STEEL

ESTABLISHED 1882

Contents

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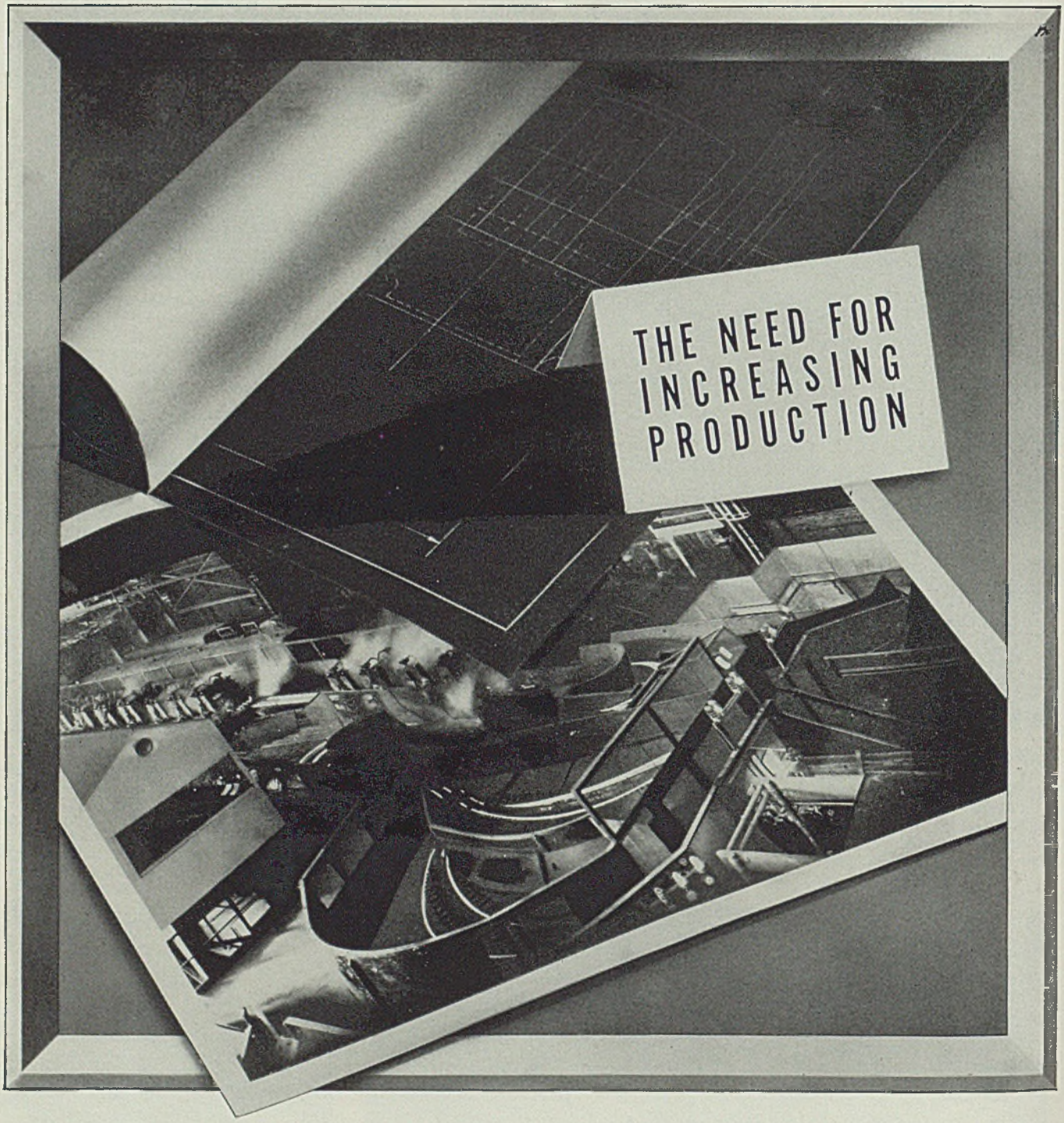
PRODUCTION • PROCESSING • DISTRIBUTION • USE



INDUSTRY'S No. 1 answer to this problem is more speed per hour, more hours per week. . . . Morgan Continuous Rolling Mills can "take it" because Morgan has always planned for the future. We're busy doing that now—but we'll be glad to help you if we can.

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WORCESTER
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R-90

HIGHLIGHTING
THIS ISSUE OF
STEEL

■ SHORTAGES of pig iron and scrap, which of late have prevented further increases in steel production, last week (p. 21) actually caused a reduction in the operating rate in the middle Atlantic section. Reduced operations in other districts from the same cause are foreseen. The scrap crisis, declares E. L. Shaner, STEEL'S editor-in-chief (p. 46), is due to maladministration at Washington; if the scrap problem is put up to experienced men along with authority "then we will have scrap". . . . Six new blast furnaces, some to be blown in shortly, will have annual capacity (p. 22) of more than 2,000,000 tons; last week OPM asked for blast furnace expansion of 6,508,950 tons.

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OPM Branches In Key Cities

Though the great majority of consumers continue to obtain enough steel to maintain production, both on defense and nondefense, some trouble is being encountered (p. 89) by job and contract consumers who cannot anticipate what they will need a few weeks or months ahead. Though OPM has established priority branch managers in 13 key cities they have no authority and can only advise. These cases usually involve equipment, as for blast furnace and steel plant maintenance, that is essential to defense production; it is necessary that a system be set up so such consumers can get steel. . . . Warehouse stocks are assured of replenishment (p. 25) but all sales must be to holders of priority ratings.

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Homestead, Pa. To Be Remade

Industry (p. 31) foresees grave economic dislocations if the St. Lawrence seaway project is carried to completion. . . . A 15-man steel industry advisory committee (p. 32) has been named to advise with A. D. Whiteside, head of OPM's iron and steel section, on allocation of tonnage. . . . Twenty per cent more steel will be available (p. 25) to agricultural implement manufacturers. . . . Five Canadian vessels, with more to come later, now (p. 23) are in the American iron ore trade on the Great Lakes. . . . Homestead, Pa., will be remade (p. 24) to make way for a great armor plate plant. . . . First eight steel producers to report earned 20 per cent less profit in the second quarter (p. 26) than in the first.

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Flywheels For Machine Tools

Guy Hubbard, STEEL'S machine tool editor, discusses (p. 50) the use of flywheels on machine tool devices and tells how one such auxiliary permitted a planer to operate on 30 per cent less motor power. . . . Gaylord G. Thompson analyzes (p. 62) the cause of carbide tool tip breakage and shows how to prevent it. He points out the economies of sharpening the tools *before* they become noticeably dull. . . . The various factors to be considered when choosing coal for by-product coking are examined (p. 68) by J. D. Doherty. . . . A new synthetic plastic for mending metals (p. 72) is announced. . . . H. J. Wills details (p. 78) procedure for grinding ultra-finish rolls, including tungsten-carbide rolls.

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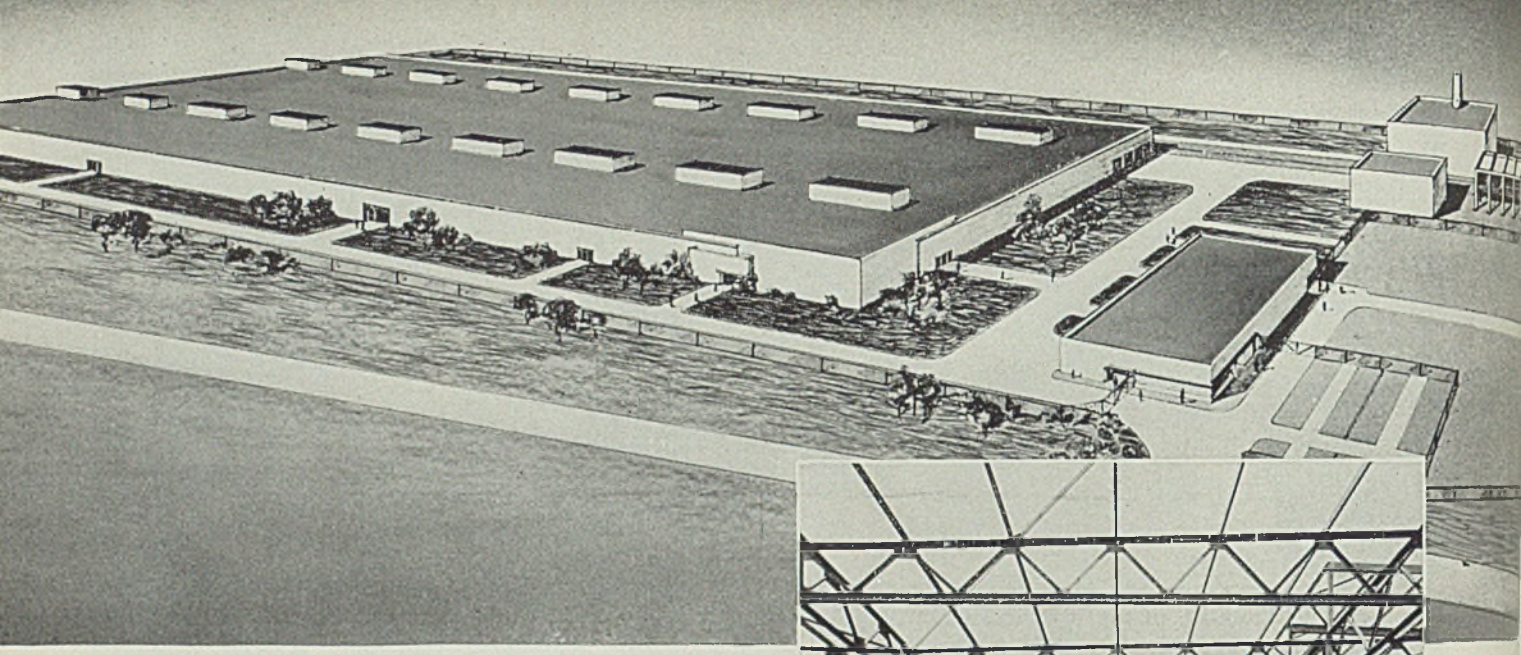
Gun Recoil Mechanisms

Much of the "mystery" of gun recoil mechanisms and their manufacture is dissipated by G. W. Birdsall, STEEL'S engineering editor, as he explains (p. 52) their operation and manufacture at Rock Island Arsenal. . . . D. Bedell Baxter tells (p. 60) about resurfacing single-hearth bottoms with quick-setting magnesite. . . . An unusually efficient materials handling system (p. 58) for cleaning castings is described. . . . An efficient setup for automatic resistance welding of passenger and freight cars (p. 74) is explained by John W. Sheffer. Work is done on jig cars, wheeled under the automatic welder and covered with a secondary copper grillage.



This new Studebaker plant will have 600,000 sq. ft. of floor space, and when operating at capacity its four thousand workers will be turning out parts for production of two engines per hour. It is one of three Studebaker defense plants now nearing completion.

Inland's No. 1 Job: National Defense

IN common with the vast majority of American industry, every phase of Inland's business is geared to one great purpose—National Defense. It is our No. 1 job! Our mills are making new production records; our schedules are being constantly made and remade so that the steel for our Country's Defense may be delivered when and where needed.

Typical of this is the new Studebaker Airplane Motor Part Plant illustrated above. Late one evening Studebaker officials notified Inland that this plant was to be built and that time was the important factor. Inland's help was needed along with others. The orders reached us January 28, 1941. Schedules were revamped, deliveries began February 7 and were completed February 27. This is what Inland is doing daily to aid in the great program in which our nation is engaged.

However, we also have a No. 2 job. Defense comes first; after that, all our efforts are directed toward an equitable distribution of our remaining production so that we may, to the best of our ability, serve the many friends whose business has been responsible for the development and growth of our company.

SHEETS • STRIP • TIN PLATE • BARS • PLATES • FLOOR PLATE • STRUCTURALS • PILING
RAILS • TRACK ACCESSORIES • REINFORCING BARS

INLAND STEEL CO.

Elusive Scrap Now "Critical" for Steel; OPM Wants More Pig Iron Capacity

Six new blast furnaces under way or projected; others are being rebuilt and enlarged . . . Few stacks now idle . . . Lake ore movement continues heavy as Canadian ships join fleet

■ CURTAILMENT in ingot production for lack of scrap within the next three or four weeks was foreseen by steel producers and defense agency officials last week.

Some slight reductions in operations already have been ascribed to shortage of this raw material, although the national operating rate continues at 97 per cent.

In the central eastern seaboard district production last week was down 1.5 points due to the scrap scarcity and steelmakers said further reductions would follow in a few weeks if more adequate supplies were not forthcoming. One producer who has been able to maintain production so far said the present rate could be increased if sufficient scrap and pig iron were available.

In the Detroit area the supply outlook is becoming more critical and the leading producer foresaw possibility that some furnaces would be withdrawn soon.

Efficiency Lowered

Pittsburgh district reports no furnaces have been withdrawn for lack of raw materials but steelmakers say more efficient operations would result if better grades of steelmaking scrap were available in quantity.

Chicago producers believe incoming supplies plus stocks will be sufficient to maintain operations until the start of cold weather.

Foundry operations have been affected more severely than the steel mills as the shortage of cast is even more pronounced than in the steelmaking grades. The industrial research department at the University of Pennsylvania reports gray iron production in the Philadelphia Federal Reserve District declined 4.3 per cent in June, despite an increase of 15.5 per cent in unfilled orders. While stocks of coke and pig iron were heavier, scrap inventories were down 6.4 per cent. Steel foundry production also declined fractionally while unfilled orders increased 16.7 per cent; scrap supplies in this division were reported off 15.1 per cent.

Office of Production Management officials were giving increasing attention to means for swelling available supplies. The program suggested by the scrap industry's advisory committee last June 10—and which was ignored by Leon Hender-

Exports of American Scrap in Five Years

(Net Tons)

To Allied Countries

	1936	1937	1938	1939	1940	Totals
United Kingdom	408,659	948,838	433,829	569,288	1,085,756	3,446,370
Canada	71,357	207,840	103,283	196,556	426,589	1,005,625
China	33,544	39,553	11,306	39,054	24,674	148,131
British Honduras	.....	.	.	. ....	10,024	10,024
Hong Kong	3,602	3,196	5,706	5,548	4,236	22,288
Total	517,162	1,199,427	554,124	810,446	1,551,279	4,632,438

To Axis and Countries Now Dominated

Japan	1,184,536	2,140,889	1,547,617	2,270,076	1,079,141	8,222,259
Italy	319,241	427,161	486,883	477,004	359,434	2,069,823
Spain	1,328	.. ....	13,103	25,441	59,670	99,542
Switzerland	.	. .	.	.....	28,249	28,249
Hungary	6,481	7,386	1,959	. .	13,998	29,824
Sweden	17	34,268	1	73,341	13,903	121,530
Belgium	4,922	52,487	19,190	1,934	1,101	79,634
Norway	1,364	8,689	5,832	4,928	804	21,617
Total	1,517,989	2,670,880	2,074,585	2,852,724	1,556,300	10,672,478

All Others

Mexico	37,719	68,708	23,857	41,608	42,095	213,987
Honduras	.....	.....	9,404	8	3,607	12,419
Cuba	....	....	40	10,919	2,516	13,475
Others	95,598	654,720	696,412	291,013	6,662	1,744,405
Total	133,317	723,428	729,713	343,548	54,280	1,984,286
GRAND TOTAL	2,168,468	4,593,735	3,358,422	4,006,718	3,161,859	17,289,202

son's Office of Price Administration and Civilian Supply in establishing ceiling prices for scrap—was dusted off and re-examined. Many scrap men believe the present situation could have been averted had their program received prompt and sympathetic attention by the defense agencies.

However, there were no indications emanating from Washington that the price ceiling would be raised. A high OPM official said privately that he still is opposed to an increase in the established prices and that OPACS officials share his views.

In some quarters, it was believed a general increase in ceiling prices is not the answer to the present shortage. Upgrading, lax inspection, and other evasions to nullify the government regulations are reported in some instances, although reliable observers estimate 60 per cent of the scrap is being sold at the established prices.

At a meeting of 300 Ohio auto wreckers and dealers in Columbus last Friday, a proposal to ask OPM to name a committee of 20 to prepare a plan for wrecking old cars to increase the scrap supply was approved.

In attendance were R. C. Allen and R. H. Ridgeway, of OPM; E. A. France Jr., of OPACS; Herman Lind, Cleveland district manager, Defense Contracts Service; L. J. Borinstein, Indianapolis, president, Institute of Scrap Iron and Steel Inc.; E. C. Barringer, executive secretary of the scrap institute; and Carl A. Ilgenfritz, Cleveland, member of the OPM Iron and Steel Committee.

OPM Asks 6,508,950-Ton Increase in Pig Iron Capacity; 6 Stacks Building

Increased blast furnace capacity totaling 6,508,950 tons was recommended by the OPM last week as an "essential step in maintaining and increasing the productive capacity of the steel industry."

Government financing of the new construction will be required "and is so recommended by us for the best consideration of the Defense Plant Corp.," William S. Knudsen, OPM Director General, stated in a letter to Jesse Jones, Federal Loan Administrator.

Mr. Knudsen said the present and prospective demand for pig iron was far in excess of capacity and that the demand for scrap was also in excess of the available supply.

Six new blast furnaces, with an aggregate annual capacity of 2,019,000 tons, now are being constructed or have been authorized.

Inland May Build Sixth

Inland Steel Co., Chicago, last week awarded a tentative contract to the Arthur G. McKee Co., Cleveland for construction of a 1000-ton stack at its Indiana Harbor, Ind., works. Definite determination on the matter is expected to be made this week. If built, the stack will be Inland's sixth.

Other furnaces previously announced include: An 850-ton furnace at Tennessee Coal, Iron & Railroad Co.'s Ensley, Ala., plant; 1000-ton unit for American Rolling Mill Co., Ashland, Ky.; and a 1000-ton stack for Weirton Steel Co., Weirton, W. Va.

Bethlehem Steel Co. reports one new 1000-ton blast furnace, at its Maryland plant, is scheduled for completion next month. Another being built at Lackawanna, N. Y., is to be placed in operation in October.

Proposed expansion at the Columbia Steel Co., Provo, Utah, includes additional unannounced blast furnace capacity.

Three modern furnaces now are being built to replace obsolete units. Two are under construction at the Edgar Thomson works of Carnegie-Illinois Steel Corp., Braddock, Pa., and one at the Lorain, O., plant of National Tube Co. When these are placed in blast, they will increase capacity by 293,250 tons.

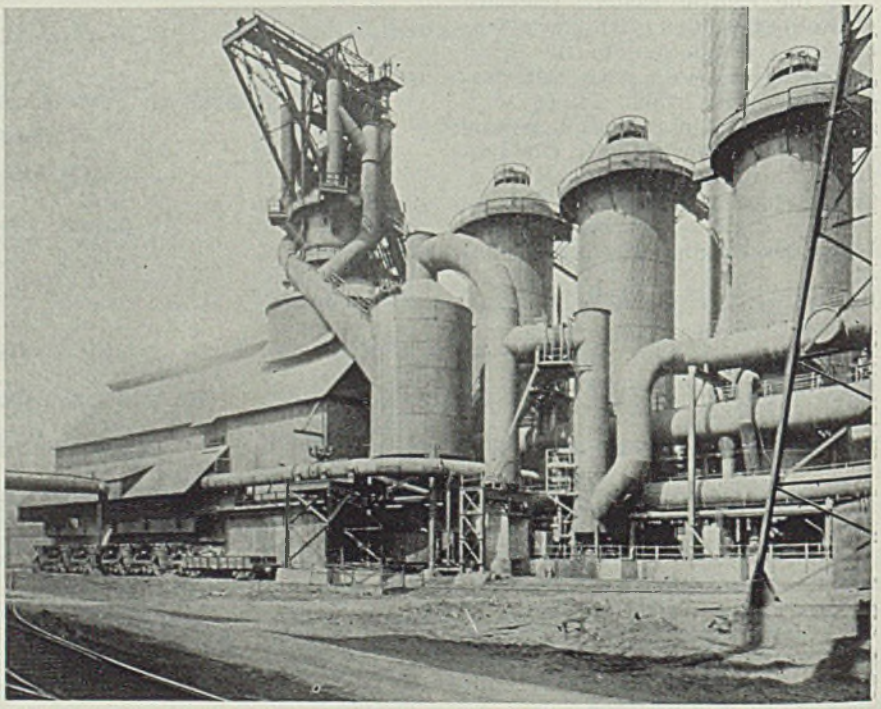
Capacity of No. 3 Clairton stack of Carnegie-Illinois has been increased by 150,000 tons by rehabilitation. Three other furnaces have been enlarged, two at the Buffalo plant of Hanna Furnace Corp. and the No. 4 stack of Carnegie-Illinois at Duquesne, Pa. to bring in an additional 320,000 net, making a total of 470,000 net tons from rebuilding and rehabilitation since the first of the year.

Blast furnaces idle this summer have been relatively few, as increased demand for pig iron for national defense has resulted in the lighting and operation of more stacks than have been active since July, 1929.

Out of 229 stacks in the United States, 18 were idle June 30, as shown by STEEL's monthly compilation. Five of these had been in blast earlier this year, and were down for relining or other repairs.

In all, 11 of the 18 are being re-

Blast Furnace Shell Is All-Welded



■ One of four furnaces adding total of 780,000 tons to Bethlehem Steel Co.'s pig iron producing capacity. This furnace, at Steelton, Pa., was recently rebuilt and now is in operation. The shell is all-welded. A furnace also was rebuilt at the Bethlehem plant. A new furnace will be completed at the Maryland plant next month and another at Lackawanna in October

conditioned, including six long inactive. No plans have been reported for the immediate future of the other seven.

These 11 represent in themselves an annual capacity of more than 2,000,000 net tons. From recent reports it appears several of these have been relighted in July, and though one or two others were blown out for repairs, the net result will be a substantial increase in production over June.

Stacks that were in blast earlier this year and were out June 30 for repair include:

Tennessee Coal, Iron & Railroad Co.'s Ensley No. 5, at Ensley, Ala., blown out June 1 for relining and scheduled to resume soon. Last rebuilt in 1922 and relined in 1936, the stack's annual rated capacity is 137,000 net tons.

National Steel Corp., one Detroit stack blown out May 31 for repairs, and expected to be relighted soon.

Bethlehem Steel Co., Bethlehem A, in Pennsylvania, taken out for repairs Jan. 6. Last relined in 1937, its capacity was listed at 217,000 tons.

Stack Reconditioned

Carnegie-Illinois Steel Corp.'s Duquesne No. 4, at Duquesne, Pa., blown out late in April for repair. Reconditioning was immediately started by H. A. Brassert Co., Pittsburgh, and is to be completed in the near future. The furnace, with 270,000 ton capacity, was last relined in 1929 and last rebuilt in 1919.

Jones & Laughlin Steel Corp., Eliza No. 2 stack at Pittsburgh, blown out for repairs April 29. Relighted early in July, this furnace's capacity is 336,000 tons per year.

Stacks that are being reconditioned after having been inactive as much as 12 years:

Central Iron & Coal Co., Holt, Ala., Tuscaloosa stack, recently purchased by Tennessee Coal, Iron & Railroad Co., Birmingham, Ala. Constructed in 1903 and idle since 1929, the unit is being rebuilt and is expected to be in operation early in September. Production, it is reported, will be about 325 tons of foundry iron daily. Formerly a merchant producer, the stack is expected to be transferred to the steelworks or nonmerchant classification.

Granite City Pig Iron Co., Granite City, Ill., two furnaces and appurtenant equipment, recently acquired by Koppers United Co., Pittsburgh. Granite City A had been last relined in 1928, B stack was built in 1926. Combined capacity was rated at more than 400,000 tons annually. One stack was scheduled to resume blast in July; the other is being repaired and production of 500 tons daily is expected early in September.

Colonial Iron Co., Riddlesburg, Pa., Colonial furnace, purchased last spring by the Reconstruction Finance Corp., and more recently taken over by United States Pipe & Foundry Co., Burlington, N. J. Rehabilitation is said to be underway, and production has been scheduled to start in a few weeks. Idle since 1929, the furnace was last rebuilt in 1911, last relined in 1925, has annual capacity of 80,000 tons.

Roane Iron & Coal Co.'s two stacks at Rockwood, Tenn., acquired by Tennessee Products Corp., Nashville, Tenn. Both furnaces are being relined and their mechanical equipment modernized. With former capacity, of foundry iron, totaling about 600 tons daily, they are to be put into production of standard manganese, daily output to be about 75 tons each.

Furnaces long idle, none of which is being repaired and which may eventually be dismantled:

Carnegie-Illinois Steel Corp., two stacks at Joliet, Ill., mentioned in recent reports that the company is contemplating transfer of two eastern blast furnaces to Provo, Utah, to increase West Coast steel capacity. Each is said to require considerable repair before it could again be operated. Their combined capacity was reported to be 540,960 tons.

Two Carnegie furnaces at the Edgar Thomson Works, Braddock, Pa., also inactive many years, likewise considered for dismantlement and transfer to Provo, as an alternative to moving the Joliet units. Columbia Steel Co., at Provo, a subsidiary of United States Steel Corp. also, would operate the transferred stacks.

Carnegie's South Works Old No 7 furnace, at South Chicago, Ill., last relined in 1927 and idle several years, reported to be in fairly good condition for early rehabilitation. Capacity of the stack was more than 250,000 tons.

Delaware River Steel Co.'s Delaware furnace at Chester, Pa., idle the past 11 years, acquired this summer by Philadelphia Electric Co. It is reported bids for operation of the stack have been received by the purchaser, but no definite information has been issued. Rebuilt and relined in 1925 but in condition to be restored to service in a relatively short time, the stack's capacity is 120,000 net tons annually.

Warner Iron Co., Cumberland furnace, at Cumberland Furnace, Tenn., inactive since 1929. Last relined in that year, it was last rebuilt in 1899, and had annual capacity of 16,800 tons ferrophosphorus. No change concerning its status has been reported.

Canadian Vessels Join Ore Fleet; Shipments To Exceed 75,000,000 Tons

■ CANADIAN freighters last week began in earnest to supplement the United States ore fleet, now operating at capacity and establishing new records in tonnages moved month by month.

At least five Dominion vessels are carrying ore from American ports to American ports.

Addition of the Canadian vessels will permit greater stockpiling of ore at lower lake docks and furnaces. The United States vessels now need only to duplicate the 1940 movement from the first of July to the end of the season to move a total of more than 75,000,000 tons. This is sufficient for furnaces that are dependent on Lake Superior ore to operate one year at capacity. However, consumers desire to build up a greater reserve at the lower lakes.

More Dominion ships are expected to join in the American ore trade before the season ends, although this depends on the volume of the grain movement and other Canadian shipping demands. United States shippers believe the Canadian vessels may be withdrawn after a few weeks.

Ralph Budd recently estimated the Canadian freighters available for the ore trade could move 1,500,000 tons a season, if necessary. Shippers believe it is unlikely they will haul this tonnage this year.

Ore shipments to July 1 from upper lake ports, totaled 28,825,921 tons, or 11,557,231 more than was shipped to the same date a year ago. From July 1 to the end of the season in 1940, 46,444,000 tons were shipped. Equivalent movement this year would result in a total of 75,270,000 for the season. Although this year's fleet has 5400 tons less trip capacity than vessels in commission a year ago, shippers are confident they can better the 1940 record. Shipping was hampered last November by unusually severe storms.

Until the middle of September, the carriers will be permitted to load about 4 inches deeper, which will add several hundred tons to each cargo.

June consumption of Lake Superior ore was 6,231,067 tons, compared with 6,232,213 tons in May, and 5,212,699 tons in June, 1940, according to the Lake Superior Iron Ore Association, Cleveland.

In the first six months 36,681,083

tons were used, compared with 27,322,666 tons in the first half of 1940. These figures include ore used in open hearths, and at eastern furnaces which use only a small proportion of lake ore.

Stocks on hand at furnaces, July 1, totaled 23,919,172 tons; at Lake Erie docks, 2,710,498 tons; total, 26,629,670 tons. The total June 1 was 21,816,898 and on July 1, 1940, 23,515,802.

Historic Homestead To Feel Steel Defense Expansion Over Wide Area

■ THE TOWN of Homestead, Pa., will be remade to create a site for the huge new armor plate plant to be built there by Carnegie-Illinois Steel Corp. and the Defense Plant Corp. Duquesne, Pa., a few miles away also will be affected, but to a lesser extent.

Families of more than 10,000 people it is said will have to find new homes in the two towns. The Homestead project calls for razing 1363 houses, 11 churches, 2 convents, 28 saloons, 68 grocery stores, 5 clubs, 5 schools, 46 miscellaneous shops, three garages, a planing mill, a waterworks, a knife factory, a machine shop, a baking company, and a number of filling stations and junkyards. Railroad tracks, street car lines and public utility services will be removed and relocated.

The project will require 4000 additional employes, necessitating a large scale housing project.

Building will start as soon as the ground can be cleared; the clearing job is expected to require two to three weeks.

A $75,000,000 armor plate plant will be built at Homestead and will include a new open hearth plant with 12 furnaces with aggregate annual capacity of 1,700,000 net tons of steel; a new slabbing mill; a new 160-inch plate mill; an armor plate forging plant and a machining shop. Principal products will be armor plate, deck plates and forgings required by the United States Navy.

Plant is scheduled to start operations within a year, about half the time that normally would be required to build a plant of this size.

At Duquesne there will be built two electric furnaces, with 100,000 tons annual capacity, and an alloy steel heat treating plant which will manufacture special steels for naval ordnance. Cost at Duquesne will be $10,000,000.

The government will supply about 90 per cent of the funds, and the company 10 per cent. Carnegie-Illinois will operate the plants under a five-year lease agreement. (STEEL, June 30, p. 13).

Jones & Laughlin To Develop Ore Tract in New York State

Jones & Laughlin Steel Corp., Pittsburgh, has leased a tract of 32 acres of iron ore deposits 65 miles east of Watertown, N. Y., from the Benson Iron Co. Inc. Company will build a sintering plant as well as mining equipment. Development will cost an estimated $2,750,000 and will require 18 months. The tract has not been worked since the World war when Benson started to develop it.

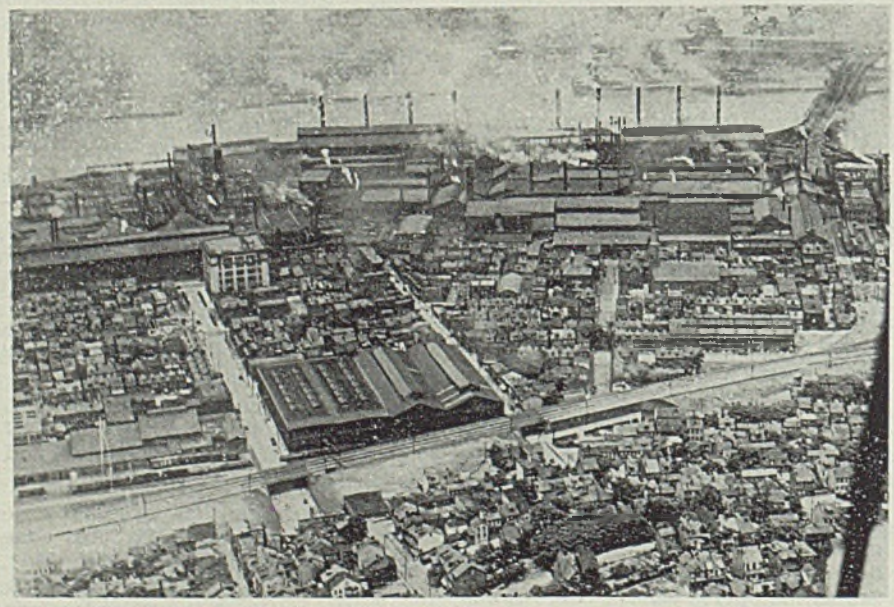
H. E. Lewis, Jones & Laughlin president, said explorations have been under way for more than a year and that the tract would produce 800,000 tons of sintered ore annually. Concentrates will have iron content of 65 per cent and will be shipped to Pittsburgh by rail.

The ore has a low phosphorus content and is especially good for bessemer operations.

Report Republic To Expand Facilities at Birmingham

Reports were current in Birmingham, Ala., last week that Republic Steel Corp. will reopen its Shannon ore mine, build a new blast furnace, construct additional coke ovens, and develop new coal mines in Alabama.

At its Cleveland headquarters, a company spokesman said nothing definite had been decided, but pointed out that OPM has asked for additional blast furnace capacity and that "Republic stands ready to cooperate."



■ HOMESTEAD: Now undergoing a major geographical operation to make room for Carnegie-Illinois' new armor plate plant, this famous mill town soon will present a radically changed appearance. NEA photo

R. C. Allen Returns To OPM Iron, Steel Section

■ R. C. Allen, executive vice president, Oglebay-Norton & Co., Cleveland, has returned to OPM, attached to the iron and steel section. Mr. Allen had served as consultant for OPM and the National Defense Advisory Commission until last month when he was granted "an indefinite leave of absence."

N. T. Bartlett, secretary, Department of Commerce business advisory committee, has been appointed executive assistant to Sidney J. Weinberg, of the OPM Bureau of Clearance of Defense Industry Advisory Committees. Kenneth M. Watson, Federal Trade Commission attorney, has been named an assistant consultant.

AFL Building Trades Ban Strikes on Defense Jobs

■ OPM Associate Director Hillman last week announced an agreement had been reached with AFL building trade unions banning strikes on defense projects for the duration of the emergency. Affecting some 800,000 workers, the agreement provides disputes will be settled by arbitration, and stipulates no work stoppages over jurisdictional disputes.

Mr. Hillman told the President the pact means continuous work on defense contruction projects.

Warehouses Assured Steel for Priorities

■ Warehouse distributors will start July 28 to make reports of each sale, which will enable them to replenish their steel from the mills, a system having been devised by OPM.

Forms will be filled out, giving a code number, describing kind of steel, its analysis, manufacturer, and uses to which the buyer claims he will put the steel. All sales out of warehouses are to be made to holders of priority ratings only.

In due time the warehouse will present duplicates of these forms to the manufacturer who originally supplied the steel, the latter being required to replenish in equal tonnages.

Though warehouses welcome this system they express concern regarding customers who have been unable to get defense orders and therefore are no longer entitled to steel. Such small customers in normal times are the "backbone" of the warehouse business.

Distributors have been mailing circular letters to customers explaining the ruling, so that they will be forewarned as to the data to be furnished.

Increase in Farm Implement Manufacture Limited to 20%

Quantity of materials to be delivered for the manufacture of farm machinery during the next three months will be limited to 120 per cent of quantity used during the corresponding three months in 1939 or 1940, whichever was higher.

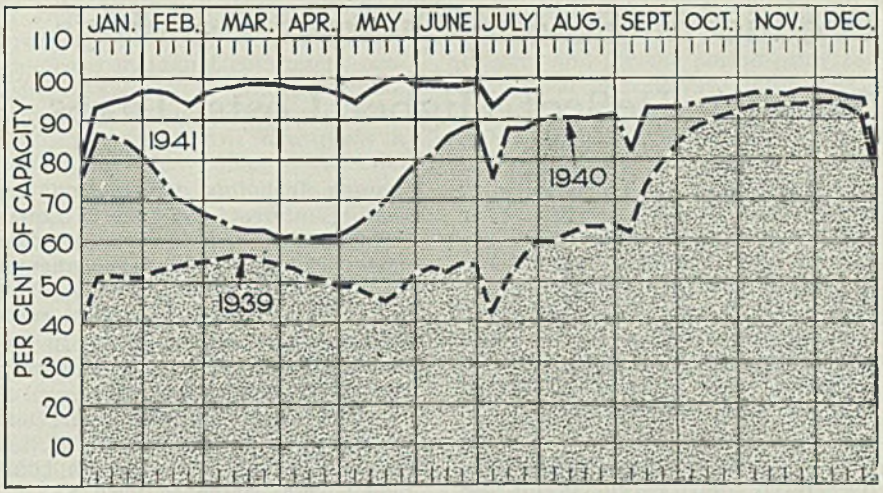
The limit was set in a civilian allocation program worked out by OPACS which provides that farm machinery and equipment manufacturers be given the highest civilian preference rating for materials to be delivered during August, September and October.

Preference ratings are not to be used to accumulate inventories. Manufacturers were asked to conserve critical materials and to plan production on the basis of what implements are needed.

Steel Drum Manufacturers Ask Preference Ratings

OPM last week appointed a six-man committee to represent steel drum manufacturers in their attempt to obtain preference ratings for steel and other materials.

Committee members: T. W. Floyd, Wilson & Bennett Mfg. Co.; J. A. Connelly, Petroleum Iron Works Co.; Livingston Keplinger, Rheem Mfg. Co.; H. W. Lees, Draper Mfg. Co.; D. F. Manion, Manion Steel Barrel Co.; F. O. Wahlstrom, Southern States Iron Roofing Co.; and F. T. Barton, Bayonne Steel Barrel Co.



PRODUCTION . . . . Steady

■ STEELWORKS operations last week remained unchanged at 97 per cent, need for furnace repairs and some materials shortage precluding a rise in the rate. In the corresponding week a year ago, the rate was 89.5 per cent; two years ago, 60 per cent.

Detroit—Gained 2 points to 88 per cent, three open hearths idle for repairs. Reports of impending scrap shortage may affect operations next week.

Youngstown—Unchanged at 98 per cent, with three bessemer, 74 open hearth and 25 blast furnaces in operation. Water supply is somewhat improved but still offering handicap, and scrap problem is causing concern. No change expected next week, as only idle units are those being repaired.

Buffalo—Held at 93 per cent for third week; pig iron output remains at capacity.

New England—Down 10 points to 85 per cent, one open hearth having been taken off for repairs.

Pittsburgh—Rose ½ point to 100 per cent.

Wheeling—Up 2 points to 93 per cent.

Birmingham — Steady at 90 per cent for fourth consecutive week, with 14 furnaces active at Birmingham and eight at Gadsden.

Central eastern seaboard—Shortage of raw materials reduced operations 1½ points to 95.5 per cent. Larger decline is expected unless relief is quickly provided.

Chicago—Held at 100 per cent.

Cincinnati—Need for furnace repairs kept the rate at 85.5 per cent for the second week.

St. Louis—Continued steady at 98 per cent. This rate has been maintained since early April.

Cleveland—Gained 1 point to 96 per cent.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended July 26	Change	Same week 1940	Same week 1939
Pittsburgh	100	+ 0.5	86.5	50
Chicago	100	None	96.5	56
Eastern Pa.	95.5	— 1.5	86	41
Youngstown	98	None	85	54
Wheeling	93	+ 2	94	79
Cleveland	96	+ 1	65	73
Buffalo	93	None	90.5	51
Birmingham	90	None	92	84
New England	85	—10	75	40
Cincinnati	85.5	None	85	31
St. Louis	98	None	65	47.5
Detroit	88	+ 2	99	64
Average	97	None	89.5	60

Will Build $600,000 Experimental Laboratory

■ A $600,000 laboratory soon will be built for the Bureau of Standards to house experiments in metals and alloys that are being made as part of the defense program.

Dr. Lyman J. Briggs, director of the bureau, announced a three-story building will be erected on ground adjacent to the present buildings. It will provide space, in addition to the equipment for testing metals and their fabrication and welding, for experimental apparatus used on military aircraft, fuels, lubricants, textiles and other materials.

Since the bureau's present tunnel for testing modern steel geodetic tapes is not long enough, a feature of the new building will be a 200-foot tape tunnel. The steel tapes will be tested under various temperatures, since some of them will be used in the tropics and others in arctic regions where allowance must be made for expansion and contraction.

Producers' Second Quarter Earnings Off 20%; Reflect Higher Costs, Taxes

■ FIRST eight steel producers to report their financial returns for the second quarter showed an aggregate net income of $11,995,211, compared with a total of $5,836,979 earned by the same companies in the corresponding period in 1940, when two incurred deficits.

In the first quarter, 1941, the identical companies' total net profit was $15,036,624.

This decrease in earnings from the March quarter reflects for the first time the result of higher wage schedules in the industry, increased cost of raw materials, and large provisions for anticipated increases in federal income and excess profits taxes. In several cases provision for expected rise in taxes for the entire first half was made from second quarter earnings.

The same eight producers reported an aggregate net income for the first half of $27,031,837, compared with $10,616,944 in the six months ended June 30 last year. Each company's earnings statement showed a substantial increase in net income over the period in 1940. In the prior half, two had reported a net loss.

Republic's Second Quarter Profit Below First Period Earnings

Consolidated net income earned by Republic Steel Corp., Cleveland, in the June quarter totaled $5,428,749 after interest, depreciation, depletion and provision for federal income and excess profits taxes based on the present law. Contingent provision of $2,000 000 for anticipated changes in the tax law was also made.

Profit in the quarter was equal to 87 cents per share on common, after dividend requirements on the 6 per cent prior preference and the 6 per cent preferred stocks. It compared with $3,337,730 net earnings, equal to 47 cents per common share, in the corresponding period last year. In the first quarter, 1941, net income was $8,189,966 or $1.35 per common share.

The corporation's net profit in first six months was $13,618,716, or $2.22 per share on common. This compared with $6,449,453 or 90 cents per common share earned in the corresponding period in 1940.

Jones & Laughlin's First Half Net Profit $8,098,227

Consolidated net profit reported by Jones & Laughlin Steel Corp., Pittsburgh, for the quarter ended June 30 was $3,937,720 after all charges, including depreciation, depletion, interest and taxes. Equal to $5.05 per common share after preferred dividend requirements, this compared with net income of $2,141,645 or $1.93 per share on common in the period last year. In the first quarter, 1941, net profit was $4,160,507 or $5.43 per share.

In the first half this year, net earnings reported totaled $8,098,227, equal to $10.48 per share on common. This compared with $3,276,256 or $2.12 per common share in the corresponding period in 1940.

Corporation reports no provision was required in the six months for excess profits tax. Provision was made, however, for anticipated requirements under the proposed revenue act.

Due to the reorganization plan now underway, it is reported, no dividend declaration was made.

Sloss-Sheffield's First Half Net Profit $863,464

Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., reports net profit in the six months ended June 30 was $863,464, after depreciation, depletion and provision of $281,236 for normal federal income taxes plus $165,000 for estimated increase in income and excess profits taxes based upon proposed legislation.

This was equal, after dividend requirements on the company's $6 preferred stock, to $7.83 per share on common. In the first half of 1940, net income was $572,543 or $4.20 per share on common. Indicated profit in the June quarter, based on reports of the first half and March quarter operations, was $351,105.

Sharon Steel's Second Quarter Net Profit $285,988

Net income reported by Sharon Steel Corp., Sharon, Pa., in the quarter ended June 30 was $285,988 after provision for depreciation, interest, federal income and excess profits taxes at rates now in effect, plus $300,000 for anticipated increases in the federal income and excess profits taxes. Of the latter provision, $130,000 is applicable against first quarter earnings.

Profit in the second period was equal to 54 cents per share on common after provision for dividend requirements on the corporation's $5 cumulative convertible preferred stock, and compared with net income of $79,327 or 1 cent per common share in the June quarter of 1940. In the first period of 1941, net profit was $527,253 or $1.15 per common share.

Indicated net profit in first half, as compiled from the company's quarterly reports, was $813,241 or $1.69 per share on common. This compared with $388,903 or 61 cents per share in the period in 1940.

Rustless Earned $1,164,460 Net Profit in First Half

Rustless Iron & Steel Corp., Baltimore, reports net profit in the second quarter was $582,762 after provision of $180 000 for anticipated increases in federal income and excess profits taxes, plus provision for taxes now in effect, depreciation, interest and other charges.

This was equal after preferred dividend requirements, to 61 cents per share on the corporation's common stock, and compared with $217,411 adjusted net income in the period last year. In the first quarter, 1941, adjusted net income was $581,698 or 60 cents per common share.

For the first half, ended June 30 net income totaled $1,164,460 or $1.21 per share on common. Adjusted net earnings in the corresponding period in 1940 totaled $430,537 or 42 cents per common share.

Keystone Reports $1,618,375 Net Income in Year Ended June 30

Preliminary report of Keystone Steel & Wire Co., Peoria, Ill., subject to audit now in process, shows net profit in the fiscal year ended June 30 was $1,618,375 after all charges and federal taxes. This was equal to $2.13 per share on the company's capital stock, and compared with net income of $1,418,221 or $1.87 per share in 1940 fiscal year.

A. M. Castle Reported $186,527 Net Income for Second Quarter

A. M. Castle & Co., Chicago, iron and steel merchandisers, earned $186 527 net income in the quarter ended June 30. Equal to 78 cents per share of capital stock, this compared with net profit of $92,319 or 38 cents per share in the period last year. In the first quarter, 1941, net earnings were $223,038 or 93 cents per share.

Net income in the first half, 1941, was $409,555 or $1.71 per share, compared with $192,518 or 80 cents per share in the corresponding period in 1940.

$460,256 Net Income Before Taxes Reported by Wickwire Spencer

Net profit before provision for taxes earned by Wickwire Spencer Steel Co., New York, in the quarter ended June 30 was $460,256. This

compared with a deficit, before tax provision, of $177,471 in the corresponding quarter last year. In first period, 1941, net income before taxes was $231,172.

Indicated net income in the first half, compiled from quarterly reports, was $691,428 before taxes. This compared with a $440,171 deficit incurred in the period last year.

Detroit Steel Corp. Nets $197,869 in June Period

Detroit Steel Corp., Detroit, steel finisher, reports net profit in second quarter this year was $197,869 after depreciation, federal income and excess profits taxes and other provisions. Equal to 96 cents per share on the corporation's par $5 capital stock, this compared with net profit of $95,407 or 46 cents per share in the period last year. In the March quarter, 1941, net profit was $233,767 or $1.13 per share.

Net income in the first half, as indicated by quarterly reports, was $431,636 or $2.09 per share. It compared with $209,939 or $1.02 per share in the corresponding period in 1940.

Interlake Iron Corp. Earned $524,469 Net Income

Interlake Iron Corp., Chicago, reports net income in the quarter ended June 30 was $524,469 after interest, depreciation, depletion, federal taxes including contingent provision of $238,000 for anticipated additional taxes, and provision of $35,142 for amortization of investment in Dalton Ore Co. Equal to 26 cents per share on the company's capital stock, this compared with a $147,190 net deficit incurred in the corresponding period in 1940, and a net profit of $774,855 or 39 cents per share in the first quarter, 1941.

Indicated net profit in the first six months this year, compiled from the company's quarterly reports, was $1,299,324 or 65 cents per share. In the period in 1940, net loss was $255,512.

GM Defense Production $75,200,000 in Quarter

■ Defense activities in General Motors Corp. plants, evolving from the preparation stage into production, now are resulting in a substantial and increasing flow of a wide variety of defense materials, as indicated by deliveries with a dollar volume of $75,200,000 in the second quarter of 1941. This was revealed in a statement released last week by Alfred P. Sloan Jr., chairman, in advance of his forthcoming second quarterly report to stockholders.

This report will show the progressive increases in delivery of GM defense products in the last three quarters and for the period prior to Oct. 1, 1940, as follows: Before Oct. 1, 1940, $34,000,000; fourth quarter, 1940 $43,700,000; first quarter, 1941, $56,600,000; second quarter, 1941, $75,200,000.

"The greater part of current volumes," Mr. Sloan states, "naturally is made up of those products for which basic manufacturing facilities existed or were under development at the inception of the national defense program in May, 1940. In these categories are diesel engines, military trucks and Allison aircraft engines.

"But in addition, production and deliveries of materials are under way in the case of a number of entirely new projects originated less than a year ago following the inauguration of the national defense program—items for the production of which extensive retooling and in some cases new factory construction were necessary. Included are machine guns, specialized electrical equipment, tank gun mounts, shells, cartridge cases, fuses, airplane control and instrument equipment, and many other products of a technical nature.

"The aggregate of defense orders assigned to General Motors or under negotiation now amounts to about $1,200 000 000, representing of course commitments extending over a considerable period of time. By far the great proportion of these involve intricate, highly technical products requiring intensive application of engineering and production skills. Defense activities throughout the organization are progressing steadily in step with the national defense program."

Engineers Ready To "Pin" a Bridge

■ Much as it may look like one, this is not a shell: it is a forged steel pin which will help hold together two spans of the Pit river bridge being built over an arm of the Shasta reservoir in California. Pin is 22 inches in diameter and 8 feet long. NEA photo from Bureau of Reclamation

Airplane Engine Plant Expansions Announced

■ Airplane engine plants will be built at Buffalo and Tonawanda, N. Y., for General Motors Corp. at a cost of $37,161,529, by the Defense Plant Corp. Approximately $33,200,000 will be spent for machinery and equipment.

Under an agreement with General Electric Co., DPC will build and equip naval equipment plants at Erie, Pa., and West Lynn, Mass. The costs will be $24,508,494, of which $17,310 235 will be spent for equipment and machinery.

■ River commerce on the Ohio at Pittsburgh in June set new high records, according to the United States Engineer's office, Pittsburgh.

Principally coal shipments, total tonnage was 1,785,300 net tons. Of this, 236,5000 tons was steel products. On the Monongahela, 2,832,800 tons moved, including 145,700 tons of steel products.

Iron and Steel Exports in May Lowest in Thirteen Months

■ LOWEST in 13 months, exports of iron and steel other than scrap totaled 409,840 gross tons valued at $35,346,239 in May, according to the Department of Commerce.

This compares with shipments aggregating 515,657 tons valued at $10,980,907 in April, 1941, and 470,852 tons, $29,196,711 in May last year.

Cumulative five-month exports, 2,618,001 tons valued at $187,988,868, top those of the first five months of 1940—2,147,762 tons valued at $156,910,625.

In point of tonnage, non-alloy steel ingots, blooms, etc., comprised the chief item exported, the total 58,900 tons comparing with 72,734 tons exported in April. Non-alloy black steel sheets took second rank with the month's total of 32,136 tons some 2800 tons greater than the April figure of 29,300. Other outstanding commodities in the May trade included alloy steel ingots, blooms, etc., 30,817 tons, pig iron, 27,444 tons, and non-alloy plates, 24,173 tons.

At 62,894 tons in May scrap exports were little more than half as large as 120,152 tons in April, and amounted to about 20 per cent of 310,870 tons in May, 1940.

Cumulative scrap exports stand at only 356,862 tons, in contrast with 1,161,123 tons in the first five months of 1940.

Exports of Industrial Machinery Drop 11 Per Cent

United States exports of industrial machinery in May, 1941, were valued at $36,508,559, a decline of 11 per cent from the April figure of $40,963,265, according to the Department of Commerce. Decreased shipments of metal-working machinery more than offset substantial gains recorded in the exports of power-generating equipment, construction and conveying machinery.

Dropping to the lowest value recorded since July, 1940, machine tools amounted to $14,389,047 compared with $19,021,589 in April. Practically all classes of machine tools shared in the decline, milling machines showing the largest drop to $2,950,349 from $5,285,184. Exports of lathes were off to $2,414,299 from $3,503,755, and drilling machines dropped to $576,436 from $1,112,884. Shipments of grinding machines amounted to $2,061,239 compared with $2,428,440 in the preceding month.

Exports of metal-working machinery other than machine tools also were down, to $2,758,088 from $3,359,743 in April. May shipments of sheet and plate metal-working machinery totaled $1,065,306 against $1,429,735 in the preceding month and exports of forging machinery dropped to $825,570 from $902,601. Rolling mill machinery exports were up to $227,136 from $208,001 in April.

Exports of power-generating machinery amounted to $4,295,292, or 46 per cent over the April total of $2,950,445. The most important factors were the gains recorded for marine diesel engines to $1,360,347 from $864,009, and steam locomotives to $1,036,975 from $176,063.

IRON AND STEEL FOREIGN TRADE STATISTICS

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	May 1941	May 1940	Jan. through May 1941
Pig iron	27,444	23,606	268,822
Ferromanganese and spiegeleisen	1,745	3,431	1,807
Other ferroalloys	2,104	759	11,682
Ingots, blooms, etc.:			
Not containing alloy	58,900	129,304	573,125
Alloy incl. stainless	30,817	3,960	198,810
Steel bars, cold fin.	1,794	3,210	52,958
Bars, iron	263	471	1,705
Bars, concrete	17,700	8,421	76,167
Other steel bars:			
Not containing alloy	15,780	36,368	96,882
Stainless steel	34	156	283
Alloy, not stainless	8,277	2,805	30,391
Wire rods	11,077	16,796	55,602
Boiler plate	623	802	15,655
Other plates, not fab.:			
Not containing alloy	24,173	35,716	166,492
Stainless steel	8	25	151
Alloy, not stainless	899	301	2,370
Skelp iron or steel	15,357	4,799	66,927
Sheets, galv. iron	535	847	4,880
Sheets, galv. steel	8,291	10,864	43,646
Sheets, "black" steel:			
Not containing alloy	32,136	31,999	167,814
Stainless steel	74	62	469
Alloy, not stainless	1,816	308	5,474
Sheets, black iron	1,516	1,839	5,408
Strip steel, cold-rolled:			
Not containing alloy	3,817	3,645	23,458
Stainless steel	33	44	195
Alloy, not stainless	96	29	302
Strip steel, hot-rolled:			
Not containing alloy	7,289	8,560	40,804
Stainless steel	2	1	25
Alloy, not stainless	74	45	257
Tin plate, taggers' tin	19,705	29,537	86,093
Terneplate (incl. long ternes)	452	727	3,368
Tank, except lined	1,836	1,477	10,577
Shapes, not fabricated	17,356	15,766	126,387
Shapes, fabricated	5,003	6,650	27,841
Plates, fabricated	1,668	1,063	13,635
Metal lath	237	229	883
Frames and sashes	130	373	793
Sheet piling	137	1,009	3,589
Rails, 60 lbs.	4,292	11,589	46,656
Rails, under 60 lbs.	2,412	4,100	19,415
Rails, relaying	225	1,182	3,279
Rail fastenings	533	1,333	8,444
Switches, frogs, crsgs.	46	169	767
Railroad spikes	457	523	3,140
R.R. bolts, nuts	171	297	792
Boiler tubes, seamless	4,403	1,446	22,141
Boiler tubes, welded	106	158	749
Pipe:			
Seamless casing and oil-line	8,964	11,198	30,930
Do., welded	1,934	1,472	7,745
Seamless black	3,076	2,051	12,959
Pipe fittings:			
Mall.-iron screwed	531	291	2,170
Cast-iron screwed	159	239	517
Pipe and fittings for:			
Cast-iron pressure	5,884	9,783	21,262
Cast-iron soil	1,456	1,752	5,677
Pipe, welded:			
Black steel	5,832	2,401	23,446
Black wrought-iron	480	347	1,859
Galvanized steel	9,223	4,422	33,702
Galv. wrought-iron	415	294	2,369
All other pipe, fittings	1,513	830	11,532
Wire:			
Plain iron or steel	6,445	5,991	27,937
Galvanized	5,150	5,596	25,150
Barbed	6,150	3,552	23,388
Woven-wire fencing	529	486	1,774
Woven-wire scr'n cloth:			
Insect	111	67	461
Other	238	195	1,087
Wire rope and cable	1,520	1,065	6,396
Wire strand	279	78	888
Electric welding rods	498	251	2,574
*Card clothing		1	
Other wire	1,256	1,104	5,771
Wire nails	5,444	3,834	20,010
Horseshoe nails	266	26	1,107
Tacks	166	57	497
Other nails, staples	644	554	3,115
Ordinary bolts, machine screws	3,320	1,496	17,124
Castings:			
Gray-iron (incl. semi-steel)	808	415	4,204
Malleable-iron	158	221	1,732
Steel, not alloy	408	165	1,387
Alloy steel, incl. stainless	101	57	522
Car wheels, tires, axles	1,954	1,318	7,050
Horseshoes and calks	68	34	297
Forgings, n.e.s.:			
Not containing alloy	4,340	1,730	17,764
Alloy, incl. stainless	348	675	2,488
Total	409,840	470,852	2,618,001
Scrap, iron and steel:		308,456	
†No. 1 heavy melt.	10,379		80,885
†No. 2 heavy melt.	35,761		153,599
†Baled and bundled	7,053		29,404
†Cast and burnt	1,231		19,755
†Other	6,645		66,427
Scrap, tin plate		165	176
Tin plate circles, strips, cobbles, etc.	536	290	2,459
Waste-waste tin plate	1,207	1,849	3,803
Terneplate clippings and scrap	82	110	354
Total scrap	62,894	310,870	356,862
GRAND TOTAL	472,734	781,722	2,974,863
Iron ore	208,407	86,075	280,469

* Not separately classified after Dec. 31, 1940.
† New class.

