.	Fuel pumps	122,629.00
Roseman Tractor Mower Co., Evanston, Ill.	Lawn mowers	26,445.00
Harris Seybold Potter Co., Cleveland	Lithographic press	14,850.00
American Type Founders Sales Corp., Washington	Lithographic presses	22,676.00
Wallace & Tiernan Co. Inc., Newark, N. J.	Water purif. units	32,610.00
Barber-Greene Co., Aurora, Ill.	Paving machine	10,554.50
The B. Jahn Mfg. Co., New Britain, Conn.	Cutting machines	15,700.00
TOTAL		\$776,326.00

*Estimated. Walsh-Healey awards are made through the public contracts division of the United States department of labor.

Contracts Awarded By Navy Department

■ Bureau of supplies and accounts, United States navy department last week awarded the following contracts:

Pedrick Tool & Machine Co., Philadelphia, portable boring bar, \$8700.

Hanson Van Winkle Munning Co., Matawan, N. J., motor generator sets, \$7288.

Perine Machinery & Supply Co., Seattle, vertical boring mill, \$22,957.

Charles F. Elmes Engineering Works, Chicago, hydraulic accumulator, \$12,585.

Handy & Harman, New York, silver solder, \$5429.50.

The Lodge & Shipley Machine Tool Co., Cincinnati, engine lathes, \$25,509.

Lloyd & Arms Inc., Philadelphia, radial drills, \$17,230.

Bethlehem Steel Co., Bethlehem, wire rope, \$8381.40.

Pratt & Whitney division, West Hartford, Conn., thread miller, \$5901.

Midwest Piping & Supply Co. Inc., St. Louis, flanging machine, \$16,595.

C. J. Rainear & Co. Inc., Philadelphia, iron and steel pipe, \$101,264.26.

Taylor Parker Co., Norfolk, Va., twist drills, \$16,292.88.

Reynolds-Robson Supply Co., Philadelphia, motor-generator set, \$14,298.

Westinghouse Electric & Mfg. Co., Washington, bus-transfer equipment, contactors, \$7053.02.

McCauley Steel Propeller Co., Dayton, O., aircraft propeller, \$7100.

United Aircraft Corp., Hamilton Standard Prop. division, East Hartford, Conn., aircraft propellers, \$21,075.

Pacific Marine Supply Co., Seattle, portable pumps, \$33,285.15.

Fairchild Aviation Corp., Jamaica, N. Y., aircraft cameras, \$8723.

General Motors Corp., Cleveland Diesel Engine division, Cleveland, repair parts for overhaul ships, \$34,903.12.

Pioneer Instrument, division of Bendix Aviation Corp., Bendix, N. J., remote indicating compass system, \$18,000.

Cargocaire Engineering Corp., New York, dehumidifying units, \$35,848.98.

Crane Co., Washington, steel valves, \$32,311.60.

North American Refractories Co., Cleveland, fire brick, \$25,135.94.

United Aircraft Corp., Vought-Sikorsky Aircraft Corp., Stratford, Conn., cockpit cabin track assemblies, \$9383.55.

National Twist Drill Tool Co., Detroit, twist drills, \$71,053.26.

Gleason Works, Rochester, N. Y., gear cutting machine, \$44,810.

Union Asbestos & Rubber Co., Cicero, Ill., pipe covering, \$21,899.92.

Brown & Sharpe Co., Providence, R. I., cylindrical grinder, \$9970.

American Car & Foundry Co., New York, snatch blocks, \$6166.

Consolidated Expanded Metals Co., Wheeling, W. Va., expanded metal, \$19,451.95.

Camillus Cutlery Co., New York, jack-knives, \$17,374.

United States Rubber Co., New York, oil hose, \$22,252.80.

Pioneer Rubber Mills, San Francisco, oil hose, \$13,193.

Boston Woven Hose & Rubber Co., Cambridge, Mass., oil hose, \$35,898.40.

Bureau of yards and docks awarded:

Negotiated contract for subassembly shop, steel storage runways, etc., at navy yard, New York, to Walter Kidde Constructors, Inc., New York. Estimated cost, \$1,520,000.

Contracts awarded for ordnance department, quartermaster corps and corps of engineers included:

E. I. Du Pont de Nemours & Co., Wilmington, Del., smokeless powder, \$20,000,000.

Goodrich Rubber Co., Akron, O., band tracks for half track vehicles, \$1,409,439.

R. Hoe & Co. New York, recoil systems for antiaircraft mount, \$732,000.

Sperry Gyroscope Co. Inc., Brooklyn, N. Y., fire control instruments, \$1,241,610.80.

Eclipse Aviation division of Bendix Aviation Corp., Bendix, N. J., parts for data transmission systems, \$489,035.

Read Machinery Co., York, Pa., mortars and mounts, \$278,452.38.

Saginaw-Stamping & Tool Co., Saginaw, Mich., trailers, \$272,700.

National Pneumatic Co. Inc., Rahway, N. J., mortars and mounts, \$133,231.50.

General Motors Truck and Coach division of Yellow Truck and Coach Mfg. Co., Pontiac, Mich., service trucks, \$109,439.60.

Robert E. McKee, El Paso, Tex., buildings at Albrook field, Canal Zone, \$2,271,500.

Tuller Construction Co., Red Bank, N. J., hangars at Westover Field, Chicopee Falls, Mass., \$1,621,800.

J. H. Marchbanks Construction Co., Chicago, shop expansion at Patterson Field, O., \$336,370.

Chas. H. Shook, Dayton, O., engine test building at Patterson Field, O., \$261,000.

Kirk Building Co., Kansas City, Mo., repair building at Patterson Field, O., \$177,900.

Kramp Construction Co., Milwaukee, aprons and drainage at Chanute Field, Rantoul, Ill., \$272,377.

John K. Ruff Co., Baltimore, shop building at Aberdeen Proving Ground, Md., \$177,700.

Simpson Construction Co., Chicago, addition to laboratory, Wright Field, Dayton, O., \$168,000.

Yellow Truck and Coach Mfg. Co., Pontiac, Mich., 102 trucks, \$215,334.66.

Aluminum Cooking Utensil Co., New Kensington, Pa., utensils for field ranges, \$366,930.

Parish Pressed Steel Co., Reading, Pa., field range cabinets, \$278,750.

Stewart-Warner Corp., Indianapolis, fire units for field ranges, \$237,480.

Flour City Ornamental Iron Co., Minneapolis, footbridges, \$313,523.06.



PRODUCTION... Up

■ STEELWORKS operations last week advanced $1\frac{1}{2}$ points to $89\frac{1}{2}$ per cent, highest since the middle of December. Seven districts showed increased production, led by $5\frac{1}{2}$ points at Pittsburgh, and five made no change. A year ago the rate was 60 per cent; two years ago it was 37 per cent.

Detroit—With an increase of 4 points to 99 per cent, operations are at a virtual ceiling with indications of this rate being continued.

Chicago—Rise of $1\frac{1}{2}$ points to $96\frac{1}{2}$ per cent gives the highest rate in 11 years and an all-time high for this district in tonnage. Several plants are exceeding rated capacity by substantial margin.

St. Louis—Steady at 65 per cent for the third week, with 16 open hearths in production.

Birmingham, Ala.—Addition of one open hearth has caused a 4-point advance to 92 per cent.

Central eastern seaboard—Removal of one independent open hearth was balanced by other shifts and the rate continues at 86 per cent. Some plants are close to full capacity.

Youngstown, O.—Gain of 1 point to 85 per cent resulted from addition of one open hearth, 68 now

being in production. Shenango Furnace Co. may light its second stack soon, which will leave only two idle in this district.

Buffalo—Remained at $90\frac{1}{2}$ per cent for the third week, with expectation of no change this week.

New England—Rate continued at 75 per cent for the third week.

Pittsburgh—At $86\frac{1}{2}$ per cent, $5\frac{1}{2}$ points higher than the preceding week, production is at the highest rate since early January.

Wheeling—No change was made by any producer, leaving the rate at 94 per cent for the third week.

Cincinnati—Increased 1 point to 85 per cent. Changes by various producers were mixed.

Cleveland—Up 2 points to 65 per cent. A rate above 80 per cent is indicated this week.

Bar Mill Wages Steady

■ Monthly wage conference last week between Western Bar Iron association and the Amalgamated Association of Iron, Steel and Tin Workers disclosed the card rate for August on boiling and 12-inch mills will be 2.15c, and on guide and 10-inch mills, 2.25c.

■ Presentation of United States Steel Corp. service medals to 78 employees of Tennessee Coal, Iron & Railroad Co., during the second quarter this year was announced last week by Robert Gregg, president of the Tennessee company. Twenty-five-year medals went to 36 employees; 26 received 30-year medals, 14 got 35-year awards. There also was one 45-year medal and one 40-year medal.

District Steel Rates

	Percentage of Ingot Capacity Engaged In Leading Districts		Engaged	
	Week ended July 27	Change	1939	1938
Pittsburgh	86.5	+ 5.5	50	29
Chicago	96.5	+ 1.5	56	37.5
Eastern Pa.	86	None	41	28
Youngstown	85	+ 1	54	38
Wheeling	94	None	79	46
Cleveland	65	+ 2	73	23
Buffalo	90.5	None	51	37.5
Birmingham	92	+ 4	84	53
New England	75	None	40	38
Cincinnati	85	+ 1	31	50
St. Louis	65	None	47.5	24.5
Detroit	99	+ 4	64	38
Average	89.5	+ 1.5	60	37

HOUSE MOVES TO SPEED TVA EXPANSION BILL.

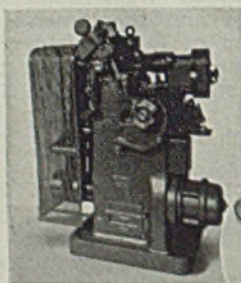
House rules committee has granted right-of-way for the \$25,000,000 appropriation bill to expand the power output of Tennessee Valley authority for the production of aluminum for airplanes. It is anticipated the bill will be taken up early this week.

The \$25,000,000 appropriation is to be used to start a three-year program costing \$65,800,000 which has been urgently requested by the members of the defense commission.

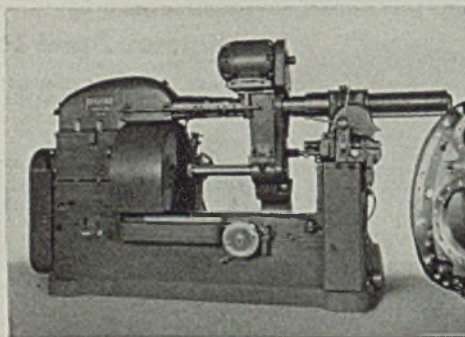
*Very Small
OR
Very Large*

GRIND THEM ON A BRYANT

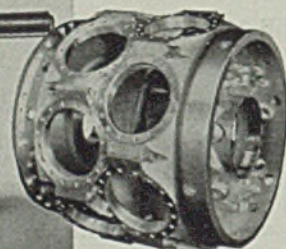
THE Bryant line of Internal Grinders is suitable for grinding each size bore that may be required by the manufacturer's design. Any of these machines will produce finish and accuracy to satisfy every need. Straight and taper holes may be ground with standard equipment either separately or in combination with each other. Standard machines may be easily arranged to grind cams and out-of-round holes by adding the cam attachment.



Bryant No. 5 Internal Grinder and groups of parts ground on this machine.



Bryant No. 24 Internal Grinder with 36" swing.



Double bank aircraft engine crankcase ground on this machine.

BRYANT CHUCKING GRINDER CO., Springfield, Vt.

Windows of WASHINGTON



By L. M. LAMM
Washington Editor, STEEL

Senators Procrastinate on Labor Law Amendments.

Administration Fears They Might Be Passed.

Tin Reserves Not To Be Released Until 1944.

Defense Commission Appoints Housing Co-ordinator.

WASHINGTON

■ NEITHER house of congress seemed inclined to work last week. They each met on Monday, adjourned until Thursday and then adjourned until July 29.

There was no action in the upper house on amendments to the national labor relations board act. The amendments which passed the house by a two-to-one vote have been held in the senate committee on education and labor for the past six weeks.

Every test so far has shown the popular approval of the amendments but evidently the administration does not want them to get on the floor of the senate because it fears they might be passed. It is believed, however, that there is a good chance the committee will have to report them out because the public, as well as industrialists, are watching developments.

It will be recalled that the changes proposed in the Smith amendments create a new board. They also separate the functions of prosecutor, judge and jury, and limit the board's authority. They also establish an administrator to investigate and prosecute and they guarantee employers' right of expression of opinion. Another amendment denies the board's right to reinstate employes who have been engaged in malpractices, and gives the employers the right to ask for elections.

Other amendments provide for secret balloting, permit a court re-

view of board orders and prohibit the board from engaging in conciliation activities. In other words, if the senate should pass the amendments which have already been passed by the house it is believed many of the troubles created by this organization in the past few years would be over.

Draft Excess Profits Tax

Roswell Magill, Columbia university and one-time undersecretary of the treasury, and Randolph Paul, New York, a tax lawyer, have been employed by the treasury department to help draft the proposed excess profits tax.

Tentative draft of the proposed new bill was handed to a subcommittee of the house ways and means committee last week but none of its provisions have yet been made public.

Tax experts on Capitol Hill have indicated that the measure of "surpluses" would be either "normal earnings" or "reasonable return on capital investment," depending on individual cases.

One of the questions before congress is whether or not it should repeal the new profit limitation on government airplane and warship contracts. Members of the national defense commission feel definitely that these provisions of Vinson-Trammell act will have to be repealed and the question of amortization and depreciation taken care of

before the government can go ahead with large expenditures for contracts. It has been reported in some quarters at the Capitol that rates in the new tax bill will have to be determined by the amount of money the government wishes to raise from them.

Tin Reserve Available in 1944

Jesse Jones, federal loan administrator, last week announced an agreement between the reconstruction finance corporation and the metals reserve company, created by the RFC, and the international tin committee covering the purchases of tin by the United States government for the national defense program.

Object of the agreement is to acquire and carry a reserve supply of tin in the United States without interfering with domestic consumers' requirements. It will be the policy of the metals reserve company, it is stated officially, to limit its purchases to excess production and domestic consumers will be expected to cover their current requirements of tin in co-operation with the government agencies. Tin acquired by the metals reserve company will not be available to private industry until after Jan. 1, 1944.

Agreement between the RFC, the metals reserve company and the international tin committee is signed by Emil Schram, RFC chairman, former Senator Charles B. Henderson, president, metals reserve company, and Victor A. Lowinger and J. Van den Broek on behalf of the international tin committee.

PALMER APPOINTED HOUSING CO-ORDINATOR BY COMMISSION

National defense advisory commission has announced appointment of Charles F. Palmer, Atlanta, Ga., as housing co-ordinator under the direction of the commission.

His duties will involve the expedi-

tion of housing developments which may be undertaken in connection with defense activities, particularly where plant expansion may create pressing needs for new or additional housing facilities.

Mr. Palmer will work with existing government housing agencies to the end that their various services may be efficiently employed through co-ordination of effort.

Henry M. McAdoo, president, United States Leather Co., New York, has been appointed group executive on leather, industrial belting and related products of the defense commission. Mr. McAdoo is a director of the Peabody Leather Co., the Nice Ball Bearing Co., C. C. Collings & Co., and the American Hair & Felt Co.

Merrill A. Watson, executive vice president, Tanners Council of America Inc., New York, is to be an assistant to Mr. McAdoo.

John W. Watzek, Jr., Chicago, is to be group executive on lumber and lumber products. Mr. Watzek is president of the Jackson Lumber Co. Lockhart, Ala. In 1935-36, he was president of the National Lumber Manufacturers association of Washington, and since 1936 has been a director of the American Forestry association. He is also a member of the advisory council of the Charles Lathrop Pack Forestry Foundation.

ASKS INCREASED CAPITAL FOR IMPORT-EXPORT BANK

President Roosevelt last week asked congress to increase the capital and lending power of the Export-Import bank by \$500,000,000 and to remove some restrictions on its operations "to the end that the bank may be of greater assistance to our neighbors south of the Rio Grande, including financing the handling and orderly marketing of some of their surpluses."

The Chief Executive said that as a result of the war in Europe "far-reaching changes in world affairs have occurred, which necessarily have repercussions on the economic life both of the United States and of the other American republics. All American republics in some degree," he said, "make a practice of selling, and should sell, surplus products to other parts of the world, and we in the United States export many items that are also exported by other countries of the western hemisphere . . .

"The course of the war, the resultant blockades and counter blockades, and the inevitable disorganization, is preventing the flow of these surplus products to their normal markets. Necessarily this has caused distress in various parts of the new world, and will continue to cause distress until foreign trade can be resumed on a normal basis,

and the seller of these surpluses is in a position to protect himself in disposing of his products. Until liberal commercial policies are restored and fair trading on a commercial plane is reopened, distress may be continued.

"It is to be hoped that before another year world trade can be re-established, but, pending this adjustment, we in the United States should join with the peoples of the other republics of the western hemisphere in meeting their problems. I call the attention of congress to the fact that by helping our neighbors we will be helping ourselves. It is in the interests of the producers of our country, as well as in the interests of producers of other American countries, that there shall not be a disorganized or cutthroat market in those commodities which we all export.

"No sensible person would advocate an attempt to prevent the normal exchange of commodities between other continents and the Americas, but what can and should be done is to prevent excessive fluctuations caused by distressed selling resulting from temporary interruption in the flow of trade, or the fact that there has not yet been re-established a system of free exchange. Unless exporting countries are able to assist their nationals, they will be forced to bargain as best they can."

CO-ORDINATE RAILROADS TO MILITARY REQUIREMENTS

Creation of a military transportation section of the car service division, Association of American Railroads, and the appointment of Arthur H. Gass as manager, effective on Aug. 1, has been announced by the association.

As outlined in an understanding reached between representatives of the railroads and the military authorities, the duties of the new section will be to maintain close liaison between the military forces and the rail systems. Headquarters of the new section will be maintained in the office of the quartermaster general of the army in Washington, with field representatives at important points. These field representatives will have full authority to act for the rail carriers in all matters pertaining to military rail transportation.

INDUSTRIALISTS, LABOR, REVIEW TRAINING PROBLEMS

Owen D. Young, advisor on industrial training to Sidney Hillman, member of the national defense advisory commission in charge of labor supply, announced last week that unanimous agreement was reached by a committee of indus-

trial and labor leaders called to discuss ways and means of training workers in industry.

The committee decided to call a general conference representing defense industries, labor and government agencies soon to perfect plans for state and local agencies to promote training in industry.

It was recognized, Mr. Young said, that the first and best source of additional workers will be those skilled men now unemployed. Next to them, he added, should come those presently employed who can be trained in industry itself.

The committee agreed to preliminary plans for obtaining information on the number of workers needed in the defense industries and for assuring such adjustments as may be necessary in the labor supply.

Agree on General Program

The general program agreed upon involves aiding industry in training apprentices, re-training workers, refreshing their skills where necessary, and generally stimulating the up-grading of those presently at work on key defense production processes.

Those attending the meeting were: M. F. Burke, United Aircraft Corp., Pratt & Whitney Aircraft, East Hartford, Conn.; E. C. Davison, general secretary-treasurer, International Association of Machinists, Washington; Clinton Golden, regional director, Steel Workers Organizing committee, Pittsburgh; John Green, president, Industrial Union of Marine and Shipbuilding Workers of America, Camden, N.J.; Marion Hedges, International Brotherhood of Electrical Workers, Washington; Randall Irwin, Lockheed Aircraft Corp., Burbank, Calif.; Albert Sobey, director, General Motors institute; W. G. Marshall, vice president, Westinghouse Electric & Mfg. Co., Pittsburgh; Walther Mathesius, vice president, United States Steel Corp., Pittsburgh; K. F. Ode, personnel manager, Falk Corp., Milwaukee; William F. Patterson, chief of apprenticeship, department of labor, Washington; Walter Reuther, United Automobile Workers of America, Detroit; and E. J. Robeson, personnel manager, Newport News Shipbuilding and Drydock Co., Newport News, Va.

ARGENTINA IS ALLOCATED \$20,000,000 CREDIT FUND

Export-Import Bank has allocated \$20,000,000 for credits to Banco Central de la Republica Argentina and the Argentine government to cover purchases in the United States of industrial and construction materials and transportation equipment for export to Argentina. The credits will run from one to three years.

"Congress Should Act Now on Amortization, Profits Tax"

By E. J. KULAS

President, Otis Steel Co.
and Midland Steel Products Co.,
Cleveland

■ EVERY day we read in the papers that more billions have been appropriated for national defense.

That makes us all feel very comfortable.

We think about the strife and the turmoil and the terror over there—and then we sit back complacently over here and say, "We are protected against all that."

As a matter of actual fact, nothing is more dangerous to this country than the delusion that dollars in and of themselves constitute defense.

We can't defend the United States with money, and we can't defend it with legislation. We can only defend the United States with machines, materials and men.

What we must do is to use our defense dollars to transform materials into the machines which will enable men to defend this country.

And that job is by far the most difficult and stupendous ever undertaken by the United States.

The amount of the current appropriations for this purpose gives only a partial measure of the size of the job. If we were to attempt to put this country on a basis of defense comparable to the German capacity for attack, the number of dollars required might mount to thirty-five, forty, or even forty-five billion dollars.

Now, in the face of that contingency—what have we accomplished to date?

The frank answer is that thus far we have barely made a beginning. We have talked in a large way in terms of billions, and even those billions are not enough—but as far as actual production of defense equipment is concerned, we have only begun to scratch the surface.

Sooner or later the American public is going to wake up to this fact. And when they do, there is a real danger that they will blame industry for the small amount of progress which has been made thus far.

To date some \$14,000,000,000 have been appropriated for national defense. If this money is to be spent effectively and intelligently, very careful and detailed advance planning is imperative.

We may be sure that in the realm of rounding up raw materials and

production capacity and in gearing up the country's industrial machine, the national defense advisory commission headed by William S. Knudsen and E. R. Stettinius Jr., will do an efficient and thorough job, so far as it lies in its power. However, the industrial machine cannot be thrown into high gear overnight nor can the job of re-arming be completed quickly, even when the machine is running full tilt.

Just for example, it is estimated that the time required to build one hydraulic press needed in the manufacture of one of the great defense guns is two years. And when the press is completed it takes another 18 months to two years to build the gun. Four years are needed to build a battleship. Throughout the armament program the job of tooling up plants to turn out new kinds of material is a matter of months. These are all physical problems of which time is the only solution.

Who Is Slowing Program?

It is unfortunate the American public has been given the impression that vast defense production can be, and has been, started overnight. The engineers and production executives in American industry know very well the nature and the extent of the details which must be decided before defense production can be thrown into high gear.

Not all of the delays and obstacles are of a physical nature and unavoidable, however. One of the most serious checks upon the whole program lies within the power of the government itself to correct by the simple procedure of clearing up the whole complicated problem of taxes and amortization.

At present, industry does not know where it stands in the vitally important matter of amortization rates for new plant and equipment facilities acquired specifically for national defense purposes.

For many months the treasury insisted that although industry should build new plants for national defense no permission could be given for any writing off of such expansion except upon the basis of normal peace time schedules.

There was evidence of some awakening to realities in the statement issued July 10 following a meeting of administration leaders in which it was said that the new excess profits tax bill to be introduced in congress would "incorporate a provision for amortization over a five-year period of additional facilities of both plant

and equipment certified as immediately necessary for national defense purposes by the army and navy and advisory commission of the national defense."

That was a promise of relief but it was not relief. Industry cannot be sure what action congress will take on the proposal. In any event no one expects the new tax bill to reach the stage of final passage before September or possibly October. Must the wheels of the national defense programs be slowed down by these tax brakes which could easily be removed?

The situation calls for immediate and separate action by congress. It should pass at once a joint resolution authorizing the treasury department to make prior commitments to companies for the amortization of defense expansion investments over a five-year period.

If congress really intends to roll the amortization obstacles out of the path of the national defense program, let it act now instead of putting it off until enactment of the new excess tax law.

Another constructive move promised by the administration leaders in their statement of July 10 was that the "proposed excess profits tax bill, which will apply generally to all industries will be substituted for the excess profits provisions of the Vinson-Trammell act, which now apply only to army and navy aircraft and naval vessels."

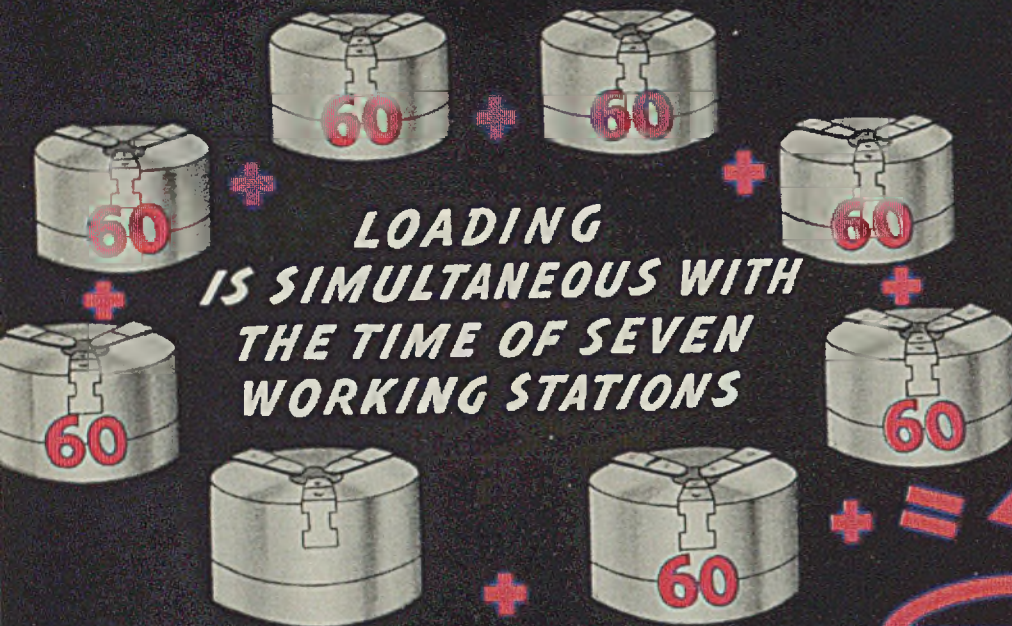
Here again congress should act separately and at once by repealing the already proscribed excess profits tax provisions of the Vinson-Trammell act. Details of the new excess profits tax could be left for working out in the coming weeks.

The actions I am urging upon congress would be definite and unequivocal. They would greatly clarify the situation and accelerate the armament program.

Industry is not seeking to profit from the national defense program but wants merely to protect itself against ruinous losses later on.

But without some assurance as to amortization there is serious danger that industries engaging in defense production today may duplicate the experience which many of them remember only too keenly from the last war. The bankruptcy crop in industry following 1918 was enormous. Hundreds of companies had expanded their plants and had bought vast quantities of machines for armament production—and when peace was declared, there they were with plants and equipment still unpaid for, with no orders, with business in the middle of a post war shambles, and nobody except the sheriff knocking on the front door.

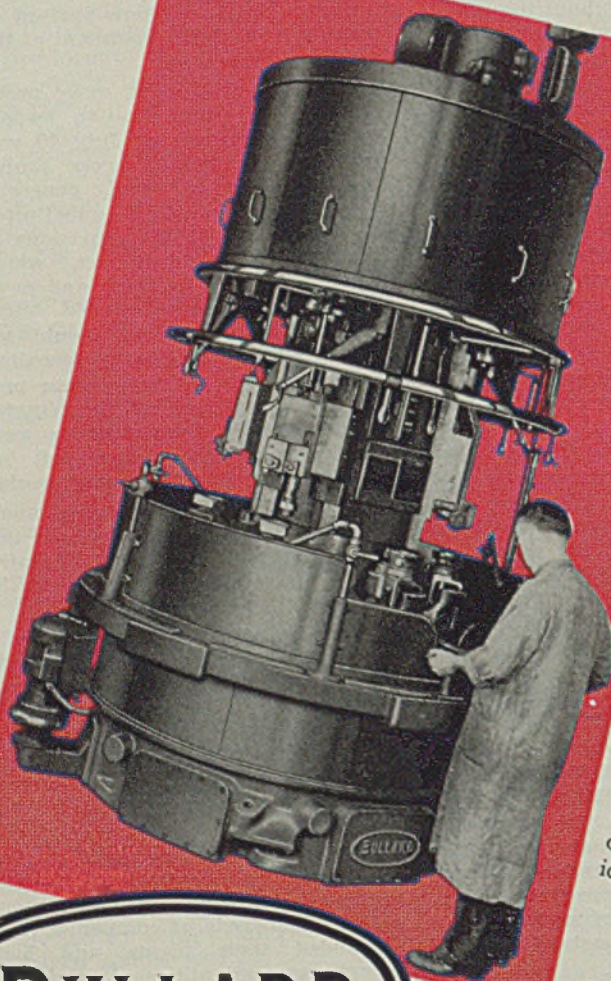
It is not profits that industry is worried about—it is survival.



**LOADING
IS SIMULTANEOUS WITH
THE TIME OF SEVEN
WORKING STATIONS**

**THE
MULT-AU-MATIC
MAKES**

= 420
Seconds
WORKING
out of ONE
MINUTE



Sounds fanciful, but it's really quite simple—One loading station and Seven working spindles in place of a single work station, and all operations simultaneously; that's the whole story.

Once it was thought these 420 second minutes were only for manufacturers with long production runs.

But not so. A surprisingly large number of shops which have miscellaneous jobs, some running as low as 200 pieces, are making profitable use of Mult-Au-Matics, now that they realize that the tooling can be easily and quickly changed over. If you have work of this sort, talk with a Bullard Engineer. Remember, there are numerous sizes and types of Mult-Au-Matics. One is very likely to be ideal for your needs.

BULLARD

THE BULLARD COMPANY
BRIDGEPORT, CONNECTICUT

Mirrors of MOTORDOM



By A. H. ALLEN
Detroit Editor, STEEL

*"Symphonic Styling" of Colors Feature 1941 Hudsons.
Washing Machines To Help Hudson Diversify Product.
Steel Simplification Most Likely in the Alloys.
GM, Nash-Kelvinator To Make Machine Guns, .45 Colts.
Machine Dimples, Drills, Rivets in One Setting.*

DETROIT
■ FIRST blistering heat wave of the season here came at an opportune time, finding most of the large motor plants operating on skeleton crews in process of changing equipment and tooling over to new models or of easing pilot jobs down assembly lines. A full swing into production will not come for a couple of weeks.

Hudson was first away from the starting line with 1941 models, initial assemblies having been made July 15. Nine cars were "sneak" previewed by newspaper men and dealers and distributors July 19 at Masonic Temple. Formal previewing will be held Aug. 14.

The story for Hudson in '41 can be summed up in two words—symphonic styling—which have been coined to connote a harmonizing color treatment of interiors with exteriors. Beyond this are such changes as increased wheelbase—116, 121 and 128 inches—2 inches lower overall body height, "Torpedo" styling of rear ends and other refinements. Front ends are practically unchanged from 1940. Belt moldings are much wider and of stainless steel.

A. E. Barit, president of Hudson, explained the origin of the new color treatment by telling how a friend recently asked him, in substance, "How long do you expect to be able to get the prices you ask for motor cars and still pay little attention to color in interior appointments? Color today is of paramount importance—in clothing, house furnishings, decorations and the like. Why not in automobiles?"

And why not? It had never been

done before in mass production but the problem was not insurmountable. So Hudson took three basic colors, gray, blue and tan, and around them developed three basic overall color treatments of exteriors and interiors. Thus a green exterior will be matched with a green shade of upholstery and interior trim, green floor carpets and mats, green instrument panel, green window moldings and so on. Similar color schemes apply to the blue and tan styling.

All in all, the effect is pleasing. Painted instrument panels and window moldings should have the further advantage of being less expensive to finish than the former wood grain effects used on these parts, but by the same token some buyers may feel the painted metal has lost the richness of the wood grain with its high polish.

May Make Washing Machines

New design of rear deck, quarter windows and roofpanel has done away with the wide, almost topheavy appearance of Hudson bodies, when viewed from the rear.

In the lowest price field (announcements on prices, incidentally, being withheld for the time being) Hudson will offer a new 92-horsepower six on 116-inch wheelbase. Above this line is a 102-horsepower supersix on 121-inch wheelbase. The top lines will be known as Commodore sixes and eights, replacing the former Country Club lines; both are on 121-inch wheel-

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base, with either 128-horsepower eight or 102-horsepower six. Also available will be a custom sedan on 128-inch wheelbase.

While on the subject of Hudson, the word is being passed around Detroit of the company's current activity in the washing machine field. According to unofficial reports the plan is to build complete washing machine units for the strictly low-price field, perhaps somewhere around \$30. They would be conventionally designed washers, with motors supplied by Sears, Roebuck & Co., the latter organization handling the merchandising.

Tubs would be made in two sections, each requiring only a shallow draw, and lockseamed together around the circumference. The top half would be pierced out and flanged. Advantage of this method is said to be that a less costly grade of steel can be used because a deep draw is not required. The tubs may be finished in dulux-type lacquer, saving over the more expensive porcelain enamel.

Hudson would have ample facilities to take on such a line as this and, if the experience so far of Murray Corp. of America is any criterion, the business would prove a welcome diversification from strictly automotive fabrication. Murray, it will be recalled, is producing sinks, bathtubs, kitchen cabinets and other pressed steel units for Montgomery, Ward & Co.

■ AGITATION for the simplification in numbers and types of steels used by industry has been prevalent since onset of the national defense program, opening gun in the movement being the paper presented by Earle C. Smith of Republic Steel at the American Iron and Steel institute meeting in May and subsequently published in STEEL. Metallurgists in automotive plants in past weeks have been giving serious consideration to the matter of reducing the number of steels required for motor car construction working in co-operation with the iron and steel division of the Soc-

ciety of Automotive Engineers and the Steel Institute.

The S.A.E. committee has made the tentative suggestion that steels be grouped into two classifications—a primary group covering all those analyses used in large tonnages, such as automotive sheet, strip and bar stock; and a secondary group of "specific utility" steels including those materials used in relatively smaller tonnages but vital to many industries. A third group might be included to cover all other steels of "uncertain utility" but perhaps not capable of elimination altogether.

To develop in detail such a tentative classification, accurate data are needed on tonnage requirements of various steels. These are now being obtained, with the co-operation of the leading motor companies and other steel consumers. Survey being made by General Motors Corp. probably will not be ready before the next meeting of the corporation's metallurgical committee which is scheduled for the week of Sept. 15.

Problem of Off-Heats

This committee, incidentally, has taken a leading role in the steel simplification movement. It comprises seven standing members, metallurgists of the car and truck manufacturing divisions and research laboratories, with 38 contact members, metallurgists from other divisions of the corporation. Chairman is L. A. Danse, Cadillac metallurgist.

He reports that first considerations showed general agreement over the desirability of simplifying the number of steels in use today, both on the part of his committee and of steel company representatives. However, more detailed study has brought up a number of complicating factors. One of the most important is in connection with the so-called "law of open-hearth probability." In any heat of steel aimed at a certain S.A.E. analysis, it is virtually impossible to make sure the steel will analyze exactly "on the nose." Off heats are common, and what was aimed at S.A.E. 1320 may turn out to be, by the law of production probability, 1330 or 1340. Any proposal to eliminate certain steel analyses from present lists must take into consideration the matter of off-heats which now need not be scrapped but rather can be applied on an order for a different analysis.

Steel companies well recognize the limits imposed and would be loath to agree to any plan to eliminate analyses which might conceivably result in scrapping heats.

It appears one of the best opportunities for simplification lies in the alloy field, since statistics show that the vast assortment of S.A.E. an-

alyses above T1315 as far as alloy content is concerned account for only 6 per cent of total steel production.

The list of General Motors steel specifications includes some 135, but actually there are not this many types of steel in current use. The active list of steels in use covers only about 50. Ford Motor Co. has a similar specification list which numbers some 58.

Indicative of the trend toward simplification is the co-operative work done on standardization of bolt classifications in the motor industry, worked out in conjunction with bolt manufacturers and representatives of General Motors, Ford,

Officials of another GM plant, in Flint, have been inspecting arms plants in the East with a view to setting up a plant in Flint to produce aircraft machine guns on the basis of 125 units daily.

Nash-Kelvinator interests are talking with equipment people of getting into the manufacture of Colt 45's. This program originally was being considered by Burroughs Adding Machine Co. but was dropped presumably because of difficulties in amortization of equipment costs. Change in government policy, permitting amortization over five-year period, may bring Burroughs back into this picture.

Graham-Paige is considering the production of bodies for scout cars and other military transport equipment, possibly figuring to supply the bodies to truck manufacturers who would prefer to concentrate solely on chassis.

The new AC Spark Plug division plant in Flint may become the scene of defense equipment manufacture, in the event definite contracts are awarded. Also to be produced in this plant is the new connecting rod bearing to be used in Buick engines. This bearing, described several months ago briefly in these columns, comprises a backing of steel strip to which is bonded and sintered a layer of copper-nickel powder, over which is deposited a thin layer of high-lead babbit. Moraine Products division in Dayton, O., will supply the copper-nickel coated strip steel.

New Aircraft Riveter Perfected

Manufacturer here has perfected methods and equipment to rivet duralumin sheets for aircraft in place and with flush-type rivets, including drilling and dimpling the sheets without removal from an assembly. A nationally known tool company will take over manufacture of the equipment. Approval of army, navy air corps is awaited.

Survey of stocks of new and used cars in hands of 500 dealers throughout the country at the end of June showed 12,208 new cars as against 10,297 a year ago; 20,330 used cars as against 17,038 a year ago, increases of 15.65 and 16.19 per cent respectively. Figures were obtained by National Automobile Dealers association.

It was revealed last week that Fred J. Fisher of Fisher Body Corp. is backing the Stout Skycraft Corp. here, which is planning mass production of small stainless steel airplanes of a new design, described in STEEL for July 1, p. 24. Fisher's interest in the development was said to extend beyond preliminary activity, possibly to the extent of providing production facilities when the plane has been licensed six months hence.

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	*366,800
6 mos....	1,305,501	2,055,744	*2,543,674
July.....	150,450	218,494	.....
Aug.....	96,946	103,343	.....
Sept.....	89,623	192,678	.....
Oct.....	215,286	324,888	.....
Nov.....	390,405	368,541	.....
Dec.....	406,960	469,120	.....
Year	2,655,171	3,732,608	.....

*Estimated.

Estimated by Ward's Reports

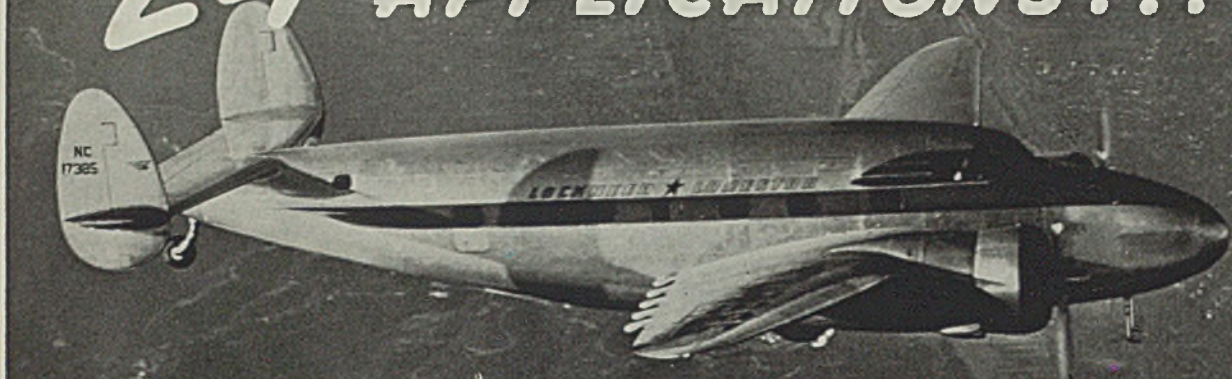
Week ended:	1940	1939†
June 29.....	87,550	70,663
July 6.....	51,975	42,784
July 13.....	62,176	61,610
July 20.....	53,020	47,420
July 27.....	34,822	40,595

†Comparable week.

Packard, Chrysler and Hudson. Bolt steels have been classified into seven groups, each having certain limits on physical properties and decarburization and each to have certain specified head markings. Final agreement has not been reached on all phases of this program which has been in process of development for about a year, but it is expected shortly. Conspicuous feature is the fact that standardization is on the basis of physicals and not on analysis of the steels.

■ GRADUALLY filtering through to Detroit are drops of information which give a clearer conception of how the defense program may crystallize in plants in this district. Machinery is now going into the Saginaw Steering Gear division of General Motors for production of Browning machine guns on a contract amounting to about \$750,000.

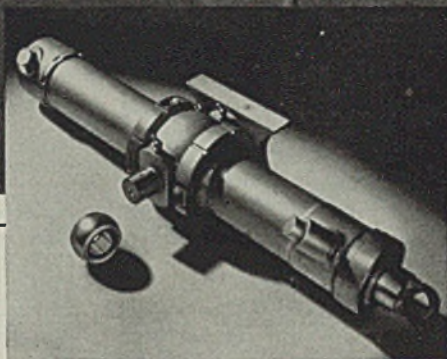
24 TORRINGTON NEEDLE BEARINGS APPLICATIONS...



SAVE WEIGHT and INCREASE PAY LOAD ON THE NEW LOCKHEED LODESTAR

(Above) On engine control, rudder pedal assembly, heating system—at a score of strategic points—designers of this world-famous Lockheed Lodestar have insured smooth, dependable anti-friction operation with minimum weight, by using the unique Torrington Bearing.

(Right) Torrington Needle Bearings are used to support this hydraulic actuating cylinder which operates the retractable landing gear mechanism—one of the most severe conditions a bearing has to stand.



In airplane design, every ounce counts. Lockheed Aircraft Corporation makes substantial weight savings, with resultant increases in pay load, by using Torrington Needle Bearings for twenty-four applications on its new transport, the Lockheed Lodestar.

Typical is the use of Needle Bearings on the hydraulic actuating cylinder of the retractable landing gear. Says P. A. Beck, Lockheed Specification Engineer, in referring to the high loads which these unique bearings have to support...

"Under normal conditions, in level flight, these loads are at least 1,300 lbs. per wheel or 650 lbs. per bearing—but in rough air, loads are increased considerably—often doubling and at times tripling. The maximum design load for this condition is 8,900 lbs. per wheel or 4,450 lbs. per bearing. Yet in spite of

this static and changeable load, these bearings stand up and are movable every time the landing gear is operated.

"Even then," adds Mr. Beck, "the bearings never make a complete revolution, since the total angular movement of the actuating cylinder is approximately 60°. This static load condition, together with the fact that the angular movement of the bearing is only a fraction of a revolution, combine to give one of the most severe operating conditions a bearing has to stand! Torrington Needle

Bearings were selected for this important installation because of their line contact, light weight and small space requirement."

* * *

And, in addition, they are low in cost, easy to install and easy to lubricate. Our Engineering Department will be glad to work with yours in adapting the Needle Bearing to your special requirements. For information, send for Catalog No. 10. For Needle Bearings to be used in heavier service, consult our Engineering Department for special bearing designs.

The Torrington Company
ESTABLISHED 1864
Torrington, Conn., U.S.A.

Makers of Needle and Ball Bearings
New York Boston Philadelphia Detroit
Cleveland Chicago London, England

TORRINGTON NEEDLE BEARINGS are also used at these points on the new Lockheed Lodestar:

Drum Assembly—Engine Control
Trunnion Assembly—Equipment Cabin Chair Mechanism
Trestle Assembly—Equipment—Cabin Chair
Trestle Assembly—Equipment—Rear Cabin Chair
End—Equipment—Heating System—Mixing Valve
Joint—Elevator Control Universal
Rudder Pedal Assembly Surface Controls
Bracket Equipment Cabin Chair Mechanism
Block—Equipment—Heating System—Butterfly Bearing
Pulley—Engine Control Stand Fuel Valve Cable
Tube Assembly—Surface Control Rudder Pedal Torque
Bearing Plate—P. P. Oil Cooler Scoop

TORRINGTON NEEDLE BEARING

MEN of INDUSTRY

■ **GEORGE SCHNEIDER** has been appointed manager of the newly reorganized heating and ventilating division of Milcor Steel Co., Milwaukee. He has been associated with the company 20 years.

Herbert G. Simmons has been made manager, Kokomo Nail & Brad Co., Kokomo, Ind., succeeding the late Ross Waggaman.

Sumner Pond, the past two years with the factory sales department of Universal Gear Corp., Indianapolis, has been appointed manager of the Detroit office, with headquarters at 2842 West Grand boulevard.

Milton Kelly, of Lemon Grove, Calif., has been appointed electrode and welder agent in that area for Harnischfeger Corp., Milwaukee. He will operate on an open basis under supervision of the Harnischfeger Los Angeles office.

William A. Maxwell, a recent graduate in chemical engineering from South Dakota School of Mines, has joined the research staff of Foote Mineral Co., Philadelphia, and will devote his time to process development.

Edward Berkfield, for many years secretary, Steel Export Association of America, and more recently vice president, American Steel Export Co., New York, has been named assistant export manager, Weirton Steel Co., Weirton, W. Va., effective Aug. 1. He will make his headquarters at the New York office of Weirton.

Robert I. Petrie has been named vice president and general sales manager, Crosley Corp., Cincinnati. Since 1938 Mr. Petrie was president and general manager, Barlow & Seelig Mfg. Co., Ripon, Wis., and before that was with Nash-Kelvinator Corp. 15 years in various executive capacities.

Dr. G. H. Clamer has been elected president and general manager, Ajax Electrothermic Corp., Trenton, N. J. R. N. Blakeslee Jr. has been named vice president and assistant general manager; A. D. Meyer, treasurer; F. T. Chestnut, secretary, and I. Prowattain, assistant treasurer.

L. A. Ver Bryck has been appointed manager of sales, Pitts-



George Schneider

burgh district, Pittsburgh Steel Co., succeeding W. M. Jensen, resigned. Mr. Ver Bryck has been in the sales department of the company since 1928, except for a short period with Wheeling Corrugating Co. His present promotion is from the post of assistant manager, welded fabric and construction products sales.

W. A. Morris Jr. has been named assistant purchasing agent, Jones & Laughlin Steel Corp., Pittsburgh. He has been with Jones & Laughlin 15 years in various capacities.

L. Lockwood York has been appointed sales and service engineer, aircraft engine division, Continental Motors Corp., Detroit. He goes to Continental from Air-Cooled Motors, Syracuse, N. Y.

Claire C. Balke has rejoined the research staff of Fansteel Metallurgical Corp., North Chicago, Ill., to participate in studies in the powder metallurgy of tantalum, tungsten, columbium, molybdenum, other metals and refractory metal carbides. Mr. Balke joined Fansteel immediately after graduation from the University of Illinois and worked in the research laboratory until Aug. 1, 1939, when he became instrumental in establishing a department of powder metallurgy at Stevens Institute of Technology, Hoboken, N. J.

H. K. Hauck has been elected president, Ohlen-Bishop Co., Columbus, O., succeeding W. C. Horr, who has resigned to devote his time to other interests, but will remain a director.

E. H. Holfelner has resigned as a vice president and general manager, his former duties being absorbed by Mr. Hauck, who will be

assisted by L. Fisher, appointed assistant to the president and manager of production. Other officers are: H. J. Bradbury, vice president, and E. K. Allen, secretary-treasurer.

Carlton Ward Jr., until recently vice president, United Aircraft Corp., East Hartford, Conn., and general manager of the Pratt & Whitney division of that company, has been elected president, Fairchild Engine & Airplane Corp., New York. He succeeds Sherman Fairchild, who has become chairman of the board.

G. V. Patrick has been appointed director of sales, Cleveland Automatic Machine Co., Cleveland. Mr. Patrick joined the company in 1928, and the past four years has been eastern sales manager, with offices at 50 Church street, New York. H. A. Gray, formerly with the United States army ordnance department, succeeds Mr. Patrick as eastern sales manager, while F. C. Reese, sales engineer, formerly with Cincinnati Milling Machine Co., has been named district manager of sales in Cincinnati, with offices at 314 American building.