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

Gross Tons

	1941		1940	
	Exports	Imports	Exports	Imports
Jan.	698,853	423	583,521	8,274
Feb.	600,240	796	671,301	6,740
Mar.	567,227	6,273	663,980	5,096
April	635,809	2,620	612,906	6,674
May	472,734	.....	783,964	7,759
June	.....	.....	936,047	5,505
July	.....	.....	1,034,938	3,542
Aug.	.....	.....	1,402,075	2,105
Sept.	.....	.....	1,221,052	2,598
Oct.	.....	.....	1,105,510	3,966
Nov.	.....	.....	788,176	980
Dec.	.....	.....	805,158	4,064
Tot.	.....	.....	10,608,628	57,303

MEN of INDUSTRY

■ **STEWART McNAUGHTON,** associated with Baldwin Locomotive Works, Philadelphia, 42 years, has been promoted to general sales manager, locomotive division, in charge of all steam and diesel locomotive sales.

♦

Otto L. Weber has been appointed superintendent of industrial relations, Edgar Thomson works, Carnegie-Illinois Steel Corp., Braddock, Pa.

♦

J. W. Colgan, formerly manager, Handy & Harman of Canada Ltd., Toronto, Ont., has been transferred to New York as sales manager of the parent company.

♦

W. C. Doemel, heretofore superintendent, Vulcan Mold & Iron Co., Latrobe, Pa., has been promoted to plant manager, and **J. Frank Mooney** has become superintendent, succeeding Mr. Doemel.

♦

George H. Lee Jr. has been appointed sales representative in southern and southeastern districts for Pittsburgh Screw & Bolt Corp., Pittsburgh. He succeeds **W. N. Hicks,** resigned.

♦

Russell G. Davis has been named manager, commercial gear plant, Foote Bros. Gear & Machine Corp., Chicago. He formerly was assistant to sales manager, chain division, Chain Belt Co., Milwaukee, with which organization he was associated 20 years.

♦

Daniel M. Watts, formerly management engineer, Bendix Aviation Corp., South Bend., Ind., has become factory manager, Kaydon Engineering Corp., Muskegon, Mich., recently organized by **A. Harold Frauenthal,** who for a number of years was vice president and general manager of Bantam Bearings Corp.

♦

Henry L. Clark, director of the statistics section of General Motors Corp. since 1933, has been appointed general manager of the Southern California Division of General Motors, South Gate, Calif., succeeding **Raymond J. Wilkins** who will become a member of the labor relations staff in Detroit. The Southern California Division assembles Buick, Oldsmobile and Pontiac cars for the West Coast.

Stewart McNaughton

George H. Lee Jr.

Daniel M. Watts

♦

Gerald R. Barrett, sales representative in the New York metropolitan area for Clover Mfg. Co., Norwalk, Conn., has been transferred to Boston, and will serve the New England territory. **L. P. O'Neill** has been assigned to the Chicago territory, and **L. W. Kilpatrick** has been made sales representative in North and South Dakota, Minnesota and northern Iowa.

♦

A. T. Carter, 36 Richmond street, Rochester, N. Y., has been named representative in upper New York state for Keystone Carbon Co., St. Marys, Pa.

♦

Robert M. MacIntosh has been appointed head of the division of analytical chemistry at Battelle Memorial Institute, Columbus, O. Mr. MacIntosh formerly was associated with Guggenheim Brothers Research Laboratories, New York, where he had served as chief chemist since 1932.

♦

W. L. Gourley, president, Lehmann Machine Co., St. Louis, has been elected treasurer also. **Paul Lehmann** and **A. H. Lehmann,** formerly vice president and secretary, respectively, have resigned. **L. A. Carter** has been made secretary.

♦

Arnold G. Lenz, assistant manufacturing manager in charge of the Flint, Saginaw and Bay City plants of Chevrolet division of General Motors Corp., has been promoted to assistant to **Hugh Dean,** assistant general manufacturing manager of Chevrolet at Detroit.

♦

J. Walter Snavely, the past seven years district manager in the Houston, Tex., territory for Chain Belt Co., Milwaukee, has returned to the sales department of the conveying and engineering products division at Milwaukee. **W. A. Pitts,** formerly representative in Oklahoma City, Okla., has been appointed district manager of oil well sales at Houston, while **George Hunt** has been named district manager of industrial sales, with headquarters at Dallas, Tex.

Activities of Steel Users, Makers

■ MATHIESON Alkali Works, New York, last week reported plans for a $16,000,000 magnesium metal plant at Lake Charles, La. Construction is to be financed through a federal grant. Annual production is to be from 15,000 to 20,000 tons. Dolomite ore from the Burnett, Tex., area will be used.

♦

A step toward further decentralization of America's program for the production of vital defense materials was seen last week in the announcement that a Goodyear Tire & Rubber Co. subsidiary shortly will erect a large plant for the manufacture of airplane parts at Litchfield Park, Arizona, 15 miles west of Phoenix.

♦

Newburgh & South Shore Railway Co., which serves steel mills and other industrials in Cleveland's Cuyahoga valley district, is doubling its fleet of diesel-electric locomotives. Less than a year ago it obtained four of them; now it is acquiring four more, all Alco-G.E. manufacture.

♦

A new record for rapid construction of modern destroyers was established by the Federal Shipbuilding & Dry Dock Co., a United States Steel Corp. subsidiary, when two destroyers were launched last week at Kearny, N. J. The U.S.S. BRISTOL and the U.S.S. ELLYSON, slid down the ways seven and one half months after keel layings. The previous construction record was made by Federal on the U.S.S. EDISON which was launched eight and one half months, and delivered ten and one half months, after keel laying.

♦

Cooper Alloy Foundry Co., Elizabeth, N. J., is starting construction of a 20,000-square foot addition to its foundry at Hillside, N. J., which since January of this year has been expanded to 60,000 square feet. When the present expansion program is completed all operations in the 30,000-square foot plant in Elizabeth will be centered in Hillside.

♦

Battelle Memorial Institute, Columbus, O., has begun construction of a $160,000 addition to its process metallurgy laboratory building. The new structure will be five stories, 70 x 105 feet and will provide 35,000 square feet of space.

♦

Southern California Gas Co. has awarded contract to Bartlett Hayward division of Koppers Co., Baltimore, for design and construction of a 10,000,000 cubic foot gas holder at its plant in Los Angeles.

♦

Revere Copper & Brass Inc. has broken ground for its $10,000,000 rolling mills at Fullerton and Normandy avenues, Chicago, to produce ammunition brass and cartridge cases. The plant, being built with government funds, is expected to be ready for complete operation by next June. James Stewart Corp., 343 South Dearborn street, Chicago, is general contractor.

♦

Keystone Carbon Co. Inc., St. Marys, Pa., has appointed the following distributors for bronze bearings: Ohio Ball Bearing Co., 6531 Euclid avenue, Cleveland; Indiana Bearings Inc., 510 North Capitol street, Indianapolis, and West Virginia Bearings, East Charleston, W. Va.

♦

Reorganization of the Enterprise Foundry Co., Belleville, Ill., closed since November, 1940, has been completed. Moise Wambergue has been elected president of the new company to be known as Enterprise Foundry Inc.

♦

Harris Calorific Co., maker of gas welding and cutting apparatus, Cleveland, has established a factory sales and service office at 5604 Stone avenue to serve metropolitan Cleveland and northern Ohio.

♦

Righter Mfg. Co. has moved from 4626 San Fernando road, Glendale, Calif., to 800 South Flower street, Burbank, Calif.

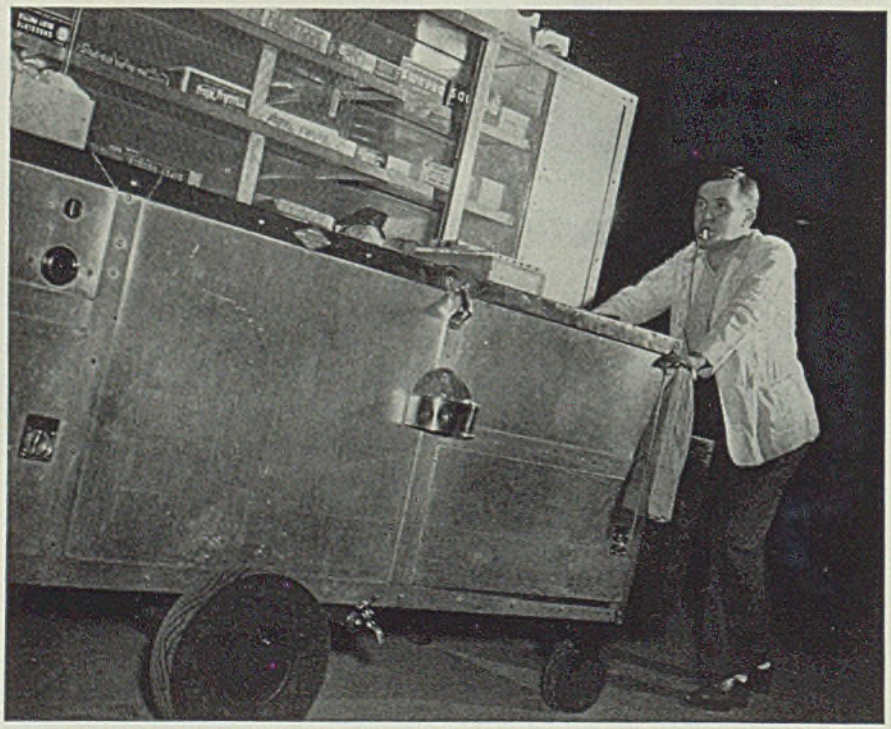
♦

Brooks-Yarrow Co., Broad Street Station building, Philadelphia, has been appointed district representative for A. F. Holden Co., New Haven, Conn., manufacturer of heat treating and affiliated equipment.

♦

C. C. Bradley & Son Inc., Syracuse, N. Y., has been reorganized after nine years of operation under receivership. New officers are: Dana W. Norris, president and treasurer, and Goodwin Bradley, vice president and secretary.

"Calory Carts" Reduce Fatigue



■ Five mobile lunch wagons, dubbed "calory carts", carry between-meal snacks to Westinghouse Electric & Mfg. Co. workers daily. Company has found that light lunches, candy and beverages help reduce industrial fatigue and improve efficiency of the workers

NAM Industrial Health Survey Report Published

■ "Industrial Health Practices," report summarizing a survey recently completed by the National Association of Manufacturers' committee on healthful working conditions, has been published by the association, 14 West Forty-ninth street, New York, and is available for further distribution. Survey

contained replies from more than 2000 manufacturing plants in 47 states, and represents nearly 2,000,000 workers.

Analysis of the survey indicated: Health programs have proved their worth to companies instituting them; most concerns use physical examinations as a means of determining proper placement of their employes but do not unwarrantedly discriminate against applicants on the basis of these examinations; factory health programs are becoming more widely accepted regardless of size and type of industry.

Single copies of the report booklet are available free to NAM members and nonprofit organizations; charge of 50 cents per copy is made to all others. Dr. Victor G. Heiser, the association's consultant to the committee on healthful working conditions, directed the study.

Third Quarter Car Requirements Up 14.8%

■ Third quarter freight car requirements will be 14.8 per cent higher than in the corresponding period last year, according to estimates by the Regional Shippers' Advisory Boards. Estimated carloadings are 7,272,955, compared with an actual 6,337,841 in the September period, 1940. Increases are expected for all of the 29 commodity classifications.

Coal and coke shipments will take 17 per cent more cars; ore and concentrates, 16.6 per cent; iron and steel, 16.5; machinery and boilers, 31.8; automobiles, trucks and parts, 54.9.

DIED:

■ **R. N. Magill,** 81, former purchasing agent, Alabama By-Products Corp., Birmingham, Ala., in Birmingham, July 10.

♦

Brooke Mousley, chief chemist, Ajax Metal Co., Philadelphia, July 20. He had been associated with the company over 30 years.

♦

Leo E. Walsh, 53, the past 12 years treasurer, Goss Printing Press Co., Chicago, at his home in River Forest, Ill., July 18.

♦

James B. Hilton, an officer and director of Columbus Mining Co., Chicago, since its formation in 1915, at his home in Chicago, July 20. He had been president since 1937.

♦

Clarence H. Kennedy, 50, vice president in charge of sales, Kennedy Valve Mfg. Co., Elmira, N. Y., in that city, July 21.

Seaway Project Assailed as Threat To Iron Ore, Coal, Oil Industries

WASHINGTON

■ VIGOROUS protest against the proposed Great Lakes-St. Lawrence deep waterway and power project was launched by Julian D. Conover, secretary, American Mining Congress, before the Rivers and Harbors Committee of the House of Representatives last week.

The mining congress spokesman, representing a substantial portion of the nation's coal production and 90 per cent of the various metals produced in this country, said that the mining industry "has consistently held the view that the Great Lakes-St. Lawrence deep waterway and power project was unwise and harmful to the best interests of the country."

Mr. Conover urged that whatever additional power is needed for defense production should by all means "be provided at the earliest possible date." He advanced the suggestion that the increased power needs be met by construction of modern, coal-fired steam generating plants at strategically located points which could be made available in far less time than power from the proposed St. Lawrence project.

"For Cheap Foreign Labor"

He charged the chief significance of the seaway would be as an inlet to the heart of America for the products of cheap foreign labor rather than an outlet for American products, as proponents of the measure contend.

He cited the Lake Superior iron ore industry which supplies 85 per cent of present requirements as an example.

"Studies of the proposed waterway show that the principal incoming cargoes would consist of bulk commodities, such as iron ore, coal, oil, and crude and semifinished iron and steel products, besides agricultural products. Some shipments of Swedish iron ore have come through the existing 14-foot St. Lawrence channel to Buffalo in years prior to the present war. The deeper channel would unquestionably encourage large scale importations of the high grade foreign ores from various sources to our lake ports for use by inland furnaces.

"We do not want to see the encroachment of foreign ores which has largely pre-empted our eastern seaboard market extended to the furnaces in the lower Great Lakes region by making seaports of the Great Lakes harbors. We wish to emphasize, as strongly as we can, first, the harm this would do to a great mining region; second, the resulting discouragement to further developments now under way by which millions of tons of previously non-commercial iron deposits may be utilized; and third, the potential danger this entails to our national security."

Mr. Conover charged that the Lake Superior iron ore industry, representing an investment of $600,000,000, wages and ore handling charges of $150 000,000 yearly, paying state and local taxes in amount of $30,000,000 annually and directly supporting 200,000 persons, would suffer heavy losses if the seaway project were to be initiated.

The witness further declared that the "inauguration of the St. Lawrence project would darken the outlook for the future and be a bitter blow to those responsible for coal production. It could not help having a discouraging effect upon the industry and its capacity to meet a national emergency."

Mr. Conover pointed out that coal being a bulk commodity, would inevitably be brought from foreign countries into the United States at ballast rates. Likewise, he added, crude petroleum and fuel oil from South America, which have largely invaded our eastern seaboard, would enter with ease the interior ports of both this country and Canada. Loss of markets for coal, both directly and indirectly, might be as much as 50 million tons annually, he stated.

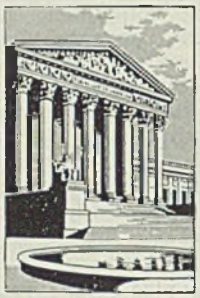
Loss to Coal and Rails

"The loss of this tonnage," he said, "would take $100 000,000 from the gross returns to the coal industry, of which fully $60,000,000 constitute wages paid to labor. Depriving the railroads of this traffic would take some $110,000,000 from their revenues, of which approximately $45,000,000 represents wages to labor. Every 1,000,000 tons of coal displaced means the loss of 1,000,000 man-days to those employed in the mining, transportation and sale of coal. Neither the bituminous nor the anthracite industry has known prosperity for many years, and they can ill afford to lose such an important part of the market for their products."

■ B. F. Goodrich Co., Akron, O., recently completed at Akron a $300,000 processing plant for manufacture of Koroseal, synthetic substance manufactured from limestone, coke and salt. The new plant climaxed expenditure of more than $1,000,000 in development of the synthetic.

Windows of WASHINGTON

Ferroalloy capacity considered adequate for current rate of consumption. Inventories reported low. New production units near completion . . . Federal specifications altered to relieve scarcity in metals . . . Aluminum scrap supplies freed by household collection campaign . . . Ceiling prices established for brass mill scrap. Premiums offered for quantity shipments . . . Special power unit in OPM organized



By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ FERROALLOY capacity is adequate for the present rate of consumption, although inventories are low, according to defense officials. They question, however, whether increases in capacity now under way or projected will be sufficient for the anticipated increase in demand. Consumers of ferrochromium and ferrosilicon now are reported to be on a hand-to-mouth basis.

OPM and other government officials contend they do not know just how much the increases in capacity will ease the present tight situation, and, they add, if such information were available, it would be considered a military secret.

One unit of Ohio Ferro-Alloys Corp., in the state of Washington, is reported to be in production and a second unit will start producing in September. Pittsburgh Metallurgical Co. with a new plant in Charleston, S. C., and Electro Metallurgical Co. with a new plant in Portland, Oreg., will start operations soon.

Defense officials refuse to state what type of ferroalloys will be produced in these plants or to reveal capacity.

Vanadium Corp. of America is expanding production of ferrochromium and ferrosilicon. Rustless Iron & Steel Corp. is reported to be developing a large reserve of chrome ore in California while the government is opening chrome ore mines in Montana. Similar projects are under way in Alaska.

Much lower grades of chrome and manganese can be used in industry than is present practice, government officials believe. Lower grade ores, however, would reduce efficiency and increase production costs, and will be used only if supplies of high grade ores are inadequate.

Treasury Changes Specifications To Conserve Scarce Metals

Twenty-six changes in federal specifications to eliminate the necessity for using scarce metals in goods purchased by the government have been ordered by the Procurement Division of the Treasury Department.

Clifton E. Mack, director, said the emergency specifications are designed to conserve zinc, chromium, bronze, nickel, brass, aluminum and steel alloys. The specifications cover such items as corrugated sheet iron containers, laundry appliances, chain-link or welded fencing.

In the case of zinc, standard federal requirements are that the metal be used as a galvanizer for pails, tubs and cans. The emergency specification permits the use of metallic, painted, lacquered or enameled corrosion protective coatings. In another emergency revision, the use of zinc is minimized by allowing for a thinner coat of the metal through electroplating rather than hot dipping.

Commerce Department To Report on New Construction

A construction unit that will provide comprehensive current data on all phases of construction in the United States has been set up in the Department of Commerce.

Carroll L. Wilson, director of the Bureau of Foreign and Domestic Commerce, in which the unit will be situated, said the need for complete and detailed analyses of the construction industry "is very evident at this time."

S. Morris Livingston, an economist, will direct the unit. Joseph H. Ehlers, an engineer with experience in this country and China, will be technical assistant.

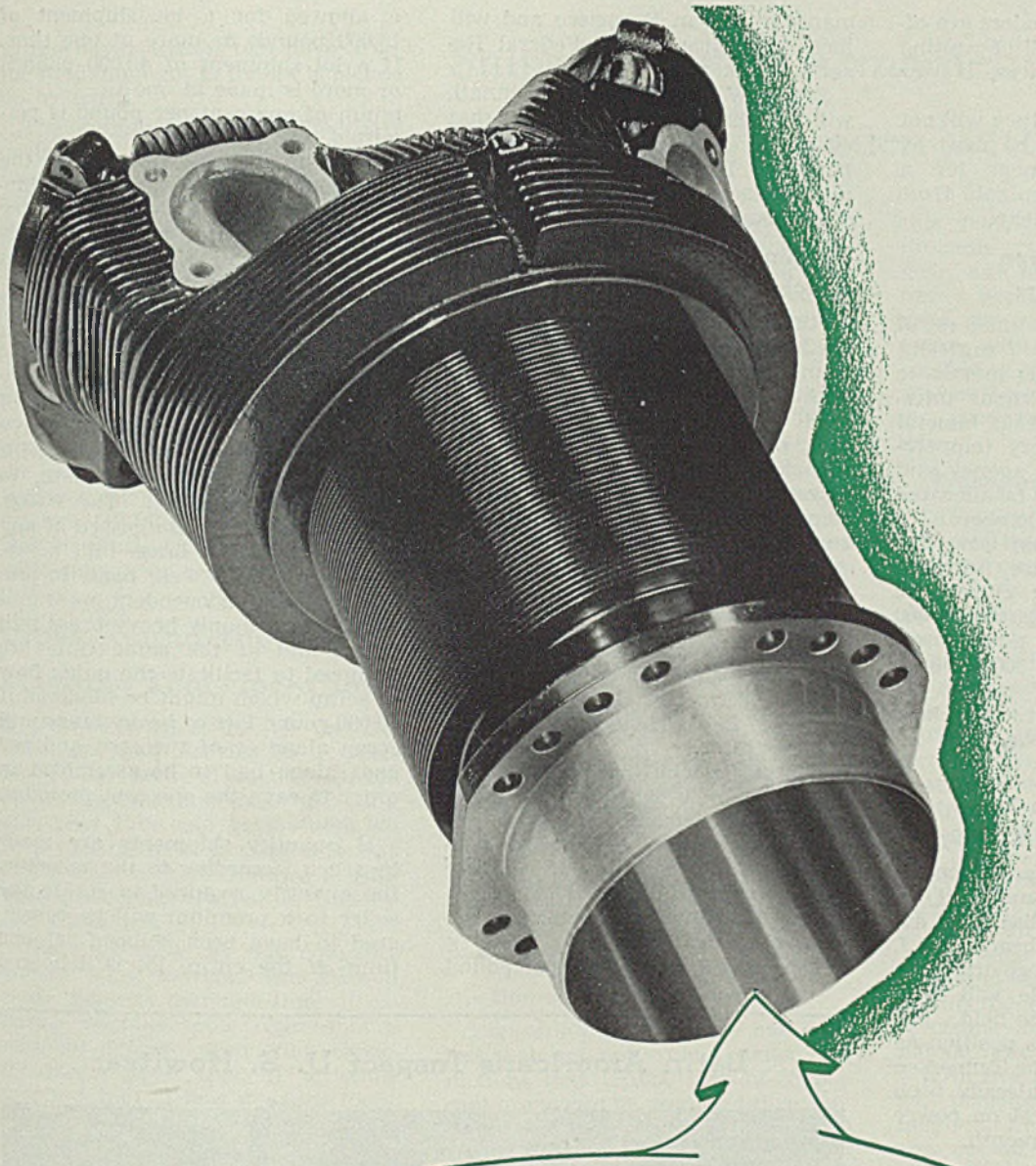
Household Aluminum Collection Drive Frees Scrap Supplies

Publicity given to the household aluminum collection campaign has caused a noticeable freeing of aluminum scrap held by dealers, OPM officials said last week. Apparently fearful that contributions will be so heavy as to cause weakening in the

OPM Steel Industry Advisory Committee Named

Steel industry defense advisory committee of 15 was appointed last week by the Bureau of Clearance of Defense Industry Advisory Committees, OPM. Committee will advise and consult with A. D. Whiteside of OPM's Production Division, who has been designated presiding officer for the government. First meeting was held July 23. Committee members:

W. F. Detwiler	Chairman	Allegheny Ludlum Steel Corp., Pittsburgh
B. F. Fairless	President	United States Steel Corp., New York
Frank R. Frost	President	Superior Steel Corp., Pittsburgh
T. M. Girdler	Chairman	Republic Steel Corp., Cleveland
E. G. Grace	President	Bethlehem Steel Co., Bethlehem, Pa.
Edward L. Parker	President	Columbia Steel & Shafting Co., Pittsburgh
Henry A. Roemer	President	Pittsburgh Steel Co., Pittsburgh
Frank Purnell	President	Youngstown Sheet & Tube Co., Youngstown, O.
E. L. Ryerson Jr.	Chairman	Inland Steel Co., Chicago
Hayward Niedringhaus	President	Granite City Steel Co., Granite City, Ill.
Ernest T. Weir	President	National Steel Corp., Pittsburgh
Charles R. Hook	President	The American Rolling Mill Co., Middletown, O.
Robert W. Wolcott	President	Lukens Steel Co., Coatesville, Pa.
Elton Hoyt	Partner	Pickands, Mather & Co., Cleveland
W. S. Tower	President	American Iron and Steel Institute, New York



WHAT ARE YOUR REQUIREMENTS?

Mirror finish? Grey finish? Finish within 3 or 4 micro-inches? Absolute straightness and roundness? High production? Take a tip from the aircraft engine manufacturers — here, where finish, accuracy, and production are of such vital importance, Bryant Internal Grinders are the recognized choice. Overhead wheel slide, massive construction, rigidity, and ease of operation are features that are writing a new cost and production story in the aircraft industry. Let Bryant estimate the cost and production story on your own work — there is no obligation.

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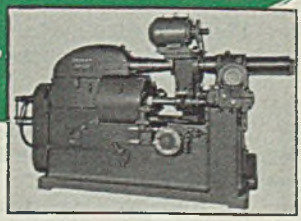


SERIES 24 BRYANT
INTERNAL GRINDER

price structure, many dealers are offering scrap now instead of waiting for more favorable prices, it was said.

OPM spokesmen said they will not allow this situation to be used by smelters as an argument for a lower price on aluminum sold from the government scrap heap.

Makers of Bimetals Given High Preference Ratings

OPACS has granted makers of thermostatic bimetals sufficient quantities of nonferrous metals to maintain operations without interruption. Pointing out that bimetal is essential in machinery temperature control devices, the agency said the following supply will be allocated to manufacturers until October:

Nickel, 14.4 short tons; iron, 43.8 short tons; silicon bronze, 9.6 tons; muntz metal, 2.7 tons; chromium, 1320 pounds; manganese, 600 pounds; aluminum, 75 pounds; cobalt, 75 pounds; copper, 300 pounds; zinc 210 pounds.

OPACS requested that the highest civilian preference rating be assigned to such orders.

Special Power Section Is Established, Under J. A. Krug

Establishment of a special power unit in the OPM to handle all defense power problems has been announced. New unit is headed by J. A. Krug, acting as OPM co-ordinator for defense power. He will have full responsibility in this field. Mr. Krug, on leave from his position as manager of power for the Tennessee Valley Authority, has already been actively at work in OPM on power problems for nearly a month.

High-Copper-Base Alloys Exempted from Metals Order

General Metals Order No. 1 has been amended to exempt from its provisions copper-base alloys in which the percentage of copper, by weight, equals or exceeds the percentage of all other metals.

Amendment was made necessary because inventory control of such copper-base alloys is already provided for in the order providing industry-wide control on copper, copper products and copper-base alloys.

Priorities Division Opens Three New Field Offices

Three new field offices, located in Atlanta, Ga., Cincinnati, and San Francisco, have been opened by the Priorities Field Service. Field offices previously had been opened in ten other cities.

John B. Reeves will be district manager for the service in Atlanta and will have his office in the Federal Reserve Bank in that city.

Andrew L. Kerr will be district manager in San Francisco and will have his office in the Federal Reserve Bank there.

Bruce W. Burroughs, Cincinnati, will be district manager for that city, with offices in the Union Trust building. District managers usually may be located through Federal Reserve Banks in the cities named.

Machine Gun Production Reaches 1500 Per Day

Rifles and submachine guns now are being produced at a rate of more than 1500 per day. This compares with daily average production in August, 1940, of 289, and in January, 1941, of 931.

Included in these figures are the Garand semiautomatic rifle, the automatic Browning, and the Thompson submachine gun.

Ceiling Prices Established For Brass Mill Scrap

Ceiling prices were put into effect on the principal kinds of brass mill scrap in Price Schedule No. 12, issued by Leon Henderson, OPACS administrator.

Top prices which may be charged under the new schedule for heavy scrap range from 9½ cents per pound for commercial bronze containing 95 per cent or more copper to 8⅝ cents per pound for yellow brass. Rod ends and turnings scale downward from these prices.

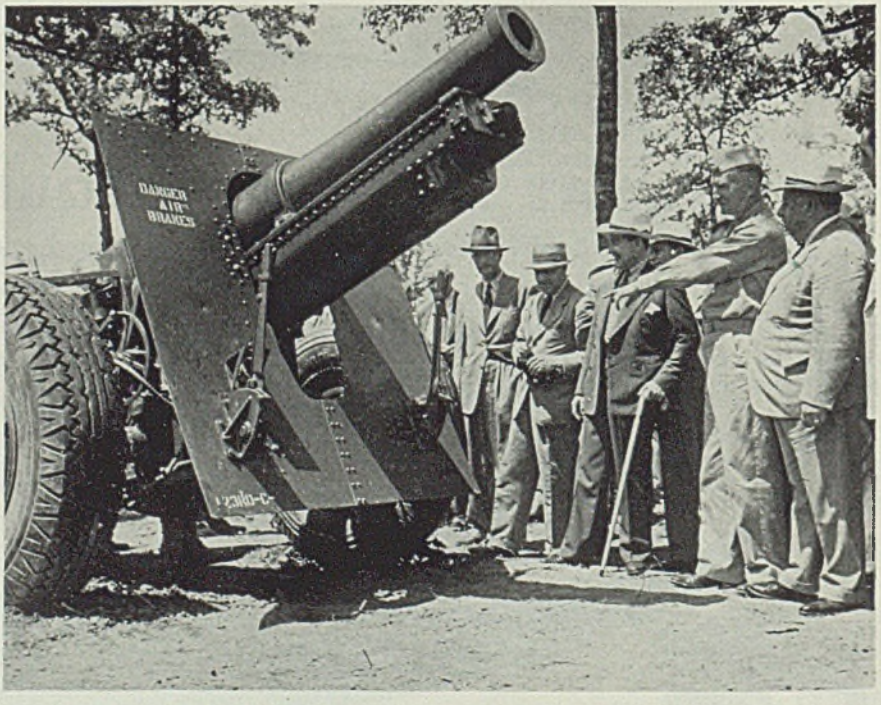
A premium of ⅝ cents per pound is allowed for a lot shipment of 15,000 pounds or more at one time. If a lot shipment of 40,000 pounds or more is made at one ti[me] mium of one cent per pound is permitted.

All ceiling prices contained in the schedule are f.o.b. point of shipment and apply to clean and dry scrap, free from foreign materials and meeting the generally accepted maximum standards in the trade.

In reference to quantity differentials, the schedule stipulates that a lot of 15,000 pounds may be made up of any kind or grade of heavy scrap or of any kind or grade of turnings and rod ends, but heavy scrap may not be mixed either with turnings or rod ends, or both, to make up such a lot. The 40,000-pound lots may be comprised of any kind or grade of brass mill scrap. These provisions were made to protect the small independent brass mill which can use only heavy brass mill scrap, and at the same time are designed to facilitate the quick flow of scrap which might be hindered if 40,000-pound lots of heavy brass mill scrap alone or of turnings and rod ends alone had to be assembled in order to earn the one cent premium per pound.

If quantity shipments are made by truck, according to the schedule, the quantity required to entitle the seller to a premium will be considered to have been shipped "at one time" if the entire lot is delivered

Latin Americans Inspect U. S. Howitzer



Features of a 155-millimeter howitzer are explained to Dr. Carlos N. Brin, ambassador from Panama, and Honduran Minister Julian R. Caceres by Gen. Sam T. Lawton, commanding officer at Camp Forrest, Tennessee, during a visit by a group of Latin American diplomats. NEA photo

to the buyer within two days after the first shipment in the lot is picked up by truck.

The premiums will compensate dealers for sorting and accumulating scrap until 15,000 or 40,000-pound lots are assembled. However, any maker or seller of scrap is entitled to similar quantity premiums. The base maximum prices stipulated in the schedule, of course, apply to all sellers of scrap, makers or dealers.

New ceiling prices are effective as of July 22, regardless of pre-existing contracts. However, if necessary to protect the dealer against loss on the sale of brass mill scrap already acquired at prices above the new ceilings OPACS will grant permission to conclude such contracts entered into prior to July 22, 1941.

Urges Round-the-Clock Machine Tool Operation

■ More extensive use of the Defense Contract Service as a clearing house between manufacturers possessing machine tools operating only part time and government offices placing defense contracts was urged last week by Charles J. Stilwell, president, Warner & Swasey Co., Cleveland.

"Surveys made by our company and by other sources," Mr. Stilwell said, "indicate that idle time of existing machine tools represents a national defense production capacity larger than that of a whole year's output of new machine tools. These machines must be put to work around-the-clock.

"This need is especially urgent because the new bomber program and other increased schedules have created an additional machine tool demand which will become acute somewhere between December and March. The machine tool industry is already straining all its facilities to meet national defense requirements and the time is too short for the new load to be handled by building and equipping additional machine tool plants. The solution can lie only in putting to work, on jobs they are able to perform, the thousands of existing machine tools now operated only part-time in hundreds of manufacturing plants throughout the country, thereby releasing more new machine tools for aircraft production and similar work requiring extreme accuracy.

"No new government agency is required to effect this objective. It is a matter of proper co-ordination between existing agencies. Thus far, however, such co-ordination has not been apparent. . . .

"Putting in operation a machine tool now idle is the equivalent of a new machine tool *today*."

Ships Carrying Armaments To Red Sea To Return Laden with Manganese

NEW YORK

■ MANGANESE ore imports will increase sharply over the next several months as ships leaving here carrying armaments to Red Sea ports are scheduled to return with ore cargoes from India and South Africa. Several vessels already have loaded and are due back in American ports soon.

Substantial tonnages of chrome ore also will be imported from South Africa under this arrangement.

Most of the manganese and chrome ore is for the Metals Reserve Co. which since its formation has purchased more than 2,300,000 gross tons of which only a relatively small proportion has been delivered.

Domestic production also is being accelerated. Anaconda Copper Mining Co., Anaconda, Mont., recently started production at a new $1,000,000 concentrating plant and has contracted to supply the government with 80,000 tons a year for the next three years. The government has contracts for approximately 1,500,000 tons of domestic ore, from various producers, but little has been delivered yet.

Domestic Output Increasing

Domestic output to date has been less than anticipated and earlier predictions that 150,000 tons of 35 per cent ore would be produced this year have been scaled down to 100,000 tons. While this represents a substantial increase over the 40,000 tons produced in 1940 it is still far short of the record production of 304,366 tons in 1918.

Manganese stocks in this country July 1 were about 1,600,000 tons. Of this amount, 1,289,000 tons were for industrial account; Metals Reserve Co. has about 230,000 tons and the United States Ordnance Department 82,000 tons.

Imports during the first six months were 548,502 tons, as indicated in the accompanying table. Brazil was the largest supplier, followed by the Union of South Africa, India and Cuba.

As indicated by shipments so far this year, Brazilian shipments will probably run well ahead of last year, and may approximate 300,000 tons. Brazil is the largest manganese ore producer in this hemisphere, with deposits probably comparable in size with those anywhere else in the world, and in 1917 Brazil got production up to 524,000 gross tons.

Transportation Major Problem

Difficulty in moving ore from the mines to the seaboard has long been a major obstacle to large expansion in Brazil's output, but should the United States become sufficiently pressed for ore it may find it expedient to finance the construction of additional transportation facilities.

The United States Steel Corp. owns the largest manganese mine in Brazil. Some of the other mines are controlled entirely, or in part, by European capital, but it is pointed out, the Brazilian government could insure peak production of these properties if contracts proved sufficiently attractive.

Last year output was estimated at around 240,000 to 250,000 tons and during the three years immediately preceding, output averaged annually 220,000 tons.

With Brazil's other sources of outlet, principally Germany, France, Belgium, Luxembourg and Holland now cut off by the war, practically all of her output will be available to the United States. Most, if not all, of her output last year came to this country. This compares with a little more than half in 1939, about one-third in 1938 and approximately 60 per cent in 1937.

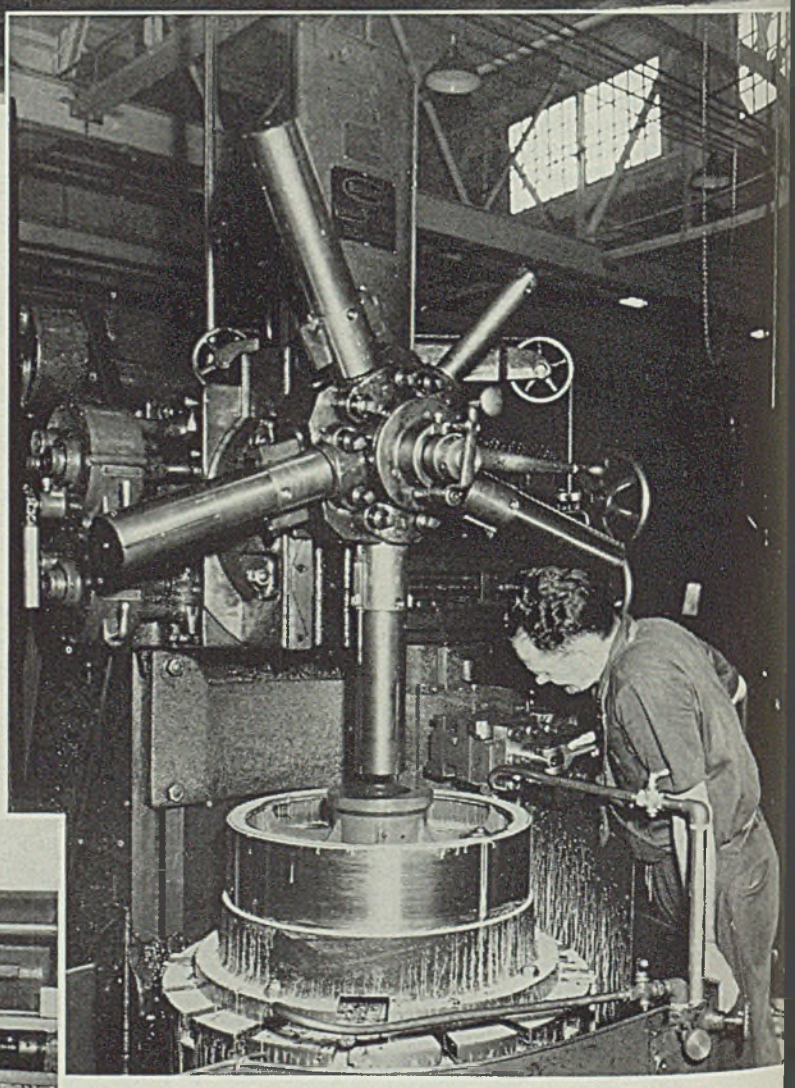
Cuban production, moving entirely to this country, is likely to be stepped up to around 160,000 to 170,000 gross tons. Of this amount, 130,000 tons will be provided by the principal producer which earlier in the year completed improvements at its concentrating plant. Cuban ore is high grade, running around 50 per cent. Chile may supply about 20,000 tons to this country.

1941 Imports of Manganese Ore

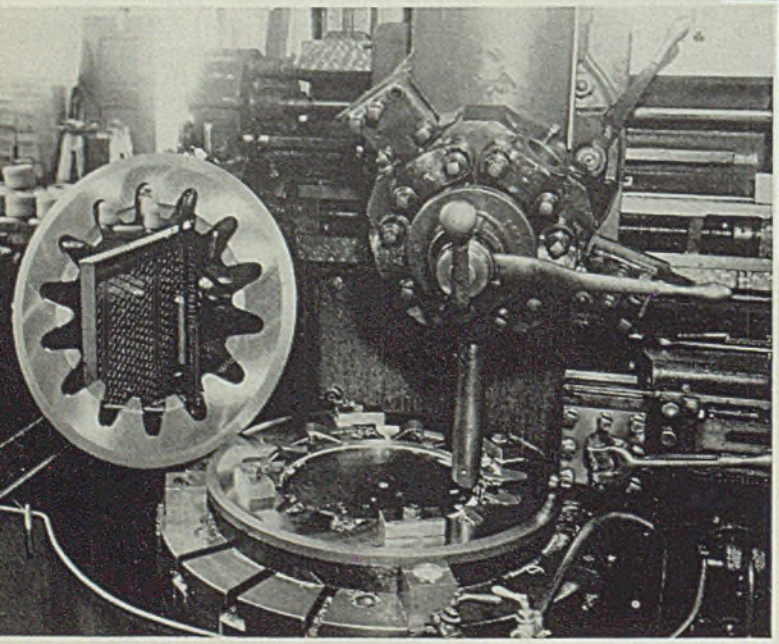
(Principal sources and total from all sources)

	Union of So. Africa	Brazil	India	Cuba	Total Imports
January	7,821	7,935	. . .	7,602	54,818
February	26,143	2,389	50,785	11,923	91,369
March	33,366	49,130	21,677	18,107	139,063
April	32,834	19,682	11,813	6,321	72,198
May	20,879	40,244	21,121	25,929	123,372
June	8,312	20,775	4,850	29,488	67,642
Total	129,355	140,155	110,246	99,370	548,502

FASTER TANKS... FASTER!...



DESIGNING faster tanks is one thing—rolling them off the assembly line at a faster rate is another. We must have faster tanks—a lot of them—and in a hurry. That is why there are great numbers of Bullard Vertical Turret Lathes working 24 hours a day on tank parts—like the ones illustrated here.



A Bullard V.T.L. with its main and side heads cutting simultaneously, saves time ON cuts and BETWEEN cuts. And—this is highly important—it is about the most versatile machine on the market.

BULLARD

THE BULLARD COMPANY

Mirrors of MOTORDOM

Fur starts to fly in debate over smoothness versus roughness on bearing surfaces. Babbitt thickness may be key to contrary results experienced with roughened crankpins . . . Working on changes in crankpin grinding technique . . . Henderson edict by "press release" starts parade to Washington, protesting curtailment . . . More machine tools needed for engine plants . . . Veterans rewarded, pass on

By A. H. ALLEN
Detroit Editor, STEEL

DETROIT

■ CHEERS, jeers and sneers greeted announcement here of the new conception of crankpin finish which Buick engineers have evolved. It will be recalled that decision was reached to roughen up crankpin surfaces—and possibly wristpins—from 3-5 to about 60 microinches as measured by the profilometer, in the belief that life of connecting rod bearings would be measurably improved.

Dave Wallace's Superfinish crowd at Chrysler is convinced there is something "screwy" about the development and at the moment is inclined to "wait and see." All their tests have proved just the reverse of the Buick findings—namely that pressures for oil break-down greatly increase as rubbing surfaces are finished progressively smoother. Why the experience at Buick should point in the opposite direction is for the moment a mystery, but one which no doubt will be explained satisfactorily before too much time elapses.

Question Is Why

One factor suggests itself in this teapot tempest over finishes. It is this: Buick's tests were made on connecting rods with a comparatively heavy layer of babbitt spun directly onto the steel of the rod and cap, in thickness of around 0.025-inch. Although this thickness is sharply reduced from former practice requiring 0.065-inch, it is still not as thin as engineers would like. They visualize getting down to around 0.010-inch, but it is difficult to realize this in shop practice with the Buick method.

However, motor companies using the inserted shell type of bearing with babbitt thickness down around 0.002-inch, look on the Buick rod bearings as thick, and this may be the explanation of why the roughened crankpins were productive of so much improvement in bearing life in Buick experimental engines. Certainly there is ample proof that bearing life was improved by the rougher shafts. The big question now is why.

There is considerable research being devoted by at least two major companies to the matter of finish grinding of crankpins. Practice has been to grind and lap journals as near perfectly straight across as was possible, within a couple of ten thousandths. This produces fillets next to the cheeks at either side of the journal and there is a tendency for the grinding wheel to climb this fillet and thus produce a journal which is not perfectly straight across but in fact dished out in the center. The idea now has been conceived of either turning or grinding a groove or channel at either side of the journal next to the cheeks, a couple of thousandths below the level of the journal and extending a couple of thousandths out from the cheeks. This permits accurate surfacing of the journal to the end that a better bearing will be realized with the connecting rod.

In turning such grooves there is of course the danger of getting a sharp corner at either end of the journal which might be the focal point for cracking from fatigue failure. It is reasoned that if these grooves could be formed with a grinding wheel, specially shaped to the job, it would be possible to maintain the radius clear up to the journal surface.

Anyway, the storm has broken between the adherents of roughness and the proponents of smoothness on bearing surfaces, and the edge still must be conceded to the latter. It will be interesting to watch the denouement.

One place where roughness is conceded to be desirable, of course, is on pistons where anodizing of aluminum followed by tin plating, or the phosphatizing of iron by the Parker Lubrite process (successor to Granodizing) is currently practiced. Chrysler has used the anodizing plus tin plating on aluminum pistons, the plating being felt necessary because of the scoring action often resulting from the plain anodized pistons. The thin tin coating prevented this and because of its softness provided an ideal break-in coating, filling in any low spots and being wiped off high spots on the piston. The Lubriting works much the same way, being a soft coating which can be scraped off with the fingernail.

Production Cut Proposal Brings Storm of Protest

The automotive industry, laden down with $2,000,000,000 of defense orders, the bulk of which are some distance from the production stage, did not utter a peep over the "proposal" of Leon Henderson that car production be scaled down to 200,000 passenger cars and light trucks per month for the year beginning Aug. 1. But labor, through the CIO, and automobile dealers and the governor of Michigan gathered their statistics together in a hurry and descended on Washington pell mell to protest. They were somewhat assuaged by the President's press conference statement that what was planned was not curtailment but "substitution"—defense production for car production— but the future course of events is far from clear.

In the first place, Mr. Henderson (head of the Office of Price Assignment and Civilian Sacrifice, as some call it) issued his proposal in the usual form of a press release, with no automobile company informed even in general terms. In the second place, he has apparently taken no cognizance of savings in critical materials the industry has effected by its program of conservation—70 per cent in aluminum, 76 per cent in nickel steel, 70 per cent in zinc,

72 per cent in tungsten and 37 per cent in plain steel—calculated on the basis of a 20 per cent curtailment from the 1941 model rate. There is more than a suspicion that for the moment at least the Henderson office is a little short on facts and a little long on sentiment.

Ready for Any and All Defense Assignments

Again it should be emphasized that repeatedly the motor industry has declared openly that defense production is its No. 1 job, that determination of defense needs must properly be the responsibility of the government, that the industry will move at once to do whatever is asked of it by the government as far as defense production is concerned. Beyond that, however, it feels that arbitrary curtailment of production is a needless gesture leading to serious dislocation of employment and disruption of activity in the plants of thousands of parts suppliers.

A logical procedure would be to let defense priorities on equipment, materials and labor determine the extent of car production. This has been the thinking of Mr. Knudsen in the OPM, and there is no one in all Washington who knows the manufacturing picture better or more intimately than he.

It may be interesting to note what car and truck production in the U. S. were for the six months starting Aug. 1, 1940, then to watch how closely the industry this year will approach these totals:

	Pass. Cars	Trucks
August	46,823	29,050
September	224,470	44,638
October	421,214	72,009
November	407,091	80,261
December	396,531	89,673
January	411,258	87,036

Allot Funds for Tools To Buffalo Engine Plants

Cost of equipping three Chevrolet plants in the Buffalo area with tools for aircraft engine production will exceed $37,000,000, according to announcement by the Defense Plant Corp. This is over and above the $89,000,000 order for 5000 engines and parts already placed with the Buffalo divisions. Chevrolet assembly plant, motor and axle plant and a Fisher Body plant will share the equipment appropriation with a new testing and reassembly unit to be built.

Graham-Paige plant in Detroit has received a commitment for $1,000,000 for additional machine tools to speed output of parts for the Sterling Engine Co. in Buffalo. Graham will build bases, reverse gear covers, connecting rods and other parts to the extent of $2,000,000 for Sterling which has contract for 8-cylinder 600-horsepower engines for the Coast Guard and 1200-horsepower engines for British torpedo boats.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1939	1940	1941
Jan.	356,962	449,492	524,058
Feb.	317,520	422,225	509,326
March	389,499	440,232	533,849
April	354,266	452,433	489,854
May	313,248	412,492	545,321
5 mos.	1,731,495	2,176,874	2,602,408
June	324,253	362,566	.....
July	218,600	246,171	.....
Aug.	103,343	89,866	.....
Sept.	192,679	284,583	.....
Oct.	324,689	514,374	.....
Nov.	368,541	510,973	.....
Dec.	469,118	506,931	.....
Year	3,732,718	4,692,338	.....

Estimated by Ward's Reports

Week ended:	1941	1940†
June 28	127,926	87,550
July 5	96,457	51,975
July 12	114,318	62,176
July 19	109,912	53,020
July 26	105,635	34,822

†Comparable week

Ford Veterans Promoted

Election of C. E. Sorenson and A. M. Wibel as vice presidents and directors of Ford Motor Co. was announced simultaneously with departure of P. E. Martin on a year's leave of absence to recuperate from illness. These three men were synonymous at Ford with production, purchasing and engineering, in that order. Messrs. Martin and Sorenson were two of the earliest associates of Henry Ford, Mr. Martin starting as machinist and assembler in 1903, the year the company was incorporated, and Mr. Sorenson beginning a year later as patternmaker. Mr. Wibel has been with the company since 1912, the last 14 years as purchasing director.

In recent weeks the years have taken toll of two other prominent figures in the annals of motordom. One was Fred J. Fisher, eldest of the six Fisher brothers who established Fisher Body. The other was Bernard G. Koether, sales genius for General Motors who came up through the Hyatt Bearings Division. Both were but 63 at their passing, young in years but old in point of service, for in the automotive industry an executive usually crowds about two years of business into one year of living, which is profitable but not always conducive to good health.

Develops Plastic Body

Ray Russell, industrial designer of suburban Detroit, has built up an experimental plastic car body on a 1941 Chevrolet chassis which has a number of interesting innovations. According to the *Detroit News*, the body structure is of welded steel tubing covered with wire mesh over which a cellulose acetate coating varying from 1/16 to ⅛-inch in thickness has been applied by some sort of "extrusion gun." Windows and windshield are of curved transparent plastic, the windows sliding horizontally. Bumpers are integral with the body and are of rubber covered steel. The roof is translucent to admit light. Overall height is 62 inches and width 76 inches.

Automotive Exports in May Highest Since January, 1938

United States exports of automotive products were valued at $35,007,743 in May, 1941, a new monthly high since January, 1938, and a record May valuation since 1930, according to the Department of Commerce.

The May valuation was 6.6 per cent higher than the $32,829,870 shipped in April, 1941, and 53 per cent over the $22,876,127 exported in May, 1940. The gain over April was accounted for by increased shipments of passenger cars, trucks, engines, garage equipment, motorcycles, and marine engines. Increases over May 1940 were shown in exports of practically all automotive products.

Passenger car exports in May totaled 8782 units valued at $6,147,380 compared with 8386 at $5,642,965 in April, 1941, and 9207 at $5,843,707 in May, 1940.

Shipments of trucks to foreign markets totaled 12,910 units valued at $13,659,787 in May as compared with 9914 at $12,009,948 in April, 1941, and 7832 at $6,995,465 in May, 1940.

June Industrial Truck Bookings Are Lower

■ Unit domestic bookings of electric industrial trucks and tractors in June were below those for April and May, according to the Industrial Truck Statistical Association, 208 South LaSalle street, Chicago. June bookings were 287, compared with 320 in May, and total net value of chassis was $948,005 in June and $1,234,936.35 in May.

Bookings included: 26 nonelevating platform trucks; 216 cantilever type; 32 tractors; and 13 cranes.

Further details may be obtained from the association.

■ General Electric Co.'s appliance and merchandise department, Bridgeport, Conn., has received a large order for newly perfected electrically heated flying suits from the Army Air Corps. Suits are designed to keep aviators comfortable through temperatures from 70 degrees above zero to 60 degrees below.

WING TIPS

Horsepowers and bomb loads zoom from days of first World war, making bombers flying artillery platforms . . . Pursuit ships likewise follow trend to speed and fire power, with six to eight machine guns and cannon . . . Try 75-millimeter cannon in nose . . . Steel armor plate added to protect pilots, calling for complete redesign of planes . . . Curtiss and Bell operate new plants in Buffalo

■ FOR anyone who is a little hazy on the subject of modern warfare and the leading role which aircraft play in it, here are a few "believe-it-or-nots" which may prove illuminating:

The four motors of a modern heavy bomber, each rated at about 1400 horsepower (possibly more this week), generate close to 50 per cent more power than the locomotive of the Twentieth Century Limited, which carries 13 cars and a tender.

The heavy bomber of today weighs a neat 44,000 pounds and its bomb load between 5000 and 10,000 pounds. Incidentally, the bomb load of one bomber is equivalent to about one-third of all the bombs German planes dropped over London in the first World war.

Bombing planes of 20 years ago, including crew and bombs, seldom exceeded 7000 pounds total weight. The pilot of that day flew a single-engine biplane, with 300-400 horsepower, or about four times the power of a modern automobile engine. He had one assistant in an open cockpit at his rear—a general utility man who was observer, gunner and photographer all in one. Speed of the bomber then was 70-100 miles an hour and its load of missiles comprised eight 50-pound bombs strapped under the wings.

The four to ten-man crew in the modern heavy bomber works inside closed compartments, facing a maze of controls as complicated as those on the bridge of a modern ocean liner. Over 100 instruments are connected to engines alone, and each of the four engines has from 12 to 15 controls and adjustments which can be operated in flight. Separate sets of instruments are provided for navigation purposes, with duplicates of each, bringing the total number of instruments to around 300.

Each member of the crew is connected by telephone with the others, and the plane carries complete two-way receiving and sending radio apparatus. Gas load is some 1700 gallons, enough to keep the ten-man crew aloft for a day and a half at a cruising speed in the neighborhood of 300 miles an hour. Auxiliary power is provided to operate gun turrets, move landing flaps and raise and lower the landing gear.

The Germans stated some time ago that they had dropped 7000 tons of bombs over the British Isles in a single week. Match this figure against the 35 tons of bombs dropped over London in World war I and you can appreciate that the bomber of today is literally a flying artillery platform. Its bomb-load provides offensive power and its maneuverable cannon and machine guns furnish protection against attack.

Heavy as Freight Car

Even though it is built throughout of the lightest possible materials, the heavy bomber weighs as much as a railroad freight car or a medium size tank. Sixteen-ply tires stand close to 6 feet high, and with inner tubes weigh ten times as much as the average automobile tire.

So much for bombers which the nation's aviation and allied industries are gearing to produce at a rate of 500 or more a month. Consider now the pursuit ship, or the pursuit-interceptor, such as the Bell Airacobra or the Curtiss P-40, a 3-ton flying machine gun with engine power anywhere from 1200 to 2000 horsepower driving it through the sky at 400 miles an hour.

These lethal air weapons, with barely enough space in the pilot's compartment for a flyer of medium build, mount a couple of machine guns in each wing, as well as a couple of .50-caliber guns in the fuselage firing through the three-blade propeller, plus a hefty 37-millimeter cannon firing through the stainless steel nose. The pilot can select any one or all of these guns to fire at the touch of a button and can loose 120 bullets a *second*. Fired in short bursts, the machine guns at this rate are literally pouring out 250 pounds of lead a minute at their target.

It has been calculated that a pursuit pilot, flying his plane straight for one minute and firing his guns continuously, would scatter empty cartridge cases over six miles of countryside, with the last of his bullets landing at least a mile ahead of the last cartridge case. The pursuit pilot aims his guns at the target by aiming his plane, the guns being mounted rigid. Thus, the maneuverability and speed of the plane must be of the highest order for effective marksmanship.

It was noted some months ago that the defense of the United Kingdom required a force of fighter planes large enough to keep at least 2000 ships in combat at any given time. If all the planes of a force this size fired at once, they would consume 12,800,000 rounds of ammunition in one minute, which is something for the brass people to think about.

The average fighter plane stays in the air about two hours. So, if an entire force of 2000 fighter planes did a daily patrol in flights of 400 machines, they would consume 721,000 gallons of gasoline and 72,000 gallons of oil—the capacity of 81 railroad tank cars.

Recoil and Cooling Are Problems in Gun Mounting

The cry for more armament on both pursuit and fighter planes still goes up. While six machine guns and a cannon give good assault

power in a forward direction, there may eventuate need for additional guns directed sidewise and rearward. And already experiments in mounting a 75-millimeter, or 3-inch, cannon in the nose of pursuit ships, instead of a 37-millimeter cannon appear successful. The 75 is the same gun as that mounted on the M-3 medium tank and used with an explosive shell would give the pursuit terrifically devastating fire power against permanent objectives.

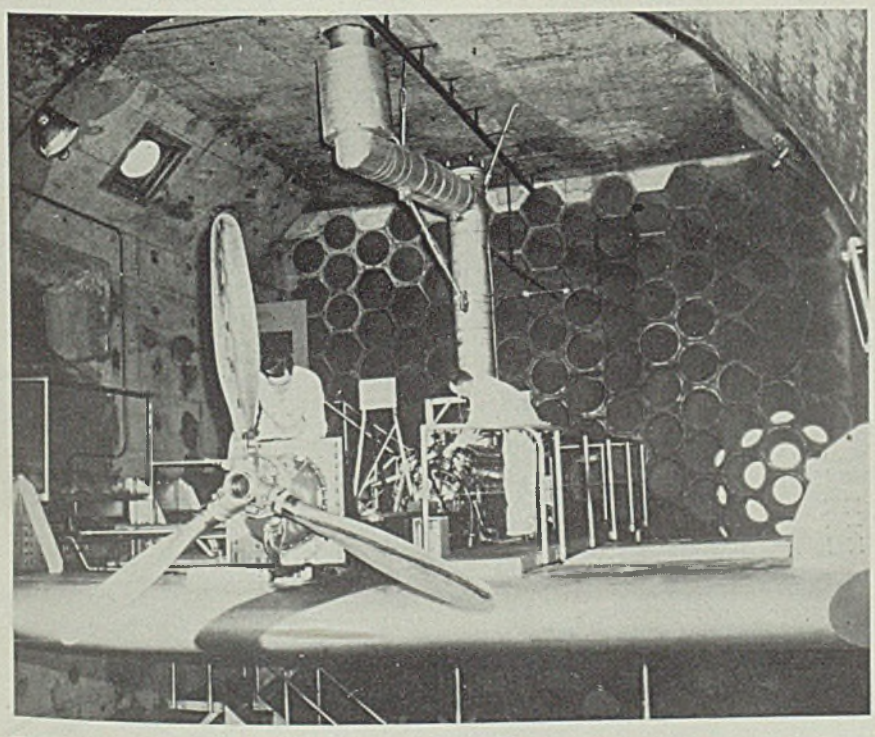
One of the knotty problems in mounting heavy guns of this type in airplanes is how to absorb the recoil. Devices have been perfected to do this, both hydraulically and with springs, but there still remains the matter of cooling, particularly in machine guns. These rapid firing .30 and .50 caliber air-cooled machine guns can be fired in short bursts only, because of the intense heating effect on the barrel and bolt which is likely to result in jamming.

The swiftly-moving airstream about a 400-mile-an-hour pursuit ship would appear to the layman sufficient for gun cooling, but it has not proved to be, hence new methods are now in the works and a solution appears imminent, if not already in production.

In addition to armament on pursuits and fighters, there is the matter of protective armor. The story is told of British pilots early in the war climbing into their planes and setting pieces of boiler plate under their seats and behind their backs for protection. This soon gave way to installation of armor plate in the ship itself, advantage being taken of the strength of the armor in the structural design of the plane. Armor plate ¾-inch in thickness is now installed at several places in pursuit ships—in the nose, behind the pilot, in the front bulkhead.

One of the unfortunate parts of putting more armor and more armor plate protection in planes is that each time such a change is made, practically a complete redesign of the plane is necessary. The Bell Airacobra, for example, is currently in its fourth or fifth redesign because of changes specified by the military. Basically the plane is the same, but each time more guns are added, or bullet-proof gasoline tanks are called for, or more armor plate is decided upon, it is necessary to start all over on designing parts and subassemblies.

Manufacturing New Hydraulic Propellers for Army



■ Housed in a new, modern plant with 193,000 square feet of floor space, the Aeroproducts Division of General Motors at Dayton, O., is now at work producing a new type of hydraulically controlled propeller, with five different models in the testing stage. More than 500 employes are currently at work, eventual employment being set at 2600.

The propellers, one of which is here illustrated, are made of hollow heat treated gear steel and are designed so that engine speeds are held constant and variations in load requirements are met by changing the pitch of the blades.

The design also permits mounting of the aircraft cannon, the hub being hollow. The hub is said to be designed so that the effect of centrifugal force on the propeller mechanism balances the blade torque at the safest operating angle.

Buffalo Will Pour Out Pursuits for U. S. and Britain

In a little over two weeks the new $18,000,000 airplane plant of Curtiss-Wright Corp. at the Buffalo airport will be dedicated formally, with appropriate ceremonies marking delivery of the first of the P-40 pursuit planes from the new production line at the plant. Work has been going on in the plant for almost two months, 5000 men now being employed against eventual employment of 12,000. Parts and subassemblies are being trucked to the new assembly plant from the Curtiss Vulcan street plant, thus duplicating the procedure of Bell Aircraft Corp. which recently opened a new plant at Niagara Falls. The latter plant, devoted primarily to final assembly, is supplied with many parts and subassemblies from the company's Kenmore avenue plant in Buffalo.

Curtiss now is reportedly turning out P-40s in excess of ten a day from both its plants.

United Aircraft Wage Boosts Shared by 25,000

Wage agreement recently signed by the Hamilton Standard Propeller Division of United Aircraft Corp. with an AFL local in East Hartford, Conn., is typical of rates current in several airplane plants in the East and Middle West. It provides for retention of the present starting rate of 60 cents an hour for male employes, except apprentices, students and trainees, but with two increases bringing the minimum to 70 cents an hour within a four-month period. Other provisions include an increase of the rate premium for second and third shift employes from 5 to 7½ cents an hour, and 8 hours' pay for a 6½ hour work period for the third shift. Double time instead of time and a half will be paid for work on Sundays and recognized holidays.

United Aircraft also has increased wage rates in its Pratt & Whitney Division and Vought-Sikorsky Division, as well as in the Pawcatuck, Conn., plant of Hamilton-Standard. In all, the increases apply to more than 25,000 employes and add over $4,200,000 to annual payrolls. The latest wage increase is the third received by employes within a period of seven months, making a total wage increase for the period of from 12½ to 15 cents an hour.

War Department's National Defense Awards Total $354,514,098 in Week

■ DEFENSE contracts reported by the War Department last week totaled $354,514,098. Ordnance Department and Quartermaster Corps contracts together comprised a large part of the week's aggregate. Sum of aircraft awards was much lower than in the preceding week.

Continued development of a nation-wide network of airports is shown by numerous contracts for extension of landing facilities and hangars. Many contracts were for lighting equipment.

Awards reported in the week by the War Department included:

Central Contracting Co., Atlanta, Ga., two permanent air corps flight hangars at MacDill field, Florida, $861,000. Arch Roof Construction Co., New York, furnishing design and engineering services.

Cities Service Defense Corp., New York, $9,991,860 for operation of Maumelle Ordnance Works, Marche, Ark., and management service during construction, equipping plant and training key personnel. Plant to manufacture ammonium picrate. Construction and architect-engineer services will be subcontracted by Cities Service.

Cleveland Container Co., Cleveland, ammunition carriers, $633,500.

Electric Vacuum Cleaner Co., Cleveland, fuzes, $1,438,500.

Forcum-James Co., Dyersburg, Tenn., landing field improvements at Barksdale field, Louisiana, $1,020,900. Night lighting system, additions to runways, taxiways included.

Globe Machine & Stamping Co., Cleveland, cartridge cases, $1,137,500.

Jones, Newton, Glenn & Knost, Hattiesburg, Miss., aviation mechanics school, Biloxi, Miss., $9,697,746, to include 650 miscellaneous buildings, railroad tracks, utilities. Architectural-engineering contract awarded to George P. Rice, New Orleans.

O'Driscoll & Grove Inc., New York, housing for 5600 men at Scott field, Illinois, $1,623,800. Utilities, railroad spur, approximately 165 miscellaneous buildings included.

Republic Steel Corp., Cleveland, armor plate, $5,423,000.

Ordnance Department Awards

Abrasive Machine Tool Co., East Providence, R. I., grinders and milling machines, $169,349.

Addressograph-Multigraph Corp., Cleveland, fuze parts, $355,500.

Atlas Powder Co., Reynolds, Pa., engine starting cartridges, $32,625.

Barber-Colman Co., Rockford, Ill., pinion hobbing machines, $26,109.

Benrus Watch Co., New York, centrifugal gears and shafts, $83,900.

Bethlehem Steel Co., Bethlehem, Pa., steel plates, $11,333.79.

Black & Decker Co., Kent, O., shells, $180,000.

Broderick Co., Muncie, Ind., track shoe links, $120,800.

Brown & Sharpe Mfg. Co., Providence, R. I., grinding and plain milling machines, $17,542.50.

Budd Wheel Co., Detroit, shells, $427,040.

Bullard Co., Bridgeport, Conn., turret lathes, $37,239.

Casco Products Corp., Bridgeport, Conn., primers, $100,908.

Chase Brass & Copper Co. Inc., Waterbury, Conn., hard seamless bands, $46,866.80.

Cincinnati Gilbert Machine Tool Co., Cincinnati, radial drills, boring, drilling and milling machines, $134,275.

Cincinnati Milling Machines & Cincinnati Grinders Inc., Cincinnati, cylindrical grinders, milling machines and profilers, $286,467.80.

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., revolvers, gun components, endless belts, pistols and magazines, $660,359.60.

Conmark Products Corp., Newark, N. J., gages, $39,304.

Consolidated Packaging Corp., Buffalo, primer tube assembly machines, $16,250.

Continental Can Co. Inc., New York, parts for can packing, $64,802.25.

Crankshaft Machine Co., Jackson, Mich., contour turning lathe, $25,315.

Derbyshire Machine & Tool Co., Philadelphia, punches and holders, $10,336.

Dick, A. B., Co., Chicago, fuzes, $234,770.

Dole Valve Co., Chicago, shells, $150,392.60.

Easy Washing Machine Corp., Syracuse, N. Y., primers, $53,886.

Edgcomb Steel Co., Philadelphia, tool steel, $6520.60.

Emeloid Co., Arlington, N. J., containers, $76,500.

Falls Screw Products Co., Cuyahoga Falls, O., projectiles, $196,710.

Federal Products Corp., Chicago, cylinder gages, $5022.

Foster, L. B., Co. Inc., Chicago, railroad rails, $12,530.21.

Gallmeyer & Livingston Co., Grand Rapids, Mich., grinders, $64,824.50.

Garden City Plating Co., Chicago, fuzes, $139,998.

General Machinery Corp., Niles Tool Works Co. Division, Hamilton, O., lathes, $371,120.

General Motors Corp., Detroit, guns, $337,714.46.

Genesee Tool Co., Fenton, Mich., small tools, $13,253.80.

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., milling and drilling machine and grinders, $54,544.

Globe Machine & Stamping Co., Cleveland, cartridge cases, $44,850.

Gordon-R Co., Detroit, milling machines, $16,920.

Great Lakes Steel Corp., Ecorse, Detroit, steel plates, $20,854.52.

Greenfield Tap & Die Corp., Greenfield, Mass., gages, $39,647.02.

Hanchett Mfg. Co., Big Rapids, Mich., grinders, $34,544.

Heald Machine Co., New York, boremat-ics, $9340.

International Harvester Co., Chicago, adapter boosters, $128,400.

Jones & Lamson Machine Co., Springfield, Vt., thread grinding machines, $28,178.38.

Kearney & Trecker Corp., Milwaukee, vertical and milling machines, $35,941.

Kent Aircraft & Machine Tool Co., Camden, N. J., fuzes, $18,463.80.

Lamson Corp., Syracuse, N. Y., gun mounts, $50,910.

La Pointe Machine Tool Co., Hudson, Mass., broaching machines, $58,122.

Lincoln Engineering Co., St. Louis, shells, $386,100.

Lincoln Park Tool & Gage Co., Lincoln Park, Mich., gages, $18,249.84.

Link-Belt Co., Indianapolis, chains, $13,280.25.

Mack Molding Co., Wayne, N. Y., boosters, $49,680.

Mamaux, A., & Sons, Pittsburgh, breech end covers, $6745.

Martin-Parry Corp., York, Pa., adapters, $80,610.50.

Mattatuck Mfg. Co., Waterbury, Conn., retaining springs, $34,800.

Mattison Machine Works, Rockford, Ill., surface grinders, $10,243.

Micromatic Hone Corp., Detroit, honing tools, $34,339.53.

Midvale Co., Nicetown, Philadelphia, forgings, $5994.47.

Miles Machinery Co., Saginaw, Mich., boremat-ic, $5400.

Modern Tool & Die Co., Philadelphia, gages, $14,170.50.

Mossberg, C. F., & Sons Inc., New Haven, Conn., rifles, $93,500.

Motor Wheel Corp., Lansing, Mich., shells, $460,010.

National Tube Co., McKeesport, Pa., projectiles, $14,625.

National Wire & Cable Co., Pittsburgh, cable, $6873.24.

Neptune Meter Co., Long Island, N. Y., fuzes, $452,580.

Niles-Bement-Pond Co., Pratt & Whitney Division, West Hartford, Conn., gun-barrel reaming, rifling and drilling machines, $38,307.

Norton Co., Worcester, Mass., grinders, $22,612.

Poor & Co., Canton Forge & Axle Works Division, Canton, O., drop forgings, $17,600.17.

Prentiss, Henry, & Co., New York, grinders, centerless and drilling machines, $17,104.

Producto Machine Co., Bridgeport, Conn., milling machines, $7560.

Reliable Tool Co., Irvington, N. J., tools and fixtures, $5077.

Remington Arms Co., Bridgeport, Conn., percussion elements, rifles, $476,889.18.

Rhodes, N. H., Inc., Hartford, Conn., timing mechanisms, $7500.

Rockford Machine Tool Co., Rockford, Ill., planers, $13,608.90.

Ryerson & Haynes Inc., Jackson, Mich., shells, $304,716.

St. Louis Steel Products Co., St. Louis, wire arming assemblies, $12,176.32.

Schoenberger, W. J., Co., Cleveland, fuzes and primers, $142,375.

Stockham Pipe Fittings Co., Birmingham, Ala., grenades, $155,098.80.

Strong Steel Foundry Co., Buffalo, steel castings, $9979.20.

Timken-Detroit Axle Co., Wisconsin Axle Division, Oshkosh, Wis., final drives, $46,980.

Tubular Service Corp., Cambridge, Mass., seamless steel tubing, $5647.28.

Underwood-Elliott-Fisher Co., Hartford, Conn., primers, $48,830.

Unique Specialties Co., New York, tools and equipment, $10,250.

Veit & Young, Philadelphia, dies, punches and ejecting stems, $16,974.

Verduin, John, Machine Corp., Paterson, N. J., single beam presses, $21,237.50.

Warner & Swasey Co., Cleveland, turret lathes, $84,979.28.

Weaver Mfg. Co., Springfield, Ill., bomb lift trucks, $68,876.

Western Cartridge Co., Winchester Repeating Arms Co. Division, East Alton, Ill., shot guns, cartridges, $101,977.43

Westinghouse Electric Mfg. Co., Springfield, Mass., fuzes, $43,000.

Wheel Trueing Tool Co. Inc., Detroit, diamonds, $7201.27.

Wyckoff Drawn Steel Co., Pittsburgh, cold drawn steel, $12,942.15.

Zimmerman Steel Co., Bettendorf, Iowa, castings, $24,148.32.

Quartermaster Corps Awards

Albert & Harrison Inc., New York, ordnance shop, boiler house, railroad spur and underground sewers, Camp Stewart, Georgia, $73,050.

American Chain Fence Co., Medford, Mass., fencing, Ft. Ethan Allen, Vermont, $9680.

Barnes, James I., Constructing Co., Greensboro, N. C., six regimental chapels at Ft. Eustis, Virginia, $102,138.

Boyle Construction Co., Sumter, S. C., three recreation buildings, guard house,

and post exchange, Ft. Moultrie, South Carolina, $26.000.

Brockway Motor Co. Inc., Courtland, N. Y., tractor trucks with semitrailers, $229,200.

Chicago Pneumatic Tool Co., Chicago, engine generating unit at Savanna ordnance depot, Illinois, $84,946.

Davidson, Peter, Santa Barbara, Calif., hospital building, administration building, at Hoff general hospital, Santa Barbara, $31,532.

Dyer, Hal C., Dallas, Tex., two barracks, one administration building, 15 day rooms, one patient's recreation building, Camp Bowie, Texas, $138,748.

Enterprise Mfg. Co. of Pennsylvania, Philadelphia, meat and food choppers, $8147.25.

Fargo Motor Corp., Detroit, 1½-ton tractor-trucks, $81,073.56.

Federal Contracting Co., Boston, eight regimental chapels at Ft. Devens, Massachusetts, $164,973.

Fruehauf Trailer Co., Detroit, parts for semitrailers, $18,059.20.

General Motors Corp., Chevrolet Division, Detroit, tractor-trucks, 5-passenger sedans and ¼-ton trucks, $109,658.57.

Gray & Dudley Co., Nashville, Tenn., camp kettles, $26,460.

Holden, J. R., Galveston, Tex., regimental chapel, Ft. Crockett, Texas, $15,707.

International Harvester, Chicago, dump trucks, spare parts, $321,719.88.

Jones, J. A., Construction Co. Inc., Charlotte, N. C., 500-man mess hall, Ft. Jackson, South Carolina, $40,000.

Kahn, M. B., Construction Co., Columbia, S. C., hospital, recreation building, administration building, four barracks at Ft. Jackson, South Carolina, $83,845.

Kawneer Co., Niles, Mich., cookpot cradles, $6094.95.

King & Co., Vancouver, Wash., red cross building, Barnes General Hospital, Vancouver Barracks, Washington, $17,-208.

Linn Corp., Onconta, N. Y., trucks, $61,-228.66.

Lone Star Construction Co., Ft. Worth and Dallas, Tex., 75 recreation buildings, Camp Hulen, Texas, $144,800.

Mack Mfg. Co., Allentown, Pa., tractor trucks with semitrailers, $231,150.

MacNutt, Watts & Tankard Inc., New York, electric distribution system, Ft. Hamilton, New York, $16,200.

May, George, Electric Co., Rockford, Ill., electric distribution system at Savanna ordnance depot proving ground, Illinois, $17,640.

Michuda, Leo, & Son, Chicago, hospital, recreation building, officers' mess, ambulance garage, Camp Grant, Illinois, $69,900.

Montgomery, P., Dallas, Tex., 15 buildings in hospital unit, and six regimental chapel buildings, Camp Wolters, Texas, $358,800.

Moore & Roberts, San Francisco, addition to garage building, Benicia arsenal, California, $38,307.

Morgan, J. E., & Sons, El Paso, Tex., nurses' quarters at William Beaumont general hospital, El Paso, Tex., $34,-063.

Newton & Glenn, Hattiesburg, Miss., modification of service club, Camp Shelby, Mississippi, $12,499.

Owen, Ames, Kimball Co., Grand Rapids, Mich., colored service club, ambulance garage, storage for engineering equipment and officers' day rooms, Ft. Custer, Michigan, $108,450.

Pittsburgh-Des Moines Steel Co., Chicago, erect 200,000 gallon water tank, Ft. Benjamin Harrison, Indiana, $36,-200; removal of elevated steel water tank, and erect water storage standpipe at Ft. McKinley, Maine, $34,900.

Presto Gas Mfg. Co., Chicago, parts for field ranges, $30,070.74.

Protectoseal Co., Chicago, steel safety cans, $7347.06.

Pyrene Mfg. Co., Newark, N. J., chains and tighteners, $13,440.

Rabalais, E. E., & Son, Bunkie, La., two recreation buildings, Camp Beauregard, Louisiana, $5800; five regimental chapels, Camp Polk, Louisiana, $102,-800.

Sound Construction & Engineering Co., Seattle, annex to headquarters building, Ft. Lewis, Washington, $16,679.

Southeastern Construction Co., Charlotte, N. C., six regimental chapels, and 9 portable steel igloo magazines, Camp Croft, South Carolina, $119,429.

Southeastern Mfg. Co., Tuscaloosa, Ala., 26 day rooms and two officers' mess, Camp Shelby, Mississippi, $187,000.

Stalker, G. E., Basehor, Kans., additional temporary facilities at reception center, Ft. Leavenworth, Kans, $322,492.

Taylor, James T., Ft. Worth, Tex., standard ordnance shop, Camp Bowie, Texas, $75,496.

Twaits, Ford J., Co. and Morrison-Knudsen Co. Inc., Los Angeles, installing 24 fire hydrants, at Ft. Ord, California, $6200.

Welso Construction Co., Chicago, theater, fire station, administration building, barracks for medical personnel, recreational building at Camp Grant, Illinois, $58,445.

Air Corps Awards

Curtiss-Wright Corp., Curtiss-Propeller Division, Caldwell, N. J., propeller assemblies, $68,550.

United Aircraft Corp., Pratt & Whitney Aircraft Division, East Hartford, Conn., aeronautical engines, $171,947.76.

Yale & Towne Mfg. Co., Philadelphia, chain hoists, $60,862.50.

Engineers Corps Awards

Aqua Systems Inc., New York, air corps gasoline fueling system, Harrisburg municipal airport, Fairview Township, Pa., $29,530.

Chicago Bridge & Iron Co., Chicago, 3,000,000-gallon steel water reservoir, Scott field, Belleville, Ill., $52,510.

Chicago Pneumatic Tool Co., St. Louis, compression riveters, riveting hammers, $84,425.

Cincinnati Bickford Tool Co., Cincinnati, radial drills, Ft. Crook aircraft assembly plant, Omaha, Nebr., $81,528.

Cleveland Pneumatic Tool Co., Cleveland, riveting hammers, Fairfax airport, Kansas City, Mo., $27,500.

Colorado Fuel & Iron Corp., Denver, mesh wire, welded steel fabric for steel reinforcement, Hill Field, Ogden, Utah, $15,950.

Electric Service Co., Ann Arbor, Mich., airport lighting equipment and materials, East Baton Rouge Parish airport, Louisiana, $42,266.

Elkington Hellwig Mfg. Co., San Francisco, dishwashers, $5580.

Empire Electric Co., Ft. Worth, Tex., system of lighting, municipal airport, Waco, Tex., $16,395.

Favret, Lionel F., & Boh Bros. Construction Co., New Orleans, chapel, storehouses and officers' mess, New Orleans airport, Louisiana, $42,999.50.

Flanaghan, Thomas M., Reading, Pa., pumping station, Middletown air depot, Pennsylvania, $113,368.40.

Gaw Construction Co., Philadelphia, engine repair building, Middletown air depot, Pennsylvania, $445,706.

Independent Pneumatic Tool Co., Chicago, compression riveters, aircraft assembly plant, Kansas City, Kans., $197,150.

Korsmo, E. O., Construction Co., Memphis, Tenn., superstructure for Cypress Creek pumping station, Shelby County, Tennessee, $128,829.

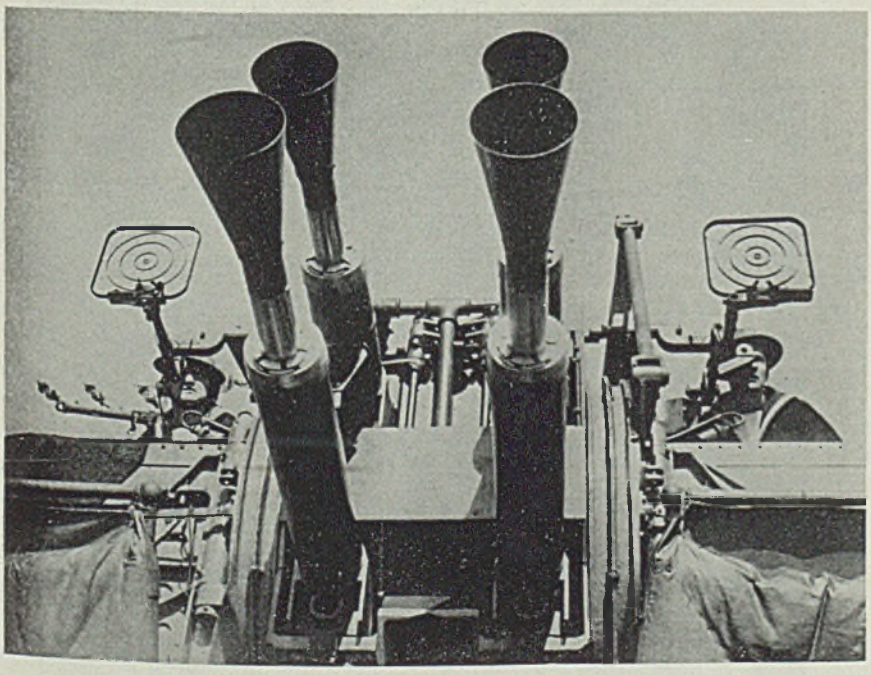
Lawrence Construction Co., Sacramento, Calif., air corps hangar and control tower, Mather field, Sacramento, $90,-740.

Mahon, R. C., Co., Detroit, pre-rotation vanes, fairings, honeycomb and closed throat section for wind tunnel, Wright field, Dayton, O., $164,917.35.

McGillivray Construction Co., Sacramento, Calif., airplane parking area, McClellan field, Sacramento, $338,-262.75.

Montague Co., San Francisco, ranges and

Practicing with Pom-Poms



Pom-pom antiaircraft guns on a United States destroyer and gunners on guard against the enemy. A rapid-firing automatic machine cannon of small bore, the pom-pom is so named from its peculiar drumming sound in action. Projectiles, fired in sequence from the gun's multiple barrels, are explosive; some have fuzes adjusted to set off the contained charge upon contact with an airplane's fabric cover. Flared end of the gun barrel is a flash-shield, to prevent widespread illumination when the gun is fired. NEA photo

bake ovens, $9193.40.
Mowat, John, San Francisco, electric refrigerators, $7807.66.
National Electric Service Co., St. Louis, electric substations, Jefferson Barracks, Missouri, $38,847.
Nelson, H. B., Construction Co., Atlanta, Ga., basic lighting system, Lexington county airport, Columbia, S. C., $14,297.
Pennsylvania Supply Co., Harrisburg, Pa., roads and railways, Middletown air depot, Pennsylvania, $108,814.50.
Ritter, T. E., Co., Norfolk, Va., paving runways, Langley field, Virginia, $314,995.20.
Trewhitt-Shields & Fisher, Fresno, Calif., air corps hangar and control tower, Bakersfield, Calif., flying field, $101,388.
United States Pipe & Foundry Co., San Francisco, pipe and water material, $6399.40.
Villard Contracting Inc., Hastings-on-Hudson, N. Y., air corps gasoline fueling system, Stewart field, New York, $9362.
Walsh, M. J., & Sons, Holyoke, Mass., radio beacon range and transmitter buildings, Westover field, Chicopee Falls, Mass., $22,210.

Medical Corps Awards

Acme Shear Co., Bridgeport, Conn., scissors, $8448.
American Medical Specialties Co. Inc., New York, sterilizers, $8840.
American Sterilizer Co., Erie, Pa., sterilizer drums, $7187.
Chayes Dental Instrument Corp., New York, engine wheels and handpieces, $67,760.
Cleveland Dental Mfg. Co., Cleveland, miscellaneous dental supplies, $38,836.50.
Colson Corp., Elyria, O., electric food carts, $12,845.
Dittmar, F., & Co. Inc., Philadelphia, Pa., retractors, $22,000.
Girard Dental Mfg. Co., Philadelphia, chisels; excavators; scalers; and pluggers, $9271.
General Refineries Inc., Minneapolis, wire, $51,156.
Grieshaber Mfg. Co., Chicago, knives, $15,805.
Henning, Albert A., & Co., New York, hemoglobinometers, $5245.
Ivory, J. W., Philadelphia, retainers and separators, $14,500.
Langbein, William, & Bros., Brooklyn, N. Y., forceps, scissors, knives, $44,812.50.
Metal Office Furniture Co., Grand Rapids, Mich., nurses' desks, $38,269.50.
Mizzy Inc., New York, miscellaneous dental supplies, $12,260.84.
Oneida Ltd., Oneida, N. Y., forceps, $116,735.
Penn Surgical Mfg. Co. Inc., Philadelphia, hemostatics, $18,750.
Picker X-Ray Corp., New York, X-ray and chassis machines, $535,500.
Prometheus Electric Corp., New York, sterilizers, $18,825.60.
Ransom & Randolph Co., Toledo, O., burs, $50,160.74.
Sklar, J., Mfg. Co., Long Island City, N. Y., tuning forks, retractors, jaw props, compressors, hammers, headlights, scissors, clamps, forceps, carriers and dilators, Metcalf sets, $762,573.23.
Weck, Edward, & Co. Inc., Brooklyn, N. Y., forceps, $97,920.

Defense Corp. Finances Plane Plant Expansions

■ Defense Plant Corp. agreements recently announced by Loan Administrator Jesse Jones included:

Westinghouse Electric & Mfg. Co., $22,000,000 for naval equipment plant at Lester, Pa.; Eureka Vacuum Cleaner Co., $103,017 for machinery, equipment for its Detroit plant; Crucible Steel Co. of America, $1,000,000 increase in lease agreement for shell production machinery; Titeflex Metal Hose Co., $1,000,000 for a radio equipment plant at Newark, N. J.; New Britain Machine Co., $650,000 for machinery and equipment for its machine tool plants at New Britain and Berlin, Conn.; Phelps Dodge Copper Products Corp., $105,000 additional for construction costs of its Los Angeles plant; Aeronautical Products Inc., $36,908 additional for equipment for its aircraft parts plant; Huck Mfg. Co., Detroit, $84,490 for equipment for production of aircraft parts; Graham-Paige Motors Corp., $900,000 for additional machinery for the marine engine parts plant at Dearborn, Mich.

A loan of $100,000 to American Electric Fusion Corp., Chicago, to be used in production of tube-making machines, has been announced by RFC.

Foundry Equipment Sales Index Lower in June

■ Foundry Equipment Manufacturers Association, Cleveland, reports index of net orders closed for new equipment in June was 273.3, compared with 291.2 in May and 405.3 in April. Index for repairs was 304.7, compared with 321 in May and 292.5 in April. Total sales index was 281.1 in June, 298.7 in May, and 377.2 in April.

Indexes are percentages of monthly averages of sales to metalworking industries, 1937-39. Practical comparison of figures on the old base can be determined by multiplying by 1.328.

■ British women workers aid in building tanks in northern England. More than 400 women are employed in this plant. They were given a month's technical training before starting, and have achieved an excellent record, according to the British-approved caption. Their accident rate is "only about 5 per cent, compared to 8 per cent for men workers, and 16 to 18 per cent for boys." NEA photo, passed by British censor

Canadian War Expenditures Nearly $2,000,000,000 in Past Two Years

TORONTO, ONT.

■ EXPENDITURES by the Department of Munitions and Supply and its predecessors from July 14, 1939, to June 30 1941, have aggregated $1,930,814,203, according to preliminary figures announced last week.

Contracts placed for Canadian account, including commitments for plants and plant extensions, totaled $1,095,844,203 while the aggregate of orders placed for United Kingdom account was $602,673,000. United Kingdom commitments for plants and plant extensions, together with orders for the output of some of these plants, amounted to $212,297,000. Contracts of the Civilian Aviation Division for airport construction and land purchase under the British Commonwealth air training plan totaled nearly $20,000,000.

Approximately 135,000 contracts have been placed by the Department of Munitions and Supply and its predecessor bodies. These had an average value of $8000. The rate at which contracts were placed reached their peak in the quarter ended June 30, 1941, with a monthly average of 12,759, compared with average of 7903 for the preceding three months and 4051 for the corresponding quarter of 1940.

Canadian and United Kingdom commitments for new plants, plant extensions and equipment totaled $511,256,321 on May 31. About 35 per cent was for Canadian account; 26 per cent for United Kingdom account, and 39 per cent joint account. Facilities for the manufacture of miscellaneous goods (materials not finished products, special purchases, allotments to wholly-owned government companies, and purchases by controllers) accounted for the largest share, 26.6 per cent; chemicals and explosives accounted for 22.7 per cent; guns, mountings and carriages, 22.3 per cent; shells, 10.4 per cent; railway equipment, 4.8 per cent; aircraft, 4.6 per cent; machine tools and equipment, 3.8 per cent; tanks and carriers, 2.9 per cent, and bombs, depth charges and mines, 0.4 per cent. Capital expenditures fall into the following classifications:

	Amount
Materials	$136,211,741
Chemicals, explosives	116,193,973
Guns, mountings, carriages	113,786,295
Shells	52,952,759
Railway equipment	24,234,498
Aircraft	23,682,010
Machine tools, equipment	19,646,054
Tanks, carriers	14,377,774
Automotive equipment	7,413,248
Bombs, depth charges, mines	2,757,969

Aircraft production in Canada is moving ahead rapidly. Output for the quarter ended June 30 showed a gain of 25 per cent over the previous three months and was ten times greater than the entire production of 1939, C. D. Howe, Minister of Munitions and Supply stated. Output for the first six months of this year exceeded the total for all of 1940.

The minister pointed out, however, that measured in the terms of numbers, monthly production of planes is now declining because Canadian plants are turning from production of training craft to service planes, and because plants that had been making service planes are changing output to meet new needs. Many plants are in process of retooling for production of big bombing planes.

In addition Mr. Howe stated, Canadian aircraft industry is expanding to meet overhaul and repair needs.

Dominion Bridge Co. Ltd., will not remove its rolling mill from Calgary, Alta., to Vancouver, B. C., as previously planned. Instead of moving the plant the company has decided to resume operations at the Calgary works which can get underway much more speedily than if the plant was moved to Vancouver. Former employes of the Calgary works have been recalled to work and are putting machinery in shape for reopening.

Steel Scrap Collected

Following the original announcement regarding establishing of a steel plant at Vancouver to make use of the vast supplies of scrap materials from British Columbia and Western Alberta, a wide campaign was undertaken to collect this scrap material and as a result between 25,000 and 50,000 tons have been accumulated, according to reports from Vancouver. In addition there are other large supplies collected throughout the province waiting for a market. Before the war scrap from this section of western Canada was exported, chiefly to Japan, but with the rigid enforcement of export embargoes there has been no market for this surplus of iron and steel scrap materials. A survey of the British Columbia market reveals there is a dependable market for at least 15,000 tons of merchant bars and angles and other steel materials annually, while the new shipbuilding program provides an outlet for an additional 18,000 to 25,000 tons. Thus a mill with annual capacity of 40 000 tons would find a ready market for its products. The opening of the Calgary plant by Dominion Bridge Co., however, indicates that the company will supply a large part of British Columbia's needs from the Alberta works and also may draw heavily on the scrap supply as originally planned.

Algoma Steel Corp., Sault Ste. Marie, Ont., has completed plans and is awarding contracts in connection with an expansion program to cost $4,000,000, to be financed by the government.

The new works will increase the annual rolled steel capacity of Canada by about 12½ per cent.

To assure adequate facilities for the handling of the steadily increasing amount of freight in Canada, chiefly resulting from the movement of war materials and supplies, orders for several million dollars are expected to be placed soon for new rolling stock.

Contracts awarded by the Department of Munitions and Supply, for the week ended July 10, numbered 3912 and had total value of $11,704,203. Orders placed with United States companies in the week were valued at $1,088,177. Week's orders include:

Ordnance: John Inglis Co. Ltd., Toronto, $2,592,000; War Office, England, $116,300; Massey-Harris Co. Ltd., Toronto, $15,446; Canadian General Electric Co. Ltd., Toronto, $82,500; Alexander Fleck Ltd., Ottawa, $8475; Dominion Engineering Works Ltd., Montreal, $45,000.

Munitions: War Office, England, $11,782; Fonderies Nationales de Pont-Rouge Ltd., Pont-Rouge, Que., $33,611; Renfrew Electric & Refrigerator Co. Ltd., Renfrew, Ont., $30,780; Parmenter & Bulloch Ltd., Gananoque, Ont., $63,000; Anaconda American Brass Ltd., New Toronto, Ont., $8350; Metal Stampings Ltd., Toronto, $12,125; Rogers Majestic Corp. Ltd., Toronto, $27,000; Galt Art Metal Co. Ltd., Galt, Ont., $32,485.

Metals: The British Metal Corp., (Canada) Ltd., Montreal, $108,432.

Shipbuilding: Pictou Foundry & Machine Co. Ltd., Pictou, N. S., $14,650; Lunenburg Foundry Co. Ltd., Lunenburg, N. S., $10,000; St. John Dry Dock & Shipbuilding Co. Ltd., Saint John, N. B., $9850; Grew Boats Ltd., Penetanguishene, Ont., $7960.

Dockyard Supplies: Dominion Wire Rope & Cable Co. Ltd., Montreal, $7987; Hiram L. Piper Co. Ltd., Montreal, $5510; Joseph Stokes Rubber Co. Ltd., Welland, Ont., $6058.

Land Transport: Sicard Ltd., Montreal, $14,442; International Harvester Co. of Canada Ltd., Ottawa, $17,467; General Motor Products of Canada Ltd., Oshawa, Ont., $8000; Dunlop Tire & Rubber Goods Co. Ltd., Toronto, $92,247; Firestone Tire & Rubber Co. of Canada Ltd., Hamilton, Ont., $122,704; Ford Motor Co. of Canada Ltd., Windsor, Ont., $143,633; General Motors of Canada Ltd., Windsor, $12,500.

Aircraft: Canadian Pratt & Whitney Aircraft Co. Ltd., Longueuil, Que., $45,432; Aviation Electric Ltd., Montreal, $36,522; Noorduyn Aviation Ltd., Montreal, $5469; Dunlop Tire & Rubber Goods Co. Ltd., Toronto, $21,364; Robert Mulhall Ltd., Ottawa, $7743; Kingsley Mfg. Co. Ltd., Toronto, $7257; Turnbull Elevator Co. Ltd., Toronto, $94,111; MacDonald Bros. Aircraft Ltd., St. James, Man., $5782; MacKenzie Air Service Ltd., Edmonton, Alta., $28,362.

Instruments: Ontario Hughes-Owens Co. Ltd., Ottawa, $8539; K. Blevis Laboratories, Toronto, $7290; Ingram & Bell Ltd., Toronto, $5138.

Electrical equipment: British Admiral-

(*Please turn to Page* 67)

STEEL

Scrap – Great 3-Point Lesson

■ THIS nation has arrived at a point in its defense program where it should begin to profit from past mistakes.

One good place to begin is its handling of the problem of iron and steel scrap.

Today the scrap situation is serious. Production in steelworks and foundries is on the point of being throttled because of the difficulty of obtaining adequate supplies.

Why has this condition been permitted to develop?

To answer this question dispassionately, and without intent to criticize, one must go back to the period immediately before the European war broke out.

At that time the demand for steelmaking scrap in the United States was sluggish. As domestic steelmakers did not seem to want scrap at any price, many dealers turned to the export markets.

♦ ♦ ♦

Exports of scrap in the four years from 1936 to 1939, inclusive, totaled 14,127,343 net tons.

More than half of this scrap—7,143,118 tons—went to Japan alone. Italy received 1,710,389 tons and Spain 39,872 tons. The three nations imported 8,893,379 net tons of American scrap—a substantial contribution to the preparation of the axis war machine.

War broke out in September, 1939. One would expect that this would have caused an immediate curtailment of scrap shipments to axis belligerents. But in 1940 the United States shipped 1,556,300 tons of scrap to axis powers and to nations under axis control as against 1,541,255 tons to England and her allies.

With the proper foresight we could have retained at least 6,000,000 tons of the more than 10,000,000 tons of scrap which we turned over to potential enemies from 1936 to 1940.

♦ ♦ ♦

Our handling of the scrap situation at home has been equally unfortunate. Good national management would have averted the coal strike, which would have conserved scrap.

Our administration of the defense program insofar as it involves scrap supply has been marked by wrangling and vindictiveness, almost from the very beginning. Sometimes one wonders whether some of the principals are concerned more with the prestige of their offices than with the problem of increasing the supply of scrap.

The foregoing adds up to a total of unfortunate blunders.

Why not profit from them, wipe the slate clean, and make a new start?

How?

1. The President must appoint one competent man to head defense and must clothe him with adequate authority.
2. Put the scrap problem up to experienced men.
3. Charge them with the responsibility of getting scrap—regardless of politics, social concepts, economic theories, prejudice, fear, favor or red tape.

Then we will have scrap.

E. L. Shaner

EDITOR-IN-CHIEF

July 28, 1941

The *BUSINESS TREND*

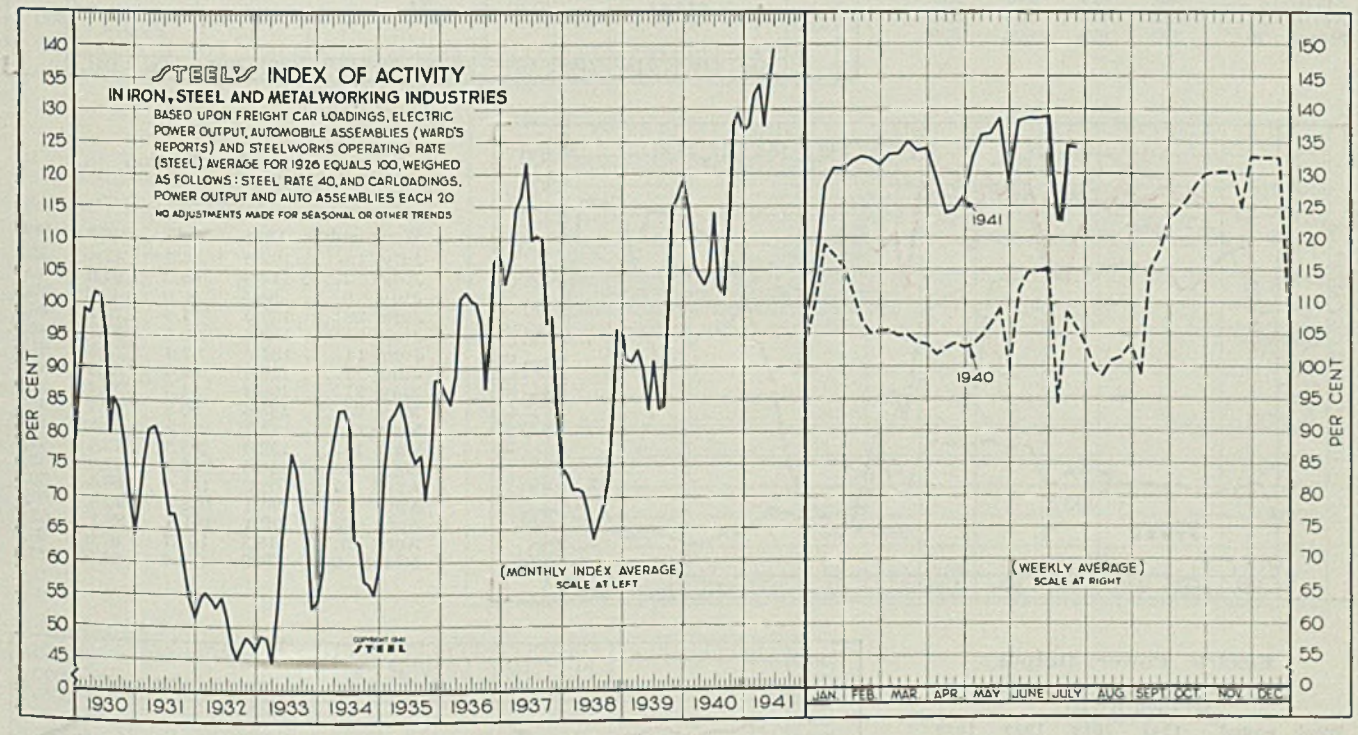
Industrial Activity Lags Behind June Levels

■ INDUSTRIAL activity in July has lagged behind that in June, the year's peak month, but is substantially above July last year. The moderate decline recorded for each week from the corresponding period in June was occasioned first by the holiday, then by a slight decrease in the steel operating rate and a continuation of the tapering off in automobile output.

In the week ended July 19, STEEL'S index of activity declined 0.4 points to 134.1 from the preceding week's 134.5, and compared with 106.0 in the corresponding period last year. National steel rate in the week was off 0.5 points to 97 per cent of capacity, against 88 per cent in the week in 1940. Necessity for furnace repairs and a 1-day strike at a Detroit plant were responsible for the decrease.

Revenue freight carloadings gained more than seasonally in the week to 899,370, the second highest level this year. Peak of 908,664 cars loaded was reached in the week of June 28. Electric power output increased further to 3,162,586,000 kilowatt hours, up 18 per cent from the corresponding week last year.

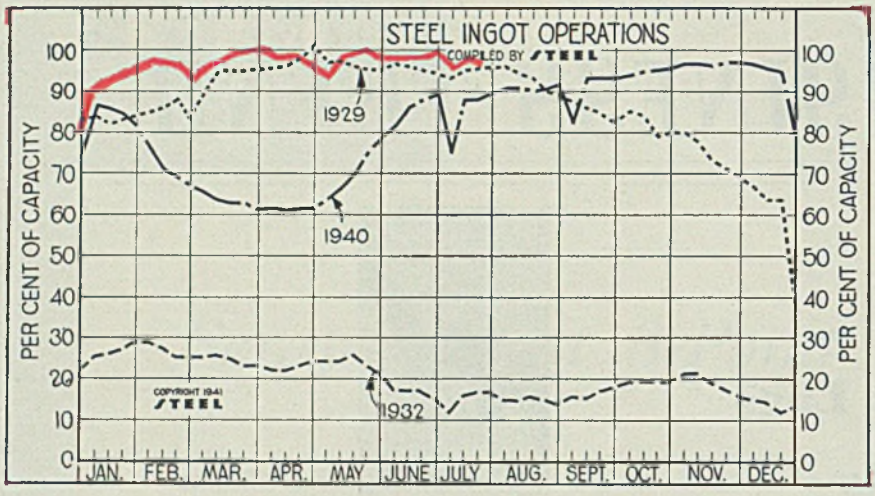
Automobile assemblies eased to 109,912 units, against 114,318 in the preceding week and 53,020 in the week of July 19 last year.



STEEL'S index of activity declined 0.4 *points to* 134.1 *in the week ended July* 19:

Week Ended	1941	1940
May 3	132.6	103.3
May 10	135.9	104.8
May 17	136.1	106.8
May 24	138.6	109.1
May 31	128.4	99.2
June 7	138.4	111.9
June 14	138.7	114.6
June 21	138.7	114.8
June 28	138.8	115.3
July 5	122.9	94.2
July 12	134.5	108.5
July 19	134.1	106.0

Mo. Data	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930
Jan.	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6
Feb.	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2
March	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4	98.6
April	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7
May	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2
June	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8
July	.....	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9
Aug.	.....	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4
Sept.	.....	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7
Oct.	.....	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8
Nov.	.....	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0
Dec.	.....	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3



Steel Ingot Operations

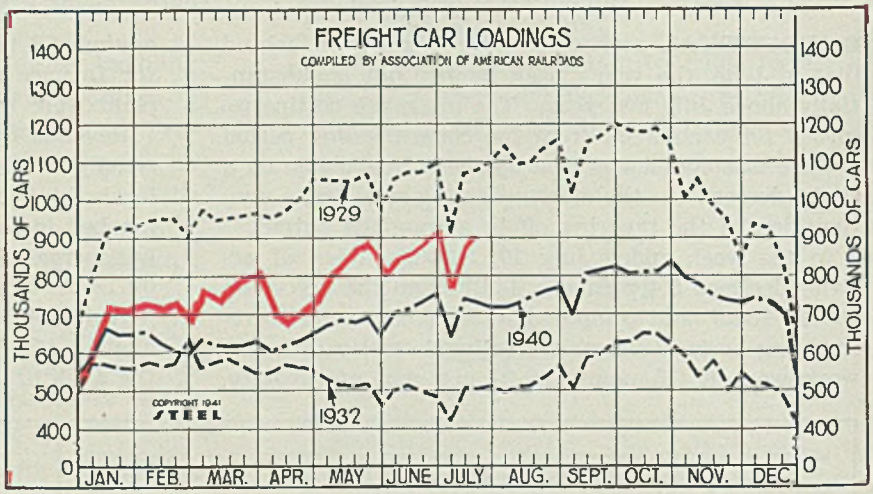
(Per Cent)

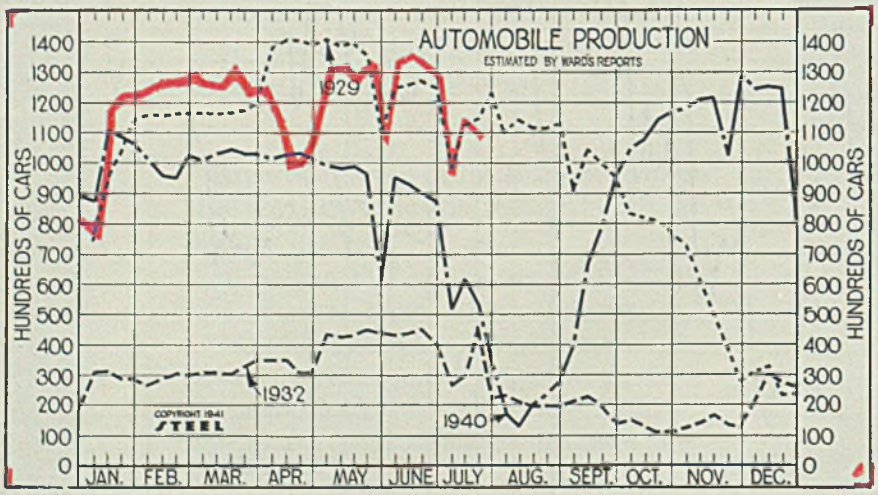
Week ended	1941	1940	1939	1938
July 19....	97.0	88.0	56.5	36.0
July 12....	97.5	88.0	50.5	32.0
July 5....	96.5	75.0	42.0	24.0
June 28....	99.5	89.0	54.0	28.0
June 21....	99.0	88.0	54.5	28.0
June 14....	99.0	86.0	52.5	27.0
June 7....	99.0	81.5	53.5	25.5
May 31....	99.0	78.5	52.0	25.5
May 24....	100.0	75.0	48.0	28.5
May 17....	99.5	70.0	45.5	30.0
May 10....	97.5	66.5	47.0	30.0
May 3....	95.0	63.5	49.0	31.0
April 26...	96.0	61.5	49.0	32.0
April 19...	98.0	61.5	50.5	32.5
April 12...	98.0	61.0	51.5	32.0
April 5...	98.0	61.5	53.5	32.0
March 29..	99.5	61.0	54.5	36.0

Freight Car Loadings

(1000 Cars)

Week ended	1941	1940	1939	1938
July 19.....	899	730	656	581
July 12.....	876	740	674	602
July 5.....	740	636	559	501
June 28.....	909	752	666	589
June 21.....	886	728	643	559
June 14.....	863	712	638	556
June 7.....	853	703	635	554
May 31.....	802	639	568	503
May 24.....	886	687	628	562
May 17.....	864	679	616	546
May 10.....	837	681	555	542
May 3.....	794	666	573	536
April 26.....	722	645	586	543
April 19.....	698	628	559	524
April 12.....	680	619	548	538
April 5.....	682	603	535	522
March 29....	792	628	604	523





Auto Production

(1000 Units)

Week ended	1941	1940	1939	1938
July 19....	109.9	53.0	47.4	32.1
July 12....	114.3	65.2	61.6	42.0
July 5....	96.5	52.0	42.8	25.4
June 28....	127.9	87.6	70.7	40.9
June 21....	133.6	90.1	81.1	40.9
June 14....	134.7	93.6	78.3	41.8
June 7....	133.6	95.6	65.3	40.2
May 31....	106.4	61.3	32.4	27.0
May 24....	133.6	96.8	67.7	45.1
May 17....	127.3	99.0	80.1	46.8
May 10....	132.6	98.5	72.4	47.4
May 3....	130.6	99.3	71.4	53.4
April 26...	108.2	101.4	86.6	50.8
April 19...	99.9	103.7	90.3	60.6
April 12...	99.3	101.9	88.1	62.0
April 5....	116.3	101.7	87.0	61.0
March 29..	124.2	103.4	86.0	57.5

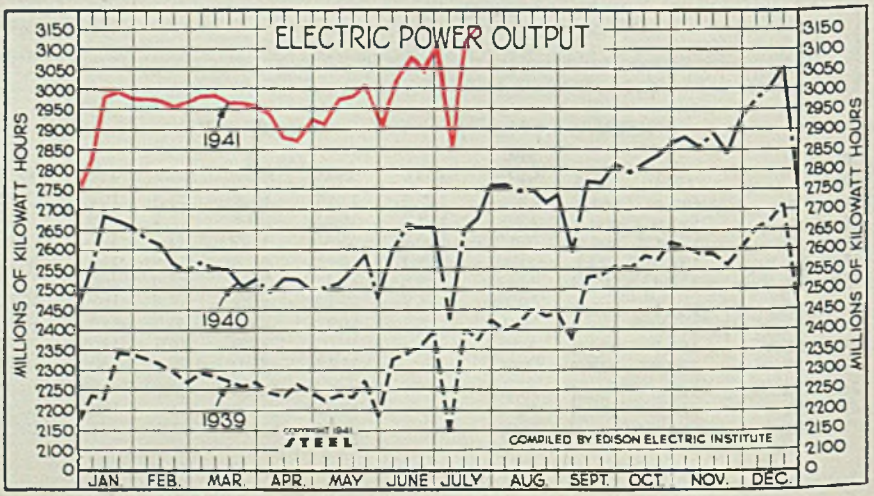
Electric Power Output

†

(Million KWH)

Week ended	1941	1940	1939	1938
July 19.....	3,163	2,681	2,295	2,085
July 12.....	3,141	2,652	2,403	2,154
July 5.....	2,870	2,425	2,145	1,937
June 28.....	3,121	2,660	2,396	2,074
June 21.....	3,056	2,654	2,362	2,082
June 14.....	3,057	2,665	2,341	2,051
June 7.....	3,042	2,599	2,329	2,057
May 31.....	2,924	2,478	2,186	1,937
May 24.....	3,012	2,589	2,278	2,031
May 17.....	2,983	2,550	2,235	2,024
May 10.....	2,975	2,516	2,239	2,019
May 3.....	2,915	2,504	2,225	1,992
April 26.....	2,926	2,499	2,244	1,996

†New series: Includes additional governmental and power generation not previously reported.