Celebrates Forty-Fifth Anniversary at Lukens

■ Frank H. Gordon, vice president in charge of sales, Lukens Steel Co., Coatesville, Pa., celebrated his forty-fifth anniversary with the company July 25.

Mr. Gordon was born in Coatesville May 27, 1878, was educated in the public and high schools there and started as an office boy with Lukens.

After various clerical positions in



Frank H. Gordon

the sales department, Mr. Gordon was made assistant general sales agent in 1903. He succeeded J. R. Van Ormer as general sales agent upon Mr. Van Ormer's retirement in 1907. He was elected vice president in charge of sales Jan. 28, 1928.

Mr. Gordon is a director of By-Products Steel Corp., and Lukenweld Inc., divisions of the Lukens company. He is a director and member of the executive committee of the Home Building & Loan association of Coatesville; vice president, Coatesville chamber of commerce; treasurer and trustee, Presbyterian church of Coatesville, and member of the board of governors, Coatesville Country club. He is also a member of the Union league, Philadelphia, and Railroad club, New York.

Westinghouse Organizes For Emergency Products

■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., last week announced appointment of key men in a newly created emergency products division, organized to produce defense equipment under the government's preparedness program.

Frank Davies Newbury, manager of the division, said that in addition to producing all of the company's emergency products requiring new manufacturing facilities, his organization also will act as co-ordinator in negotiations involving emergency products which Westinghouse is now prepared to make in existing operating divisions. His staff will include Lawrence Dow Rigdon, manager of manufacturing; Carl Seymour Coler, manager of industrial relations; and William Daniel O'Connell, auditor.

Mr. Newbury has been manager of the new products division since August, 1938, and for a number of years has served as economist for the company.

Le Tourneau Completing Novel Georgia Project

■ R. G. LeTourneau Inc., Toccoa, Ga., is rapidly completing a \$3,000,000 factory project which will increase capacity 30 per cent. Plant was begun in November, 1938, and has required 5500 tons of steel. It contains 160,000 square feet of floor space and is located on 5000 acres of land.

Are welded steel fabrication features all buildings. These include a main plant, an office building, warehouse, airplane hangar, hotel, two dormitories, and 40 residences for employees.

When completed the project will include a cattle barn, milk cow barn for 50 cattle, pasteurizing building, canning plant, several silos, employees

recreation hall, a tabernacle, 250-watt radio station, cafeteria, stores, and 60 additional houses.

A steel panel construction developed by Le Tourneau was used throughout. This made possible in the main plant a trussless roof supported only by columns of 18-inch heavy tubing on 46-foot centers. Columns house electric power lines, oxygen, acetylene and air lines. About 75 tons of shielded type welding electrodes have been used so far in construction of the project.

Le Tourneau products feature arc welded construction and among the variety of machine tools valued at \$728,000 installed in the plant, there are 60 SAC type arc welders manufactured by Lincoln Electric Co., Cleveland.

Republic Takes Lead in Electric Steelmaking

■ Republic Steel Corp., Cleveland, is installing two 50-ton electric furnaces with additional processing and finishing equipment at its works in Canton, O. With these furnaces it will have three 50-ton electric furnaces, three of 25-ton, three of 15-ton and two of six-ton capacity. A 50-ton furnace was put in operation last spring and a 25-ton unit was moved from Buffalo to Canton at that time.

Completion of this addition will make Republic the leading producer of electric furnace steel in the United States, according to C. M. White, vice president in charge of operations.

Semet-Solvay Acquires Wilputte Coke Oven Corp.

■ Semet-Solvay Co., New York, subsidiary of Allied Chemical & Dye Corp., announced last week that it had acquired Wilputte Coke Oven Corp., New York, builder of coke ovens, by-product recovery apparatus and gas generating equipment. Louis Wilputte, president, and his staff will be associated with Semet-Solvay Co.

Shipbuilding Increased Slightly During June

■ A further, although moderate, increase in ship work in June is reported by the American Bureau of Shipping, New York. Under construction to its classification July 1 were 291 vessels, aggregating 1,566,660 gross tons, compared with 295 vessels with total gross tonnage of 1,516,185, June 1. During June, nine vessels, totaling 76,520 gross tons, were added to the list.

Compared with a year ago, the

increase is impressive. On July 1, 1939, only 122 ships, aggregating 630,240 gross tons, were under construction.

Electric Truck, Tractor Orders Higher in June

■ June bookings of domestic orders for electric industrial trucks and tractors were slightly higher in number and slightly lower in value than in May, according to the Industrial Truck Statistical association, Chicago. During June, 104 units, valued at \$362,057.44, were booked, compared with 101 units, valued at \$384,403, in May. Valuation figures are for chassis only, f.o.b. shipping points. Peak month this year was in April when 120 units, valued at \$423,381.50, were ordered.

During June, 82 cantilever-type trucks were booked, compared with the year's peak of 83 in March. During June the base price range for chassis only was from \$1985 to \$6215 for capacities ranging from 2000 to 10,000 pounds; in March it was from \$2025 to \$11,525 for capacities ranging from 2000 to 20,000 pounds. Total net value for cantilever-type trucks was \$287,897.44 and \$304,579.85, respectively, in June and March.

Foundry Equipment Indexes Rise in June

■ June index of foundry equipment orders stands at 174.2 for new equipment and 138.3 for repairs, with total sales 164.9. These compare with 127.5, 133.9 and 129.1 in May.

The indexes are percentages of the monthly average of reported sales to metalworking industries during 1937-39. Comparison with the old base, 1922-24, can be determined by multiplying new base figures by 1.328.

Forecast Carloadings Will Gain 9 Per Cent

■ Freight car requirements for the third quarter will be 9 per cent higher than in the comparable period last year, according to estimates by the 13 regional shippers' advisory boards. Estimated carloadings for the current quarter will be 6,173,298, compared with actual loadings of 5,663,517 for the third quarter in 1939.

Estimated loadings of iron and steel will increase 28.8 per cent, from 354,046 to 456,043. Automobiles, trucks and parts are expected to increase 24.5 per cent, from 70,852 to 88,219. Ore and concentrates carloadings are estimated at 742,837, a 22.5 per cent gain over 606,280 actual loadings in third quarter 1939.

Immediate Action Is Necessary

■ **THERE** are grave fears in industry that the actual execution of the armament program is getting off to too slow a start. Production for defense requirements has not yet reached a substantial portion of our total production—and many manufacturers who are logical sources for key war equipment and materials have not yet been informed as to what is to be required of them.

To an extent, this slow start is excusable. While we have had a national defense plan for many years, revised periodically in the light of new developments, that whole plan is now subject to drastic revision and tremendous expansion at a time when military concepts have changed so suddenly and radically as a result of the war in Europe. Then, too, there has yet been no adequate answer to the question: "Who and what are we to defend?"

Any but a careful, studious approach on national defense—motivated realistically in the light of world conditions of today—will invite costly and damaging mistakes. There are a lot of "angles" to the defense problem. Unfortunately, many of them are of a political nature. Hence their solution—in this presidential election year—is liable to be delayed longer than is desirable from the standpoint of the country's welfare.

No Valid Excuse for Armament Delay; Definite Amortization Plan Imperative

There can be no valid excuse for failures to speed to the maximum the production of armament whose usefulness is unquestioned. That includes such items as airplanes, warships, antiaircraft guns, tanks, coast defense guns and the like, as well as uniforms, and various service supplies. Unwarranted delays in producing such equipment can develop not only through

dilatory action on the part of government planning and procurement agencies, but also because of other reasons.

One possible obstacle to immediate execution of armament contracts is uncertainty in the matter of amortizing plant additions and additional equipment necessary to the defense program. Administration leaders recently agreed in principle that amortization in connection with the defense program may be spread over a five-year period. As is pointed out elsewhere in this issue of *STEEL* (p. 25) by E. J. Kulas, such agreement in principle is not enough. Congress, instead of incorporating such a provision in the contemplated new tax law, should give the necessary authorization to the treasury department immediately. By such action it will relieve prospective government contractors of existing doubts as to future solvency, thus pave the way toward getting vital contracts accepted and executed without undue delay.

Longer Work-Week Necessary in Face Of Great National Emergency

Another matter on which congress should take immediate action is that of the "hours ceiling" set by the fair labor standards act. As was pointed out in *STEEL* of July 22, p. 16, production capacity of our present corps of skilled workers would be 25 per cent higher on the basis of a 50-hour work-week as compared with the 40-hour work-week that is slated to become effective next October. On the basis of a 60-hour work-week it would be increased by 50 per cent.

Congress is sincerely interested in speeding the defense program. Manufacturers can help by letting their congressmen know of their present doubts and fears. Congress right now is in the mood to take such drastic action as the situation requires.

The BUSINESS TREND



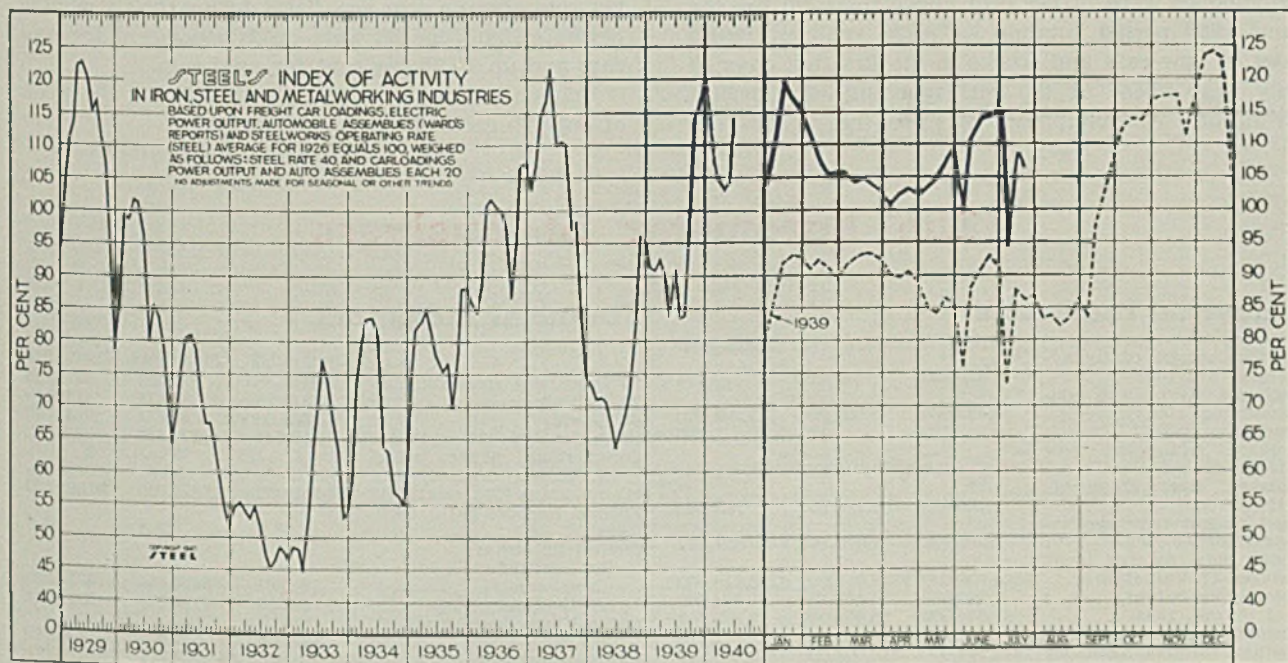
Order Backlogs Sustain Industrial Output

INDUSTRIAL activity continues at a high level for this seasonal period, although the sharp upturn which got underway during May and advanced further throughout June, now appears to be temporarily leveling off in a few industrial lines. In some instances, such as the automotive industry in winding up its 1940 model production schedules, the recent tapering off in output is strictly seasonal in character. Considered seasonally, industrial operations are substantially more active than usual, particularly in the heavier lines.

Large order backlogs accumulated in the steel, ma-

chine tool, aircraft, shipbuilding and heavy industrial equipment industries are sufficient to sustain a high level of operations for some months ahead. Prospects of additional car buying and equipment purchases by the railroads, together with expanding construction both private and public, should further bolster industrial activity.

Excluding the holiday weeks ended June 1 and July 6, STEEL'S index of activity in the iron, steel and metalworking industries during the latest period recorded the first decline in nine weeks. For the week ended July 20, the index eased 2.5 points to 106.0



STEEL'S index of activity declined 2.5 points to 106.0 in the week ended July 20:

Week Ended	1940	1939	Mo. Data	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
May 18.....	106.8	86.6	Jan.	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
May 25.....	109.1	85.4	Feb.	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
June 1.....	99.2	75.9	March	104.1	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
June 8.....	111.9	88.2	April	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
June 15.....	114.6	90.9	May	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
June 22.....	114.8	93.0	June	114.2	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
June 29.....	115.3	91.0	July	.....	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
July 6.....	94.2	73.4	Aug.	.....	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
July 13.....	108.5†	87.8	Sept.	.....	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
July 20.....	106.0	86.0	Oct.	.....	114.0	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
			Nov.	.....	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
			Dec	.....	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3

†Revised.

July 29, 1940

THE BUSINESS TREND—Continued

level, compared with 108.5 the previous period and 86.0 in the comparable week a year ago. During the corresponding periods of 1938 and 1937 the index stood at 68.7 and 108.0 respectively.

Normal seasonal tapering off in automobile production and the contraseasonal decline in revenue freight carloadings forced the decline in STEEL's index during the week of July 20.

Automobile assemblies in that week declined to 53,-

Where Business Stands

Monthly Averages 1939 = 100

	June, 1940	May, 1940	June, 1939
Steel Ingot Output	131.2	111.2	83.5
Pig Iron Output	131.4	116.4	81.8
Freight Movement	110.5	102.3	94.8
Building Construction	109.7	111.2	97.4
Wholesale Prices	100.3	101.7	99.0
Automobile Production	116.6	133.5	104.3

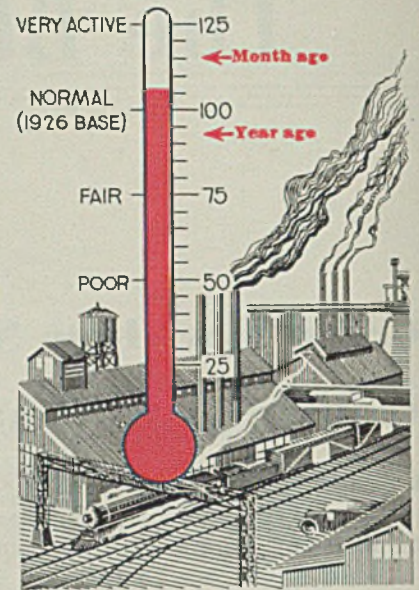
020 units, compared with 65,176 the previous period and 47,420 in the corresponding 1939 week. Further easing in motor car output is expected over the coming weeks as additional builders complete 1940 model assemblies.

In the first six months this year factory sales of automobiles were 24 per cent above the total for the same 1939 period, totaling 2,428,528 vehicles. Retail sales of new cars and trucks in the first ten days of July were ahead of the corresponding June period, an upturn without precedent since the model year

Industrial Weather

TREND:

Sidewise



has been on its present basis. Part of the contraseasonal upturn in automotive retail sales was stimulated by the widespread anticipation, already realized to some extent, that car prices would be advanced.

New car stocks as reported by 500 members of the National Automobile Dealers' association as of June 30 were 15.65 per cent above the total recorded on the same date last year. Stocks of used cars were 16.19 per cent above a year ago. Sales during the six months period ended June 30 were up 21.5 per cent for new cars and up 13.25 per cent for used cars.

Volume of freight traffic handled during the week of July 20 declined contraseasonally.

The Barometer of Business

Industrial Indicators

	June, 1940	May, 1940	June, 1939
Pig iron output (daily average, net tons)	127,103	112,811	79,125
Iron and steel scrap consumption (tons)	3,482,000	3,061,000	2,221,000
Gear Sales Index	129	133	90
Foundry equipment new order index†	164.9	129.1	.....
Finished steel shipments (Net tons)	1,209,684	1,084,057	807,562
Ingot output (average weekly; net tons)	1,289,723	1,092,867	821,417
Dodge bldg. awards in 37 states (\$ Valuation)	\$324,726,000	\$328,914,000	\$288,316,000
Automobile output	362,566	452,433	324,235
Coal output, tons	32,640,000	35,468,000	29,135,000
Business failures; number	1,114	1,238	1,119
Business failures; liabilities	\$13,734,000	\$13,068,000	\$12,581,000
Nat'l Ind. Conf. board (25 industries, factory):			
Av. wkly. hrs. per worker†	37.5	37.6	36.5
Av. weekly earnings†	\$27.67	\$27.66	\$26.19
Cement production, bbls.†	12,668,000	10,043,000	11,185,000
Cotton consumption bales	556,529	636,467	578,436
Car loadings (weekly av.)	723,860	670,351	620,797

†May, April and May respectively. ‡New series.

Foreign Trade

	May, 1940	April, 1940	May, 1939
Exports	\$325,306,000	\$324,018,000	\$249,466,000
Imports	\$211,382,000	\$212,238,000	\$202,493,000
Gold exports	\$3,563,000	\$33,000	\$36,000
Gold imports	\$438,695,000	\$249,885,000	\$429,440,000

Financial Indicators

	June, 1940	May, 1940	June, 1939
25 Industrial stocks	\$156.33	\$171.62	\$173.12
25 Rail stocks	\$18.29	\$19.79	\$20.79
40 Bonds	\$69.09	\$70.41	\$71.72
Bank clear'gs (000 omitted)	\$19,747	\$21,925	\$23,022
Commercial paper rate, (N. Y., per cent)	½—%	½—%	½—%
*Com'l. loans (000 omitted)	\$8,435,000	\$8,475,000	\$8,089,000
Federal Reserve ratio (per cent)	88.8	88.4	85.6
Capital flotations: (000 omitted)			
New capital	\$81,861	\$122,111	\$274,350
Refunding	\$144,596	\$128,033	\$312,234
Federal gross debt, (mil. of dol.)	\$42,968	\$42,808	\$40,445
Railroad earnings†	\$47,076,826	\$33,822,211	\$25,172,741
Stock sales, New York stock exchange	15,573,025	38,968,832	11,967,710
Bond sales, par value	\$102,695,925	\$176,484,975	\$126,656,525

†May, April and May respectively.

*Leading member banks Federal Reserve System.

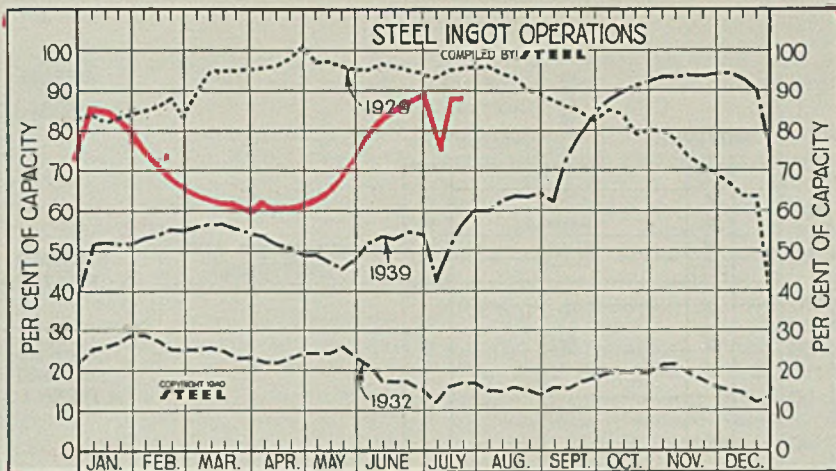
Commodity Prices

	June, 1940	May, 1940	June, 1939
STEEL's composite average of 25 iron and steel prices	\$37.69	\$37.33	\$35.69
U. S. Bureau of Labor's index	77.3	78.4	76.3
Wheat, cash (bushel)	\$0.98	\$1.11	\$0.90
Corn, cash (bushel)	\$0.78	\$0.80	\$0.65

Steel Ingot Operations

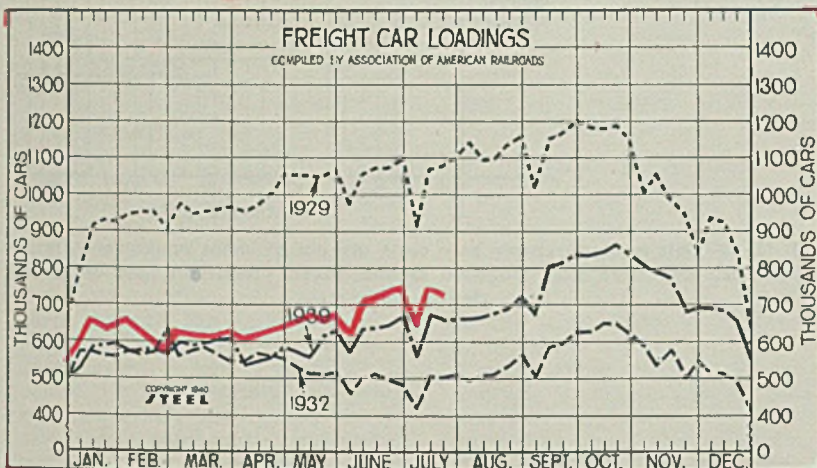
(Per Cent)

Week ended	1940	1939	1938	1937
Apr. 20....	61.5	50.5	32.5	91.5
Apr. 27....	61.5	49.0	32.0	91.0
May 4....	63.5	49.0	31.0	91.0
May 11....	66.5	47.0	30.0	89.0
May 18....	70.0	45.5	30.0	91.5
May 25....	75.0	48.0	28.5	75.0
June 1....	78.5	52.0	25.5	75.0
June 8....	81.5	53.5	25.5	74.0
June 15....	86.0	52.5	27.0	75.5
June 22....	88.0	54.5	28.0	74.0
June 29....	89.0	54.0	28.0	77.5
July 6....	75.0	42.0	24.0	74.0
July 13....	88.0	50.5	32.0	82.0
July 20....	88.0	56.5	36.0	81.0



FREIGHT CAR LOADINGS

COMPILED BY ASSOCIATION OF AMERICAN RAILROADS



Freight Car Loadings

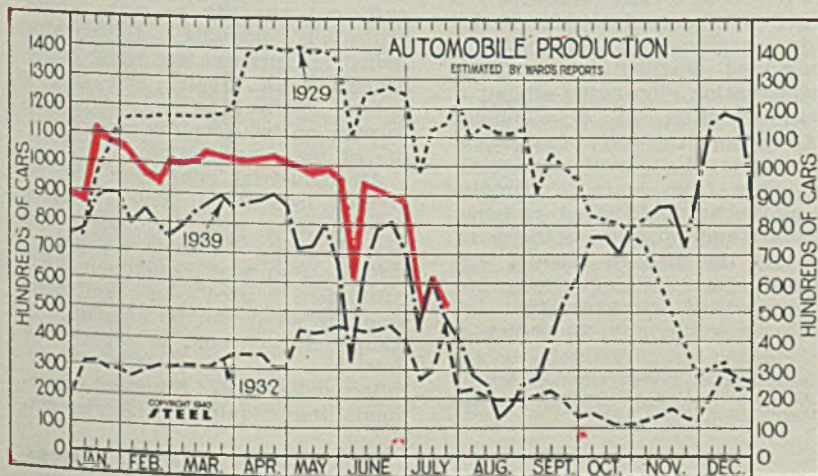
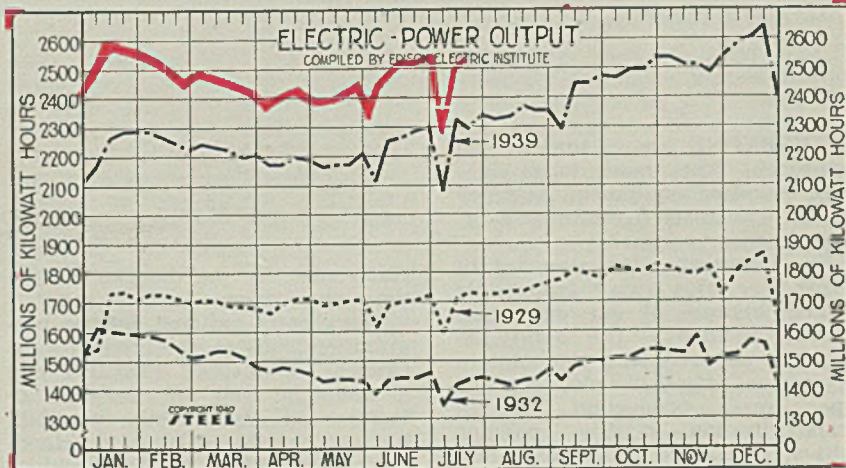
(1000 Cars)

Week ended	1940	1939	1938	1937
Apr. 20.....	628	559	524	761
Apr. 27.....	645	586	543	782
May 4.....	666	573	536	767
May 11.....	681	555	542	774
May 18.....	679	616	546	779
May 25.....	687	628	562	795
June 1.....	639	568	503	692
June 8.....	703	635	554	754
June 15.....	712	638	556	756
June 22.....	728	643	559	774
June 29.....	752	666	589	806
July 6.....	637	559	501	682
July 13.....	740	674	602	770
July 20.....	730	656	581	771

Electric Power Output

(Million KWH)

Week ended	1940	1939	1938	1937
Apr. 20...	2,422	2,199	1,951	2,188
Apr. 27...	2,398	2,183	1,939	2,194
May 4....	2,386	2,164	1,939	2,176
May 11....	2,388	2,171	1,968	2,195
May 18....	2,422	2,170	1,968	2,199
May 25....	2,449	2,205	1,973	2,207
June 1....	2,332	2,114	1,879	2,131
June 8....	2,453	2,257	1,992	2,214
June 15....	2,516	2,265	1,991	2,214
June 22....	2,509	2,285	2,019	2,238
June 29....	2,514	2,300	2,015	2,238
July 6....	2,265	2,088	1,881	2,096
July 13....	2,483	2,324	2,084	2,298
July 20....	2,524	2,295	2,085	2,259



Auto Production

(1000 Units)

Week ended	1940	1939	1938	1937
Apr. 20....	103.7	90.3	60.6	133.2
Apr. 27....	101.4	86.6	50.7	139.5
May 4....	99.3	71.4	53.4	140.2
May 11....	98.4	72.4	47.4	140.4
May 18....	99.0	80.1	46.8	131.3
May 25....	96.8	67.7	45.1	131.4
June 1....	61.3	32.4	27.0	101.7
June 8....	95.6	65.3	40.2	118.8
June 15....	93.6	78.3	41.8	111.6
June 22....	90.1	81.1	40.9	121.0
June 29....	87.6	70.7	40.9	122.9
July 6....	52.0	42.8	25.4	101.0
July 13....	62.2	61.6	42.0	115.4
July 20....	53.0	47.4	32.1	88.1

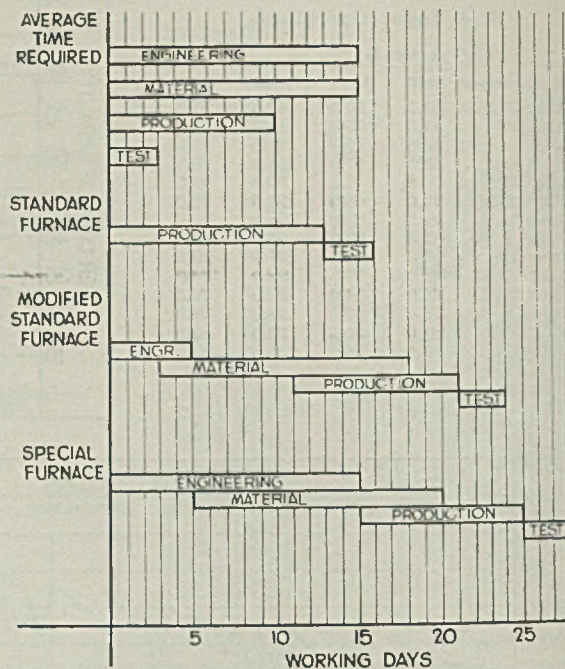
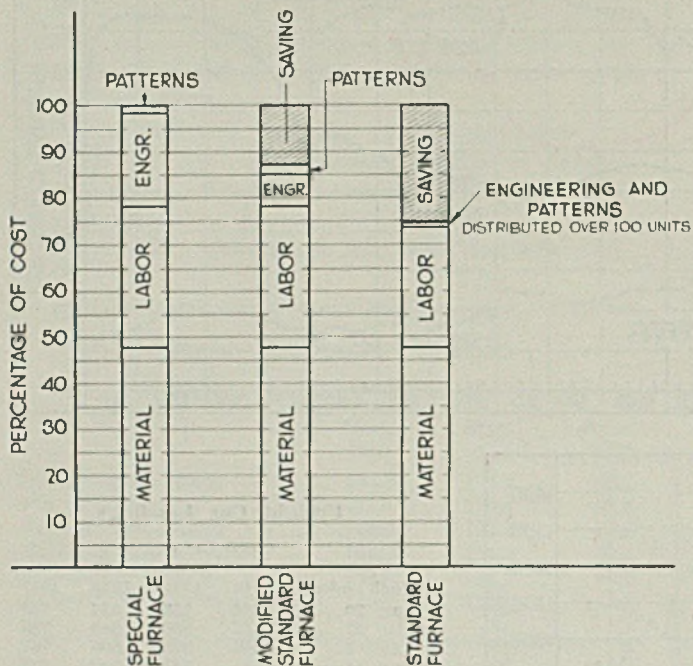


Fig. 1. (Left)—This analysis shows how costs are cut by mass production. Fig. 2. (Right)—Each departure from standard means added production time as shown clearly here

Standard Versus Special

■ EVERYONE knows that special equipment costs more to produce than standard equipment, but few realize how costs pyramid with departure from standard.

The extremely high standard of living we enjoy today is possible largely because of our mass production methods. The ability to improve products and to maintain or reduce prices likewise depends upon mass production through standardization—neither possible without the other. Standardization requires mass production to gain its benefits and mass production is not possible without a high degree of standardization.

Perhaps the modern automobile is the most notable example of standardization for mass production. Standardization is nothing more than the production of a large number of duplicate units from one set of plans or drawings using the most efficient manufacturing equipment possible.

Engineering, development, testing and drafting costs are considerable. Where such work must be charged against only a machine, cost of that machine may be many times the cost of an identical ma-

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chine made by the thousands from the same design.

The present national defense program emphasizes the necessity of efficient production. To this end it would be well for every manufacturer to consider the possibilities and benefits of increased standardization. Where 100,000 machines are produced, each machine is charged with only 1/100,000 of the design, engineering, development, testing and drafting costs. Thus standardization eliminates all but a minute fraction of development costs—reduces the price of an article—permits rapid production and minimum time from start to completion of the product. Another benefit from standardization is the assurance that the finished product will perform properly—a guarantee to the prospective purchaser that far exceeds in value any guarantee a

manufacturer can possibly write.

Consider the manufacture of gas-burning industrial equipment. It affords an excellent example of the truth of the above statements. Manufacture of domestic gas equipment such as ranges, water heaters, conversion burners, furnaces, boilers, refrigerators already is largely standardized for mass production. While manufacture of industrial gas equipment does not run into such large volume of units, nevertheless there are many pieces of equipment which are purchased in sufficient quantity to make standardization possible. Gas-burning industrial furnaces are being standardized to a greater and greater extent—permitting manufacturers to pass on to users the many benefits of mass production.

All industrial equipment can be divided into three general classes in accordance with the demand and degree of standardization possible:

First—Standard Equipment, that equipment used in sufficient amounts so it can be standardized completely and sold as a packaged unit.

Second—Modified Standard Equipment, that equipment fundamen-

Drawn from a presentation at American Gas association conference, Toledo, O., March 28 and 29, 1940.

ally standard but supplied with certain modifications to improve its use for a particular application.

Third—Special Equipment, that which must be designed for a particular operation, equipment in most cases rarely duplicated.

In industrial gas furnaces, for instance, the necessary engineering work to prevent errors, assure duplication of parts for replacement at some later date, predetermined operating characteristics, etc., is costly. Where one furnace is built from a certain set of drawings, the selling price must include the entire engineering cost. Where 100 furnaces are built, price of each furnace need include only 1/100th of the engineering cost.

Similarly, production costs can be lowered as given a sufficient volume of work, the time for setting up machines and the expense of developing special jigs and fixtures and other forms of highly efficient tooling can be justified. Also, a good volume of any particular part permits raw material to be purchased in large quantities at better prices.

Actual routing of component parts through the factory is simplified if the product is a duplicate of equipment produced many times before. It is surprising to learn how much time and money can be saved by a mechanic in producing duplicate units after the first two or three have been completed. While this is usually recognized to some extent, the fact that added production costs can easily double the cost of a completed article is not so well known.

Costs Well Distributed

Fig. 1 diagrammatically illustrates an analysis of how the various items which make up the parts of a large oven furnace are distributed. In establishing the price factors for a given furnace for this analysis, the engineering and pattern costs are distributed over 100 units.

Where full engineering and pattern costs must be charged against only one unit produced, this furnace is considered in the "special" group.

If a standard furnace with some minor modifications could be used, the required engineering might be reduced two-thirds. Pattern charges for new parts would remain the same and a saving of about 12½ per cent in overall cost could be obtained.

Where a design is completely standardized, engineering and pattern charges are reduced 99 per cent. Labor can be reduced 5 per cent. Result is an overall saving of 25 per cent in cost of the completed furnace.

The decrease in production cost with resultant decrease in price

permitted by standardizing the design offers a decided sales advantage.

Standard or packaged equipment makes possible far more rapid deliveries. Order and book work are minimized. Engineering work is practically eliminated.

Another factor is that it is possible to stock completed units, permitting still faster shipments.

Even equipment which is not sold in large volume can be shipped within a short period of time if standardized. While the equipment must be assembled, castings and other parts which require a long time to obtain can be carried in stock. Often careful planning will make it possible to use the same castings for a number of different size units or designs, thus reducing stock costs. This, however, is possible only through carefully analyzed standardization.

Steps Up Delivery

Fig. 2 illustrates well how standardization reduces the time required between receipt of order and date of shipment of a large oven furnace. This same graph, of course, is applicable to a wide range of industrial equipment. The same furnace which was used for the cost analysis in Fig. 1 was selected for this time analysis. While type of equipment materially changes the time required, the particular item selected is an excellent example of average conditions encountered.

Time required to design in detail such a furnace is about 15 days. Where no material is in stock, about 15 days will be required to get delivery. Actual production work requires about 10 days with an average of 3 days to dry the furnace, bring it to temperature, test it and allow it to cool for shipment. These times are shown at top of graph, Fig. 2.

Where furnace is a standard unit, engineering is entirely eliminated and material is on hand so production starts as soon as the order is entered. In 13 working days, the unit is ready to ship because production and tests are the only factors involved and these proceed consecutively as shown in upper portion of Fig. 2.

For orders in the second class—standard equipment with minor modifications—an average of about 5 days is necessary to change the standard drawings and issue revised bill of material. In practically all such cases, castings and patterns must be changed, causing a delay of about 15 days to obtain all necessary material. However, by careful planning of engineering, the manufacturer may have the order far enough along after three days' engineering to permit ordering some material. Such deviation from normal planned routine re-

quires additional handling and so increases cost as well as increasing time.

Production can be started, however, before all material is received so these periods will overlap slightly as shown near central section of Fig. 2. However, at least three days is required to process and assemble the material last received so production will be three days longer than time required to get the last material in the plant. This also means upsetting plant routine and increasing costs.

A modified standard furnace as shown in Fig. 2 increases production time about 85 per cent, lengthening it to an average of 24 working days.

Where furnace ordered is of special design—the third classification—it must be completely engineered, which means that it is possible to order material only after about five days of engineering work. However, production cannot start until all engineering is completed, which means engineering and production cannot overlap.

As seen in lower section of Fig. 2, the time of shipment is thereby increased to about 28 working days, a 115 per cent increase over the time to ship a standard unit.

Today when prompt deliveries are assuming increasing importance, this means of shortening the manufacture period deserves full consideration.

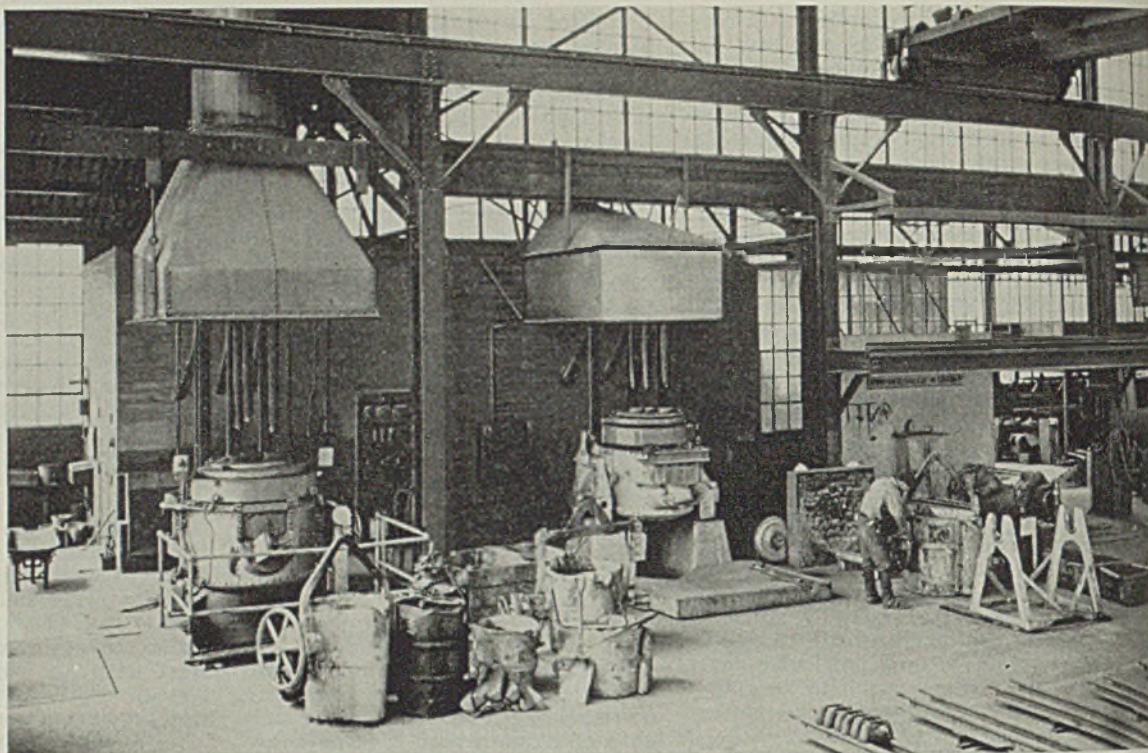
Repair Parts Easily Available

As with many other types of industrial equipment, standardization and duplication of gas-burning furnaces offers the prospective purchaser a decided advantage in assurance of complete satisfaction as identical units will already have been well tested in actual service so operating characteristics and costs are known accurately. Ratings need not be based on estimates but on actual results already obtained.

Flexibility in use of standardized equipment is possible by ingenious design and manufacture. This is a marked benefit to the user as it means that even changes in type of work handled, or in manufacturing sequence and procedure can be accommodated.

Repair parts for standardized equipment can be obtained quickly—another important feature. In most cases such parts are obtainable directly from stock, reducing maintenance costs and periods of nonproduction to a minimum.

It might be well for all industrial equipment manufacturers to review their production to see what advantages might be obtainable by more complete standardization of product. Already the machine tool industry is doing much along these lines.



HEAT and CORROSION

RESISTANT CASTINGS

Corrosion - resistant alloys, principally stainless varieties, afford outstanding service in process industries. Addition of 2 to 4 per cent molybdenum helps prevent pit corrosion

By D. W. TALBOTT*
Assistant Superintendent
Ohio Steel Foundry Co.
Springfield, O.

Part II

■ **THUS** far in this discussion, heat-resistant alloys have been considered. Turn now to the corrosion-resistant alloys, popularly referred to as stainless steels. The name indicates these alloys, when properly selected, do not stain or corrode in many solutions or atmospheres destructive to ordinary steel.

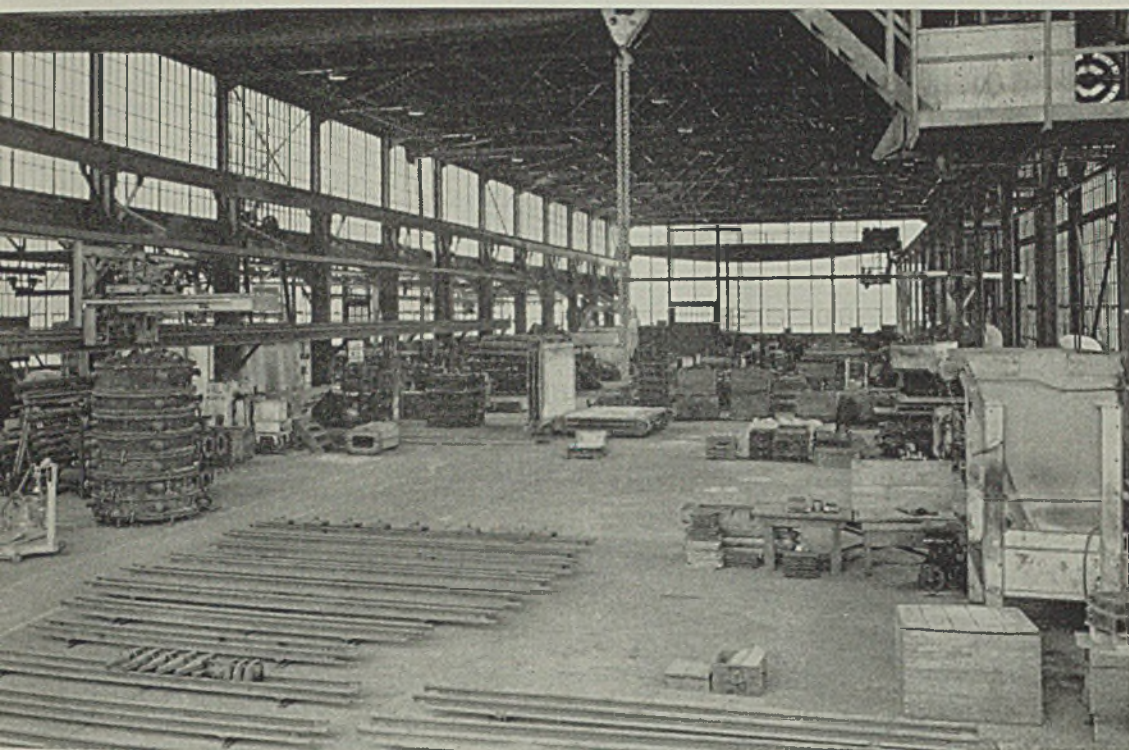
Increased use of so-called stainless steels has been enormous during the 28 years since first introduced.

*The author wishes to thank L. E. Welch, metallurgist of the Fahrite division, and other employees of Ohio Steel Foundry Co. for their valuable contributions and criticisms incident to preparation of this discussion.

They are well established in the architectural world from whence they derive their popularity among the masses who do not know or realize their great importance to chemical and other major industries. Much information has been gathered to show the value of wrought stainless alloys in various corrosive media. The number of analyses available in the wrought material is much less than in the casting industry. Table II lists a group of representative corrosion-resistant alloys.

This list does not include all the special alloys available. In the acid-resisting field, a number of alloys with various percentages of chromium, nickel, silicon, molybdenum, copper and tungsten are being used with success.

The following list possibly represents the best known and most used types of stainless alloys:



Interior of typical foundry producing chrome-nickel-iron castings for heat and corrosion resisting service

Chromium	Nickel	Carbon	Fahrite
	Per Cent		Grade
18	8	0.07	C-8A
18	8	0.10	C-8
18	8	0.07*	C-8AM
18	..	...	C-18
13	..	...	C-12
24	12	**	C-7
29	9	...	C-6

*2½ Per Cent Mo

**With or without Mo

Scope of Usage. The 18-8 alloys have by far the widest field of application. They are supplied in the three grades listed above, according to type of service. These alloys, although austenitic, are not stable since a partial change in the austenite takes place when heated near 1200 degrees Fahr. The treatment results in a loss in the corrosion resistance of the alloy due to the precipitation of carbide at the grain boundaries. Considerable research work has been carried out in an attempt to overcome this failing in the 18-8 type alloy. Some good can be accomplished by proper balance of chromium, nickel and carbon or by the addition of some element that holds the carbon in solution. The elements columbium, titanium and tantalum have been used by columbium has been the most favorably received. Columbium is preferred over titanium in products that must be welded since much of the latter is lost through rapid oxidation at welding temperatures.

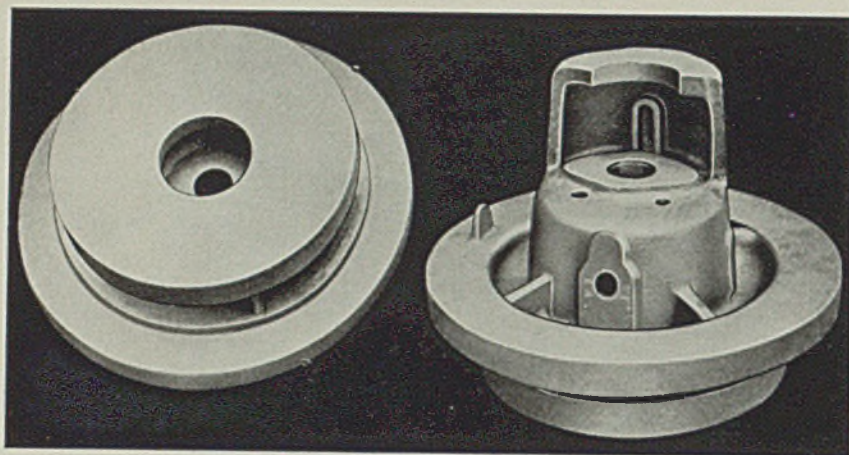
Various service conditions have resulted in modification of the 18-8 analysis by addition of other elements. Molybdenum, the most outstanding of these, is added in amounts of 2 to 4 per cent to prevent "pinholes" or "pit corrosion." It increases resistance to sulfite, sulfuric acid and acid attack in general.

Castings of the 18-8 analysis must be given a satisfactory solution heat treatment to bring out full corrosion resistance. Thin-section castings can be heat treated by water quenching from 2050 degrees Fahr. Thick-section castings should be air cooled from a temperature of 1850 to 1950 degrees Fahr. to prevent intergranular cracking.

18 Per Cent Chromium. This alloy is furnished in the nonhardenable grade with carbon less than 0.15 per cent, or hardenable with a minimum of 0.35 carbon. It has wide application in the nitric acid industry and possesses greater resistance to atmospheric corrosion, vegetable and fruit juices, mild acids and alkali than the 13 per cent chromium alloy. The hardenable 18 per cent alloy is useful where abrasion as well as corrosion is encountered. Hardness in excess of 500 brinell may be obtained with carbon over 0.60 per cent.

13 Per Cent Chromium. This alloy, dating back to the beginning of the stainless steel industry, still has many useful applications. It is resistant to fresh water, moist atmosphere, hot oils, fruit and vegetable juices and a variety of mild acids and alkalies. Its nongalling properties make it a satisfactory alloy for valve seats and disks as well as other parts of valves. It can be hardened to approximately 400 brinell by suitable heat treatment and is more resistant in the hardened condition.

24 Per Cent Chromium, 12 Per Cent Nickel. Recent research in the 24-12 alloy, either with or without molybdenum, has shown its superiority over the lower chromium-nickel alloys. It is resistant to nitric and nitric-sulfuric acid mixtures. The 24-12 alloy with



Cast stainless steel fittings for industrial service

molybdenum is exceptionally resistant to sulfite-liquors encountered in the paper pulp industry. Due to the higher alloy content and its stability at elevated temperatures, it is especially suitable for applications in corrosive media where the temperature is above 1000 degrees Fahr. or in the range where carbide precipitation will seriously affect the corrosion resistance of the 18-8 alloy.