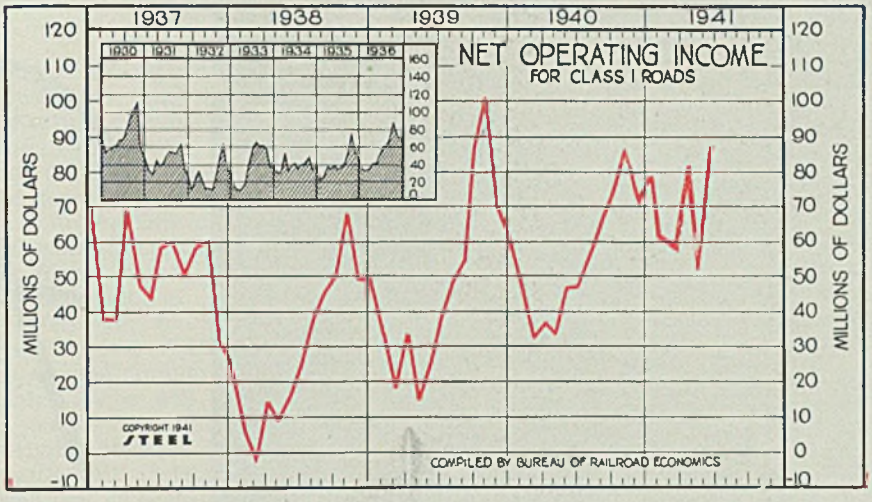


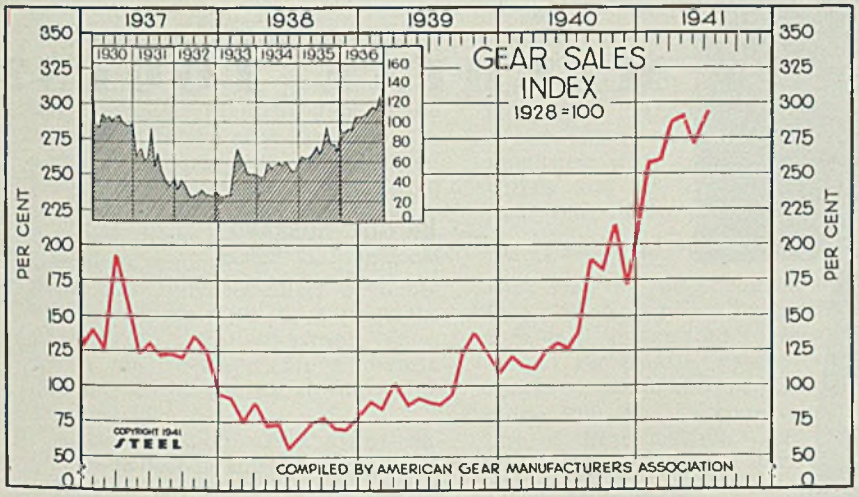
Class I Railroads
Net Operating Income

(Unit: $1,000,000)

	1941	1940	1939	1938
Jan.	$62.36	$45.57	$32.89	$7.14
Feb.	58.49	32.86	18.59	1.91*
Mar.	80.63	36.73	34.32	14.73
April	52.57	33.82	15.32	9.40
May	88.63	47.08	25.10	16.67
June	....	47.42	39.10	25.16
July	....	57.08	49.01	38.43
Aug.	....	66.01	54.59	45.42
Sept.	....	74.19	86.43	50.36
Oct.	....	86.99	101.62	68.57
Nov.	....	71.10	70.35	49.67
Dec.	....	78.79	60.95	49.37
Average	....	$56.84	$49.02	$31.02

*Indicates deficit.





Gear Sales Index

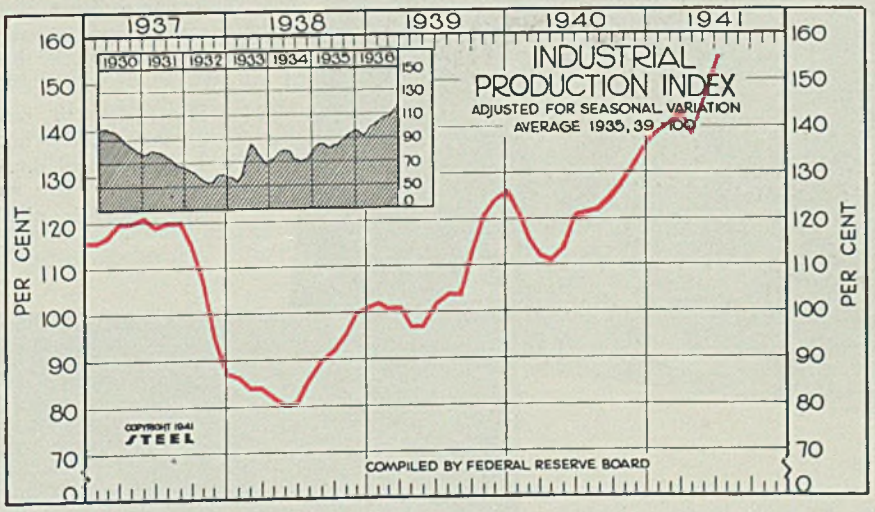
(1928 = 100)

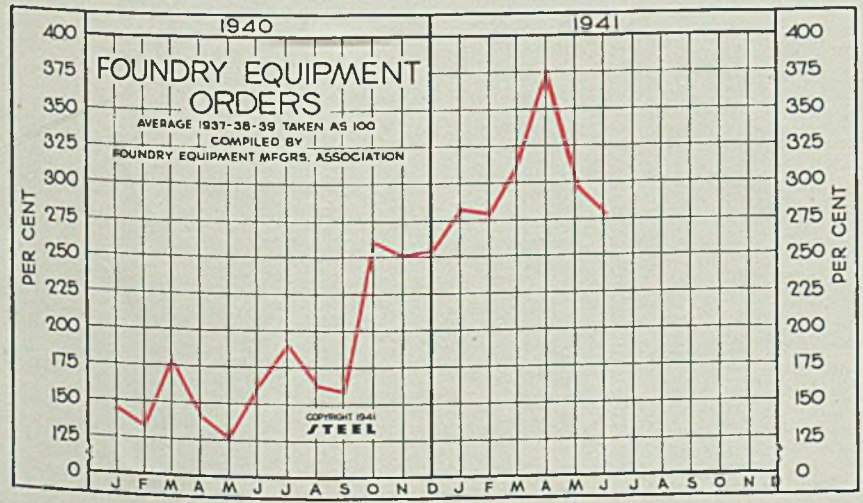
	1941	1940	1939	1938	1937
Jan.	259	123	91.0	93.0	144.0
Feb.	262	116	86.0	77.0	130.5
Mar.	288	114	104.0	91.0	195.0
April	292	128	88.0	74.0	164.0
May	273	133	93.0	70.0	125.5
June	299	129	90.0	58.0	134.0
July	...	141	89.0	67.0	124.0
Aug.	...	191	96.0	76.5	125.0
Sept.	...	183	126.0	80.5	123.0
Oct.	...	216	141.0	72.5	139.5
Nov.	...	173	126.0	72.0	127.5
Dec.	...	208	111.0	81.0	97.0
Ave.	...	155.0	103.0	76.0	135.5

Industrial Production
Federal Reserve Board's Index

(1935-39 = 100)

	1941	1940	1939	1938	1937
Jan.	139	122	102	86	116
Feb.	141	116	101	84	117
March	143	112	101	84	120
April	140	111	97	82	120
May	150	115	97	80	121
June	156	121	102	81	119
July	...	121	104	86	120
Aug.	...	121	104	90	120
Sept.	...	125	113	92	115
Oct.	...	129	121	95	107
Nov.	...	133	124	100	95
Dec.	...	138	126	101	87
Year Ave.	...	122	108	88	113





Foundry Equipment Orders

Monthly Average

(1937-38-39 equals 100)

	1941	1940
Jan.	285.3	149.0
Feb.	281.1	135.7
March	315.2	183.2
April	377.2	145.2
May	298.7	129.1
June	281.1	164.9
July	....	194.4
Aug.	....	165.4
Sept.	....	161.2
Oct.	....	264.0
Nov.	....	254.2
Dec.	....	257.8

Flywheels ON MACHINE TOOLS?

By GUY HUBBARD
Machine Tool Editor

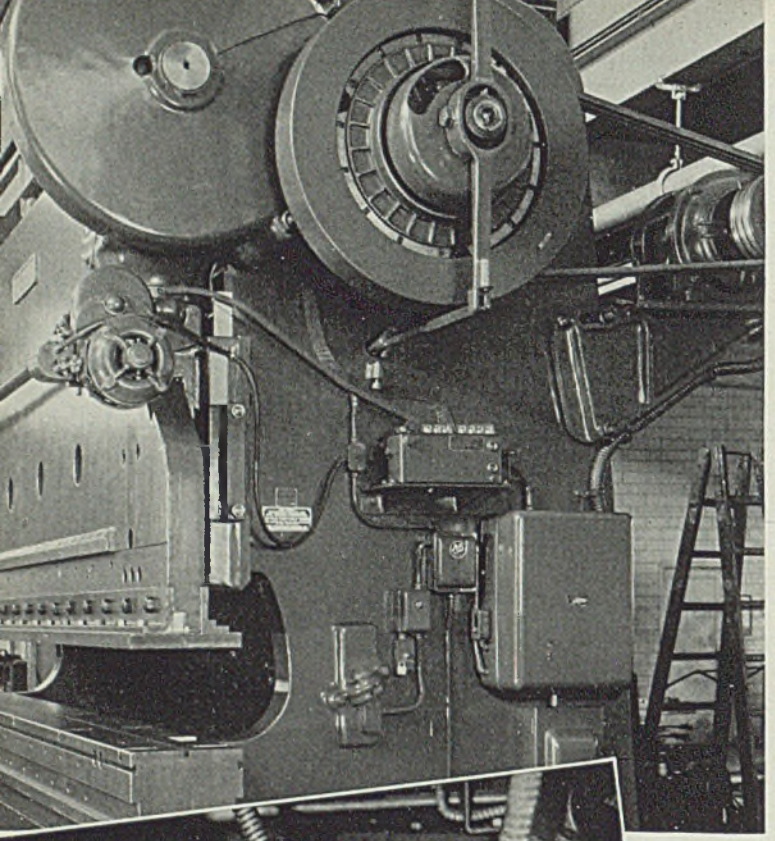


Fig. 1. (Upper left)—Drive system of this 12-foot all-steel press brake built by Cincinnati Shaper Co. gives excellent example of use of flywheel to enable a relatively small motor to cope successfully with a heavy peak load which is imposed briefly during the operating cycle

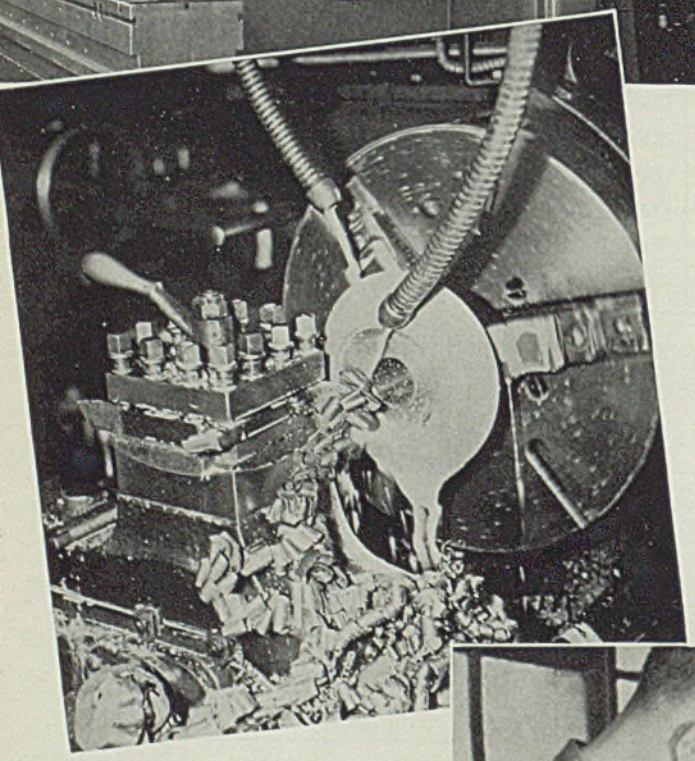


Fig. 3—Typical case, immediate left, where "flywheel effect" of chuck somewhat larger and heavier than required by mere physical dimensions of work, helps to insure smooth machining. This high tensile steel bevel gear blank is being turned in a Warner & Swasey turret lathe at Braun Gear Corp., Brooklyn, N. Y.

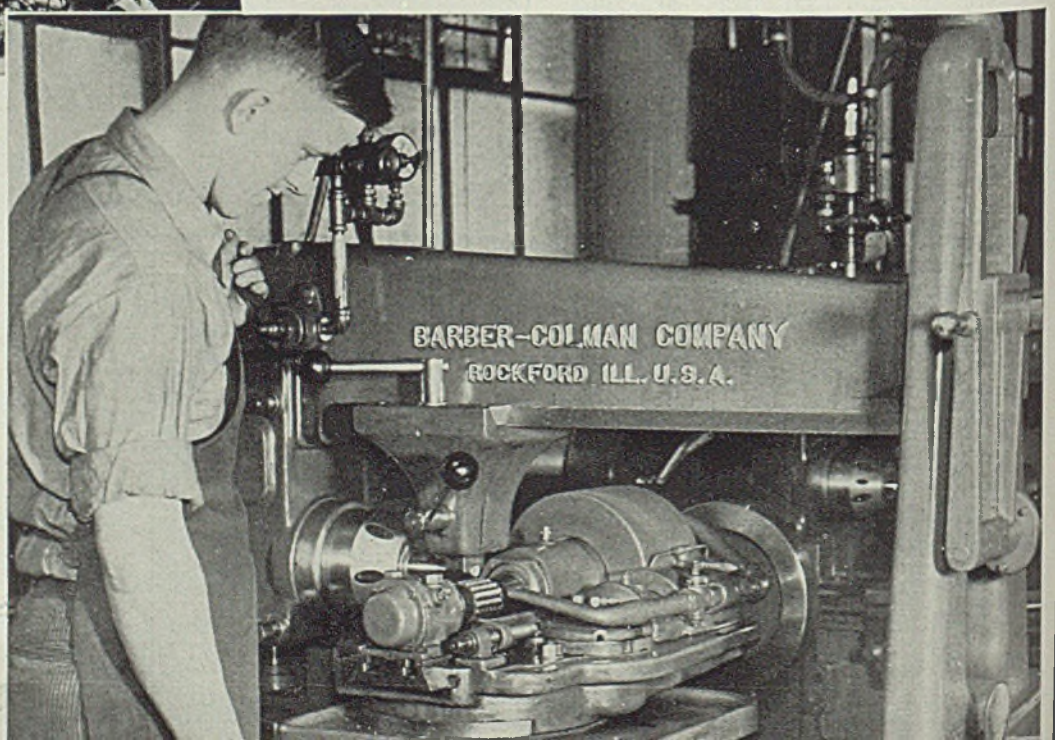


Fig. 4—"Flywheel effect" is particularly helpful in connection with certain milling and hobbing operations. Some engineers, recognizing this, deliberately put flywheels on these machines, which is true of this Barber-Colman hobber shown splining steel shafts at the Maytag plant, Newton, Iowa

■ BECAUSE of their familiarity with successful use of flywheels on metalworking machines of "percussion type"—including punching and forming presses, shears and power brakes (See Fig. 1)—production men often ask this question:

"Why are flywheels not used on machine tools?"

A good many years ago the writer asked that same question of a machine tool designer whose experience extended back into the early days of the industry. His answer was:

"Because flywheels *never were* used on machine tools!" His tone of voice indicated that what he really meant was:

"It simply isn't done!"

There used to be quite a number of traditions like that in the machine tool business. Many of them have been upset in the past 25 years. As a matter of fact, "flywheel effect" always has influenced machine tool performance, regardless of whether designers have recognized it or not. Conscious experience of many of them with flywheel effect probably has been more with its undesirable phases than with its desirable ones, which may account for a certain amount of antagonism to the whole flywheel idea.

A case in point is that of the planer—wherein starting, accelerating, stopping and reversing of the table or platen always has been a problem, particularly so when efforts have been made to speed up the cycle of operations. While the reciprocating table of a planer involves straight line motion, what goes on nevertheless does fall within the category of flywheel effect. Each time a cut is taken, the inertia of a heavy mass of metal (table and work) first has to be overcome and within the shortest possible time this mass must be brought up to effective cutting speed. After being held at that speed throughout the duration of the cut, it then must be decelerated and brought to a stop within the shortest possible space, reversed immediately, and run back at high speed to the starting point of the next cut. This cycle is repeated over and over, each cut involving four "battles with inertia."

Anyone familiar with old-time machine shops will recall vividly the agonized screaming of the planer driving belts as they fought their battle with inertia at the beginning and end of each cutting and return stroke. Since the advent of electrical drive, this screaming has been eliminated. However, the struggle with inertia still goes on, although electricity handles the situation much more effectively and with much less wear and tear on the machines and on the dispositions of their operators.

Case of Inertia vs. Inertia

In view of the problems induced into planer operation by flywheel effect, it is interesting to recall that one of the classic examples of intentional use of a flywheel on a machine tool was in connection with one of these machines. A number of years ago, at Worcester Polytechnic Institute, a planer driven by an individual 10-horsepower induction motor was fitted up with a flywheel on the motor drive. The primary idea was to relieve the motor from heavy peak loads when the table was started, stopped and reversed.

Tests proved that with the flywheel about 30 per cent less motor power was required on short-stroke work, and about 25 per cent less on long-stroke work. Furthermore, it was found that the flywheel enabled the machine to negotiate tough spots in the work without loss of speed and it served to speed up reversals. In other words, by providing simple and effective means for the motor to store up a reserve of power during the considerable time when full load was not imposed upon it, the motor had something to help it over the brief peaks when otherwise it would have been overloaded.

There is food for thought here both for designers of new machine tools and for those responsible for the revamping of existing machines to meet the exigencies of the defense production program. For some years it has been common practice to think of machine tool power requirements in terms of peak demands rather than in terms of average requirements. Machine tools, especially those of automatic and semi-automatic types, are inclined to have severe peaks of power demand at certain brief periods in their operating cycles. These peaks are comparable to those of the planer just mentioned.

For instance, in a multiple-spindle automatic each indexing involves the turning over of a heavy spindle carrier loaded with anywhere from four to eight heavy bars of stock. At the same time a turret and toolslides loaded with tools are snapped back, stock is fed and chucked and a stock stop is actuated. To get these "non-productive operations" over with as quickly as possible, the cam system in the meantime has been thrown into high gear—imposing still further load on the driving motor.

Although there is considerable inherent flywheel effect in the drive and transmission of these machines,

(*Please turn to Page* 86)

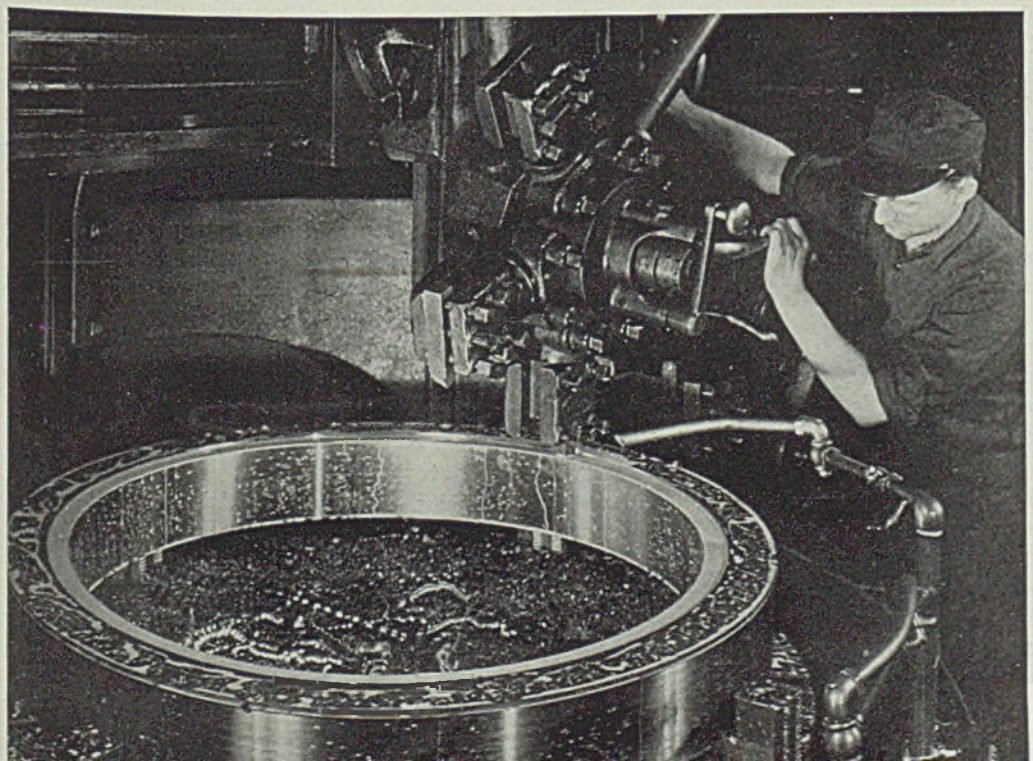


Fig. 2—Inherent "flywheel effect"—often unrecognized but none the less important in many machine tools—is well exemplified by the revolving table of the Bullard vertical turret lathe, here shown in the act of machining a big steel ring gear blank at the Nuttall works of Westinghouse in Pittsburgh

Unusual Features Involved In Making Large Gun Carriages and Recoil Mechanisms

The special problems incident to manufacture of carriages for large guns center around the procedures for making the recoil mechanism—the heart of the gun carriage. Features and principles of operation of a typical unit are described: how these influence design and manufacture is told. Also detailed are actual manufacturing methods and equipment employed at Rock Island Arsenal

By G. W. BIRDSALL
Engineering Editor

FIRST let's look at Fig. 1 and examine a gun carriage for a typical large gun, such as the 155-millimeter shown here. Since modern warfare demands extreme mobility, provision is made to haul the unit at high speeds on large pneumatic tires with the heavy load adequately insulated from shock of rough terrain by large springs.

Fig. 1 shows the gun carriage in firing or battery position with bogie unit (running gear) lifted, allowing the anchor H on the stationary or lower carriage member to sink into the ground. Here also the limber has been unhooked, allowing the trails to be spread and then anchored to dig into the ground at H and H'. D, upper carriage member (the yoke or Y-section), supports the gun barrel and recoil mechanism and permits them to be revolved on the bed frame F to change the horizontal angle of the gun. Provision is included for elevating the gun muzzle to vary the vertical firing angle.

A, Fig. 1, is the housing carrying the recoil mechanism and control cylinders. B is part of the recoil mechanism that adjusts the amount of recoil according to the gun elevation, since the recoil must be shortened at higher elevations. C is the gun barrel itself.

Gun carriage running gear or bogie unit, shown in Fig. 2, involves no particularly unusual manufacturing problems. In fact, Rock Island Arsenal buys this bogie unit complete from a manufacturer as a subassembly. Note that each wheel is equipped with dual tires and that each wheel has its own heavy-duty mechanical brake. The brakes are connected in pairs, two brake levers being employed to control the four brakes. Of course oversize suspension springs are necessary to withstand the shocks incident to transportation of such a heavy load. Weight of the unit shown in Fig. 1 is approximately 2½ tons.

As in any manufacturing operation, as many units as possible are built in the form of subassemblies. The gun carriage in Fig. 1 is made in the form of the following subassemblies: Bottom carriage or bottom frame F, top carriage or yoke D, two trails at G, recoil mechanism at A, and equalibrator at K, bogie unit shown separately in Fig. 2, limber shown separately in Fig. 3.

To transport the gun from place to place, screw jacks, which are part of the bogie unit at E, are screwed down, lifting the gun carriage from the ground. Then the two trails are swung together. Next the limber, Fig. 3, is run over the trails and a large screw jack mechanism operated, lifting the trails. Gun and carriage then are pulled by a tractor connected to the limber. Note heavy springs on this unit, also.

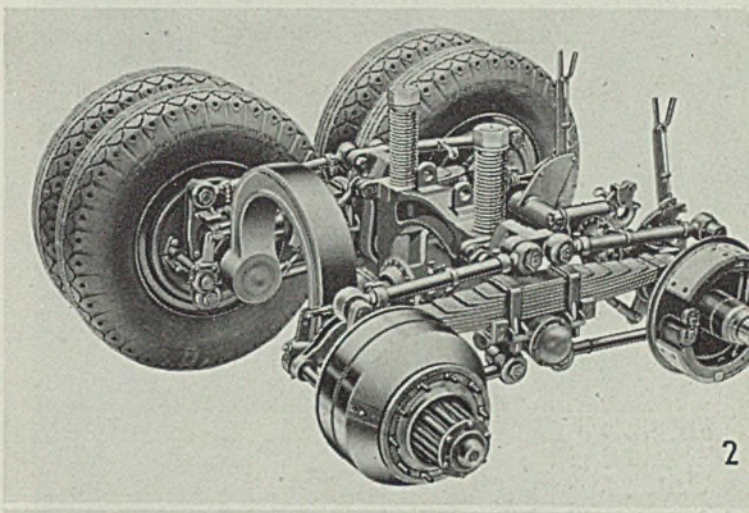
The limber also is manufactured outside the arsenal, being purchased as a complete assembly. It involves no unusual manufacturing problems.

The bottom carriage or bed plate F is built up of welded steel plates and shapes as shown in Figs. 4 and 5. At A, Fig. 4, is the surface on which the upper portion of the carriage or yoke revolves. The surface at C is especially prepared and hardened to resist the impact produced when the gun fires.

At B and B′, Fig. 4, are the bearing bushings in which are placed pins connecting the trails to the carriage. These permit the trails to be swung together for transportation and to be moved apart to form a triangular support for the gun when in action. Note the many brackets for connecting various items to the carriage.

Fig. 5 reveals the intricate web of bracing employed in the bottom carriage unit as seen from below. This is the same unit as shown in Fig. 4 except rolled over on edge to permit examination. Note the exceptionally smooth and uniform weld beads deposited. To withstand shocks in service, it is, of course, most essential that welds be the best it is possible to obtain.

Fig. 6 is a view in the welding department which occupies a large separate building with working sec-



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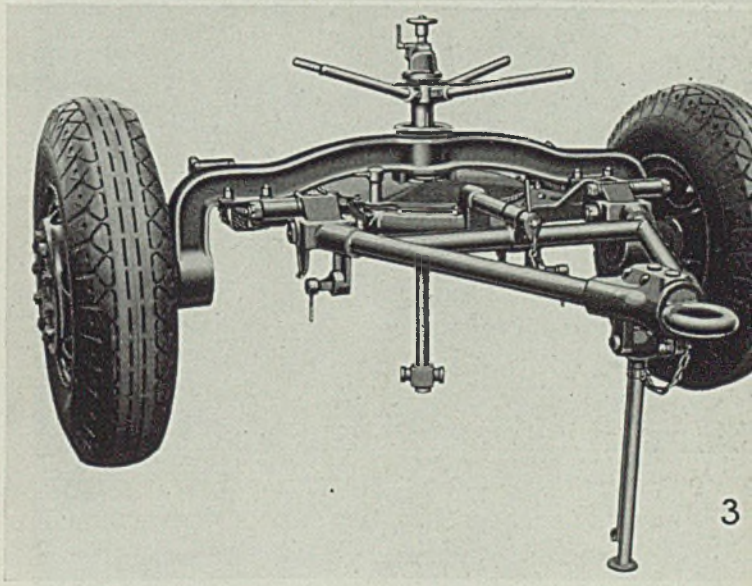

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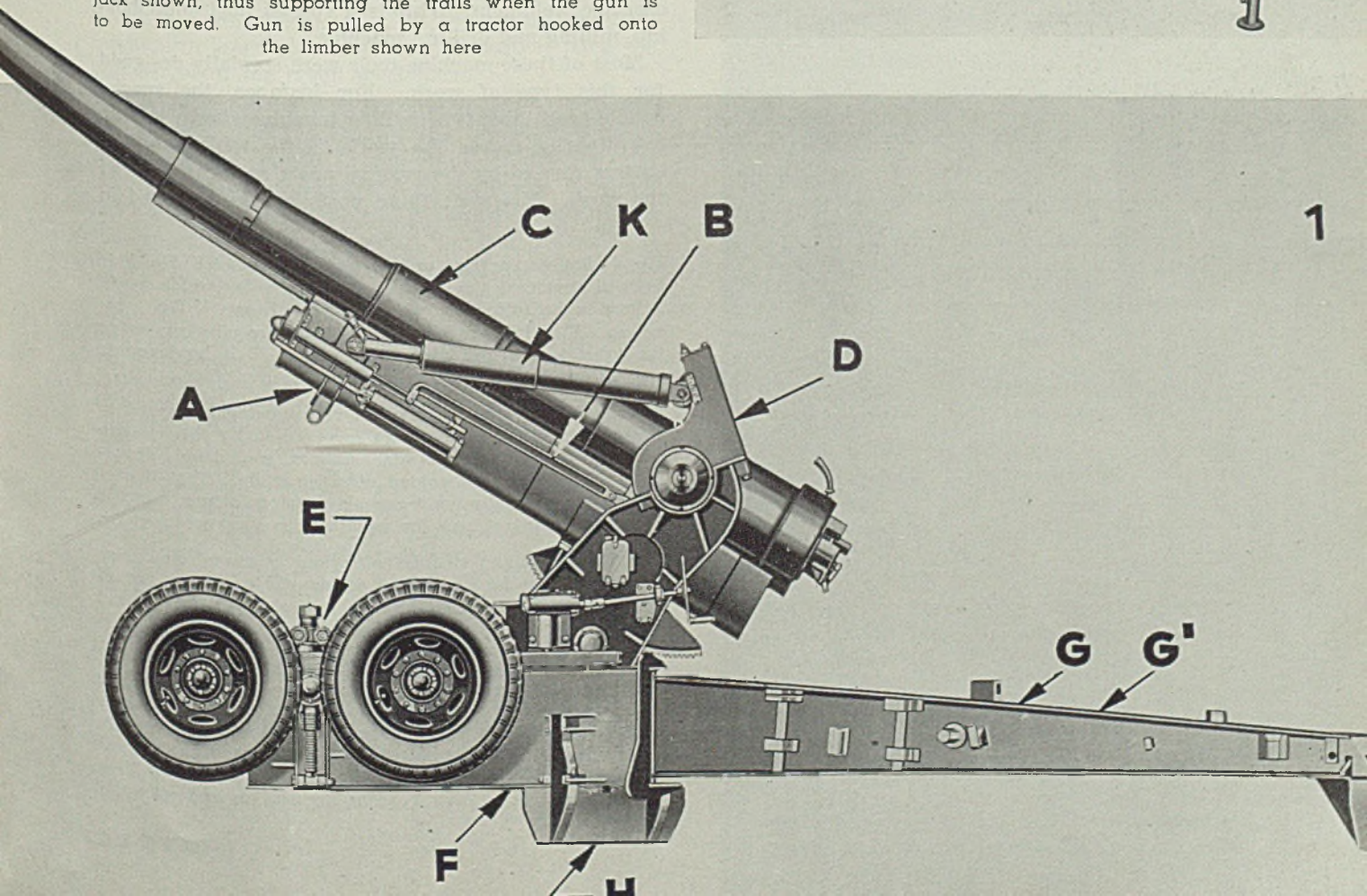
Fig. 1—Side view of complete gun carriage for a 155-millimeter gun. Key: A, housing for recoil mechanism; B, part of mechanism that adjusts amount of recoil according to gun elevation; C, gun barrel; D, upper carriage member—also known as the yoke or Y-section—supports gun barrel and recoil mechanism and permits them to be revolved on bed frame F; E, bogie unit or running gear with wheels lifted; G and G′, two trails or legs; H and H′, anchors which sink into ground; K, equalibrator, part of recoil adjusting mechanism. Total weight about 2½ tons

Fig. 2—Detail view of running gear or bogie unit which carries largest portion of weight of 155-millimeter gun and mount, about 2½ tons. Large screw jacks seen near center permit gun to be lifted up on the wheels when it is moved. Note two brake levers; each works brakes on two of the four wheels

Fig. 3—Limber: When the two trails are swung together, this unit is run over their end, the trails lifted by the screw jack shown, thus supporting the trails when the gun is to be moved. Gun is pulled by a tractor hooked onto the limber shown here



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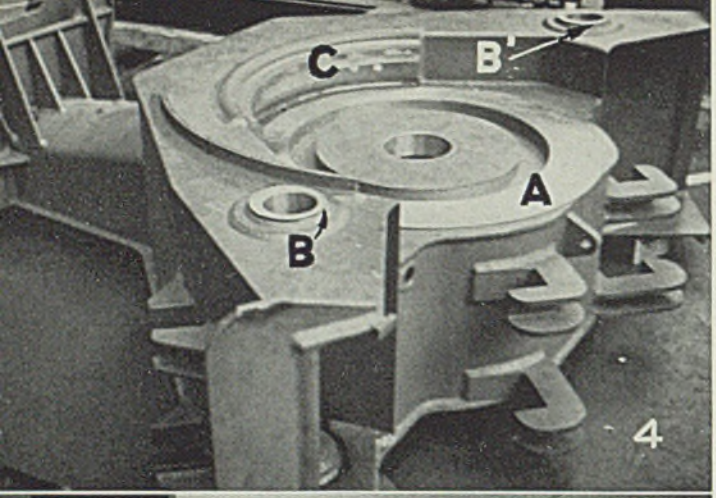
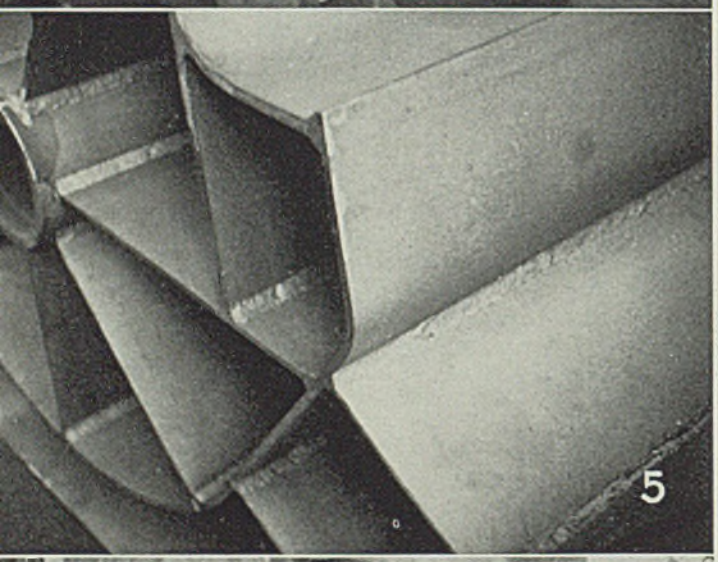
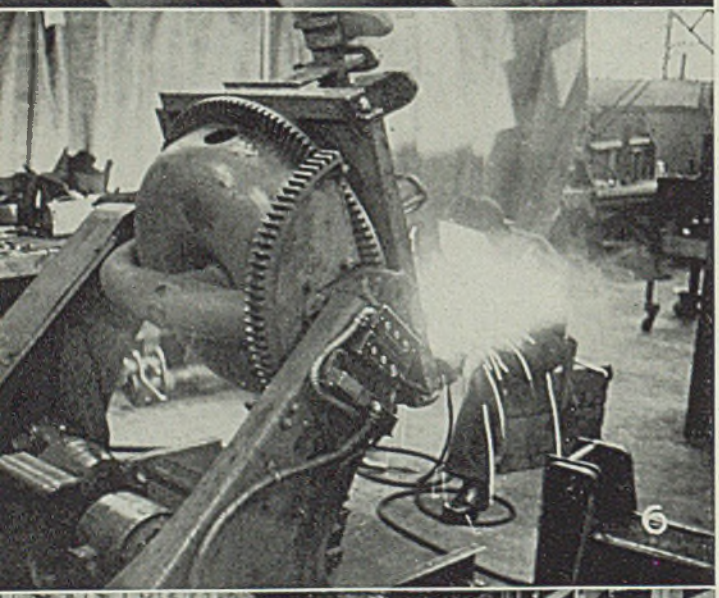
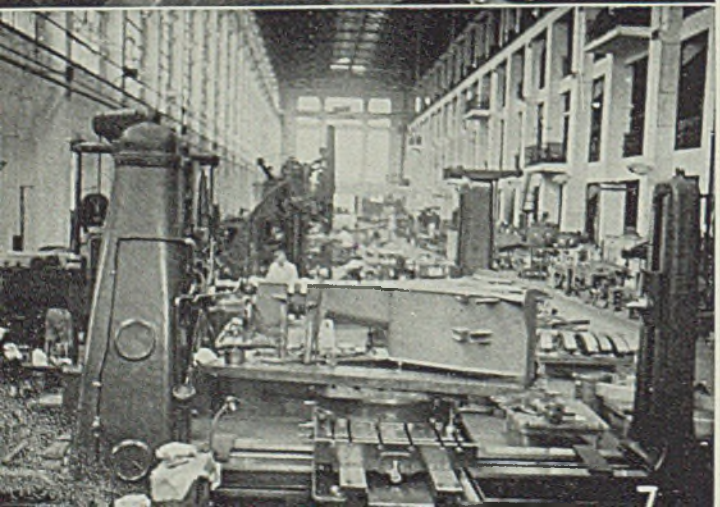








tions partitioned off into booths. As shown in Fig. 6, all work is carefully positioned for downhand welding, a wide variety of sizes and types of positioners—all power operated—being available. Note the pushbuttons on the control station in Fig. 6. In welding such fabrications, sequence is most carefully determined to assure minimum distortion and locked up stresses.

The trails G, Fig. 1, are also welded. These consist of a box section, the top and bottom plates extending out past the side plates a sufficient distance so weld beads are all deposited on the outside of the structure. A trail is made up of ¼ and ⅜-inch thick plates. After plates are squared and lined up, they first are tack welded in position. Then continuous beads are deposited, two passes being employed. All the welding is done using heavily coated rod and all work is positioned for downhand welding.

Bottom carriage, top carriage, the two trails and the recoil mechanism housing are all-welded structures. All steel plate entering into the welded constructions (which thus form practically all of the gun carriage) is a low-carbon high-tensile low-alloy material of good weldability and excellent machining properties, such as Cor-Ten, Man-Ten or the like.

Fig. 7 is a view in the main manufacturing bay at Rock Island. This area is 60 feet wide, 600 feet long and is four stories high under the roof with a 65-foot lift being provided by cranes serving this bay, assuring ample space for the large machine tools required for machining gun cariage sections. In Fig. 7 a bottom carriage unit is being machined on the second machine tool in this lineup. In immediate foreground is a machine being used to finish a bottom carriage weldment. This is a special horizontal boring, milling and drilling machine.

Most of these machine tools were specially designed for this type of work. For instance, the special double-head table-type milling machine shown in Fig. 8 ordinarily moves the work on the table past the cutters carried by the vertical posts on either side of the work. However, these posts can be adjusted in

Fig. 4—Bottom carriage or bed plate, shown at F, Fig. 1, is built of structural steel plates and shapes by welding. At A here is the surface on which upper carriage, D Fig. 1, revolves. B and B′ are bearing bushings for pins connecting the trails to the bed plate. Surface at C is hardened to resist impact produced when gun fires

Fig. 5—The intricate system of web bracing employed to stiffen the bed plate structure is revealed by this closeup which also shows the excellent uniform weld beads deposited. This is an all-welded steel structure. That it successfully withstands the tremendous impacts from firing is evidence of how far welding has progressed

Fig. 6—All welding is done with heavily coated electrodes and positioned for downhand welds. This is only one of many positioners in the big welding shop at Rock Island Arsenal

Fig. 7—View in main manufacturing bay at Rock Island Arsenal: Here are the heavy machine tools for handling the gun carriages and recoil housings. Special machine in foreground here, finishing a bottom carriage weldment, is a combination boring, milling and drilling machine. Most machine tools utilized for heavy work in the arsenal were designed especially by War Department engineers

and out with respect to the work as well as providing for vertical movement of the cutting head. In addition, a boring tool can be utilized for various boring operations or a cutting tool can be employed to machine outer surfaces of hubs forming bearings for the recoil mechanism housing as shown in this illustration.

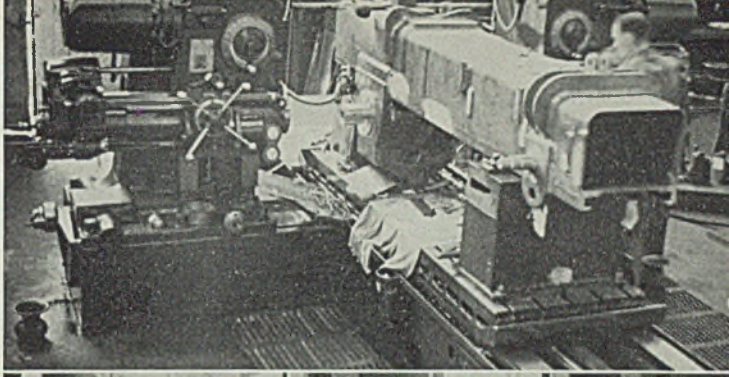
Fig. 9 shows closeup view of this same unit shown in Fig. 8 being employed on a hub-boring operation, the hub being a part of the recoil housing and used to pivot it to the upper or movable portion of the carriage.

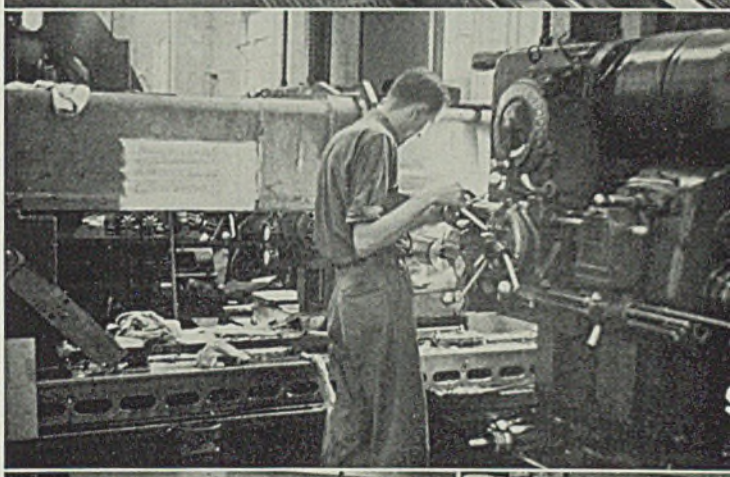
These machines are exceptionally flexible in operation and so are adaptable to an extremely wide variety of machining operations incident to manufacture of gun carriages. This one special machine thus is enabled to handle operations which otherwise would require a number of separate machines. The advantages, of course, are obvious.

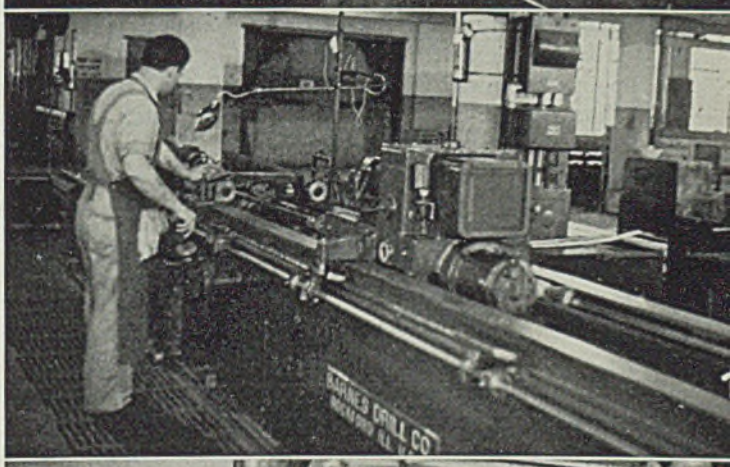
Now we come to the difficult part of the work—making the recoil mechanism. There are a wide variety of recoil mechanism designs, but they all depend for effective and reliable operation upon extremely close, sliding metal-to-metal fits—and these fits must really be good. In fact, all parts of recoil mechanisms must be hand fitted for a particular assembly and so are not interchangeable with any other recoil mechanism assembly. This simply means that the limits are so exacting that it is not practicable to make the parts interchangeable.

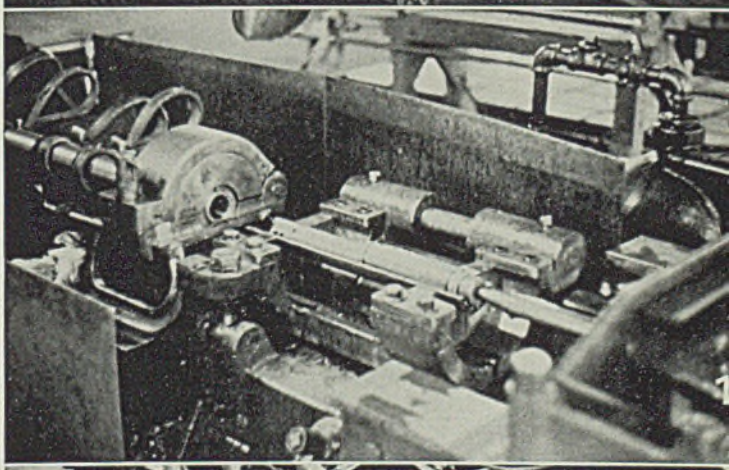
The principle of almost all recoil mechanisms is based on the following sequence of actions: Refer to simplified diagrammatic sketches in Fig. 10. Right diagram, Fig. 10 shows how projections at W and W′ fit into channels C and C′ at the top of the recoil mechanism housing. At A is a connection from the gun barrel to the recoil mechanism.

Now refer to the left drawing in Fig. 10. When gun is fired, the reaction of the propelling charge forces the gun barrel to the right. Since the gun barrel is connected through A to the piston B in cylinder M, the oil in chamber C is forced down through the connection D into cylinder N. Flap valves at G allow the oil to fill chamber F rapidly and compress









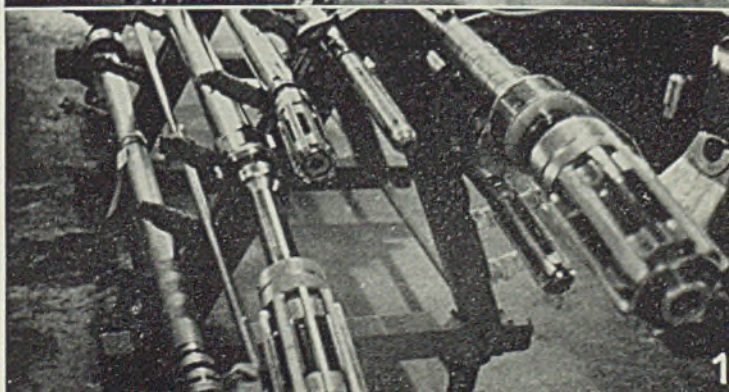


Fig. 8—Special double-head table-type milling machine is an exceptionally versatile unit. Ordinarily work moves on the table past cutters carried by the vertical posts on either side but these posts also permit various boring and cutting operations, too. A recoil mechanism housing is on the table

Fig. 9—Here, for instance, the same machine shown in Fig. 8 is being used to bore hubs in a recoil mechanism housing. Each of the vertical posts carries a full complement of tool holders and drives

Fig. 11—Honing cylinders for recoil mechanisms. This work requires exceptional care

Fig. 12—Closeup of honing equipment showing honing head on slide, ready to enter work

Fig. 13—Group of several honing heads in rack. Note head consists of alternate hardened steel spacer bars and abrasive cutter bars or stones. Spacer bars center the head, which is swiveled as may be noted. These are precision tools

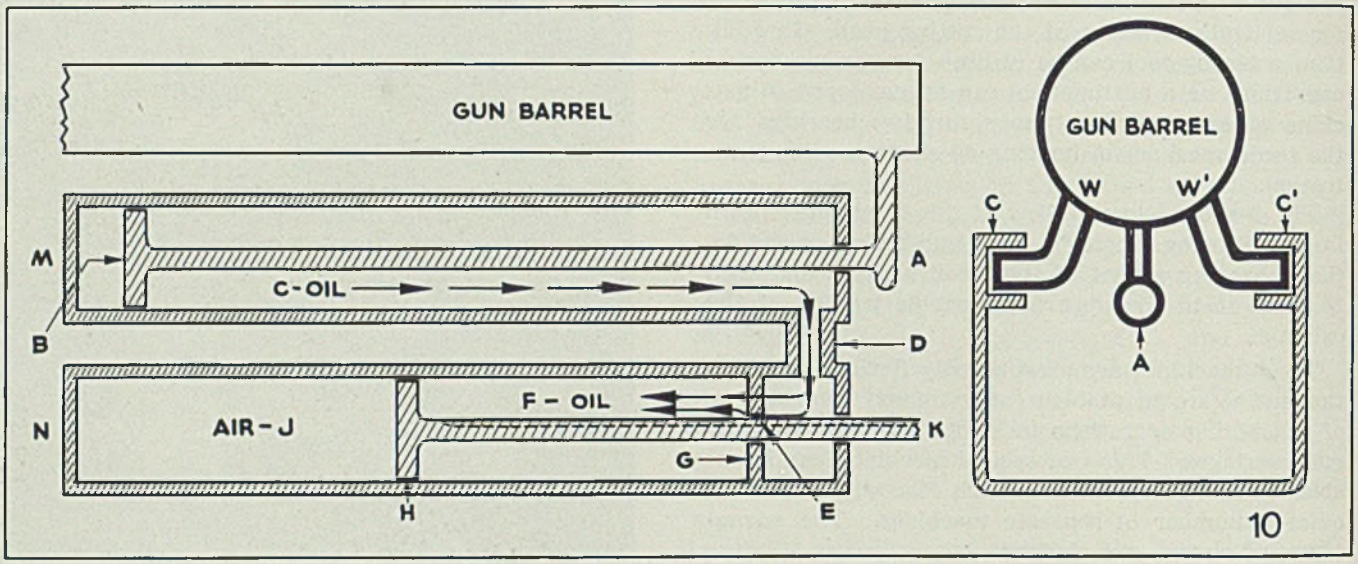


Fig. 10—Right is schematic cross section of gun barrel which carries slides W and W' which travel in channels C and C' in upper portion of recoil mechanism housing during recoil. A is connection to recoil absorbing mechanism further detailed in drawing at left where key is: A, connection between gun barrel and recoil mechanism; B, main piston connected directly to gun barrel through A; C, chamber carrying oil in upper recoil cylinder M; D, connection permitting oil to pass from chamber C in cylinder M into chamber F in cylinder N through control ports at E and flap valves in stationary head G; as gun recoils, piston H is moved to left by entry of oil into F, thereby compressing air in J. See text for explanation of action

the air in chamber J as the piston H moves to the left, carrying the rod K along with the head H.

As the gun barrel continues to move during the recoil, the air pressure in chamber J builds up higher and higher until it eventually reaches a point where it is sufficient to stop the motion of the gun. At this point, the air pressure acts to push the oil back from chamber F through G and D into the chamber C, thus returning the gun to battery position. Here is where the tricky business enters.

To prevent the gun from returning to battery with a bang, wrecking itself and the entire gun carriage, it is necessary to slow down the movement as it approaches the battery position. Here is where the use of the oil enters. As the oil passes from chamber F into chamber C, it first must pass through the stationary head G. The flap valves in G have closed so the only passage for the oil is through the comparatively small ports at E, also built into head G. These ports are made in such a manner that slots or other openings in the piston rod K control the size of opening at E according to the longitudinal position of the rod K. This affords a means of controlling the rate that oil is returned to C by reducing the number of ports or reducing the port size as the rod K moves to the right. Thus it is possible to reduce the velocity of the gun barrel movement. In fact, this affords means of getting any type of "slowdown" that may be desired.

For simplicity, other cylinders employed are not shown, including the length of recoil control labeled B, Fig. 1. This controls the distance that the gun recoils, possibly by adjusting amount of oil in the system, thus exerting an increased initial pressure in chamber J. Some such adjustment must be provided automatically to cut recoil at increased gun elevations, otherwise the barrel would strike the ground on recoil.

Of course, the key to the whole business is the system of ports at E, Fig. 10, and the means of their control embodied in the piston rod K and auxiliary control devices, not shown. Regardless of the exact size, shape and number of these ports, it is quite evident that they must be machined with exceptional accuracy, thus involving a certain amount of difficulty in their manufacture.

Also pistons in the two main cylinders as well as the inside cylinder walls and those of auxiliary control devices must be machined with extreme accuracy as no leakage of oil or air can be tolerated. These cylinders are made from special steel by a very careful machining procedure. After being manufactured to exceptionally close limits, the interiors of the cylinders are given an exacting finishing sequence.

Fig. 11 shows the honing machines employed with Fig. 12 revealing a typical setup at close range. Fig. 13 is a closeup of typical honing tool heads that carry the abrasive bars which do the actual honing. These heads consist of an arrangement of expandable cutting bars and guides which are revolved at the same time they are passed longitudinally back and forth through the cylinders.

First or rough honing is done with 120-grit stones. Semifinishing is done with 180-grade. Polishing employs 320-J grade stone, while the fine lapping head used to finish the surface is a 500-I stone. All are carborundum.

Outside of these considerations pointed out above, no manufacturer will find there are any unusual or unexpectedly difficult operations involved in making the recoil mechanism. In fact, there is a large amount of mystery attached to recoil mechanisms entirely beyond what the subject deserves. Their successful manufacture is no mystery at all, simply being a matter of very careful machining.

HERE'S HOW TO GET MORE OUT OF MACHINE TOOLS...

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A

Suppose each tool you make could be made to produce more pieces—in fewer days—with less attention in service.

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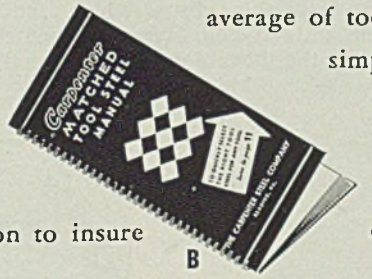

B

With the helpful literature shown on this page, you can easily put this method to work in your own tool room—and chances are that some of this literature is already on file there. If so, check into it now. You will be surprised at the way this system for simplifying tool room procedure fits into present needs—at the opportunity it offers for improving tools, relieving pressure on the tool room, and increasing machine output.

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An Efficient

MATERIALS HANDLING SYSTEM

for cleaning castings

■ THE HANDLING of work to the blasting machines in the cleaning department and then on to the next processing step with a minimum of effort and lost time is being given more and more thought by foundries and other large production plants.

Possibly the installation recently made at Walworth Co. plant, Greensburg, Pa., may be considered typical of the advances resulting from proper consideration of this problem. Here the ingenious conveying system shown below, both in plan and elevation diagrams, is used to move malleable iron pipe fittings from the annealing ovens, through the cleaning operation, to the sorting tables and on to the galvanizing department.

As the malleable iron fittings leave the annealing oven, they are dumped on a vibrating shakeout screen at extreme left in Fig. 1. This is an inclined screen, allowing the fittings to roll onto the adjacent feeder of a continuous conveyor which elevates the fittings, carrying them to an overhead loading bin in the cleaning department. This bin, as will be seen from Figs. 1 and 2 is fitted with two gates, which in turn feed into two 48 x 42-inch Wheelabrator Tumblasts — airless blast cleaning machines made by American Foundry Equipment Co., Mishawaka, Ind. It will be noted these two machines are located face to face with the loading bin directly above the alley in between the two machines. These two units clean the entire production of fittings at this plant.

By means of manually operated vertical lift doors seen in the lower section at right in Fig. 1, any desired quantity of fittings can be fed from the loading bin into the cleaning chamber of either machine. The usual load for one of these machines is about 1700 pounds of castings weighing from 4 ounces to 75 pounds apiece. Cleaning time ranges from 4 to 5 minutes for the large fittings to a maximum of 15 minutes per load for the smaller sizes. An average load will require about 10 minutes.

After the castings have been cleaned, they are unloaded by means of a portable chute which feeds them onto a belt conveyor located below the floor level and directly beneath the center of the bin as shown in Fig. 1. This conveyor in turn carries the work out from the vicinity of the cleaning machines and elevates it to the mezzanine floor where the castings are delivered into a hopper located directly above a circular "merry-go-round" table which is shown at upper right, Fig. 1.

Sorters and inspectors standing within this circular "merry-go-round" conveyor then inspect the castings and sort them into various sizes and types. Similar pieces are placed in separate barrels just outside the circular conveyor as shown. When the barrels are loaded, they are trucked directly to the galvanizing department.