29 Per Cent Chromium, 9 Per Cent Nickel. The 29-9 alloy has been used extensively in equipment for the sulfite paper pulp industry, the active corrodent being sulfurous and sulfuric acids. In cases where the 29-9 alloy has shown signs of failure, alloys containing molybdenum have been used successfully and so may be desirable.

Applications of Alloys. The paper industry is one of the principal users of stainless alloy castings. In sulfite pulping, the cooking liquor by oxidation contains free sulfuric acid, while in the sulfate pulping the active corrodent is caustic soda and sodium sulfide. In the former, alloys such as 29-9 or 24-12 have proved satisfactory with or without molybdenum. In the latter, 18-8

and 18-8 with molybdenum have served well.

In the construction of equipment for the chemical industry, it is often necessary to consider mechanical strength and machinability as well as resistance to corrosion. If corrosion were the only consideration, then the high-silicon irons, fused silica, glass and stoneware would serve this industry without resorting to stainless steels.

Service life of equipment in the chemical industry is influenced by temperature, concentration, amount of impurities, velocity or agitation and galvanic action. These many influences make it practically impossible to predict the service life of alloys from laboratory tests.

Whenever possible, plant tests of the alloys found most suitable in laboratory tests should be made. This will enable the manufacturer to determine the most suitable alloy before any costly investment in equipment has been made.

The chemical industry in all its branches provides the largest market for corrosion resistant alloys.

Food Industry. Castings of 18-8 with 0.12 or 0.07 per cent maximum carbon, with or without molybde-

num, are used for pumps, valves, fittings, agitating and mixing equipment in the food industry to prevent contamination or discoloration and as a protection against bacterial growth. Manufacturers of catsup, mayonnaise and vinegar have simplified their processes of manufacture because of the merits of these alloys in withstanding attacks of acetic, lactic, citric and tartaric acids.

Rayon Industry. The rayon industry offers a large market for corrosion resistant alloys, principally 18-8, in a variety of special equipment. Applications extend from the manufacture of raw materials to the final finishing of rayon in the form of cloth. Some special equipment is made in the higher nickel-chromium alloys, but 18-8 is used for conveying, mixing and agitating chemicals in both dry and liquid state.

Calls Steel Square Carpenter's Handbook

■ *Steel Square*, by Gilbert Townsend; fabricoid, 96 pages, 5½ x 8¼ inches; published by American Technical society, Chicago, for \$1.25.

The author calls the steel square the carpenter's handbook, instructor and tool without price. Without it he is just a hammer and saw man, who can hit a nail and saw to a line. The steel square brings knowledge of lines and angles in a simple and practical way.

The aim is to help the young carpenter who may benefit more from its pages than from the indifferent teaching of an experienced worker with whom he may be associated. The veteran carpenter also may find new short cuts and help for doing unusual jobs.

More Proportional Feed Diagrams Available

■ Three additional proportional feed diagrams similar to those previously issued by Milton Roy Pumps, 3160 Kensington avenue, Philadelphia, are now ready for distribution. These show, respectively, how to feed boiler water treating chemicals against boiler pressure, how to feed two or more boilers from a single-end pump and how to feed two boilers, individually or together, from a double-end pump.

The photo-lithographed diagrams, 8½ x 11-inch size, are convenient for filing or binding in standard binders. Earlier diagrams of this series covered proportional continuous feed of sulphuric acid, chemicals and shot feed of boiler water chemicals to either feed line or direct against boiler pressure. All six diagrams, upon request, are available free to anyone interested.

TABLE II

Types	Per Cent			Additional Elements	Fahrite Grade*
	Cr	Ni	C		
29-9	26-30	7-9	0.25 max.		C-6
25-20	24-27	19-22	0.25 max.		C-63
25-20Mo	24-27	19-22	0.20 max.	2.5-3.5 Mo	C63-M
24-12	22-26	10-12	0.25 max.		C-7
24-12Mo	22-26	10-12	0.20 max.	2.5-3.5 Mo	C-7M
18-8	18-21	8-10	0.12 max.		C-8
KA-28	18-21	8-10	0.07 max.		C-8A
KA-28Mo	18-21	8-10	0.07 max.	2.5-3.5 Mo	C-8AM
20-25	19-22	24-27	0.25 max.		C-31
10-20	18-21	9-11	0.12 max.		C-10
15-35	13-17	34-37	0.25 max.		C-1
28	26-30	3.0 max.	0.25 max.	with or without 3 Mo	C-28
12	16-20	3.0 max.	0.15 max.		C-18
12	11-13	1.0 max.	0.12 max.		C-12

*Fahrite is trade name for alloys produced by Ohio Steel Foundry Co.

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THE CARPENTER STEEL CO., READING, PA.



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Carpenter MATCHED TOOL STEELS

Check Your Tools to find Extra Plant Capacity



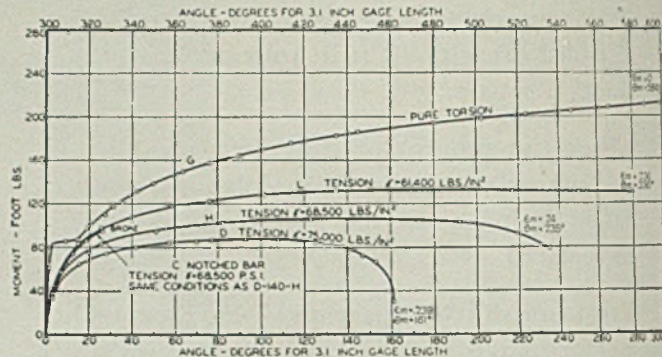
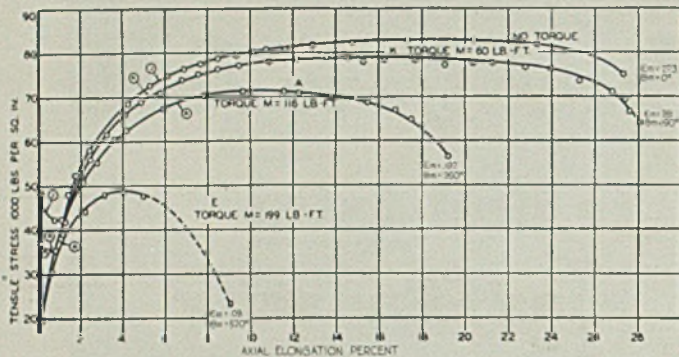
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Combined Tension-Torsion Loadings

■ FREQUENTLY some member of a structure or machine carries loads in both tension and torsion simultaneously. A typical example of combined tension and torsion loading is a bolt which has been tightened by a wrench. As the nut is drawn up, the twisting moment of the wrench is applied to the bolt and there is danger that the bolt may be strained in torsion to the extent that it will not support its load in tension.

The amount the tensile strength is reduced in combined tension-torsion loading, however, is not well known, and engineers generally avoid this type of loading wherever either the tension or the torsional stress is likely to be high.

In an effort to determine just what effect a superimposed load in one direction has on the strength of a bar carrying a second load in another direction, several sets of combined tension-torsion tests were made. In choosing the material, a typical bolting steel of 0.35 per cent carbon was selected, since bolting materials are subjected to this type of loading.

Testing equipment included a specially designed extensometer clamped on the shoulders of the test specimens, the gage length in each case being 3.1 inches and diameter of test section 9/16-inch. Axial strain was determined by two micrometer heads clamped to the frame in such a manner that they would measure the separation between the frame and the plain disk. The angle of twist was measured by a roller attached to the frame which rolled on the periphery of the disk.

Before any combined stress tests were run, the material was tested in pure tension and pure torsion. The ultimate strength in pure tension was 83,000 pounds per square inch and elongation at rupture was

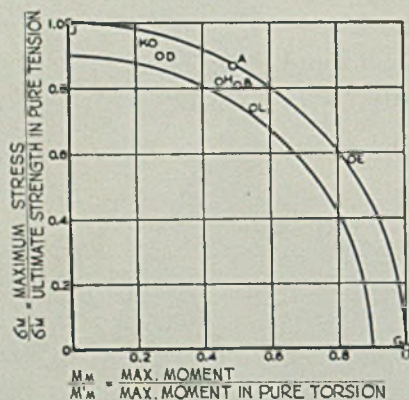


Fig. 1. (Upper left)—Constant torque plus constant rate tension. Fig. 2. (Upper right)—Constant tension plus constant rate torsion. Fig. 3. (Lower center)—Summary of test results

27.3 per cent. In the pure torsion test, the breaking torque was 237 pound-feet and the maximum angular twist was 584 degrees.

First set of tension-torsion tests results is shown in the upper left-hand chart. Here, in addition to tension, constant torques of 60, 118 and 199 pound-feet were superimposed. The value of the axial strain and the angle of twist at rupture are listed at the end of each curve. It can be seen readily that the amount of axial strain is considerably reduced when a high torque is applied to the bar. The ultimate tensile strength also is reduced. A torque of 60 pound-feet (one-fourth of the breaking torque in pure torsion) reduced the ultimate strength only about 5 per cent, but

a torque of 199 pound-feet (5/6 of the breaking torque) reduced the ultimate strength over 40 per cent.

Chart at upper right shows results of tests which were run with a constant strain rate in torsion. Curve G is the pure torsion test. Curves L, H and D are torsion tests with superimposed tensile stresses of 61,400, 68,500 and 75,000 pounds per square inch, respectively. In these tests the tensile loads were fairly high. All were above the yield point in pure tension so the curves do not show any discontinuity in torsion such as curve G shows. The amount of axial strain did not vary much in these three combined-stress tests, but the angle of twist at rupture was reduced from 584 degrees for the pure torsion test to 161 degrees for the bar which also carried a tensile stress of 75,000 pounds per square inch.

Curve C, upper righthand chart, shows results of a test similar to curve H. Bar C had a single circumferential notch 1/32-inch deep at the middle of the gage length. The constant tensile stress based on the area at the bottom of the notch was 68,500 pounds per square inch. The apparent increase in strength over curve H is due partly to the fact that the notch prevents the bar from reducing in diameter and partly because actual unit strains in a notch are much greater than shown by the diagram, which is based on a 3.1-inch gage length.

An interesting observation can be made concerning the combined tension-torsion tests. In pure torsion such as curve G in upper right, the moment-angle diagram has a positive slope until fracture occurs and the bar carries its maximum torque just the instant before it falls. In the combined stress tests

(Please turn to Page 71)

Abstracted from a paper by E. A. Davis, land turbine engineering, Westinghouse Electric & Mfg Co., South Philadelphia, Pa., presented at the spring meeting of American Society of Mechanical Engineers held at Worcester, Mass., May 1-3, 1940.

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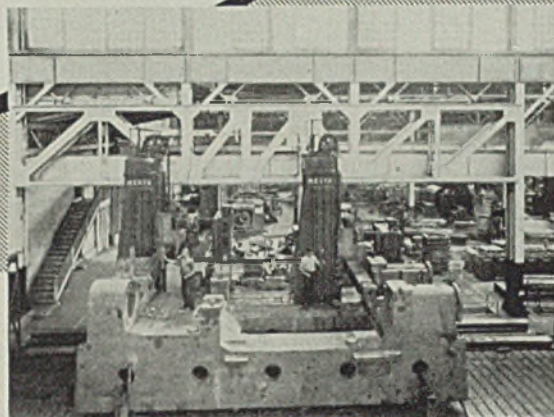
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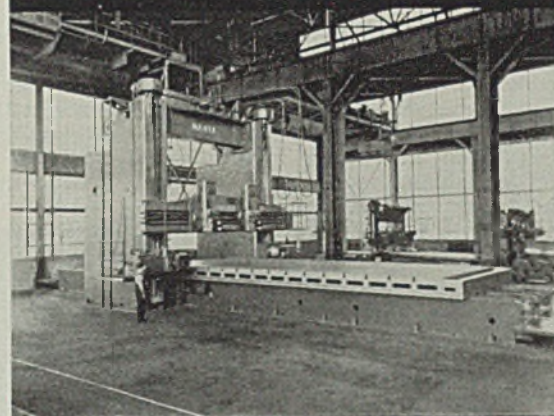
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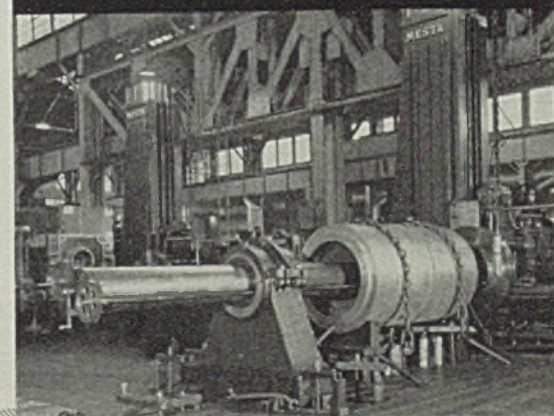
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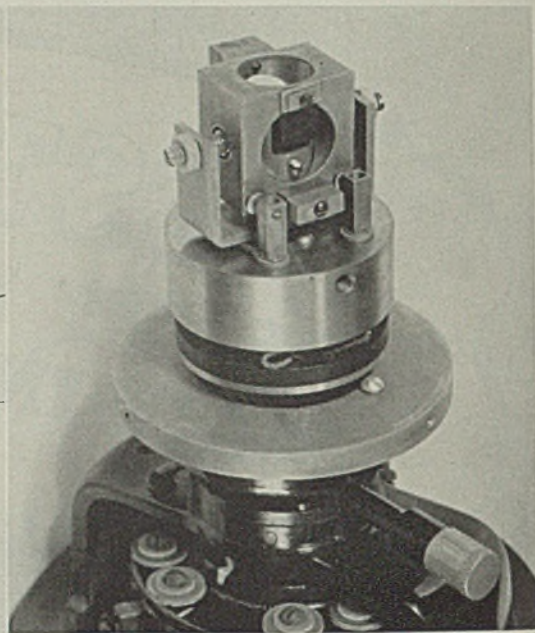
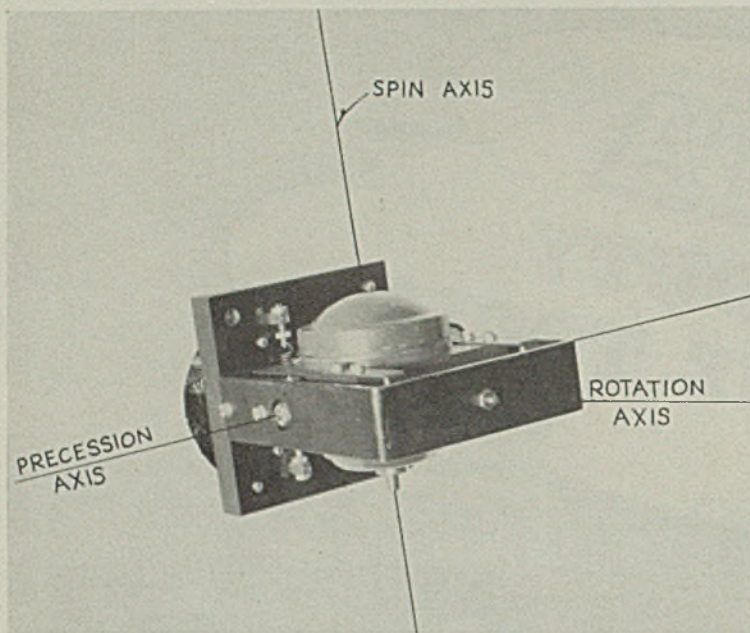


Fig. 1. (Left)—Gyroscopic governor for low speed control utilizes new governor action. Fig. 2. (Right)—Two-member inertia governor on motor-generator set also employs advanced principles for obtaining desired close governor action

New Speed Control System Heads Off Changes Before They Occur

■ AS A RESULT of work done at Westinghouse Research Laboratories, East Pittsburgh, Pa., a novel system of speed control has been developed which has some interesting applications for controlling motions and speeds in many mechanical operations and processes. The system works on the principle of acceleration as well as velocity. It is sensitive to the rate at which a change is taking place in addition to the extent to which the change has progressed. In actual operation, the device appears rather uncanny in that its anticipatory action begins to correct for something that has started to happen before it actually happens.

Experiments now in progress indicate the possibility of using analogous schemes with anticipatory response for the control of tension and gage thickness in rolling steel in high-speed strip mills. Successful application here is expected to reduce materially the scrap losses from off-gage material, one of the major problems in the steel industry.

In conventional governor-type speed control systems, the centrifugal force is proportional to the square of the speed. At low speeds, large weights are therefore needed to obtain the force required for proper contact operation. Another limitation of the centrifugal governor at low speeds is the magnified influence of gravity disturbances.

For example, any mass revolving at a radius of 1 inch will have a gravity component equal to its centrifugal force at 185 revolutions per minute. At low speeds of, say, 100 revolutions per minute or less, it thus is practically impossible to obtain any regulation with directly connected centrifugal governors because of the large weight required and the gravity effect that would be difficult to balance out due to the presence of friction torques.

Permits Speed Regulation

The gyroscopic governor was developed to permit speed regulation in this low speed range with direct coupling to the regulated machine. While this also is a contact-type regulator, it develops its speed responsive contact pressure by means of a gyroscopic torque. The gyroscope itself is a small single-phase motor of suitable moment of inertia and mounted with its axis of spin at right angles to the axis of rotation of the governor. The gyroscope is supported by ball bearings on its precession axis which is at right angles to both the axis of spin and the axis of machine rotation as shown in Fig. 1.

Precession of the gyroscope is restrained by a loaded spring which holds the contacts open or closed, depending on the control circuit, in the same manner as do the springs used in the centrifugal types of governing systems. The torque available to overcome this spring is given

by the product of the spin inertia of the gyroscopic rotor times the spin velocity of the gyroscope times the rotation speed of the regulated machine. From this it is apparent that although the regulated speed may be low, it is possible to obtain a large precessional torque by making this spin momentum of the gyroscope sufficiently large. Different regulated velocities may be obtained either by changing the precession spring force or by using a variable-speed motor to control the gyroscope spin velocity.

In comparing the operation of the gyroscopic governor with that of the centrifugal type system, it will be noted that the force at the contacts of the former is directly proportional to the square of the speed. The centrifugal governor without anticipation will, therefore, function for either direction of rotation, while it is necessary to provide an additional contact or to reverse the direction of spin if the gyroscopic governor is to regulate for both directions of rotation. The linear speed response of the gyroscopic governor is particularly desirable in applications covering a wide range of velocities, since the range can be covered with a smaller change in spring force than in the case of the centrifugal governor.

In addition, antihunting can be added to the gyroscopic governor simply by making one of the control contacts responsive to acceleration. This can be done by mount-

(Please turn to Page 71)



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Fig. 1—One of the first assembly operations is to fasten the electromagnetic element to the enclosing case. Power screwdrivers help. Belt conveyor carries work from station to station

Meter Assembly

A shadow projector checks gear alignment and mesh, stethoscope tests bearing assemblies, a color system assures proper selection of parts. Assembling in groups increases handling efficiency

■ ASSEMBLY of meters at Sangamo Electric Mfg. Co., Springfield, Ill., is carried out in two ways. Meters in quantity production, such as the totalizing watt-hour meter for residence and commercial use, are handled progressively on an assembly belt conveyor. Special units, such as the time control clock and other units made in smaller quantities, are assembled progressively by a pass-on method.

General assembly of meters produced in quantity is located on the third floor, along south and west windows for light. Parts are transported up an inclined belt conveyor from the first and second floors. Metal fabrication, plating, baking and impregnating are carried out on the first floor. Coil winding and similar work are handled on the second floor, but much of it goes to the first floor for impregnating and baking.

This inclined conveyor rises from near baking oven and stockroom to discharge at starting end of assembly conveyor. Practically all of the larger plated parts or coils are handled in compartment trays for protection. These trays are placed along the assembly line where they are to be used.

First operation is assembly of

By GEORGE RALPH

Process Engineer
Sangamo Electric Co.
Springfield, Ill.

electro-magnetic element to mounting plate. Name-plate with type and serial number progresses with the assembly although not attached until near the final steps in assembly. This serves for identification as to type of meter and provides any other necessary information during assembly.

Gear-train mechanism is assembled on a side conveyor feeding into main conveyor where it is to be used. Jeweled bearings are in colored gelatin pharmaceutical capsules to keep clean and retain the oil.

In assembling gear train to meter, the worm wheel and worm are meshed in a shadow projector which magnifies any misalignment and accuracy of depth of mesh. This permits much greater accuracy of assembly than if left to the eyesight or even when using a jeweler's eyeglass. Either tight or loose meshing or misalignment of teeth to worm would affect the accuracy of the meter by increasing

the friction load on the bearings or permitting too much play between gear and worm, thus slowing down the registering mechanism.

Assembly of meters is practically complete, except for adding the enclosing case with glass front, as they reach the end of the first line. Inspectors and testers then take them and pass along on a line at right angles. After passing preliminary tests, all meters are given a running test in groups of ten.

Glass case then is attached, the meter sealed in an individual carton, stamped with the serial number. Four individual cartons then are placed in a larger carton which is carried to the shipping room on the first floor by gravity conveyor.

Special items, such as the synchronous electric time control clock, are assembled at tables and passed from one assembler to the next. Only a small group of assemblers work on this clock as it is a comparatively new item in the line. Therefore operations are not so minutely subdivided and assigned as in assembly of quantity items.

An unusual method of assembly is practiced by the girl adding the first several parts to the frame. Ten frames are placed in recesses in the assembly table. The girl

then adds the first part to each as she passes along in front of the group. As she passes back she inserts and sets screws to fasten this part or adds a second part if the two are held by the same screw. She passes back and forth adding parts and setting screws until her portion of the assembly is completed and the group of ten passed on to the next assembler. Advantages are that time is saved in reaching for the screw-driver and laying it down only once for the group instead of ten times. Also, repeating the same operation ten times in sequence more nearly ap-

proaches the dexterity of continuous repetition.

As this clock is for time control, an astronomic (24-hour) dial is used. Clocks are tested for 90 hours on low voltage to see if they maintain synchronous timing under unfavorable conditions. Also, the clock mechanism is given a test to determine accuracy which must be maintained within plus or minus limits of 5 minutes per year. In time tests the clocks are mounted on the test board in a group.

During inspection motor bearings are tested with the stethoscope to detect incorrect fitting, misalignment or inaccuracies in the shafts. Before assembly all coils are given thorough electrical checks, tests and inspection. After assembly circuits are tested in their entirety.

In the manufacture of totalizing watt-hour and other electrical metering equipment several parts are quite similar in general appearance, but differ slightly. These dif-

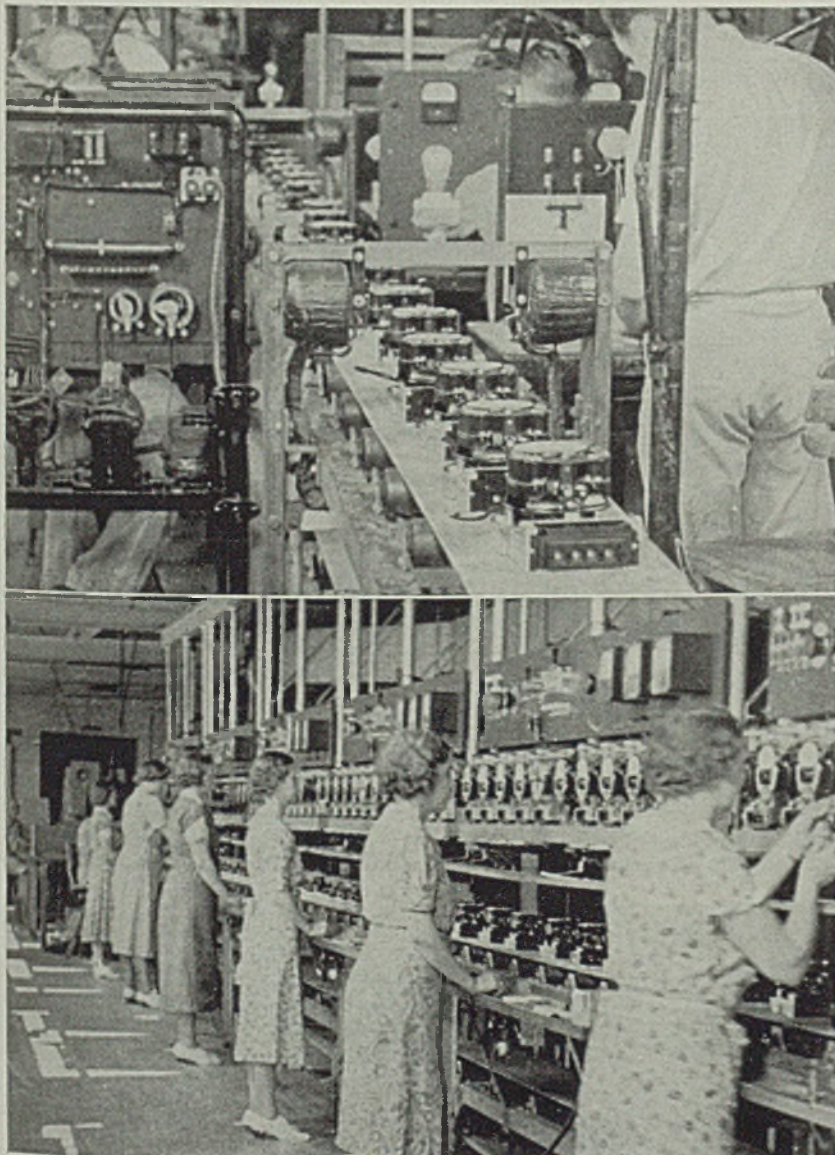
ferences are due to use as "lefts" or "rights" or in various models and types of meters.

To make the differences quite obvious to the assembler, these coils or shunts are made or insulated in different colors—brown, black or yellow. These colors also have electrical significance. This coloring is in addition to coloring the leads to indicate positive and negative connections. Bakelite parts also are molded in the three colors.

In assembly, the proper selection is obvious. Also, the inspector can tell at a glance if a wrong coil is used or if parts are not placed in proper position. He does not have to make an individual check on

(Please turn to Page 73)

Fig. 2. (Upper)—Meters are calibrated on specially designed test racks and are carried down the line on the large belt conveyor shown. Fig. 3. (Lower)—Here six operators make a final check of all previous tests, averaging 220 meters per hour. After checking here, meters are replaced on the conveyor, packed and shipped or held in stock



Clear Coating Material Protects Plated Metals

■ A new fast drying coating material, Microlac, used to protect and beautify metal surfaces of either natural or plated finishes is announced by Michigan Chrome Co., 6340 East Jefferson avenue, Detroit. Its color approximates that of distilled water, and it dries to a high luster. In addition, it provides excellent resistance to sulphur dioxide, sunlight, moisture, oil, grease, gasoline and abrasion.

Feature of the material is it does not require a thinner and is applied either by dipping or spraying, just as it comes out of the container.

Strain Reliever Protects Electric Cord

■ An Eastman strain reliever, a device which guards against burning and short circuiting is now being incorporated on all electric tools manufactured by Wodack Electric Tool Corp., 4627 West Huron street, Chicago. It is a spring-like unit installed over the 3-conductor cord where it enters the tool, protecting the cord from injury at that point and at the same time making it impossible to pull the cord loose from the terminals.

One-Coat Enamel Produces Whiter Finish

■ A one-coat, opaque enamel, Neopake, which provides a durable finish not subject to chemical change, is announced by Porcelain Enamel & Mfg. Co., Baltimore. It is inorganic in character and, although less enamel and opacifier is used, it produces a much whiter and brighter finish. It also has a wider burning range and is not subject to black specking and blistering.

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Dear Charlie:—

You remember the trouble we were having with our drill bits when we first called you in last January? Boy, they certainly made it a hard winter for us and no foolin'.

No matter how careful we were and how much we spent on processing—and we were spending plenty—the bits were still not up to snuff. That's when you came in.

The first shipment of steel from your company showed you knew what you were talking about. The U·S·S Controlled Steel did everything you claimed for it. The quality of the drill bits improved immediately and the shop troubles eased off.

We were pretty well satisfied—but apparently you weren't! I wondered why you kept nosing around the shop but now I know. It was certainly time well spent as far as we are concerned. Your help with Mike at the forge hammer surely made a difference. Getting him to start forging at a higher temperature and slowing down the cooling was a darn good idea.

So was your tip to our heat treater. Quenching from a higher temperature and drawing for a longer time has given us exactly what we want. Machinability has been greatly improved and our bit quality is right on the nose. You'll be pleased to know we're buying U·S·S Controlled Steel right along now and have made your suggestions standard shop practice.

So here I am at Lake Pymatuning, without a worry on my mind. The fish aren't bitin' today, but who cares. All I can say is "Thanks, again, Charlie" and "wish you were here."

Bill

(If you like this photograph—and we think it's a dandy—we'll gladly send you a print suitable for framing. Address your request to Room 621 Carnegie Building, Pittsburgh, Pa.)



STEELS

C O R P O R A T I O N

UNITED STATES STEEL

Cold-Dip Tin Plating

New process applies an effective tin coating to inside of tubing, fittings and other hard-to-get-at places. Method is extremely flexible, can coat both coiled and formed tubing very easily

■ A SERIOUS difficulty in use of copper or copper-alloy water lines is sometimes encountered as certain chemical ingredients often present in so-called pure water react with the copper to produce "green water." Rate of formation of these green deposits (metallic salts) varies with the chemical constituency of the water, the gases dissolved therein, temperature and other factors.

The trouble is prevalent in many parts of the United States, particularly where the water supply originates in surface wells. Where the flow of water is practically continuous, the concentration of salts is usually not great enough to color the water noticeably or to stain plumbing fixtures to a great extent. On the other hand, if the flow of water is intermittent, as in dwelling houses, office buildings, etc., the concentration of the salts may be great enough to discolor the water or to stain plumbing fixtures badly. Formation of color stains also is promoted by certain soaps which form insoluble colored copper deposits.

Many attempts have been made to protect copper surfaces to prevent the formation of green deposits. While it is possible to electroplate exterior surfaces, interior surface coating of tubing by this method is practically impossible. Mechanical tinning has been employed with some degree of success but is costly and not always entirely satisfactory.

Known as the hot-tinning process, molten tin is applied to the inside of tubing by a mechanical swabbing operation. This procedure is limited to comparatively short sections of tubing and the coating often is uneven. Further, this method is not

By B. J. HIGGINS
Metallurgist
Lindermere Tube Co.
Cleveland

suitable for coating the inside of a coiled pipe.

To overcome the disadvantages of former tinning processes as applied to copper and copper-alloy tubing and to insure an adequate tin coating for both exterior and interior surfaces, the Lindermere Tube Co., Cleveland, is using a recently developed cold tin plate process. This company purchases copper, brass and aluminum tubing in standard sizes and redraws the product to all sizes from 1/8-inch to 2 inches into straight tubing and coils for various purposes in both tinned and untinned varieties.

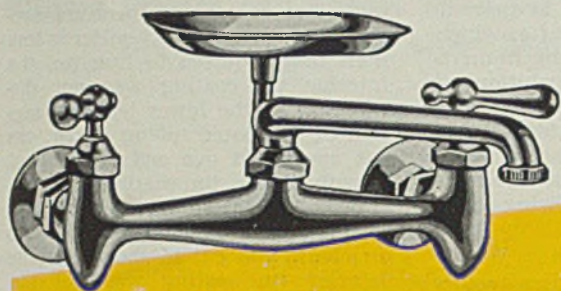
Concentration May Vary

One form of the method employed is a sodium stannite, sodium cyanide bath, prepared by the reaction of stannous chloride and sodium hydroxide as follows: $\text{SnCl}_2 + 4\text{NaOH} = \text{Na}_2\text{SnO}_3 + 2\text{NaCl}$. This is prepared for use by addition of sodium cyanide. The concentration of sodium stannite can vary from 1/2 gram per liter to a solution substantially saturated. The concentration of sodium stannite may be lower than 1/2 gram per liter, but if so the solution becomes depleted quite rapidly in use. The concentration of cyanide must be high, but the lower limit that can be used varies with the time allowed for coating.

The following example will illustrate the concentration of sodium cyanide that can be used under varying conditions. A bath was prepared

containing 5 grams per liter $\text{SnCl}_2 \cdot 2\text{H}_2\text{O}$ and 5.6 grams per liter NaOH . The cyanide concentration was varied. A solution containing 5 grams per liter NaCN at room temperature gave but little visible coating in less than one hour, and the coating secured in that time was thin and incomplete. The surface of the copper was not protected. When the concentration of NaCN was 15 grams per liter a visible coating was obtained in about 4 to 5 minutes, but immersion for approximately an hour was required to give complete and adequate coverage. At 25 grams NaCN per liter, visible coatings were obtained in 2 minutes and satisfactory coverage was obtained in 10 minutes or less. At 50 grams and above per liter visible coatings were obtained in one minute or less. Coatings have been made with solutions containing as much as 200 grams NaCN per liter. These examples are only illustrative as the process is not limited to the concentrations given.

In carrying out this process, the first step is to clean the tubing thoroughly by following the methods commonly employed for cleaning copper or copper-alloy parts for electroplating. In some instances, however, such cleaning operations are not absolutely necessary since the solution itself has cleaning properties. If the tubing is to be coated externally, it is simply immersed in the solution. Tin begins to deposit immediately upon immersion. In many cases an immersion of one minute is sufficient to bring about a satisfactory coating. In some cases a longer immersion is necessary. Generally speaking, the longer the immersion the heavier will be the coating obtained. It is believed that



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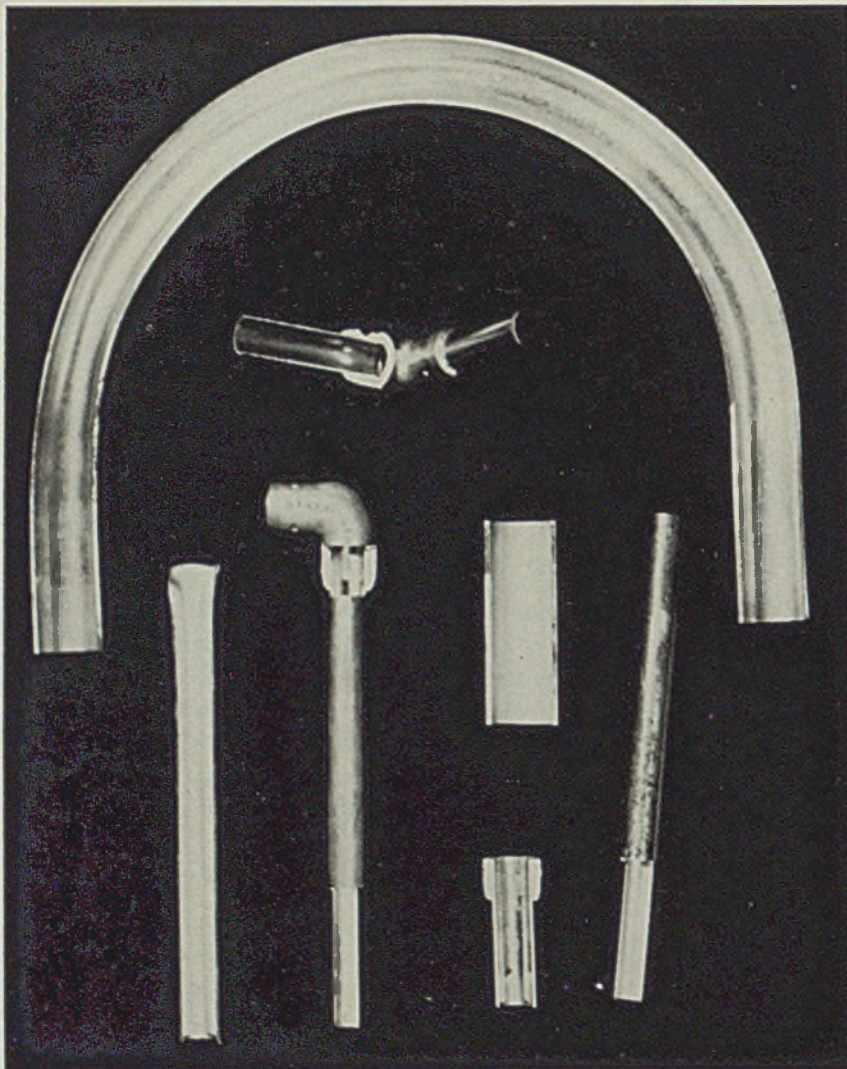
PENNSYLVANIA SALT
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Chemicals

the coating is formed by an electrochemical replacement, with the copper going into solution and the tin depositing out of the solution. The bath may be operated at ordinary room temperature. Under ordinary conditions the deposited tin coating is approximately 0.0002-inch thick.

When it is necessary to coat the inside surface of tubing, regardless of whether in straight lengths or in coils, the process is simplicity itself. All that is necessary is to attach a

coated material is heated to approximately 230 degrees Cent. after which a second coat is applied by immersing the article in the solution or pumping solution through it. The procedure may be repeated several times if desirable. In some cases temperatures above 230 degrees Cent. may be desirable to bring about an alloying of the tin with the base metal.

A few of the satisfactory results obtained on copper tubing are shown in the accompanying illustration.



These various test pieces were prepared to demonstrate the effectiveness of the cold-dip tin plate process

rubber hose at one end and pump the solution through the tube. Thus it is just as simple to coat the inside of a coil or other bent shape as it is to plate straight work.

While the foregoing is a general outline of the process, there are variations that sometimes are followed. For example, under some conditions it has been found advantageous to bring about a superior coating by applying an initial coating in the manner described. Then the tin-

The size of these various parts can be judged from the fact that the large U-section is $\frac{3}{8}$ -inch copper tubing with a wall thickness of $\frac{1}{16}$ -inch. This test piece was first plated internally then bent and cut apart to show the results. Notwithstanding the sharp bend, the tin coating was in no manner broken or wrinkled.

Directly below this piece is an elbow in which two pieces of tubing have been soldered in place by sweat-

ing. Because the temperature necessary to melt ordinary solder is less than that required to fuse tin, the interior tin coating was not disturbed. At the lower left is a section of tin-coated tubing which was cut apart and one end flanged out sharply. The tin coating was not cracked. Next to this specimen is another piece of tube sweated into an elbow and cut to show that the interior tin coating was not disturbed. Note the smoothness of the tin coating in these and the remaining three specimens.

Tests reveal that distilled water saturated with carbon dioxide causes the most severe attack on copper pipe and produces the most pronounced "green water" effects. In these tests, tubes were immersed in the tin solution for varying lengths of time and then were filled with the test water which remained in the tubes for 24 hours. A control tube of uncoated copper was tested at the same time and under the same conditions. After the tubes were drained the water was analyzed for copper in parts per million.

Tested in Ammonia Solutions

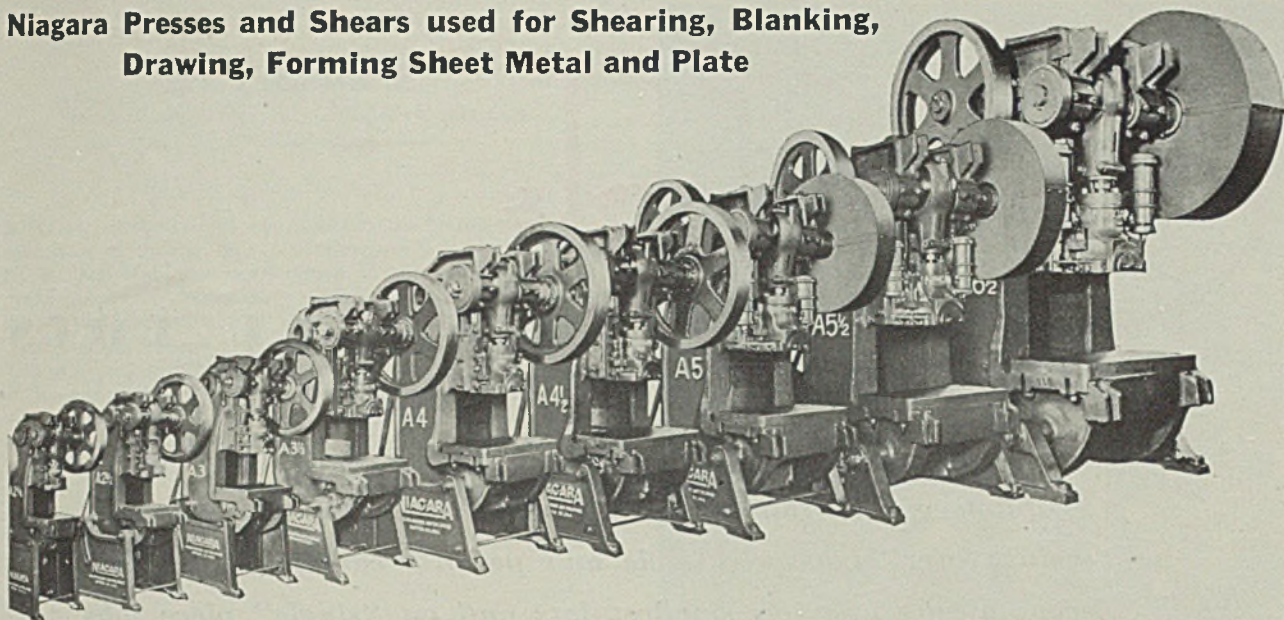
The control tube reached a peak of approximately 15 points per million within 8 days and continued at this point for about 40 days at which time it began to decrease. The tubes which had been tinned inside gave adequate protection as was shown by the fact that at no time did the dissolved copper increase above two parts per million.

Other tests were run in ammonia solutions to determine the density of coverage. Here 50 and 100-foot coils of copper pipe coated on the inside by this process were tested for porosity by filling them with commercial ammonia and allowing them to stand for various lengths of time. The ammonia then was drained and checked for color change which would indicate the presence of copper. Some tests showed no appreciable color change after 48 hours.

Tests were made at soft-soldering temperatures to determine the effect of heat on parts coated by this process. No effect on either the inside or outside of the parts was observed other than a slight oxidation.

It is evident the process has great possibilities as it furnishes a practical means for tin coating both straight and formed tubing to be used in various installations where it is imperative to overcome the evil effects of "green water" in ordinary water piping systems. In addition, the process appears to have great value in tinning tubes for water coolers, beer dispensing equipment, air conditioning equipment and similar uses.

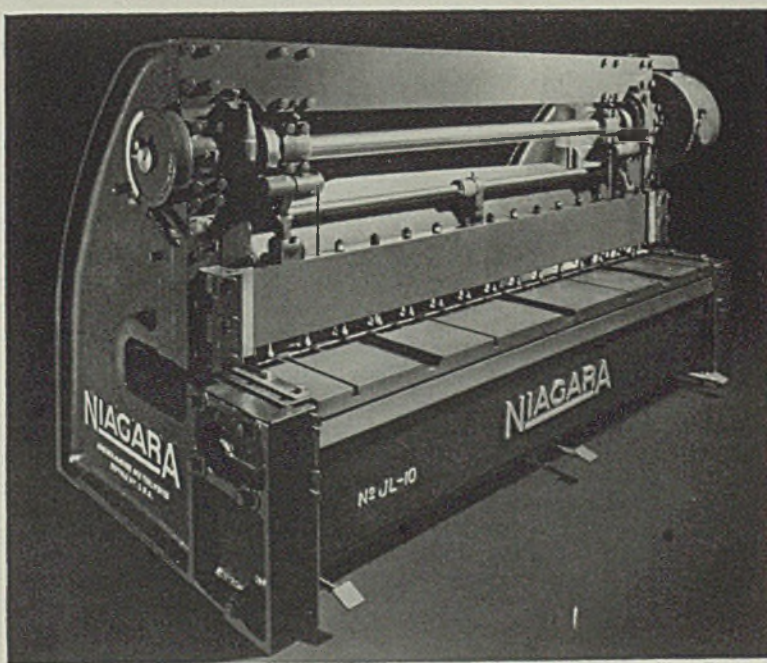
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Features of latest type Niagara Power Squaring Shears include accurate, flat cutting . . . enclosed drive with anti-friction bearing mounted gears and clutch running in oiltight case . . . 14-point sleeve clutch with built-in single stroke mechanism for instant engagement and more working strokes per hour . . . positive clutch lock . . . triangular section crosshead . . . box section bed . . . smooth acting, toggle operated holddown with individual cushioned feet to compensate for varying thicknesses of sheets . . . self-measuring, ball bearing, parallel back gage measuring in increments of 1/128 inch for ease and micrometer accuracy of adjustment.



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Carbide Tools

FOR MACHINING SMALL LOTS

Adoption of general purpose carbide tools shows 25 per cent savings over high-speed tools and permits carbide to be used economically even on smallest lots and on "single" piece jobs

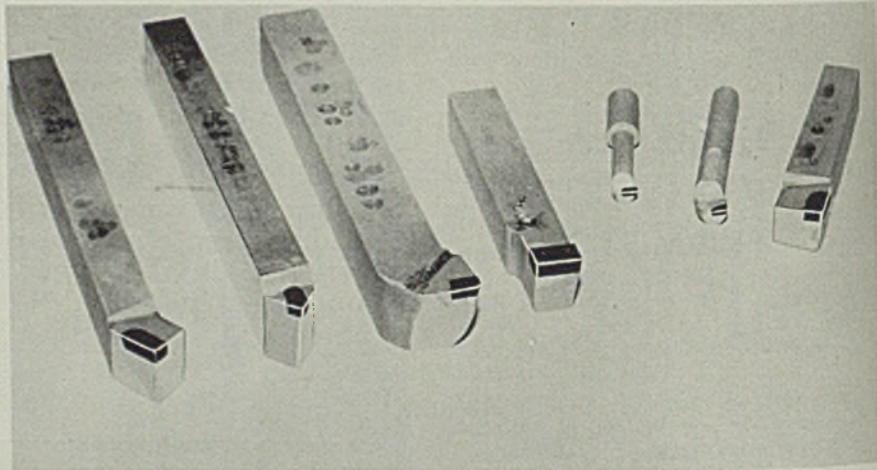
■ USE OF carbide tools on diversified short-run machining work naturally involves problems not encountered in mass production. Short runs involve neither the time nor sufficient profit margin to justify extensive experiments on any one job to determine the ultimate in tool design, the final modicum of speed and feed. Nor is it normally profitable to purchase a carbide tool simply for one specific job as the small quantity involved usually will not permit absorption of the cost. Exceptions are the specific jobs of such difficult nature or material that carbides alone can handle them.

Production at Taft-Peirce, in addition to manufacture of steel and carbide tipped gages and small tools, also involves a substantial volume of contract work. This requires the machining of a wide variety of metals, frequently in lots as low as one piece but averaging perhaps between 24 to 75 pieces per lot. Past practice on contract work was to apply carbide tools principally to jobs involving fairly large quantities or presenting unusual difficulties in machining. Bulk of the work was done with high-speed steel tools whose performance left much to be desired when compared to that of carbide. As a result, some practical method was sought by which carbides could be used more extensively.

The plan adopted has shown considerable merit. Essentially, that plan is as follows:

A "carbide application man" was appointed and charged with the sole responsibility of controlling the application, grinding and maintenance of carbide tools in all departments.

A minimum number of general purpose carbide tool designs were adopted, each one having a wide application to our diversified work.



A minimum number of general purpose carbide grades were selected, each suitable for broad use in the shop.

Adequate facilities were provided to grind carbide tools satisfactorily.

The appointment of a "carbide application man" within the plant has many obvious benefits. It hastens the extensive use of carbide tools. It provides a central source of authoritative information on carbide tool practice accessible to all departments. It creates at once a unified system for use and control of carbide tools.

We selected a job setter for this work. After giving him a period of intensive training in application, grinding and maintenance of carbide tools, which included a week's experience in the carbide supplier's own plant, a system was set up to operate around him.

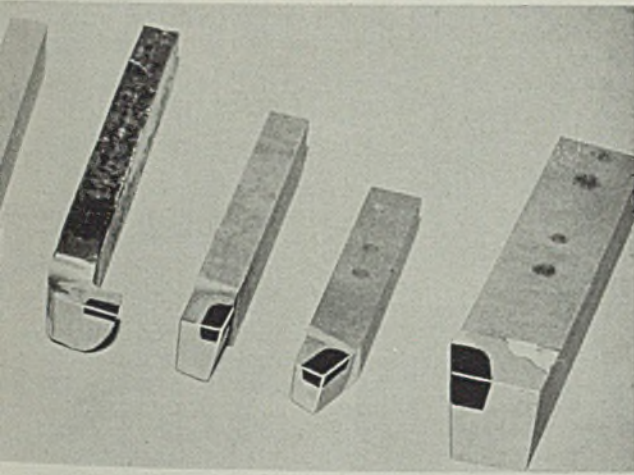
The control of carbide tools is in his hands. Operators obtain carbide tools from him for any particular application and return them to him when the job is completed or when tools require grinding. When new jobs come up, our carbide specialist recommends and directs the use of carbide on that job. He specifies

By F. S. BLACKALL JR.

President and Treasurer, Taft-Peirce Mfg. Co.
Woonsocket, R. I.

■ Widely recognized as an authority on engineering and economics of tooling and interchangeable manufacturing, Mr. Blackall long has been active in the affairs of trade associations and engineering societies, and in the interests of standardization and national defense.

Mr. Blackall received his bachelor of arts degree from Yale university in 1918. During the war he served overseas as an ensign in the United States navy. In 1922, after earning his bachelor of science degree at Massachusetts Institute of Technology, Cambridge, Mass., he went to work for Taft-Peirce Mfg. Co., Woonsocket, R. I., as supervisor of heat treating. He was made assistant manager in 1935, a director in 1926, general manager in 1928, vice president in 1929. He has been president and treasurer of the company since 1933.



These 10 general purpose styles of Carboly tools are used on a wide variety of machining including steel, cast iron, aluminum, brass, etc. Two styles of carbide boring tools, widely applied, are shown in the center

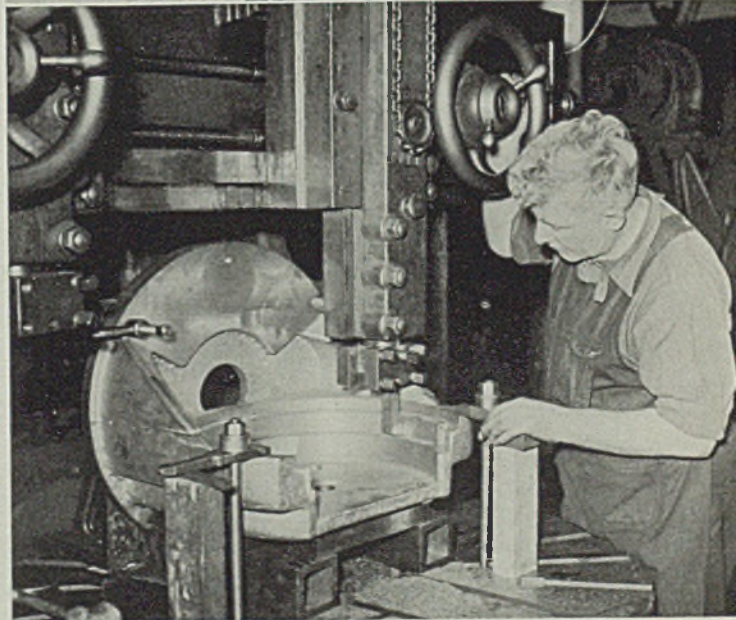
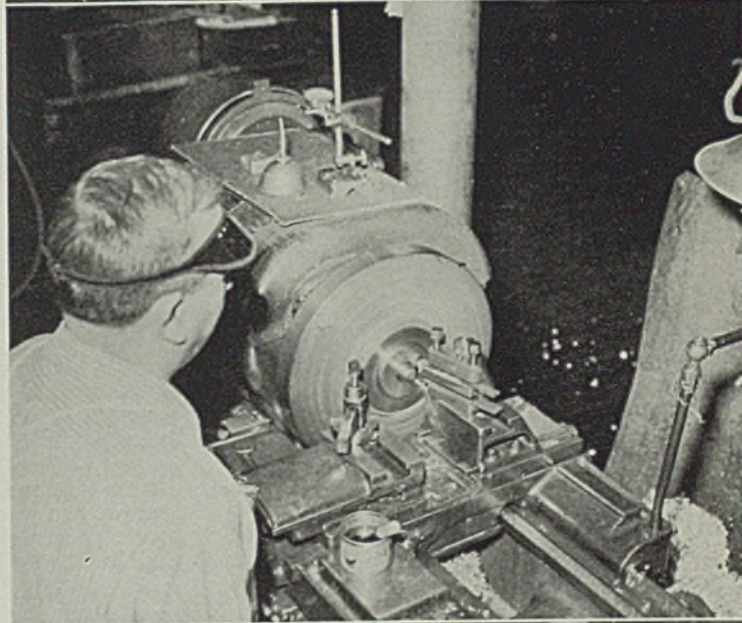
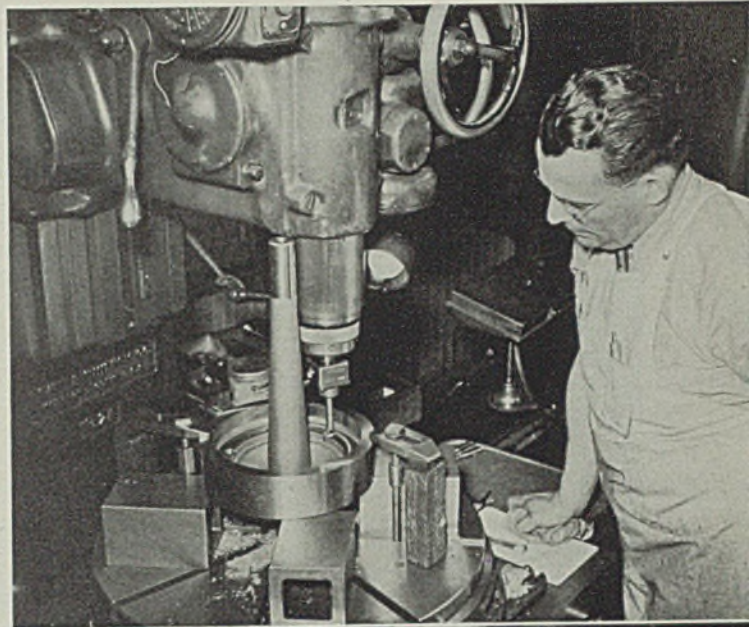
Top, a 6-piece lot with a severe intermittent cut. Carboly tool rough bores and faces this cast iron part at 101 surface feet per minute, 0.030-inch feed, 0.140-inch cut. It is not always practical to obtain the ultimate in speed but jobs like these contribute to a worthwhile net saving

Center, rough and finish facing an aluminum aircraft part with Carboly general purpose tools at 570 surface feet per minute, 0.002-inch feed, 0.003-inch cut. There are 540 pieces in this lot

Bottom, general purpose carbide tools can be applied economically in lots as small as one piece. Jig boring this SAE 2512 balancing arbor is a typical example

the tools to be used, establishes the feeds and speeds, and instructs the operator in the essential requirements of carbide-tool use.

All trouble shooting on carbide tools is performed by this man. He is also responsible for the design of the tools, the selection of carbide grades to be used, the maintenance of a carbide-tool inventory, etc. Tool grinding is performed under his supervision, all car-



bide tools being ground exactly to rakes and angles established as correct for each tool.

First duty of this carbide application man, after installation of the plan, was to study the cutting tool requirements of a representative assortment of work passing through our shop. Based on this analysis, a series of 10 carbide tools was designed to fit as broadly as possible our particular classes of work. These 10 tools were established as standard general purpose tools, each one being suitable for a wide variety of applications. They are illustrated in center spread, pages 54 and 55.

Two boring tools, one a "wobbler", are also included in this illustration. While these two cannot be classed as general purpose tools, we have included them in our standards as they are used extensively in our shop on boring operations.

In designing general purpose carbide tools, machine work was studied in consultation with the carbide supplier to determine the minimum number of carbide grades which could be used effectively and economically. The ultimate objective was to standardize upon one grade for machining steel and another for all other metals. While this might involve a minor sacrifice in performance on certain jobs, it was felt that lowered tool inventory and maintenance charges would net a substantial saving coupled with a reasonable investment in tools.

Although we have not reached the point of complete standardization on grades due to necessity of using up a rather large inventory of carbides stocked prior to introduction of the present program, we are gradually working toward that end.

An important feature of our general purpose carbide tool program

is the provision of proper grinding facilities on a most economical basis. A pedestal grinder, actually about 25 years old, was reconditioned through replacement of the bearing to reduce end play. An adjustable table was added, total cost being about \$20.

One spindle of this grinder was equipped with a 12 x 4-inch silicon-carbide cup wheel, 60 grit, for roughing carbide tools. The other spindle was provided with an ordinary abrasive wheel for grinding steel tools and for "hogging" clearances on the steel shanks of carbide tools.

Equipment Not Expensive

For dressing carbide tools on diamond wheels, a pedestal grinder equipped with a 120-grit metal-bond diamond wheel is used. This grinder also has a 6-inch straight-silicon-carbide wheel for rough grinding of smaller carbide tools. A protractor is employed with this grinder.

A Brown & Sharpe No. 2 surface grinder, equipped with Ex-Cell-O spindle, on which we have alternated a 60 or 100-grit silicon carbide wheel and a 100-grit diamond wheel is also available. This machine is now being replaced with a Taft-Pehee No. 1 precision surface grinder, whose tilting spindle makes it ideally suited to carbide tool dressing operations.

The "4-point plan" described above for using general purpose carbide tools was introduced in our plant somewhat less than a year ago. To date, carbide tools have been applied to approximately 30 per cent of our cast iron, aluminum, bronze and brass jobs; and to 20 per cent of our steel jobs. On contract work, nearly every job is different and relatively few are repetitive.

Because of this, it is difficult to obtain an exact comparison of carbide tool performance against previous tool performance in the shop.

However, based upon our previous experience with high speed tools and our present experience with carbide, we believe that the latter return at least a 25 per cent saving.

It is particularly significant that our present program of general purpose application of carbide tools frequently permits us to use carbide tools profitably on single "one-piece" jobs. Under other conditions, this would be prohibitively expensive if the entire cost of the carbide tools had to be absorbed on any one such job unless the single piece involved an extraordinary amount of machining time, or unless its material happened to be extremely difficult or impossible to machine with ordinary tools. Because of the adaptability of our standardized "general purpose" carbide tools to such a wide variety of work, their cost is spread over many jobs. Obviously, that makes them available for economical use even on the shortest runs.

New Clear Lacquer Resists Perspiration

■ Maas & Waldstein Co., Newark, N. J., announces a new type of clear lacquer that is suitable for finishing articles subject to handling such as flashlights, pencils, etc. Its characteristics are such that it resists the corrosive action of perspiration and furnishes protection for both finished metal surfaces and undercoats of lacquer enamel.

Light in color, it also has good outside weather resistance, adhesion and color retention. It is available in either high gloss or flat finish.

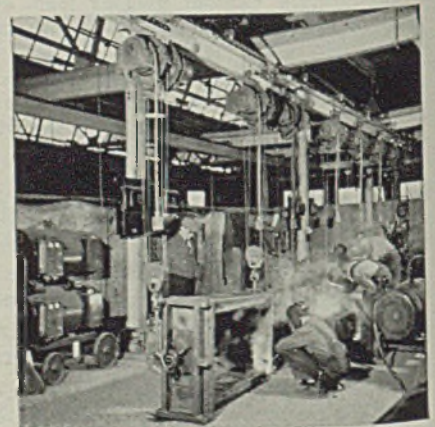
Hoist Assembly Increases Welding Efficiency

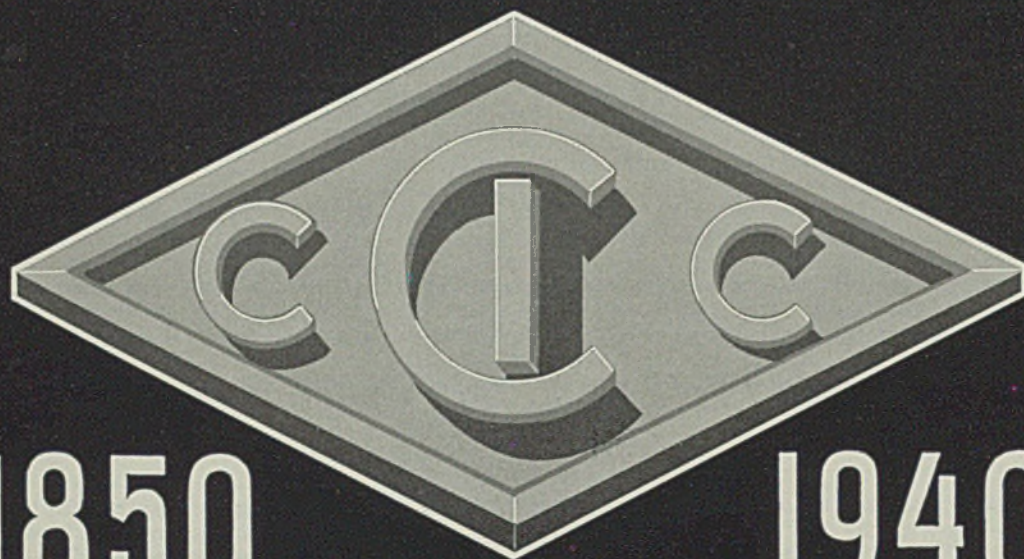
■ By using hoists in conjunction with welding operations, a midwest-

ern tractor manufacturer speeded up production by increasing the pace of the welding operations. Throughout the process, the hoists perform two functions. As shown in the accompanying illustrations two hoists are used on each jig. First they move the jig and, as the welding progresses, they tip the unit into position for down-hand welding.

Illustration at left shows, in the background, the arrival by hoist of a heavy pressed steel part which forms the main body piece of a tractor. In the foreground a similar part has been clamped into the jig where lugs, stampings and various accessories are being tack welded. In the view at the right, the part and jig have been moved forward, and the heavy welding is taking place.

Photos by Harnischfeger Corp., 4411 West National ave., Milwaukee.





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Open-Hearth Trends

PART II

Improvement shown in slag control and steelmaking technique. Near solution of temperature control appears promising. Pit practice offers possibility of reduction in cost of ingots

■ TO MAINTAIN open-hearth operation consistently with the idea of producing steel to some standard, means that raw materials should be constant. A supply of pig iron of constant analyses is the first step in slag control. Other materials such as scrap, limestone, etc. are also of importance. The scrap industry is constantly studying this problem and is using more care in the sorting of the different grades of scrap. However, there is a large percentage of automobile scrap on the market, containing various alloys, and much of this cannot be used, at least in steel in which the alloy content is closely specified and where heat treating operations etc. demand close adherence to specifications. What to do with this large percentage of material is a problem, and what the future holds for it is a matter of conjecture.

Little improvement in limestone can be expected. However, there may be a decrease in the percentage of limestone used, as more is learned about the proper ratios of lime to silica needed in the open-hearth process. High limestone charges mean excessive burdens, higher pig charges, and lower yields and anything that can be done to increase yields and cut costs is a step in the right direction.

For a number of years it has been the custom

By W. J. REAGAN

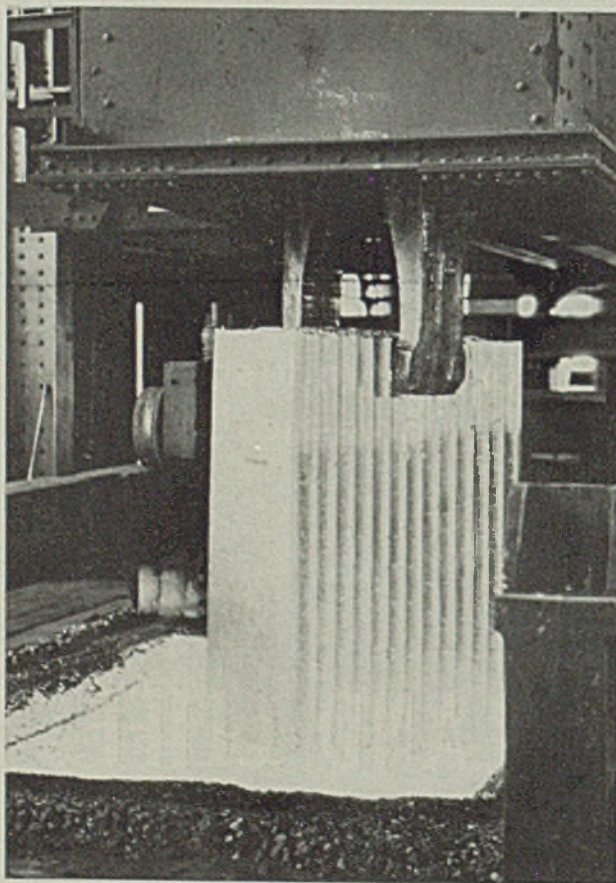
Assistant Open-Hearth Supt.
Edgewater Steel Co.
Oakmont, Pa.

in the open hearth to do certain things in certain ways in order to obtain certain results. In the control of phosphorus and sulphur the

same tools are used to control them as was employed 25 years ago. However, these tools are handled more efficiently now since steelmakers have a much better knowledge of how to use them. Lime and iron oxide are needed to control practically the phosphorus elimination. Low temperatures and a low percentage of phosphorus in the charge are also of importance, but by using high lime (CaO) slags and high iron oxide (FeO) slags phosphorus can be eliminated to almost any figure desired.

Lime, slag fluidity and low-sulphur fuel are needed in sulphur removal. With low-sulphur fuel and high-lime slags, a slag fluidity is the controlling factor, although control (reduction) of sulphur in the basic open hearth is a slow expensive process; it can be removed cheaper in the blast furnace. The future seems to show little improvement in control of either of these items, but new materials may be developed that will be of importance.

Slag Control — The practical application of slag control is still a controversial problem despite the fact that much has been written on this subject. Three types of steel enter into the picture, i.e. fully killed steel, semideoxidized steel and rimming steel. Approximately 20 per cent of our steel output goes into fully-killed



Slabbing ingot for rolling into plates being removed from soaking pit

Table II
Pour Temperatures Vs. Steel Rejections
(0.10% Carbon)

Temperature deg. Fahr.	Rejects, %
2850	28.7
2870	6.8
2890	5.9
2910	4.1
2930	4.9
2950	5.3
2970	13.4

steels and another 20 per cent goes into rimming grades, with the balance mostly semideoxidized steels.

In fully-killed steels the usual method of slag control consists of controlling the silicon in the charge, and reducing the amount of limestone or burnt lime down to a minimum. After the heat is melted corrective additions of lime or mill scale or sand are made as indicated by conditions of the slag or metal. Additions of lime are made, depending upon the lime-silica ratio desired which in turn depends upon the final phosphorus or sulphur in the finished product. Iron oxide, in the form of mill scale or fine ore, is added to increase the iron oxide content of the slag and is often helpful in getting into solution, large lumps of lime. By keeping the initial lime charge as low as possible, the melting of the heat is speeded up, and the FeO content of the slag is kept low. Lime or FeO usually can be added with little difficulty early in the heat. By adding lime the CaO of the slag is increased, as is the lime-silica ratio, and usually the FeO is increased by the extra lime thickening up the slag.

Limestone additions as low as 4 per cent are in use in one plant and considerable discussion ensues at all open-hearth meetings on the proper

lime-silica ratio needed. In a number of plants the belief is held that only sufficient basicity (lime-silica ratio) is needed to keep phosphorus and sulphur under the specified amount in the finished product. FeO in killed steels usually is kept low, to give lower iron losses in the slag, higher yields and greater efficiencies for additions of manganese, etc. The use of the viscosimeter or some other device is always of value in maintaining constant slag fluidities.

In rimming and semideoxidized steels slag control is somewhat similar to that used in killed steels. Lime in the charge may be kept low and added later, the amount again depending upon the silicon in the charge. FeO is usually high, due to the low-carbon contents of this type of steel. However, if it is too low, corrective additions of mill scale may be added, and also lime additions to increase the FeO in the slag so that the proper rimming action in the ingot may be secured.

Corrective additions of sand, either in the original charge, or

Table III Effect of Hot Pour on Stool Stickers Heats	
above scheduled temperature, %	Stickers, %
31	12
44	16
58	23

after the heat is melted may be made to reduce the FeO, but best results are obtained to have the heat melt low in FeO and to build it up, either with lime or with mill scale.

Slag cake samples, chemical

Table IV
Pour Temperature Vs. Pipe Rejections
(0.20% Carbon)*

Temperature deg. Fahr.	Rejects, % Ingots
2835 to 2850	1.8
2850 to 2870	2.1
2870 to 2890	3.3
2890 plus	3.5

*Killed billet heats with 15% top discard.

analyses and petrographic examination of the slag, all are helpful in determining its composition. Knowledge of the working and shaping of slags gradually is being increased. With the many groups, universities, research laboratories, etc. working on the problems of slag-metal relationship there is a better understanding of just what is going on between the open-hearth slag and the metal bath.

Ladle Design

Modern trends in ladle design indicate the use mostly of the all-welded ladle made from high-tensile steels.

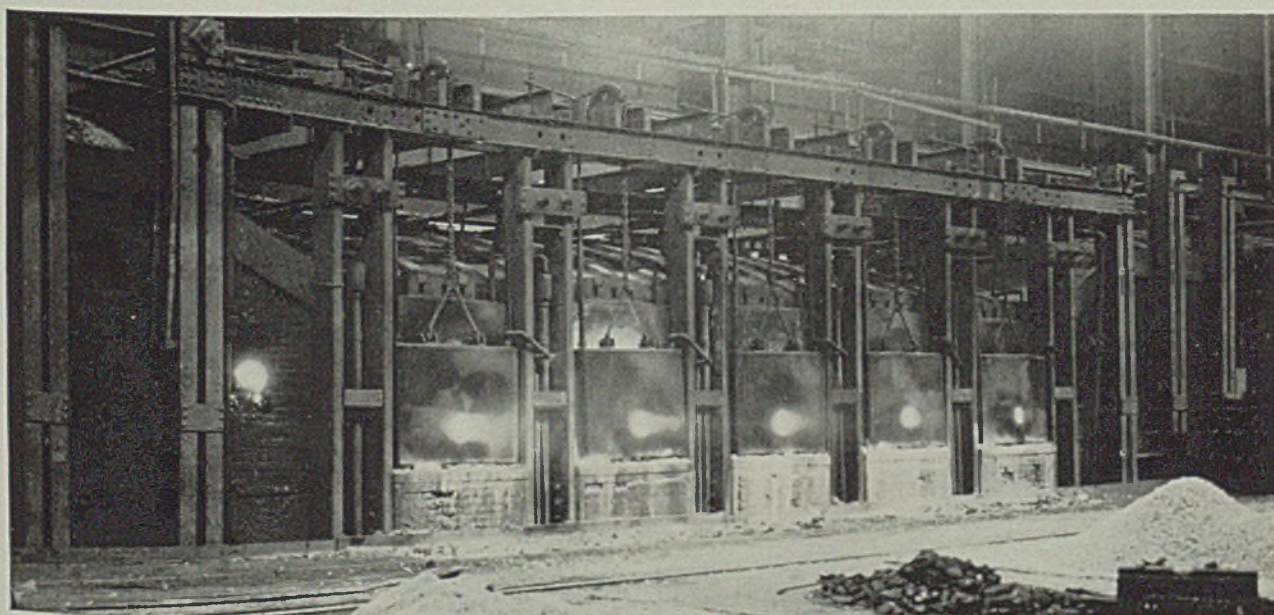
This design allows for a greater pay load of molten steel being carried on the ladle cranes, whose capacity is usually limited, the increased tonnage soon returning the added expense. By the use of elliptical ladles, increased ferrostatic heads are prevented. The static condition of furnace size indicates that ladles will not increase much in the future, present sizes of 150 to 175 tons appearing stable.

Pit Practice

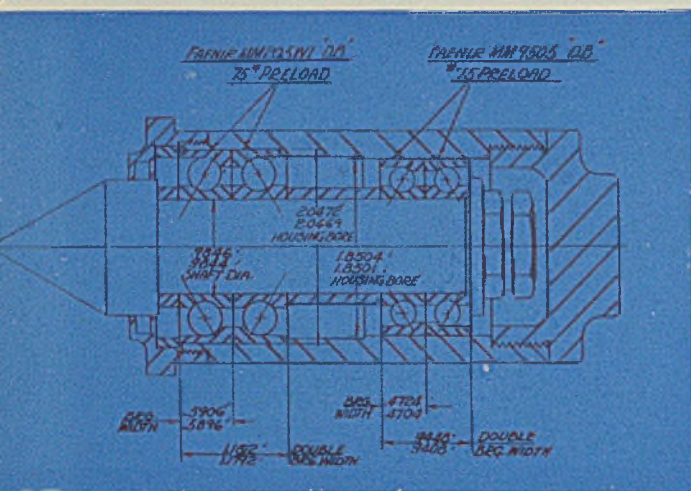
Better care of ingot molds and more attention to pit and pouring

*From Open-hearth Steel Making by Earnshaw Cook.

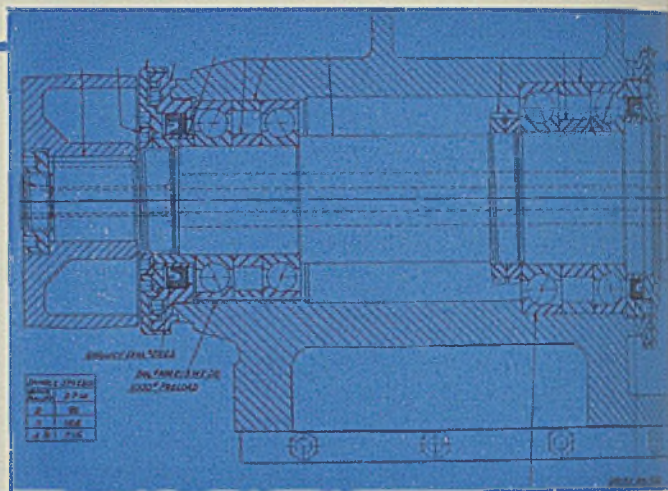
Charging side of basic open-hearth operated by automatic control



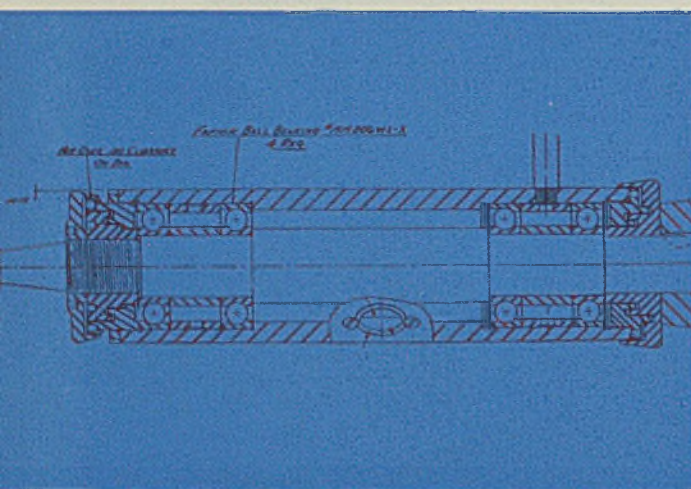
X for Better Finish, Increased



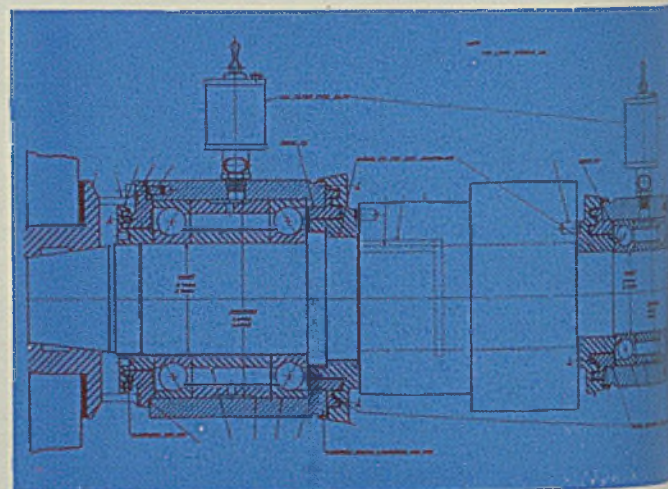
s, gears, ground to .0002" tolerances with this ball bearing live-center design.



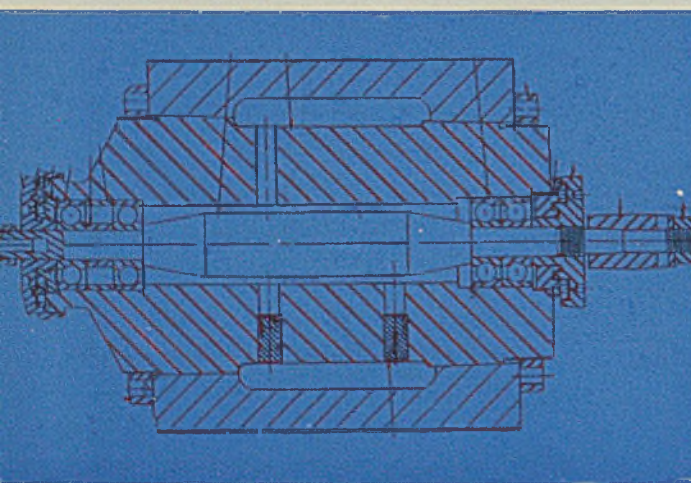
Fafnirs on big grinder work head greatly increase bearing life and production



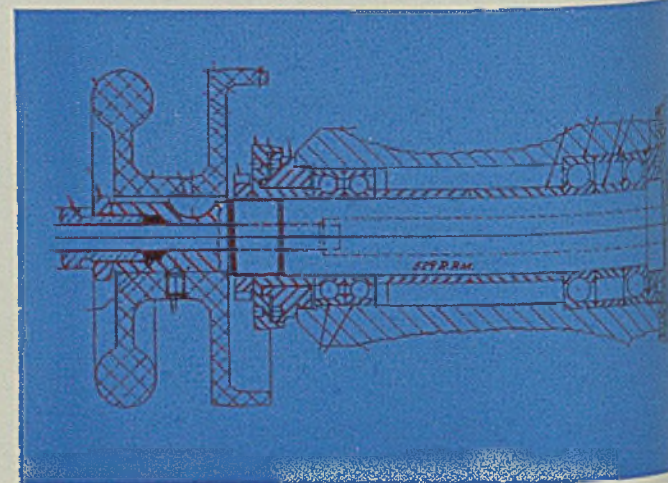
Long shaft turning 15,000 R.P.M. Preloaded Fatnirs, rear pair floating.



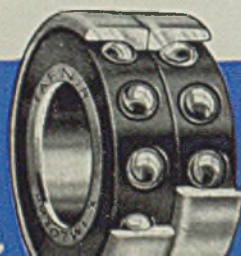
Standard Precision Falmers carrying spindle with 18" wheel on external g.



R.P.M. spindle, Fafnir-mounted, grinds very small holes to extreme accuracy.



Bore grinding machine involving Duplex Face-to-Face and Back-to-Back



Super Precision

FAFNIR

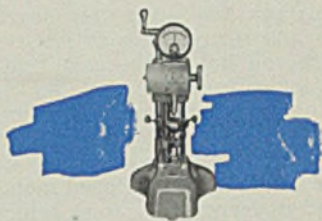
Accuracy and Greater Production

When work starts coming through inaccurate, rough and out-of-round . . . when a high-speed grinder chatters . . . when a lathe or milling machine piles up excessive tool wear or breakage . . . the remedy may be simply a matter of employing better spindle bearings. Here's what to do about it:

First, choose ball bearings. Because they run cooler. Because their accurately controlled preload eliminates any need for take-up adjustment. Because their lack of friction means lower power consumption.

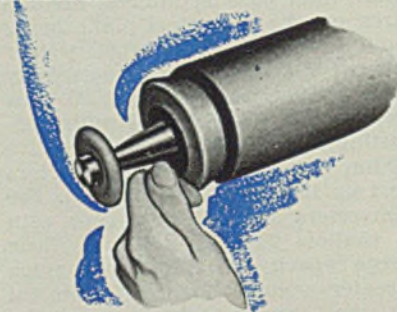


Choose precision ball bearings that are made with exacting care. Such as those made in Fafnir's Super-Precision Department, the factory-within-a-factory where balls are matched to size within .000005", where rings are carefully heat-treated and seasoned to maintain their accurate dimensions, where inbuilt preload is measured and controlled with a highly specialized machine, developed exclusively for this one purpose.



But that's only part of the story. It's the accuracy of the assembled bearing that's important to you, so Fafnir utilizes the "eyes" and "hands" of electricity to "feel" hundred-thousandths as your fingers feel inches, checking eccentricities of assembled bearings to five decimal places . . . matching pairs so carefully that variations between assembled bearings are reduced to millionths of an inch.

How can you be sure that Fafnir Spindle Bearings will operate permanently within the extremely close tolerances required? The answer lies in accurately preloaded bearings, mounted in duplex pairs, according to the recommendations of experienced Fafnir application engineers. Properly mounted, these bearings mean the elimination of harmful deflection. The result is inherent rigidity . . . truly accurate production.



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Study the layouts at the left. Remember that the same Fafnir engineering skill and experience used to equip our own Super-Precision Department is available to help you with your spindle problems as it is helping others. And, remember that in precision bearings, as in the standard types, Fafnir means "The Balanced Line—Most Complete in America". Write for new Spindle Bearing Data Folder. The Fafnir Bearing Co., New Britain, Conn.

Ball Bearings

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Table V

Pour Temperature Vs. Hot Bed Rejections
(0.80% carbon rail steel)

Temperature, deg. Fahr.	Rejects, % ingots
2730	7.0
2750	5.9
2770	7.4
2790	7.0
2810	7.2

practice has paid fine dividends. Poor mold and pouring practice can be expensive. Maintaining the control of temperature, pouring speed and mold conditions are valuable helps in keeping costs down. Some idea of the possibilities in this field is had from Table II to IX*.

Tables II to VI show the effect of pouring practice and temperature upon steel rejects and give some indication of the tremendous effect of steel temperatures upon steel defects. Much work has been done on this problem and the future should have the answer as to some device to determine quickly and accurately the temperature of the steel in the open-hearth bath. Table II indicates that medium temperatures from 2890 to 2930 degrees Fahr. are most suitable for keeping hot bed rejections of rimmed steel heats at a minimum. Table III shows the effect of hot heats upon stool stickers, the percentage of stickers increasing greatly as temperatures increase. Table IV pictures the effect of low temperatures on reducing pipe defects on killed billet heats—a much lower percentage of rejects resulting from heats poured at lower temperatures. Table V gives figures on rail steel heats—again indicating that a medium temperature (in this case 2750 degrees Fahr.) as being most suitable to keep hot bed rejections at a low figure.

The most recent development in open-hearth bath temperature control consists of a metal tube, inserted in the steel bath, through which a low-pressure current of air passes, and upon this tube is either an electric eye, or a radiation type pyrometer coupled to a high-speed recorder. Such a job is showing promising results and when brought to the point where it will give accurate results and stand up under open-hearth conditions it can about name its own price. When such an instrument is developed much interesting data on the effect of temperature can be expected. In acid

Table VI

Effect of Bad Pour on Rejections

Grade	Pouring practice	Rejects % ingots
0.20% C. killed	Good	6.00
	Sloppy	33.20
0.20% C. 1.25% Ni, 0.60% Cr.	Good	1.00
	Sloppy	4.43

open-hearth practice it has been found that temperature plays a most important part in controlling the reactions and similar conditions may be found in basic open-hearth practice if a suitable device is made available to measure its temperature.

Table VI shows the effect of bad pouring practice upon open-hearth rejects and many times this is tied up with too hot or too cold heats, again indicating the need for accurate temperature measurements. Table VII gives data on the effect of mold conditioning, comparing untreated molds with tar dipped molds. A decided decrease in steel rejects is found from steel cast in tar dipped molds. There is still room for plenty of research on this problem, and also for the devising of better mold coatings than tar.

Table VIII and IX show the effect of top casting as compared with bottom casting. A much lower percentage of seams and scabs is found

Table VII

Mold Preparation Vs. Steel		Rejections
Grade % carbon	Untreated, % rejects	Tar dipped, % rejects
0.12 killed	6.2	2.8
0.12-0.20 killed	14.3	5.1
0.20-0.75 killed	10.1	2.6
0.08 rimmed	6.4	1.0

on bottom cast ingots, indicating a better mold surface. A decided increase in bottom casting has been noted in recent years and this type of pouring should continue to increase as unquestionably it improves the ingot surface and by group pouring gives much better control of pouring temperature, speed, etc.

Another side to the open hearth that the future seems to hold interesting possibilities is the combination of bessemer and open hearth usually known as duplex practice. A recent talk in Pittsburgh indicated some real possibilities for the bessemer, particularly with the use of the new flame control device. Of more than passing interest are figures on the new steel plant being built with the largest capacity ever housed in a single unit. The capacity of this unit will be 2,500,000 tons per year. The individual units consisting of three 1200-ton mixers, five 60-ton basic bessemer converters and six 150-ton tilting furnaces. The converters are of a new type with a shallow bath in spite of their large capacity and they have a much greater volume for molten metal in the annular space around the tuyere area, than has ever before been provided. They are circular in shape or rather spherical. Special facilities are provided to bring hot scrap from the blooming and slab mill shears direct to the converters

Table VIII

Slabs Rejected for Reconditioning Vs. Pouring Practice
(0.10-0.20% C rimmed heats)

Practice	% Seams	% Scabs	Total	No. slabs
Top poured	29.1	13.4	42.5	4,152
Bottom poured	12.2	7.4	19.6	11,787

and the lime is charged by a special crane. When it is realized that each of the furnaces will produce some 34,000 tons per month or about 416,000 tons per year some idea is had of the tremendous output.

Possibilities in this field are almost unlimited and any number of companies are working on similar problems. Perhaps the most outstanding development in tonnage and speed of reactions is the Perrin process where steel and slag are melted separately and brought together in ladles where the steel is deoxidized and dephosphorized at tremendous speeds. Perhaps more will be heard of this and the duplex process in the near future. When it is realized how fast the reactions proceed in the Perrin process we can visualize some of its possibilities. For example, a metallic alloy containing 50 per cent silicon has been reduced to 0.5 per cent silicon in about one minute. The technique of this process results in extremely rapid reactions between molten slags and metals which arise from the considerable extension of the surface of contact. Briefly, steel is made in the bessemer converter, by the basic process, is poured onto an acid slag, already molten and thus deoxidized. Dephosphorization and desulphurization take place in the converter. By combining the electric furnace process with similar methods of deoxidation, nickel-chrome steels and similar types of quality steels are produced. Considerable experimental work has been done in this country and it would appear that much more of this process will be encountered in the near future.

Summary

Briefly the trend picture shows that better materials from the blast furnace, largely by better control of chemical analyses of the pig iron, may be expected.

Open-hearth design shows indications of going stream-lined with larger quantities of basic refractories being used and a greater

(Please turn to Page 72)

Table IX

Sheet Mill Rejections Vs. Pouring Practice
(0.08% C rimmed heats)

No. sheets	% Bottom	% Total	% Blisters	% Primes
Inspected				
60,000	21	22.0	1.5	54.4
159,000	77	11.3	4.4	68.2
145,000	99	8.0	3.8	70.6

METAL SHOW ISSUE

OCTOBER 14, 1940

featuring

NATIONAL METAL EXPOSITION

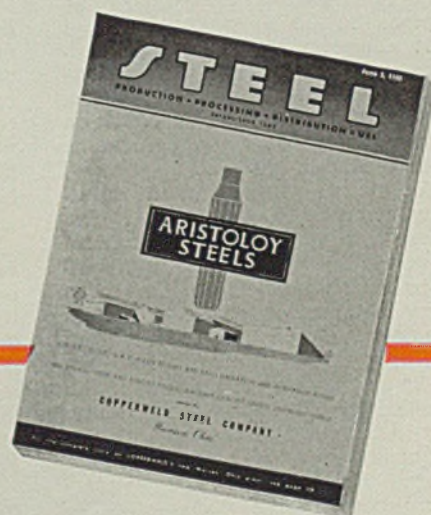
CLEVELAND, OCTOBER 21-25, 1940

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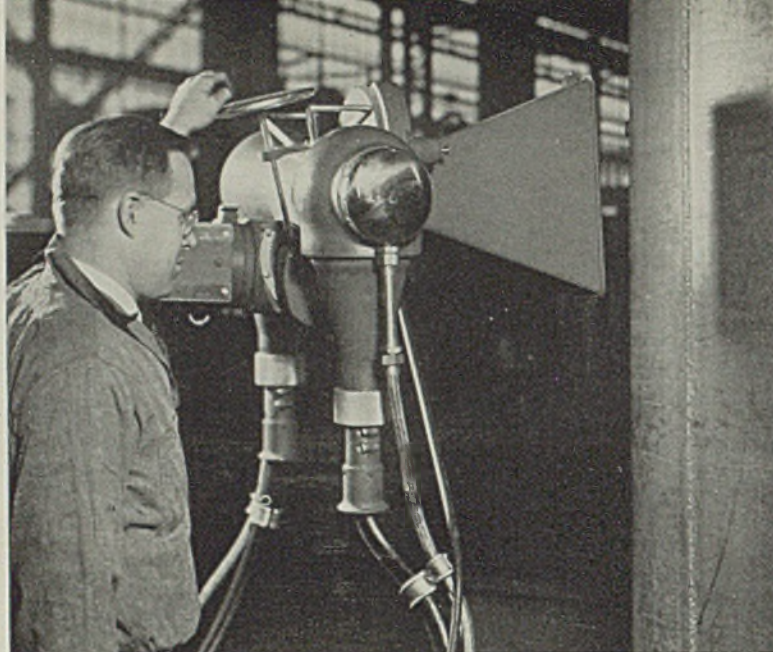


Fig. 1—Proper alignment is the first essential—otherwise faulty radiographic technique may result in needless repairs

Repairing Defects in Welds

Proper repair of defects as revealed by the X-ray involves a number of factors which, although simple, must be fully understood if the first repair attempt is to be a success

■ ONE OF the most exasperating problems confronting the shop that inspects welding by the X-ray is the repair of defects. There are a few simple precautions that must be observed before this type of weld may be made with a reasonable assurance of success in the first attempt.

Some may wonder why an exposition on the repairing of X-ray defects is desirable. From the reports on patching difficulties that have come to the writer's attention, there appears to be a woeful lack of knowledge on this subject. With more and more welded fabrications being checked by X-ray examination, it is time that adequate information on the repair of these defects be made available.

Too often a shop has made an attempted repair from six to twelve times with a possible detrimental effect on the whole structure. Added to such possible harm has been many instances of lengthy and needless delay. Costs pyramid, too, from such misguided efforts.

The three common types of faults revealed by the X-ray are porosity, slag inclusions and cracks, with the frequency of occurrence in this same order. Any good welding supervisor knows of the causes of these

By HAROLD LAWRENCE
Welding Engineer

troubles. Even so, the most rigid supervision may fail to eliminate such ills completely. So X-ray inspection is likely to remain with us as long as welding is done.

Proper discovery of defects and their interpretation depends first upon the careful lining up of the X-ray machine before the exposure is made. In Fig. 1, an operator is lining up the head of a portable industrial X-ray unit prior to making an exposure of a welded seam. Distorted exographs result when inadequate attention is paid to this elementary detail. It is important, however, as needless repairs have been made because of faulty radiographic technique.

The first of the common welding faults uncovered by the X-ray, porosity, is directly linked with incorrect current settings. Most modern electrodes possess the ability to make perfect welds in the hands of a skilled welder but some are more insensitive to slight voltage differences than others. The fault generally lies with the operator.

Incorrect current settings leading to porosity involve both amperes

and volts-across-the-arc, for the product of amperes and volts gives the available watts of welding current (direct current welding). Wattage or "heat" controls the burn-off rate of the electrode, which has an important bearing on position of the slag covering.

Unless the slag follows the pool of molten metal closely, the deposit exposed to the air and gases may become dissolved in the fluid steel. Unable to escape, the gases freeze in the steel to show up as porosity in the exograph. A close-following slag blankets the pool, allowing all gases ample time to float to the slag-steel interface.

Arc voltage indicates arc length and so points to another cause of porosity. Too long an arc fails to give protection to the metal going through the arc stream while too short an arc will trap products of combustion in the deposited metal. Too long and too short are abstract terms without much meaning in themselves except as they are interpreted by the skilled operator in terms of correct electrode operation. The electrode manufacturer, however, usually specifies a voltage which is close to the optimum in most instances.

So much for gas. What about

slag? Once more current settings are involved, but slag results from improper electrode manipulation more than from all other causes combined.

Here, too, the skilled operator watches the slag for the guide to perfect welding. When the slag fails to wet the sidewall, for instance, he will recognize a point of poor fusion and back his arc to that point to correct the harm. Otherwise a worm-hole inviting slag inclusion will be found when the slag is removed before welding the next pass.

If the welder misses this fault, it is up to the welder's helper who is cleaning the weld to recognize the bad spot and chip it out. Should he fail to do this, the slag inclusion pictured in upper part of Fig. 2 as disclosed by the X-ray cries for removal.

Cracks, the third type of defect, are most difficult of all to forestall. Extensive studies have shown the ability of modern electrodes to make perfect welds without any tendency towards cracking except where an excessive amount of heat is used. Then shrinkage taking place while the hot metal has little tensile strength will cause a crack.

Sometimes cracks may be eliminated by preheating and peening. Preheating will make the temperature gradient less steep, minimizing stress concentrations. Peening helps stretch the weld metal to overbalance normal shrinkage.

Both porosity and slag inclusions are repaired in the same general manner. Lower section of Fig. 2 indicates how once the location of the defect is found, the first step is to groove out the bad spot before making a reweld.

Three general methods are avail-

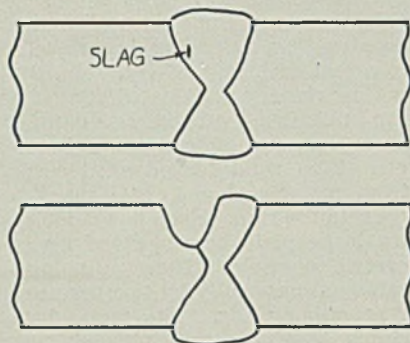


Fig. 2—Slag inclusion shown at top is removed below, leaving sloping sides for the repair weld

able for cutting out regions of poor welds: Pneumatic chipping, melting with an electrode and flame gouging.

Removing bad metal with a round-nosed chisel in a pneumatic gun is not much different from that encountered in other activities about the welding shop. But one extra skill must be had by the chipper assigned to removal of defects. *He must recognize the defect when it is uncovered by the chipping operation and cease chipping.* More than once a chipper who was lacking in experience has chipped completely through a weld because he did not know he had removed the cause of his efforts.

Not quite so well known is the application of electric arc cutting to the removal of X-ray defects.

Fig. 3. (Left)—Slag inclusion in 1½-inch welded plate is revealed by this exograph. Fig. 4. (Right)—Here the inclusion has been chipped out and the joint rewelded. Photos courtesy General Electric X-Ray Corp., Chicago

A heavily coated electrode of large diameter carrying much more current than normal is used to melt out the defective area. The work is positioned so the molten steel will run out. A distinct advantage of this method is the speed with which the work may be accomplished, not to mention the certainty with which the defect can be identified.

A recent method for defect removal is flame gouging. Speed and certainty of identification characterize this process, as well as an accuracy approaching that of pneumatic chipping.