The Walworth Co. uses No. 25 steel shot for abrasive in these blast cleaning machines. This produces a finish which makes the fittings suit-

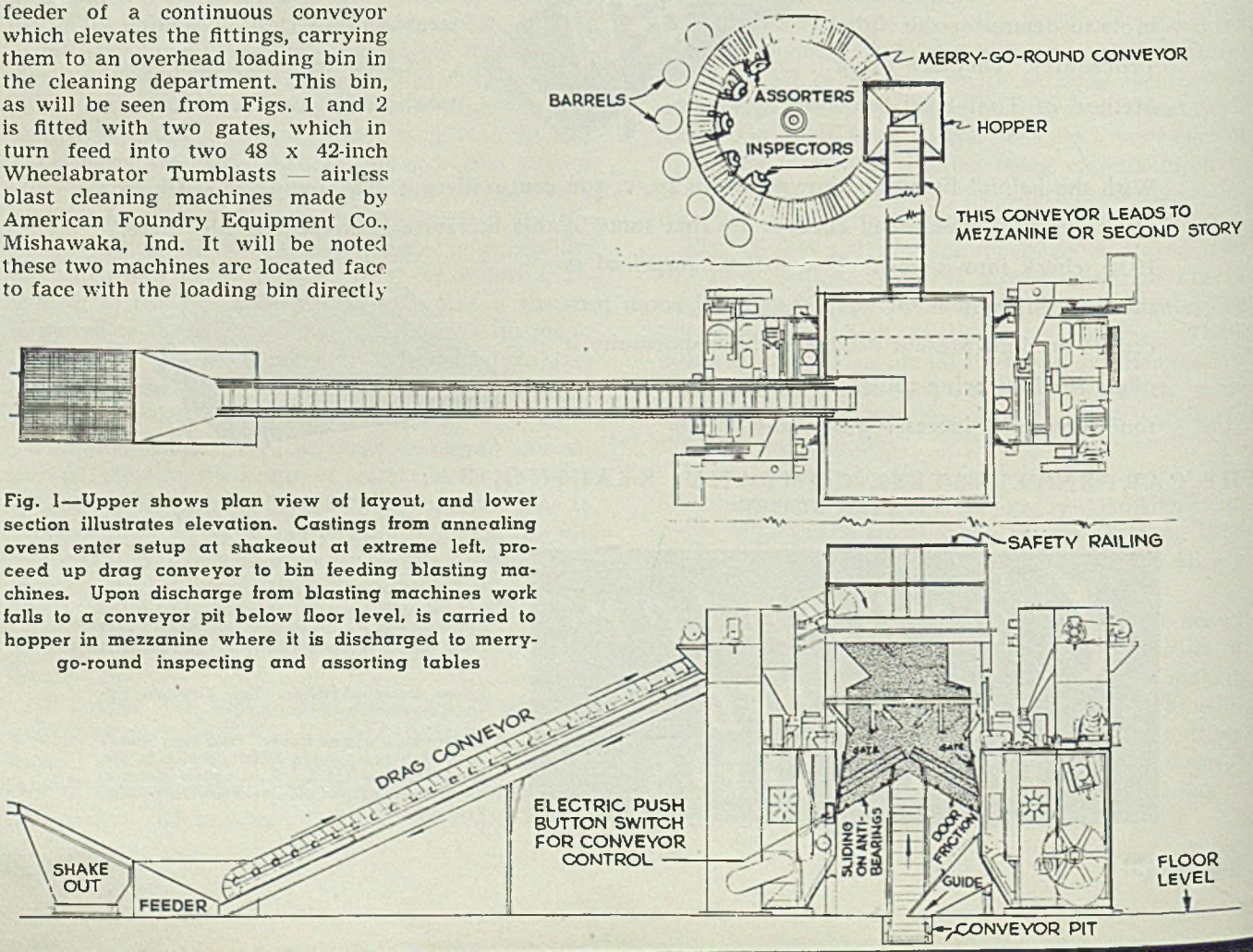
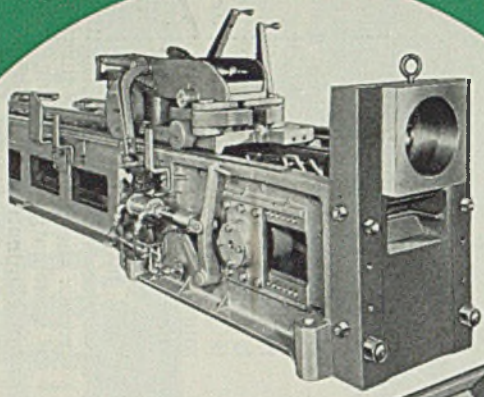
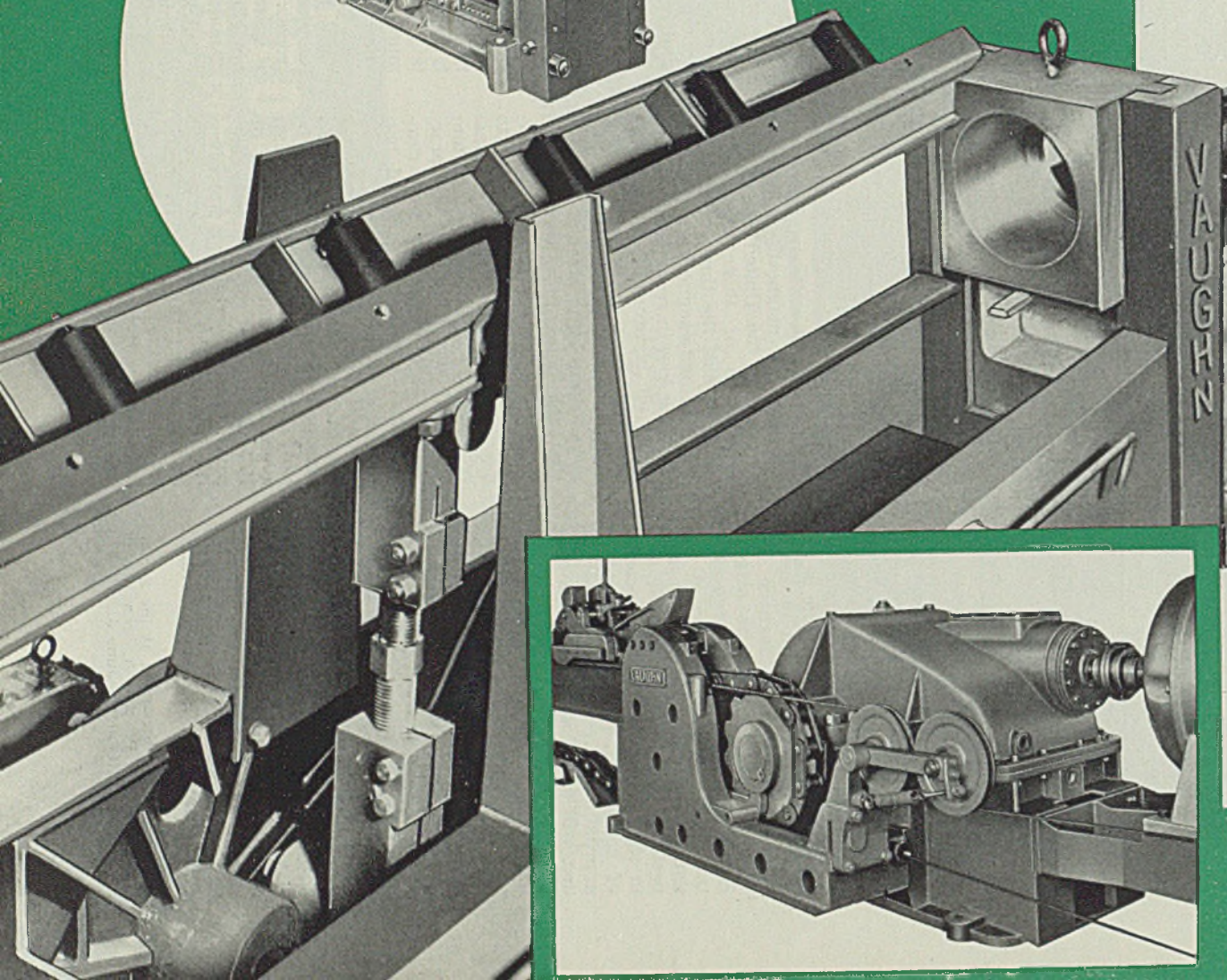


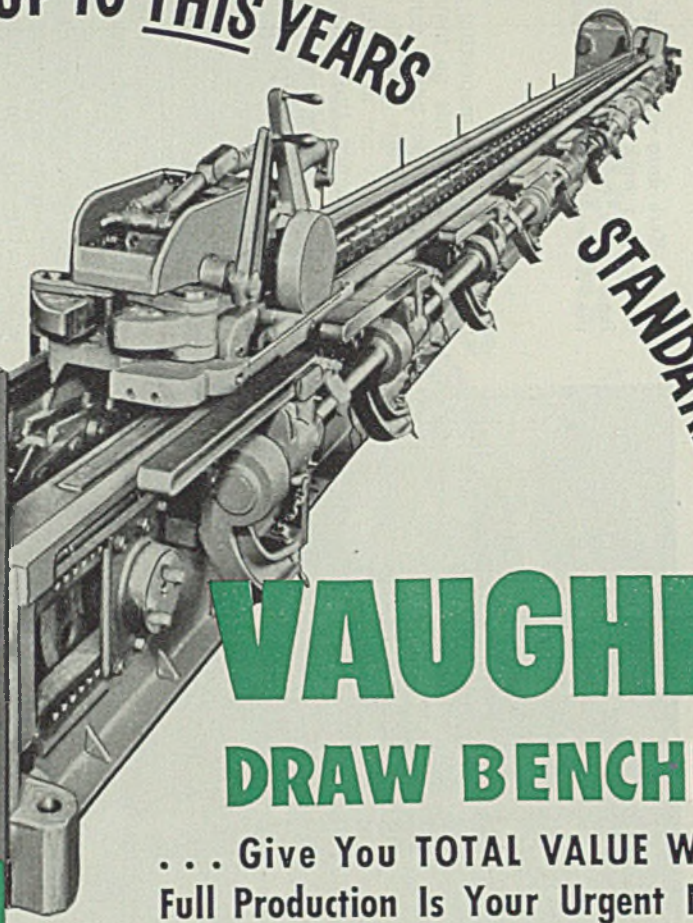
Fig. 1—Upper shows plan view of layout, and lower section illustrates elevation. Castings from annealing ovens enter setup at shakeout at extreme left, proceed up drag conveyor to bin feeding blasting machines. Upon discharge from blasting machines work falls to a conveyor pit below floor level, is carried to hopper in mezzanine where it is discharged to merry-go-round inspecting and assorting tables

TAKE A *COLD* LOOK AT YOUR COLD DRAWING EQUIPMENT

WILL IT MEASURE UP TO THIS YEAR'S STANDARDS?







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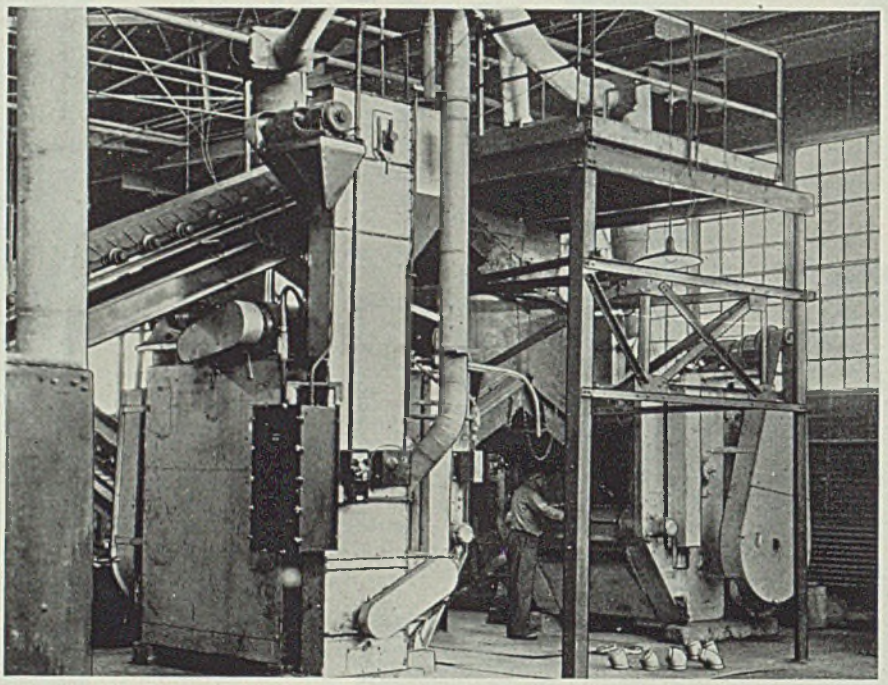


Fig. 2—Here drag conveyor is seen at left carrying work to the overhead bins feeding the two blasting machines at the Walworth Co. plant, Greensburg, Pa.

able either for display on customers' shelves or for taking a satisfactory galvanizing coat.

It will be noted that the castings are not touched or handled by hand at any point from the annealing oven down to the inspecting and assorting tables. Thus no manual effort is required for any of this work. Although the loads from the annealing ovens may not arrive in a continuous sequence, the bin over the blast units maintains a constant stock of material so the blasting machines can be operated continuously at peak load. Likewise, inspection and sorting of the work can proceed continuously, regardless of the intermittent discharge from the blasting machines, since another bin over the sorting table provides a bank of work there.

The many advantages of such a system make its consideration well worth while. Of course the arrangement of shakeouts, conveyors, bins, etc., can easily be modified to suit particular plant layouts or to meet various building arrangements.

Resurfacing Single-Hearth Bottoms With Quick-Setting Magnesite

By D. BEDELL BAXTER
Service Engineer
Basic Refractories Inc.
Pittsburgh

■ AN OPEN-HEARTH bottom maintained in good condition is of the utmost value to the operator inasmuch as off-grade steel is eliminated, refractory costs are lowered and greater tonnage is produced. The top 2 or 3 inches of a basic open-hearth furnace bottom in service loses its original refractoriness by becoming contaminated with impurities. A bottom having a 65 to 70 per cent magnesia content when new will drop to 45 to 50 per cent after a couple of campaigns and, at the end of approximately two years of normal use, will have lost most of its original refractoriness. Slag, containing numerous metalloids of low-melting points such as iron, lime, lead and babbitt, is absorbed by the bottom, thus weakening it to the extent that it is unable to withstand normal use unless large quantities of hearth materials are employed. Any effort to eliminate results of bottom contamination a little at a time is a losing proposition.

Some operators correct such conditions before it is too late by resurfacing regularly with a quick-setting type of magnesite refractory, such as the product Basifrit. This material is manufactured from Nevada brucite ore which has the highest magnesia content of any ore in the United States. An installation of this type can be made in half the time required for the slag and magnesite hearth and the time lost in resurfacing is soon made up because of reduction in bottom delays. Accurate records kept on a 100-ton open-hearth furnace in one large steel plant show that the delay time was reduced by Basifrit resurfacing from an average of 25.8 minutes per heat to 6.1 minutes per heat. The time required to resurface this bottom was 100 hours. This time was practically made up in the first campaign on the new resurfaced bottom.

The life history of this resurfaced hearth was charted in campaigns of nine periods of 300 heats each. Lost time in the first campaign averaged 6.1 minutes, a saving of 19.7 minutes lost time per heat compared with the campaign preceding the resurfacing job, with a total saving of lost time of 98½ hours throughout the campaign. Delay time on the following eight campaigns increased from 8.9 minutes per heat on the second campaign and 15.3 minutes on the fifth campaign to 25.5 minutes on the ninth campaign.

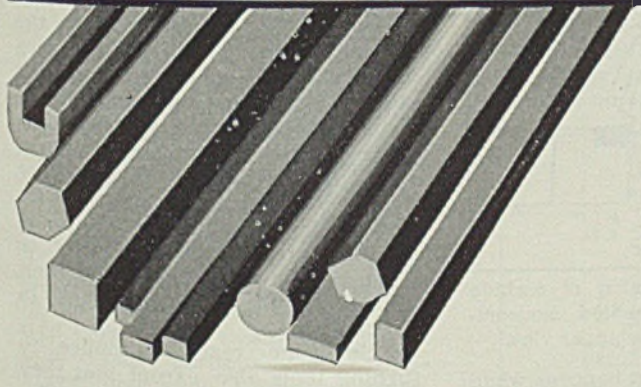
Total delay time eliminated on all nine campaigns exceeded the time required to resurface the bottom with Basifrit by 359 hours, equivalent to approximately 36 extra heats. Figuring a furnace hour at $60, a saving of $21,540 was obtained. This time saving has the important result of making possible faster, greater and more dependable production. With each succeeding campaign, the average delay time increased due to increased contamination of the hearth. Eventually, the hearth, in the ninth campaign, returned to its condition before the Basifrit resurfacing.

The bottom should be thoroughly washed out and resurfaced at least after every fourth campaign. By this practice, the resurfacing job will take less time than the original, complete resurfacing. The time required for a resurfacing job is greatly reduced when the bottom is not allowed to deteriorate too much. Regular resurfacing provides larger savings in time than does the practice of using a resurfaced bottom as long as possible. Regular resurfacing greatly increases the life of the furnace and a systematic resurfacing program can eliminate many of the worries of maintaining steel quality.

Quick-setting magnesite must be applied twice as fast as ordinary, slow-setting magnesite. With the proper application, an excellent bottom is assured.

From a paper presented at the Spring meeting of the Pittsburgh Open Hearth Committee, Pittsburgh, June 6.

MINDING his "P's" and "Q's" in the Bar Mill



Quality Production, but *always* Quality Paramount:

Believe it or not, those are the "P's" and "Q's" that this husky steelmaker is minding as he expertly seizes and throws this fast-moving, white-hot rod from one set of finishing rolls to the next.

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15-4D

MACHINING SHELL with CARBIDE TOOLS

or

how to tell when to

sharpen carbide tools

Here a supervisor of carbide tools explains what causes failure of carbide tool tips, how to prevent it and how to obtain maximum production from carbide tools at lowest tool cost

By GAYLORD G. THOMPSON
917 Talcott building
Rockford, Ill.

■ ONE OF the most consistent causes of carbide tool destruction and high tool costs is to continue the use of the tool after it has passed the stage where it should have been resharpened—all because the carbide tool doesn't know when it's licked. Like a good fighter, it will keep on cutting long after it has acquired its "second wind". Then it becomes a battle of forces between the ruggedness and stamina of the dulling carbide and the horsepower available to drive the tool. It usually winds up in a draw —a double knockout. The power is stalled and the carbide tip is fractured.

The question is often asked, "Why does a carbide tip break so easily when it stalls a machine during a cut?" The fact is that a carbide tip does not fracture so easily if it is *sharp* at the time that it stalls a machine. During a test run with several types of carbide tools for cutting steel, a carbide known as Kennametal grade KM stalled a geared-head motor-driven lathe SEVEN TIMES while turning steel forgings. Not a chip was broken from the cutting edge. But note: Each time that the machine stalled, the tool was carefully removed from the tool post without the slightest motion to the machine. While this spoils a setup, it surely pays. So remember: The tool must be released from the tool post before any part of the machine is set in motion after stalling.

What Makes It Break? Take a look at Fig. 1. This shows a cut-off tool just as it is about to enter into the work. A detail drawing of this tool is shown in the upper left-hand corner of Fig. 3. As long as the tool is sharp and there is sufficient power to keep the tool cutting, it will proceed toward the center until the part is cut off. Note the 5-degree front cutting-edge angle.

This angle is important in that it permits the tool to ease through the work gently at the moment of completing the cut-off operation and thus save the cutting edge from undue punishment by fin chips. The tool shown is designed for setting upside down in a rear tool post of the machine.

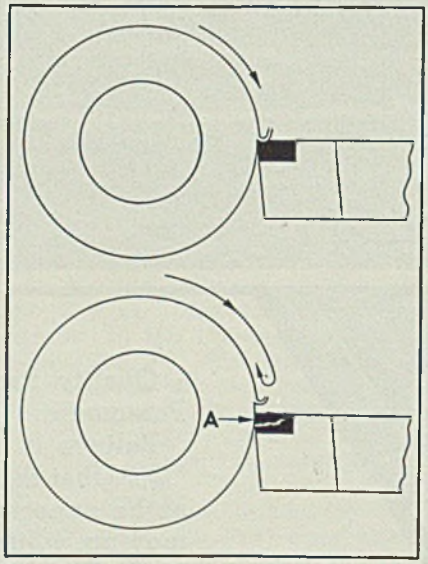


Fig. 1 — Normal operation of carbide cutting-off tool is presented diagrammatically here. Note upper view

Fig. 2—This shows what happens when the tool stalls the machine. There is always some backlash or back motion of the work as the forces built up in the machine are dissipated by shutting off current to the driving motor. This results in slight backward motion of the work against the tool, tending to break off the tool tip as shown in lower view

Now then, suppose this tool is operated beyond the dulling stage—that is, beyond the point where the tool should have been sharpened. It is a certainty that considerably more horsepower will be consumed as the tool becomes more dull, and it will finally come to the stage where it will stall the machine.

For what happens, let's look at Fig. 2.

Effect of Stalling: Just prior to stalling the machine, every bit of slack existing in the drives between tool point and motor has been compressed to practically zero by the resistance of the tool against the maximum torque of the motor. When this power is suddenly released by shutting off current to the motor, there is bound to be a back-lash or recoil through the entire machine to the work in which the tool has entered. Since the tool was on its way into the work, there naturally is a slight cam action on the contour of the work that has passed the cutting edge. Thus, when the machine stalls, this slight backward movement of the work due to the recoil creates a cam-like pressure at A which fractures the carbide tip.

If the tool is sharp at the time it stalls the machine, the recoil is not so great because there has been less force exerted against the tool than would be the case if the tool were dull. The greater the pressure against the tool at the time of stalling, the greater the "rebound" or recoil of the work up to the limit of the amount of normal slack in the machine.

This same reaction applies to turning tools also, except that they operate on a different angle. The cut-off tool is cited as an example because it is easier to illustrate.

Under no circumstances should the machine tool be reversed to back the work from the tool as this exerts pressure against the carbide tip in a direction in which there is no metal in the shank to back up the carbide—result, a badly damaged or completely ruined tip.

Bad Practice—A Typical Example: A shell manufacturer bought a supply of carbide cut-off tools. But something was wrong. Too many carbide tips were being broken. In-

vestigation showed that there was no established maximum as to the number of pieces that should be made with each sharpening of the tool. Machine operators used the tools until they stalled the machines in practically every case before the tools were removed for sharpening. If the carbide tip was broken—well, it was just too bad. If it wasn't—it was just lucky. And so it went.

Previously, the cut-off operation had been analyzed and after some tests, the speeds and feeds of the machines were set as noted on the chart in Fig. 3 and the design of the tool as shown in the upper left-hand corner adopted as the most efficient. But what about power requirements?

Tracing It Down: Meters were attached to the motor of one of the cut-off machines to watch the variation in the power demands beginning with a sharp tool and continuing until the tool was dull or the machine stalled. Four carbide tips known as grade KM attached to shanks were ground as closely alike as mechanically possible. The horsepower load of these tools is shown graphically by lines A, B, C and D in Fig. 3. Almost 2 horsepower was required to run the machine idle.

It will be noted from Fig. 3 that the first piece to be made by each of the four tools started out fairly evenly at 5 horsepower. But on the second piece to be machined, there was a decided difference in the horsepower load of each. It might be well to state here that the apparent wide degree of difference in the performance of the four tools could be laid to the condition of the rough shell forgings. A truck load of 100 shell machined by tool C were of a different lot than those machined by the other three tools and seemed to be smoother and have less scale or oxidation.

Dull Tool — More Horsepower: The jump in horsepower load on the second piece to be machined by each of the tools with the exception of tool C makes it seem reasonable to assume that this was caused by the slight wearing down of the keen edge of the newly sharpened tools, some perhaps more than others, depending upon the scale condition on the respective shell.

It is interesting to note that after the first dulling period caused by the first and second shell, there is a sort of parallel though different amount of horsepower required for each of the four tools when the twentieth shell was reached.

Test Detail: Tool A was the first tool to be tried. Although the tool started cutting at 5 horsepower, the horsepower load started to climb before the cut was completed. On the second shell, the meter reading jumped at once to 7 horsepower. It was thought the tool was "shot", but when the work and the edge of the tool were examined, they did not look so bad but what another trial of the tool could be given. The tool surprised everyone with its performance until the thirty-fifth shell where the tool was checked again because of the rapid rise in power requirements from the time that the thirtieth shell was completed.

It was decided to take another chance and see just what was the maximum life of the tool. There was a steady climb in power requirements until about the fiftieth piece.

At that point, the tool was stoned a little while in the machine and then continued to operate at a fairly uniform power consumption until the sixty-ninth shell when a slowing down of the machine was noted, more pronounced than previously. This continued to get worse with each succeeding shell until the machine almost stalled on the seventy-third shell.

The tool then was removed and examined. Although not chipped, it showed every evidence of the abrasive action of the uneven scaled surfaces of the shell machined.

Approximately 0.015-inch had to be ground off the front end of the tool and approximately 0.005-inch from each side to sharpen it for further use.

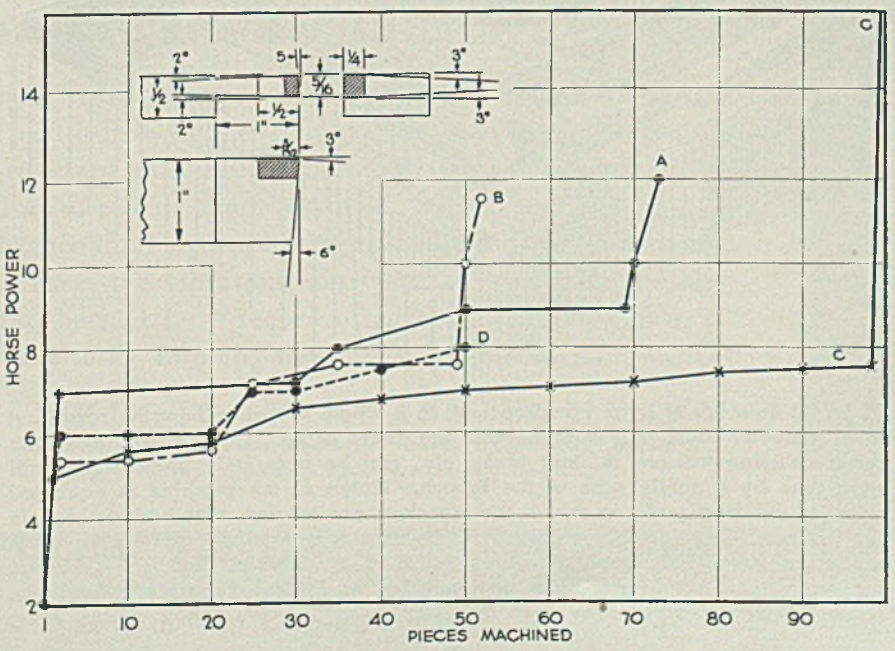
Tool B was the second tool tried. Although it got away to a better start than tool A, it proved a little more eccentric between the twentieth and the thirty-fifth shell. It then went along fairly uniformly until the forty-ninth shell, when the power requirements zoomed up rapidly until it was necessary to remove the tool after the completion of the fifty-second shell. The condition of the tool at this point was about the same as tool A.

Good Shell, Cuts Well: When tool C was put into the machine, a new rack-truck of 98 shell bodies was started. As stated before, these shells were smoother and not so heavily incrusted with scale as they had been "hand-picked" from a stock of several carloads in the yard. The cut-off operations went along beautifully as can be seen by the chart, until all the shell were gone. Only two more shell were needed to fill the rack or to complete 100 shell, so two were taken from unsorted stock.

When the ninety-ninth shell was put into the machine and the tool started cutting, the power required rocketed so rapidly that there was no time to release the feed on the tool before the machine stalled. The edge, as gathered, was broken off of the tool.

Whether this was caused by the intermittent cutting on the heavy scale at the start of the cut or by stalling of the machine could not be ascertained. However, considering that the tool was working perfectly on the ninety-eighth shell and that it suddenly stalled the machine while cutting through the uneven scaled surface of the next shell, it appears reasonable to assume that

Fig. 3—These curves show the horsepower load plotted against number of pieces machined. This shows clearly effect of dulling action on the four 5/16-inch wide, grade KM, steel cutting, carbide tipped, cutting-off tools shown at upper left. Each tool was started sharp and run until dull except tool D. Material cut was shell steel forgings X 1340, very rough and with thick scale. Tensile strength was 55,000 p.s.i.; hardness, 180 to 196 brinell; cutting speed, 266 c.f.p.m.; feed, 0.1012-inch



the rough surface of the ninety-ninth shell broke the tool.

When tool D was put into the machine, it was decided to stop its performance when 50 shell bodies had been completed, regardless of how the tool was performing at that time.

The idea was to note the condition of the tool and to determine the amount of grinding involved if a maximum of 50 shell was established between each tool grind. Naturally, we could not accept the performance record of ONE tool in establishing this maximum. This happened to be the first of a series of tests, the latter of which were not involved in horsepower readings. Just as a matter of information, the tool D performed much like tool C.

When tool D was removed at the end of the run of 50 shell, about 0.010-inch was ground off the front end of the tool and 0.003-inch on each side, to sharpen it. In subsequent trials, grindings of 0.005 to 0.010-inch on the front and 0.002 to 0.004-inch on each side were necessary to sharpen the tools.

Shell Badly Scaled: One very important point to bear in mind is that the performance here of the four grade KM steel-cutting carbide tools is no criterion whatever of the actual performance that can be expected from this kind of carbide tool *on good shell.* Material conditions here were super special—the shell exterior was like a straight knurled surface coated with carborundum. High-speed steel tools flattened out the minute they contacted the materials. Tool engineers with better material than high-speed steel gave up this particular lot of shell bodies as "bad eggs."

It was entirely up to steel-cutting carbide tools to save what would ordinarily have been a rejected mess of shell forgings. On subsequent runs with other tools than the four mentioned in the chart, as high as 149 shell were cut off before removal of the tool was even necessary.

Under average conditions, cutting off of 200 shell is a general attainment of the KM steel-cutting carbide cut-off tool.

In standard production—that is, with the run-of-the-mill stock of good shell forgings—a maximum of 50 shell seemed to be an easily acquired average.

But another consideration comes into the picture here.

It was noted that the first decisive jump in power requirements of a newly sharpened tool came quite consistently between the twentieth and thirtieth shell. Considering this fact, a tentative maximum of 25 shell per tool grind was established for a trial period. Tools that completed 25 shell showed a slight rounding of the cutting edge—hardly noticeable to the naked eye. These tools were in such condition that ordinarily they would have been permitted to keep on operating.

But the question was — would it be profitable to do so? Only 0.003 to 0.005-inch was required to sharpen the cutting edge and practically a polishing grind sufficed on the sides. This alone just about doubles the life of the carbide tool over those tools worked at 50-shell maximum.

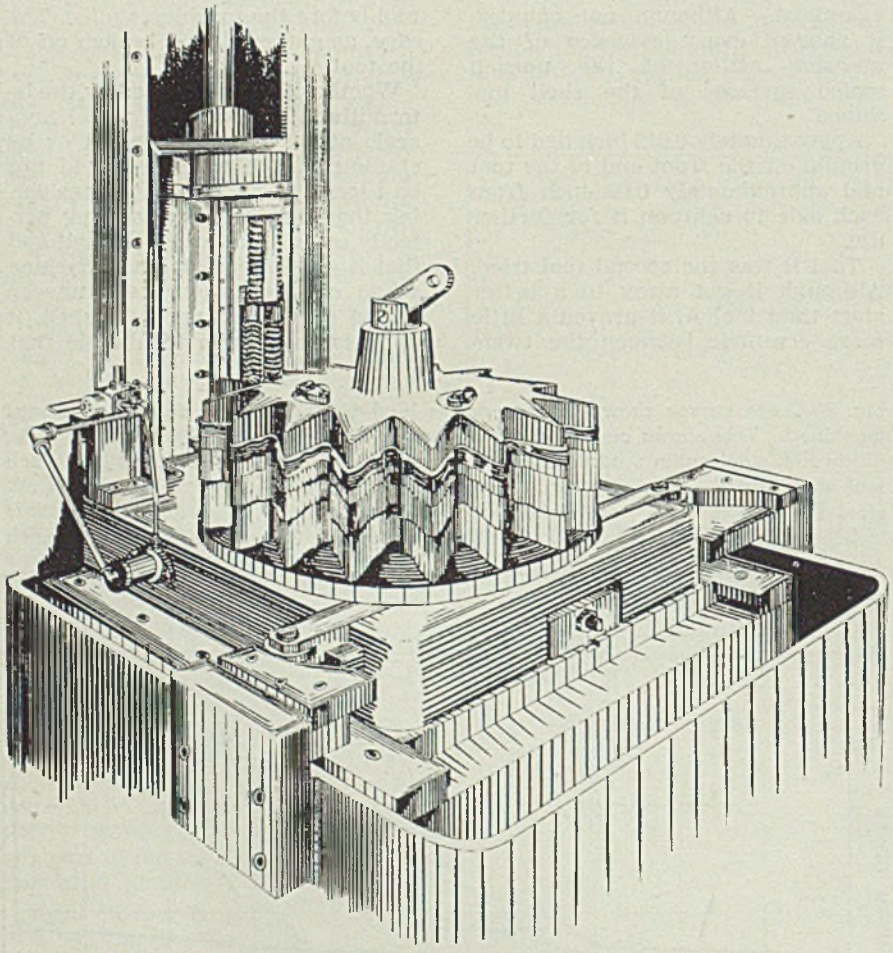
Now, let's go into this tool cost a little bit deeper!

Not only was more of the carbide tip wasted through grinding after 50 shell were completed than 25, but it took on an average of 15 minutes longer to sharpen the former tool. Actual timing of the changing of cut-off tool in the machine showed that 1.9 minutes was required for each tool. Let's call it two minutes.

Now then, does it make sense to let a cut-off tool wear out to the point where it takes 15 *minutes longer* to sharpen it when it takes only 2 *minutes* to make a change from a dull tool to a sharp one? . . . Naturally, it is better to change tools at the completion of 25 pieces. It saves time in grinding and saves greatly in physical tool costs by reducing amount of expensive carbide *ground* away and increasing that portion *worn* away.

And remember, the fundamental principles of this type of economical tool management, in-so-far as it concerns steel cutting carbide tools, can be applied to every operation in which carbide tools are used to machine steel.

Producing Sprockets for Tanks



■ Rapid finishing of large sprocket teeth in a single operation from the rough cut steel plates or castings is possible with the above setup. Thus, crawler sprockets for tracklaying tractors, military tanks, etc., can be accurately broached several at a time by a single pass of the broach. Platen of the machine is equipped with an indexing table on which the sprockets are located after boring the hole for the hub. If production warrants it, the machine may be arranged for automatic indexing. This installation was designed by Colonial Broach Co., Detroit, for use with a single-ram broaching machine of 25 tons capacity and 66-inch stroke, equipped with indexing table. At present, two companies are using this scheme

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Million-Volt X-Ray Unit To Radiograph Drums

One of the first million-volt industrial X-ray units built by General Electric X-Ray Corp.—a unit that is capable of producing energy equal to $90,000,000 worth of radium—is now being installed in the Chattanooga boiler shops of Combustion Engineering Co. Inc., New York. Exceeding by 600,000 volts the rating of previous industrial units, it is capable of radiographing 8-inch steel and is said to effect a tremendous reduction in the time required for radiography of welded seams of the usual thickness required in boiler drums and other high-pressure vessels.

The new unit will radiograph 5-inch plate in about 5 minutes at a focal distance of 48 inches, and 3-inch plate at the same focal distance can be penetrated in 48 seconds. It is being installed in a separate building erected especially for it. The unit itself consists of a resonant transformer within which is a coaxially-mounted, multisection, high-vacuum X-ray tube, both contained in a grounded steel tank and employing compressed gas (Freon) insulation.

The X-rays are generated from a target mounted in the end of an extension chamber projecting out from one end of the electrically grounded tank.

Rubber-Base Steel Paint Is Corrosion Resistant

A new rubber-base quick-drying metal coating especially adapted to all types of exposed iron and steel is reported by Truscon Laboratories, Caniff and Grand Trunk railroad, Detroit. Known as Paratex metal coating, it also protects aluminum, copper, and galvanized metal. Because of the product's chlorinated rubber composition, it is resistant to acid, alkali, fumes and chemicals. It also provides ample protection against corrosion.

Canadian Expenditures

(*Concluded from Page* 45)

ty, England, $6399; Northern Electric Co., Ltd., St. John, N. B., $11,944; Quebec Power Co., Quebec, $42,000; Aviation Electric Ltd., Montreal, $427,664; Canadian Marconi Co. Ltd., Montreal, $11,745; Exide Batteries of Canada Ltd., Montreal, $108,151; Dominion Engineering Co. Ltd., Lachine, Que., $48,888; Northern Electric Co. Ltd., Ottawa, $25,509; R.C.A. Victor Co. Ltd., Ottawa, $14,505; Outboard, Marine & Mfg. Co. of Canada Ltd., Peterborough, Ont., $16,876; Exide Batteries of Canada, Ltd., Toronto, $7747; Thomas Pocklington Co., Toronto, $18,200; Stromberg-Carlson Telephone Mfg. Co. of Canada Ltd., Toronto, $17,379; National Steel Car Corp. Ltd., Hamilton, $5877; Service Lamp Co. Ltd., London, Ont., $15,543.

Machinery: Canadian Machinery Corp. Ltd., Montreal, $5615; Industrial Equipment Co. Ltd., Montreal, $7671; Williams & Wilson Ltd., Montreal, $16,325; Alexander D. Porter & Associates, Toronto, $119,181; Sheridan Equipment Co., Leaside (Toronto), $129,656; The A. R. Williams Machinery Co. Ltd., Toronto, $6315.

Miscellaneous: Lundy Fence Co. Ltd., Toronto, $13,442; Canada Iron Foundries Ltd., Montreal, $6323; United States Steel Export Co., Montreal, $21,539; Steel Co. of Canada Ltd., Hamilton, $10,339; Iron Fireman Mfg. Co. of Canada Ltd., Toronto, $13,248; Miner Rubber Co. Ltd., Granby, Que., $71,534; Dominion Rubber Co. Ltd., Montreal, $27,600; Canadian General Rubber Co. Ltd., Galt, $71,624; Kaufman Rubber Co. Ltd., Kitchener, Ont., $71,519; Safety Supply Co., Toronto, $14,400; General Steel Wares Ltd., Ottawa, $14,560; The Hobart Mfg. Co. Ltd., Toronto, $14,400; Woods Mfg. Co. Ltd., Ottawa, $62,500; Universal Plumbing & Heating Co. Ltd., Toronto, $150,000; Canadian Kodak Co. Ltd., Toronto, $5188; LaFrance Fire Engine & Foamite Ltd., Toronto, $31,919.

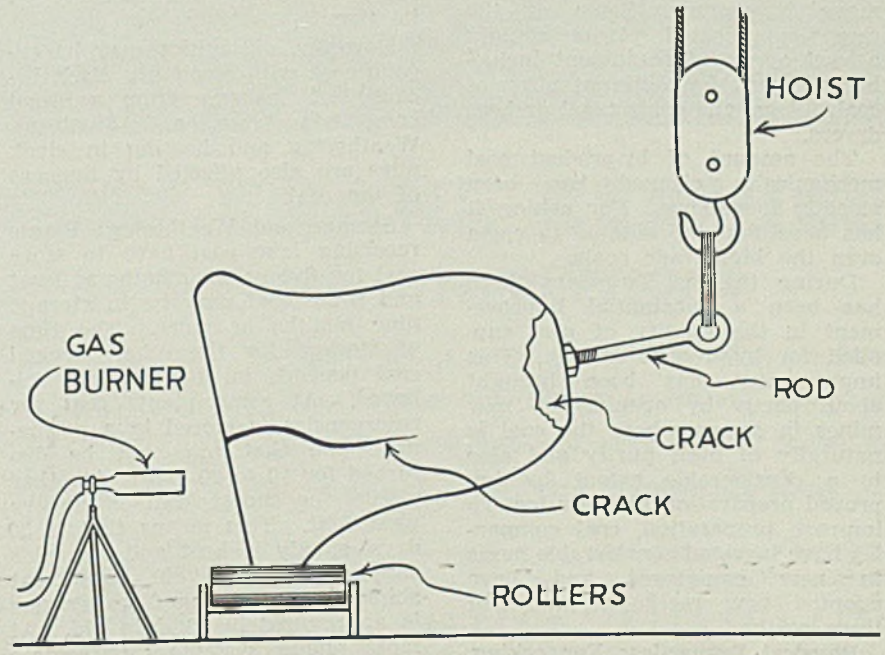
Old Mission Bell Restored by Arc Welding

Recently the Catholic church of College Station, Tex., brought to Prof. H. P. Rigsby, mechanical engineering department, Texas Agricultural and Mechanical college, an old 400-pound brass bell which had been damaged in the Rio Grande Valley Mission fire. The problem was to weld two cracks in the bell—one running from the lip up 17 inches and another 10-inch crack around the top.

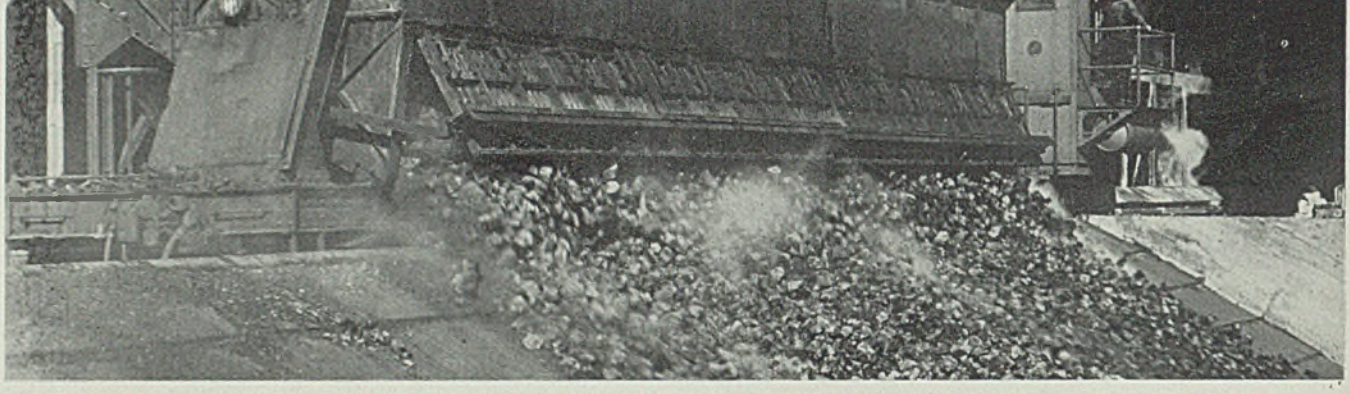
At first thought it appeared necessary to chip out the cracks with a hammer and chisel, but since it was realized that this would be a long, laborious task, some other method was sought. The bell in its heaviest portion was about 2½ inches thick. It was decided to arrange the bell as shown in the accompanying illustration so it could be handled easily. This arrangement also facilitated preheating the bell with a gas burner to temperature of about 500 degrees Fahr. With the bell at this temperature, the cracks were scarfed or burned out with a Hobart electric arc welder, using a 3/16-inch mild steel mineral coated electrode and a current of 300 amperes. The scarfing was easily accomplished in about 30 minutes.

After the cracks had been burned to a sufficient depth, the slag deposits and burned metal were cleaned out with a hammer and chisel. Then while the temperature of the bell was kept between 500 and 600 degrees Fahr., the cracks were welded using ¼-inch coated electrodes and applying weld metal in layers, cleaning thoroughly after each pass.

With the welding completed, the bell was covered to eliminate all drafts and then allowed to cool slowly by gradually cutting down on the heating flame. The result was that the tone of the bell was restored perfectly.



This is the setup employed to preheat and hold the 400-pound cast brass bell while repairing the two cracks shown. The rollers, shown above here, helped greatly in positioning the bell



By-product coke being discharged by the quench car onto the steel plate wharf

Coal for BY-PRODUCT COKING

The by-product coke industry is undoubtedly the most stringent in its demands of all major coal-consuming industries. No other leading consumer considers so many factors in selecting coal or requires such high quality and degree of uniformity. Selection of coals for making by-product coke is not likely to be reduced to a formula. Various factors to be considered in choosing suitable coal for coking are discussed by the author

By J. D. DOHERTY
The Koppers Coal Co.,
Pittsburgh

■ COALS MINED in this country for by-product coking usually occur in seams from 30 to 108 inches thick. Coals with suitable coking qualities and analyses occur in thinner seams but it is not economical to mine them in this country at the present time.

Modern tipples, which are more properly called preparation plants, are much more elaborate even for the purest coals that do not require mechanical cleaning to remove impurities. Some of the more complicated plants contain a vast array of equipment including washers for different sizes of coal, filters, and centrifugal or heat dryers.

The amount of by-product coal mechanically cleaned has been steadily increasing. For coking it has been found profitable to clean even the high-grade coals.

During the last 20 years there has been a substantial improvement in the quality of coal supplied for by-product coking. This improvement has been brought about partly by opening up new mines in seams where the coal is naturally of high purity and also to a considerable extent by improved preparation at the mine. To improve preparation, coal companies have invested considerable sums in new equipment and have adopted new methods, many of them costly.

Physical Properties: For coking, physical properties of the coal are of less importance than for almost any other use. Coke plants can take any size coal from smallest slack to lump. This benefits both the coke plant and the coal producer since the plant can take the sizes with the best analyses and the producer thus has an outlet for coal that may be difficult to move for other uses because of its size.

However, difficulties may be encountered with small dry slack because of leakage from railroad cars, wind loss, and dustiness. Weathering and heating in stock piles are also affected by fineness of the coal.

Storage and Weathering: Plants receiving lake coal have to store coal for five or six months at least and some coal may be in storage nine months or more. The time of storage for the other stocked coal depends on the practice followed. At some plants coal for emergencies is stored in a permanent pile that may not be disturbed for 10 to 20 years. At other plants the oldest coal is always used first. This means that if 30 days' supply is kept and a week's supply is received in each boat shipment, coal taken from storage is approximately 36 days old. At most plants systems intermediate between these two extremes are used, such as using and replacing the emergency stock at 6-month or yearly intervals, or having part of the emergency reserve in a separate undisturbed pile and the remainder in the constantly rotating stock.

High-Volatile Coal: It has been found that coarse sizes of high-rank high-volatile coals such as those used for by-product coking do not suffer greatly in coking properties during storage if they do not heat. Or if they cool off after moderate heating during the first weeks, there is practically no further deterioration with prolonged storage. This suggests that a carefully built storage pile could be kept indefinitely. To allay any fear that the first weathering may seriously affect the coal in such a permanent storage pile it has been suggested that screened lump coal be used.

Low-Volatile Coal: This grade has the following properties that should give it resistance to weathering:

1. It is less reactive than high-volatile coal.
2. It does not slack or break up on repeated wetting and drying.
3. It has a low porosity.

Nevertheless low-volatile coal does frequently give trouble due to heating and deterioration of coking properties during storage. When placed in storage the initial oxidation of the fine coal with its great surface area results in a large rise in temperature that accelerates the oxidation and thus, if oxygen is available, may destroy coking properties or start a fire.

Moisture: A minimum moisture in the coal is generally desired as high moisture has a number of disadvantages. Moisture on the coal as weighed usually is paid for

From a paper presented before the American Gas Association, New York, May 19-21, 1941.

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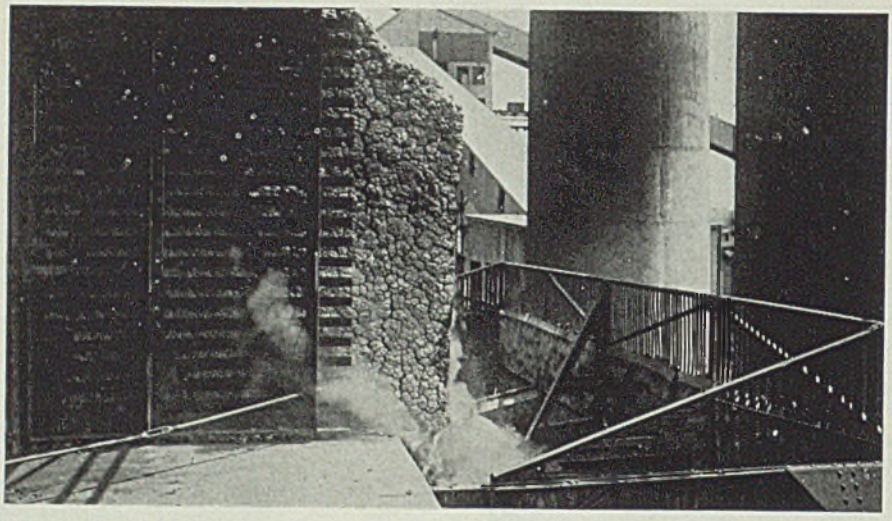

Block of coke being pushed out of a by-product oven across the platform into the quench car

at the delivered price of the coal. The higher the delivered price the more important this is.

Surface moisture reduces the bulk density of crushed or pulverized coal and excessive moisture content may thus decrease the through-put of the plant. This is especially important at present when there is a heavy demand for coke for national defense. This effect can be offset by spraying oil on the coal.

There is definite trend toward the use of weighing devices rather than volume metering devices for mixing coals. The advantages of weighing are also important when coal is mixed before pulverization to offset differences in cubic-foot-weight due to segregation of sizes.

Increased moisture has the advantage of increasing shrinkage in the oven and decreasing dustiness and wind loss in handling. Moisture is sometimes added to coking coals at the plant to achieve these effects.

Ash Content and Ash Fusion Temperature: Ash in coking coals is extremely important and is one factor over which the coal producer generally has considerable control. Ash is a diluent that the coke plant operator pays for at the delivered price of coal and which decreases the yields of gas and by-products and also decreases the value of coke.

There is an old belief that still persists among some coke men that coke with the best physical properties can be made only from coal having an ash content higher than a certain minimum and that first-grade coke cannot be made with low-ash coal.

Ash up to 10 per cent or more when present in finely divided form may have favorable effects on the coking characteristics of certain coking coals. Some of the best coking coals actually make stronger coke when fine noncoking material is mixed with them. No doubt, increased ash if sufficiently fine can produce this effect. However, ash in the form of free impurities such as slate about 10 mesh in size may cause fractures in coke and thus decrease the size and strength. Mechanical cleaning practically eliminates the free mineral matter and therefore in addition to giving a purer coal also almost invariably improves the coke.

Ash content as well as ash fusion temperature has an important bearing on clinkering tendencies. Clinkering difficulties can be greatly reduced by decreasing the ash content of coke when the ash fusion temperature remains the same.

Sulphur: High sulphur in coal for coking is undesirable because it displaces coal; because it makes coke less desirable or even unsuitable for certain uses or markets; and because it increases gas purification costs where dry boxes are used, and if sufficiently high will produce objectionable amounts of organic sulphur in gas not removed by ordinary gas purification equipment.

Calorific Value: The B.t.u. value of coal can give considerable information about coking coals. Its use by coke plants has been urged but apparently is not yet widely used.

If a coal must be rated on laboratory tests the proximate analysis alone can be misleading. Either B.t.u., ultimate analysis, a distillation test, or carbonization test is necessary in addition for an estimation of a coal's worth. The B.t.u. is easily determined and should be more widely used.

A simple common sense application of B.t.u. to coke plant coals is the following: If two different mixes have the same coal cost, give equal coke quality and meet the limiting yield requirement (usually either a minimum gas or coke yield), the mix with the higher B.t.u. is bound to give greater yields of other products and is to be preferred.

Coking Properties: At present coals are selected by actual plant trial. Although special laboratory tests, box tests, and tests of a few ovens are invaluable for preliminary investigation and no doubt in the future will be used to bring about refinements that cannot be accurately measured even when plant-scale tests are made, actual use in the plant is still the practical criterion.

Physical characteristics of coke that influence coal selection include apparent gravity or porosity, size, shatter, tumbler-test stability and hardness, cell structure, shape of coke pieces, surface, color, ring, sponginess, crushing characteristics, a breeze content.

The physical properties of coke are influenced greatly also by plant operating conditions. Coal pulverization, wetting or oiling, weight of charges, oven width and height, heats, and coking time affect the coke quality.

Another means widely used to control coke quality is blending.

High-Volatile Coals: The lower-oxygen high-volatile coals are produced for by-product coking in Pennsylvania, West Virginia, Virginia, eastern Kentucky, Alabama and Colorado. Those with high-volatile matter running up to 38 per cent are preferred at gas plants because of their high gas yields. Some of these higher-volatile coals are also used in blends for making high-grade blast furnace, water gas, and domestic coke. The lower-volatile coals in the high-volatile classification are preferred for producing furnace coke where low-volatile coal is not available for blending and for the production of premium foundry coke from blends with low-volatile coal. Some of these coals produce a coke with small cells, uniform texture, and high gravity. They are therefore generally preferred for the manufacture of all kinds of coke. The high gravity is especially desired for domestic coke.

Low-Volatile Coals: Because of expanding tendencies under normal operating conditions, low-volatile coals are not regularly coked straight in by-product coke ovens in this country. For the most part, low-volatile coals are used for blending with high-volatile coals to improve the physical quality of the coke or to increase the coke yield. The percentage of low-volatile coal runs up to 60 per cent but is usually 15 to 25 per cent for furnace

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coke, 20 to 30 per cent for domestic coke, and 35 to 50 per cent for foundry coke. At some plants, especially those producing foundry coke, coals under 18 per cent volatile matter are preferred. Nevertheless some plants are successfully using New River coals of 19 to 20 per cent volatile matter.

Apparent Specific Gravity: The apparent specific gravity of coke is of practical importance since it indicates the relative weight of the coke. It has been found that there is usually a direct relationship between the apparent specific gravity and the cubic-foot-weight of sized coke. The apparent specific gravity of coke from straight high-volatile coal varies greatly with different coals and changes appreciably in many cases with addition of low-volatile coal. Differences in apparent gravity with different low-volatile coals used in blends were comparatively small.

Apparent specific gravity can be lowered by adding moisture to the pulverized coal before coking. Moisture, of course, lowers the cubic-foot-weight of the coal. However, in a series of tests in which the cubic-foot-weight of the coal was lowered from 46.8 to 39.6 by increasingly fine pulverization without adding moisture there was no appreciable effect on the apparent specific gravity of the coke.

Some ovens have been damaged as the result of improper use of coals. The following possibilities are offered as explanations:

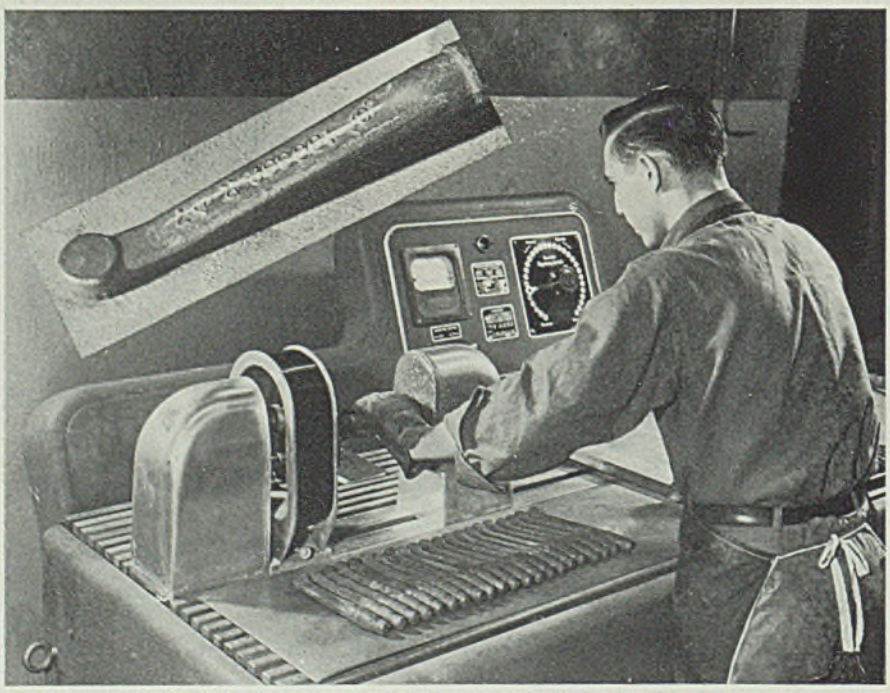
1. Failure to recognize that coal is expanding. This could happen only with medium or high-volatile coals since low-volatile coals are generally believed to be expanding.
2. Lack of knowledge of expanding power of coal. It appears that some coals expand relatively more than would be expected for their rank or analysis. The chief value of present "expansion" tests is probably in detecting these unusual coals.
3. Use of too high a percentage of low-volatile or other expanding coal considering the existing oven width, oven taper, coking time, and cubic-foot-weight of the coal as charged.
4. Improper mixing. This includes errors such as mixing high and low-volatile coals in the stock pile, putting low-volatile coal in the high-volatile bin, irregularities due to varying cubic-foot-weights where volume mixing is used.
5. Segregation of mixed coals. Some coal handling systems give considerable segregation of coal sizes, and if one coal is coarser than the other, some of the segregated coal may contain an excessive percentage of low-volatile coal.
6. Failure to control cubic-foot-weight of the coal when using a mixture close to the danger point. A coal mixture barely safe at normal moisture content may be dangerous if the coal is dry or if a change in pulverization increases the cubic-foot-weight.