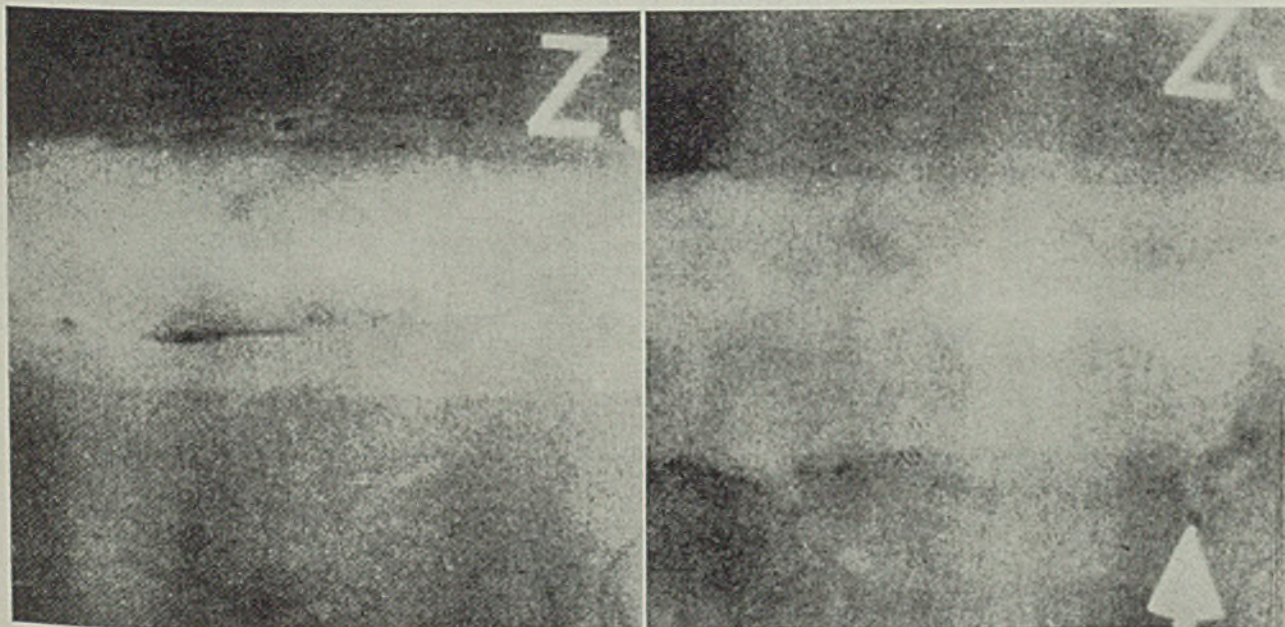
Fig. 2 lower part, shows the sidewalls have been given a generous slope in cutting out the defect. This helps the operator to get perfect fusion while making the repair. Although the ends of the short groove are not shown, they should be bevelled with a slope of from 45 to 60 degrees to allow good starts and stops to be made. No doubt the failure to appreciate this point has often been the cause of plural repairs in the same location.

Unless the plate in which the defect occurs is more than 2 inches thick, there is no necessity for preheating before welding. Thick plates need be preheated to no more than 300 degrees Fahr. because the heat of welding will soon bring the interpass temperature to about 500 degrees Fahr.

But all patches of any thickness require peening. Otherwise a crack may spring up where there was none before.

Less heat is required for patching than is needed for the original weld because of the tremendous amount of heat released in the patch by the almost continuous welding in a short

(Please turn to Page 72)





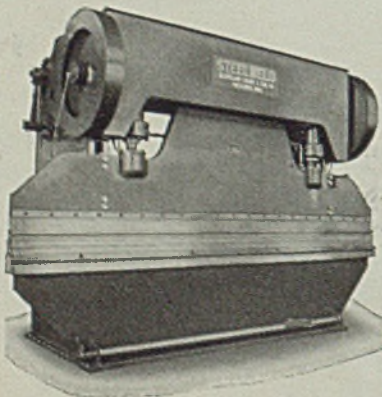
Hydraulic Press

■ Denison Engineering Co., Columbus, O., announces a versatile, DLK-C2, hydraulic press for assembling, straightening and general production pressing. Furnished in 5 or 15 ton capacities to facilitate rapid change of tools or fixtures. Location of controls, rounded corners and freedom from projections, insures safety and convenience of operation.

The control valve with its operating mechanism, motor and pump are located in the center section of the press. The ram and cylinder assembly is in the upper part of the C frame and the oil reservoir is in the base. Both the up or down stroke and pressure are adjustable. Presses are available with either manual or electric controls and the two operating push buttons provided are arranged so that both buttons must be operated simultaneously. As an additional safety measure, a transformer is incorporated so that push buttons are subject to only 110 volts. The manually controlled press is furnished with a hand lever or a foot pedal.

Bending Presses

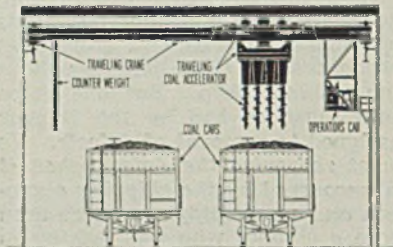
■ Steelweld Machinery division, Cleveland Crane & Engineering Co., Wickliffe, O., announces a series of bending presses adaptable for extensions of bed and ram at one or



both ends. The frames for these machines are of one-piece all-welded construction. Gearing is protected in metal enclosing covers. Shafting and machinery are located at rear of the machine, preventing damage from bent-up plates, crane hooks, etc. Two solid forged steel eccentrics, one on each end of the machine operate the ram. Each has three extra large main bearings and an eccentric bearing. These are lubricated automatically by two pressure-type oiling units. The main drive clutch is of the multiple-disk type and is easily adjusted.

Coal Accelerator

■ Stephens-Adamson Mfg. Co., Aurora, Ill., announces a new coal accelerator for unloading coal cars



quickly. Mobility is achieved by means of a traveling crane and rails, the latter so that it may travel lengthwise along a loaded car. The machine itself consists of a hoist and four vertical drills or screws which break up the coal, the operations being controlled from a cab. The accelerator is flexible, permitting rapid changes of position, each movement being effected quickly.

Hand Lift Truck

■ Yale & Towne Mfg. Co., 1421 Chestnut street, Philadelphia, have developed a hand lift truck, Trans-liftor, for handling heavier loads with less effort. Provided with a positive mechanical selective (pump action) lift, the truck is made in capacities from 3500 to 5000 pounds, in either wide or narrow frame models. Both types have safety devices and feature hydraulic release checks to prevent dropped loads. The trucks are designed for use with skid platforms.

Cylindrical Plug Gage

■ Pratt & Whitney, division Niles-Bement-Pond Co., West Hartford, Conn., has introduced a Pilot cylindrical plug gage which never jams entering a hole. It can be presented lightly at any angle and is easy to start. The combination of a cham-

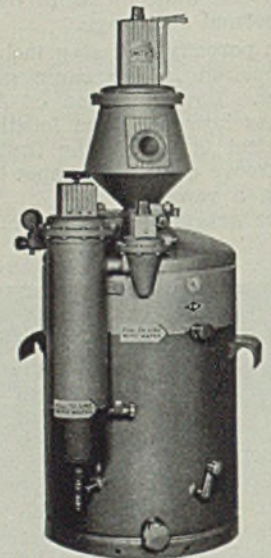
fer at the end and the annular groove near the end permits easy entry. The gage centralizes itself, lines up and enters without jamming, automatically.

Floodlight

■ Benjamin Electric Mfg. Co., Des Plaines, Ill., announces a new Alzo-Lite medium spread floodlight equipped with water-proof hinged glass cover for use in all kinds of outdoor lighting. It has a 90-degree beam spread. Besides moisture, the cover is designed to protect the lamp and reflecting surfaces against entrance of dust, dirt, fumes or smoke. It is hinged at the top and secured to the floodlight reflector by a series of hand clamps around the rim. Glass is secured in cover frame. The floodlight reflector has a knife-edge lip which compresses the cover gasket to seal the opening.

Acetylene Generators

■ Smith Welding Equipment Corp., 2619 Fourth street, Minneapolis, announces a new line of 2-stage portable acetylene generators. Water in the generator chamber is circulated by a nonmechanical air lift device which simultaneously cools and



scrubs the newly generated acetylene gas. The size 14 ND carbide is fed into the water as needed by a large pressure regulating diaphragm feeding mechanism. Generated acetylene passes through the water circulating device through the hydraulic back pressure valve and filter tank. Then it passes through another pressure regulator which may be set at the desired outlet pressure. Regulator has a large

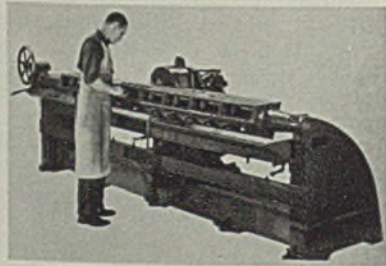
6-inch diaphragm and controls flow of gas. Generators are available in 15, 30 and 50-pound sizes.

Proportioning Pump

■ Milton Roy Pumps, 3160 Kensington avenue, Philadelphia, has introduced a new high pressure, high capacity, duplex proportioning pump capable of pumping liquids up to 1200 gallons per hour. It has a capacity of 480 gallons per hour against a pressure of 400 pounds. Pistons and all other metal parts coming into contact with solutions are of special corrosion-resistant stainless steel. The pump is available to meet practically all capacity requirements and to pump against pressures up to 20,000 pounds.

Knife Grinder

■ Seybold division, Harris-Seybold-Potter Co., Dayton, O., announces a 100-inch precision knife grinder—a high speed machine with automatic grinding wheel feed and centrifugal pump cooling system—for grinding shear blades or beveled knives. Its feature is a hollow 3-sided knife bar, each surface presenting a different series of angles to the action of the traveling grinding wheel. A fourth open

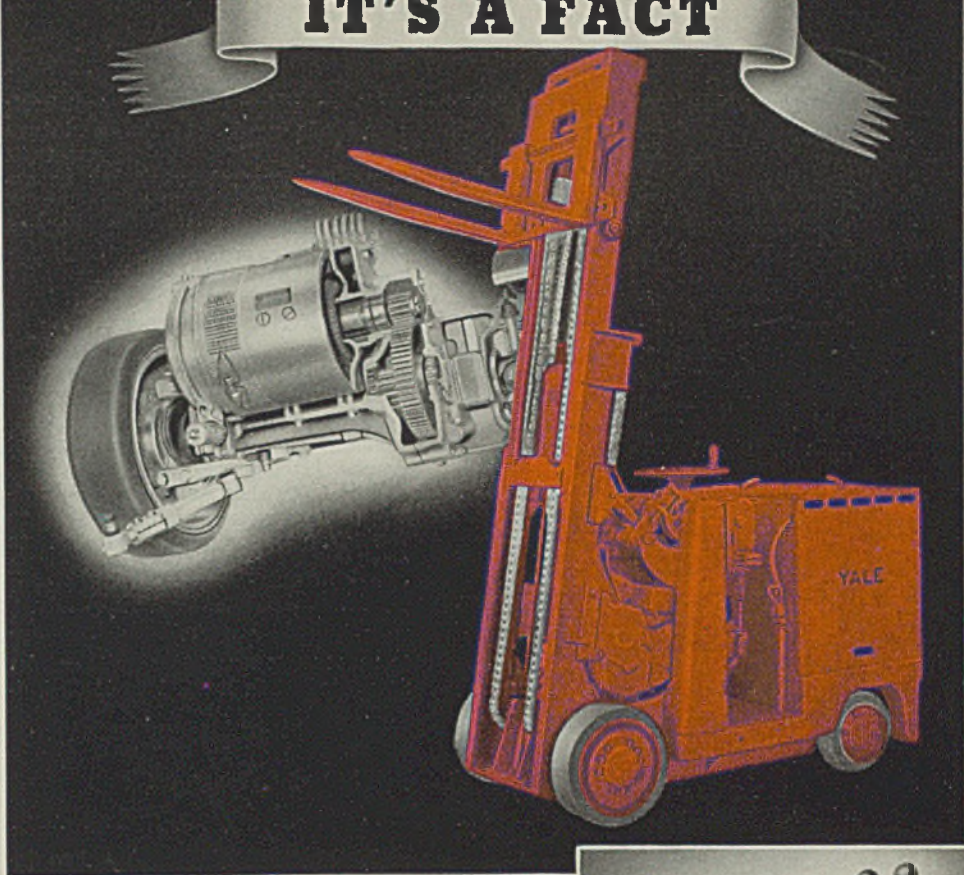


side makes it easy to bolt or clamp various types of blades to the bar. The machine accommodates shear blades up to 6 inches wide. The adjacent surfaces of the knife bar are made to accommodate almost all straight edge knives in general use. All gears and the clutch of the unit operate in an oil bath. Only the floor space occupied by the base is required for operating the grinder. It is made in three standard sizes, 70, 100 and 128 inches in length.

Metal Band Saw

■ Grob Bros., Grafton, Wis., have developed a model NS-18 band saw for use in the tool room and general machine shop. It consists of one-piece reinforced welded steel frame. Swinging doors provide access to

July 29, 1940



YALE ELECTRIC TRUCKS

are better!

BETTER—FASTER—MORE ECONOMICAL. Those four words tell the story of Yale Electric Industrial Trucks—and Yale Trucks apply those words to handling operations.

No matter what your handling problem, there's a money-saving Yale Truck for the job. The complete line includes low-lift and high-lift platform, fork, ram and crane models in capacities for every need.

In addition, basic underlying features make Yale Trucks do superior work longer. Here are a few of them:

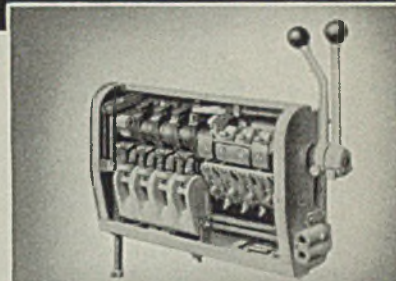
1. Drive Unit . . . uses straight spur, or combination of bevel and spur gears. Gears are drop-forged, chrome-nickel, heat-treated steel, cadmium plated for longer life. For smooth operation, they are mounted on roller bearings and move in an oil bath. Here's extra power 24 hours a day!

2. Cam-O-Tactor Controller . . . Positive mechanical cam and roller action makes and breaks contacts, guards against welding of contact points. Permanent alnico blow-out magnets instantly quench arc—lengthen contactor life. This improved simplified controller is safer, trouble-free—means fewer costly repairs and lost hours.

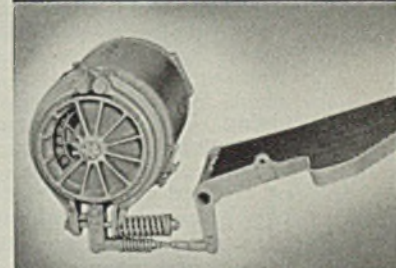
3. Driving Brake . . . mounted directly on motor end head, operates on a high-speed cast-iron drum and transmits the braking action to both driving wheels via a train of gears and differential. Regardless of operating conditions, it brakes the power at the source—gives operator the added safety of simultaneous braking on both drive wheels.

4. Drive Wheels . . . are electrically welded disc steel type, mounted to the driving flange by specially hardened steel dowel bolts. Wheels can be easily demounted without exposing the sealed bearings or disturbing alignment. Servicing time reduced to a minimum!

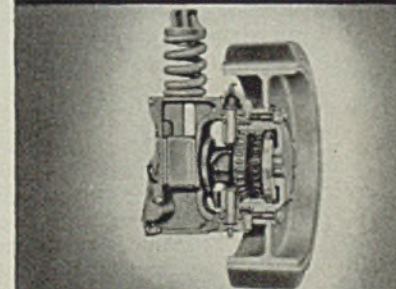
There is a Yale Electric Truck for your handling job. The Yale representative (listed in the Classified Directory) will be glad to tell you about it. Or write to us direct.



CAM-O-TACTOR CONTROL



DRIVING BRAKE



DRIVE WHEEL

THE YALE & TOWNE MFG. CO.

PHILADELPHIA DIVISION, PHILADELPHIA, PA., U. S. A.

IN CANADA: ST. CATHARINES, ONT.



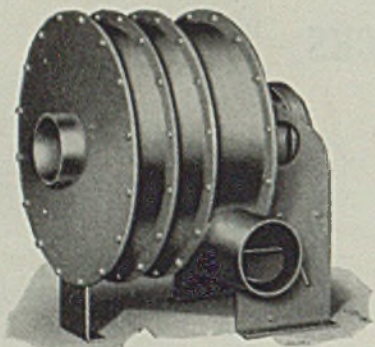
Makers of Yale Hand Chain Hoists, Electric Hoists, Electric Industrial Trucks, Hand Lift Trucks and Skid Platforms

change saw blades. A cast iron table of box section construction and heavily ribbed, 24 x 24 inches in size is included. This is tiltable four ways. A butt welder with built-in tool grinder is mounted into the frame so operator can join saw blades for internal cutting.

Both upper and lower saw guides are adjustable in height. The upper and lower saw guide holders are locked into position by an improved lever clamp. The unit is driven by a 1-horsepower motor in conjunction with a silent V-belt drive. The speed range is from 50 to over 2000 feet per minute.

Motor Blower

■ Ingersoll-Rand Co., Phillipsburg, N. J., has introduced type G motor blower for furnishing air to oil and gas-fired furnaces. It can be installed on any floor since it requires no special foundation. A built-in blast gate is incorporated in the blower discharge, and flexible pipe connections are provided for connecting either intake or discharge to plant



pipng. The blower permits direct connection to several burners, any one or more of which can be turned off without affecting the operation of the rest. It is built in 72 sizes with pressures from $\frac{1}{4}$ to 2 $\frac{1}{4}$ pounds and volumes from 100 to 4500 cubic feet per minute. The discharge opening on all sizes can be located in any one of 8 positions in steps of 45 degrees.

Hydraulic Metal Saw

■ Peerless Machine Co., Racine, Wis., has developed a 6 x 6-inch high duty hydraulic metal saw, equipped with hydraulically operated bar feed. It includes an automatic multiple vise, special automatic length gage, automatic stock support and stock chute and 20 feet of conveyor. The conveyor is equipped with a heavy sheet metal coolant drip pan. The machine is capable of cutting work in any length up to 36 inches. During a recent performance, this

machine, using a 6-tooth steel back saw blade, made 82 cuts on sixteen 1 3/8-inch SAE 1010 steel bars, with the eighty-second cut being as accurate as the first. It took 6.5 minutes to complete the first cut and 6.65 minutes for the eighty-second.

Steel Pallet

■ Union Metal Mfg. Co., Canton, O., has placed on the market a new light weight steel pallet for use with fork lift trucks and hand pallet trucks. It has exceptional strength and rigidity due to use of the corrugated cross members welded to the channel members, shaped to take these corrugations. The pallet is 5 $\frac{1}{4}$ inches high and has a 4-inch clearance between deck and bottom. Its length and width can be varied to meet requirements, also it can be furnished with a solid deck or bottom.

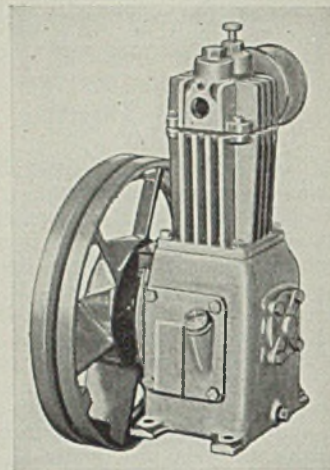
Multiple Control

■ Harnischfeger Corp., 4411 West National avenue, Milwaukee, has developed a new paralleling arrangement to combine the capacities of two or more WD-150 welders. It enables the control of one welder to control the current of the combined machines. The selector of each machine is connected to that of the other machines by means of a multiple shifter, thus for a current of 375 amperes using three machines, the multiple shifter is set at 125 amperes, automatically setting all machines at that figure and producing a resultant current of 375 amperes.

When machines are to be operated as separate units, the wing nut on the connecting rod of the multiple shifter is loosened, disengaging the rod and enabling individual current settings to be made on each machine. Single or multiple units are available with stationary or portable mountings.

Air Compressors

■ Sullivan Machinery Co., Michigan City, Ind., announces a new line of small air compressors in smaller sizes. Line is known as type Q and is applicable for industrial diesel starting service. Units are air cooled, single and 2-stage, and range in capacity from 2.8 to 45.7 cubic feet per minute. Compressors have cushioned air valves, balanced crankshaft, taper roller main bearings, Lynite connecting rods, copper intercooler, chromium nickel cylinders and dust-proof crankcase. They are available bare, base mounted or tank mounted, for V-belt drive from motor or air



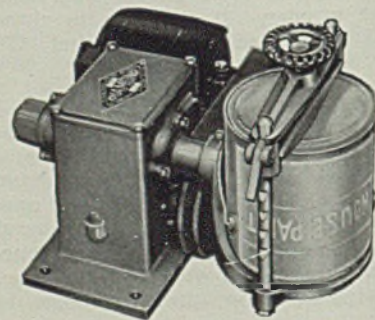
cooled gasoline engine. Units for diesel starting may have combination motor and gasoline drive.

Lightning Arresters

■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has introduced a new line of type LV lightning arresters covering the range from 20 to 73 kilovolts for small substations. Complete arrester units 20, 25, 30 and 37 kilovolts consist of 3-inch diameter porous block elements, and a multiple series gap of resistance spacers and metal electrodes. Entire assembly is encased in wet process porcelain, hermetically sealed. Each arrester is guaranteed to discharge at least 65,000 surge amperes on a 5-10 micro-second wave. They may be mounted directly on transformers, or other equipment. Where small clearances prohibit this, mounting brackets may be used.

Paint Conditioner

■ Diamond Iron Works Inc., division of Mahr Mfg. Co., 1728 North Second street, Minneapolis, has placed on the market a new paint conditioner for industrial plants. This one arm mixer is of rugged construction and built in two sizes, one for cans or buckets up to one gallon, and the other for cans from 2 to 5 gallons. They operate on

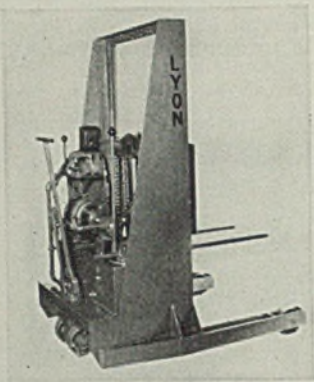


a reverse action principle, breaking up circulating currents by creating a powerful slushing effect. The motion mechanism of each mixer is completely enclosed with lubricant reservoir providing splash lubrication to all bearings. The clamp mechanism is adjustable for small cans.

The latter may be stacked under the clamp bar when more than one is to be mixed. The mixer has shaft extensions on both sides and can be converted into a 2-arm conditioner.

Elevating Truck

■ Lyon Iron Works, Greene, N. Y., has developed a fork type elevating truck with a combination 2-speed hydraulic hand pump and motor



driven hydraulic pump for handling pallets of tin plate. It is of 3000-pound capacity. The forks are 27 inches long, 18 inches wide overall and have a lowered height of 2 inches and an elevated height of 48 inches. The truck is of the fifth wheel steer type, all wheels being 7 inches in diameter with 3-inch face.

Grinding Attachments

■ Brown & Sharpe Mfg. Co., Providence, R. I., announces No. 10 and No. 13 end mill grinding attachments for use on its No. 10 and No. 13 cutter, universal and tool grinding machines. These are of particular value in sharpening the peripheral teeth of steep spiral end mills having straight or taper shanks. A knob at the rear end of each attachment spindle makes it easy to hold the tooth being ground in contact with the tooth rest while feeding the cutter across the wheel by longitudinal table movement. Mounting of the spindle on antifriction bearings provides a sensitive, free-turning unit.

The attachment spindle, however, is carried in a body which is supported by and turns horizontally on a base casting. Two zero lines 180 degrees apart assure proper align-

ment of the spindle with the table of the machine.

End mills having a No. 9 B & S taper shank will fit directly into the attachment spindle, while cutters having shanks of other B & S tapers, as well as cutters with milling machine standard taper shanks and straight shanks, are accommodated by stock collets and adapters.

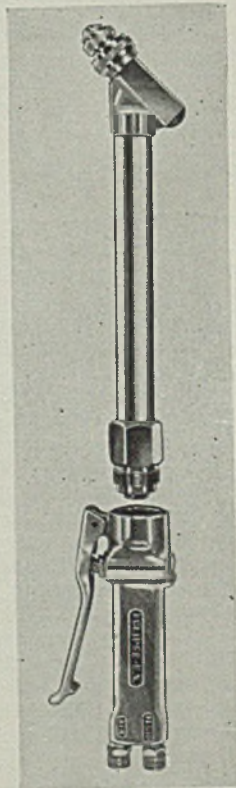
Tile Cutter

■ Crescent Machine Co., Leestonia, O., announces a portable, motor-driven machine for cutting sheet metal up to 3/32-inch thickness, as well as tile and wood. It is 18 inches long, 13 inches wide and 8 inches high, and is equipped with an abrasive wheel 8 1/16 inches in diameter with a projection above the table of 1 3/4 inches for cutting tubing of any material up to 1 1/2 inches, outside diameter. An 8-inch steel saw can be substituted for cutting boards up to 1 1/2 x 12 inches wide or ripping up to 6 inches wide.

The machine is self-contained and driven by a 1/3-horsepower motor through a V-belt. The self-aligning table is constructed with two brass tubes which are babbitted in the bottom and slide on steel rods. The whole unit weighs 71 pounds.

Extension Spray Gun

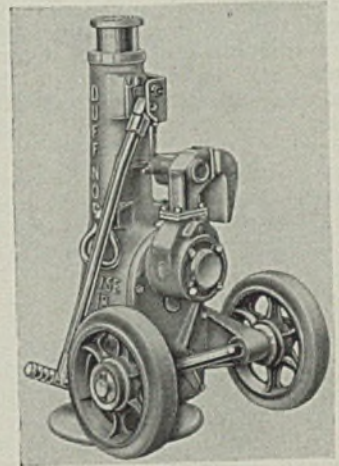
■ Eclipse Air Brush Co., Newark, N. J., has placed on the market an improved extension type EX spray



gun for painting large surfaces beyond the natural reach of the operator without the use of scaffolding and staging. The extension gun is supplied in lengths up to 12 feet. It features a detachable gun grip control, the same grip being suitable for different lengths of shaft. The shaft turns in the grip so that spray can be directed. The spray head is supplied in two models.

Air Motor Jack

■ Duff-Norton Mfg. Co., 2709 Preble avenue, Pittsburgh, announces a new 20-ton rotary air motor jack for railroad service and varied industrial uses. It is mounted on rubber-tired, roller-bearing wheels and is



easy to move and place. Lift permits one man to operate two jacks through a Y valve connection, with a quick, even raise up to its limit of 18 inches. When lifting standard reaches the safe limit of raised or lowered position, the motor is cut off automatically.

Tap Grinder

■ Edward Blake Co., Newton Centre, Mass., has developed a new J-B tap grinder which is small, self-contained and complete with motor, diamond trueing device and extension cord. Its movable parts are protected from dirt and grit, and it can be changed quickly to grind 2, 3, 4 or 5 flute taps of any size within its capacity.

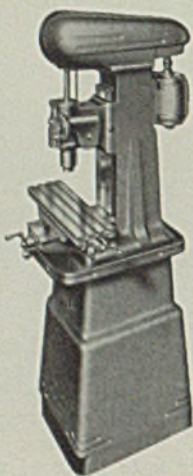
The motor is mounted on a swivel base. A cross feed permits accurate feeding of the grinding wheel to the work, and back to the diamond for dressing. The latter is mounted in a swinging arm and is pulled across the grinding wheel. A spring keeps the diamond from the grinding wheel. The feeding screws on the motor end and the work end of the machine enable the entire face of the wheel to be used.

The work head is mounted on a

slide which can be adjusted to various length taps. The work head unit rocks on a shaft in the base plate slide, and is connected by a special adjustable eccentric mechanism with the crank shaft spindle. To grind taps with a different number of flutes, it is necessary to remove and change only one gear. A plate on the machine lists the correct gear for each number of flutes. Each machine is equipped with two bell centers that fit into the collet. These permit grinding taps with shanks larger than $\frac{1}{2}$ -inch up to 5 inches long.

Milling Machine And Jig Borer

■ Machinery Mfg. Co., Vernon Branch, Los Angeles, has announced a new combination vertical milling machine and jig borer for jigs, fixtures, dies and all types of vertical milling work within its range.



Known as the Vernon combination vertical milling machine and jig borer, it has a quill arranged so a slow hand feed is provided by a hand wheel, accurately graduated to one-thousandth inch. Drive is provided with eight spindle speeds, spindle being driven by a long V-belt. Knee and column are integral and overall height is 71 inches. It takes up 38 x 33 inches of floor space and has a collet capacity of $\frac{1}{2}$ -inch. Spindle speeds range from 250 to 4200 revolutions per minute. The spindle is mounted with combination radial and thrust bearing, driven with 6-spline shaft.

Push-Button Stations

■ General Electric Co., Schenectady, N. Y., has introduced a new line of 1 and 2-button standard-duty push-button stations. These are protected from accidental operation by guard rings. The words "start"

and "stop" molded into the front of the buttons are filled with white paint. Other identification can be provided on separate plates attached to the enclosure directly above the buttons.

The new stations measure 4 $\frac{9}{16}$ x 2 $\frac{5}{8}$ x 2 $\frac{1}{2}$ inches and have ample wiring space. Station enclosure is of steel and consists of back and cover. Mounting holes are in the upper lefthand and lower righthand corners. The contacts are of fine silver backed by steel, and are arranged to provide a double-break action. Terminals are spun onto the molded base in such a position that the base provides both an attachment and a firm support for the terminal.

Steel Press Brake

■ E. W. Bliss Co., Brooklyn, N. Y., announces an all steel press brake equipped to handle a wide range of different types of work. It has a capacity of $\frac{1}{4}$ -inch by 12 feet mild steel. Deflection in the bed and slide is held to an absolute minimum by the use of beam members, giving an exceedingly rigid construction. Other features include electrically operated friction clutch and bronze bushings for eccentric shaft and intermediate shaft bearings. The press brake is fitted with a V-belt motor drive and its intermediate gearing is lubricated by oil or grease.

Specifications are: Distance between housing 12 feet 6 inches; depth of gap 12 inches; stroke of slide 3 inches; adjustment of slide by motor 6 inches; distance bed to slide with stroke down, adjustment up 12 inches. The machine operates at 30 strokes per minute.

New Bearing Series

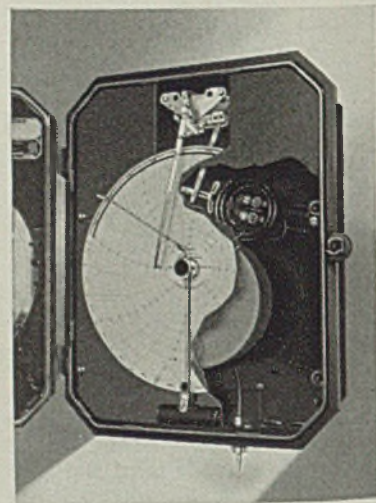
■ Timken Roller Bearing Co., Canton, O., has introduced a new bearing series of the standard SS type. The first bearing in this series is 9285-9220, with a cone bore of 3 inches, outside diameter of 6 $\frac{3}{8}$ inches and width of 1 $\frac{15}{16}$ inches. At 500 revolutions per minute this bearing has a radial capacity of 6255 pounds, and a thrust capacity of 8710 pounds. The 9100, 9300 and 90,000 series bearings of the SS type have also been redesigned to reduce the outside diameters and widths of each series while still maintaining the same load carrying capacities. Two cone bores of 2 $\frac{7}{16}$ inches and 2 $\frac{11}{16}$ inches are available in the 9100 series. Two different bores of 3 inches and 3 $\frac{5}{16}$ inches are available in the 9300 series and one cone bore of 3 $\frac{13}{16}$ inches in the 90,000 series.

These series in addition to those

now available in the SS type provide a wide range of capacities, varying in cone bores from $\frac{3}{4}$ to 12 $\frac{1}{2}$ inches. The SS series are single row bearings with steep cup and cone angles. They are designed to handle those loading conditions where thrust loads are large compared to the radial loads. Their design embodies the principles of "on Apex" construction, which assures true rolling motion, and positively aligned rolls, which prevent roll skewing. The multiple perforated cage retains the rolls equally spaced around the bearing periphery.

Temperature Recorders

■ Taylor Instrument Co., Rochester, N. Y., has placed on the market new recorders for temperature, humidity, pressure, load, rate of flow, liquid level and receivers for pneumatic transmission systems. They



are available with 10 or 12-inch charts, with one, two or three pens. A die-cast aluminum chart plate on each recorder gives a rigid surface for pencil notations on chart and for carrying the chart clamp and pen lifter.

Other features include a new electric chart clock with improved coil design, totally enclosed oil-immersed gears and slower speed motor.

Machinist's Bench

■ Stackbin Corp., Providence, R. I., has introduced an all-welded steel machinist's bench for use along the sides of machines. Its top is $\frac{1}{8}$ -inch steel, shelves 14-gage steel and legs are of heavy angle steel. Finished in baked-on, machine-gray enamel, it can be equipped with a lock drawer, if desired. Also, it can be furnished in any size.

Speed Control System

(Concluded from Page 44)

ing the contact on a mass which revolves with the governor but which is free to respond to acceleration as in the case of the two-member centrifugal governor described below.

The two-member governor is another recent development in governor design aimed at preservation of contact amplification to insure high accuracy and the provision of adequate system stabilizing influences by means of anticipatory response. The design which meets these requirements over a wide range of applications is shown in Fig. 2 attached to a motor shaft. It consists of a gravity-balanced speed-responsive member which is pivoted on ball bearings about an axis through a center of gravity, and perpendicular to the axis of the motor and an acceleration responsive member in the form of a flywheel mounted on ball bearings on the motor axis. The speed-sensing member is a cage-like structure supporting a pair of weights which give rise to a centrifugal couple tending to rotate the cage about its pivot axis. This rotation is restrained by a Z-shaped flat spring attached at its end to the cage and at its center to a stub shaft which is coupled to the motor shaft.

Rotation Changed by Switch

Two pairs of silver contacts are attached to the cage and flywheel in such a relation that relative movement between the cage and the flywheel can make and break a spring-connected external circuit.

It is apparent that in the absence of angular acceleration, the contact forces are equalized by the freedom of the cage and the flywheel to rotate about their pivot axes. During angular acceleration, this equalization is disturbed by the amount of torque required to accelerate the flywheel, and this torque is produced by a decrease in force between one pair of contacts and a corresponding increase between the other pair. This dependence of contact pressure on the cage position and on the flywheel acceleration prevails also at the regulated speed, and a hovering condition is established by equality between the centrifugal couple on the cage and the spring torque.

In such a two-member inertia governor, a change in rotation is possible simply by interchanging the control and reaction contact functions by means of a switch. The regulated speed can be changed by adjusting the amount of initial spring torque on the cage by means of a set screw.

The two-member inertia governor

is quite flexible in its adaptability to different operating conditions because both the acceleration and the speed response can be varied independently of each other over a wide range without the necessity of changing such design details as bearing mountings or sizes.

Vacuum Chucking Used In Polishing Stainless

■ A battery of eight speed lathes employing special vacuum chucks designed by Schauer Machine Co., 2066 Reading road, Cincinnati, solved the problem of a creamery equipment maker for holding odd-shaped pieces for final processing.

The work involves putting flawless mirror-like finish both on the inside and out of a large number of pieces of a variety of shapes and sizes, ranging from small cups,

which the work is inserted is through the pipe shown at the left, which in turn is coupled to the back of the hollow spindle by means of a revolving airtight seal. The work for which the fixture shown in the illustration is designed is a stainless steel bowl 22 inches in diameter. When set into the fixture and the vacuum turned on, this bowl is firmly and accurately held by outside air pressure against the airtight sealing rubber which can be seen in the illustration as a dark band on the inside surface of the fixture. The bowl is then finished as the fixture with the spindle revolves.

These lathes are powered by motors of two horsepower. An automatic braking system brings the work to a smooth stop and, in case of emergencies, will stop the motor in two seconds from high speed.

Tension Loadings

(Concluded from Page 42)

where the tensile stress was fairly high, the torque reached the maximum quite some time before failure as shown by the curves H and D, upper right. Possibly this is because the diameter of the bar becomes considerably reduced when it is stressed in tension, thus increasing the shear stress without increasing the applied moment.

A summary of test results is shown in the small diagram at lower center. The ratio of maximum tensile stress in any test to the maximum stress in the pure torsion test is plotted as ordinates and a similar ratio of the moments is plotted as abscissas in the chart. The test points all fall close to a circle of unity radius, passing through the points of the pure torsion and pure tension tests. All points fall outside of a circle, center of which is at the origin and the radius is 0.9.

A sharp V-notch in a ductile material does not cause any stress concentration that can be detected in a short-time tension test, but it does seriously affect the amount of strain at rupture. This is particularly true if torsion loads are present. In the pure tension tests, the maximum strain was reduced from 27 per cent for the cylindrical bar to 7 per cent for a notched bar. In the case of pure torsion, the angle of twist was similarly reduced from 584 degrees to about 60 degrees.

The amount that the bars necked down was roughly proportional to the amount of ultimate tensile load. When heavy torques were present, the bars failed before any appreciable necking occurred. Initial yielding in a circumferentially notched mild steel bar occurs on a conical surface and not in the plane where the bar will eventually fail.

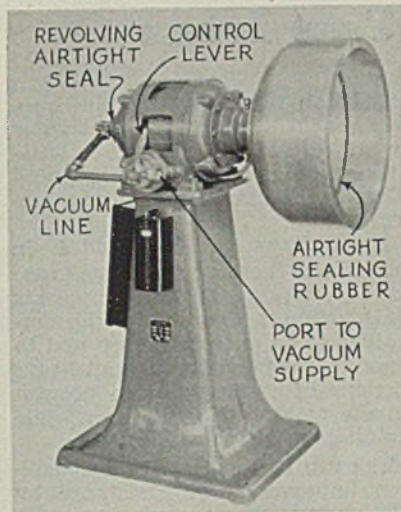


Illustration shows a lathe designed for vacuum chucking. It is capable of placing a mirror-like finish on a large variety of stainless steel shapes

plates and disks to huge stainless steel bowls.

Conventional methods of holding these pieces for grinding and polishing not only were slow but also resulted in scratches which later had to be taken out by hand. With the vacuum chucking method, higher production resulted because handling time was reduced. At the same time finish quality was improved and scratching eliminated.

Both the inside and outside of the surfaces of the same piece are now polished on one lathe. The vacuum line, as shown in the illustration, is connected to the lathe at the port to the right of the hand lever. The latter controls a valve which releases the vacuum in the chuck, or creates it, at the will of the operator. Vacuum connection with the chuck or fixture into

Repairing Defects

(Concluded from Page 65)

groove. And the slag MUST follow right behind the arc.

Before the arc is broken at the end of the run the electrode should be halted for a second or two and then withdrawn suddenly. Watch the slag. If the slag covers the end of the pool quickly, a good patch will result.

Cracks offer a much more serious problem. Usually they may be repaired but once. Then a hole should be burned completely through the weld and a backing strip must be placed beneath the cut-out.

Next the repair weld is made,

being sure that each layer is peened.

Should this procedure lead to the formation of yet another crack on X-ray examination, there is but one course of procedure left. The entire weldment must be stress-relieved before making the repair. The appearance of a crack the second time is a sure indication of the existence of inherent stresses in the structure that would not allow the repair to be made. Removing such stresses by a stress-relieving heat treatment will eliminate the condition and afterwards it will be found quite easy to patch the crack.

Following these rules will aid in the making of a perfect patch at the first attempt. Fig. 4 denotes the repaired plate with slag inclusion in Fig. 3 chipped out and rewelded.

New Alloy Additions Reduce Chilling, Improve Cast Irons

■ TWO NEW addition alloys for improving cast iron have recently been developed by Electro Metallurgical Co., 30 East Forty-second street, New York. Known as "SMZ" and "CMSZ," both alloys are primarily designed to be used as ladle additions. The first alloy is suitable for any application where strong graphitizing action is desired. It is especially recommended to produce a high-silicon cast iron from a low-carbon low-silicon white iron.

This first alloy also is advantageous when it is desired to produce an improved gray cast iron by means of a ladle addition; to reduce chilling of edges, corners and thin sections of a casting without sacrifice of mechanical properties in the heavier sections; or to reduce wall sensitivity. For castings of sections from $\frac{1}{2}$ to 2 inches thick, the addition of from 0.25 to 0.75 per cent of this first alloy will effectively convert a white iron to a high-strength gray cast iron.

Strength Increased

As an example of its ability to reduce chill, an addition of 0.25 per cent silicon as SMZ alloy (8½ pounds per net ton) reduced the depth of chill from 1.09 to 0.31-inch and at the same time increased transverse strength from 1900 to 2600 pounds, increased deflection from 0.185 to 0.315-inch and increased ultimate strength from 36,000 to 40,000 pounds per square inch.

The second or CMSZ alloy consists essentially of the hardener, chromium, as well as silicon, manganese and zirconium. Effect of this alloy addition in hardening or graphitizing a cast iron depends

largely on the nature of the iron. When added in small percentages to an oxidized iron or to a low-silicon iron, the most pronounced effect is to eliminate chilling tendency.

This alloy may be added in the ladle to increase wear resistance and hardness without decreasing machinability; to prevent the formation of an open structure and to equalize hardness throughout heavy sections of castings; or to prevent growth at high temperatures while maintaining machinability.

The use of the CMSZ alloy addition improves wear resistance by eliminating the eutectic graphite formations and by introducing chromium without chilling thin sections and lessening machinability. The addition of chromium contributes to the wear resistance of the iron by causing the formation of a completely pearlitic structure. To increase wear resistance without decreasing machinability, this alloy is added to a slightly oxidized iron such as is used for motor blocks, in amounts of 0.10 to 0.30 per cent chromium (6 to 18 pounds of alloy per net ton).

Open-Hearth Trends

(Concluded from Page 62)

amount of instrumentation placed in service.

Slag control and steelmaking technique shows a gradual improvement due to a better knowledge of the fundamental reactions occurring in the open-hearth furnace.

Pit practice, mold conditioning,

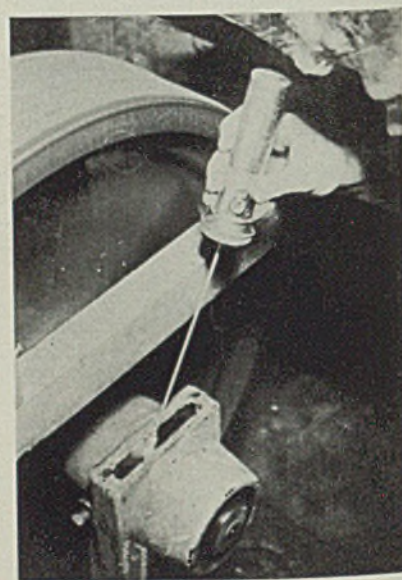
temperature control, all indicate an increase in the available information on these subjects with the outstanding subject of temperature control giving great promise of near solution.

Due to radical changes in the type of product produced and the method of producing it, nearly all manufacturers are on their toes to use every available bit of knowledge to make the best possible piece of steel, and at the same time make it tough for their competitors.

Incidentally the tonnage of stainless steels is growing slowly but surely and while general details of its manufacture and fabricating process are closely held it would appear that the future will see a much greater tonnage of this material produced.

Flashlight Extension Facilitates Inspection

■ By means of a flashlight bulb extension recently developed by Sierra Aircraft Co., Sierra Madre, Calif., internal inspection of molds, intri-



Above illustration shows an operator examining the interior of a journal housing with the aid of a flashlight bulb extension

cate core castings etc., now readily can be made.

The extension consists of tubing, the plug end of which is screwed into any flashlight with the bulb in the opposite socket. The tubing is available in lengths from 6 to 36 inches and, being bendable, it can be pushed into deep recesses. It also can be bent to form its own stand. The tubing itself consists of a special wire encased in high-grade aluminum alloy tubing.

Meter Assembly

(Concluded from Page 47)

each subassembly which already has been checked and inspected.

To identify the jewels used on the bearings in the gear train and clock mechanism, each jewel is placed in a colored gelatin pharmaceutical capsule. Three colors of capsules—clear, blue and red identify each of the three different jewels used on various meters and staffs. In addition to identifying and preventing accidental mixture, the jewel is protected from dust and oil is retained on the jewel.

Assembler has no difficulty from mixing jewels as each is identified by color of capsule. Only one capsule is opened at a time. The various jewels are different but each requires close inspection to identify. Jewels are placed in the capsules as made and so there is no danger of accidental mixture in storage, handling or issuing to assembly. After removing the jewel the two halves of the capsule are thrown into a box and returned to the jewel making department for reuse. This has been found an important aid to assembly operations.

New Gray Iron Group To Do Research at Battelle

■ Gray Iron Research institute, organized recently, will conduct a program of foundry research at Battelle Memorial institute, Columbus, O., it is announced by Clyde E. Williams, director of Battelle. The new organization is chartered as a non-profit corporation, under Ohio law, to engage in scientific research and technical development work for the gray iron industry.

Charter members include: Advance Foundry Co., Dayton, O.; Buffalo Foundry & Machine Co., Buffalo; Bullard Co., Bridgeport, Conn.; Carondelet Foundry Co., St. Louis; Chicago Hardware Foundry Co., North Chicago, Ill.; Forest City Foundries Co., Cleveland; Fremont Foundry Co., Fremont, O.; Spring City Foundry, Waukesha, Wis.; United States Pipe & Foundry Co., Burlington, N. J.; and Worthington Pump & Machinery Co., Harrison, N. J.

As a first part of the program, it is planned to conduct studies of the fundamental principles of cupola melting of gray cast iron, using the combined laboratory facilities of the fuels and metallurgical laboratories as well as the experimental foundry at Battelle. It is expected that these investigations will provide the groundwork for more accurate control of metal quality and composition and that the technical information obtained in the operation of the

experimental cupola will indicate to the member foundries the changes in practice and the degree of control necessary to obtain highest quality metals at lowest operating costs.

The experimental program at Battelle will be under the direction of Dr. C. H. Lorig, supervising metallurgist, and R. A. Sherman, head of the fuels division. John Lowe, foundry engineer on the Battelle staff, will serve as contact man between the laboratories and member foundries, so that results obtained in the research program can be translated into practical foundry operations without loss of time.

Died:

■ J. WALTER SCOTT, 62, president, Pittsburgh Machine & Supply Co., Pittsburgh, July 20 at his home in Coraopolis, Pa.

Harold B. McFarland, president, Carter, Donlevy Co., Philadelphia, in that city, July 15.

Capt. Eddy P. Rogers, 80, vice president, Excelsior Foundry Co., Belleville, Ill., at his summer home in South Haven, Mich., recently.

E. L. Crum, 64, president, Ideal Equipment Co., Indianapolis, in that city recently. He liquidated his interests in the Ideal company the first of this year.

Milton B. Craighead, 69, for years an officer of Gaar, Scott & Co., Richmond, Ind., maker of threshing

machines, in Richmond, July 16. He was with the threshing machine company until its merger with M. Rumely Co.

Morris Eckley Mutchler, since 1920 general sales manager, Sterling Engine Co., Buffalo, in that city, July 23.

Jack H. Nierath, the past 15 years Cleveland district manager of General Drop Forge Co., Buffalo, in Cleveland, July 24.

Walter Frank Hill, 61, former superintendent, Hendricks Copper Rolling Co., Belleville, N. J., with which company he was associated 42 years, July 13 in East Orange, N. J.

Albert R. Braden, 64, superintendent, drop forging department, United Shoe Machinery Corp., Beverly, Mass., recently in that city.

John P. Brophy, 83, vice president and general manager, Cleveland Automatic Machine Co., Cleveland, prior to his retirement 20 years ago, in Cleveland, July 19.

E. H. Maytag, 56, chairman of the board and president, Maytag Co., Newton, Iowa, at his summer home in Lake Geneva, Wis., July 20.

W. F. Sloss, 49, special representative of Pittsburgh Plate Glass Co. in the Philadelphia territory 22 years, July 16 at his summer home in Ocean City, N. J.

Robert P. Durham, president, McDonald Engineering Co., Chicago, in Chicago recently. He joined the company in 1916.

It Pays to Use Dependable Wire Rope

When a wire rope fails, the equipment on which it is used is temporarily out of business, production stops, time is lost and labor is wasted... The best recommendation for "HERCULES" (Red-Strand) Wire Rope is its performance record, by which it continues to make and hold friends—year after year... In order to

be suitable for all purposes, "HERCULES" is made in a wide range of both Round Strand and Flattened Strand constructions—all of which are available in either the Standard or Pre-formed type... If you will tell us how you use Wire Rope, we shall be glad to suggest the construction and type we consider best for your conditions.

Made of Acid Open-Hearth Steel Wire

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NEW YORK	90 West Street	SAN FRANCISCO	320 Fourth Street
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DENVER	1554 Water Street	SEATTLE	3410 First Avenue South

Financial News

(Continued from Page 14)

quarterly and the annual statements, was \$446,402, compared with \$380,738 net profit earned in the corresponding period last year. Net profit for first quarter, 1940, was \$279,386.

For six months ended June 30, indicated net income was \$725,788, against \$698,346 in the first half, 1939.

WICKWIRE SPENCER

Wickwire Spencer Steel Co., New York, incurred a \$177,471 net deficit in the quarter ended June 30, as against a net loss of \$149,100 in the period last year. In first quarter, this year, net loss was \$262,701.

Six months' indicated net loss, computed from quarterly reports, was \$440,172, compared with \$307,853 net deficit incurred in first half, 1939.

ACME STEEL CO.

Acme Steel Co., Chicago, reports \$661,149 net income for quarter ended June 30. This was equal to \$2.02 per common share, and compared to net income of \$259,969 or 79 cents a share on common for the period last year. Net profit for quarter ended March 31 was \$384,254 or \$1.17 per common share.

Indicated net profit for first six months this year, compiled from company's quarterly reports, totaled \$1,045,403, equal to \$3.19 per share. In first half of 1939 net income was \$599,641 or \$1.83 a share.

For 12 months ended June 30 net profit was \$2,361,095, equal to \$7.20 a share, against \$912,374 or \$2.78 per share in previous year.

DETROIT STEEL CORP.

Detroit Steel Corp., Detroit, earned \$95,407 net profit in the quarter ended June 30, after provision for federal income taxes at the current rate and adjustment for previous quarter. This was equal to 46 cents per share on par \$5 stock, and compared with net income of \$17,943 or nine cents per share in the period last year.

Net income for six months ended June 30 was \$209,939, equal to \$1.02 per share; in first half, 1939, net profit was \$110,351 or 53 cents a share.

OTIS STEEL CO.

Otis Steel Co., Cleveland, incurred a net loss of \$196,630 after deduction of all charges, in quarter ended June 30. Net deficit in corresponding period last year was \$431,766, while net loss for quarter ended March 31 was \$165,513.

Aggregate net loss for first half, 1940, was \$362,143, against net

deficit of \$251,440 in the period last year.

ALAN WOOD STEEL CO.

Consolidated net profit of Alan Wood Steel Co., Conshohocken, Pa., for the quarter ended June 30 was \$224,312, compared with \$30,276 earned in the period last year. For the quarter ended March 31, net income was \$297,246.

With net sales and operating revenue for the first half, 1940, totaling \$9,626,592, net profit for the period was \$521,558. In first half, 1939, net sales and operating revenue aggregated \$5,896,621; net income was \$264,255.

Dividends paid on the company's 7 per cent cumulative preferred stock during six months ended June 30 aggregated \$2 per share, totaled \$143,649. Cumulative dividends on this stock were in arrears \$50.75 per share, for a total of \$3,645,068 on 71,824 shares outstanding at end of first half.

JONES & LAUGHLIN

Jones & Laughlin Steel Corp., Pittsburgh, reports its net profit for the quarter ended June 30, after federal income taxes, interest, depreciation and depletion was \$2,141,645. Equal to \$1.93 per common share after dividend requirements on the corporation's 7 per cent preferred stock, this compared with a \$471,287 net loss incurred in the period last year. In quarter ended March 31, net income was \$1,134,611 or 18 cents per common share.

Net profit for six months ended June 30 totaled \$3,276,256, equal to \$2.12 a share on common; in first half, 1939, net loss aggregated \$847,812.

Comparison of consolidated income account for second quarter:

	1940	1939
Profit after federal income taxes	\$4,757,862	\$1,638,259
Interest	522,028	556,625
Depreciation and depletion	2,091,710	1,539,082
Minority interest	2,479	13,839
Net profit	\$2,141,645	\$ 471,287*

*Loss.

Six months ended June 30:

	1940	1939
Profit after federal income taxes	\$8,261,860	\$3,369,949
Interest	1,054,628	1,121,124
Depreciation and depletion	3,924,491	3,079,605
Minority interest	6,485	17,032
Net Profit	\$3,276,256	\$ 847,812*

*Loss.

INTERLAKE IRON CORP.

Interlake Iron Corp., Chicago, incurred in the quarter ended June 30 a net loss of \$147,190, after interest,

depreciation, taxes, and \$75,000 provision for amortizing investment in the Dalton Ore Co. This compares to \$442,573 net deficit for second quarter last year, and net loss of \$108,322 in the first quarter, 1940.

For six months ended June 30, the corporation's net loss, as computed from quarterly reports, was \$255,512. Net deficit in first half, 1939, totaled \$793,252.

A. M. CASTLE & CO.

A. M. Castle & Co., Chicago, steel warehouse and distributing concern, reports net profit of \$92,319, equal to 38 cents per share for quarter ended June 30. This compared with \$45,083 net income, equal to 19 cents a share, earned in the period last year; for quarter ended March 31 net profit was \$100,199 or 42 cents per share.

Net profit for six months ended June 30 was \$192,518 or 80 cents per share, compared with \$80,964 or 34 cents per share in the first half, 1939. Full increase in federal income taxes for first half this year was charged against second quarter earnings.

Warner & Swasey To Offer Stock to Public

Warner & Swasey Co., Cleveland, a privately-owned enterprise since its formation 60 years ago, will become a corporation with substantial public ownership, if present plans materialize. In a letter to common stockholders, Charles J. Stilwell, president, set forth a recapitalization plan. It is proposed to increase common stock from an authorized 300,000 shares of \$5 par value to 1,000,000 shares no par stock. Each \$5 par share would be exchanged for three shares of the new no par stock.

There are 248,245 shares of \$5 par value now outstanding, most of which are owned by the heirs of the founders, officers, directors and employees of the company.

The heirs or estates of Messrs. Warner and Swasey plan to dispose of a part of their holdings, largely for reasons of tax or diversification. The company expects to list these shares and any shares the company may sell with the securities and exchange commission.

Company also has 13,502 shares of 6 per cent cumulative preferred outstanding. These will be retired this year, if the recapitalization plan is carried out, either through redemption or possibly through exchange for common stock.

Mr. Stilwell and other senior executives will continue to be responsible for the management of the company, which is a leading producer of machine tools, especially turret lathes, and astronomical instruments.

Buying Slightly Slower But Production Rises

*Railroad and structural demands lead
with defense requirements appearing.
Scrap continues downward movement*

■ SOME EFFECT of midsummer slackening is noted in the steel market as various factors limit buying, but mill backlogs are sufficient to carry over the relatively dull period.

One effect has been to allow steelmakers to make progress against backlogs and in some instances deliveries have been improved slightly. In the case of some products pressure is still heavy, particularly in semifinished steel, large tonnages for export to Great Britain, some going by way of Canada for partial fabrication, presenting a problem to producers. Recent British orders involved two lots of 70,000 tons and 40,000 tons of semifinished steel.

Pressure for raw steel is becoming so great in some instances that a large independent producer is said to have contracted with another producer for steel to augment its immediate supplies.

In spite of the slight recession in buying steel production continues at a high rate most mills making some increase in activity and others holding to their previous rate. Practically all available blast furnace capacity is active and repair work is being expedited on such as are out for relining. Foundry melt is only slightly affected by the summer period and with resumption of automobile production will be at high rate.

Structural and reinforcing steel placements hold to the high level of the past few weeks, defense work being prominent, with increasing private construction coming out. Southern California Edison Co. has placed 7543 tons for transmission towers, and 5500 tons has been awarded for an appraisers' store and immigration station at San Francisco, this project also taking 4500 tons of reinforcing bars. Aluminum Co. of America has awarded 1850 tons for its Los Angeles plant and 1450 tons for its works at Alcoa, Tenn. To date 12,500 tons has been booked for the naval air station at Corpus Christi, Tex.

Railroads continue to place heavy orders for cars and locomotives and the steel involved is reaching large proportions. In the past week the Illinois Central has placed 2000 freight cars in addition to the 1000 ordered a few days previous. Norfolk & Western has ordered 50 box cars in addition to the 1000 hoppers just placed and figures are being taken on 500

more box cars. Atchison, Topeka & Santa Fe has awarded ten steam locomotives and the Reading Co. 13 diesel-electric switchers. One steam locomotive each has been ordered by the Alaska railroad and the Sao Paulo-Parana railroad in Brazil. Atlantic Coast Line will open bids early in August for 1565 miscellaneous cars.

Tin plate demand fails to hold up to expectations and production last week slipped 2 points further, to 73 per cent of capacity. Indications of a large vegetable and fruit pack promise a heavier demand within a few weeks. Stocks in hands of producers and consumers appear to be increasing at the moment, to which is attributed the present recession in production.

Automotive output continues its seasonal decline, dropping 19,000 units last week, to 34,822, compared with 53,020 the preceding week and 40,595 in the comparable week a year ago. Parts makers are receiving increasing orders for material for 1941 models and some car builders will be taking tonnages for new models in a few weeks.

Placing of scrap iron, steel and other metals under the export license rule creates a virtual embargo on scrap movement except under special permission and will halt shipments for the present, throwing back on the domestic market such tonnages as have been collected for export. Just how broadly this regulation will be applied remains to be seen.

Scrap is a factor of weakness in STEEL'S composite prices, causing the iron and steel composite to decline four cents to \$37.53 and the steelworks scrap composite is down 25 cents to \$18.17. The finished steel figure is unchanged at \$56.60.

Most steel-producing areas increased their rate last week, led by a 5½-point rise at Pittsburgh. The national rate advanced 1½ points to 89½ per cent of capacity, the highest since mid-December, when it was above 90 per cent, and half a point above the level preceding July 4. Pittsburgh advanced 5½ points to 86.5 per cent, Chicago 1½ to 96½ per cent, Birmingham 4 to 92, Detroit 4 to 99, Youngstown 1 to 85, Cleveland 2 to 65 and Cincinnati 1 to 85 per cent. Rates were unchanged in the following districts: St. Louis 65 per cent, Eastern Pennsylvania 86, Wheeling 94, Buffalo 90½, New England 75.

MARKET IN TABLOID ★

Demand

*Slight lull in several lines;
others active.*

Prices

*Little weakness except in
scrap.*

Production

*Up 1½ points to 89½ per
cent.*

Financial News

(Continued from Page 14)

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INTERLAKE IRON CORP.

Interlake Iron Corp., Chicago, incurred in the quarter ended June 30 a net loss of \$147,190, after interest,

depreciation, taxes, and \$75,000 provision for amortizing investment in the Dalton Ore Co. This compares to \$442,573 net deficit for second quarter last year, and net loss of \$108,322 in the first quarter, 1940.

For six months ended June 30, the corporation's net loss, as computed from quarterly reports, was \$255,512. Net deficit in first half, 1939, totaled \$793,252.

A. M. CASTLE & CO.

A. M. Castle & Co., Chicago, steel warehouse and distributing concern, reports net profit of \$92,319, equal to 38 cents per share for quarter ended June 30. This compared with \$45,083 net income, equal to 19 cents a share, earned in the period last year; for quarter ended March 31 net profit was \$100,199 or 42 cents per share.

Net profit for six months ended June 30 was \$192,518 or 80 cents per share, compared with \$80,964 or 34 cents per share in the first half, 1939. Full increase in federal income taxes for first half this year was charged against second quarter earnings.

Warner & Swasey To Offer Stock to Public

■ Warner & Swasey Co., Cleveland, a privately-owned enterprise since its formation 60 years ago, will become a corporation with substantial public ownership, if present plans materialize. In a letter to common stockholders, Charles J. Stilwell, president, set forth a recapitalization plan. It is proposed to increase common stock from an authorized 300,000 shares of \$5 par value to 1,000,000 shares no par stock. Each \$5 par share would be exchanged for three shares of the new no par stock.

There are 248,245 shares of \$5 par value now outstanding, most of which are owned by the heirs of the founders, officers, directors and employees of the company.

The heirs or estates of Messrs. Warner and Swasey plan to dispose of a part of their holdings, largely for reasons of tax or diversification. The company expects to list these shares and any shares the company may sell with the securities and exchange commission.

Company also has 13,502 shares of 6 per cent cumulative preferred outstanding. These will be retired this year, if the recapitalization plan is carried out, either through redemption or possibly through exchange for common stock.

Mr. Stilwell and other senior executives will continue to be responsible for the management of the company, which is a leading producer of machine tools, especially turret lathes, and astronomical instruments.

Buying Slightly Slower But Production Rises

*Railroad and structural demands lead
with defense requirements appearing.
Scrap continues downward movement*

■ SOME EFFECT of midsummer slackening is noted in the steel market as various factors limit buying, but mill backlogs are sufficient to carry over the relatively dull period.

One effect has been to allow steelmakers to make progress against backlogs and in some instances deliveries have been improved slightly. In the case of some products pressure is still heavy, particularly in semifinished steel, large tonnages for export to Great Britain, some going by way of Canada for partial fabrication, presenting a problem to producers. Recent British orders involved two lots of 70,000 tons and 40,000 tons of semifinished steel.

Pressure for raw steel is becoming so great in some instances that a large independent producer is said to have contracted with another producer for steel to augment its immediate supplies.

In spite of the slight recession in buying steel production continues at a high rate most mills making some increase in activity and others holding to their previous rate. Practically all available blast furnace capacity is active and repair work is being expedited on such as are out for relining. Foundry melt is only slightly affected by the summer period and with resumption of automobile production will be at high rate.

Structural and reinforcing steel placements hold to the high level of the past few weeks, defense work being prominent, with increasing private construction coming out. Southern California Edison Co. has placed 7543 tons for transmission towers, and 5500 tons has been awarded for an appraisers' store and immigration station at San Francisco, this project also taking 4500 tons of reinforcing bars. Aluminum Co. of America has awarded 1850 tons for its Los Angeles plant and 1450 tons for its works at Alcoa, Tenn. To date 12,500 tons has been booked for the naval air station at Corpus Christi, Tex.

Railroads continue to place heavy orders for cars and locomotives and the steel involved is reaching large proportions. In the past week the Illinois Central has placed 2000 freight cars in addition to the 1000 ordered a few days previous. Norfolk & Western has ordered 50 box cars in addition to the 1000 hoppers just placed and figures are being taken on 500

more box cars. Atchison, Topeka & Santa Fe has awarded ten steam locomotives and the Reading Co. 13 diesel-electric switchers. One steam locomotive each has been ordered by the Alaska railroad and the Sao Paulo-Parana railroad in Brazil. Atlantic Coast Line will open bids early in August for 1565 miscellaneous cars.

Tin plate demand fails to hold up to expectations and production last week slipped 2 points further, to 73 per cent of capacity. Indications of a large vegetable and fruit pack promise a heavier demand within a few weeks. Stocks in hands of producers and consumers appear to be increasing at the moment, to which is attributed the present recession in production.

Automotive output continues its seasonal decline, dropping 19,000 units last week, to 34,822, compared with 53,020 the preceding week and 40,595 in the comparable week a year ago. Parts makers are receiving increasing orders for material for 1941 models and some car builders will be taking tonnages for new models in a few weeks.

Placing of scrap iron, steel and other metals under the export license rule creates a virtual embargo on scrap movement except under special permission and will halt shipments for the present, throwing back on the domestic market such tonnages as have been collected for export. Just how broadly this regulation will be applied remains to be seen.

Scrap is a factor of weakness in STEEL's composite prices, causing the iron and steel composite to decline four cents to \$37.53 and the steelworks scrap composite is down 25 cents to \$18.17. The finished steel figure is unchanged at \$56.60.

Most steel-producing areas increased their rate last week, led by a 5½-point rise at Pittsburgh. The national rate advanced 1½ points to 89½ per cent of capacity, the highest since mid-December, when it was above 90 per cent, and half a point above the level preceding July 4. Pittsburgh advanced 5½ points to 86.5 per cent, Chicago 1½ to 96½ per cent, Birmingham 4 to 92, Detroit 4 to 99, Youngstown 1 to 85, Cleveland 2 to 65 and Cincinnati 1 to 85 per cent. Rates were unchanged in the following districts: St. Louis 65 per cent, Eastern Pennsylvania 86, Wheeling 94, Buffalo 90½, New England 75.

MARKET IN TABLOID ★

Demand

*Slight lull in several lines;
others active.*

Prices

*Little weakness except in
scrap.*

Production

*Up 1½ points to 89½ per
cent.*

COMPOSITE MARKET AVERAGES

	July 27	July 20	July 13	One Month Ago June, 1940	Three Months Ago April, 1940	One Year Ago July, 1939	Five Years Ago July, 1935
Iron and Steel	\$37.53	\$37.57	\$37.68	\$37.69	\$36.69	\$35.82	\$32.44
Finished Steel	56.60	56.60	56.60	56.60	55.90	55.62	54.00
Steelworks Scrap..	18.17	18.42	18.83	19.03	16.00	14.72	10.64

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	July 27, 1940	June 1940	April 1940	July 1939	Pig Iron	July 27, 1940	June 1940	April 1940	July 1939
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c	Bessemer, del. Pittsburgh	\$24.34	\$24.34	\$24.34	\$22.34
Steel bars, Chicago	2.15	2.15	2.15	2.15	Basic, Valley	22.50	22.50	22.50	20.50
Steel bars, Philadelphia	2.47	2.47	2.47	2.47	Basic, eastern, del. Philadelphia	24.34	24.34	24.34	22.34
Iron bars, Chicago	2.25	2.25	2.25	2.05	No. 2 foundry, Pittsburgh	24.21	24.21	24.21	22.21
Shapes, Pittsburgh	2.10	2.10	2.10	2.10	No. 2 foundry, Chicago	23.00	23.00	23.00	21.00
Shapes, Philadelphia	2.215	2.215	2.215	2.215	Southern No. 2, Birmingham	19.38	19.38	19.38	17.38
Shapes, Chicago	2.10	2.10	2.10	2.10	Southern No. 2, del. Cincinnati	22.89	22.89	22.89	20.89
Plates, Pittsburgh	2.10	2.10	2.10	2.10	No. 2X, del. Phila. (differ av.)	25.215	25.215	25.215	23.215
Plates, Philadelphia	2.15	2.15	2.15	2.15	Malleable, Valley	23.00	23.00	23.00	21.00
Plates, Chicago	2.10	2.10	2.10	2.10	Malleable, Chicago	23.00	23.00	23.00	21.00
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.00	2.00	Lake Sup., charcoal, del. Chicago	30.34	30.34	30.34	28.34
Sheets, cold-rolled, Pittsburgh	3.05	3.05	2.95	3.05	Gray forge, del. Pittsburgh	23.17	23.17	23.17	21.17
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50	Ferromanganese, del. Pittsburgh	125.33	115.33	105.33	85.33
Sheets, hot-rolled, Gary	2.10	2.10	1.95	2.00					
Sheets, cold-rolled, Gary	3.05	3.05	2.90	3.05	Scrap				
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50	Heavy melt, steel, Pitts.	\$18.75	\$19.90	\$16.45	\$15.55
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60	Heavy melt, steel No. 2, E. Pa.	17.25	18.10	15.50	13.55
Tin plate, per base box, Pitts.	\$5.00	\$5.00	\$5.00	\$5.00	Heavy melting steel, Chicago	17.25	18.00	15.20	13.55
Wire nails, Pittsburgh	2.55	2.55	2.55	2.40	Rolls for rolling, Chicago	21.25	22.25	18.65	17.75
					Railroad steel specialties, Chicago	20.25	21.40	18.05	15.50
Semifinished Material					Coke				
Sheet bars, Pittsburgh, Chicago.	\$34.00	\$34.00	\$34.00	\$34.00	Connellsville, furnace, ovens	\$4.75	\$4.75	\$4.75	\$3.75
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00	Connellsville, foundry, ovens	5.75	5.75	5.75	5.00
Re-rolling billets, Pittsburgh	34.00	34.00	34.00	34.00	Chicago, by-product fdry., del.	11.25	11.25	11.25	10.50
Wire rods No. 5 to 3/4-inch, Pitts.	2.00	2.00	2.00	1.92					

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. 304	
Bars	24.00	25.00	
Plates	27.00	29.00	
Sheets	34.00	36.00	
Hot strip	21.50	23.50	
Cold strip	28.00	30.00	
Straight Chromes			
	No. No.	No. No.	
	410 430	442 446	
Bars	18.50	19.00 22.50	27.50

Plates ...	21.50	22.00	25.50	30.50	Gulf ports	2.45c
Sheets ...	26.50	29.00	32.50	36.50	Birmingham	2.10c
Hot strip ...	17.00	17.50	24.00	35.00	St. Louis, del.	2.34c
Cold stp. ...	22.00	22.50	32.00	52.00	Pacific Coast ports	2.70c

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.46c
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
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.	2.21 1/2c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c

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

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	2.05c
Chicago or Gary	2.05c
Detroit, delivered	2.15c
Cleveland	2.05c

Buffalo	2.05c
Birmingham	2.05c
Gulf ports	2.40c
Pacific Coast ports	2.70c

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.	2.05c
Gulf ports	2.40c
Pacific Coast ports	2.50c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails	\$2.55
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(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 barless wire, column	70

To Manufacturing Trade

Base, Pitts. - Cleve. - 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
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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
Alloy	
S.A.E. Diff.	S.A.E. Diff.
2000	3100
2100	3200
2300	3300
2500	3400
4100 0.15 to 0.25 Mo.	0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.10
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.	

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, Blrm.	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	68.5 off
Do. larger, to 1-in.	66 off
Do. 1½ and larger	64 off
Tire bolts	52.5 off
Stove Bolts	
In packages with nuts separate 72.5 off; with nuts attached add 15%; bulk 83.5 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.	
Step bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex. U.S.S. S.A.E.	
½-inch and less.	67 70
¾-1-inch	64 65
1¼-1½-inch	62 62
1½ and larger	60
Hexagon Cap Screws	
Upset 1-in., smaller	70.0 off
Square Head Set Screws	
Upset, 1-in., smaller	75.0 off
Headless set screws	64.0 off

Piling

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.85c
Pacific Coast ports	2.95c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.	
Structural	3.40c

¾-inch and under	65-10 off
Wrought washers, Pitts., Chl., 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. Pitts., 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 Steel

In.	Bk.	Galv.
½	63½	54
¾	66½	58
1-3	68½	60½

Iron

¾	30	13
1-1½	34	19
1½	38	21½
2	37½	21

Lap Weld Steel

2	61	52½
2½-3	64	55½
3½-6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½-3½	31½	17½
4	33½	21
4½-8	32½	20
9-12	28½	15

Line Pipe Steel

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
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

¾ butt weld	25	7
1 and 1½ 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	
2½" O.D.	12	15.16		
2¾" O.D.	12	16.58	26.57	
3" O.D.	12	17.54	29.00	
3¼" O.D.	11	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	
5½" 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
2½" O.D.	12	16.01	18.45
2¾" O.D.	12	17.54	20.21
3" O.D.	12	18.59	21.42
3½" O.D.	12	19.50	22.48
4" O.D.	11	24.62	28.37
4½" O.D.	10	30.54	35.20
5" O.D.	10	37.35	43.04
5½" 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	
Std. ftgs., 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., Chl., 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 ½-inch incl. (per 100 lbs.) ..	\$2.00
Do., over ½ to 1½-in. incl.	2.15
Worcester up \$0.10; Galveston up \$0.25; Pacific Coast up \$0.50.	

Skelp

Pitts., Chl., Youngstown, Coatesville, Sparrows Pt.	1.90c
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Coke

Price Per Net Ton

Beehive Ovens	
Connellsville, fur.	\$4.35- 4.60
Connellsville, fdry.	5.00- 5.75
Connell, prem. fdry.	5.75- 6.25
New River fdry.	6.25- 6.50
Wise county fdry.	5.50- 6.50
Wise county fur.	5.00- 5.25

By-Product Foundry

Newark, N. J., del.	11.38-11.85
Chicago, outside del.	10.50
Chicago, delivered	11.25
Terre Haute, del.	10.75
Millwaukee, ovens.	11.25
New England, del.	12.50
St. Louis, del.	11.75
Birmingham, ovens.	7.50
Indianapolis, del.	10.75
Cincinnati, del.	10.50
Cleveland, del.	11.05
Buffalo, del.	11.25
Detroit, del.	11.00
Philadelphia, del.	11.15

Coke By-Products

Spot, gal., freight allowed east of Omaha	
Pure and 90% benzol.	15.00c
Toluol, two degree	27.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c
Per lb. f.o.b. Frankford and St. Louis	
Phenol (less than 1000 lbs.) ..	14.75c
Do. (1000 lbs. or over) ..	13.75c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls. to jobbers	7.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	\$28.00

—The Market Week—

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.	Malle- able	Basic	Besse- mer
Bethlehem, Pa.	\$24.00	\$24.50	\$23.50	\$25.00
Birmingham, Ala.	19.38		18.38	24.00
Birdsboro, Pa.	24.00	24.50	23.50	25.00
Buffalo	23.00	23.50	22.00	24.00
Chicago	23.00	23.00	22.50	23.50
Cleveland	23.00	23.00	22.50	23.50
Detroit	23.00	23.00	22.50	23.50
Duluth	23.50	23.50		24.00
Erie, Pa.	23.00	23.50	22.50	24.00
Everett, Mass.	24.00	24.50	23.50	25.00
Granite City, Ill.	23.00	23.00	22.50	23.50
Hamilton, O.	23.00	23.00	22.50	
Neville Island, Pa.	23.00	23.00	22.50	23.50
Provo, Utah	22.00			
Sharpsville, Pa.	23.00	23.00	22.50	23.50
Sparrow's Point, Md.	24.00		23.50	
Swedeland, Pa.	24.00	24.50	23.50	25.00
Toledo, O.	23.00	23.00	22.50	23.50
Youngstown, O.	23.00	23.00	22.50	23.50

†Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:

Akron, O., from Cleveland	24.39	24.39	23.89	24.39
Baltimore from Birmingham	24.78		23.66	
Boston from Birmingham	24.12			
Boston from Everett, Mass.	24.50	25.00	24.00	25.50
Boston from Buffalo	24.50	25.00	24.00	25.50
Brooklyn, N. Y., from Bethlehem	26.50	27.00		
Canton, O., from Cleveland	24.39	24.39	23.89	24.89
Chicago from Birmingham	23.22			
Cincinnati from Hamilton, O.	23.24	24.11	23.61	
Cincinnati from Birmingham	23.06		22.06	
Cleveland from Birmingham	23.32		22.82	
Mansfield, O., from Toledo, O.	24.94	24.94	24.44	24.44
Milwaukee from Chicago	24.10	24.10	23.60	24.60
Muskegon, Mich., from Chicago				
Toledo or Detroit	26.19	26.19	25.69	26.69
Newark, N. J., from Birmingham	25.15			
Newark, N. J., from Bethlehem	25.53	26.03		
Philadelphia from Birmingham	24.46		23.96	
Philadelphia from Swedeland, Pa.	24.84	25.34	24.34	
Pittsburgh district from Neville Island		Neville base, plus 69c, 84c, and \$1.24 freight.		
Saginaw, Mich., from Detroit	25.31	25.31	24.81	25.81
St. Louis, northern	23.50	23.50	23.00	

No. 2	Malle- able	Basic	Besse- mer
St. Louis from Birmingham	23.12		22.62
St. Paul from Duluth	25.63	25.63	26.13
†Over 0.70 phos.			

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., \$28.50, base; \$29.74 delivered Philadelphia.

Gray Forge

Valley furnace	\$22.50	Charcoal	
Pitts. dist. fur.	22.50	Lake Superior fur.	\$27.00
		do., del. Chicago	30.34
		Lyles, Tenn.	26.50

†Silvery

Jackson county, O., base: 6-6.50 per cent \$28.50; 6.51-7—\$29.00; 7-7.50—\$29.50; 7.51-8—\$30.00; 8-8.50—\$30.50; 8.51-9—\$31.00; 9-9.50—\$31.50; Buffalo, \$1.25 higher.

Bessemer Ferrosilicon

Jackson county, O., base; Prices are the same as for silvers, 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

Ladle Brick

(Pa., O., W. Va., Mo.)

Per 1000 f.o.b. Works, Net Prices	Dry press	\$28.00
	Wire cut	26.00

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
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Silica Brick

Pennsylvania	\$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Fluorspar

Washed gravel, duty	
pd., tide, net ton	\$25.00-\$26.00
Washed gravel, f.o.b.	
Ill., Ky., net ton,	
carloads, all rail	21.00
Do. barge	21.00
No. 2 lump	22.00

Ferroalloy Prices

Ferromanganese, 78-82%, carlots, duty pd.	\$120.00	Do., ton lots	11.75c	Do., spot	145.00	Silicon Metal, 1% iron, contract, carlots, 2 x	
Ton lots	130.00	Do., less-ton lots	12.00c	Do., contract, ton lots	145.00	1/4-in., lb.	14.00c
Less ton lots	133.50	67-72% low carbon:		Do., spot, ton lots	150.00	Do., 2%	12.50c
Less 200 lb. lots	138.00	Car- Ton Less		15-18% ti., 3-5% carbon,		Spot 1/4c higher	
Do., carlots del. Pitts.	125.33	loads lots ton		carlots, contr., net ton	157.50	Silicon Briquets, contract	
Spiegel Eisen, 19-21% dom.		2% carb...	17.50c 18.25c 18.75c	Do., spot	160.00	carloads, bulk, freight	
Palmerton, Pa., spot...	36.00	1% carb...	18.50c 19.25c 19.75c	Do., contract, ton lots	160.00	allowed, ton	\$69.50
Do., 26-28%	49.50	0.10% carb.	20.50c 21.25c 21.75c	Do., spot, ton lots	165.00	Ton lots	79.50
		0.20% carb.	19.50c 20.25c 20.75c			Less-ton lots, lb.	3.75c
		Spot 1/4c higher		Alsilfer, contract carlots,		Less 200 lb. lots, lb.	4.00c
Ferrosilicon, 50% freight		Ferromolybdenum, 55-		f.o.b. Niagara Falls, lb.	7.50c	Spot 1/4-cent higher	
allowed, c.i.	74.50	65% molyb. cont., f.o.b.		Do., ton lots	8.00c	Manganese Briquets, contract	
Do., ton lot	87.00	mill, lb.	0.95	Do., less-ton lots	8.50c	carloads, bulk freight allowed,	
Do., 75 per cent	135.00	Calcium molybdate, lb.		Spot 1/4c lb. higher		lb.	5.00c
Do., ton lots	151.00	molyb. cont., f.o.b. mill	0.80	Chromium Briquets, contract,		Ton lots	5.50c
Spot, \$5 a ton higher.		Ferrotitanium, 40-45%		tract, freight allowed,		Less-ton lots	5.75c
Silicomanganese, c.i., 2%		lb., con. ti., f.o.b. Niagara Falls, ton lots	\$1.23	lb. spot carlots, bulk	7.00c	Spot 1/4c higher	
per cent carbon	118.00	Do., less-ton lots	1.25	Do., ton lots	7.50c	Zirconium Alloy, 12-15%,	
2% carbon, 108.00; 1%, 133.00		20-25% carbon, 0.10 max., ton lots, lb.	1.35	Do., less-ton lots	7.75c	contract, carloads,	
Contract ton price		Do., less-ton lots	1.40	Do., less 200 lbs.	8.00c	bulk, gross ton	102.50
\$12.50 higher; spot \$5 over contract.		Spot 5c higher		Spot, 1/4c higher.		Do., spot	107.50
Ferrotungsten, stand., lb.		Ferrocolumbium, 50-60%,		Tungsten Metal Powder,		34-40%, contract, car-	
con. del. cars	1.90-2.00	contract, lb. con. col., f.o.b. Niagara Falls	\$2.25	according to grade,		loads, lb., alloy	14.00c
Ferrovanadium, 35 to 40%, lb., cont.	2.70-2.80-2.90	Do., less-ton lots	2.30	spot shipment, 200-lb. drum lots, lb.	\$2.50	Do., ton lots	15.00c
		Spot is 10c higher		Do., smaller lots	2.60	Do., less-ton lots	16.00c
Ferrophosphorus, gr. ton,		Technical molybdenum		Vanadium Pentoxide,		Spot 1/4c higher	
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	trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill	0.80	contract, lb. contained	\$1.10	Molybdenum Powder,	
				Do., spot	1.15	99%, f.o.b. York, Pa.	\$2.60
Ferrochrome, 66-70 chromi-		Ferro-carbon-titanium, 15-		Chromium Metal, 98% cr., 0.50 carbon max.,		200-lb. kegs, lb.	2.75
um, 4-6 carbon, cts. lb., contained cr., del. carlots	11.00c	18%, ti., 6-8% carb., carlots, contr., net ton	\$142.50	contract, lb. con. chrome	84.00c	Do., 100-200 lb. lots	3.00
				Do., spot	89.00c	Molybdenum Oxide	
				88% chrome, contract	83.00c	Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant	80.00c
				Do., spot	88.00c		

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates 1/4-In. & Over	Struc- tural Shapes	Floor Plates	Hot Rolled	Sheets Cold Rolled	Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars Carbon	S.A.E. 2300	S.A.E. 3100
Boston	3.98	3.86	4.86	3.85	3.85	5.66	3.51	4.48	4.66	3.46	4.13	8.63	7.23
New York (Met.)	3.84	3.76	3.76	3.76	3.75	5.56	3.38	4.40	4.05	3.31	4.09	8.59	7.19
Philadelphia	3.85	3.75	4.25	3.55	3.55	5.25	3.35	4.05	4.25	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	3.62	3.62	3.62	3.40	5.25	3.05	4.30	4.00	3.22	3.75	8.15	6.75
Pittsburgh	3.35	3.40	3.40	3.40	3.40	5.00	3.15	...	4.45	...	3.65	8.15	6.75
Cleveland	3.25	3.30	3.30	3.40	3.58	5.18	3.15	4.05	4.42	3.20	3.75	8.15	6.75
Detroit	3.43	3.23	3.48	3.60	3.65	5.27	3.25	4.30	4.64	3.20	3.80	8.45	7.05
Omaha	3.90	3.80	3.80	3.95	3.95	5.55	3.45	...	5.00	...	4.42	...	...
Cincinnati	3.60	3.47	3.47	3.65	3.68	5.28	3.22	4.00	4.67	3.47	4.00	8.50	7.10
Chicago	3.50	3.40	3.40	3.55	3.55	5.15	3.05	4.10	4.60	3.30	3.75	8.15	6.75
Twin Cities	3.75	3.65	3.65	3.80	3.80	5.40	3.30	4.35	4.75	3.83	4.34	8.84	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	6.98
St. Louis	3.62	3.52	3.52	3.47	3.47	5.07	3.18	4.12	4.87	3.41	4.02	8.52	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	3.53	3.55	3.70	3.70	5.30	3.25	...	4.76	...	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	4.33	4.33	5.93	3.99	...	5.71	...	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.	4.05	6.20	6.20	4.05	4.05	5.75	4.20	...	5.25	...	...	...	...
Seattle	4.00	3.85	5.20	3.40	3.50	5.75	3.70	6.30	4.75	...	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	4.45	4.00	4.00	6.40	4.30	6.50	5.25	...	6.60	10.65	9.80
San Francisco	3.50	4.00	6.00	3.35	3.35	5.60	3.40	6.40	5.15	...	6.80	10.65	9.80

	S.A.E. 1035- 1050	Hot-rolled Bars (Unannealed) 2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.18	7.50	6.05	5.80	7.90
New York (Met.)	4.04	7.35	5.90	5.65	...
Philadelphia	4.10	7.31	5.86	5.61	8.56
Baltimore	4.45	...	...	...	...
Norfolk, Va.	...	...	...	...	...
Buffalo	3.55	7.10	5.65	5.40	7.50
Pittsburgh	3.40	7.20	5.75	5.50	7.60
Cleveland	3.30	7.30	5.85	5.85	7.70
Detroit	3.48	7.42	5.97	5.72	7.19
Cincinnati	3.65	7.44	5.99	5.74	7.84
Chicago	3.70	7.10	5.65	5.40	7.50
Twin Cities	3.95	7.45	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.82	7.47	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	9.40	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, Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham.

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; 300-4999 in San Francisco, Portland; any quantity in Twin Cities; 300-1999 in Los Angeles.

Galvanized Sheets: Base, 1500-3499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle, San Francisco; 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; 10 to 24 bundles in Philadelphia.

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 Rates of Exchange, July 25

Export Prices f.o.b. Port of Dispatch—

Domestic Prices at Works or Furnace—

By Cable or Radio

Last Reported

	British gross tons U. K. ports	Continental Channel or North Sea ports. gross tons†		Quoted in dollars at current value	**Quoted in gold pounds sterling	£ s d	Fdy. pig iron, St. 2.5	£ s d	French Francs††	Belgian Francs	Reich Mark
		£ s d			£ s d						
Foundry, 2.50-3.00 Bl.	\$23.16	6 0 0*	\$33.23	3 18 0							
Basic bessemer											
Bemattite, Phos. .03-.05	24.13	6 5 0*									
Billets			\$31.95	3 15 0							
Wire rods, No. 5 gage			60.71	7 2 6							
Standard rails	\$40.53	10 10 0	\$48.99	5 13 0							
Merchant bars	2.51c	14 15 0	2.77c	7 6 0							
Structural shapes	2.34c	13 16 0	2.83c	7 9 0							
Plates, 1/4 in. or 5 mm.	2.53c	14 17 6	3.53c	9 6 0							
Sheets, black, 24 gage											
or 0.5 mm.	3.21c	18 17 6	2.98c	7 17 0*							
Sheets, gal., 24 ga., corr.	3.70c	22 2 6	3.94c	10 7 6							
Bands and strips			2.70c	7 5 0							
Plain wire, base.			3.15c	8 6 3							
Galvanized wire, base.			3.75c	9 17 6							
Wire nails, base.			3.56c	9 7 6							
Tin plate, box 108 lbs.	\$ 5.69	1 9 0									
British ferromanganese \$120.00 delivered Atlantic seaboard duty-paid.											

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.	16.00
Bos. dock No. 1 exp.	16.00-16.25
New Eng. del. No. 1	15.50-16.00
Buffalo, No. 1.	18.00-18.50
Buffalo, No. 2.	16.00-16.50
Chicago, No. 1.	17.00-17.50
Chicago, auto, no alloy	16.00-16.50
Cincinnati, dealers.	14.50-15.00
Cleveland, No. 1.	17.50-18.00
Cleveland, No. 2.	16.50-17.00
Detroit, No. 1.	†14.50-15.00
Detroit, No. 2.	†13.50-14.00
Eastern Pa., No. 1.	18.50-19.00
Eastern Pa., No. 2.	17.00-17.50
Federal, Ill., No. 2.	14.50-15.00
Granite City, R. R. No. 1	15.25-15.75
Granite City, No. 2.	14.00-14.50
Los Ang., No. 1, net	17.50-18.00
Los Ang., No. 2, net	12.50-13.50
N.Y. dock No. 1 exp.	15.00-15.50
Pitts., No. 1 (R.R.)	19.50-20.00
Pittsburgh, No. 1.	18.50-19.00
Pittsburgh, No. 2.	17.50-18.00
St. Louis, No. 1.	15.00-15.50
St. Louis, No. 2.	13.75-14.25
San Fran., No. 1, net	13.50-14.00
San Fran., No. 2, net	12.50-13.00
Seattle, No. 1.	15.00
Toronto, dlrs., No. 1	11.00
Valleys, No. 1.	18.50-19.00

COMPRESSED SHEETS

Buffalo, new	17.00-17.50
Chicago, factory	16.50-17.00
Chicago, dealers	15.00-15.50
Cincinnati, dealers	13.50-14.00
Cleveland	17.00-17.50
Detroit	†16.00-16.50
E. Pa., new mat.	18.50-19.00
E. Pa., old mat.	15.50
Los Angeles, net.	10.50-11.00
Pittsburgh	18.50-19.00
St. Louis	13.00-13.50
San Francisco, net.	10.50-11.00
Valleys	18.00-18.50

BUNDLED SHEETS

Buffalo, No. 1.	16.00-16.50
Buffalo, No. 2.	14.50-15.00
Cleveland	14.00-14.50
Pittsburgh	17.50-18.00
St. Louis	11.00-11.50
Toronto, dealers	9.75

SHEET CLIPPINGS, LOOSE

Chicago	12.50-13.00
Cincinnati, dealers	9.00-9.50
Detroit	†12.50-13.00
St. Louis	10.00-11.00
Toronto, dealers	9.00

BUSHING

Birmingham, No. 1.	15.00
Buffalo, No. 1.	16.00-16.50
Chicago, No. 1.	16.00-16.50
Cincin., No. 1 deal.	11.00-11.50
Cincin., No. 2 deal.	5.50-6.00
Cleveland, No. 2.	12.00-12.50
Detroit, No. 1 new	†15.00-15.50
Valleys, new, No. 1	18.00-18.50
Toronto, dealers	5.50-6.00

MACHINE TURNINGS (Long)

Birmingham	5.00
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Buffalo	12.00-12.50
Chicago	12.00-12.50
Cincinnati, dealers	7.00-7.50
Cleveland, no alloy	11.50-12.00
Detroit	†9.50-10.00
Eastern Pa.	12.50-13.00
Los Angeles	4.00-5.00
New York	†8.50
Pittsburgh	13.50-14.00
St. Louis	9.00-9.50
San Francisco	5.00
Toronto, dealers	7.00-7.25
Valleys	11.50-12.00

SHOVELING TURNINGS

Buffalo	13.00-13.50
Cleveland	12.00-12.50
Chicago	12.50-13.00
Chicago, spcl. anal.	14.50-15.00
Detroit	†11.00-11.50
Pitts., alloy-free	15.50-16.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†6.00-6.25
Buffalo	11.50-12.00
Cincinnati, dealers	5.50-6.00
Cleveland	12.00-12.50
Eastern Pa.	11.00-11.50
Detroit	†10.50-11.00
New York	†7.00
Pittsburgh	11.00-11.50
Toronto, dealers	6.75

AXLE TURNINGS

Buffalo	16.00-16.50
Boston district	†9.50-10.00
Chicago, elec. fur.	17.50-18.00
East. Pa. elec. fur.	17.50-18.00
St. Louis	11.25-11.75
Toronto	6.00-6.50

CAST IRON BORINGS

Birmingham	8.00
Boston dist. chem.	†8.50-8.75
Buffalo	11.50-12.00
Chicago	10.75-11.25
Cincinnati, dealers	5.50-6.00
Cleveland	12.00-12.50
Detroit	†10.50-11.00
E. Pa., chemical	14.50-15.00
New York	†7.50-8.00
St. Louis	8.00-8.50
Toronto, dealers	6.75

RAILROAD SPECIALTIES

Chicago	20.00-20.50
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ANGLE BARS—STEEL

Chicago	19.50-20.00
St. Louis	17.25-17.75

SPRINGS

Buffalo	22.50-23.00
Chicago, coil	21.50-22.00
Chicago, leaf	20.00-20.50
Eastern Pa.	24.00-24.50
Pittsburgh	24.50-25.00
St. Louis	19.00-19.50

STEEL RAILS, SHORT

Birmingham	17.00
Buffalo	23.00-23.50
Chicago (3 ft.)	20.00-20.50
Chicago (2 ft.)	20.50-21.00
Cincinnati, dealers	21.50-22.00
Detroit	†20.50-21.00
Pitts., 3 ft. and less	24.00-24.50
St. L. 2 ft. & less.	19.00-19.50

STEEL RAILS, SCRAP

Birmingham	15.50
Boston district	†14.50-15.00

Buffalo	21.00-21.50
Chicago	17.50-18.00
Cleveland	23.00-23.50
Pittsburgh	20.50-21.00
St. Louis	17.50-18.00
Seattle	18.00-18.50

PIPE AND FLUES

Chicago, net	12.50-13.00
Cincinnati, dealers	11.00-11.50

RAILROAD GRATE BARS

Buffalo	13.00-13.50
Chicago, net	13.50-14.00
Cincinnati, dealers	10.00-10.50
Eastern Pa.	15.00-15.50
New York	†11.50-12.00
St. Louis	12.00-12.50

RAILROAD WROUGHT

Birmingham	14.00
Boston district	†9.50-10.00
Eastern Pa., No. 1.	19.50-20.00
St. Louis, No. 1.	11.50-12.00
St. Louis, No. 2.	13.50-14.00

FORGE FLASHINGS

Boston district	†11.00-11.50
Buffalo	16.00-16.50
Cleveland	17.00-17.50
Detroit	†14.75-15.25
Pittsburgh	16.50-17.00

FORGE SCRAP

Boston district	†7.00
Chicago, heavy	21.50-22.00

LOW PHOSPHORUS

Cleveland, crops	23.00-23.50
Eastern Pa., crops	25.00-25.50
Pitts., billet, bloom, slab crops	25.00-25.50

LOW PHOS. PUNCHINGS

Buffalo	21.00-21.50
Chicago	20.50-21.00
Cleveland	20.50-21.00
Eastern Pa.	25.00-25.50
Pittsburgh	24.00-24.50
Seattle	15.00
Detroit	†16.50-17.00

RAILS FOR ROLLING

<i>5 feet and over</i>	
Birmingham	16.50
Boston	†15.75-16.00
Chicago	21.00-21.50
New York	†17.50-18.00
Eastern Pa.	23.00-23.50
St. Louis	19.50-20.00

STEEL CAR AXLES

Birmingham	18.00
Boston district	†18.00-18.50
Chicago, net	21.50-22.00
Eastern Pa.	24.50
St. Louis	20.50-21.00

LOCOMOTIVE TIRES

Chicago (cut)	21.50-22.00
St. Louis, No. 1.	17.50-18.00

SHAFTING

Boston district	†18.50-18.75
New York	†19.00-19.50

Eastern Pa.	24.50-25.00
St. Louis, 1 1/4-3 3/4	18.25-18.75

CAR WHEELS

Birmingham, iron	13.00
Boston dist., iron	†14.75-15.00
Buffalo, steel	22.50-23.00
Chicago, iron	18.50-19.00
Chicago, rolled steel	20.50-21.00
Cincin., iron, deal.	18.00-18.50
Eastern Pa., iron	21.00-21.50
Eastern Pa., steel	24.00-24.50
Pittsburgh, iron	19.50-20.00
Pittsburgh, steel	24.50-25.00
St. Louis, iron	16.50-17.00
St. Louis, steel	18.25-18.75

NO. 1 CAST SCRAP

Birmingham	15.50
Boston, No. 1 mach.	†16.50-17.00
N. Eng. del. No. 2.	14.50-14.75
N. Eng. del. textile	18.75-20.00
Buffalo, cupola	18.00-18.50
Buffalo, mach.	19.50-20.00
Chicago, agri. net.	14.50-15.00
Chicago, auto net.	16.50-17.00
Chicago, railroad net	15.50-16.00
Chicago, mach. net.	16.50-17.00
Cincin., mach. deal.	18.75-19.25
Cleveland, mach.	21.25-21.75
Detroit, cupola, net.	†17.00-17.50
Eastern Pa., cupola.	21.00-21.50
E. Pa., No. 2 yard.	18.00
E. Pa., yard fdry.	18.00-18.50
Los Angeles	16.50-17.00
Pittsburgh, cupola.	19.00-19.50
San Francisco	14.50-15.00
Seattle	14.50-16.00
St. L., agri. mach.	18.00-18.50
St. L., No. 1 mach.	18.50-19.00
Toronto, No. 1 mach., net dealers	18.00-18.50

HEAVY CAST

Boston dist. break.	†14.25-14.50
New England, del.	15.50-16.00
Buffalo, break.	16.50-17.00
Cleveland, break, net	16.50-17.00
Detroit, auto net.	†17.25-17.75
Detroit, break.	†15.00-15.50
Eastern Pa.	19.00-19.50
Los Ang., auto, net.	13.00-14.00
New York break.	†15.00
Pittsburgh, break.	16.00-16.50

STOVE PLATE

Birmingham	10.00-11.00
Boston district	†11.00-11.50
Buffalo	15.00-15.50
Chicago, net	11.50-12.00
Cincinnati, dealers	10.50-11.00
Detroit, net.	†11.00-11.50
Eastern Pa.	15.00-15.50
New York fdry	†12.25
St. Louis	†11.50-12.00
Toronto dealers, net	12.00

MALLEABLE

New England, del.	21.50-22.00
Buffalo	22.00-22.50
Chicago, R. R.	21.50-22.00
Cincin. agri. deal.	15.50-16.00
Cleveland, rail.	21.50-22.00
Eastern Pa., R. R.	22.00-22.50
Los Angeles	12.50
Pittsburgh, rail.	23.50-24.00
St. Louis, R. R.	18.50-19.00

Ores

Lake Superior Iron Ore

<i>Gross ton, 51 1/4 %</i>	
<i>Lower Lake Ports</i>	
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
<i>Foreign Ore</i>		
<i>Cents per unit, c.i.f. Atlantic ports</i>		
Manganiferous ore.	45-55% Fe., 6-10%	
Mang.		
N. African low phos		

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
<i>F.O.B. Rio Janeiro.</i>	
Scheelite, imp.	\$25.00
Chrome ore, Indian,	
48% gross ton, ctf.	\$28.00-30.00

Manganese Ore

<i>Including war risk but not duty, cents per unit cargo lots.</i>	
Caucasian, 50-52%	60.00
So. African, 50-52%	57.00
Indian, 49-50%	55.00
Brazilian, 46%	50.00-53.00
Cuban, 50-51%, duty free	71.00-73.00

Molybdenum

Sulphide conc., lb.	
Mo. cont., mines	\$0.75

Sheets, Strip

Sheet & Strip Prices, Pages 76, 77

Pittsburgh—Sheet mill operations continue to gain, although buying for July is running behind June figures. Currently mill operations are estimated at slightly better than 70 per cent of capacity. Chief interest lies in the automotive market, where buying for 1941 models is expected to begin shortly. Galvanized operating rate last week was reported at 70 per cent.