The following procedures may be followed when the mixture being used is suspected of being dangerous.

1. Reduce the cubic foot weight of the coal. This can usually be accomplished by finer pulverization and increased moisture.
2. Lower the flue temperature and lengthen the coking time.
3. Reduce the amount of low volatile to safe limits.

Plastic Properties: In many respects the mechanism of coking in a by-product oven is still pretty much of a mystery. What takes place obviously determines the nature of the coke. For many years efforts have been made in the laboratory to determine properties of coal in the plastic state and then to correlate the results with known practical coking properties, which are usually described in terms of coke quality.

Ferromagnetic Powder Locates Defects



■ In inspecting all parts important to the safety of the driver, Studebaker's South Bend plants make use of the above Magnaflux which shows up defects not discernible with a 100-power microscope. Parts are first magnetized by the unit and then sprayed with ferromagnetic powder which adheres to the imperfection. Note the part inset above

Triple-Action Agent Guards Employe Health

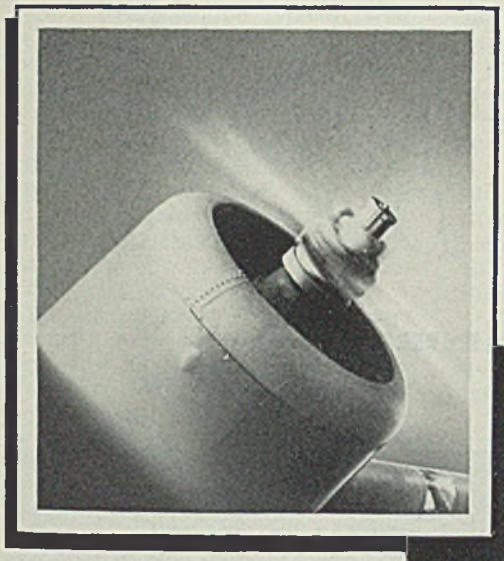
■ Oakite Deodorant No. 1, a triple-action material combining deodorizing, detergent and disinfecting properties, developed to guard against infection and to protect employe health, is announced by Oakite Products Inc., 57 Thames street, New York. A dry, white, free-flowing powder, used in cold water, it is solely for use in connection with deodorizing and cleaning washrooms, shower stalls, "first aid" rooms, lavatories and locker rooms.

Odorless itself, the material not only dissipates and neutralizes odors without masking or "covering up" one odor with another, but also provides effective dirt and grime removal action on cement, tile and porcelain surfaces. In addition, its disinfecting properties are said to help provide added protection against harmful organisms.

Develops Synthetic For Mending Metals

■ A new synthetic for mending all metals and metal alloys is reported by Perfect Mfg. Co., 3317 Madison road, Cincinnati. Called So-Luminum, the product is said to be the only plastic mender for metals that withstands the heat of boiling water and direct flame. In laboratory tests, repairs made on ordinary aluminum pots and pans withstood 100 hours of boiling at temperatures reaching 2000 degrees Fahr.

The material is applied without heat or electricity. A drop squeezed on a hole, crack or joint in aluminum, stainless steel, iron, porcelain or granite ware dries hard overnight.



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By JOHN W. SHEFFER
Electrical Engineer
American Car & Foundry Co.
New York

AUTOMATIC WELDING

of railroad cars

■ WELDED construction of freight cars is not new, but it has had a slow growth. In 1908 we built four gas-welded tank cars using scrap trimmings from the plates for electrode material. In 1911, the first spot-welded freight car was built in the South St. Louis plant, using resistance-welding equipment of our own manufacture. A few rivets were employed in the car to hold the erected members in place during the spot welding instead of jigs because of the lower cost, as only one car was built —a tailor-made job. An official inspection of this car in 1925 indicated that the spot welding was standing up well.

Finds Welding Economical

As far back as 25 years ago, A. C. F. designed and manufactured more than 15 spot welders. Among these were the first portable welders. One of the early applications of butt welding was fusion of wire nails to the inside of sheathing to form fasteners for the application of insulation. During the early thirties, five 50-ton gondola cars were built with floors and superstructure welded. Since 1932, the company has been building covered hopper cars for such commodities as cement, carbon black and other dry materials which it is necessary that the interior surfaces of the car be absolutely smooth to assure free discharge of the load. This would have been extremely difficult without welding. At the present time, these covered hoppers are manufactured in quantities with the whole car body welded except the trucks. There are approximately 1100 feet of arc welding of which about one-fourth is on the hopper sides—work that can be done automatically in the subassemblies.

Automatic arc welding is used because it affords greater economy of labor and material, more uniform results and greater operating factor, greater production and reduced fatigue to the operators. Automatic arc welding is particularly adapted to high-production welding of freight cars since there is enough footage of the same type of welding to justify construction of a fairly expensive holding or clamping fixture.

Because of these factors, two of our shops now manufacturing hopper cars are equipped with automatic arc welding equipment utilizing Thyratron control. The electrode is a lightly coated type unreeled from a coil. Hopper car side stakes welded to the sheets also act as stiffeners, thus strengthening these sheets which act as the car sides and also making the stakes integral with the car side framework.

In 1934 spot welded passenger cars were made of high-tensile low-alloy steel in which the exteriors of the cars were perfectly smooth.

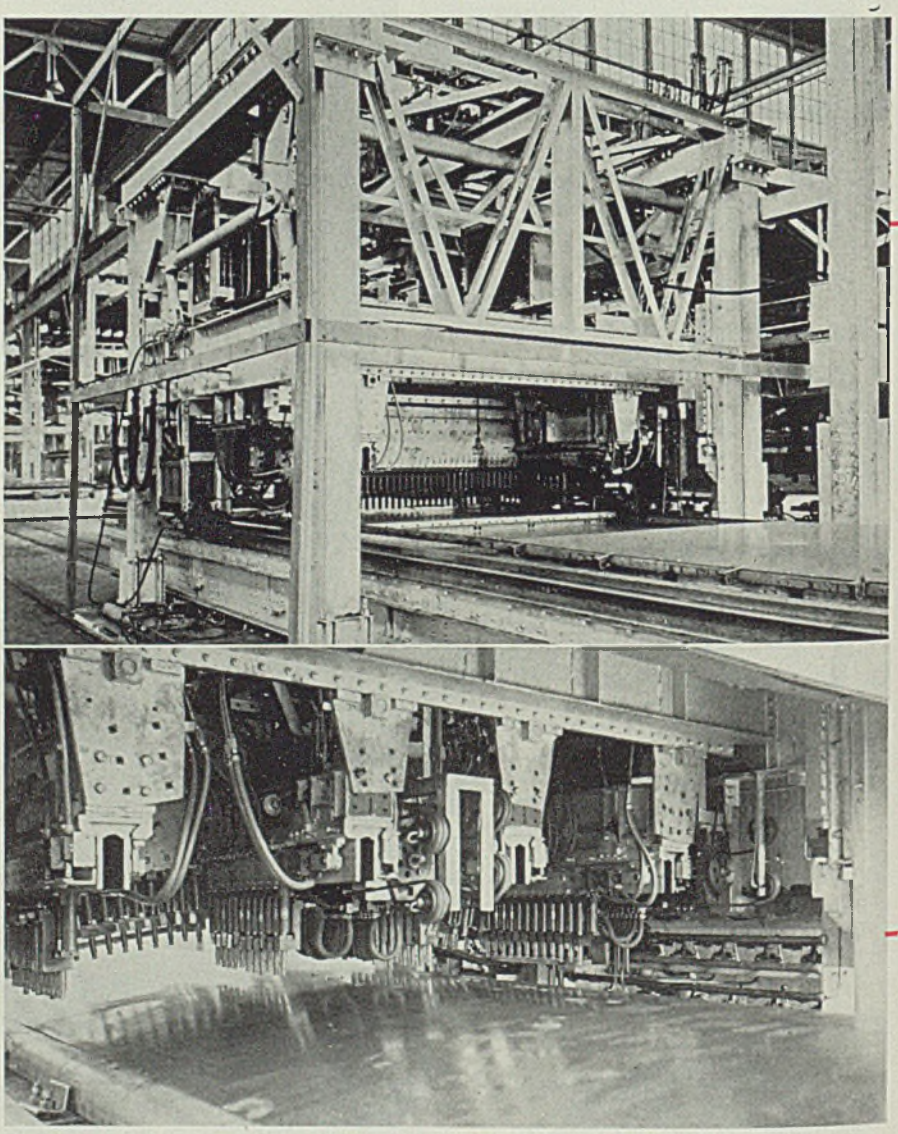


Fig. 1—Welder for automatically spot welding car sides: Note various linkages in welder superstructure to permit vertical movement and the horizontal shift. The sequence panel for setting up the automatic welding cycle is shown in the center overhead (top view)

Fig. 2—Closeup view, lower illustration, of the roof tailback electrodes before they are lowered onto the work

From a paper presented before the American Welding Society at St. Louis, April 11, 1941.

Here a panel section type of spot welded construction was used with roof and sides built up in 9½-foot sections and assembled on the car by means of rivets through the vertical flanges of the side post angles. A specially built vertical-gap spot welder was located in a pit at the final spot welding position for attaching the side sheathing to the side sills. The underframe was completely riveted.

It was apparent that the panel section method of spot welding was expensive as the spot welder was stationary and the panels necessarily small, thus requiring many panel units per car. Arc welding of the subassemblies in the final position on the track also was expensive and considerable time and shop space were required for the hand arc welding. Thus it was decided to spot weld a complete side and complete roof with a single machine capable of making welds simultaneously and consecutively at a high rate. These units then were to be assembled into a complete shell by concealed rivets. Except for the center sill, the framework is composed largely of pressed steel formed from alloy sheets.

During 1940, equipment was installed at our Madison, Ill., plant and 400 lightweight box cars were produced of welded construction with a weight saving of over 3 tons per car. Due to the wide variation in thickness of the sections used for the various members in the car underframe, arc welding is the preferred method of assembly. But one seam may be welded automatically—the others are too short to justify setup, hence are welded by hand.

First the various members of the underframe such as bolsters, cross bearers and cross ties are fitted up and arc welded in assembly jigs. The main assembly must have an accurate, sturdy jig to hold firmly the various parts to be assembled. When production quantities permit, a rotating or positioning type of jig is employed.

Freight car ends are made up of several pressings, arc welded together along their horizontal adjacent edges.

The unit system of fabricating underframes, sides, roofs and ends of freight cars in jigs apart from the main track assembly permits positioning for horizontal arc welding when required and gives full accessibility for doing the work carefully and for making complete inspection. Final assembly by riveting these main subassemblies on track production lines facilitates the desired output and assures economies on future repairs.

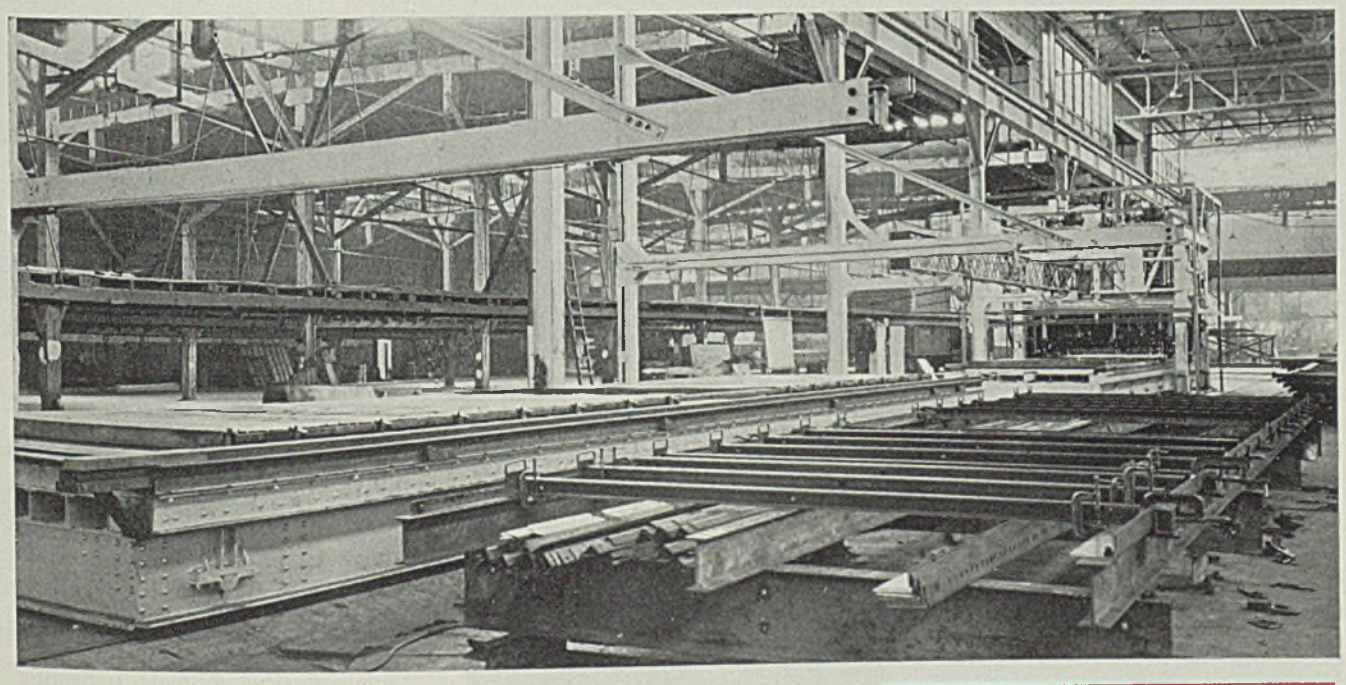


Fig. 3—This shows the jig cars in the foreground with the welder in the background. A side frame jig is in the foreground and in the background are jig cars carrying the sheets clamped onto the frame ready for spot welding

For fabricating the roof and sides of box cars, the resistance spot welding method is performed by special multiple spot welding machines. A multiple distribution switch in the secondary or heat generating circuit permits the entire group of electrodes to be put under pressure simultaneously, thus clamping all of the work at each weld location. The electrodes remain in position throughout the entire cycle of individual electrode welding sequence. Having electrodes dwell upon the work until the welds are sufficiently cool produces an exceptionally clean, strong and uniform quality of welds.

The multiple spot welder consists of the following:

A constant-pressure hydraulic system for platen lift and electrode shift.

An adjustable-pressure hydraulic system to supply all electrode cylinders.

Multiple mounted transformer unit to supply the electrode groups.

Primary current supply to each transformer group through ignition contactor and mechanical timing cams.

High-speed secondary distribution switches.

An indexing welding jig car covered with a secondary copper grillage.

A water cooling system to transformers, secondary switches, distribution cable and electrodes.

As seen in Fig. 1, these automatic multiple spot welding machines consist of an upper platen which moves vertically in a fixed framework under which jig cars are rolled carrying the work. Two of these machines are used, one with electrodes set up for welding roofs, the second with electrodes set up for welding car sides. The panel welder for roofs has two welding jig cars which move on a track under the electrode platen to permit continuous operation of the welder. See Fig. 3. As soon

as welding on one jig has been completed, it is moved out and welding started on the second jig while the first jig is being reloaded.

Preliminary to the spot welding, the roof framing and side framing members are assembled in these jigs and firmly clamped into position. In the case of the roof, the car lines are arc welded to the side plates and the purlines to the car lines. With the car sides, the posts are arc welded to the side sill angle and the side plate before spot welding.

Both jig cars have a grillwork of copper which backs up the multiple electrodes. The jig cars are motor driven through a separate pushbutton control. Pushbutton control also raises and lowers the platen carrying the electrodes through a magnetically operated control valve from the constant-pressure hydraulic system. At the same time, the contact shoes of the welding transformers make contact with the copper bus bar grillwork on each side of the welding jig car. All electrode cylinders are put under pressure simultaneously through a manually operated valve connected to a hydraulic system.

A pushbutton starts the welding cycle. There are three motor-driven secondary distribution switches which pass about 20,000 amperes successively to each of the welding electrodes to which they are connected. There are three of these secondary switches, all operating simultaneously on a 3-phase closed delta primary power supply through three welding transformers and three ignitron contactors for switching. The motor-driven secondary switches are started by pushbuttons and stopped automatically by a limit switch at the end of their travel, and are operated both forward and backward. Two of the secondary switches are operated consecutively to segregate a group of about 32 spots in the sequence of 19 and 13 spots respectively. The third secondary switch is operated two welds at a time as in series spot welding with the current passing down through one electrode to the work and back up through an adjoining electrode, whereas the first two switches control flow of current directly through one electrode, down to the work and back through contactors connected to the copper backing grillwork.

Adjustable timing cams operate the micro switch which is attached to the trolley of each secondary distribution switch to determine the desired timing of each spot.

Intermediate spacing of spots is done by lifting the platen about 1 inch and shifting the electrode mounting and shifting slide about 1 or 2 inches. Then the complete cycle is repeated as required. When the panel has been completely welded, the platen is raised 4 inches and the jig car is moved out and replaced by the alternate car carrying new work.

There are more than a dozen pushbuttons and more than a dozen manual valves on the central operator's control board. These individual controls initiate and control more than twelve operations. The manual setting of a selector switch, however, automatically executes these operations so duplicate panels can be spot welded with dispatch once the controls are set for the desired sequence. This magnetic control through a sequence panel is the nerve center of the system.

This system affords manual control of each welding operation individually if desired.

The setup will proceed automatically to the final preset point, when desired.

Any previously preset arrangements can be interrupted at will and a single operation performed manually with the preset arrangement continuing thereafter.

Also any individual operation can be terminated manually.

The setup for welding car roofs is quite similar to the arrangement described above but employs three transformers, five secondary switches and 76 electrodes arranged in five groups. Two groups of 19 electrodes each take the cross line or car line welds, while two other groups of 13 electrodes each at right angles take the side plate welds. A fifth group of 12 electrodes, also at right angles to the first two groups takes the purline welds between the car lines.

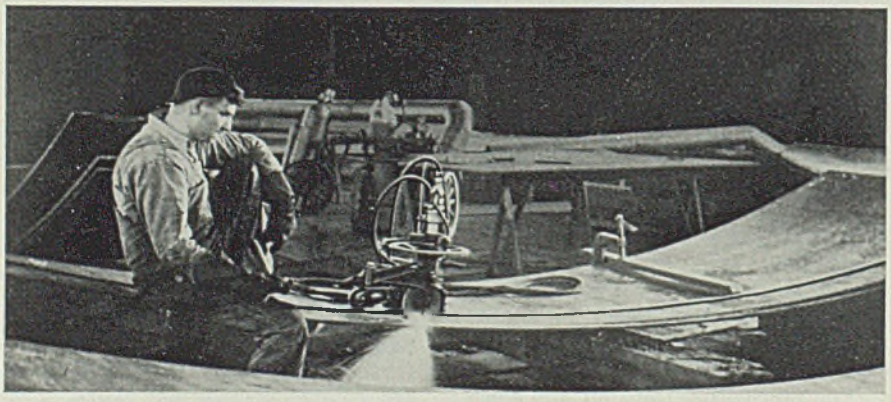
More Welds to a Setting

These 76 electrodes attached to the spot welder platen through pedestal mountings and shifting slides permit 76 additional spot welds to be made by a vertical 1-inch lift of the platen and a 1-inch lateral movement which can be followed by another 76 additional spot welds by a second 1-inch lateral movement of the electrode groups. Thus 228 welds can be made with one setting of the jig car which carries the copper grillwork that backs up the work opposite the electrodes and distributes the low voltage current to these electrodes.

This is one of the first installations of its kind applied to freight car multiple-spot welding and is unique from the standpoint of extremely flexible control. Indicating lights show at a glance the progress of the welding cycle. The operator not only can tell which circuits are being welded but the duration of the weld for each spot and the time of transfer from one circuit to another. Indicating lights also tell the operator which circuits are being supplied with power and whether the power is being applied consecutively or simultaneously to the various circuits.

Although the illustrations shown here show the recent installation of multiple-spot welding equipment at the St. Charles, Mo., plant for the welding of roofs and sides of passenger cars, the setup is the same as described above for freight cars. About the only difference is that the panel welding of passenger car sides and roof is accomplished on a single welder.

Machine-Cutting Dished Tank Segments

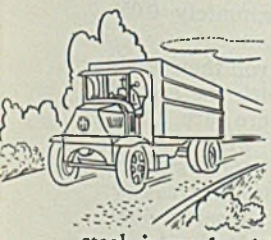


■ The operator above is shaping a segment of a 30-foot diameter dished tank head with a portable cutting machine, made by The Linde Air Products Co., New York. The special track, which he is using to guide the machine, is both practical and convenient for work of this nature as it bends easily to the contour of the plate. It consists of a 22-foot length of 1/4 x 2-inch flat bar stock which has been grooved longitudinally on one of the 2-inch sides. The groove is 1/4-inch wide by 3/16-inch deep. C-clamps and flat bars clamp the track to the plate at 4-foot intervals. The rear wheels of the cutting machine ride in the groove of the track so that the desired 20-foot cut is made in one smooth, continuous operation

SAME GROSS WEIGHT—BUT

2000 pounds more pay load

EVERY TRIP



Although the loaded weight of this coal truck is no heavier than when formerly equipped with a body made of 3/16-in. carbon steel, it can haul 2000 pounds more pay load—an extra ton on every trip.

Why? Because the use of Republic Double Strength Steel for the body made possible a saving in dead-weight of 2000 pounds.

And despite the fact that high-sulphur stoker coal treated with calcium chloride was hauled in this body for five years, the thickness of the body sheets was reduced by corrosion and abrasion less than 4%. The body has been used on three different chassis without one cent of repair expense in that time.

Republic Double Strength Steel—the original low-alloy, high-tensile steel—saves weight, because its higher strength permits the use of thinner sections. It is resistant to corrosion and abrasion—easy to form and weld. Its use for commercial bodies of every type means lower hauling costs—longer life—lower maintenance and depreciation costs.

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R. J. Wysor
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Step-by-Step

Procedure for Grinding

Ultra-Finish Rolls

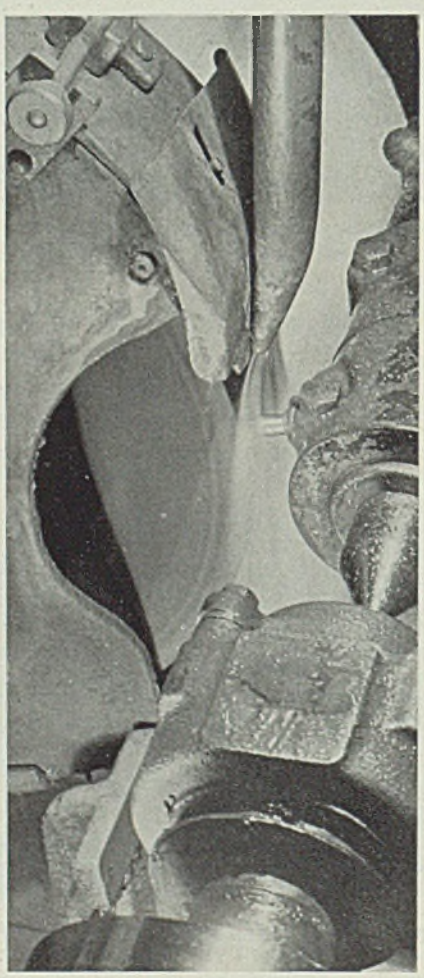
Here Mr. Wills, in the third section of his series on ultra-finish grinding, points out the exact sequence of operations, and for each step details grit size, surface speed, traverse rate, type of dressing, amount of economical stock removal. Procedure for tungsten-carbide Steckel mill rolls is included. For information on ultra finish and factors involved in obtaining it, see previous two sections of this series, *STEEL, June 30, 1941, p. 52, and July 21, 1941, p. 56*

By H. J. WILLS
Engineer
The Carborundum Co.
Niagara Falls, N. Y.

■ BEFORE discussing procedure, there is one precaution that should be emphasized. The slightest excess pressure of wheel on work is fatal to ultra finish, for it is nearly certain to produce a surface burn. Often such a burn may be invisible, yet quickly develop into a blister or spall in service. Damaging pressure is most apt to occur when the wheel is brought to the work suddenly. That causes the wheel spindle to spring, allowing the wheel to bounce on the roll and to produce intermittent burned spots. Therefore bring the wheel to the work most carefully and only when both are in motion, with ample coolant flowing.

Hardened Steel Rolls: With the exception of roughing wheels for building up surfaces from the black, only fine grit wheels should be used. Refinishing or reconditioning work usually involves removal of merely a few thousandths of an inch so only semi-finish, finish and ultra finish wheels are required. A common mistake is to use a too coarse wheel to remove stock rapidly. This actually wastes time, for it takes longer to smooth the resulting surface than if fine wheels are used entirely.

Wheel Sequence Important: Five wheels are required for grinding a roll from the rough forging to an ultra finish, using each wheel for both roughing and finishing. First remove as much stock at a rapid traverse, after an open dressing, as the size of the grit will warrant. Then the wheel (except the ultra finish wheel) should be redressed at slow traverse—1 to 2 inches per minute—allowing the cut to die out. Then, after rounding off the wheel edges, grinding should be done at minimum traverse speed, maximum vibrationless work speed and reduced wheel speed, allowing the wheel to spark out. This procedure generates good surfaces and allows greater grit gaps than would be possible if the wheels were not finished out.



Dressing with the diamond is an important step in preparing the grinding wheel for production of ultra finishes. Exact instructions are given by Mr. Wills in the accompanying article. Note dressing is done wet

First Wheel: When grinding from the rough roll forging, the first wheel, from 24 to 50 grit, is used for three roughing operations: First, operating at a wheel speed of 5500 surface feet per minute and maximum traverse rate, with open dressing; second, the wheel is then dressed smooth and operated at 4000 surface feet per minute with intermediate traverse; third, with no additional dressing and minimum traverse, the wheel is operated at 4000 surface feet per minute. Economical total stock removal with this wheel is approximately 0.050 inch.

Second Wheel: The roll then needs a smoothing grind with the second wheel, 80 grit. There are three operations with this wheel: First, with open dressing, 5500 surface feet per minute, maximum traverse rate; second, smooth dressing, 4000 surface feet per minute intermediate traverse rate; third, no dressing, 4000 surface feet per minute, minimum traverse. Economical total stock removal is 0.025 inch.

Third Wheel: The third wheel, from 150 to 180 grit, is used for four semi-finish operations: First, open dressing, maximum traverse, 5000 surface feet per minute; second, smooth dressing, intermediate traverse, 4000 surface feet per minute; third, fine dressing, minimum traverse, 4000 surface feet per minute; fourth, no dressing, minimum traverse, 4000 surface feet per minute. Total economical stock removal with this wheel is 0.010 inch.

Fourth Wheel: For finishing and refinishing, the fourth wheel is 320 grit to FF. The three operations are: First, smooth dressing, maximum traverse, 4000 surface feet per minute; second, fine dressing, intermediate traverse, 4000 surface

Metal Show ISSUE

OCTOBER 13, 1941

featuring:

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PHILADELPHIA, OCTOBER 20-24, 1941

STEEL's October 13, 1941 Metal Show issue will carry a combination editorial and advertising insert section devoted to the same interests as the National Metal Congress and Exposition.

This insert section, printed in red and black on special coated stock, will prevue the show for those who attend and will bring it to those who do not.

Additional copies of the issue and the insert section will be distributed at the show. Advertising in this issue will be very much worth while. Write for details.

STEEL

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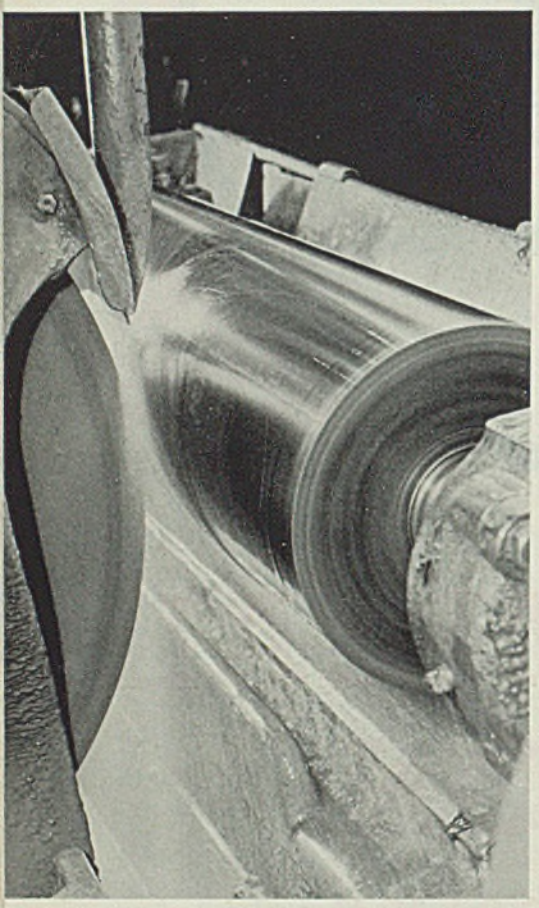
feet per minute; third, no additional dressing, minimum traverse, 4000 surface feet per minute. Economical stock removal is 0.0008 inch—not much metal.

Fifth Wheel: The roll is now ready for the ultra grinding, according to the methods suggested in previous articles in this series. See STEEL, June 30, 1941, p. 52, and July 21, 1941, p. 56. The fifth and final wheel which gives the ultra finish is a special 500 or 600 grit.



Ultra-finish work requires a copious supply of **clean** coolant and it must be applied at the point of contact as shown here

The two operations are: First, fine dressing, intermediate traverse, 2500 surface feet per minute; second, no dressing, minimum traverse, 3000 surface feet per minute. Economical stock removal for this wheel is 0.0003 inch—practically no removal.

Grinding Steckel Mill Rolls: Steckel mill rolls are made of various analyses of high-speed tool steels and from forged tungsten carbide. Their service and method of their mounting dictate that they be ground to a very high degree of accuracy and concentricity. The surface finish must be of the grade we have defined as ultra. Although a high polish is customary, it is not always necessary.

Setting Up The Grinder: The grinder must be in the best possible condition. Spindle, headstock, tailstock and foundations must be rigid. Ways must be true, and free from "give". Vibration of any element is fatal. Spindle bearings should be sleeve or cap type, set up with a minimum oil clearance, entirely filled with oil that will not thin excessively. High grade babbitt appears the best material. Spindles and bearings should be lapped both individually and together, using an 800-grit aluminum oxide abrasive in an oil vehicle; then burnished with white lead and oil.

The machine and roll centers should be lapped carefully when the rolls are ground on centers. Roll centers should be extra large and not more than half of their length should be utilized as a bearing. A rigid back-rest or stop is also essential.

Neck-rests may be used if their construction insures freedom from vibration and provides good lubrication. The rests should be mounted rigidly on the grinder bed and a positive acting cap or clamp used to hold the roll in place. They should also have corner radii to correspond with those on the roll necks.

In general, tool steel Steckel mill rolls may be ground to an ultra finish by roughing with a 150-grit silicon-carbide wheel with a special bond and abrasive. Final passes are made with an aluminum oxide wheel of 320 grit, both bond and abrasive being special. Both wheels are used for roughing and finishing, as in grinding hardened steel rolls, and both wheels are operated at 4500 surface feet per minute.

Tungsten-Carbide Rolls: To recondition forged tungsten-carbide Steckel mill rolls, use diamond wheels, either resinoid or metal bonded. The same procedure as that for hardened steel rolls is followed in grinding tungsten-carbide rolls.

Rolls that are nicked or worn so that as much as 0.001-inch must be removed, require diamond wheels of 100 grit, 220 grit, 400 grit and 500 grit, used progressively. Since a feature of tungsten-carbide rolls is that they ordinarily stand up well in use, an ultra finish can be restored in most cases by removing as little as 0.0003-inch. This can be done by using only two wheels—the 400 and the 500-grit ones, both operated at 4500 surface feet per minute.

Lapping Not Necessary: Lapping commonly is specified for cold mill rolls, especially Steckel mill rolls. This should not be necessary if the grinding machine is in proper condition. For example, one mill specified a roughness of not more than 1 micro inch for a Steckel mill roll. With the grinder then in use, this could be secured only by lapping. But when properly conditioned, the machine was able to secure a finish of only 0.77-micro-inch roughness, solely by grinding.

But Here's How: If lapping seems desirable do it this way: A cast iron lap may be made by turning a ring to an inside diameter 0.002 inch larger than the roll diameter and about 2 inches wide. The edges of the lap are rounded to prevent scraping off the abrasive and to prevent traverse marks. The hole is finished, the ring split in one place, and a means provided for adjustment.

The roll is moistened with 400-grit aluminum-oxide finishing compound, and the lap adjusted until it just begins to drag. With the roll turning at maximum speed, the lap is traversed slowly from end to end. As the roll surface approaches perfection, gradually thin out the compound with oil. If possible, a lengthwise spiral stroke should be used, providing that the roll can be turned on its axis at each stroke. This movement can be acquired by moving the lap by hand along the mounted roll.

A very effective lap for small rolls such as Steckel mill rolls can be made by casting lead around the roll to the full length. Outside diameter of the mold should be tapered. After cooling, the lap is split lengthwise and a clamp with the same taper provided for adjustment. The roll is revolved in this lap with 600-grit aluminum-oxide finishing compound.

However, it should be remembered that ultra finishes can and should be secured purely by grinding. Inability to do so is a sign of something wrong somewhere.

Chilled Iron Rolls: These rolls are seldom ground to an ultra finish since they are used mostly for hot metal work. However, some manufacturers give their iron rolls an ultra finish for the sake of appearance. Silicon-carbide wheels are used. If only a good finish is required, use first a wheel of 20 to 36 grit, employing it as both a roughing and finishing wheel, as in grinding hardened steel rolls. For first operation, use an open dressing, maximum traverse rate and wheel speed of 5500 surface feet per minute. After sparking out, redress the wheel to smooth and grind with intermediate traverse at 5500 surface feet per minute. Finally, with no further dressing and minimum traverse, operate the wheel at 4000 surface feet per minute. About 0.050 inch will be removed with this wheel economically.

Second wheel will be 60 to 80 grit, using the same three opera-

(*Please turn to Page* 88)

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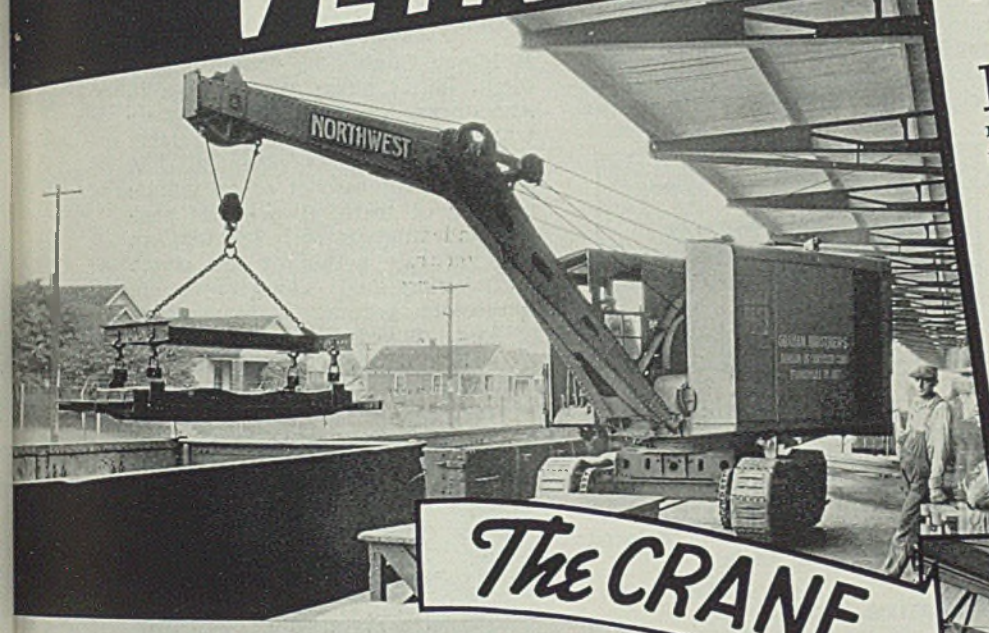
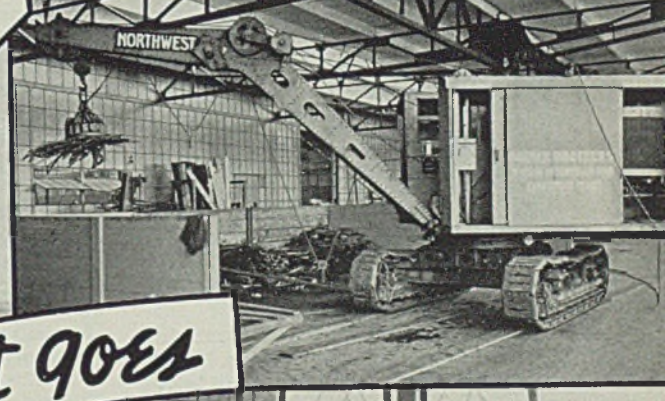


The CRANE



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Industrial Equipment

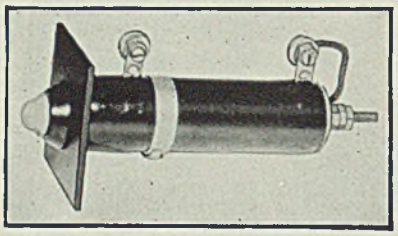
Job Selector

■ Continental Machines Inc., 1301 Washington avenue, South, Minneapolis, is incorporating a new job selector on all DOALL contour sawing, filing and polishing machines. It serves as a ready reference to all basic materials which are to be contour sawed or filed, containing

data for 56 basic materials—ranging from ferrous to nonferrous. Only a flip of the operator's hand gives the correct sawing speed, pitch, temper and set. Additional items contained on the job selector cover oiling directions for the DOALL machine—the minimum width of saw to use in cutting contours of various radii. Cardboard replicas of this selector are available for users, students, and NYA programs.

Indicating Lamps

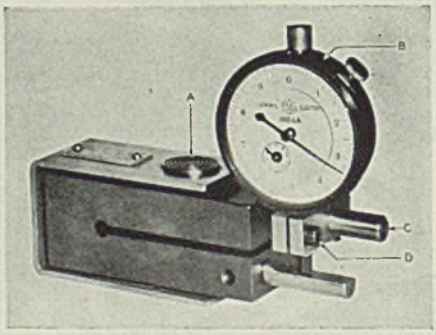
■ Allis-Chalmers Mfg. Co., Milwaukee, has placed on the market an improved line of indicating lamps for visual or pilot light indication on switchboards, switchgear, panels and controls. These are compact and require little panel space for mounting. An outstanding feature is the use of a special material in the color cap which allows less lamp voltage with equal brilliance and corresponding longer lamp life-consuming only approximately 4 watts. The color caps are threaded and easily removed and replaced from the front of the board. The receptacle of each of these lamps is of insulating material and mounts from the front of the panel through a ¾-inch hole. The resistor slips over the receptacle, taking very little space. Strong metal contact clips firmly hold the lamp bulb in position. The assembly mounts on any thickness of panel up to 2 inches, without panel counterboring. It projects less than 5 inches from the



surface of the panel. Binding screws provide easy means for making connections. The lamp slips into the receptacle from the front after the color cap is unscrewed. The lamp bulb may be removed or replaced without the use of tools.

Pressure Gage

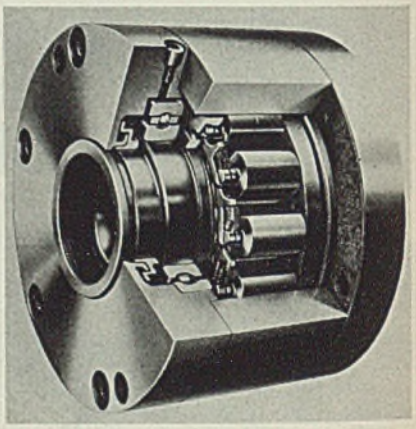
■ General Electric Co., Schenectady, N. Y., has developed an electrode pressure gage to measure the pressure between the electrodes of resistance-welding machines. It is for use either as a standard for checking existing gages or pressure indicators on spot, line, or projection welders, or for checking the electrode pressure at the time of setup, before proceeding with production work. It also may be used by testing laboratories for pressure determinations. The gage measures pressures from 0 to 4500



pounds; an automatic stop safeguards it against damage, should pressures of more than 4500 pounds be applied. Consisting simply of a calibrated steel yoke and a micrometer dial indicator, it is easily applicable to existing resistance welding machines without the need for jigs or other auxiliary equipment. The gage is simply inserted between the electrodes so that they press on the pads on the top and bottom of the gage yoke. The electrode pressure is adjusted until the desired pressure is registered on the gage dial. The dial indicator has two scales, one for reading in 10-pound intervals up to 1000 pounds, and the other to read in 1000-pound intervals.

Indexing Clutch

■ Morse Chain Co., Clutch department, 7601 Central avenue, Detroit, announces an indexing and freewheeling clutch for use as a ratchet for various feed mechanisms. A self-contained ratchet of an infinite number of teeth, it provides positive, indexing control. The uniform and accurate action of this clutch to indexing loads down to minute limitations permits a higher rate of feed. Speeds and index strokes to accommodate various stocks is accomplished by one machine ad-



justment. Power is transmitted from an inner hub or driver member by a system of gear actuated cams. These actuate into and out of engagement smoothly and instantaneously. Clutches are available in 12 standard sizes with torque capacities ranging from 26 to 2300 pounds.

Production Grinder

■ Landis Tool Co., Waynesboro, Pa., has developed a new No. 1 race-a-way grinder for production grinding of the raceways of small ball bearing outer races. It handles smaller races up to and including the No. 204 size. The machine is equipped with a sizing device which in combination with an electric timing device permits the performance of three operations during the same grinding cycle. The race is rough ground up to the point where only a small amount of stock is yet to be removed. Grinding continues, but at a slower grinding feed which is equivalent to what would ordinarily be the finishing operation. With the work practically to size, grinding feed and work head oscillation stop. The work head is centered and for a fixed but exceedingly brief period of time the wheel sparks out until the work is down to exact size. The

< < HELPFUL LITERATURE > >

1. Lighting Fittings

Thompson Electric Co.—40-page illustrated catalog No. 41 presents complete description of line of disconnecting and lowering hangers, shock absorbers, suspension devices and accessories, special appliances, chain, chain and cable fittings, and wire cable for lighting fixtures and other suspended devices. Typical installations and applications are shown.

2. Rustproofing

International Rustproof Corp.—4-page bulletin, "Metalbond Phosphate-Depositing Solution," describes application and effectiveness of this corrosion solvent process which provides rust resistance and prolongs life of finish applied to metal surfaces.

3. Disc Clutches

Conway Clutch Co.—8-page illustrated bulletin No. L-29 is descriptive of stud drive disc clutches ranging in capacity from 13 to 200 horsepower at 100 revolutions per minute. Mounting dimensions, horsepower and torque data are given in charts.

4. Air Circulators

Emerson Electric Manufacturing Co.—8-page illustrated catalog No. X4058 describes line of quiet operating air circulators. Two sizes are available, each with ceiling, wall bracket, counter column or floor column mountings. Performance information and detailed specifications are included.

5. Ferro Alloys

Electro Metallurgical Co.—24-page pocket-size booklet, "Electromet Products and Service," includes descriptions and suggestions for uses of recently developed "Electromet" ferro alloys and metals, as well as of those already known. Data are included on numerous alloys in common use among steel producers and foundries.

6. Blast Cleaning

Ruemelin Manufacturing Co.—8-page illustrated bulletin No. 32-A shows available types of blast cleaning cabinets and lists typical industrial applications of these units. Construction details, features and application data are given.

7. Repair Cements

Smooth-On Manufacturing Co.—40-page illustrated "Smooth-On" handbook includes over 170 diagrams with instructions on sealing cracks in castings, stopping leaks in apparatus, tightening loose fixtures and parts of equipment, making tight pipe joints, patching concrete floors and walls, waterproofing cellars and similar maintenance and repair work.

8. Electrical Controls

Electric Controller & Manufacturing Co.—25 bulletins and 24 price sheets, as well as index and checking list, are latest additions to catalog on products of this company. Complete data are given on controls, brakes, contactors, controllers, crane equipment, limit stops, limit switches, magnets, switches, panels, regulators, relays, resistors, rheostats, starters, timers and similar electrical equipment.

9. Welding Alloys

Bridgeport Brass Co.—16-page illustrated booklet on "Bronze Welding Alloys" lists available products and gives their physical properties and applications. Methods are given for welding cast iron, steel and silicon copper tank stock.

10. Single End Shears

Buffalo Forge Co.—4-page illustrated bulletin No. 302-B contains complete description and specifications on line of single end shears. Features and details of construction are shown. Capacities and dimensions are given in tabular form.

11. Lathes

South Bend Lathe Works—56-page catalog No. 50-B covers "South Bend" 9-inch precision lathes, models A, B, and C. Two new models as well as 26 other types are described. Attachments, tools and accessories for use with these machines are shown.

12. Bearings

New Departure—156-page illustrated handbook, volume I, 15th edition is filled with data, such as dimensions, load ratings, bearing fits and list prices on principal types of ball bearings. Engineering application information and selection guidance are given in this book.

13. Combustion Control

Hays Corp.—20-page illustrated publication No. 40 is entitled, "Automatic Combustion Control and Its Relation to Lower Steam Costs." Typical applications of combustion controls to stoker, oil, pulverized fuel and gas fired boilers are shown in schematic form. Principles of automatic control and results obtainable are outlined.

14. Rubber Tracks

B. F. Goodrich Co.—4-page bulletin section C illustrates commercial applications of rubber tracks, apart from their use on crawler type military vehicles. Two types are described,—endless band track which is reinforced longitudinally with steel cable and rubber block track with individual segments.

15. Shell Lathe

Sparks Machine Tool Corp.—4-page illustrated bulletin is desecriptive of new semi-automatic "Hydra-Feed" lathe for all size shell bodies from 75 to 155 millimeters inclusive and for rapid machining of similar shapes. Specifications and general description of machine are included.

16. Material Conveyor

Link-Belt Co.—24-page illustrated bulletin No. 1975 is descriptive of new "Bulk-Flo" continuous flow system for loose-materials handling. This self feeding, self cleaning, positive conveyor features simple construction. Capacities range from one to 140 tons per hour with minimum of power consumption.

17. Die Steel

Jessop Steel Co.—8-page illustrated booklet, "Jessop 3C", presents complete information regarding this high carbon, high chrome die steel which is oil hardening and possesses high resistance to wear. It is non-deforming and has good machinability for use where long runs per grind of die are desirable.

18. Bronze

Koppers Co., Bartlett Hayward division—Illustrated data sheet No. E-8117 discusses use of "D-H-S Bronze" in steel industry. Recommended applications, minimum physical properties and other data are given on four grades of this metal.

19. Carburizing

Leeds & Northrup Co.—24-page illustrated catalog No. T-623 describes "Homocarb" method of carburizing which is said to develop case of specified thickness on variety of work, such as gears, spindles, cones, bushings and camshafts. Action photographs, diagrams and charts show application of method in representative plants.

20. Railway Cars

Pressed Steel Car Co.—16-page illustrated bulletin No. 71 presents descriptions of industrial railway cars for all types of service. End dump, side discharge, platform and special types of cars are shown. Trackless equipment for materials handling is described, as are car parts, tracks, switches and accessories.

21. Blowers and Pumps

Roots-Connersville Blower Corp.—6-page illustrated folder No. VA-102 covers applications of "Victor-Acme" blowers and gas pumps for use with wide variety of oil and gas fired units. Sectional view shows design of these two impeller machines which are of rotary positive type.

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(Continued)

22. Switch Houses

Allis-Chalmers Manufacturing Co.—8-page illustrated bulletin No. RL41 is devoted to metal-enclosed outdoor switch houses for feeder or line protective switching equipment. Units are finished products, completely assembled, tested and ready for installation. Design advantages, operating features, dimensions, application data and typical arrangements are included.

23. Power Shovel Dippers

American Manganese Steel Division, American Brake Shoe & Foundry Co.—22-page illustrated bulletin No. 641-D describes power shovel dippers which have renewable lip dipper made of manganese steel. Close-up photographs show details of construction and design, as well as many of types of dippers available for special applications. One section is devoted to explanation of manganese steel, its composition, characteristics and advantages.

24. Diesel Tractor

Caterpillar Tractor Co.—32-page illustrated catalog No. 6289 deals with 80-horsepower diesel D7 tractor. Cutaway pictures show cross sections of engine and tractor chassis while accompanying text describes all working parts. Separate sections are devoted to fuel system, engine construction features, lubricating system, transmission and final drive, tracks and roller assemblies and available allied equipment.

25. High Voltage Equipment

Delta-Star Electric Co.—Three 4-page illustrated bulletins Nos. 4101, 4103, 4105 cover outdoor terminators, 3-conductor cable supports and motor mechanisms, respectively. Features, capacities and ratings and applications are discussed. Line drawings and close-up internal views present details of design and construction.

26. Rotary Pumps

Worthington Pump & Machinery Corp.—12-page illustrated bulletin No. W-483-B1 features line of rotary pumps which have double-helical gears. Use of these geared rotors results in high pumping efficiency, by eliminating thrust and preventing trapping of liquid between teeth. Seven types are available. Schematic views showing details of construction, applications, features, capacities and general description are given for each type.

27. Sheet Metal Data

Newcomb-David Co.—60-page illustrated catalog covers spray booths, drying ovens, metal parts washers, exhaust systems, dust collectors and miscellaneous sheet metal equipment. Comprising 28 pages is section identified as "Handbook of Sheet Metal Engineering Data," which includes tables, charts and general information on design, installation and operation of sheet metal equipment.

28. Plating Rack Coating

United Chromium, Inc. — Two-fold pamphlet deals with plating rack material which can be applied by dipping in drum in which it is shipped, and drying in air at room temperature. Plating cycles in which racks coated with material can be used, method of application, and advantages are given.

29. Flexible Couplings

American Flexible Coupling Co.—20-page illustrated catalog No. 411 describes complete line of flexible couplings for efficient power transmission. Series B is of all steel construction with hard chromed faces on jaw flanges for heavy duty installations. Series C is of all steel construction with hard chromed faces on jaw flanges, and has removable nonferrous Oilite bearing strips interposed between wearing surfaces.

30. Fluorescent Lighting

General Electric Co.—28-page illustrated bulletin No. Y-138 describes fluorescent lighting as applied to industry. Subjects covered include benefits of lighting; relation of light to task and eyes; increased production and reduced spoilage; light, visibility and brightness meters for measuring illumination; lighting levels needed for common production tasks, general and supplementary industrial lighting; mercury and filament lighting and drying lamps, typical factory lighting units; and certified "Fleur-O-Lier" fixtures.

31. Magnetic Inspection

Western Industrial Engineering Co.—8-page illustrated bulletin is descriptive of equipment for magnetic inspection of raw materials, machined parts, fatigued parts and all highly stressed ferrous metals for discovery of hidden flaws. Instruments are "Ferroscope" for rapid inspection of large parts and "Steelscope" for small parts.

32. Heat Treatment

National Copper Paint Corp.—6-page bulletin No. 114 outlines application of "Sel-Car" method of heat treatment of steels. Features of this process which provides surface protection during carburization, prevents carbon penetration, and is used in temperature range of 1575 to 2300 degrees Fahr. are described.

33. Atmosphere Generator

Mahr Manufacturing Co.—Illustrated bulletin No. 1300 gives complete data on "No-Ox" generator which supplies controlled oxygen free atmosphere for use in heat treating, bright annealing and purging explosive mixtures from pipe lines and containers.

34. Electric Trucks

Easton Car & Construction Co.—Two illustrated bulletins, Nos. 161 and 162 describe Type TLC-6 and TLC-4 electric tier-lift trucks, respectively. Construction and design of individual parts, capacities, speeds, features and electrical equipment are covered. Series of action photographs show some of typical applications.

35. Potentiometer Recorders

Foxboro Co.—19-page illustrated bulletin No. 190-5 deals with potentiometer recorders. Theory, operating mechanisms, features and design are discussed and described with large close-up photographs. Large facsimile of chart shows method of indication which can record as many as six thermocouple readings. General specifications are included.

36. Arc Welder

Una Welding, Inc.—4-page bulletin No. 600 describes heavy duty alternating current arc welder which has built-in power factor correction. Text covers design, operation, construction of coils and related parts, adjustment and maintenance. Complete specifications are listed.

37. Boring Mills

Yoder Sales Co.—6-page illustrated bulletin describes horizontal boring mill for use in general machine shops, tool and die and production plants. Large illustration contains arrows indicating salient features which are covered in detail in text. Table lists complete specifications. Attachments are described and illustrated.

38. Industrial Furnaces

Drever Co.—4-page illustrated bulletin No. B-3 shows typical industrial furnace installations. Pictured and briefly described are furnaces for bright annealing stainless steel wire, for general forging and maintenance work, for bright annealing of stainless steel tubing, for age hardening aluminum alloys and for annealing copper wire. Equipment for providing protective atmospheres is also described.

39. Self-Locking Nuts

Elastic Stop Nut Corp.—4-page illustrated bulletin outlines principle, manufacture and application of "Elastic Stop" self-locking nuts for use as vibration proof fastenings on military and transport planes, and on mechanical and electrical equipment. Photographs picture some of equipment on which fasteners are used extensively.

STEEL

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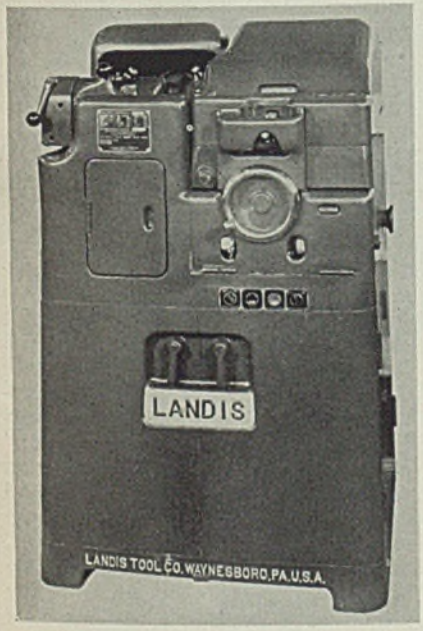
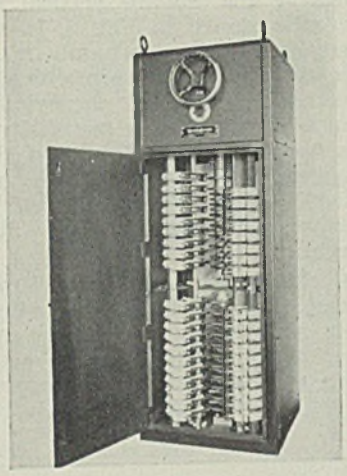
entire grinding cycle is automatic. Basic feature of the design is the Solex sizing device which may be furnished in the form of the compensating type or the finger type. The former is used with races having a groove diameter less than ⅞-inch and controls the size of each race ground by compensating automatically for any slight error found on the race previously ground. The latter is considered extra equipment and is used only with races having a groove diameter of ⅞-inch and up. Wheel spindle of the unit operates at 50,000 revolutions per minute. In event the machine is intended to grind only the larger races having ⅞-inch groove diameter and up, a 30,000-revolution-per-minute wheel spindle is supplied instead. Each mechanism of the machine is inside the bed behind doors which form part of the outside walls. The machine is arranged so the coolant flow may be automatically stopped



during the finishing portion of the cut. A large master safety button stops every machine movement instantaneously. A hydraulic wheel reset mechanism causes the wheel base to reset itself automatically at the end of each grinding cycle.