Miscellaneous demand for narrow strip increased slightly last week, although little change is expected over the next few weeks. Automotive placements will probably boost the rate of incoming orders somewhat. Miscellaneous buying is fairly active. Export demand is good, although shipping difficulties have cut down the volume of orders.

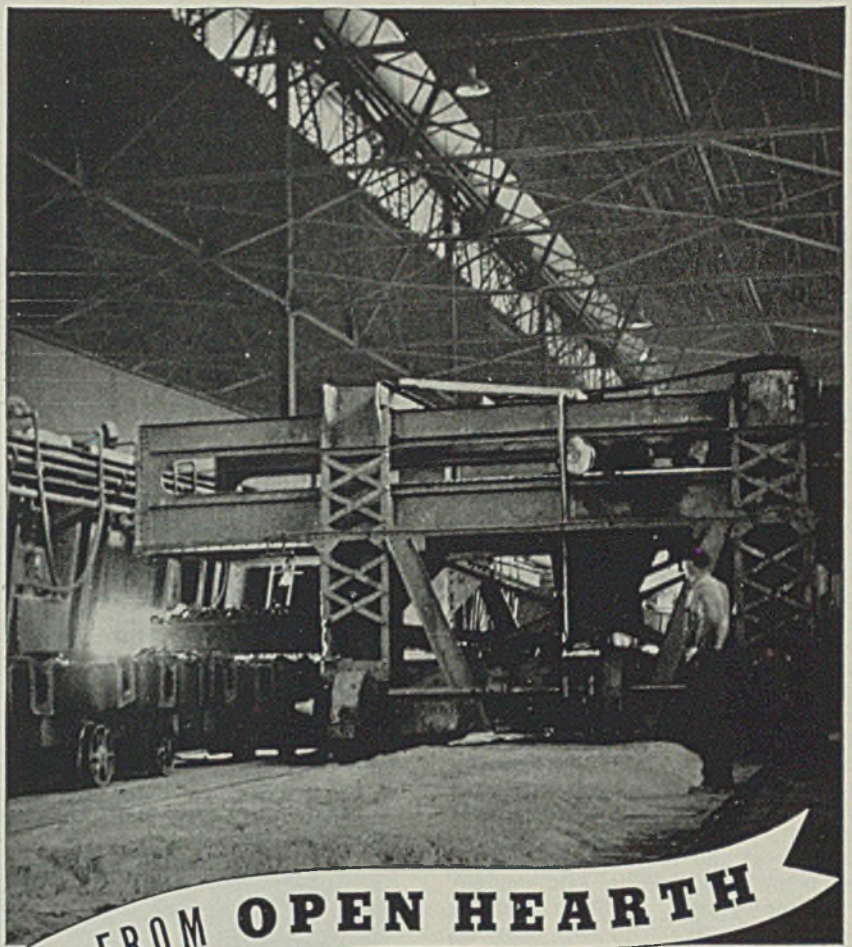
Chicago — Buying has eased off due, it is believed by producers, to recent inventory improvement and to seasonal influences. Deliveries on sheets are slightly better as a result, and average four to five weeks.

Boston — Incoming narrow cold strip volume about equals current production schedules, which are in the high eighties as to capacity. Shipments the last half of the month have been slightly higher than the first and some specialty producers' deliveries for July are a trifle ahead of bookings, although backlogs have not been reduced materially. More buying traceable to the automobile trade is appearing. Sheet buying, except for scattered orders for stainless and special finishes, is slack.

New York — Of the major products, sheets are being specified least actively. This reflects not only a seasonal lull in some lines, but, more importantly, the substantial placing of orders at concessions late in first half. Demand for narrow cold strip is centered largely in specialties or from consumers who failed to cover heavily on low-priced material. July shipments are slightly heavier than bookings with re-rolling operations close to 90 per cent in many instances. Automobile partsmakers are buying in better volume and demand by fabricators of household electrical appliances also holds well.

Philadelphia — Leading automotive partsmakers in this district are reported specifying sheets for 1941 cars more actively than in the Detroit area. At least one large interest has taken in a substantial tonnage for 1941 work. However, it is understood that no hurried effort will be made to place 1941 models on the market due to the carryover

July 29, 1940



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STANDARD STEEL WORKS

Division of THE BALDWIN LOCOMOTIVE WORKS
P H I L A D E L P H I A



of 1940 cars. New buying is comparatively light since most consumers still are working down commitments made at the \$4 concession. Some are covered well into fourth quarter, it is said.

Buffalo—Production of sheet and strip is maintained at recent peak levels against heavy backlogs. Seasonal shutdowns of leading industrial plants, including motormakers, is reflected in minor slackening in current specifications.

Cincinnati — Sheet rolling schedules are being maintained above 80 per cent. New business has dropped to 60 per cent of capacity, and backlogs are shrinking. The slackening in export demand may soon be offset by better releases for automotive sheets for new models.

St. Louis—Buying and specifications for steel sheets have tapered during the past two weeks. This is seasonal in character, particularly in the case of galvanized sheets for rural use. Mill backlogs in several instances are smaller than 30 days ago, reflecting large shipments and contraction of new business.

Birmingham, Ala. — Sheet production is near 90 per cent, largely because of demand for both manufacturers' and roofing sheets. Strip is being produced in fair volume.

Toronto, Ont. — Sheet booking continues active with new demands upon producers as Canada's war effort is expanded and production of new types of war materials are introduced. The automotive industry is placing sheet contracts for 1941 models and trucks and other war vehicles.

involved. Demand for gasoline station storage tanks is fair. Railroads are releasing needs sparingly. Boiler and miscellaneous fabricators are buying close to requirements without materially increasing inventories.

New York—Plate buying is expanding and is becoming increasingly diversified. Structural requirements are heavier and railroad equipment demands are more encouraging. While tank and boiler work is proving disappointing to some sellers, it appears to be at least holding its own. Ship tonnage has

shown little variation but there is an increasing amount in prospect.

Birmingham, Ala. — Plate production is heavy. Much tonnage is coming from tank manufacturers and from miscellaneous users. Recent orders for railroad cars will account for some 20,000 tons.

Philadelphia—Miscellaneous plate business continues to display mild improvement but no large backlogs have been built up, as indicated by the fact that several mills can work in additional tonnage for delivery in approximately ten days. Generally, three weeks is asked and larger

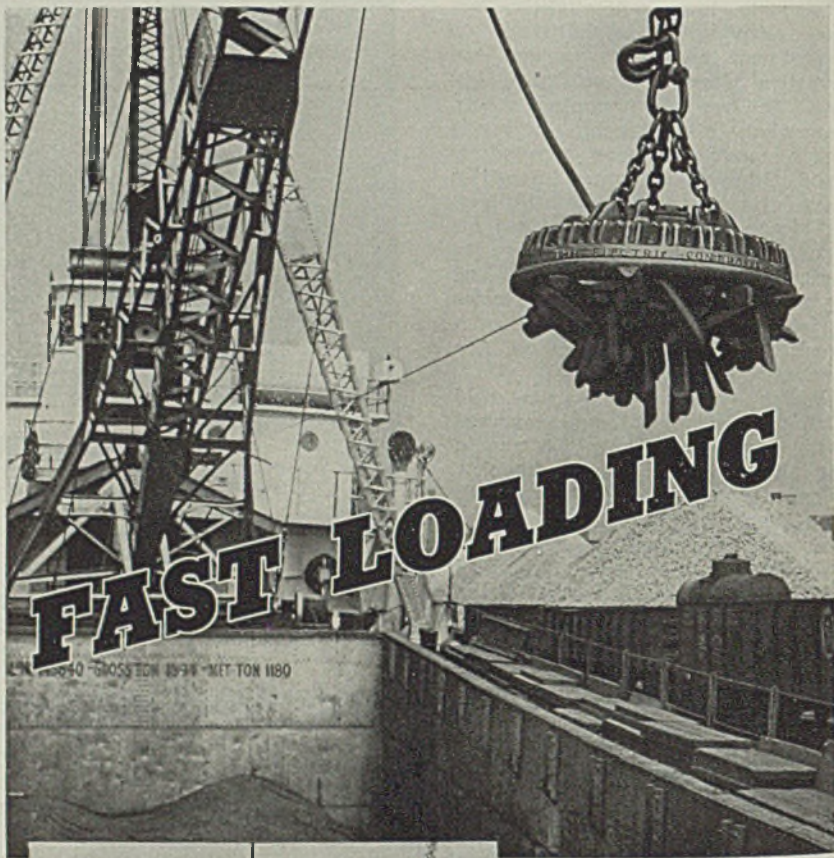
Plates

Plate Prices, Page 76

Pittsburgh—Marine construction work, as well as industrial expansion, continues to build up backlogs at plate mills. Wider sizes are still the chief problem.

Chicago—Demand is high, with government work prominent. Deliveries on large plates are, in some instances, extended as far ahead as next fall, due to particularly heavy demand for wider sizes. Once traditionally weak, plate prices now are unusually firm. Current demand, aside from government needs, is supported by increased bridge work, tank fabrication and freight car requirements.

Boston—Plate specifications by shipyards are maintained, with small-lot miscellaneous buying also slightly more active. Most purchases, however, are for less-than-car lots and specified work is light. Construction needs are mounting, but few large individual lots are



EC&M No. 6 Type SA 65-inch diameter Lifting Magnet on Freighter "Tampico," owned and operated by Nicholson Transit Co. of Detroit, which has paid for itself many times over through high speed loading and unloading during several seasons of successful operation.

**Pays for itself quickly --
by shorter time at dock.**

mills are quoting ahead as far as four to six weeks. Light plates are slower than heavier gages.

Ship releases are coming through steadily although some mills appear to be disappointed over tonnage available for current rolling.

Seattle — Maj. E. P. Antonovich, construction quartermaster, McChord Field, Wash., has called bids Aug. 8 for oil storage tanks and distributing system, a \$70,000 project, tonnage unstated. Army and navy air bases in Alaska call for a large number of fuel and oil storage units, one unit requiring more

than 1000 tons, reported placed with Graver Tank & Mfg. Co. Inc., East Chicago, Ind.

Toronto, Ont. — With consumption of plates growing rapidly, due to increased production of heavy war vehicles and ships for war, demand is growing. During the past two or three weeks contracts were placed for several ships of the anti-submarine type with Canadian yards for which plate soon will be purchased, this business, it is stated will go almost exclusively to the United States.

San Francisco—The outstanding

plate award went to Columbia Steel Co., 3764 tons for a cyclotron radiation laboratory for the University of California, Berkeley. Interest centers around the outcome of bids just opened by the United States maritime commission for 16,560 tons for six C-3 type cargo vessels. Awards aggregated 3914 tons, bringing the total for the year to 45,792 tons as compared with 19,144 tons for the corresponding period in 1939.

Plate Contracts Placed

3764 tons, cyclotron radiation laboratory, University of California, Berkeley, Calif., to Columbia Steel Co., San Francisco.

100 tons, aquarium, Malibu La Costa, Calif., to Western Pipe & Steel Co., San Francisco.

Plate Contracts Pending

280 tons, steel pipe, specification 1377-D, Ogden River project, Utah; bids in.

Bars

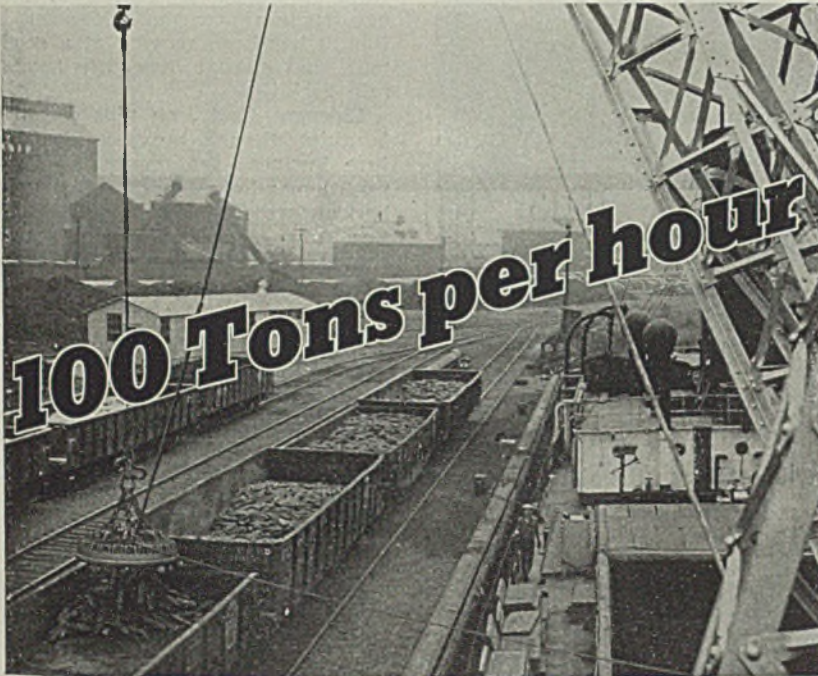
Bar Prices, Page 76

Pittsburgh—Merchant bar orders have dropped slightly, due principally to seasonal factors. No indications have been received as to the volume of new automobile buying, but some specifications are expected soon. Export demand is steady miscellaneous buying is good, and most mills have fair backlogs.

Chicago — Bars were chiefly involved in last week's slower rate of steel buying. Alloy steels continue strong, however, with no slackening of demand. Government and foreign demand, chiefly British, continue to bolster the market. Carbon steel bar demand has slowed perceptibly, curtailment being attributed to previous forward coverages and satisfactory inventory positions of consumers in general. Deliveries have improved. In some cases orders can be rolled the week following receipt.

Boston—Consumption of bars, notably alloys, tends upward and is broadening. This is reflected to some extent in heavier buying, although consumers have been releasing specifications in good volume and substantial tonnage on mill books is yet to be shipped.

New York—Bar demand has eased somewhat. However, many, particularly cold-drawn bar sellers, regard it as temporary as some heavy shell tonnage for the government is expected to develop shortly. Screw machine manufacturers are looking for substantial orders and government arsenals have large programs in the making. Current de-



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Several prominent ship operators have equipped their boats with EC&M Lifting Magnets. They know the EC&M ribbed-case construction (an exclusive EC&M feature) insures large heat-radiating surface. This is an important advantage because it maintains lifting capacity at a high rate during periods when the magnet is worked continuously.

Stevedoring companies, and warehouse terminal corporations are also large users of EC&M Lifting Magnets. In Bulletin 900, complete data on lifting capacities, sizes, typical applications, unusual handling problems, etc. are well illustrated and completely described. Write for your copy to-day.



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mand, while easier, is still active.

Buffalo—No tangible change was shown in the bar market during the past week. Mill schedules are still at capacity on a five-day week basis. Aircraft specifications continue to expand. Machine and toolmakers are taking heavy tonnage.

Philadelphia—Bar deliveries are still more extended and some consumers report entering specifications as far as fourth quarter. Auto Specialties Mfg. Co., St. Joseph, Mich., apparently is low bidder on 2,600,000 twenty-mm. empty, fin-

ished shells for Frankford arsenal here, requiring 1300 tons of steel. The same arsenal also is closing bids today on 163,504 3-inch empty, finished shells under Schedule 314-41-69, requiring an estimated 400 tons.

Toronto, Ont.—Merchant steel is in brisk demand, both for spot and future delivery. Toolmakers show more interest recently and large orders for delivery to the end of September have been booked.

Birmingham, Ala.—Bar volume holds up well. Merchant bars are

moving in considerable quantities and there is sustained demand for concrete reinforcing bars. Individual tonnages are not particularly large, but the total is highly satisfactory.

Pipe

Pipe Prices, Page 77

Pittsburgh—Shipments of standard pipe to consigned stocks were heavier over the past week and apparently the rise in demand for these products is geared to the construction program. Mechanical tubing has been moving at a good pace and special items are taxing mill facilities.

Chicago—Cast iron pipe demand is quiet, though prospects for future business are improved. Current demand consists of a fair number of projects. Most municipalities have completed annual purchases, and WPA requirements have dwindled.

Boston—Cast pipe buying and releases are below normal, the former including a small tonnage of 10-inch class B for Lynn, Mass. Merchant steel pipe for building needs, heating and plumbing, is more active, but most such pipe will not be bought for some weeks.

Birmingham, Ala.—Pipe bookings continue to reflect moderate improvement in construction programs by municipalities and public utilities. While lettings are not in large lots, the aggregate is comparatively satisfactory.

Seattle—Bellingham, Wash., is planning a three-mile industrial water main and bids will be called soon for cast iron pipe and alternates. Montana Power Co. will begin a \$50,000 project at Missoula, Mont., in August, involving placing of a 20-inch supply main. Some small lots are being sold out of stock but no important pipe jobs are up for figures.

San Francisco—No new inquiries of size for cast iron pipe are noted. Awards totaled 1433 tons and brought the year's aggregate to 21,923 tons, compared with 18,382 tons for the same period a year ago.

Cast Pipe Placed

500 tons, 2 to 12-in., Phoenix, Ariz., to Central Foundry Co.

338 tons, 6 and 24-inch, San Diego, Calif., to United States Pipe & Foundry Co., Birmingham, Ala.

200 tons, 3 and 4-inch Class 100, water district No. 45, King county Wash., to H. G. Purcell, Seattle, for United States Pipe & Foundry Co., Burlington, N. J.

Cast Pipe Pending

Unstated, 3-mile industrial supply line



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THE HORSBURGH & SCOTT CO.

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for Bellingham, Wash., with alterations; bids soon.

Rails, Cars

Track Material Prices, Page 77

Further award of 2000 steel box cars by the Illinois Central, in addition to smaller orders by other railroads, has boosted domestic freight car awards so far this year to more than 21,300 units, well in excess of last year, when 9642 cars were placed during the first seven months. It also exceeds the 8021 placed during the first seven months of 1938, but is well below the first seven months of 1937 when 47,015 freight cars were ordered by domestic carriers.

Locomotive buying has taken a spurt, being featured by the placing of 13 Diesel-electric switch engines by the Reading Co., and 10 steam locomotives by the Atchison, Topeka & Santa Fe.

Car Orders Placed

Illinois Central, 2000 box cars, in addition to 1000 reported last week, as follows: 1000 to General American Transportation Corp., Chicago; 500 to American Car & Foundry Co., New York; 500 to Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill.

Interstate commerce commission, 10 fusion-welded tank cars, authority granted to American Car & Foundry Co., New York, for construction for experimental service in the transportation of petroleum products.

Interstate commerce commission, one tank car, authority granted to General American Transportation Co., Chicago, for construction for experimental service in the shipment of caustic soda solution.

Norfolk & Western, 50 steel box cars, to Greenville Steel Car Co., Greenville, Pa.; in addition to the 1000 hopper cars noted last week as having been divided equally between the Bethlehem Steel Co., Bethlehem, Pa., and the Virginia Bridge Co., Roanoke, Va.; 500 box cars are still being figured.

Unstated eastern railroad, 24 lightweight stainless steel coaches, to Edward G. Budd Mfg. Co., Philadelphia.

Locomotives Placed

Alaska Railroad, one steam engine, to Baldwin Locomotive Works, Eddystone, Pa.

Atchison, Topeka & Santa Fe, ten 4-8-4 steam locomotives, to Baldwin Locomotive Works, Philadelphia.

Reading Co., 13 Diesel-electric switch engines, with one 1000-horsepower and four 600-horsepower units going to the Electro-Motive Corp., La Grange, Ill., two 1000-horsepower and three 660-horsepower units to the Baldwin Locomotive Works, Eddystone, Pa., and three 600-horsepower units to the American Locomotive Works, New York.

Sao Paulo-Parana Railroad, Brazil, one steam locomotive to Baldwin Locomotive Works, Eddystone, Pa.

Rail Orders Placed

Western Maryland, 2000 tons, divided between Carnegie-Illinois Steel Corp., Pittsburgh and Bethlehem Steel Co., Bethlehem, Pa.

Buses Booked

A. C. F. Motors Co., New York: Fifteen 30-passenger and ten 27-passenger for Chicago & West Towns Railways Inc.; ten 33-passenger for Chicago & Calumet District Transit Co.; ten 37-passenger for Blue Ridge Transportation Co., Hagerstown, Md.; seven 37-passenger for Bowen Motor Coaches, Fort

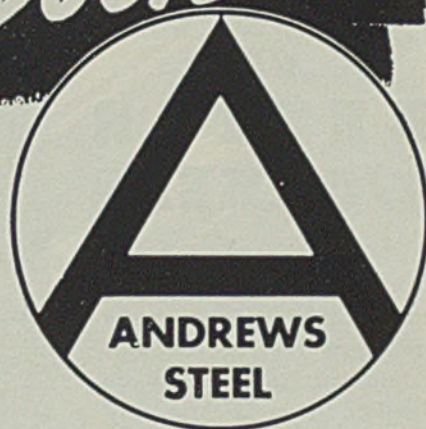
Worth, Tex.; five 42-passenger for Boston Elevated Railway Co., Boston; three 37-passenger for Southeastern Greyhound Lines, Lexington, Ky.; three 37-passenger for Northern Trails of Illinois Inc., Chicago; two 37-passenger for Foye Bros. Yellow Cab Co., New Orleans; two 39-passenger for Scranton Transit Co., Scranton, Pa.

Twin Coach Co., Kent O.: Twenty-five 31-passenger for Syracuse Transit Corp., Syracuse, N. Y.; fourteen 41-passenger for Seattle Transit System, Seattle; ten 27-passenger for Denver Tramway Corp., Denver; fifteen 29-passenger for Milwaukee Electric Railway & Transport Co., Milwaukee; six 40-passenger for Jamaica Buses Inc.,



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THE NEWPORT ROLLING MILL COMPANY
THE GLOBE IRON ROOFING & CORRUGATING CO.

Jamaica, L. I., N. Y.; two 33-passenger for Overlake Transit Service, Bellevue, Wash.

Wire

Wire Prices, Page 77

Pittsburgh—Merchant wire market is seasonally inactive. Manufacturers' items are moving fairly well, largely for miscellaneous uses. Agricultural business is slow and buying for 1941 automobile production has been limited to a few partsmakers.

Chicago—Demand eased slightly

last week but tonnage this month may exceed that of June. Orders are smaller, mostly of a fill-in nature, but total tonnage is encouraging.

Boston—Buying of manufacturers' wire has slackened mildly, but the tonnage of orders reaching mills is not far from current finishing operations, 85 to 90 per cent of capacity. Rope and fabric continue active, marine demand for the latter being notable.

New York—Export demand for wire rods and finished wire, including barbed wire and some merchant

products, for the most part is taking up a mild slack in domestic demand which is mostly in manufacturers' wire. Substantial sales and shipments are being made to South America and England and domestic demand for rods, coupled with foreign purchases, has materially lowered available supplies of this type of semifinished stock.

Birmingham, Ala. — July bookings have shown some increase over June, in all specifications, much of the tonnage accounted for through restocking on the part of jobbers and dealers.

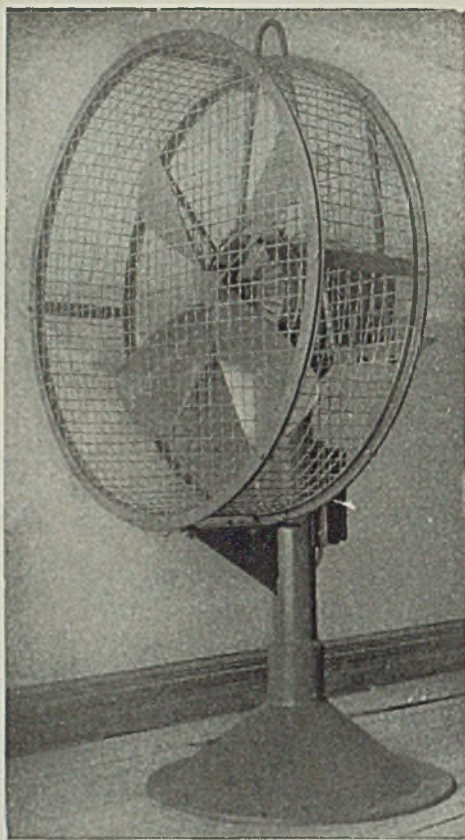
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TRUFLO FAN COMPANY

600 MERCER ST. PITTSBURGH DISTRICT HARMONY, PA.



Shapes

Structural Shape Prices, Page 76

Pittsburgh — New construction, both industrial and public works, continues to swell shape mill backlogs. Deliveries are several weeks behind on some sizes, but thus far delays have been relatively few because much of the material now being delivered was specified considerably in advance of actual needs. Industrial construction is at the best level in many years.

Chicago — Demand slackened slightly last week after bookings at some mills had touched a new high for the year. Pending tonnage remains substantial, bolstered by increased highway bridge work, and heavy requirements of other construction. Virtually all pending jobs are small individually.

Boston — Although awards are lighter, inquiry is heavier with first contracts for the Quonset Point, R. I., air station up for estimates, including a 1100-ton hangar, bids in Shipyard extensions and other construction connected with the defense program are on the boards with several thousand tons required.

New York — Structural bookings in June totaled 103,101 tons, compared with 121,367 tons in May and 111,594 tons in June, 1939, according to the American Insti-

Shape Awards Compared

	Tons
Week ended July 27 ..	45,939
Week ended July 20 ..	47,479
Week ended July 13 ..	18,795
This week, 1939 ..	23,176
Weekly average, year, 1940 ..	20,266
Weekly average, 1939 ..	22,411
Weekly average, June ..	18,059
Total to date, 1939 ..	677,693
Total to date, 1940 ..	607,974
Includes awards of 100 tons or more.	

tute of Steel Construction, New York. June shipments were 111,211 tons, compared with 112,034 in May and 130,114 in June, 1939.

Seattle—Heavy tonnages, as yet unstated, are involved in the blank contract awarded the Austin Co., for navy projects in Washington and Oregon. Awards are also pending for 350 tons for the Continental Can Co. plant at Walla Walla, Wash., 500 tons for a building at Puget Sound Navy yard, bids July 31, and 465 tons for a unit of the Bonneville project.

San Francisco—A decided improvement has taken place in the structural market and awards were the largest for any week so far this year, while pending business calls for more than 79,000 tons. Awards aggregated 22,219 tons and brought the total to date to 138,512 tons, compared with 71,975 tons for the corresponding period in 1939.

Birmingham, Ala. — While showing some improvement, shapes are hardly up to the average for other major items. Output, however, is satisfactory.

St. Louis — Little change has taken place in the structural steel market. Booking of additional small jobs, plus backlogs, have permitted fabricating yards to maintain a rate about even with the June average.

Shape Contracts Placed

12,500 tons, structural steel contracts placed to date, naval air station, Corpus Christi, Tex., divided as follows: Bethlehem Steel Co., Bethlehem, Pa., 4000 tons; Virginia Bridge Co., Roanoke, Va., 3000 tons; Ingalls Iron Works Co., Birmingham, Ala., 3000 tons; Mosher Steel Co., Houston, Tex., 2500 tons; placed by Brown & Root Inc., W. S. Bellows Construction Co., and Columbia Construction Co., Corpus Christi, joint contractors for project; reinforcing steel yet to be bought, also additional fabricated structural material, James F. Chambers, general purchasing agent for contractors.

7543 tons, transmission towers, Southern California Edison Co., Los Angeles, to Emsco Derrick & Equipment Co., Los Angeles.

5500 tons, appraiser's store and immigration station, San Francisco, to Bethlehem Steel Co., San Francisco.

3320 tons, Kettle Falls, Wash., bridge for relocation Great Northern tracks, to American Bridge Co., Pittsburgh.

2000 tons, steel curbing, department of purchases, New York, to Phoenix Bridge Co., Phoenixville, Pa.

1850 tons, buildings 106-108-110-112, Aluminum Co. of America, Los Angeles, to Minneapolis-Moline Power Implement Co., Minneapolis, Minn.

1800 tons, airplane repair dock, Patterson field, Dayton, O., for United States government, to R. C. Mahon Co., Detroit.

1450 tons, pot rooms 120-2-3, Aluminum Co. of America, Alcoa, Tenn., to Converse Bridge & Steel Co., Chattanooga, Tenn.

1400 tons, 20 radial spillway gates,

Watts Bar dam, Tennessee, for TVA, to Hunter Steel Co., Pittsburgh.

1100 tons, hangar, naval air station, Quonset Point, R. I., to Bethlehem Steel Co., Bethlehem, Pa., through joint general contractor, George A. Fuller Co. and Merritt-Chapman & Scott Corp., New York.

925 tons, extension to building No. 63, General Electric Co., Erie, Pa., to Ingalls Iron Works Co., Birmingham, Ala.

900 tons, road guard posts, various locations, for Pennsylvania turnpike commission, to Bethlehem Steel Co., Bethlehem, Pa.

850 tons, Waterman Memorial building, for University of Vermont, Burlington, Vt., to American Bridge Co., Pittsburgh.

810 tons, coal washing plant, Taylorville, Ill., to Pan-American Bridge Co., New Castle, Ind.

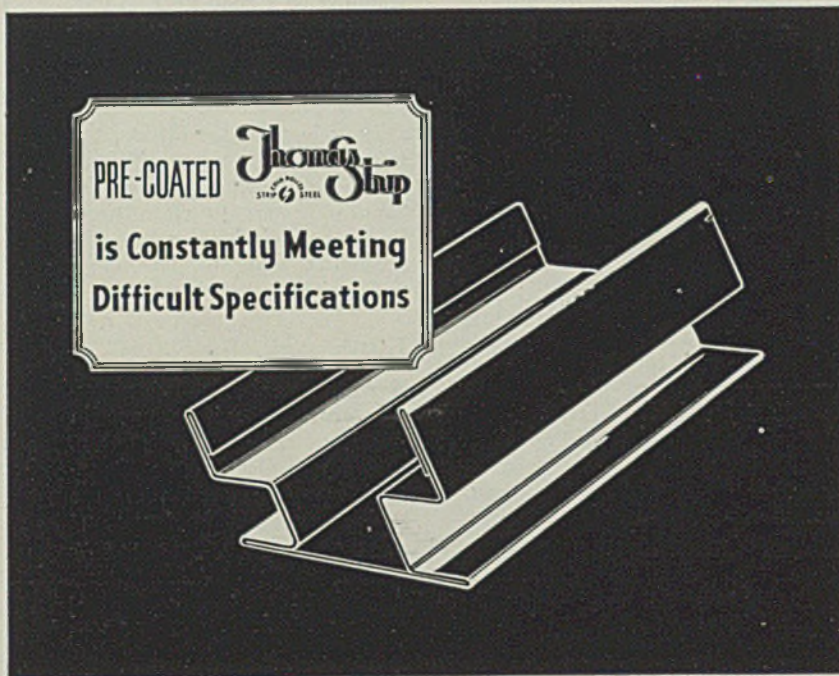
650 tons, extension, Hutchinson river parkway, New York, for Triboro bridge authority, to Bethlehem Steel Co., Bethlehem, Pa.

415 tons, remelting building No. 140, Aluminum Co. of America, Los Angeles, to Minneapolis-Moline Power Implement Co., Minneapolis, Minn.

400 tons, aeroplane landing mats, Langley Field, Va., to Reliance Steel Products Co., McKeesport, Pa.

400 tons, grade separation, contract E-1 Brooklyn, to American Bridge Co., Pittsburgh, through Ross Galvanizing Co., New York.

320 tons, state bridges FAS-206-F, Ar-



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THE THOMAS STEEL CO.
SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL
WARREN, OHIO

Behind the Scenes with STEEL

—The Market Week—

A. of M. A. C. & A.

■ Down at the Noo Yoik Woild's Fair (remember) a couple of weeks ago a whole batch of the country's most cock-eyed societies got together and formed the Amalgamation of Mad American Clubs and Associations. The meeting was sponsored by the Benevolent and Protective and Completely Universal Order of Fred Smiths of America, which boasts of an active membership of some 5000 Fred Smiths and a few honorary Smith Fredericks. The call went out to such stalwart groups as the Guild of Former Pipe Organ Pumpers, Liars Club of America, the Monroe Horse-Thief Detecting Society, Covered Wagon Baby Club, the Mothers-In-Law Association, the Non-Vice Presidents, and the National Honorary Society of Former Circus Elephant Water Toters which was represented by a Grand Fire Hydrant. The historic meeting took place at Schaefer's where free beer soon proved to be the one common denominator, but we confidently expect to hear great things from the A. of M. A. C. & A.

Rufometer

■ A new b. p. m. machine developed by Dow Chemical Co. measures and records the relative roughness of roads. It is correctly called a Rufometer but the b. p. m. is short for "bumps per mile."

Profitable Ideas

■ Since 1919, when an employee suggestion plan was begun, 300,000 suggestions have been made by General Electric workers. About 25 per cent of these have been adopted or an average of more than 10 a day for the past 20 years. A million dollars has been paid out for these suggestions, which are judged both for value and ingenuity. Recently one young fellow, just six months out of college, collected \$1200 for

proposing the use of plastic strips between the inner and outer linings of refrigerators.

Rumor Has It

■ The story is making the rounds of the nervy reporter who asked Wendell Willkie if Commonwealth & Southern wouldn't be a good stock to buy, on the assumption it might go up if Willkie gets elected. When Willkie replied that he thought Pennsylvania Railroad might be a better buy for speculation, the reporter asked why. "Well," Willkie is reported to have said, "When I start to clean those babies out of Washington, the Pennsy is going to have more traffic than it can handle!"

Illini

■ An unusual advertising program makes its appearance in this issue, up front on page 3. The Illinois Development Council is out to do a job for the Prairie State and the first effort looks good. They don't say anything about the weather out there but if it's a half-degree cooler we'll move out bag and baggage.

Getting Told

■ *Jokey*: A particularly hard-headed business man billed a customer for some \$3861.01 and being a stickler for technicalities, he raised particular h... when he received a check for only \$3861. Accordingly he wrote several burning letters to the customer and finally received a check covering the balance due of one cent. So, he takes the one-cent check to his bank, waited in line for 15 minutes but then found out he hadn't endorsed it so he stepped back and started over. At the window the teller looked it over, stamped it on the back and looked up. "Well, now buddy," he said, "How do you want this—heads or tails?"

SHRDLU

- tesla, N. Mex., to Missouri Valley Bridge & Iron Co., Leavenworth, Kans.
- 280 tons, state highway bridge, project RC-40-45 and 46, Otsego county, New York, to American Bridge Co., Pittsburgh; Madison County Construction Co., Madison, N. Y., contractor; American Steel & Wire Co., New York, awarded 52 tons of reinforcing steel.
- 275 tons, New York state highway bridge work, FARC-40-45 FAGH-40-46, Otsego county, to American Bridge Co., Pittsburgh.
- 275 tons, A. C. hangar, Anchorage, Alaska, for United States government, to Milwaukee Bridge Co., Milwaukee.
- 260 tons, transmission poles, for Philadelphia Electric Co., Philadelphia, to Ingalls Iron Works Co., Birmingham, Ala.
- 240 tons, building, Continental Can Co., Chicago, to Wendnagel & Co., Chicago.
- 240 tons, bridge No. 5866, Smithville, Minn., to American Bridge Co., Pittsburgh.
- 220 tons, highway bridge, Minturn, Colo., to Kansas City Structural Steel Co., Kansas City, Mo.
- 225 tons, addition, North American Aviation Co., Venice, Calif., to Bethlehem Steel Co., Los Angeles.
- 216 tons, state highway bridge, Mitchell county, Texas, to North Texas Iron & Steel Co., Fort Worth, Tex.; also 980 feet bridge railing.
- 200 tons, tape plant, Johnson & Johnson, New Brunswick, N. J., to American Bridge Co., Pittsburgh.
- 187 tons, state highway bridge, Kaufman county, Texas, to North Texas Iron & Steel Co., Fort Worth, Tex.; also 65 tons reinforcing steel, 960 feet bridge railing and 3638 feet bearing piling.
- 180 tons, McKean county court house, Smethport, Pa., to Ernst Iron Works Inc., Buffalo.
- 180 tons, shapes and bars, two warehouses, Westover field, Northeast air base Chicopee Falls, Mass., to Haarmann Steel Co., Holyoke, Mass., and Truscon Steel Co., South Boston, Mass.; Grande & Volpe Inc., Malden, Mass., contractor.
- 175 tons, nine bridges, New York Central, near Kingston, N. Y., to unstated fabricator.
- 170 tons, chemical products building, Sherwin-Williams Co., Chicago, to Joseph T. Ryerson & Son Inc., Chicago.
- 170 tons, state bridge RC-40-53, West Seneca, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.
- 158 tons, Fender ferry bridge, Shasta county, California, to Moore Drydock Co., Oakland, Calif.
- 155 tons, bridge, route 264-B, Franklin county, Pennsylvania, to Fort Pitt Bridge Works, Pittsburgh.
- 150 tons, gate house and labor board building, naval air base, Alameda, Calif., to Judson-Pacific Co., San Francisco.
- 140 tons, highway bridge, Colorado Springs, Colo., to Minneapolis-Moline Power Implement Co., Minneapolis, Minn.
- 140 tons, state bridge FAP-163-C (1), Roswell, N. Mex., to American Bridge Co., Pittsburgh.
- 135 tons, bridge, Erie railroad, Bellwood Park, N. J., to American Bridge Co., Pittsburgh.
- 130 tons, Garden apartments, Trenton, N. J., to Belmont Iron Works, Philadelphia.
- 125 tons, two buildings, central manufacturing district, Los Angeles, to unnamed interest.
- 125 tons, two 125-ton overhead travel-

ing cranes, Invitation 111-1, Bonneville dam, Oregon to Judson-Pacific Co., San Francisco.

115 tons, East Church street municipal bridge, Elmira, N. Y., to American Bridge Co., Pittsburgh.

115 tons, factory building, Logansport, Ind., to Hugh J. Baker Co., Indianapolis.

110 tons, bridge, Lafayette county, Wisconsin, to Midland Structural Steel Co., Cicero, Ill.

105 tons, Salvation Army building, 213 East Fifty-second street, New York, to Dreier Structural Steel Co., New York.

100 tons, sheet piling, Jacobs No. 1 draw-bridge near Stockton, Calif., to Columbia Steel Co., San Francisco.

200 tons, route marker supports, New York state.

190 tons, bridge 3670, Bridgeport, Conn., for New York, New Haven & Hartford railroad.

180 tons, highway bridge, Red Falls, Minn., bids Aug. 2.

178 tons, relocation of railroad tracks near Kettle Falls, Wash.; J. A. Terteling & Son, Boise, Idaho, general contractor; materials by reclamation bureau.

165 tons, state bridge RC-40-64, Monticello, N. Y.

150 tons, medical school, Carlisle, Pa., for U. S. government quartermasters department, bids Aug. 21.

140 tons, addition to machine shop, for

Northern Pump Co., Minneapolis.

140 tons, state bridge over Stillwater river, Covington, O.

125 tons, two-span beam bridge and I-beam bridge, Halifax, Vt.; bids Aug. 2, H. E. Sargent, commissioner of highways, Montpelier.

120 tons, extension to building, for A. M. Byers Co., Ambridge, Pa.

120 tons, addition to building and runway, for Castanea Paper Co., Lock Haven, Pa.

115 tons, sheet piling, levee work on Sacramento river, California; bids opened.

110 tons, store building, for J. J. Newberry Co., Massena, N. Y.

108 tons, three-span continuous deck

Shape Contracts Pending

3000 tons, Southeastern airport, Mobile, Ala., bids Aug. 1.

1750 tons, Woodrow Wilson high school, Queens, N. Y.

950 tons, explosives manufacturing building and storehouse, Newport, R. I., for government.

900 tons, factory, for General Electric Co., Erie, Pa.

900 tons, navy yard assembly shop, Bremerton, Wash.

700 tons, Brooklyn shafts, Battery-Brooklyn tunnel; bids Aug. 6.

570 tons, state bridge RC-40-66, Laphams Mills, N. Y.

540 tons, viaduct, Mercer county, Pennsylvania; bids to state highway department, Harrisburg, Pa., Aug. 2.

500 tons, shop building Puget Sound navy yard; bids July 31.

450 tons, subway, Nyssa, Oreg., for state.

440 tons, state bridge, contract 1997, Seymour, Ind.

420 tons, alterations to McCreery building, for Pittsburgh Business Properties, Pittsburgh.

370 tons, also 225 tons of reinforcing bars, for Coca Cola Co. building, Louisville, Ky; bids in on general contract.

363 tons, grade separation, Michigan Central railroad, Dearborn, Mich., for Wayne county.

340 tons, state bridge, contract 1993, Rolling Prairie, Ind.

330 tons, extension to power station, for Montaup Electric Co., Somerset, Mass.

320 tons, factory and office building, for Johnson Metal Products Co., Erie, Pa.

300 tons, state highway bridge, Centerville Station, Ill., bids in.

280 tons, office building, for Employers' Mutual Insurance Co., Wausau, Wis.

270 tons, state bridge 5886, Duluth, Minn.

265 tons, crest gates and bulkhead, Loyalhanna dam, Saltsburg, Pa., for army engineers.

220 tons, state bridge FAGH-119, Milbank, S. Dak.

220 tons, state bridge, contract 1996, Evansville, Ind.

205 tons, bascule bridge, Dewey Beach, Sussex county, Del., George E. Schockley, Rehoboth Beach, Del., low on general contract.

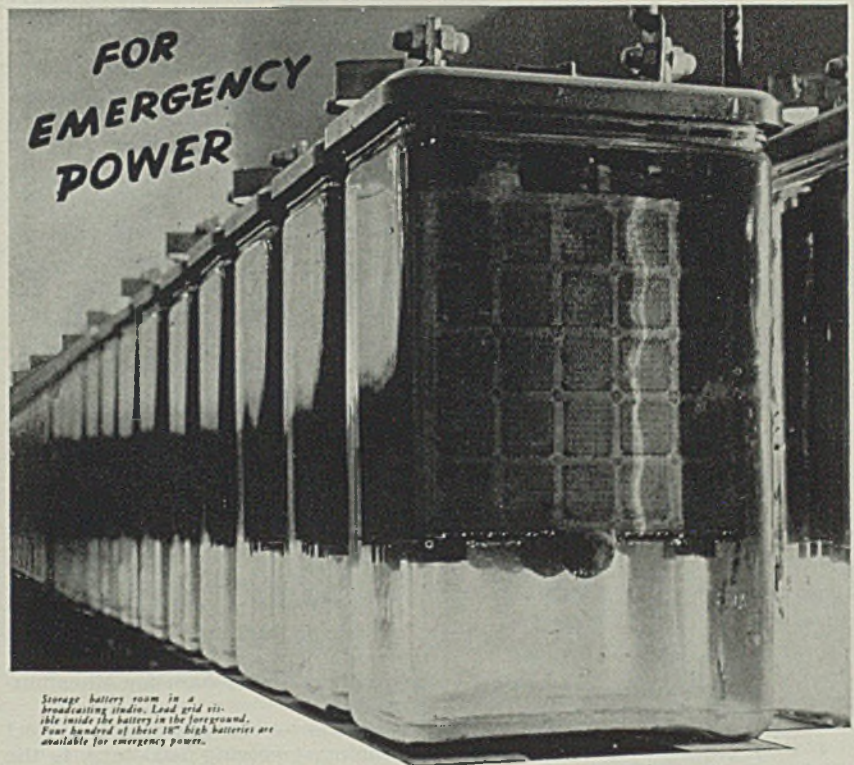
200 tons, building, for New England Telephone & Telegraph Co., Quincy, Mass.

200 tons, repairs to bridges, Joliet, Ill., for state.

200 tons, route marker supports, various locations, New York, for state.

200 tons, state bridge 5921, Red Lake Falls, Minn.

200 tons, scrap building, navy yard, Brooklyn.



Storage battery room in a broadcasting studio. Lead grid visible inside the battery in the foreground. Four hundred of these 18" high batteries are available for emergency power.

LEAD Stand-By BATTERIES

In major emergencies, when floods, hurricanes or earthquakes disrupt normal power, lead-acid batteries are the dependable source of reserve power.

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Lead storage batteries perform numerous duties less dramatic, but, indeed, no less neces-

sary. Their function in an automobile is well known. They also furnish power for operating submarines, industrial trucks, mine locomotives, drawbridges, etc. Today, countless farms are electrically lighted by them.

In the manufacture of lead storage batteries, to whose total weight lead contributes as much as 65%, 198,000 tons of lead were used last year. A considerable part of this tonnage came from the mines of this Company—the country's largest producer of pig lead.

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TURNINGS ARE MORE EXPENSIVE THAN THE STEEL FROM WHICH THEY COME!

... not in scrap value, of course, but in their cost of manufacture ... But, you say, we don't intend to manufacture turnings! Yet, you do if you attempt to economize by making ring dies, bushings, forming rolls, etc., from solid steel.

With a complete stock of BISCO alloy and tool steel tubing on hand—and with both local and distant deliveries so modernly dependable, it becomes more economical to select your exact requirements from the BISSETT line of tubing and also secure the exact size needed in both inside and outside diameters nearest your individual requirements ... In addition to BISCO Non-shrink, oil-hardening tool steel tubing, we furnish from stock stainless steels, alloy steels, etc. A copy of our stock list will be mailed promptly upon request.

THE BISSETT STEEL CO.