Secondary Controller

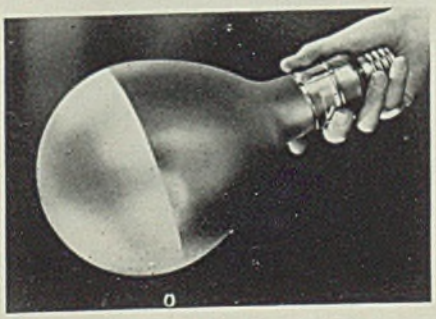
■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces a new motor-operated secondary controller for use with polyphase wound rotor motors on fan, pump, and similar drives. It provides either 13 or 20 balanced points of control by varying the external resistance in the motor secondary winding. Enclosed in a self-supporting steel cabinet, the unit has cam-actuated contactors arranged for sequential operation in pairs from a common motor-driven cam shaft. Individual cams give "quick-make" and "quick-break" contact action. Pure silver inlays on contact surfaces assure current conductivity and avoid heating due to oxida-



tion of the copper base. Also, separate copper arcing contacts prevent burning or pitting of main contact surfaces. The controller drive mechanism consists of a pilot motor, a gear reduction unit, and a Geneva gear for angular movement of the cam shaft. Step-by-step action is assured by a gear and pinion arrangement. Over-travel protection is provided by auxiliary cam-actuated switches. The motor may be supplied for 115 or 230 volts direct current and 110, 220 or 440 volts alternating current.

Direct Reflector Lamp

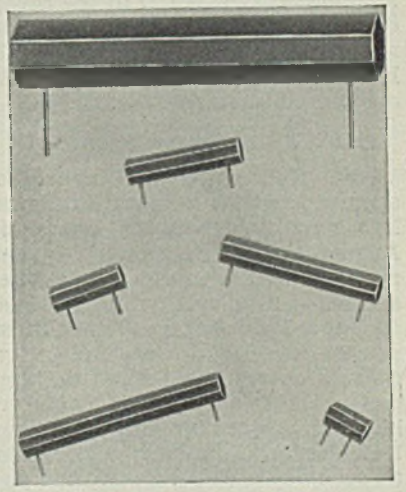
■ Wabash Appliance Corp., 335 Carroll street, Brooklyn, N. Y., has introduced a new "sealed-silver" high voltage Birdseye lamp for use in industrial plants generating their own electric current. It incorporates its own built-in reflector unit in form of a solid sliver lining hermetically sealed inside the bulb where it cannot gather dust, tarnish, crack or peel. A nickel neck



reflector disk redirects light that would ordinarily be wasted through the neck of the bulb. The combination of neck reflector disk, silver lining and exact optical placement of the filament is said to direct a concentrated flood of light rays straight out of the bulb direct to the work area to be illuminated. Lamps are available in six sizes from 100 to 1000 watts, and in seven different high voltages.

Electric Resistor

■ Keystone Carbon Co., 1935 State street, Saint Marys, Pa., has placed on the market a new negative temperature coefficient resistor. It is made of a hard, black, nonmetallic substance, the chief characteristic of which is a decrease in electrical resistance with an increase in temperature. Thus the temperature of this unit can be changed either externally by a change in ambient temperature, or internally by heat developed by passage of current through the resistor, or by a combination of both. Change of resistance with temperature change occurs in the region of ordinary temperatures; namely, 0-150 degrees Cent. The resistors are mechanically strong and can be supplied in a



wide variety of sizes and shapes. Connections are "molded-in" to provide secure and permanent electrical contact.

Micro-Action Valve

■ J. A. Campbell Co., 645 East Wardlow road, Long Beach, Calif., announces a micro-action valve for dampening the pulsation of boiler plant pump governors and to eliminate "jitters" of the gage hand. Known as the Micro-Bean, it can be installed on the pressure line to the diaphragm of a pump governor. The valve is capable of handling steam, fuel oil, gas, water or other liquids, with simple adjustment for each viscosity. Unit consists of a solid brass body in which is enclosed a filter. The valve has a slight taper which minimizes the tendency to pinch off, under changing pressure conditions. The micrometric control of the opening enables the operator to obtain the closest approach to full shut-off down to the last 0.0003-inch, regardless of the line content. The device can be utilized in applications up to 3000 pounds pressure.

More About Flywheels

(*Continued from Page* 51)

including that of the armature of the motor, the majority of them undoubtedly are "motored" considerably above their normal operating requirements as represented by the load during the actual cutting portion of their operating cycle. If such be the case, then a flywheel either on the motor or elsewhere in the drive (integral with the V-belt pulley on the machine, for instance) should be an expedient worthy of careful consideration.

In normal times, when there was plenty of power and plenty of copper and plenty of motors of all sizes, it became customary for American machine tool engineers to reason something like this: "Why split hairs about a few extra horsepower when motors cost so little and power itself is one of the cheapest commodities involved in the manufacturing of metal products?" European engineers always have questioned that reasoning.

Don't Be a Power Spendthrift

Now that power shortages face some industrial centers in America; now that existing copper in American industrial plants is carrying all that it can at a time when additional copper is not easy to get; and now that electric motors themselves are being carefully "rationed;" it looks as though the time has come for American engineers likewise to question this reasoning. Now seems to be the time for them to devote some attention to the possibilities of flywheels as one means of circumventing this situation without sacrificing any of the production possibilities of their machines.

As a matter of fact, there is evidence that in many cases they can increase production while reducing the motor capacity of those machine tools in whose operating cycles spasmodic peak loads occur. After all, the operating characteristics of many of them, as far as fluctuations in power requirements are concerned, are not so different from those of drawing presses and press brakes. No one questions the importance and value of flywheels on these latter machines. Just consider what kind of a motor would be required to drive the Cincinnati press brake shown in Fig. 1 if flywheels were not employed!

To keep this article from degenerating into one of speculation as to what flywheels *might* accomplish when used in connection with machine tools, I will at this point inject further concrete evidence as to what they actually *are* accomplishing. First, let us consider some of those cases where the flywheel is inherent in the machine in the disguise of a chuck, work table or other revolving member—thereby commonly being overlooked as a flywheel.

An excellent example of this is given by the Bullard vertical turret lathe shown in Fig. 2. In this particular instance not only is the revolving table of the machine an effective flywheel, but the symmetrical work itself adds materially to the flywheel effect. This is a steel ring-gear blank which is being machined at the Nuttal works of the Westinghouse company in Pittsburgh.

Machines of the type just mentioned long have been noted for their satisfactory machining characteristics—smoothness of action being obvious on this job. Deserved credit has been given to their rugged construction and well designed transmissions in achieving such results. Perhaps too little credit has been given to the flywheel effect of their heavy revolving tables in smoothing out minute pulsations in the power flow; in counteracting the tendency of irregularly shaped, unbalanced work to wobble; and in "carrying over" hard spots and interrupted cuts without slow downs or jumps, and without overloading the drive motor.

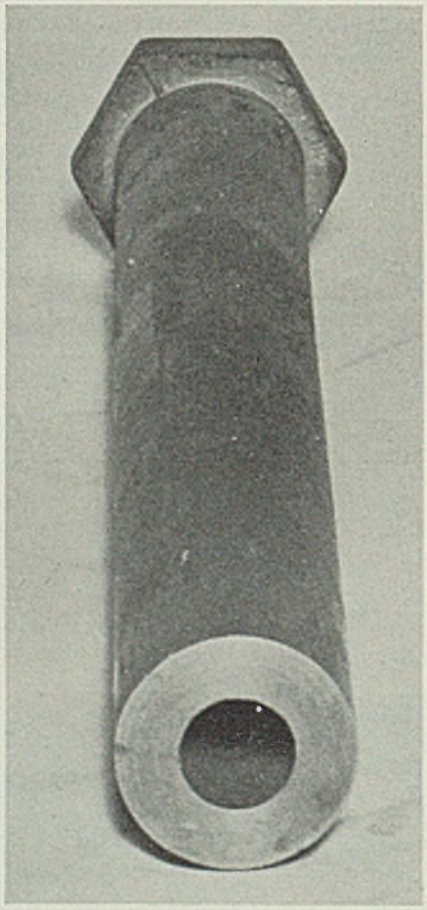
Flywheel effect of chucks on machine tools of horizontal spindle type likewise has desirable effect on quality of work under certain conditions. Because of the fact that chucks on these machines—lathes and turret lathes for example—are removable, it is possible to select a chuck with its flywheel effect in mind. For that reason it sometimes is in order to use a heavy chuck of fairly large diameter for holding work which could be gripped in a smaller, lighter chuck. A case in point is depicted by Fig. 3, which is an action photograph of the machining of a tough steel bevel gear blank in a Warner & Swasey turret lathe. This was taken in the plant of the Braun Gear Corp., Brooklyn, N. Y.

Flywheel Energy Demands Respect

When using heavy chucks on machines having threaded spindle noses, it must be remembered that sudden reversal of the spindle is liable to free the chuck and cause it to unscrew itself from the spindle. Don't take any chances on having that happen. A "run-away" chuck—like any other flywheel on the rampage—is a dangerous and destructive thing. The writer once saw one jump out of one lathe, break a leg off an adjoining lathe and then smash through a heavy partition. A word of caution applies to flywheels in general. Don't underestimate the energy which they embody, even though they are disarmingly harmless in appearance when running smoothly.

Let us consider the concrete example of a one-piece steel flywheel of webbed design—one whose outside diameter is 18 inches and whose rim is 3 inches wide and 3 inches thick. The weight of this rim is 119.43 pounds and when the wheel is running at 1800 revolutions per minute, this ring-shaped body of metal is traveling at average linear velocity of 117.81 feet per second. As a revolving body, this does not constitute a particularly impressive visual representation of kinetic energy. Think of it, however, as a 3-inch-square steel bar nearly 4 feet long rushing past at the speed of almost 70 miles per hour, and you get a clearer idea of the blow that its 119.43 pounds is capable of

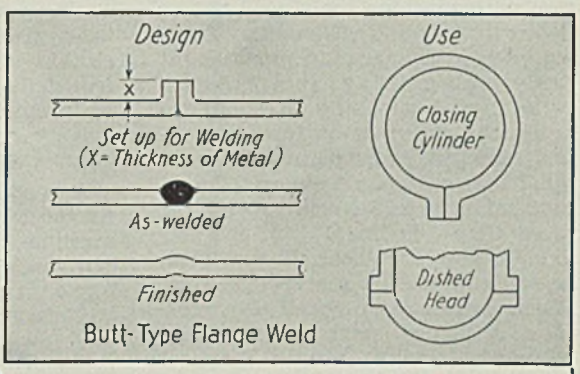
Making More from Less

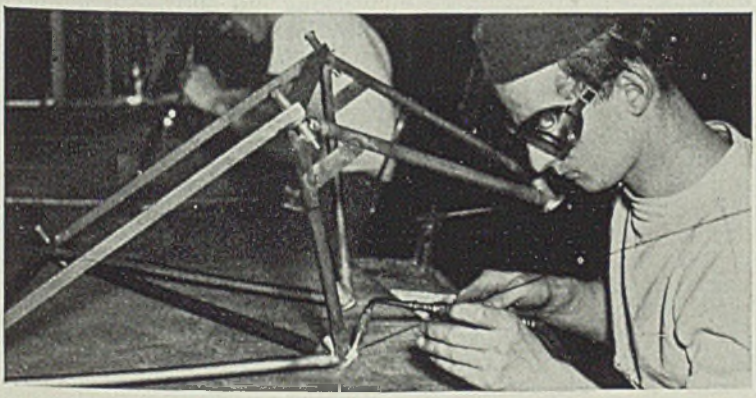


In times when steel ingot capacity is taxed and many articles contain strategic elements, the study of how to make more parts from less steel becomes important. The photo above depicts a finished pin approximately 15 inches long which was originally machined completely from a 2¾-inch solid hexagon bar, and which the Babcock & Wilcox Tube Co., New York, is now producing by upsetting a hexagon head on a piece of seamless steel tubing to obtain the same results.

How the LINDE organization can help you get Good Welding and Cutting Results . . .

TO get consistently good results in the fabrication of parts by oxy-acetylene welding and cutting—and to do it in less time and at lower cost—it will pay you to develop "procedure control" which provides a *managed* co-ordination between engineering and production. Such control starts with design, and follows through the actual shaping and welding of the structure. Some of the ways in which Linde is helping manufacturers to do this are shown here. We may also be able to help you.



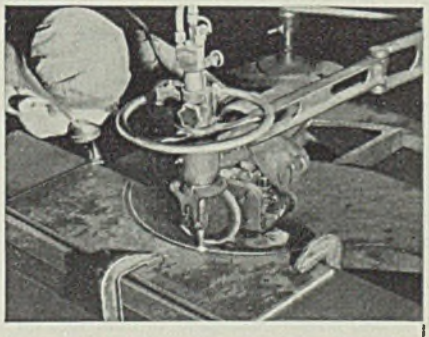


Design — It is important to consider the relation between the design of a unit and the cutting and welding procedure, as it affects final results. Linde engineers can often contribute helpful suggestions on "designing for welding."

Jigs — Correctly designed jigs and fixtures produce savings in time and materials, and assure consistently good results. Linde men are experienced in the design of good jigs for all types of production cutting and welding.

Gas Supply — Linde not only can supply these essential materials but also can help you organize a gas distribution system and an efficient layout of welding stations.

Operator Training — Linde process literature and Linde service operators are contributing daily to the skill and knowledge of operators everywhere. Linde also co-operates with welding schools in the training of competent production welders.



Apparatus — Oxweld apparatus, welding rod, and supplies are well-made, uniformly dependable, and enable operators to do their best work with a minimum of effort. For this reason, Oxweld apparatus is standard in many industrial plants.

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delivering. At 1800 revolutions per minute this flywheel actually "packs a wallop" of more than 25,771 foot-pounds. Like high-pressure steam or high voltage electricity, forces such as this are not to be trifled with.

From the foregoing example, it becomes apparent that in most cases flywheels for use in connection with machine tools need not be heavy or large in diameter—especially if they are to operate at fairly high speed, as they ordinarily will. And speaking of speed, to be on the safe side as far as bursting strength is concerned, bear in mind that cast-iron flywheels should not be operated at rim speeds of more than 100 lineal feet per second. A similar wheel of cast steel is safe up to 200 feet per second. When higher rim speed is necessary, a forged steel wheel should be used. In any case, a flywheel should be smoothly machined all over and should be accurately balanced.

On machines where quick stopping is necessary, flywheels had best be mounted between the power source and the declutching element rather than directly on tool or work spindles. If it is necessary to mount a flywheel directly on a spindle without a clutch, braking capacity should be increased to absorb quickly the increased kinetic energy. In such installations it is a good plan to provide a safety pin or safety key which will shear off and disconnect the flywheel in case a jam up of tools or work occurs. In fact, that is a good thing to do wherever the flywheel is placed.

Deliberate use of flywheels on milling and hobbing machines has not been at all uncommon. A number of very successful milling machines have been built with removable flywheels which can be mounted on the spindles when nature of the cutters is such that speed balancing and power storing characteristics given by the flywheel are desirable. In other cases flywheel effect deliberately has been "built-in" by providing extra heavy rims on driving gears or other suitable revolving elements in the power train.

An excellent example of deliberate flywheel application to a hobbing machine is given by Fig. 4. This Barber-Colman machine is operating on a production splining job at the plant of the Maytag Co., Newton, Iowa. It will be noted that in this case the flywheel is not mounted directly on the cutter spindle but is on the end of the back shaft on the cutter head. The steel shafts in which the splines are being cut are tough and rather hard and the flywheel has a distinct effect in steadying the cutting action of the hob, thus insuring smooth work.

Few production machine tools are any scarcer at this time than milling machines, and no machine tools are being pushed any harder than the thousands of older model milling machines which are being operated night and day to meet the defense emergency. Many of these older machines were not designed for use with coarse tooth cutters, therefore considerable trouble is being encountered in the way of chattering and stalling—especially when fast feeds are attempted on tough materials.

Here is one of the most attractive fields for experimentation with the flywheel idea as a practical expedient for helping old machines to cope successfully with new conditions. This is not suggested as a cure-all, nor is it possible to expound set rules as to how the idea can be applied. Of necessity, applications will have to be made in the simplest and most economical manner. There are times when a plain disk locked on the cutter arbor will serve the purpose.

Good common sense, coupled with instinctive appreciation of the surprising amount of energy which a relatively small flywheel can "soak up" and then give out, are fully as necessary as theoretical knowledge, in working out successful flywheel applications to machine tools either old or new.

Ultra-Finish Rolls

(*Concluded from Page* 80)

tions and the same conditions of dressing, traverse and speed as the first wheel. Stock removal will be about 0.02-inch.

Additional wheels up to 500 grit may be used if an ultra finish is desired, the wheels and mode of using them being the same as for hardened steel rolls.

To Sum Up: Ultra finish grinding of rolls requires perfect machine condition; copious supply of *clean* coolant; gradual building up of a surface by grinding, not burnishing, using several wheels of diminishing grit size; using each wheel as both a roughing and finishing wheel, allowing the wheel to spark out.

In the fourth and last section of this series, to appear in an early issue, instructions will be given on how to avoid specific blemishes.

Do's and Don't's for Carbide Cutting Tools

ALWAYS	NEVER
Use flat, rigid base	Never use rocker support under tool
Set tools approximately on horizontal plane	Never set tools above or below center line
If necessary set tool short of desired length and adjust from rear	Never use hammer on cutting end of tool
Use tool holders designed to hold tool on horizontal plane	Never use inclined tool holders
Back out tool when tightening clamp screws	Never have tool against work when tightening clamping screws
Use dog-point or flat clamping screws	Never use pointed clamping screws
Cut overhang to minimum	Never leave excessive overhang
Always allow tool to cool naturally	Never dip tool in any liquid while tool is hot
Use generous coolant flow. If possible, force coolant UNDER chip and against cutting edge	Never use weak stream of coolant
Always disengage feed before stopping spindle	Never stop spindle before disengaging feed
Always use silicon carbide or diamond wheels for grinding tip	Never use "any old wheel" for grinding carbide tips
Sharpen carbide tools at regular intervals to get longest life	Never run a carbide tool until it won't cut any more
Keep tool moving across wheel when grinding to avoid localized overheating	In grinding carbide tips don't hold tool motionless too long against wheel

■ **In view of increasing use of carbide cutting tools and the large number of newly trained men being employed in connection with speeding defense production, Carboloy Co. Inc., Detroit, suggests the above table of simple "do's" and "don't's" to remember in connection with such tools. While they do not cover all carbide problems, their observance will assist in reducing tool spoilage and improving performance**

Committee Reaffirms Simplified Practice

■ Simplified practice recommendation R87-32, "Forms for Concrete Joist Construction Floors," has been reaffirmed without change by the standing committee of the industry according to the division of simplified practice, National Bureau of Standards, Washington. First promulgated in 1929, revised in 1932 and reaffirmed in 1936, it covers the dimensions of standard and special forms for concrete joist construction floors.

Copies of the recommendation may be obtained from the superintendent of documents, Government Printing Office, for 5 cents each.

Steel Consumers Still Manage To Operate

This may indicate that fears are unfounded. Virtually all sales are to priority holders. Earnings may have bearing on future prices.

MARKET IN TABLOID ★

Demand
Is much abated except where defense is involved.

Prices
Track bolts rise 60 cents per 100 pounds.

Production
Unchanged at 97.

■ STEEL supply situation becomes ever tighter; yet, despite many weeks of severe strain and even hysteria, there are few, if any, instances of steel users shutting down from lack of materials, even those engaged in nondefense work. The longer that such shutdowns can be staved off, the more hopeful the industry be comes that all users will pass the crisis safely.

Often shortages of steel in hands of consumers are rather vacancies only in certain sizes. Stocks are very unbalanced, partly because defense work required sizes and specifications other than usual and consumers bought the wrong descriptions, foresight being more difficult than hindsight. If there were some practical way of returning surpluses in exchange for scarce items the situation would be much smoother.

The class of consumers having most difficulty in obtaining steel are those who turn out contract work, of a specialty nature, tailor made to fit some specific purpose. Naturally such steel users can't anticipate steel requirements. Thus a maker of blast furnace and steelworks equipment has trouble in getting steel for ultimately manufacturing steel, obviously entitled to priority rating, but not yet granted one.

Allocating steel deliveries on a percentage basis of what has been ordered, particularly to civilian consumers, is the order of the day. Some mills have assigned quotas to branch offices, who, in turn, allocate their customers. Because of the rapid growth of priority orders allocations on these priorities are expected by many by the end of the current quarter. Already several steelmakers and allied manufacturers complain of more A-1-A ratings than they can fill.

In several cases, consumers finding their priority ratings are not high enough to get results, have returned to OPM to get higher ratings necessitating another wait. Railroads complain that their A-3 ratings are not potent enough to be effective.

There is often confusion as to whether certain new Washington propositions are actual orders or proposals. Thus the recommendation by OPACS that materials going to makers of household appliances and automobile makers be cut 50 per cent yet remains to be passed upon by OPM, though many were under impression it was a definite order.

Some steelmakers note that pressure from consumers for materials has been shifted somewhat from their own headquarters to Washington as users realize that only the fountainhead of priorities is truly effective.

One of the most drastic cuts among allocations was on the part of a widely diversified producer who cancelled all orders on books where no priority ratings ruled on sheared plates, honoring still only orders for universals and plates made on strip mills. The strain on plates is stupendous, particularly for ship and carbuilding. Moreover Secretary Ickes has just recommended construction of a pipe line from Texas to the Atlantic Coast, a proposition pending for a long time.

The price of track bolts has been advanced 60 cents per 100 pounds, or to $4.75 base. Reports multiply of paying higher than official prices for steel scrap by various subterfuges. The supply becomes more precarious. Typical is the Chicago situation where makers say they can run at full capacity through the quarter with scrap supplies now in sight, though with the future dubious.

The difficulty of buying rails was shown by desire for 4000 relayers for the shell-loading plant at Ravenna, O. Impossible to get, the army had difficulty in finally buying 2000 tons of new rails.

Securing of priority ratings for the obvious is not always easy. A stovemaker showed orders for a cantonment but was denied priorities, which illustrates that OPM does not issue them promiscuously.

Statements on earnings for second quarter begin to appear and there is speculation as to whether the returns will bring revisions upward on ceiling prices.

Scheduled automobile production for last week was 105,635 units, down 4277 for the week, comparing with 34,822 for the same week of 1940.

Ingot production for the country was unchanged at 97 per cent last week. Advancing districts were: Pittsburgh ½ point to 100, Wheeling 2 points to 93, Cleveland 1 point to 96, Detroit 2 points to 88. Declines were: eastern Pennsylvania 1½ points to 95½ and New England 10 points to 85. Unchanged were: Chicago at 100, Youngstown at 98, Buffalo at 93, Birmingham at 90, Cincinnati at 85½ and St. Louis at 98.

STEEL's three composite price groups for last week were unchanged: iron and steel at $38.15, finished steel at $56.60 and steelworks scrap at $19.16.

COMPOSITE MARKET AVERAGES

	July 26	July 19	July 12	One Month Ago June, 1941	Three Months Ago April, 1941	One Year Ago July, 1940	Five Years Ago July, 1936
Iron and Steel	$38.15	$38.15	$38.15	$38.15	$38.15	$37.63	$33.49
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.60	53.40
Steelworks Scrap..	19.16	19.16	19.16	19.16	19.16	18.56	12.89

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 26, 1941	June 1941	April 1941	July 1940
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
Iron bars, Chicago	2.25	2.25	2.25	2.25
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.21	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv. Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago.	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	July 26, 1941	June 1941	April 1941	July 1940
Bessemer, del. Pittsburgh	$25.34	$25.34	$25.34	$24.34
Basic, Valley	23.50	23.50	23.50	22.50
Basic, eastern, del. Philadelphia.	25.34	25.34	25.34	24.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	23.69
No. 2 foundry, Chicago	24.00	24.22	24.22	23.00
Southern No. 2, Birmingham	20.38	20.38	20.38	19.38
Southern No. 2, del. Cincinnati	24.06	24.06	24.06	23.06
No. 2X, del. Phila. (differ. av.)	26.215	26.215	26.215	25.215
Malleable, Valley	24.00	24.00	24.00	23.00
Malleable, Chicago	24.00	24.00	24.00	23.00
Lake Sup., charcoal, del. Chicago	31.34	31.34	30.34	30.34
Gray forge, del. Pittsburgh	24.19	24.19	24.19	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	125.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.20	$19.55
Heavy melt. steel, No. 2, E. Pa.	17.75	17.75	18.00	17.50
Heavy melting steel, Chicago	18.75	18.75	18.80	17.45
Rails for rolling, Chicago	22.25	22.25	22.65	21.65
No. 1 Cast, Chicago	20.00	21.50	22.31	16.95

Coke

Connellsville, furnace, ovens	$6.25	$6.25	$5.50	$4.75
Connellsville, foundry, ovens	7.25	7.25	6.00	5.75
Chicago, by-product fdry., del.	12.25	12.25	11.85	11.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.10c
Chicago, Gary	2.10c
Cleveland	2.10c
Detroit, del.	2.20c
Buffalo	2.10c
Sparrows Point, Md.	2.10c
New York, del.	2.34c
Philadelphia, del.	2.27c
Granite City, Ill.	2.20c
Middletown, O.	2.10c
Youngstown, O.	2.10c
Birmingham	2.10c
Pacific Coast ports	2.65c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast ports	3.70c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast ports	4.05c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.55c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.40c	4.00c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 303	No 304
Bars	24.00	26.00	25.00
Plates	27.00	29.00	29.00
Sheets	34.00	36.00	36.00
Hot strip	21.50	27.00	23.50
Cold strip	28.00	33.00	30.00

20% Ni.-Cr. Clad

Plates	18.00*
Sheets	19.00

**Annealed and pickled*

Straight Chromes

	No. 410	No. 416	No. 430	No. 442
Bars	18.50	19.00	19.00	22.50
Plates	21.50	22.00	22.00	25.50
Sheets	26.50	27.00	29.00	32.50
Hot strip	17.00	18.25	17.50	24.00
Cold stp.	22.00	23.50	22.50	32.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c-2.54c
Philadelphia, del.	2.15c
Boston, delivered	2.42c-2.57c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.10c-2.35c
Sparrows Point, Md.	2.10c-2.35c
Claymont, Del.	2.10c-2.35c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast ports	2.65c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	4.00c

Structural Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast ports	2.75c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Roofing Ternes

Pittsburgh base, package 112 *sheets* 20 x 28 *in., coating I.C.*

8-lb.	$12.00	25-lb.	$16.00
15-lb.	14.00	30-lb.	17.25
20-lb.	15.00	40-lb.	19.50

Bars

Hot-Rolled Carbon Bars

Pittsburgh, Chicago, Gary, Cleve., Birm., base 20 tons one size	2.15c
Detroit, del.	2.25c
New York, del.	2.49c
Duluth, base	2.25c
Philadelphia, del.	2.47c
Gulf ports, dock	2.50c
All-rail	2.59c
Pac. ports, dock	2.80c
All-rail	3.25c

Rail Steel Bars

Pitts., Chicago, Gary, Cleveland, Birm., base 5 tons	2.15c
Detroit, del.	2.25c
New York, del.	2.49c
Philadelphia, del.	2.47c
Gulf ports, dock	2.50c
All-rail	2.59c

Pac. ports, dock 2.80c
All-rail 3.25c

Hot-Rolled Alloy Bars

Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size 2.70c
Detroit 2.80c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000.....	0.35	3100.....	0.70
2100.....	0.75	3200.....	1.35
2300.....	1.70	3300.....	3.80
2500.....	2.55	3400.....	3.20
4100 .15-25 Mo.....			0.55
4600 0.20-0.30 Mo.; 1.50-2.00 Ni.			1.20
5100 80-1.10 Cr.....			0.45
5100 Spr. flats.....			0.15
6100 Bars			1.20
6100 Spr. flats			0.85
Carb., Van.			0.85
9200 Spr. flats			0.15
9200 Spr. rounds, squares			0.40
T 1300, Mn, mean 1.51-2.00			0.10
Do., carbon under 0.20 max.			0.35

Cold-Finished Carbon Bars

Pitts., Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs. 2.65c
Detroit 2.70c

Cold-Finished Alloy Bars

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c
Detroit 3.45c
Galveston, add $0.25; Pacific Coast, $0.50.

Turned, Ground Shafting

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c
Detroit 2.70c

Reinforcing Bars (*New Billet*)

Pittsburgh, Chicago, Gary, Cleveland, Birm., Sparrows Point, Buffalo, Youngstown, base..... 2.15c
Gulf ports, dock..... 2.50c
All-rail 2.59c
Pacific ports, dock 2.80c
All-rail 3.25c
Detroit, del. 2.25c

Reinforcing Bars (*Rail Steel*)

Pittsburgh, Chicago, Gary, Cleveland, Birm., base. 2.15c
Gulf ports, dock 2.50c
All-rail 2.59c
Pacific ports, dock..... 2.80c
All-rail 3.25c
Detroit, del. 2.25c

Iron Bars

Philadelphia, com. del. 3.06-3.50c
Pittsburgh, muck bar, .. 5.00c
Pittsburgh, staybolt 8.00c
Terre Haute com., f.o.b. mill 2.15c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails..... $2.55

(Per Pound)

Polished fence staples.. 2.55c
Annealed fence wire.... 3.05c
Galv. fence wire 3.40c
Woven wire fencing (base C. L. column) 67
Single loop bale ties, (base C.L. column) ... 59
Galv. barbed wire, 80-rod spools, base column .. 70
Twisted barbless 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

Alloy Plates (Hot)

Pittsburgh, Chicago, Coatesville, Pa. 3.50c

Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham 2.10c
Detroit, del. 2.20c
Philadelphia, del. 2.42c
New York, del. 2.46c
Pacific Coast ports ... 2.75c
Cooperage hoop, Young., Pitts.; Chicago, Birm.. 2.20c

Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown 2.80c
Chicago 2.90c
Detroit, del. 2.90c
Worcester, Mass. 3.00c

Carbon	Cleve.,	Pitts.
0.26—0.50		2.80c
0.51—0.75		4.30c
0.76—1.00		6.15c
Over 1.00		8.35c

Worcester, Mass. $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown 2.95c
Chicago 3.05c
Detroit, del. 3.05c
Worcester, Mass. 3.35c
Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill $40.00
Relay rails, Pittsburgh 20—100 lbs. 32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham. $40.00
Do., rerolling quality.. 39.00

Cents per pound

Angle bars, billet, mills. 2.70c
Do., axle steel 2.35c
Spikes, R. R. base 3.00c
Track bolts, base 4.75c
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.....65½ off
Do., ⅞ and ⅝ x 6-in. and shorter.....63½ off
Do., ¾ to 1 x 6-in. and shorter .....61 off
1⅛ and larger, all lengths 59 off
All diameters, over 6-in. long .....59 off
Tire bolts .....50 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.
Step bolts .....56 off
Plow bolts .....65 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less.	62	64
⅝-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger..	56	..

Hexagon Cap Screws

Upset 1-in., smaller .....64 off

Square Head Set Screws

Upset, 1-in., smaller.....71 off
Headless set screws.....60 off

Piling

Pitts., Chgo., Buffalo .. 2.40c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural 3.75c
⅛ inch and under.....65-5 off
Wrought wasners, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. .....$4.25 off

Tool Steels

Pittsburgh base, cents per lb.

Carb. Std.. 10.50 Oil-hardening .. 24.00
Carb. Reg. 14.00
Carb. Ext. 18.00 High car.-chr. 43.00
Carb. Spec. 22.00

High Speed Tool Steels

Tung.	Chr.	Van.	Moly.	
18.00	4	1	...	67.00
18.00	4	2	1	77.00
18.00	4	3	1	87.00
1.5	4	1	8.5	54.00
....	4	2	8	54.00
5.50-6.00	4	1.5	4-5.50	57.50

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.	Blk.	Galv.
½	63½	51
¾	66½	55
1—3	68½	57½

Iron

¾	30	10
1—1¼	34	16
1½	38	18½
2	37½	18

Lap Weld

Steel

2	61	49½
2½—3	64	52½
3½—6	66	54½
7 and 8	65	52½

Iron

2	30½	12
2½—3½	31½	14½
4	33½	18
4½—8	32½	17
9—12	28½	12

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

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut-lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½"O.D.	13	$ 9.72	$23.71
1¾"O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼"O.D.	13	13.79	21.68
2¼"O.D.	12	15.16	....
2½"O.D.	12	16.58	26.57
2¾"O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½"O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O.D.	13	$ 7.82	$ 9.01
1¼"O.D.	13	9.26	10.67
1½"O.D.	13	10.23	11.79
1¾"O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼"O.D.	13	14.54	16.76
2¼"O.D.	12	16.01	18.45
2½"O.D.	12	17.54	20.21
2¾"O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½"O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½"O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm..$45.00-46.00
4-in., Birmingham.. 48.00-49.00
4-in., Chicago 56.80-57.80
6-in. & over, Chicago 53.80-54.80
6-in. & over, east fdy. 49.00
Do., 4-in. 52.00
Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00.

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Youngs., Birm., Sparrows Point..$34.00
Duluth (billets) 36.00
Detroit, delivered 36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young, Buffalo, Birm.. 40.00
Duluth 42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point Buffalo, Canton, Chicago. 34.00
Detroit, delivered 36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅜-inch incl. (per 100 lbs.) $2.00
Do., over ⅜ to 41/64-in. incl. 2.15
Worcester up $0.10; Galveston up $0.25; Pacific Coast up $0.50.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt. 1.90c

Shell Steel

Pittsburgh, Chicago, base, 1000 tons of one size, open hearth

3-12-inch $52.00
12-18-inch 54.00
18-inch and over 56.00

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur... $6.00- 6.25
Connellsville, fdry.. 7.00- 7.50
Connell. prem. fdry. 7.25- 7.60
New River fdry. ... 8.00- 8.25
Wise county fdry. .. 7.50
Wise county fur. .. 6.50

By-Product Foundry

Newark, N. J., del... 12.60-13.05
Chicago, outside del. 11.50
Chicago, delivered . 12.25
Terre Haute, del. .. 11.75
Milwaukee, ovens.. 12.25
New England, del... 13.75
St. Louis, del. 12.25
Birmingham, ovens. 8.50
Indianapolis, del. .. 12.00
Cincinnati, del. ... 11.75
Cleveland, del. 12.30
Buffalo, del. 12.50
Detroit, del. 12.25
Philadelphia, del. .. 12.38

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol... 14.00c
Toluol, two degree 27.00c
Solvent naphtha 26.00c
Industrial xylol 26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.) 14.25c
Do. (1000 lbs. or over) 13.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers 7.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia....$30.00

Pig Iron

No. 2 foundry is 1.75-2.25 sil.; 50c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$25.00	$25.50	$24.50	$26.00
Birmingham, Ala.§	20.38	.....	19.38	25.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.00	25.50	24.50	26.00
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	.....	.....	.....
Sharpsville, Pa.	24.00– 24.50	24.00– 24.50	23.50– 24.50	24.50– 25.00
Sparrow's Point, Md.	25.00	.....	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00– 24.50	24.00– 24.50	23.50– 24.50	24.50– 25.00

§Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham†	25.61	.....	25.11	.....
Boston from Birmingham†	25.12	.....	.....	.....
Boston from Everett, Mass.	25.50	26.00	25.00	26.50
Boston from Buffalo	25.50	26.00	25.00	26.50
Brooklyn, N. Y., from Bethlehem	27.50	28.00	.....	.....
Canton, O. from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†24.22	.....	.....	.....
Cincinnati from Hamilton, O.	24.44	25.11	24.61	.....
Cincinnati from Birmingham†	24.06	.....	23.06	.....
Cleveland from Birmingham†	24.12	.....	23.12	.....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	.....
Milwaukee from Chicago	25.10	25.10	24.60	25.60
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	.....	.....
Newark, N. J., from Birmingham†	26.15	.....	.....	.....
Newark, N. J., from Bethlehem	26.53	27.03	.....	.....
Philadelphia from Birmingham†	25.46	.....	24.96	.....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....

Pittsburgh dist.: Add to Neville Island base, North and South Sides, 69c; McKees Rocks, 55c; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, 84c; Monessen, Monongahela City, $1.07; Oakmont, Verona, $1.11; Brackenridge, $1.24.

	No. 2 Fdry.	Malleable	Basic	Bessemer
Saginaw, Mich., from Detroit	26.31	26.31	25.81	26.81
St. Louis, northern	24.50	24.50	24.00	.....
St. Louis from Birmingham	†24.50	.....	23.62	.....
St. Paul from Duluth	26.63	26.63	.....	27.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50, base; $30.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$28.00
Pitts. dist. fur.	23.50	do., del. Chicago	31.34
		Lyles, Tenn., high phos.	28.50

Silvery

Jackson county, O., base, 6.00 to 6.50 per cent $29.50. Add 50 cents for each additional 0.25 per cent of silicon. Buffalo base $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

Manganese differentials in silvery iron and ferrosilicon not to exceed 50 cents per 0.50 per cent manganese in excess of 1 per cent.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00

Second Quality

Pa., Ill., Ky., Md., Mo.	46.55
Georgia, Alabama	38.00
New Jersey	49.00

Ohio

First quality	43.00
Intermediate	36.10
Second quality	36.00

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$31.00
Wire cut	29.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$25.00-$26.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail.	21.00
Do. barge	21.00
No. 2 lump	21.00

Ferroalloy Prices

Ferromanganese, 78-82%, Carlots, duty paid, sbd. $120.00; Carlots, del. Pitts. 125.33; Carlots, f.o.b. Southern furn. 145.00. For ton lots add $10, for less-than-ton lots $13.50, for less than 200-lb. lots $18.

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot.. 36.00

Ferrosilicon, 50%, freight allowed, c.l. 74.50; Do., ton lot 87.00; Do., 75 per cent 135.00; Do., ton lots 151.00. Spot, $5 a ton higher.

Silicomanganese, c.l., 2½ per cent carbon 118.00; 1½% carbon 128.00. Contract ton price $12.50 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.90-2.00

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electric furn., per ton, c. l., 23-26% f.o.b. Mt. Pleasant, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 11.00c; Do., ton lots 11.75c; Do., less-ton lots 12.00c; less than 200 lb. lots. 12.25c

67-72% low carbon:

	Carloads	Ton lots	Less ton
2% carb.	17.50c	18.25c	18.75c
1% carb.	18.50c	19.25c	19.75c
0.10% carb.	20.50c	21.25c	21.75c
0.20% carb.	19.50c	20.25c	20.75c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Molybdenum Oxide, lb. Molyb. cont., 5-20-lb. containers, f. o. b., Washington, Pa., lb. 0.80

Ferrotitanium, 40-45%, lb., con. tl., f.o.b. Niagara Falls, ton lots $1.23; Do., less-ton lots 1.25; 20-25% carbon, 0.10 max., ton lots, lb. 1.35; Do., less-ton lots 1.40. Spot 5c higher

Ferrocolumbium, 50-60% contract, lb. con. col., f.o.b. Niagara Falls $2.25; Do., less-ton lots 2.30. Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, tl., 6-8% carb., carlots, contr., net ton $142.50; Do., spot 145.00; Do., contract, ton lots 145.00; Do., spot, ton lots 150.00

15-18% tl., 3-5% carbon, carlots, contr., net ton 157.50; Do., spot 160.00; Do., contract, ton lots. 160.00; Do., spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c; Do., ton lots 8.00c; Do., less-ton lots 8.50c. Spot ½c lb. higher

Chromium Briquets, contract, freight allowed, lb. carlots, bulk 7.00c; Do., ton lots 7.50c; Do., less-ton lots 7.75c; Do., less 200 lbs. 8.00c. Spot ¼c lb. higher

Tungsten Metal Powder, 98-99 per cent, per lb., depending upon quantity $2.50-2.60

Vanadium Pentoxide, contract, lb. contained $1.10; Do., spot 1.15

Chromium Metal, 98% cr., contract, lb. con. chrome, ton lots 80.00c; Do., spot 85.00c

88% chrome, cont. tons. 79.00c; Do., spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ¼-in., lb. 14.50c; Do., 2% 13.00c. Spot ¼c higher

Silicon Briquets, contract carloads, bulk, freight allowed, ton $74.50; Ton lots 84.50; Less-ton lots, lb. 4.00c; Less 200 lb. lots, lb. 4.25c. Spot ¼-cent higher

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.50c; Ton lots 6.00c; Less-ton lots 6.25c. Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton 102.50; Do., ton 108.00

35-40%, contract, carloads, lb., alloy 14.00c; Do., ton lots 15.00c; Do., less-ton lots 16.00c. Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60; Do., 100-200 lb. lots 2.75; Do., under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: S.A.E. 2300	Cold Drawn Bars: S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.48	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	5.26	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.05	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.52	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	5.50	....	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.00	4.92	3.47	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.30	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.85	5.25	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.18	4.23	4.73	3.54	3.88	8.38	6.98
St. Louis	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.24	4.99	3.61	4.02	8.77	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.80	3.75	....	4.50	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.49	4.49	6.09	4.19	....	5.79	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.93	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	3.75	5.95	5.95	4.10	4.10	5.50	4.20	....	5.25	....	6.90	....	....
Seattle	4.00	4.00	5.20	4.75	4.75	6.50	4.75	7.25	6.00	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	5.00	....	5.75	....	....
Los Angeles	4.15	5.45	7.25	4.95	4.95	7.20	5.10	7.30	6.30	....	6.60	11.35	10.35
San Francisco	4.00	5.20	6.80	4.70	4.70	6.40	4.70	7.20	6.45	....	7.05	11.60	10.60

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	6.65	....	8.75	8.60	9.40
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	9.05
San Francisco	6.05	10.60	9.60	9.45	10.10

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 pounds and over, Portland, Seattle; 400-14,999 Twin Cities; 400-3999 Birmingham; 400 pounds and over in Memphis; Los Angeles, bars over 4-in. wide, 1-in. thick, 4.95c.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Omaha, Kansas City, St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 1 to 1499 in Los Angeles; 300 and over in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; any quantity in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

EUROPEAN IRON, STEEL PRICES

Dollars at $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH Gross Tons f.o.b U.K. Ports	£	s	d
Merchant bars, 3-inch and over	$66.50	16	10	0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20	0	0
Structural shapes	2.75c	15	10	0
Ship plates	2.90c	16	2	6
Boiler plates	3.17c	17	12	6
Sheets, black, 24 gage	4.00c	22	5	0
Sheets, galvanized, corrugated, 24 gage	4.61c	25	12	6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.20	1	10	9

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

		£	s	d
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$25.79	6	8	0(a)
Basic pig iron	24.28	6	0	6(a)
Furnace coke, f.o.t. ovens	7.40	1	16	9
Billets, basic soft, 100-ton lots and over	49.37	12	5	0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14	10	6
Merchant bars, rounds and squares, under 3-inch	3.17c	17	12	0††
Shapes	2.77c	15	8	0††
Ship plates	2.91c	16	3	0††
Boiler plates	3.06c	17	0	6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22	15	0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26	2	6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	23	15	0
Bands and strips, hot-rolled	3.30c	18	7	0

(a) del. Middlesbrough 5s rebate to approved customers. ††Rebate 15s on certain conditions.

Ores

Lake Superior Iron Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	10.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Chinese wolframite, net ton, duty pd.	$24.00-25.00
Brazil iron ore, 68-69%, ord.	7.50c
Low phos. (.02 max.)	8.00c

F.O.B. Rio Janeiro.

Scheelite, imp.	23.50-24.00
Chrome ore, Indian, 48% gross ton	.....

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	.....
So. African, 48%	70.00-72.00
Brazilian, 46%	69.00-71.00
Chilean, 47%	65.00-70.00
Cuban, 50-51%, duty free	.....

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

IRON AND STEEL SCRAP PRICES

Maximum Prices Announced June 18 by Office of Price Administration and Civilian Supply (Gross Tons)

	Pittsburgh, Weirton, Steubenville(a)	Youngstown, Canton, Warren, Sharon	Chicago	Bethlehem	*East. Pa.	Sparrows Pt.	Cleveland	Buffalo	Ashland, Ky., Portsmouth, Middletown, O.	Kokomo, Ind.
No. 1 heavy melting	$20.00	$20.00	$18.75	$18.25	$18.75	$18.75	$19.50	$19.25	$19.50	$18.25
No. 1 hyd. comp. black sheets	20.00	20.00	18.75	18.25	18.75	18.75	19.50	19.25	19.50	18.25
No. 2 heavy melting	19.00	19.00	17.75	17.25	17.75	17.75	18.50	18.25	18.50	17.25
Dealer No. 1 bundles	19.00	19.00	17.75	17.25	17.75	17.75	18.50	18.25	18.50	17.25
Dealer No. 2 bundles	18.00	18.00	16.75	16.25	16.75	16.75	17.50	17.25	17.50	16.25
Mixed borings and turnings	15.25	15.25	14.00	13.50	14.00	14.00	14.75	14.50	14.75	14.25
Machine shop turnings**	15.50	15.50	14.25	13.75	14.25	14.25	15.00	14.75	15.00	14.50
Shovel turnings	16.50	16.50	15.25	14.75	15.25	15.25	16.00	15.75	16.00	15.50
No. 1 busheling	19.50	19.50	18.25	17.75	18.25	18.25	19.00	18.75	19.00	17.75
No. 2 busheling	15.50	15.50	14.25	13.75	14.25	14.25	15.00	14.75	15.00	13.75
Cast iron borings	15.75	15.75	14.50	14.00	14.50	14.50	15.25	15.00	†15.25	14.00
Uncut structurals and plate	19.00	19.00	17.75	17.25	17.75	17.75	18.50	18.25	18.50	17.25
No. 1 cupola	21.00	21.00	20.00	22.50	23.00	22.00	22.00	20.00	21.00	20.00
Heavy breakable cast	19.50	19.50	18.50	21.00	21.50	21.00	20.50	18.50	19.50	18.50
Stove plate	19.00	.....	17.00	18.00	18.50	18.00	18.00	19.00	17.50	16.00
Low phos. billet, bloom crops	25.00	25.00	23.75	23.25	23.75	23.75	24.50	24.25	23.50	23.75
Low phos. bar crops and smaller	23.00	23.00	21.75	21.25	21.75	21.75	22.50	22.25	21.50	21.75
Low phos. punch., plate scrap***	23.00	23.00	21.75	21.25	21.75	21.75	22.50	22.25	21.50	21.75
Machinery cast cupola size††	22.00	22.00	21.00	23.50	24.00	23.50	23.00	21.00	22.00	21.00
No. 1 machine cast, drop broken, 150 pounds and under	22.50	22.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50	21.50
Clean auto cast	22.50	22.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50	21.50
Punchings and plate scrap‡‡	22.00	22.00	20.75	20.25	20.75	20.75	21.50	21.25	20.50	20.75
Punchings and plate scrap§§	21.00	21.00	19.75	19.25	19.75	19.75	20.50	20.25	19.50	19.75
Heavy axle and forge turnings	19.50	19.50	18.25	17.75	18.25	18.25	19.00	18.75	18.00	18.25
Med. heavy elec. furnace turnings	18.00	18.00	16.75	16.25	16.75	16.75	17.50	17.25	16.50	16.75

	St. Louis	Toledo, O.	Detroit	Duluth	Birmingham	Chattanooga	Radford, Va.	New England‡	Pacific Coast§
No. 1 heavy melting	$17.50	$.....	$17.85	$18.00	$17.00	$.....	$.....	$16.50	$14.50
No. 1 hyd. comp. black sheets	17.50	.....	17.85	18.00	17.00	.....	.....	.....	14.50
No. 2 heavy melting	16.50	.....	16.85	17.00	16.00	.....	.....	.....	13.50
Dealer No. 1 bundles	16.50	.....	16.85	17.00	16.00	.....	.....	.....	13.50
Dealer No. 2 bundles	15.50	.....	15.85	16.00	15.00	.....	.....	.....	12.50
Mixed borings and turnings	12.75	.....	13.10	.....	12.25	.....	.....	.....	9.75
Machine shop turnings	13.00	.....	13.35	15.50	15.00	.....	.....	.....	10.00
Shoveling turnings	14.00	.....	14.35	16.50	.....	.....	.....	.....	11.00
No. 1 busheling	17.00	.....	17.35	17.50	16.50	.....	.....	.....	14.00
No. 2 busheling	13.00	.....	13.35	13.50	12.50	.....	.....	.....	10.00
Cast iron borings	13.25	.....	13.60	13.75	12.75	.....	.....	.....	10.25
Uncut structurals and plate	18.50	.....	16.85	17.00	16.00	.....	.....	.....	13.50
No. 1 cupola	20.00	.....	20.35	18.00	20.00	20.50	21.00	22.00	18.00
Heavy breakable cast	18.50	.....	18.85	16.50	18.50	.....	.....	20.50	17.00
Stove plate	17.00	15.60	14.10	.....	17.00	17.50	18.00	14.00	14.00
Low phos. billet and bloom crops	22.50	.....	22.85	23.00	22.00	.....	.....	.....	.....
Low phos. bar crops and smaller	20.50	.....	20.85	21.00	20.00	.....	.....	.....	.....
Low phos. punch. and plate scrap***	20.50	.....	20.85	21.00	20.00	.....	.....	.....	.....
Machinery cast cupola size††	21.00	.....	21.35	19.00	21.00	21.50	22.00	23.00	19.00
No. 1 machine cast, drop broken, 150 pounds and under	21.50	.....	21.85	19.50	21.50	22.00	22.50	23.50	19.50
Clean auto cast	21.50	.....	21.85	19.50	21.50	22.00	22.50	23.50	19.50
Punchings and plate scrap‡‡	19.50	.....	19.85	20.00	19.00	.....	.....	.....	.....
Punchings and plate scrap§§	18.50	.....	18.85	19.00	18.00	.....	.....	.....	.....
Heavy axle and forge turnings	17.00	.....	17.35	17.50	16.50	.....	.....	.....	14.00
Medium heavy elec. furnace turnings	15.50	.....	15.85	16.00	15.00	.....	.....	.....	12.50

*Claymont, Del., Coatesville, Phoenixville, Harrisburg, Pa. ‡Worcester, Mass.; Bridgeport, Conn.; Phillipsdale, R. I. §Los Angeles, San Francisco, Seattle; ***⅝-inch and heavier, cut 12 inches and under; ††may include clean agricultural cast; ‡‡under ⅜-inch to ¼-inch, cut 12 inches and under; §§under ¼-inch to No. 12 gage, cut 12 inches and under. **Alloy, W. Va., base $17.60. †Base price at Portsmouth; Middletown 25 cents less; no price at Ashland.

Maximum Prices for Iron and Steel Scrap Originating from Railroads

	Pittsburgh, Wheeling, Johnstown, Steubenville	Youngstown, Canton, Sharon	Chicago	Kokomo, Ind.	*East. Pa.	Sparrows Pt.	Cleveland	Buffalo	Ashland, Ky., Portsmouth, Middletown, O.
No. 1 Railroad grade heavy melting steel	$21.00	$21.00	$19.75	$19.25	$19.75	$19.75	$20.50	$20.25	$20.50
Scrap rails	22.00	22.00	20.75	20.25	20.75	20.75	21.50	21.25	21.50
Rerolling quality rails	23.50	23.50	22.25	21.75	22.25	22.25	23.00	22.75	23.00
Scrap rails 3 feet and under	24.00	24.00	22.75	22.25	22.75	22.75	23.50	23.25	23.50
Scrap rails 2 feet and under	24.25	24.25	23.00	22.50	23.00	23.00	23.75	23.50	23.75
Scrap rails 18 inches and under	24.50	24.50	23.25	22.75	23.25	23.25	24.00	23.75	24.00

	St. Louis	Kansas City	Detroit	Duluth	Birmingham	Minnequa, Colo.	Radford, Va.	New England‡	Pacific Coast§
No. 1 Railroad grade heavy melting steel	$18.50	$17.00	$18.85	$19.00	$18.00	$17.50	$.....	$.....	$15.50
Scrap rails	19.50	18.00	19.85	20.00	19.00	18.50	.....	.....	16.50
Rerolling quality rails (a)	21.00	19.50	21.35	21.50	20.50	20.00	.....	.....	18.00
Scrap rails 3 feet and under	21.50	20.00	21.85	22.00	21.00	20.50	.....	.....	18.50
Scrap rails 2 feet and under	21.75	20.25	22.10	22.25	21.25	20.75	.....	.....	18.75
Scrap rails 18 inches and under	22.00	20.50	22.35	22.50	21.50	21.00	.....	.....	19.00

*Philadelphia, Wilmington, Del.; ‡Worcester, Mass.; Bridgeport, Conn.; Phillipsdale, R. I. §Los Angeles, San Francisco, Seattle.

NOTE: Where the railroad maker of scrap operates in two or more of the consuming points named above, the highest of the maximum prices set out above for such basing points shall be the maximum price at consumer's plant at any point on the railroad's line. (a) Re-laying quality $5 higher.

Sheets, Strip

Sheet & Strip Prices, Pages 90, 91

Sheet fabricators continue to press for defense work so as to better their chances for obtaining steel supplies. Some of the switchboard manufacturers, particularly those manufacturing the larger units used in industrial operations, have been able, by making out a sworn affidavit as to the character of their requirements, to obtain A-10 ratings. Such ratings are the lowest on the defense list, but nevertheless provide the recipients with some relief.

Stove manufacturers have received a set back by a ruling from Washington that stoves being manufactured for federal housing projects have not a priority status.

More volume is being done on an f.o.b. mill basis with prices somewhat higher than listed quotations due to higher freight. State highway departments are considering plans for the conserving of sheets in 1943 automobile registration plates. Massachusetts will probably use the same plates now being produced for 1942 licenses, adopting the Connecticut system by which the year figure is inserted in a slot, being stamped on a small disk. For next year tags, 750 tons have been delivered at the Charlestown, Mass. state prison and 100 tons more are due.

Narrow cold strip volume carries an increasing number of priorities for defense needs with supplies for civilian products tightening. Bookings during July were slightly under those of recent months, but still ahead of production, although the spread between new tonnages and shipments is narrowing.

Plates

Plate Prices, Page 90

One large plate maker was forced to cancel all non-priority orders on sheared plates because of the pressure of defense, with diversion of the tonnage to submarine net tenders mentioned as an important reason. However this company will still make good on reasonable tonnages of universal plates and plates made on strip mills.

It is believed that the time is not far off when a government agency will take complete charge of allocations of plates, the same as has been noted in reinforcing bars where 40,000 tons were allotted recently.

At Boston, ship-building and small tanks account for the bulk of plate buying and releases. Deliveries for the former are prompt and yards in most instances have accumulated fair reserves while for tanks, notably for defense needs, plate shipments are improving, scarcity of light material easing somewhat. Boiler shops, with substantial orders, are operating on a hand-to-mouth basis in numerous instances, but structural shops are not placing much business. Jobbers striving to round out inventories are feeling the pinch probably as much as any class of buyer.

Republic Steel Corp. was recently

awarded an armor plate contract involving $8,632,500.

A strong demand for plate ends rules particularly from jobbers, who have no special defense rating. Normally the market is about $10 a ton under regular prices for plates sheared to specification. Now plate ends range anywhere from $35 to $42 a ton, base, which latter price is the equivalent to the regular market.

PLATE CONTRACTS PLACED

200 tons, 3,000,000-gallon steel reservoir, Scott Field, Belleville, Ill., to Chicago Bridge & Iron Co., Chicago, $52,510; bids June 16, U. S. engineer, St. Louis.

100 tons, 300,000-gallon water tank, Fort Benjamin Harrison, Ind., to Pittsburgh-Des Moines Steel Co., Pittsburgh, $36,200.

PLATE CONTRACTS PENDING

200 tons, storage tank naval depot, Melville, R. I.

175 tons, 400,000-gallon elevated steel tank, advanced flying school, Columbus, Miss.; bids July 28, U. S. engineer, Mobile, Ala.

Bars

Bar Prices, Page 90

Of all finished steel products, alloy and carbon bars rate highest in percentage as to defense consumption, possible exception being plates. The ratio is increasing and for alloys current defense contracts, small arms leading, account for better than 90 per cent of consumption. Most new orders and releases take high priority ratings, but this preferential protection is losing some force due to the hundreds of priority orders being handled by mills. Forging shops having consumed more tonnage than was delivered for some weeks, are increasing releases. Machine tool builders and small tool producers are active buyers of specialties and tool steel demand is holding far above normal.