900 EAST 67th STREET, CLEVELAND, OHIO

plate steel girder bridge, Westminster, Vt., 218.61 feet overall; William H. Morse, Bennington, Vt., contractor.
Unstated, plant for R. N. Chipman Chemical Co., Vancouver, Wash.; bids soon.
Unstated, Bradford crossing, Bonneville project; Fritz Ziebarth, Vancouver, Wash., low.
Unstated, navy air base project, Tongue Point, Oreg.; H. J. Settergren, Portland, general contractor.
Unstated, plant for Pacific Carbide & Alloys Co., Portland, Oreg.; L. H. Hoffman, Portland, general contractor.

Reinforcing

Reinforcing Bar Prices, Page 77

Pittsburgh — Prices are slightly weaker in a few scattered sections of the Mid-west, although these are exceptions. Practically all tonnage is being placed at 2.15c. Construction volume is good, and awards and inquiries are heavy. Some mills are experiencing delivery problems, and backlogs are fairly substantial among most producers.

Chicago — Largest pending project, the substructure of Northwestern university technical school building, Evanston, Ill., has been booked by Joseph T. Ryerson & Son Inc., Chicago, 1900 tons. Demand continues heavy.

Boston — Small-lot buying of reinforcing steel is more active. Bridge requirements are small, as are highway needs. Housing projects, bid or pending in the New England district, approximate 1000 tons. Industrial expansions and hangars also account for fair tonnage, notably the latter.

Philadelphia — Reinforcing bars are more active and prices are firmer, due to lack of rolling facilities brought about by the demand for carbon and alloy bars for other purposes.

Seattle — Largest local project pending, involving 7000 tons, is the foundation, units 7 to 10, for the Bonneville power house, bids called Aug. 20 by Maj. R. H. Elliott, district engineer, Bonneville, Wash. Additional awards for various reclama-

tion jobs in Oregon and Washington have been placed, some of the tonnage to be rolled at the Seattle plant of Bethlehem Steel Co. Mills are operating only about 50 per cent of capacity but report an increase in small awards of 50 tons or less each.

San Francisco — A large volume, totaling 8475 tons, of reinforcing bars was placed during the week and brought the aggregate for the year to 98,053 tons, compared with 93,726 tons for the same period last year. Bethlehem Steel Co. took 4500 tons for the appraiser's store, San Francisco, 2000 tons for four storehouses for the naval air base, Alameda, Calif., 220 tons for the bureau of reclamation for delivery at Odair, Wash., and 153 tons for delivery at Zilla, Wash.

Reinforcing Steel Awards

4500 tons, appraiser's store and immigration station, San Francisco, to Bethlehem Steel Co., San Francisco.

2000 tons, four storehouses, naval supply depot, Oakland, Calif., to Bethlehem Steel Co., San Francisco.

1900 tons, superstructure, technological building, Northwestern university, Evanston, Ill., to Joseph T. Ryerson & Son Inc., Chicago.

911 tons, 44 standard powder magazines at Savanna, Ill., to Truscon Steel Co., Youngstown, O., through Montbatton Construction Co., Muskogee, Okla., general contractor.

637 tons, housing project, Springfield, Ill., to Missouri Rolling Mill Corp., St. Louis, through Selme Co., Bloomington, Ill., general contractor.

540 tons, housing project, Stamford, Conn., to Truscon Steel Co., Youngstown, O., through John H. Elsele Co., New York.

400 tons, new administration building, University of California, Berkeley, Calif., to Soule Steel Co., San Francisco.

390 tons, Mannheim road bridge, Orland Park, La Grange, Ill., to Joseph T. Ryerson & Son Inc., Chicago.

380 tons, five hangars, northeastern air base, Chicopee Falls, Mass., to Truscon Steel Co., Youngstown, O., through Tuller Construction Co., contractor.

350 tons, factory building, Continental Can Co., Chicago, to Inland Steel Co., Chicago.

340 tons, Harbor Terrace housing, Fall River, Mass., to Concrete Steel Co., New York, through M. Spinelli & Sons, contractors.

292 tons, schedule 4067, Panama canal to Joseph T. Ryerson & Son Inc., Chicago.

275 tons, Waterman Memorial building, University of Vermont, Burlington, to Truscon Steel Co., South Boston, Mass.

246 tons, highway work for Texas state highway department to North Texas Iron & Steel Co., Fort Worth, Tex.

235 tons, gatehouse and labor board building, naval air base, Alameda, Calif., to Cero Steel Products Corp., San Francisco.

220 tons, bureau of reclamation, invitation B-38,319-A, Odair, Wash., to Bethlehem Steel Co. Seattle.

200 tons, Panama canal, schedule 4164, bids July 17, to Taylor Davis Inc., Philadelphia.

Concrete Bars Compared

	Tons
Week ended July 27	15,420
Week ended July 20	8,402
Week ended July 13	8,585
This week, 1939	11,475
Weekly average, year, 1940 ..	8,419
Weekly average, 1939	9,197
Weekly average, June	10,377
Total to date, 1939	304,602
Total to date, 1940	252,569

Includes awards of 100 tons or more.

153 tons, bureau of reclamation, invitation A-33,952-A, Zilla, Wash., to Bethlehem Steel Co. Seattle.

150 tons, Sears, Roebuck & Co. building, Chicago, to Ceco Steel Products Corp., Chicago, through Enjay Construction Co., contractor.

150 tons, airplane repair dock, Patterson Field, Osborn, O., to Truscon Steel Co., Youngstown, O., through Silken Bros., contractors.

145 tons, operator's building, naval air base, Alameda, Calif., to W. S. Wetenhall Co., San Francisco.

140 tons, Standard Grocery Co. building, Indianapolis, to Truscon Steel Co., Youngstown, O.

130 tons, contract H-9 Triborough bridge authority, Bronx, N. Y., to American Bridge Co., Pittsburgh, through J. Rusclano & Son, New York.

120 tons, Mt. Vernon memorial highway bridge, Arlington county, Virginia, to Bethlehem Steel Co., Bethlehem, Pa., through Diamond Construction Co., contractor.

110 tons, plastic moulding plant, Monsanto Chemical Co., Springfield, Mass., to Truscon Steel Co., South Boston, Mass.; J. G. Roy & Son Co., Springfield, contractor.

106 tons, state highway bridge, Hamilton county, Texas, to North Texas Iron & Steel Co., Fort Worth, Tex.; also two tons shapes, two tons cast steel plates and 402 feet bridge railing.

100 tons, parking ramp, Minneapolis, Minn., to Truscon Steel Co., Youngstown, O.

100 tons, engine test building and spray pool, Patterson Field, Osborn, O., to Truscon Steel Co., Youngstown, O., through Charles H. Shook, contractor.

100 tons, Eugene G. Grace hall, Lehigh University, Bethlehem, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, highway project, FAS-SH-40-1, Washington county, New York, to Republic Steel Corp., through Albany Steel & Iron Supply Co., Albany, N. Y.

Reinforcing Steel Pending

7000 tons, foundations for Bonneville power house; bids to United States engineer, Bonneville, Oreg., Aug. 20.

4282 tons, including 3000 tons steel sheet piling, concrete flood walls, earth dikes and appurtenant works, Connecticut river, Hartford, Conn.; A. I. Savin Construction Co., East Hartford, Conn., low at \$1,618,467; bids July 23 to United States engineer, Providence, R. I.

2300 tons, Kingsboro housing project, New York; bids August 1.

1525 tons, bars and sheet piling, East River drive, Thirtieth to Thirty-sixth street, New York; Allen N. Sapponer & Son Inc., New York, low.

1000 tons, extension to Shipway No. 1, Brooklyn navy yard, New York; J. Rich Steers, contractor.

950 tons, for United States Veterans' hospital near Marion, Ill.; Swenson Construction Co., Kansas City, Mo., low on general contract.

780 tons, Felix Fuld housing, Newark, N. J.; Fatzler Co. Inc., Newark, N. J., low.

628 tons, Panama, schedule 4202, bids Aug. 1, Washington.

611 tons, bureau of reclamation, invitation 24,749-A, Fortuna, Ariz.; bids opened.

395 tons, invitation A-10528, treasury department, Los Angeles; bids opened.

350 tons, warehouse, Bekins Van & Storage Co., Santa Monica, Calif.; bids

opened.

300 tons, Du Pont office building addition, Wilmington, Del.; Turner Construction Co., contractor.

282 tons, relocation of railroad tracks near Kettle Falls, Wash.; J. A. Terteling & Son, Boise, Idaho, general contractor; materials by reclamation bureau.

250 tons, warehouse, Vernon, Calif.; bids opened.

210 tons, subway station, S-10-C, Chicago; bids August 8.

200 tons, county court house, Appleton, Wis.; W. C. Smith, general contractor.

200 tons, Coca Cola Bottling Co., plant, Louisville, Ky.; bids taken July 23.

200 tons, dormitories, University of Illinois, Champaign, Ill.; J. P. Cullen & Sons, contractors.

155 tons, highway and bridge, Bristol Hills, N. H.; Littleton Construction Co., Littleton, N. H., contractor.

152 tons bureau of reclamation, invitation A-38,408-A, Kettle Falls, Wash.; bids opened.

140 tons, Rhode Island hospital buildings, Providence, R. I.; bids taken July 23.

125 tons, viaduct, Mercer county, Pennsylvania; bids to state highway department, Harrisburg, Pa., Aug. 2.

100 tons, Bakelite Corp. building, Bound Brook, N. J.; bids taken July 22.

Unstated, state railroad undercrossing, Nyssa, Oreg.; C. A. Dunn, Klamath Falls, Oreg., low at \$206,950.

Pig Iron

Pig Iron Prices, Page 78

Pittsburgh—Production continues to gain and consumption is keeping pace. Inventories remain on the same level as last week, with shipments a little better. Forty of 50 blast furnaces are active.

Chicago—Rate of shipping is vir-

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A maitre d' who is a past master at assuring the success of convention banquets... sales dinners... private parties.



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a miniature city of
shops, in the Hotel.

Rooms from \$3



HOTEL CLEVELAND

Cleveland

—The Market Week—

tually unchanged and the month as a whole is expected to end with tonnage moved equal to that of June. This is due to the consistent level of foundry and nonintegrated steel mill operations. By-product coke releases continue to reflect the maintained level of foundry melt and show no change.

Boston—Pig iron buying is slow, but shipments are slightly heavier as foundry melt tends upward, stove plants sharing the improvements. Some foundries are booking castings indirectly involved in defense orders and those producing for the machine tool shops continue to take substantial orders. Mystic furnace, Everett, Mass., is now in blast.

New York—Pig iron consumption this month is expected to be a shade higher. New orders are relatively light, due primarily to heavy spring contracting, when most consumers covered for third quarter and in some cases beyond. The Troy, N. Y., stack, after having shut down for several months, has been blown in by Republic Steel Corp. It is understood it will operate on Chateaugay ores for production of low phosphorus iron, much of which will be shipped to England.

Philadelphia—July shipments for some sellers in this area will be the largest for any month this year. Most foundries are active, with current rate of melt estimated at 75 per cent. Movement abroad is being accelerated.

Industrial research department, University of Pennsylvania, reports gray iron foundries in this district had unfilled orders for 1359 tons of castings July 1, a gain of 63.3 per cent over May 1 and 63.2 per cent over a year ago.

Buffalo—In face of slight seasonal falling off in melting, producers report shipments for July show no marked decrease from June. Many foundries are still working at near-capacity levels, but general jobbing plants have curtailed production.

Cincinnati—Pig iron shipments both Northern and Southern, will be slightly under the June volume. Buying is dull. Previous coverage was, in some cases, heavier than previously reported and will carry some foundries into next year.

St. Louis—Shipments of pig iron have tapered but the movement for the month will probably exceed the large total of June by a slight margin. Sellers report purchasing at the moment is virtually absent and no change is looked for during the present quarter, owing to full previous coverage. A few small lots of fill-in and special analysis iron comprise current transactions.

Birmingham, Ala.—Pig iron out-

put is at capacity, with all furnaces active. Merchant melters report some increase in shipping instructions.

Toronto, Ont.—Pig iron sales are increasing in number and tonnage, with deliveries over 5000 tons weekly. Melters show more concern with regard to inventories and many are taking larger spot tonnage to build stocks and also are placing contracts for delivery to the end of September.

Scrap

Status of the new export licensing order on steel, iron and nonferrous scrap will be found on page 17.

Scrap Prices, Page 80

New York—Uncertainty as to the effect of licensing exports of scrap and the severity of the regulations to apply has an unsettling effect but it is generally felt that stringent curtailment of foreign shipments will have a tendency to weaken domestic prices. A substantial part of a 300,000-ton order for Japan remains to be shipped and from the East cargo space for Japanese shipments is difficult to obtain. Most current loadings are for British account although one ship is loading for Japan and one ship is due in New York. Domestic buying by steelworks and foundries is light with stocks of consumers fairly large.

Pittsburgh—Continued market inactivity has resulted in a lower price for No. 1 heavy melting steel. This grade is now quoted \$18.50 to \$19, and other open-hearth grades are off in sympathy. Buying has been insignificant here over the past week. Chief item of interest was the embargo on export scrap, but the opinion of local brokers is that it will have little effect on local markets, with the possible exception of a better flow of scrap from eastern points.

Cleveland—Continued quiet marks the steel and iron scrap market, with steelmaking grades about 50 cents lower, in keeping with declines at other centers. Considerable material is arriving by lake for local melters.

Boston—Domestic scrap trade is dull with prices for the most part unchanged. Machine shop turnings and breakable cast for domestic shipment are slightly easier. Cast grades are slower and consumers of heavy melting steel scrap in this district are buying little material.

Chicago—No mill purchases were reported last week and No. 1 heavy melting steel remained \$17 to \$17.50. Dealer-broker trading was reported

from one end of that range to the other, though generally at \$17.25. Indications of weakness earlier in the week did not develop sufficiently to bring any significant change in prices. The market currently is quiet and with trading at a minimum.

Philadelphia—Iron and steel scrap prices are little or no lower and a slightly firmer undertone is indicated. Recent purchases have been comparatively light but it is understood two or three mills would be interested in making additional commitments at around current levels.

Buffalo—With two leading consumers lowering their bid prices, the range on No. 1 heavy melting steel and allied steelmaking grades has been pared 50 cents. This makes No. 1 heavy melting steel \$18 to \$18.50. Consumers are bidding the inside figure while some dealers express a willingness to sell the outside price. Increased offerings continue to exert pressure on the market. A consignment of approximately 5000 tons is piled up at the state barge canal terminal from midstate sources for Cleveland consumers.

Detroit—Absence of some dealers and brokers, at the summer meeting of the scrap institute in Buffalo, plus a blistering heat wave, have reacted to prolong the lassitude enveloping the local market.

Dealers and brokers still are inclined to pay more than mills are willing to give for tonnages, indicating sentiment for higher prices this fall.

Cincinnati—Iron and steel scrap prices are down 50 cents on most items, and many dealers consider the decline at or near an end. The undertone is stronger and recent distress material has been absorbed. Mills are accepting shipments in fair volume contracts.

St. Louis—Scrap iron and steel prices are irregular, some grades being advanced, while others were lowered. Most revisions, however, were downward, and trading is light. The only sale reported was of small tonnage of heavy melting steel and cast scrap to an east side mill.

Birmingham, Ala.—The scrap market, largely because of the fact that Republic is temporarily out of the market, together with quite a tonnage of miscellaneous items that have appeared recently, is perceptibly weaker. Prices, while unchanged, tend downward. Republic probably will not buy again before Aug. 1 or later.

Toronto, Ont.—While offerings of iron and steel scrap to dealers have declined, there is no shortage. Demand continues heavy both for spot and future delivery. A large Toronto consumer purchased about 5000 tons of cast scrap in Winni-

peg. This is being shipped to Toronto under special railroad freight rates.

San Francisco—Somewhat lower prices for scrap are expected during the coming month but quotations continue to hold, unchanged at \$13.50 to \$14 a net ton, f.o.b. metropolitan areas of San Francisco for No. 1 heavy melting steel with No. 2 \$12.50 to \$13 a net ton.

Warehouse

Warehouse Prices, Page 79

Chicago—Market is without significant developments, movement continuing at a consistent level and tonnage booked this month on a par with that of a like period in June.

Philadelphia—Warehouse business this month is showing a slight improvement over June. Jobbers are watching stock positions closely. Prices are unchanged.

Cincinnati—Although some jobbers report seasonal tapering, warehouse volume will likely be near June levels, principally on the well-maintained, heavy industrial demand.

Buffalo—July sales may be the best for the year thus far, the bet-

terment spread over practically the entire list. Galvanized sheets are an exception to the steady tone, despite a low price of 4.00c, brought about by highly competitive conditions.

St. Louis—Sales of steel from store, bolstered chiefly by miscellaneous buyers, are holding steady with the favorable rate earlier in the month. The general manufacturing demand is holding up better than seasonally, and outlet through the building industry broad.

Tin Plate

Tin Plate Prices, Page 76

Pittsburgh—Operations are off slightly this week, estimated at 73 per cent of capacity, as stocks moved upward both at mills and in the hands of consumers. This is a temporary situation and is expected to reverse itself shortly. Export demand is still heavy, but apparently has reached peak level, at least for the present.

Coke Oven By-Products

Coke By-Product Prices, Page 77

New York — Except household

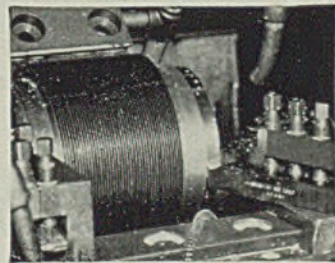
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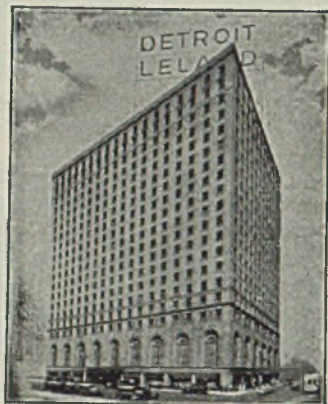
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needs for naphthalene, demand for coke oven by-products continues heavy, consumers taking out full contract commitments with spot buying limited by available supplies, although production is substantial. Makers of explosives are taking heavy shipments of toluol. While consumption of distillates by the lacquer trade is off slightly, consumer withdrawals are maintained. For plastics, phenol shipments are steady and industrial buying of naphthalene holds. The fertilizer trade is releasing heavily against contracts.



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CASS AT BAGLEY AVE.
GARAGE IN CONNECTION

Steel in Europe

Foreign Steel Prices, Page 79

London — (By Cable) — Hematite pig iron in Great Britain is becoming scarce. All steelworks are fully occupied for a minimum of six months. Shipyards are operating at full capacity. Slightly more licenses are being granted for export of finished steel. Tin plate export demand is quiet. The future iron ore situation has not been completely secured but immediate requirements are sufficiently covered.

Iron Ore

Iron Ore Prices, Page 80

New York—Metals Reserves Co. has closed on 68,000 tons of manganese ore, bringing total purchases of this strategic material for government account over recent months to 148,000 tons. Latest purchase is of South African and Indian ores, principally the latter. Price not announced but believed in some quarters to be about 60 cents per unit before duty.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 77

Bolt, nut and rivet specifications are fairly active and will be stimulated by future expansion in automotive and building construction operations, as well as by railroad needs. Export inquiry is well ahead of actual buying, as is usually the case, but orders are well sustained compared with a month ago. Industrial building, especially construction in connection with defense work, is expected to have a marked influence on bolt, nut and rivet requirements.

Semifinished Steel

Semifinished Prices, Page 77

Pittsburgh—Domestic buying has been relatively light, with export markets continuing quite active. Heaviest demand is apparently in wire rods, although all semifinished grades are moving at a rapid rate. Releases by local nonintegrated mills were slightly heavier than last week.

Ferroalloys

Ferroalloy Prices, Page 78

New York—Ferromanganese shipments are lagging behind those a month ago, when there was considerable anticipatory buying in view of the \$20 increase scheduled to become effective July 1 on con-

tracts. However, consumption maintains a high rate and it would not prove surprising if August shipments expanded. The current market is \$120, duty paid, Atlantic and Gulf ports.

Much the same general situation prevails in spiegeleisen, which is holding at \$36, Palmerton, Pa., for the 19 to 21 per cent grade, and \$49.50 for the 26 to 28 per cent grade.

Consumption of alloys generally is good.

Tool Engineers Report Shortage of Workers

■ Shortage of skilled tool and die workers, designers and tool engineers is revealed in a survey by the American Society of Tool Engineers. Thirty-four per cent of industrial organizations replying to the society's questionnaires are inadequately staffed with tool engineers for even present needs, according to Ford R. Lamb, executive secretary. Expansions to handle armament orders—and 60 to 70 per cent of those replying have plans for expansions—will accentuate the shortage.

Additional tool and die workers are needed by 68 per cent of the companies queried, while 67 per cent are searching for really skilled mechanics.

More than three-fourths of the companies planning expansions will require additional skilled men beyond present needs.

Mr. Lamb estimated from the results of the society's questionnaires that the projected expansions will require around 60,000 to 70,000 tool engineers, and about 500,000 skilled mechanics. On the West coast alone, he said, the aircraft industry will need 40,000 additional workers in the next four to six months.

"In this connection," Mr. Lamb added, "I believe it is high time that a distinction be made as to 'skilled' mechanics and other types of production labor. There is too much popular confusion between 'machine operators' who are only semiskilled, and the really skilled workers such as we are talking about. . . .

"The government training program now being instituted will help some, of course, but at best it can produce only machine operators—and relatively limited groups of these. . . . Equipment at most vocational schools is so badly antiquated that the men are learning only the rudiments of machine tending. . . . Antiquated lathes that will cut metal at around 50 to 75 feet a minute may be all right to teach a man what a lathe looks like, but put him on a modern production machine with modern tooling

from which the chips fly at rates up to 400 feet a minute and about all you will get out of him is a look of amazement."

To combat the skilled labor shortage the society is instituting a labor training program. Chapters are co-operating with educational institutions by laying out courses and assisting in actual instruction. In a letter to William S. Knudsen, national defense commissioner in charge of production, Mr. Lamb detailed the program and offered the society's co-operation in the armament program.

Investors' U. S. Steel Corp. Holdings Increase

United States Steel Corp., New York, had 8,703,252 common and 3,602,811 preferred shares outstanding June 30, according to a report released last week.

Investors' common stockholdings June 30 totaled 6,303,388 shares or 72.43 per cent of the total, compared to 6,239,061 or 71.69 per cent March 31. Brokers held the other 2,399,864 common shares outstanding, compared to 2,464,191 held by them March 31.

Outstanding preferred stock held by brokers June 30 totaled 425,795 shares, or 11.82 per cent of the total.

At the end of the previous quarter, March 31, brokers held 423,641 shares, equal to 11.76 per cent of the total. Investors' holdings on the prior date aggregated 3,177,016 shares, or 88.18 per cent of the outstanding issue. Their holdings March 31 totaled 3,179,170 shares.

Foreign holdings of Steel common declined from 717,272 to 503,195; latter was 5.78 per cent of the issue. Preferred shares owned abroad also decreased, from 74,152 to 72,614 or 2.02 per cent.

Nonferrous Metals

New York—Recovery in copper prices and a steady advance in Straits tin prices featured nonferrous metal market developments last week. Otherwise they were rather quiet affairs.

Copper—A sudden improvement in demand on Thursday resulted in a steady price advance on the outside market with custom smelters booking business up to 10.75c, delivered Connecticut valley. Mine producers maintained firm price views on the basis of 11.50c, Connecticut valley. Total sales for the week crossed the 10,000-ton mark for the first time since the week ended June 29. Sentiment was bolstered by the report showing an increase of 2757 tons in con-

Nonferrous Metal Prices

	Copper			Straits Tin		Lead	Lead	Zinc	Alumi- num	Anti- mony	Nickel
	Electro, del. Conn.	Lake, del. Midwest	Casting, refinery	Spot	New York Futures	N. Y.	East St. L.	St. L.	99%	Spot, N.Y.	Cath- odes
July											
20	*10.75	11.50	10.50	51.00	50.00	5.00	4.85	6.25	19.00	14.00	35.00
22	*10.62 ½	11.50	10.50	51.00	50.05	5.00	4.85	6.25	19.00	14.00	35.00
23	*10.50	11.50	10.25	51.25	50.37 ½	5.00	4.85	6.25	19.00	14.00	35.00
24	*10.50	11.50	10.25	51.37 ½	50.50	5.00	4.85	6.25	19.00	14.00	35.00
25	*10.50	11.50	10.25	51.50	50.62 ½	5.00	4.85	6.25	19.00	14.00	35.00
26	*10.62 ½	11.50	10.50	51.62 ½	50.50	5.00	4.85	6.25	19.00	14.00	35.00

*Based on sales by custom smelters; mine producers unchanged at 11.50c.

MILL PRODUCTS

F.o.b. mill base, cents per lb., except as specified. Copper brass products based on 11.50c Conn. copper

Sheets	
Yellow brass (high)	18.56
Copper, hot rolled	20.12
Lead, cut to jobbers	8.25
Zinc, 100 lb. base	11.50

Tubes	
High yellow brass	21.31
Seamless copper	20.62

Rods	
High yellow brass	13.55
Copper, hot rolled	16.62

Anodes	
Copper, untrimmed	17.37

Wire	
Yellow brass (high)	18.81

OLD METALS

Nom. Dealers' Buying Prices	
No. 1 Composition Red Brass	
New York	6.62 ½-6.87 ½
Cleveland	7.25-7.50
Chicago	6.75-7.00
St. Louis	7.75

Heavy Copper and Wire	
New York, No. 1	8.25-8.50
Cleveland, No. 1	8.25-8.50
Chicago, No. 1	8.00-8.25

St. Louis	8.75
-----------	------

Composition Brass Turnings	
New York	6.25-6.50

Light Copper	
New York	6.25-6.50

Cleveland	6.25-6.50
Chicago	6.00-6.25
St. Louis	6.75

Light Brass	
Cleveland	3.75-4.00

St. Louis	4.25
Chicago	4.12 ½-4.37 ½

Lead	
New York	4.50-4.60

Cleveland	3.90-4.15
Chicago	3.90-4.10
St. Louis	4.00-4.25

Zinc	
New York	3.50-3.75

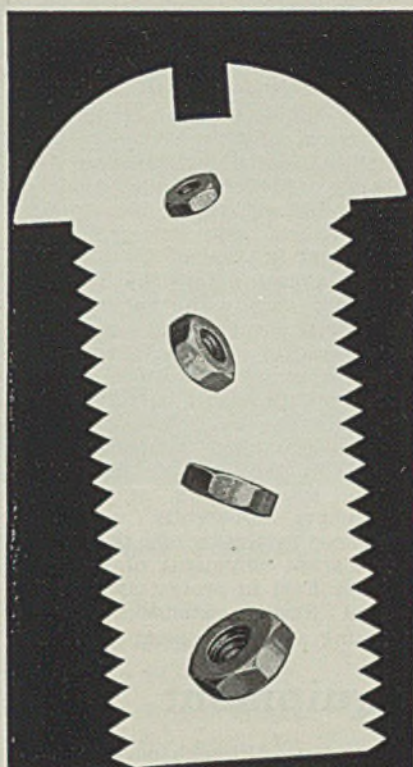
Cleveland	3.00-3.25
St. Louis	3.25-3.50

Aluminum	
Misc., cast, Cleveland	8.00

Borings, Cleveland	6.50
Clips, soft, Cleveland	14.00
Misc. cast, St. Louis	7.75-8.00

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads	11.50
Standard No. 12 aluminum	14.25-14.75



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sumption of copper by fabricators during June to a total of 70,237 tons, a new high since January.

Lead—Refiners shipped 49,904 tons to domestic consumers in June, an increase of 6 per cent over May, and have sold 61,000 tons for July delivery. Moderate new business and continued threat of foreign lead imports held prices firm at 4.85c, East St. Louis.

Zinc—Consumption has resumed an active pace with the estimated galvanized sheet output rate above 70 per cent of capacity. Fresh buying in the prime western market was light, however, at 6.25c, East St. Louis.

Tin—Fractional advances were posted in the market here with Straits spot closing at 51.62½c. Consumers apparently were not concerned by the threats that Japan will disrupt shipments of tin from the Far East in protest against the United States extension of the licensing system to scrap metals.

Equipment

Boston—Although operating extra shifts at capacity New England machine building shops have made little progress in reducing heavy backlogs and deliveries on some tools extend well into next year. There is no decline in inquiries and purchases continue heavy. Shipyard shop expansions take large machinery orders, some of which are being placed. Crane requirements are also heavy. Government shops have extensive lists up for estimates for delivery as soon as

possible while bids close Aug. 2 on 11 turret lathes for Portsmouth, N. H., 41 light duty engine lathes for various navy yards, and Aug. 6 on seven horizontal universal milling machines for the Boston yard shops.

Seattle—Volume of sales is above normal for mid-summer, interest spurred by defense projects. United States engineer, Portland, will receive bids Aug. 2 for a 10-ton traveling crane, and July 29 for transformers, bids being in for pit pumps. Vancouver, Wash., has called bids Aug. 5 for a deep well turbine, Denver will receive figures July 31 for lightning arresters and take-off structures for Coulee power plant, spec. 1389-D. Bonneville project received nine identical bids for transformer cars for five substations, and has called tenders Aug. 12, spec. 1215, for construction of control and condensery building at Salem, Oreg. Denver received nine identical bids, \$50,692, for furnishing 23 transformers for drum gate pier plates and seats, Coulee dam. Washington state will open bids Aug. 9 for furnishing boiler and coal burning equipment for Buckley custodial school. City Electric & Fixture Co., Tacoma, is low to Puget Sound navy yard at \$69,685 for fire protection system at Keyport torpedo station. Tacoma has invited bids Aug. 5 for furnishing 16 tons steel reinforced aluminum cable.

Lamneck Products Inc. has moved its offices from 416-436 Dublin avenue, Columbus, O., to Middletown, O.

Construction and Enterprise

Ohio

AKRON, O.—American Scrap Iron & Metal Co. has been incorporated by Richard T. McCullough, attorney, 1117 Second National building. Incorporators are Harry Trotter, J. B. Waite and John F. Beese, 65 Atlas street.

CLEVELAND—Interstate Metal Co., William B. Cohen, president, Rahway, N. J., has leased five-acre tract with buildings at 4832 Ridge road and will remodel for operation of smelting works. Additional building may be put up later as business warrants.

CLEVELAND—Ohio Tool Co., 3160 West 106th street, L. E. Butzman in charge, will let contract soon for addition of 3000 square feet for additional manufacturing and office use.

CLEVELAND—Webber Gage Co., 2519 Vestry avenue, manufacturer of precision gages, will move its operations soon to 2607 Vestry avenue, into larger quarters.

CLEVELAND—Ferro Enamel Corp., 4150 East Fifty-sixth street, is building an addition 54 x 72 feet. L. F. Selferd is construction superintendent.

CLEVELAND—Valve Service & Mfg. Inc., 1824 Columbus road, has filed incorporation papers, through L. F. Low, attorney, 1000 N.B.C. building, Cleveland.

attorney, 1000 N.B.C. building, Cleveland.

KENT, O.—C. L. Gougler Machine Co., 789 Stow street, will build further addition to its plating shop, 22 x 35 feet.

LAGRANGE, O.—Village will vote August 6 on \$53,000 bond issue for waterworks plant, including 100,000-gallon steel tank. P. W. Elwell, 5005 Euclid avenue, Cleveland, is engineer.

MANSFIELD, O.—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., will build \$560,000 warehouse in East Fourth street, two stories, 220 x 320 feet. Albert Kahn Inc., New Center building, Detroit, is architect. J. A. Schultz is Westinghouse purchasing agent.

BERLIN, O.—Village, H. V. Zahm, village manager, plans enlarging municipal electric plant to meet increased demand, at cost of about \$70,000. Village council has included cost in budget.

TIFFIN, O.—Tiffin Gray Iron & Semi-steel Co., Andrew Heilman, president, has bought a site and will equip a foundry, starting operations about Sept. 1.

WILMINGTON, O.—United Central Oil & Gas Co., Dallas, Tex., has leased 5000 acres near here and will drill test well for oil and gas north of Wilmington. C. Garver, Dallas, Tex., is vice president.

Connecticut

GROTON, CONN.—Electric Boat Co. will build a submarine manufacturing plant addition costing over \$40,000.

HARTFORD, CONN.—City, through T. F. Foley, WPA agent, will build airport facilities at Brainerd field, including runway, hangar, machine shops etc., costing about \$1,500,000. C. Ross, 550 Main street, is city engineer.

NEW HAVEN, CONN.—Industrial Finishing Co., 61 Hamilton street, will build a one-story factory 60 x 200 feet on Haig street, Hamden, a suburb. L. F. Caproni, 1221 Chapel street, is engineer.

NORWALK, CONN.—Ericsson Screw Machine Products Co. Inc., 25 Lafayette street, Brooklyn, N. Y., will build a brick and steel plant on the Post road here, costing \$70,000.

Maine

AUGUSTA, ME.—Quartermaster general, Washington, plans construction of airports at Augusta, Biddeford, Brunswick, Caribou, Sanford, Millinocket, and Princeton, Maine, costing \$300,000 to \$500,000 each.

Massachusetts

ATHOL, MASS.—L. S. Starrett Co., F. A. Ball, 121 Crescent street, in charge, has given general contract to MacDonald & Belbin, 88 Broad street, Boston, for a one-story top addition 55 x 60 feet to building 14, one-story grinding department and three-story 44 x 65-foot top addition to building 13, cost over \$40,000. (Noted July 22.)

CANTON, MASS.—Arthur L. Nelson, 31 St. James avenue, Boston, engineer, is taking bids on steam generating equipment and auxiliaries for the textile machinery manufacturing plant of Draper Bros. Co., Draper Lane, costing about \$50,000.

LEICESTER, MASS.—Water supply department, M. Erving Sprague, 1117 Main street, is asking bids on a 585,000-gallon steel tank, 40 feet high and 50 feet in diameter at Corey Hill, costing about \$15,000.

New Hampshire

PORTSMOUTH, N. H.—City plans waterworks system, including pumping station, pipe lines, 500,000-gallon steel tank and wells, to cost about \$250,000. Whitman & Howard, 89 Broad street, Boston, are engineers.

PORTSMOUTH, N. H.—Bureau of yards and docks, navy department, Washington, will extend alternating electric current system at the navy yard at cost of \$75,000.

New York

LAKE GEORGE, N. Y.—Village of Caldwell, N. Y., plans sewage system and disposal plant to cost \$97,000. Morrell Vrooman Inc., 21 North Main street, Gloversville, N. Y., is engineer.

SIDNEY, N. Y.—Federal Creosoting Corp., care contractor, has let general contract to Frank Lewis & Son, Bainbridge, N. Y., for a 35 x 135-foot plant, two small buildings and steel tanks, costing about \$40,000 with equipment. A. L. Kluhn is in charge.

SOUTH OZONE PARK, N. Y.—Department public works, municipal building, New York City, will build a two-story sewage disposal plant at 150-54 134th street, costing about \$405,000. W. H. Fenton, care owner, is architect.

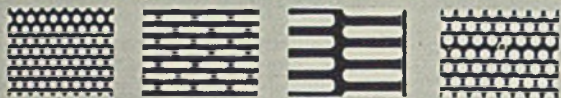
New Jersey

NEW BRUNSWICK, N. J.—Triangle Conduit & Cable Co., 92-27 Horace Harding boulevard, Elmhurst, N. J., has let general contract for a one-story factory to Brown & Matthews Inc., 122 East

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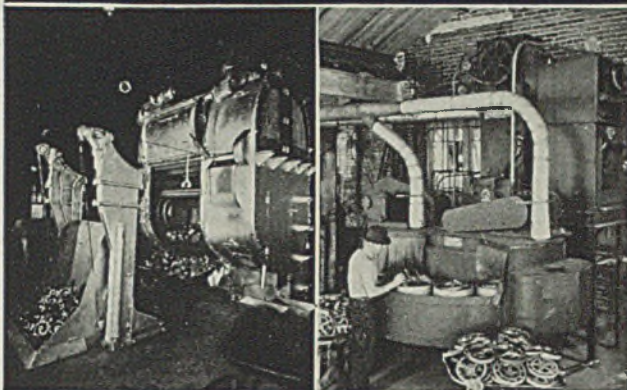
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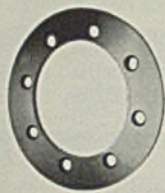
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Pennsylvania

ELLWOOD CITY, PA.—American Cotton Pin Co., C. R. Dabney, president, Park building, Pittsburgh, will build a one-story plant 40 x 50 feet.

ERIE, PA.—Erie Enameling Co., 1400 West Twentieth street, D. Goldberg in charge, is building a plant addition of 9600 square feet.

LOCK HAVEN, PA.—Piper Aircraft Corp., W. T. Piper, president, will build two 50 x 400-foot assembly buildings and 48 x 100-foot connecting head building at its aircraft plant, Hunting, Davis & Dunells, Century building, Pittsburgh, are engineers.

MARCUS HOOK, PA.—American Viscose Corp., Marcus Hook, F. H. Griffin, vice president, plans additions to its plant to cost \$1,000,000.

PITTSBURGH—Pittsburgh Coal Co., Oliver building, will remodel yard No. 4, including wharf extension, railway siding, track hopper, steel bin conveyor system, spiral type lowering chutes, electrically operated barge mover, etc.

Michigan

DETROIT—Service Tool & Machine Parts Inc., 8111 Livernois avenue, has been incorporated with \$10,000 capital to operate a general machine shop, by James Clark, 14192 Mansfield avenue.

DETROIT—Michigan Tool Co. is taking bids through Henry M. Freler, architect, for an engineering and manufacturing building 100 x 200 feet.

EAST LANSING, MICH.—State board of agriculture will expend \$340,000 for expansion and improvement of power plant at East Michigan state college here.

FRUITPORT, MICH.—Fruitport Brass & Machine Co. has been incorporated with \$100,000 capital to manufacture metal products, by Albert Marling, 1153 Pine street, Muskegon, Mich.

JACKSON, MICH.—Anodizing Co. of Jackson Inc. has been incorporated with \$25,000 capital to anodize aluminum and other metals, by Walter Michner, 536 North Mechanic street, Jackson.

KALAMAZOO, MICH.—Kalamazoo Plating Works is remodeling a three-story building as addition to its plant at cost of \$100,000, including equipment. M. C. J. Billingham, Kalamazoo, is architect.

MONROE, MICH.—Monroe Auto Equipment Co. has given general contract for \$60,000 auto equipment manufacturing plant to H. G. Christman-Lansing Co. Reed M. Dunbar, Monroe, is architect.

Illinois

BUSHNELL, ILL.—Vaughn & Bushnell, manufacturers of hammers, axes and other hand tools, have leased the Brant building and will establish a manufacturing plant here after remodeling the building for its purposes.

CHICAGO—Precision Steel Warehouse Inc., 64 East Lake street, has been incorporated with 10,000 shares no par value by G. C. Tinsley and associates. Romuell & Parnell, 100 North LaSalle street, are correspondents.

CHICAGO—Bartlett Trailer Co., 3830 South Michigan avenue, has let general contract to Henry Erlinger, 7743 North Paulina street, for a one-story trailer factory 72 x 100 feet costing about \$50,000. C. C. Henderson, 134 North LaSalle street, is architect.

CHICAGO—United Air Cleaner Co., 9705 Cottage Grove avenue, has let general contract to Bulley & Andrews, 2040 West Harrison street, for one-story 80 x 250-foot and 60 x 120-foot additions to cost about \$50,000.

Indiana

LAFAYETTE, IND.—H. M. C. Inc., 606 Lingle avenue, has been incorporated with 600 shares class A and 400 shares class B, no par value, to manufacture machinery and tools. Hubert M. Clark, 606 Lingle avenue, is correspondent.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will take bids as follows: August 2, schedule 2444, eleven motor-driven geared-head turret lathes and equipment for Portsmouth, N. H.; schedule 2463, motor-driven vertical milling machine and spare parts for Washington; schedule 2465, motor-driven precision engine lathe for Washington; schedule 2470, motor-driven universal grinder for naval academy, Annapolis, Md.; August 6, schedule 2479, three floor-type electric grinders spare parts and tools, for Philadelphia; August 2, schedule 2460, motor-driven contour metal sawing combination machine for New York; August 6, motor-driven crank shaper, spare parts and tools, for Philadelphia; schedule 2421, four hand-operated hydraulic jacks for San Diego, Calif.; schedule 2423, motor-driven turret lathe for Mare Island, Calif.; August 9, schedule 2430, six complete worm reduction gears for Mare Island, Calif.; August 2, schedule 2442, gasoline engine-driven wheel-type tractor cranes for Brooklyn, N. Y.; schedule 2447, motor-driven precision-type lathe for Newport, R. I.; two motor-driven pedestal cabinet precision lathes for Washington; schedule 2457, motor-driven bench lathe for Key West, Fla.

Louisiana

BATON ROUGE, LA.—Solvay Process Co., Syracuse, N. Y., plans erection of power plant at its chemical plant here, to be completed within a year.

West Virginia

MORGANTOWN, W. VA.—E. I. du Pont de Nemours & Co. Inc., Wilmington, Del., has bought an 80-acre site for large industrial construction to cost over \$1,000,000.

Wisconsin

RACINE, WIS.—Racine Iron & Steel Co. has been incorporated by Oscar and Joseph L. Walsman and Joe Silver.

Iowa

WATERLOO, IOWA.—Rath Packing Co., has given general contract to W. A. Klinger Inc., 201 Warnock building, Sioux City, Iowa, for a six-story cold storage building 60 x 90 feet.

Oregon

PORTLAND, OREG.—Pacific Carbide & Alloys Co., E. F. Goodner, general manager, has let general contract to L. H. Hoffman, Portland, Oreg., for plant at North Columbia boulevard and Hurst street, to cost about \$250,000. An electric furnace will be installed for production of calcium carbide and steel alloys will also be made.

Washington

DAVENPORT, WASH.—Lincoln county electric co-operative has REA allotment of \$438,000 for construction of 592

miles of power lines in Lincoln and Grant counties.

SEATTLE—Western Gear Works, 417 Ninth avenue south, is building a plant addition 56 x 60 feet to provide additional capacity for a large navy contract.

SEATTLE—Metalliferous Inc. has been incorporated with \$100,000 capital by John Markham and associates, 1115 Seventeenth avenue, to process metalliferous rock.

TACOMA, WASH.—Allen & Early, Tacoma, are low at \$73,500 for a boiler plant and laundry addition to Pierce county hospital.

YAKIMA, WASH.—Washington Natural Gas Co., 202 Miller building, has been incorporated with \$40,000 capital by N. C. Janssen and associates.

Canada

AMHERST, N. S.—Council, M. J. Kaufman, chairman, will call bids soon for a diesel plant for the municipal pumping plant to replace steam engine.

BRANTFORD, ONT.—Cockshutt Plow Co. has started construction of an addition 70 x 200 feet.

GUELPH, ONT.—Guelph Stove Co., 490 York road, is taking bids for a 50 x 130-foot plant addition.

HAMILTON, ONT.—Canadian Westinghouse Co. Ltd., 286 Sanford street North, is having plans prepared for a 450-foot addition to its plant on Aberdeen avenue. Hutton & Souter, 36 James street South are architects. D. P. Brown is engineer.

KINGSTON, ONT.—Aluminum Co. of Canada Ltd., 1010 St. Catharines street West, Montreal, has let general contract to Anglin-Norcross Corp. Ltd., 892 Sherbrooke street West, Montreal, for a large plant addition.

NIAGARA FALLS, ONT.—North American Cyanamid Co. Ltd., Fourth street, plans construction of a large plant near Montrose railway yards.

OTTAWA, ONT.—Dominion department of national defense has awarded general contract to Anglin-Norcross Corp. Ltd., 892 Sherbrooke street West, for construction of a plant to cost about \$1,500,000.

PETERBORO, ONT.—Outboard Marine & Mfg. Co. of Canada Ltd., Monaghan road, is having plans prepared by John T. Hornsby, 332 George street, and will ask bids soon on a plant addition 105 x 150 feet.

WESTON, ONT.—Moffatts Ltd., 36 Dennison road East, is taking bids on a plant addition 140 x 140 feet, including sheet steel mill. Prack & Prack, 36 James street South, Hamilton, Ont., are architects.

WINDSOR, Ont.—Ford Motor Co. of Canada Ltd., has given general contract to Dinsmore McIntyre Co., Security building, Windsor, for a machine shop addition to cost about \$700,000. (Noted July 15.)

LACHINE, QUE.—Dominion Engineering Works, Ltd., First avenue, is taking bids for a large addition to its erecting shop.

MONTREAL, QUE.—Federal Aircraft Ltd. plans construction of airplane manufacturing plant costing \$100,000. R. J. Moffett, care Canadian Vickers Ltd., Notre Dame street East, is general manager.

THURSO, QUE.—Singer Sewing Machine Co., 195 Sparks street, Ottawa, Ont., is placing contracts for an \$80,000 plant addition here. A. F. Buyers & Co. Ltd., 1226 University street, Montreal, Que., has the general contract.

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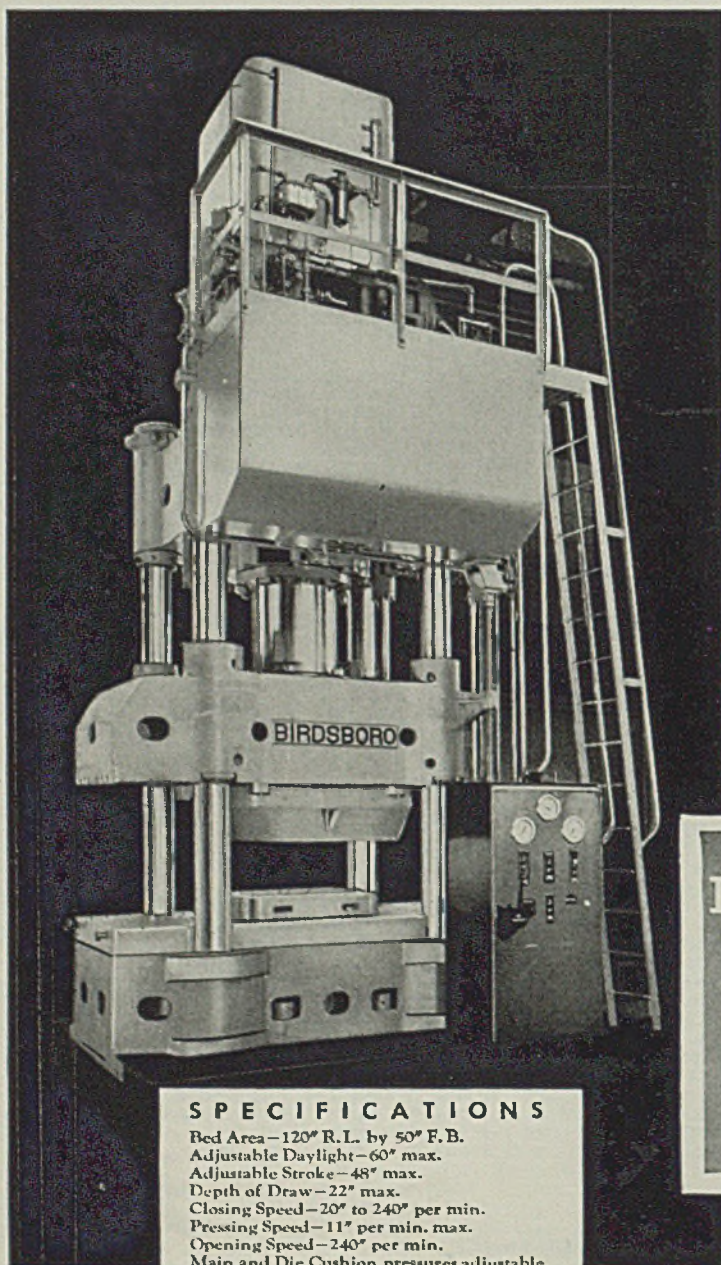
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