Pipe

Pipe Prices, Page 91

Chances of buying mechanical tubing, even for defense work, are often slim because several makers are concentrating on pressure tubing for boilers. A non-defense user of mechanical tubing, such as bicycle manufacturers, finds supplies most difficult. Leading steel tubing makers seem to have plenty of stock of raw materials but lack the finishing capacity to handle the large volume of business, which is different from many where raw materials are the bottleneck. One of the largest orders for marine boilers at one time was placed recently and divided among three makers, this requiring almost unprecedented tonnages of boiler tubes.

CAST PIPE PLACED

1580 tons, mostly 12-inch, Waterbury, Conn., to United States Pipe & Foundry Co., Burlington, N. J.; Malcolm Pirnie, New York, engineer.

1500 tons, mostly 16-inch, Kennebec Water District, Waterville, Me., to R. D. Wood & Co., Florence, N. J.

500 tons, 10-inch, Brattleboro, Vt., to R. D. Wood & Co., Florence, N. J.

480 tons, 8 and 16 in., Avalon Way improvement, Seattle, to Hugh G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

325 tons, Sand Point and No. 195th street improvements, Seattle, to Hugh G. Purcell, Seattle.

300 tons, 2 to 12 in. Shelton, Wash., improvement, to Hugh G. Purcell, Seattle.

125 tons, 6 and 8-inch, water line extensions, Boston harbor defenses, to Warren Pipe Co., Everett, Mass.

CAST PIPE PENDING

150 tons, 6 and 8 in. for Pasco, Wash.; Hugh G. Purcell, Seattle, low.

140 tons, 6 and 8-inch, Fort Benning, Ga.; bids July 30, inv. 6406-40, constructing quartermaster.

Unstated, 12,500 ft. pipe conduit; bids opened at Puget Sound Navy yard, July 22.

Unstated, 10 in. line for Willapa river; bids to South Bend, Wash., July 28.

STEEL PIPE PLACED

125 tons, steel pipe and fittings, water supply lines, Southern Pacific relocation, Central Valley project, California, Bureau of Reclamation, Denver, to California Corrugated Culvert Co., Berkeley, Calif.; bids July 10, Denver.

Wire

Wire Prices, Page 91

Relatively high ratio of specialties included in New England wire mill backlogs involving long processing and uncertain supplies of wire rods offers a major production and delivery problem. Finishing schedules are also subject to increasing influence of defense contract priorities. Buying is well maintained, but with mills averaging 50 per cent of production for defense, other

consumers are confronted by extended deliveries. Demand for Bessemer stock is strong, notably for screw machine and threaded work. Mill backlogs are not being materially lowered, although the increase in unfilled orders has slackened slightly. Less tonnage is going to the automobile industry despite heavy pressure for deliveries against unfilled committments still due car and parts makers.

Bids close Aug. 1 on 155 tons bright common wire nails for Panama under sch. 5345, Washington.

Rails, Cars

Track Material Prices, Page 91

One of the worst delinquents from standpoint of freight car supply, the Missouri-Kansas-Texas Railway, has announced an extensive rebuilding and repairing program in its own shops. Thus it will rebuild 2000 box cars, 500 seventy-ton gondolas and 52 fuel oil tank cars. In addition, it will repair 200 self-clearing coal cars and construct 60 new cabooses and 200 work cars. This will give the carrier 6966 cars in condition for Class A loading. The company is turning out an average of 15 locomotives a month, on completion of which 85 per cent of its 310 locomotives will be in Class A condition.

The difficulty of buying rails is shown in the experience of the army ordnance department which wished 4000 tons of relayers for the shell-loading plant at Ravenna, O. It was unable to buy them and finally tried to place an order for 2000 tons of new billet rails, though had to exert pressure to get this tonnage placed.

Locomotive buying is being maintained at a better rate than car demand. The latest and most sizable order involved ten 2-8-4 type steam engines for the Wheeling & Lake Erie and eight 4-6-6-4 type steam engines for Clinchfield, both orders going to the American Locomotive Co., New York. National Railways of Mexico have increased their inquiry for steam locomotives to 40, by adding eight 2-8-0 type and six 4-8-0 type locomotives. The other locomotives on inquiry comprise 20 4-8-4 type and six 2-6-6-2 type locomotives.

CAR ORDERS PLACED

Akron, Canton & Youngstown, 15 70-ton covered hopper cars, to American Car & Foundry Co., New York.

Chicago, Aurora & Elgin, 10 interurban cars, to St. Louis Car Co., St. Louis.

Chicago & Northwestern, 700 50-ton steel-sheathed box cars, to American Car & Foundry Co., New York.

Minneapolis, St. Paul & Sault Ste. Marie, five 70-ton steel hopper cars, to American Car & Foundry Co., New York.

Missouri & Arkansas, 100 50-ton steel-sheathed wood lined box cars, to American Car & Foundry Co., New York.

Missouri-Kansas-Texas, 2000 box cars and 500 seventy-ton gondolas, to be rebuilt in own shops; also repairing of 200 self-clearing coal cars, construction of 60 new cabooses and rebuilding 52 company fuel oil tank cars, in own shops; also 200 work cars.

New York, New Haven & Hartford, 50

steel caboose cars, to Pullman-Standard Car Mfg. Co., Chicago.

Pullman Co., 170 sleeping cars, to Pullman-Standard Car Mfg. Co., Chicago.

Wabash, 100 70-ton drop end gondolas, to own shops.

Western Maryland, four depressed center flat cars, to its own shops.

CAR ORDERS PENDING

Missouri Pacific and its affiliated lines, the Gulf Coast Line, International-Great Northern and Missouri-Illinois, 2850 freight cars, bids asked; list comprises 1200 50-ton box cars, 40 feet 6 inches long, and 250 50-ton box cars, 50 feet 6 inches long; 650 50-ton and 50 70-ton gondolas; 500 70-ton hoppers and 50 50-ton covered hoppers; and 150 50-ton flats.

St. Louis Southwestern, 250 fifty-ton box cars; bids asked.

LOCOMOTIVES PLACED

Boston & Maine, two 44-ton diesel-electric switch engines, to General Electric Co., Schenectady, N. Y.

The Clinchfield, eight 4-6-6-4 type steam engines, to American Locomotive Co., New York.

Ohio & Morenci, one 35-ton Diesel-electric switch engine, to Davenport Besler Corp., Davenport, Ia.

Terminal Association of St. Louis, four 666 h.p. diesel switching engines, costing $785,000, divided equally between Baldwin Locomotive Works and American Locomotive Co.

War Department, nine 45-ton Diesel-electric switch engines, to the Davenport Besler Corp., Davenport, Ia.

Wheeling & Lake Erie, ten 2-8-4 type steam engines, to American Locomotive Co., New York.

LOCOMOTIVES PENDING

National Railways of Mexico, eight 2-8-0 type and six 4-8-0 type locomotives, bids asked; these are in addition to 20 4-8-4 type and six 2-6-6-2 type locomotives previously noted.

RAIL ORDERS PENDING

2000 tons new rails, army ordnance, for use at shell-loading plant, Ravenna, O., probably to be divided equally between Carnegie-Illinois and Bethlehem companies. Originally sought 4000 tons of relayers.

BUSES BOOKED

The a.c.f. Motors Company, announces receipt of orders for fourteen motor coaches powered with the Hall-Scott horizontal engine: five for Queens-Nassau Transit Lines Inc., Woodside, Long Island, N. Y.; two for Rapid Transit Inc., Saugus, Mass.; four air-conditioned motor coaches for Carolina Coach Company, Raleigh, N. C.; and three air-conditioned motor coaches for Quaker City Bus Company, Ocean City, N. J.

Structural Shapes

Structural Shape Prices, Page 90

Some estimate that 85 per cent of the building for defense plants, cantonments, etc. has been completed, or at least contracted, indicating that some falling off may come. However exact percentages are impossible to compute accurately because of such revisions of plans. Many plants have had additions three or four times when it was expected the first addition would be sufficient.

When the end of the defense building has at last been reached much nondefense work, held back because of priorities, will emerge and keep business on an even keel. Defense has so keyed up America that it will be discontented with many existing structures, such as bridges and engineering works.

It was estimated last week tentatively that extensions to the Cleveland airport, including testing laboratories, will eventually require 5000 tons. Projects in the 1000-ton or better class are still fairly numerous.

Allocations of plain material for ship construction and car building are heavier, making production schedules to meet regular building work through fabricating shops more difficult. Structural mill rollings through June, July and August are geared at approximately 400,000 tons monthly with leeway of near 25,000 tons which has not been utilized. By the end of August at the current rate of bookings unfilled plain shape tonnage is estimated to be around 700,000 tons and indications, subject to unforeseen developments, fabricating shops will

SHAPE AWARDS COMPARED

	Tons
Week ended July 26	34,155
Week ended July 19	35,030
Week ended July 12	14,252
This week 1940	45,939
Weekly average, 1941	36,418
Weekly average, 1940	28,414
Weekly average, June, 1941	27,157
Total to date, 1940	607,964
Total to date, 1941	942,944

Includes awards of 100 tons or more.

handle close to 2,700,000 tons this year. This is below the peak year of 1929. The fabricating industry, while some shops are operating at capacity, could take on more work were orders and plain material available. This applies notably to the lower capacity group.

Numerous instances are heard of substitution of stone or wood for piling. In New England on fabricated structurals fabricating shops promise delivery and erection in around four months. Smaller units can do better, though hard put to attain full range of sizes in plain material.

SHAPE CONTRACTS PLACED

8000 tons, power plant, Philadelphia, Philadelphia Electric Co., to American Bridge Co., Pittsburgh.

5000 tons, plant at Lester, Pa., for Westinghouse Electric & Mfg. Co., to Bethlehem Steel Co., Bethlehem, Pa.

3500 tons, building addition, Bell Aircraft Corporation, Niagara Falls, N. Y., to the Bethlehem Steel Co., Buffalo, through Austin Co., Cleveland.

2500 tons, turbine shop, General Electric Co., at Erie, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

2500 tons, including 1500 tons H-section bearing piles and 1000 tons steel sheet piling, dry dock and auxiliary structures, navy yard, Portsmouth, N. H., former to Bethlehem Steel Co., Bethlehem, Pa., and sheet piling to Carnegie-Illinois Steel Corp., Pittsburgh; Aberthaw Co., Boston, contractor.

2000 tons, plant building, Allegheny-Ludlum Steel Corp., Dunkirk, N. Y., to Ingalls Iron Works Co., Birmingham.

1500 tons, terminal market building, Brooklyn, N. Y., to Harris Structural Steel Co., New York, through Federal Construction Co., New York.

1150 tons, station addition, United Illuminating Co., Bridgeport, Conn., to American Bridge Co., Pittsburgh.

1030 tons, building, Champion Machine & Forging Co., Cleveland, to Berger Iron Works, Akron, O.

655 tons, warehouse, Wichita, Kans., for Defense Plant Corp., to Kansas City Structural Steel Co., Kansas City, Kans.; Austin Co., Chicago, contractor; bids July 5.

550 tons, camouflage plant, Boeing Aircraft Co., Seattle, Wash., to Wisconsin bridge & Iron Co., Milwaukee.

450 tons, boiler house, Indianapolis, Defense Plant Corp., to American Bridge Co., Pittsburgh.

400 tons, grade separation, Painesville, O., for state, to American Bridge Co., Pittsburgh.

380 tons, state highway bridge, Oneida county, New York, to American Bridge Co., through Davis & Stearns Inc., Whitesboro, N. Y.

330 tons, bridge, Ithaca, N. Y., to American Bridge Co., Pittsburgh.

330 tons, Riverview Drive grade crossing elimination, Totown, N. J., for state, to American Bridge Co., Pittsburgh.

310 tons, extension, wire bar department, Laurel Hill, N. Y., for Phelps Dodge Manufacturing Co., to American Bridge Co., Pittsburgh.

300 tons, building, American Can Co., Newark, N. J., to Drier Structural Steel Co. Inc., New York, through Turner Construction Co., New York.

287 tons, buildings, Boeing Airplane Co., Cornell, Kans., through Defense Plant Corp., to Kansas City Structural Steel Co., Kansas City, Kans.; Austin Co., Chicago, contractor.

265 tons, Maine avenue underpass, Washington, for District of Columbia, to American Bridge Co., Pittsburgh.

265 tons, state highway bridge, Kingman county, Kansas, to George C. Christopher & Son Iron Works, Wichita, Kans.; bids June 11.

249 tons, Forest street bridge, No. 5962, St. Paul, for state, to Bethlehem Steel Co., Bethlehem, Pa.

225 tons, Pennsylvania Railroad bridge over route 30, East Union, O., for state, to American Bridge Co., Pittsburgh.

210 tons, bridge, New York Central railroad, 43rd street, Chicago, to American Bridge Co., Pittsburgh.

200 tons, bridge, Dayton, Ill., for La Salle county, to American Bridge Co., Pittsburgh.

200 tons, building 12, E. I. du Pont de Nemours & Co. Inc., Niagara Falls, N. Y., to Ernst Iron Works, Buffalo.

185 tons, quartermaster warehouse, Seattle, to Wisconsin Bridge & Iron Co., Milwaukee; Western Construction Co., Seattle, contractor.

169 tons, state bridge 538, Dancy, Portage County, Wisconsin, to Wausau Iron Works, Wausau, Wis.; P. W. Ryan Sons Co., contractor; bids June 17.

160 tons, barge canal bridge, No. 10.62, Waterford, N. Y., for Delaware & Hudson railroad, to American Bridge Co., Pittsburgh.

150 tons, one A. C. hangar, Ellington Field, Texas, to Star Mfg. Co., Oklahoma City, Okla.; Claude Everett Inc., Houston, Tex., contractor; bars to Pedin Iron & Steel Co., Houston.

140 tons, underpass, FAGM-44-(2), Mandan, N. D., for state, to Minne-

apolis-Moline Power Implement Co., Minneapolis.

130 tons, highway bridge, Skowhegan, Me., for state, to American Bridge Co., Pittsburgh.

125 tons, two buildings, Aluminum Co. of America, Lafayette, Ind., to Bedford Foundry & Machine Co., Bedford, Ind.; A. E. Kemmer, Lafayette, Ind., contractor.

110 tons, East Clinton street bridge, Buffalo, to American Bridge Co., Pittsburgh.

100 tons or more, additional facilities, naval air station, Anacostia, D. C., to Fort Pitt Bridge Works, Pittsburgh; Skinker & Garrett, Washington, contractor; reinforcing bars to Rosslyn Steel & Cement Co., Rosslyn, Va.

100 tons or more, additional expansion, small arms ammunition plant, St. Louis, for U. S. Cartridge Co. of Baltimore, to Bethlehem Steel Co., Bethlehem, Pa.; Fruco Construction Co. & Associates, St. Louis; reinforcing bars to Laclede Steel Co., St. Louis.

SHAPE CONTRACTS PENDING

20,000 tons, buildings, army air base, Rome, N. Y., Turner Construction Co. and Carlton Construction Co., New York, joint contractors.

15,000 tons, estimated, buildings, ordnance depot, near Seneca Falls, N. Y.; Poitier & McLane Corp., New York, contractor.

12,000 to 20,000 tons, air depot, Oklahoma City, Okla.

3500 tons, propeller plant, Toledo, O., American Propeller Corp.

2750 tons, turbine shop No. 17, Erie, Pa., Defense Plant Corp.

2750 tons, warehouses and miscellaneous buildings, signal depot, Avon, Ky; bids rejected April 15 by constructing quartermaster, McClelland Field, Lexington, Ky.

2730 tons, extension of pump and blower and sludge disposal building, West-Southwest sewage treatment works, Division Q, Chicago, for city of Chicago sanitary district; bids Aug. 14.

2000 tons or more, steel transmission towers, Bonneville project 230 kv lines; American Bridge Co., Pittsburgh, low, $2,042,847.

1500 tons, buildings, National Carbon Co., Clarksburg, W. Va. and Niagara Falls, N. Y.

1300 tons, stock house, Brooklyn, N. Y., Schaefer Brewing Co.

1100 tons, building, Hopedale, Mass., Draper Corp.

1000 tons, structurals and miscellaneous steel caisson, for drydock No. 1, navy yard, Charleston, S. C.; Dravo Corp., Pittsburgh, only bidder to yards and docks, navy dept., July 23.

825 tons, four warehouses, Lowry Field, Colorado; Peter Seerie, Denver, Colo., contractor.

600 tons, estimated, auditorium and laboratory, Motor Transport school, Holabird quartermaster depot, Baltimore; Henry W. Horst Co., Philadelphia, awarded contract at $468,500.

513 tons, steel sheet piling, U. S. engineer, Binghamton, N. Y.; bids in, sch. 2.

500 tons, technical service building, Cleveland, for U. S. Government.

400 tons, plant Carborundum Co. Ltd., Niagara Falls, Ont.

400 tons, warehouse, Wayne county, Michigan, for diesel engine division, General Motors Corp.

400 tons, steel sheet piling, flood walls, dikes and pumping stations, Merrimack river flood control project, Lowell, Mass.; John L. Washburne, Inc., New York, low, $304,589.03, bids July 16 to U. S. engineer Lt.-Col. L. B. Gallagher, Boston.

375 tons, roof trusses and beams, inv. 699-42-6, Ft. Rodman, New Bedford, Mass., U. S. engineer.

350 tons, building, Jeffersonville, Ind., Colgate-Palmolive-Peet Co.

330 tons, building, St. Michaels hospital, Newark, N. J.

320 tons, warehouse, aircorps, Wright field, Dayton, O., U. S. engineer.

310 tons, gate frames and gates, river outlets, dam, Friant, Calif., for U. S. Bureau of Reclamation.

300 tons, structural steel and H-piling, Panama sch. 5264; Frank M. Weaver Co., Lansdale, Pa., low on shapes and U. S. Steel Export Co. on H-piling; bids July 16.

280 tons, building, Cleveland Pneumatic Tool Co., Cleveland; revived project.

270 tons, bridge FAP-147 (3), Cut Bank, Mont., for state.

255 tons, Mile Brook bridge, Winslow, Me., for state.

240 tons, miscellaneous materials building, No. 3, Brooklyn, N. Y., for navy.

210 tons, substation and signal tower, route 49, Brooklyn, N. Y., for New York City.

205 tons, bridge, Redfield, S. D., for state.

200 tons, bridge, Weber river, Wyo., for Union Pacific railroad.

200 tons, building, Brewster Aircraft Co., Hatboro, Pa.

190 tons, bridge, Lieutenant river, Old Lyme, Conn., for New Haven railroad.

175 tons, boiler supports, Rivesville, W. Va., for Mon. W. Penn. Pub. Service Co.

160 tons, burning and welding shop,

Wilmington, Del., Pusey & Jones Corp.

150 tons, plant, Charles Lenning Co., Philadelphia; bids July 28.

145 tons, structural steel edge armor; bids July 28, U. S. engineer, Cincinnati, inv. 2.

140 tons, oven material, Chester, Pa., for Philadelphia Electric Co.

130 tons, addition, Fruit Exchange building, Cincinnati, for Southern Railway Co.

125 tons, Ephraim Gardner Kimball school, Washington, D. C.; T. Calvin Owens, Bethesda, Md., low.

120 tons, highway and railway spans, Raton, N. Mex., for state.

115 tons, gate frames and anchorage, Shasta dam, Coram, Calif., for U. S. Bureau of Reclamation.

100 tons, warehouse, Allied Kid Co., Wilmington, Del.; bids July 25.

100 tons, technical school, Ardmore, Pa.; bids July 28.

100 tons or more, two taintor gates and crane; bids to Northern Idaho REA, Sandpoint, Idaho, July 29.

Unstated, three small railroad bridges for Seattle light department; bids July 31.

Unstated, 175-ton electric traveling crane; bids to Bonneville project, Portland, Aug. 5; No. 2099.

Unstated tonnage, 109 electrically operated capstans, various yards, Bureau of Yards and Docks, spec. 10477, Washington; only bid by Enterprise Engine & Foundry Co., San Francisco, rejected; to be readvertised with some modification of plans.

Reinforcing Bars

Reinforcing Bar Prices, Page 91

Reinforcing business has dropped to almost a dribble, and except for defense tonnage is likely to remain at this level for some time. Probably requirements of many private construction jobs and public works will not be satisfied. Last week's government allocation of 40,000 tons in defense construction, and similar allocations to come will pinch sharply. Bar producers are not yet informed as to what jobs are involved in their respective allocations and are unable to proceed on individual jobs until details are supplied.

REINFORCING STEEL AWARDS

6400 tons, superstructure, Fort Green housing project, Brooklyn, N. Y., to Fireproof Products Co., through subcontractor group.

4600 tons, drydocks, Nos. 5 and 6, navy yard, Brooklyn, N. Y., to Bethlehem Steel Co., through Drydock Associates Inc., New York.

3650 tons, ordnance storage depot, near Seneca Falls, N. Y., to Truscon Steel Co., through Poirier & McLane Corp., New York.

2860 tons, Guyandotte flood wall, Huntington, W. Va., U. S. engineer, to West Virginia Rail Co.; Midwest Construction & Asphalt Co., contractor.

1500 tons, warehouse, Watertown, Mass. arsenal, pro. 6283-A, to Concrete Steel Co., Boston; Edmund J. Rappoli Co. Inc., Cambridge, Mass., contractor; Consolidated Iron Co., Malden, Mass., awarded 60 tons structural steel.

1200 tons, Yorktown mine depot requirements, Norfolk, Va., to Bethlehem Steel Co., Bethlehem, Pa., through Virginia Steel Co., Virginia Engineering Co., and Wise Construction Co.

1000 tons, dry dock and auxiliary structures, navy yard, Portsmouth, N. H., to Bancroft & Martin Rolling Mills Co., Portland, Me.; Aberthaw Co., Boston, contractor.

700 tons, grain elevators, Buffalo, N. Y., Standard Milling Co., divided between Republic Steel Corp. and Jones & Laughlin Steel Corp., Pittsburgh.

650 tons, plane engine test building, Studebaker Corp., South Bend, Ind., to Ceco Steel Products Corp., Chicago; Consolidated Construction Co., Chicago, contractor; bids July 10. As previously reported (STEEL, June 16) an additional 800 tons purchased direct by Studebaker as follows: 500 tons to Inland Steel Co., Chicago, and 300 tons to Carnegie-Illinois Steel Corp., Chicago.

500 tons, Panama Canal sched. 5279, to Youngstown Sheet & Tube Co., Youngstown, O.

300 tons, U. S. Engineer, Omaha, Nebr., to Ceco Steel Products Corp., Omaha, sch. 225.

300 tons, Coca Cola bottling plant, Bethlehem, Pa., to Bethlehem Steel Co.; Ralph S. Herzog, contractor.

200 tons, administration building, arsenal, Rock Island, Ill., to Inland Steel Co., Chicago; Priester Construction Co., Davenport, Ia., contractor; Bethlehem

CONCRETE BARS COMPARED

	Tons
Week ended July 26	25,653
Week ended July 19	14,972
Week ended July 12	15,360
Week ended July 5	5,437
This week, 1940	15,420
Weekly average, 1941	11,781
Weekly average, 1940	9,661
Weekly average, June, 1941	11,277
Total to date, 1940	252,569
Total to date, 1941	365,202

Includes awards of 100 tons or more.

Steel Co., Bethlehem, Pa., awarded 50 tons structural steel.

285 tons, navy yard, Boston, to Youngstown Sheet & Tube Co., Youngstown, O., through Stone & Webster.

235 tons, mesh, state highway project RC-41-28, Madison-Bridgewater, part 1, Oneida county, New York, to American Steel & Wire Co., New York; Davis & Stearns Inc., Whitesboro, N. Y., contractor, $306,278.80; bids July 16, Albany.

200 tons, J. Fenimore Copper high school, New York, to Jones & Laughlin Steel Corp., through Fireproof Products Co.

160 tons, St. Mary's hospital, Rochester, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; D. J. Meagher Co., Rochester, contractor.

150 tons, Rawleigh Coca Cola plant, Beckley, W. Va., to West Virginia Rail Co.

126 tons, overpass, Chicago, Burlington & Quincy railroad, Burlington, Iowa, to Sheffield Steel Corp., Kansas City, Mo.

120 tons, overpass, C. B. & Q., Des Moines, Iowa, to Sheffield Steel Corp.

117 tons, WPA 22517, Connersville, Ind., to Truscon Steel Co., Youngstown, O.

100 tons, grade elimination, D. L. & W. Totown, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, U. S. Coast Guard facilities, Baltimore, to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, state highway project, including bridge, Northbridge, Mass., to Northern Steel Co., Medford, Mass.; Carlo Bianchi, Framingham, Mass., contractor.

REINFORCING STEEL PENDING

10,000 tons, Army air base, Rome, N. Y.

2300 tons, three Federal housing projects, Philadelphia: Queen Lane, 1000 tons; Barteam Gardens, 1000 tons and Oxford Circle, 300 tons; bids July 24.

1900 tons, Panama, sch. 5344; bids Aug. 8, General Purchasing officer, Washington.

1200 tons, picnic acid plant, Marche, Ark.; Lummus Co., contractor.

750 tons, mesh, state highway projects, New York; bids Aug. 6, Albany, bulk of Allegheny and Washington counties.

650 tons, elevator addition, Standard Milling Co., Buffalo, McKenzie-Hauge, Minneapolis, contractor and designing engineer.

500 tons, Panama, sch. 5279, Youngstown Sheet & Tube Co., Youngstown, low.

405 tons, highway project, Natches Trace Park, Mississippi; bids Aug. 7, Office of Public Roads Adm., Vicksburg, Miss.

400 tons, expansion, Maryland Drydock Co., Baltimore.

400 tons, tractor warehouse, J. I. Case Co., Racine, Wis.; bids July 17.

400 tons, turbine manufacturing plant, Erie, Pa., General Electric Co.; United Engineers and Construction Co., contractor.

300 tons, aircraft plant, Fleetwings Inc., Bristol, Pa.

300 tons, sewage disposal plant, Ford Motor Co., Ypsilanti, Mich.

300 tons, U. S. army warehouses, Wright field, Ohio; F. Nessner & Sons, contractors.

300 tons, two army air corps storage buildings, Patterson field, Ohio; J. I. Barnes, contractor.

240 tons, engine test torque stand, Wright field, Ohio; Simpson Construction Co., contractor.

220 tons, navy yard requirement, 86 (42) NSAF, Portsmouth, Va.

200 tons, Broadlawn hospital, Des Moines, Iowa.

200 tons, power plant, Ford Motor Co., Dearborn, Mich.

200 tons, state bridges, Maine; taking estimates, State Highway Commission.

160 tons, building addition, Draper Corp., Hopedale, Mass.

150 tons, state highway project, Northampton street, Holyoke, Mass.; bids July 29, R. W. Coburn, chief engineer, Department of Public Works, Boston.

147 tons, State street subway, contract T-1, Chicago, for city; bids July 24.

105 tons, steel angles, etc.; bids to Bonneville project, July 18.

100 tons, state girder bridge, King county, Washington; Colonial Construction Co., Spokane, contractor.

Unstated, two state subways, Portland, Oreg.; Edlefsen & Weygandt, Portland, low.

Unstated, state bridges in Clatsop, Lincoln and Washington counties, Oregon; Frank Watt Construction Co. and C. J. Eldon, Portland, low.

Tool Steel Scrap

Cents per pound, to consumers f.o.b. shipping point

Tungsten types

For each 1% tungsten contained

Solid scrap containing over 12% ... 1.80c

Solid scrap containing 5 to 12% 1.60

Turnings, millings containing over 12% 1.40

Turnings, millings, solids under 5% .1.25

Molybdenum Types

Solid scrap, not less than 7% molybdenum, 0.50 vanadium..... 12.50

Turnings, millings, same basis... 10.50

Solid scrap, not less than 3% molybdenum, 4% tungsten, 0.50 vanadium 13.50

Turnings, millings, same basis..... 11.50

Scrap

Scrap Prices, Page 94

The supply situation is becoming worse fast and the trade has to revise its ideas constantly on the pessimistic side. Thus Chicago notes that the volume of scrap moving today is estimated at 40 or 50 per cent below a month ago, yet Chicago is supposedly adjacent to the reported great reservoirs of country scrap, reports which many doubt. Railroads are offering much less than usual despite their own brisk program of buying rolling stock and rails which might impl" releasing scrap. It is possible, of course, that the carriers are paying for their new steel partly with old steel.

The long severe drain on American scrap supplies these several years is felt today. Thus when a few years back heavy melting steel reached $26 at Pittsburgh there was an unusual effort to bring out scrap from hidden places, even to the extent of raising ships sunk in harbors. This and heavy exports these many years have wiped out much of the potential supply.

St. Louis reports that an important steel mill there has only a week's supply, with others having two to four weeks, which is light for these times. From several centers come reports of circumventing the ceiling prices, or "cheating" as some call it frankly. There is a feeling that OPACS is adamant in holding to the ceiling prices.

Chicago notes opinion that steel mills there will be able to operate at full capacity over the rest of this quarter, but thereafter the outlook is obscure and pessimistic at the moment. Some believe that before long a scrap iron collecting campaign, the same as for aluminum, may be resorted to, though in many ways this would not be so practical.

Detroit reports that diminution in supply of quick-return scrap, occasioned by model changeovers in automobile plants, has precipitated a possible scrap shortage among local consumers. Though one steel mill is comfortably fixed, the other foresees the possibility of having to take off open-hearth capacity in a month if scrap intake does not improve.

Contributing, is the cessation of wrecking activities by railroads. The Michigan Central is returning to service cars and locomotives which ordinarily would be dismantled. Thirty-year old cars are being repaired and replaced in transport. Beneath the surface is the turmoil of a market replete with many types of price chiseling and upgrading, difficult to control and, once started, spreading like wildfire. Some Detroit scrap traders have located large supplies of old iron and steel which could be reclaimed and sold, but not at today's controlled prices. Not all of this material is in remote areas, either. All that is needed is some provision to compensate for the extra cost of preparing and collecting the scrap. One such "find", beyond the limits of present prices, is reported to approximate 10,000 tons.

Because of the scarcity of scrap and pig iron it has been suggested that a government defense agency, when investigating the reliability of a potential contractor also examine his connections with raw material sources.

Several carloads of Nos. 1 and 2 heavy melting steel, scheduled for Port Richmond for export, have been diverted to Pencoyd, Pa. Consumers have let down the bars considerably on specifications. Collections in eastern Pennsylvania show no improvement and were it not for manufacturers' scrap buyers would be in very bad way.

Pig Iron

Pig Iron Prices, Page 92

Pig iron shipments, having for some time been in excess of production, reserves have reached a point where strictly defense requirements will get first call under allocation-priority distribution which is expected to be placed in effect by Washington shortly. A foundry with a current melt involving 50 per cent defense will be able to get high rating for only that tonnage and will be forced to scramble for the remainder of more non-essential needs. Those with substantial stocks, and there are few in this district, will be forced to draw on inventories even for most impor-

tant needs until stocks are materially lowered. Indications are some shops will run short of full pig iron requirements during the latter part of the current quarter.

The situation is perhaps most acute in silvery pig iron, lack of which has caused foundries to close down for a day or two at a time until more arrived. Of interest to trade is the news that OPM has authorized the increasing of pig iron capacity by 6,500,000 tons annually. The pig iron trade itself realizes the great difference between plans on paper and fulfillment. For one thing it takes two years to build a furnace, and accessories, such as ore-carrying equipment, will have to be expanded as well.

Application of the manganese differential, provided under the regulation from Washington late last month, continues to vary. Most sellers, it appears, are applying a differential of 50 cents for each 50 points or fraction thereof above one per cent. At least one, however, is applying a cent for each point above one per cent, and still another is understood to be applying 25 cents for each 25 points or fraction thereof. One other furnace, located in the South, is not applying the manganese differential at all.

Pacific Coast

Seattle—Some steel tonnages have been placed with Eastern interests as local producers were unable to take more business. Army and navy have taken a portion of the coast fleet to move essential materials to defense projects in Alaska, Hawaiian Islands and Panama zone.

Shipbuilding is gaining momentum as new yards go into production. Revival of wood shipbuilding in this area is adding to the demand for heavy equipment and some steel items. Additional steel contracts are expected to be awarded to plants in this area which appear to be low. Albina Engine & Machine Works, Portland bid $1,185,500 and $1,385,500 each on nine 250 foot steel freighters for the Maritime Commission. Steel Construction Co., Portland, bid $367,000 and $283,000 each for six diesel tugs, $344,000 and $367,000 each for six steam tugs and Birchfield Boiler Inc., Tacoma, $390,000 for one diesel tug.

Pacific Car & Foundry Co., Seattle, has a contract to build 300 flat cars for Southern Pacific Ry., involving 2000 tons or more of forgings and other items. American Bridge Co. is low to Bonneville project, $2,042,847, for furnishing steel transmission towers for 230 kv lines. Same agency has allocated $1,225,190 for a third 230 kv line. Low to Denver for furnishing three hydraulic turbines for Coulee powerhouse, 2,400 tons, is Newport News Shipbuilding & Drydock Co.

Work is expected to proceed shortly on the new Portage Bay terminal for the Alaska Railroad, a $12,000,000 project. U. S. engineer, Seattle, has called bids Aug. 15 for construction of the 8200-foot stone breakwater at Neah Bay, Wash., which will involve heavy equipment. Seattle is preparing plans and expects bids in October for the $1,200,000 steel and concrete Spokane street viaduct.

Canada

Toronto, Ont.—While there is noticeable falling off in new bookings by Canadian steel mills, there is no decline in inquiries or orders. The falling off in booking is because primary mills are fully covered on a number of materials to the end of the year. This attitude indicates the possibility of a much larger swing of business to the United States. Continuous expansion of Canada's steel requirements are indicated by the sharp increase in Government orders for war materials in recent weeks. Arrangements are under consideration for placing of big orders for rolling stock for the Canadian railroads, and awards are expected to be made almost immediately. Tightening of war priority regulations is becoming more apparent and more difficulty is reported by non-war industry in obtaining raw materials.

War demands for sheets and strip are broadening rapidly, and allotments for ordinary civilian needs are becoming smaller daily. Many of the latter are swinging out of their former production lines and taking on war business to keep plants in operation. Canadian mills show little interest in new sheet and strip orders and report backlogs on hand that will take care of their entire output for the next six months. Warehouse operators report steady drain on supplies and more difficulty in replenishing.

Plate inquiries increase and big orders are overhanging the market. Mill representatives state they are not interested in new plate business as all production for months ahead has been taken by Government contractors working on war orders. Consumers in need of plate are forced to seek supplies in the United States and imports from across the line will mark an all time record for the last half of this year.

Tin Plate

Tin Plate Prices, Page 90

Tin plate demand continues to exceed all earlier trade estimates. The pea pack alone is said to be heavier by 60 per cent than estimated earlier and unusually large packs are indicated in other vegetables.

Requirements for condensed milk are running especially heavy, not only because of the added needs of military forces in this country, but because of the large requirements for Great Britain. Needless to say, requirements of the growing number of men under arms in this country are affecting all lines of foodstuffs, even though the emphasis has been less on vegetables (fresh vegetables being supplied wherever possible) than on meats, milk and soups.

Canners in some cases are using

oil containers for some types of foodstuff. Still heavier requirements all around are anticipated for next year since makers of canning equipment have recently received an A-2 priority.

In the general line and miscellaneous classifications, there is a pronounced swing to black plate. Consumers of plate who have been forced out of the picture by heavy demand for sanitary cans are turning in increasing numbers to untinned plate.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 91

In two or three weeks bolt and nut makers expect to have a good knowledge of the proportion of defense work of their customers. A few days ago they sent out blank affidavits for customers to fill in, purpose of which is to indicate percentages of defense, thus guiding makers in apportioning their product. A few returns have already trickled in and show high percentages for defense so far. Makers of bolts and nuts find raw materials a difficult problem in contrast to a few months ago when the standardization of their product made raw materials procurement easy. Though raw materials supply is fairly large in aggregate, there is a marked lack of balance. A rise in track bolts from $4.15 to $4.75 per 100 pounds base has become universal.

Ferroalloys

Ferroalloy Prices, Page 92

The movement of ferroalloys is being limited entirely by the ability of sellers to produce, and this means that shipments this month will fall behind those of June, because of curtailed output in the South due to the dry spell which has adversely affected power production. Some sellers expect this curtailment to last through August. Prices are unchanged with ferromanganese holding at $120, duty paid, eastern seaboard, and 19 to 21 per cent spiegeleisen, at $36, Palmerton, Pa.

Steel in Europe

Foreign Steel Prices, Page 93

London—(*By Cable*)—Strict enforcement of iron and steel control plus satisfactory production and importations allow early deliveries of war contracts. Black and galvanized sheets will presently be in lesser demand. The tinplate market continues restricted.

Chrome Ore

Chrome Ore Prices, Page 93

Sellers of Transvaal chrome ore are sold out over the remainder of the year and in the case of the 48 to 49 per cent concentrates, well beyond that. Indian chrome production is reported here to be sold out until the second half of next year. The Metals Reserve Co. is said to have been the principal buyer in both instances.

Under the circumstances prices are highly nominal, and only in the case of the 45 per cent Transvaal concentrates do sellers show any interest in booking tonnage and that for delivery after the end of this year. The price on this grade appears around $30, with any further increases in freight rates subject to buyer's account.

Sheets, Strips Wanted

Herman H. Lind, deputy co-ordinator, defense contract service, Federal Reserve Bank building, Cleveland, wishes for defense purposes to obtain the following items in sheets and strips:

Sheets: 1 each, 0.018 x 12 in. x 12 in., SAE 1025 or 4130, or 1030, 1035, 1040; 1 each, 12 gage x 30 in. x 96 in., SAE 1025 or 4130, or 1030, 1035, 1040; 1 each, 0.203 x 18 in. x 24 in., SAE 1025 or 4130, or 1030, 1035, 1040; 1 each, 0.218 x 12 in. x 24 in., SAE 2512 or 2515.

Strips: 40 feet (any lengths), ¾-in. x ⅛-in., SAE 1025 or 4130, or 1030, 1035, 1040; 10 feet (any lengths), 0.107 in. x 1½ in., SAE 1025 or 4130, or 1030, 1035, 1040; 30 feet (any lengths) ¾ in. x 10 in., SAE 1025 or 4130, or 1030, 1035, 1040; 30 feet (any lengths), ½ in. x ½ in., SAE 1025 or 4130, or 1030, 1035, 1040; 3 feet (any lengths), ½ in. x 2½ in., SAE 1025 or 4130, 1030, 1035, 1040.

Largest Tool Tip Order

U. S. Steel Export Co., New York, has placed an order for $170,000 worth of tool tips with McKenna Metals Co., Latrobe, Pa., for export markets. The Export company is sales agent for Kennametal tools and tool tips in all export markets except England and the British Empire, and it is believed this is the largest single order for tool tips ever placed.

Nonferrous Metals

New York—Government control over nonferrous metals was extended further last week with OPACS issuing Price Schedule No. 12 on brass mill scrap. Maximum prices were established for all transactions in kinds and grades of scrap materials which are suitable for consumption by brass mills. A new order on copper, replacing the present one, is being worked out by the priorities division of OPM and probably will be completed in time to go into effect Aug. 1. This order will strengthen and broaden control over the metal. The nonferrous trade in general is disturbed by the delays in allocations and by uncertainties concerning the probable amount of metal which will be available to various classes of non-defense users. The automobile industry has been directed to receive 50 per cent less raw materials in the next 12 months.

Copper—Interests in the market are concerned over the probable method to be adopted for the expected full priorities and what part the industry's representatives will play in an advisory capacity to the commodity group responsible for distribution of supplies. Trading in copper futures on the Commodity Exchange has been suspended.

At the end of June fabricators were short 261,733 tons of copper compared with a shortage of 264,850 tons at the end of May.

Lead—Improved supply situation resulting from the recent purchase of foreign lead may not be permanent because it is not known definitely how much non-defense consumption will be cut. Stocks of refined metal dropped 9753 tons during June to only 24,265 tons. All lead purchased and held by Metals Reserve Co. will be allocated by OPM but no applications for allocations will be entertained until users have tried the usual methods of obtaining metal from their suppliers.

Zinc—Allocations are continuing in an orderly manner and word is now awaited on the amount to be set aside for the August pool and on the appointment of an advisory committee of producers to facilitate distribution of pool metal.

Tin—Japanese moves in the Far East resulted in an advance in prices to the highest level since June, 1940. Straits spot closed at 55.25c. The government may place into effect its control program.

Equipment

Seattle—Demand for heavy equipment is increasing with federal agencies awarding large contracts for airports and other projects requiring construction machinery. National defense needs are getting priority while private customers take chances on delivery. Electric equipment is one of the leading items. Newport News Shipbuilding & Drydock Co., Newport News, Va., is low to Denver, $1,880,000, based on weight of 2400 tons, for three Coulee turbines and governors.

Nonferrous Metal Prices

July	Copper: Electro. del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
19	12.00	12.00	12.25	53.87½	52.62½	5.85	5.70	7.25	17.00	14.00	35.00
21	12.00	12.00	12.25	53.87½	52.62½	5.85	5.70	7.25	17.00	14.00	35.00
22	12.00	12.00	12.25	53.62½	52.87½	5.85	5.70	7.25	17.00	14.00	35.00
23	12.00	12.00	12.25	53.75	53.00	5.85	5.70	7.25	17.00	14.00	35.00
24	12.00	12.00	12.25	54.25	53.62½	5.85	5.70	7.25	17.00	14.00	35.00
25	12.00	12.00	12.25	55.25	54.50	5.85	5.70	7.25	17.00	14.00	35.00

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.10
Zinc, 100 lb. base	12.50

Tubes

High yellow brass	22.23
Seamless copper	21.37

Rods

High yellow brass	15.01
Copper, hot rolled	17.87

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.78

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York	10.00-10.25
Cleveland	10.50-10.75
Chicago	9.25-9.50
St. Louis	9.50

Heavy Copper and Wire

New York, No. 1	11.25-11.50
Cleveland, No. 1	11.00-11.50
Chicago, No. 1	10.50-10.75
St. Louis	10.00-10.50

Composition Brass Turnings

New York	9.75-10.00

Light Copper

New York	9.25-9.50
Cleveland	9.00-9.25
Chicago	8.50-8.75
St. Louis	8.00

Light Brass

Cleveland	6.00-6.50
Chicago	6.50-6.75
St. Louis	5.75-6.00

Lead

New York	5.00-5.25
Cleveland	4.75-5.00
Chicago	4.75-5.00
St. Louis	4.50

Old Zinc

New York	4.50
Cleveland	4.00-4.12½
St. Louis	5.00

Aluminum

Mis., cast	11.00
Borings, No. 12	9.50
Other than No. 12	10.00
Clips, pure	13.00

SECONDARY METALS

Brass ingot, 85-5-5-5, l. c. l.	13.25
Standard No. 12 aluminum	16.00

Construction and Enterprise

Ohio

CLEVELAND--Euclid Road Machinery Co., 1361 Chardon road, will start work in August on a $20,000 boiler house, and will install new boiler and stoker. E. H. Parkhurst is president.

CLEVELAND—Crucible Steel Castings Co., 8409 Almira avenue, will build a second addition, 30 x 80 x 15 x 25 feet to its foundry at cost of about $6000. Maxwell Tielke is vice president and treasurer.

CLEVELAND—Star Machine & Tool Co., 9220 Woodland avenue, will further expand its factory and office space with 40 x 80-foot factory addition and 20 x 60-foot office addition.

CLEVELAND—Black Boring & Machine Co., L. G. Black, president, 4909 Luther avenue, will build 1-story 50 x 150-foot plant at cost of $40,000. E. G. Hoefler, 5005 Euclid avenue, engineer. (Noted July 7)

CLEVELAND — Broden Construction Co., G. A. Broden, president, 228 Lakeland avenue, will erect 1-story 60 x 180-foot steel factory and crane runway at cost of $50,000. E. G. Hoefler, 5005 Euclid avenue, engineer.

CLEVELAND—Electric Vacuum Cleaner Co., 1734 Ivanhoe road, will build a new factory adjoining its plant to handle government contracts for artillery shell fuses.

TOLEDO, O.—Interlake Iron Corp., Chicago, has begun construction of a sintering plant at its Toledo works to cost approximately $250,000.

Connecticut

FAIRFIELD, CONN.—Rolock Inc., R. P. Welles, president, Southport, Conn., has plans by Lyons & Mather, 211 State street, Bridgeport, Conn., for 1-story 100 x 100-foot and 2-story 25 x 40-foot factories. (Noted June 9)

Maine

WISCASSET, ME.—Central Maine Power Co., Green street, Augusta, Me., has plans by J. H. and J. C. Stevens, 187 Middle street, Portland, for steam electric power plant, costing over $100,000.

Massachusetts

WORCESTER, MASS.—Leland-Gifford Co., 1001 Southbridge street, has let contract to A. J. Daniels, 661 Main street, Shrewsbury, Mass., for 3-story, 100 x 105-foot machine shop addition.

New York

BROOKLYN, N. Y.—Robins Dry Dock & Repair Co., Erie Basin, has plans by Albert Kahn & Associates, 345 New Center building, Detroit, for 2-story, 26 x 61-foot electric substation, to cost $25,000.

Pennsylvania

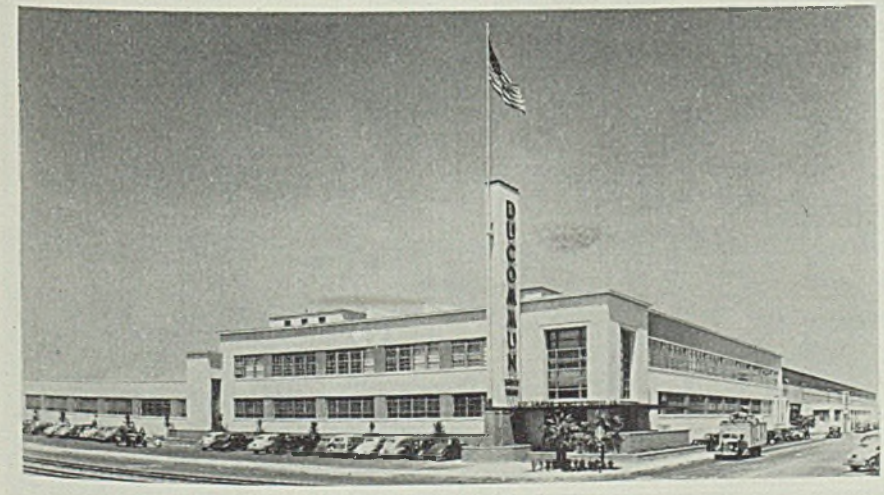
ALTOONA, PA. — Linde Air Products Co., 30 East Forty-second street, New York, will soon let contract for 1-story oxygen manufacturing plant here. S. R. Donnellon, 205 East Forty-second street, New York, chief engineer. (Noted June 9)

CORRY, PA.—Aero Supply Mfg. Co. Inc. has plans by Meyers & Johnson, Commerce building, for 1-story addition to its plant.

PITTSBURGH — American Spiral

Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 100 and Reinforcing Bars Pending on page 102 in this issue.

Metals Supply Plant Covers 11 Acres



■ Ducommun Metals & Supply Co. recently moved into its new office and warehouse building, 4890 South Alameda street, Los Angeles. The new structure is fire-proof and air conditioned; sales and stock rooms on the first floor cover an area of 86,400 square feet, and the offices on the second floor cover 34,560 square feet. Entire plant covers a total of 11 acres, of which seven are under one roof. E. C. Ducommun is president of the metals supply company.

Spring & Mfg. Co., Fifty-sixth and Butler streets, will build 1-story 50 x 177-foot steel manufacturing plant, costing $40,000.

PLYMOUTH, PA.—Owner, care of H. G. Davis, 56 Gaylord avenue, has plans for 1-story factory, costing $40,000.

Michigan

DETROIT—Vickers Inc., 1402 Oakman boulevard, Detroit, has awarded general contract to Brown & Mathews Inc., 122 East Forty-second street, New York, for factory building, 200 x 260 feet.

DETROIT — W. J. C. Kaufmann Co., 10610 Shoemaker, has general contract for construction of warehouse for National Stamping Co., 630 St. Jean, to cost $35,000.

LANSING, MICH. — Bowd & Munson, Lansing architects, are preparing preliminary plans for construction in Lansing of a propeller manufacturing plant for Nash-Kelvinator Corp., Detroit. Estimated cost $8,433,860.

Illinois

AURORA, ILL.—Western United Gas & Electric Co. will take bids Aug. 1 for power plant addition and alterations costing $500,000. Sargent & Lundy Inc., 140 South Dearborn street, Chicago, engineer.

CHICAGO—John Wood Mfg. Co., 4435 South Western avenue, will erect 1-story factory, to cost about $50,000. Alschuler & Friedman, 28 East Jackson boulevard, architects.

CHICAGO—American Flange Mfg. Co., 825 South Kirkpatrick avenue, has awarded contract to Elmo Ward, 4720 West Arthington street, for erection of 3-story, 75 x 290-foot factory addition. Estimated cost $200,000.

CHICAGO—American Varnish Co., 1140 North Branch street, has awarded contract to Rune & Son, 6760 Stony Island avenue, for 3-story plant addition. (Noted July 21)

CHICAGO — Midland Machine Corp., 6499 West Sixty-fifth street, has let contract to Whipple Co., 400 West Madison street, for 1 and 2-story factory. Estimated cost including equipment, $100,000.

CHICAGO—Excelsior Brass Mfg. Co., 217 West Illinois street, is constructing a 1-story factory building at 3452 North Knox avenue, containing 4000 square feet.

CHICAGO — Simonsen Metal Products Co., 4444 West Chicago avenue, is tripling manufacturing area by construction of a 1 and 2-story factory addition containing 12,000 square feet. The program, half completed, will cost $30,000, exclusive of equipment.

Indiana

GOSHEN, IND.—Penn Electric Switch Co., maker of electrical equipment, has awarded contracts for construction of an 80 x 208-foot plant addition to cost $51,000.

Maryland

BALTIMORE—Julian P. Friez & Sons Inc., division of Bendix Corp., plans erection of factory here. Austin Co., 19 Rectory street, New York, engineers and designers.

BALTIMORE—C. M. Kemp Mfg. Co. is taking bids in office of A. C. Radziszewski, 20 East Lexington street, architect, for factory addition.

BALTIMORE—American Brake Shoe & Foundry Co., 230 Park avenue, New York, will build 1-story, 80 x 320-foot foundry addition to its plant here. Cost estimated at $250,000. The company has also let contract for addition to its plant at Mahwah, N. J., to C. B. Johnson & Co., 6 North Michigan avenue, Chicago.

District of Columbia

WASHINGTON — Navy Department, Bureau of Supplies and Accounts, will take bids July 31, schedule 8026, one diesel engine crawler tractor, delivery Hoboken, N. J.; Aug. 1, schedule 8044, two gasoline driven, wheel type tractor cranes, delivery Brooklyn, N. Y.; schedule 7972, two motor driven bench lathes, delivery San Pedro, Calif.; schedule 7950, eight motor driven pedestal grinders, delivery Key West, Fla., and Puget Sound, Wash.; schedule 7976, four motor driven automatic screw machines, delivery Puget Sound, Wash.; Aug. 5, schedule 7977, four motor driven surface grinders and equipment, delivery Puget Sound, Wash.; schedule 8000, three motor driven medium heavy duty engine lathes, delivery San Pedro, Calif.; schedule 8001, two motor driven horizontal milling machines, delivery Mare Island, Calif.; Aug. 8, schedule 8016, 250 gasoline engine driven industrial trailer tractors, delivery Oakland, Calif.

Florida

JACKSONVILLE, FLA.—Giggs Gas Engine Co. will spend over $150,000 for additional plant expansion.

Georgia

SAVANNAH, GA.—Savannah Electric & Power Co. has permit for $30,000 addition to Riverside power plant; will install new machinery.

SAVANNAH, GA.—Rathborne, Hair & Ridgway Co., 1440 West Twenty-first place, Chicago, is taking bids for construction and improvements to plant here for manufacture of containers.

Missouri

KANSAS CITY, MO.—Black, Sivals & Bryson, 7500 East Tenth street, will build 1-story manufacturing plant addition, costing over $40,000. Contract has been let to Rau Construction Co., 2409 Harrison street.

ST. LOUIS—Union Electric Co. of Missouri, Twelfth and Locust streets, proposes $15,000,000 expansion during next two years.

ST. LOUIS—Federated Metals Division of American Smelting & Refining Co. will let contracts soon for construction of 1-story, 82 x 120-foot addition to its warehouse building at 4041 Park avenue. Murphy & Wischmeyer, 208 Board of Education building, are architects, and Neal Campbell, 200 Board of Education building, is engineer.

Arkansas

STAMPS, ARK.—Carter Oil Co., 30 Rockefeller Plaza, New York, will build gas treatment plant here at cost of $3,000,000. Arkansas Power & Light Co. is lessee.

WEST MEMPHIS, ARK.—K. H. Francis will build compress and warehouse at cost of $100,000.

Wisconsin

MT. PLEASANT, WIS.—J. I. Case Co., Racine, Wis., will soon let contract for 1-story, 241 x 447-foot and 51 x 136-foot warehouse additions. F. J. Hoffman, 201 Sixth street, Racine, architect.

NEILLSVILLE, WIS.—Clark county, O. J. Weyhmiller, highway commissioner, plans construction of a 1-story county machinery shop and warehouse, 80 x 100 feet, with a wing 24 x 50 feet. H. M. Nelson, Eau Claire, Wis., is architect.

WAUPUN, WIS.—National Rivet & Mid State Mfg. Co. has plans by R. A. Sutherland, 259 East Wells street, Milwaukee, for 1-story plant.

WHITEHALL, WIS.—Village plans installation of diesel generating equipment in municipal light and power plant. H. J. Elstad is village clerk. Mead, Ward & Hunt, Madison, Wis., are engineers.

Minnesota

MINNEAPOLIS—Ceco Steel Products Co. plans construction of a 1-story addition to Twin City warehouse for storage

of reinforcing steel and other steel products.

MINNEAPOLIS—Jacobs Wind Electric Co., maker of wind-driven power generating plants, has given general contract to Dewey Leveren for construction of a 1-story machine shop addition, 47 x 50 feet.

ST. LOUIS PARK, MINN.—Village, Joe Justad, village recorder, has begun construction of a 1-story tool house and machine shop, 67 x 109 feet. E. R. Ludwig, 516 Essex building, Minneapolis, is architect.

North Dakota

FARGO, N. DAK.—Dakota Tractor & Equipment Co., E. O. King president, has given general contract to Meinecke-Johnson Co. for construction of a 1-story shop and warehouse, 103 x 154 feet. W. F. Kurke is architect.

South Dakota

BELLE FOURCHE, S. DAK.—Eastern Clay Products Inc., Eifert, O., has begun construction of a bentonite plant, including a mill building 50 x 125 feet and a crude clay building 50 x 120 feet.

SIOUX FALLS, S. DAK.—Socony-Vacuum Oil Co. has started construction of an oil pipeline terminal in South Sioux Falls to cost about $250,000.

Iowa

DUBUQUE, IOWA — National Youth Administration plans erection of training shop building here to cost about $80,000, with equipment.

FORT DODGE, IOWA—United Light & Power Service Co. has given general contract to C. G. Walker for construction of a 2-story power plant addition to house additional equipment.

IOWA FALLS, IOWA—Ralston-Purina Co., St. Louis, has given general contract to Jones & Hettelsater, Kansas City, Mo., for construction of a $325,000 soybean processing plant, including 1-story processing plant, 32 x 75 feet; boiler room, 32 x 36 feet; 2-story mill, 72 x 84 feet; 200,000 bushel grain elevator; 40-foot truck scale and dump, and 50-foot railroad scale.

MUSCATINE, IOWA—Board of water and light commissioners, Herman Zeug, secretary, will open bids Aug. 12 for equipment for municipal light and power plant, including boiler feed pumps, coal and ash handling equipment, turbine room switch gear, mechanical draft equipment, boiler room switch gear and setting for 100,000-pound per hour steam generating unit.

OTTUMWA, IOWA — Dain Mfg. Co., maker of agricultural equipment, is planning construction of a 5-story warehouse, office and display building to cost $150,000.

Idaho

POCATELLO, IDAHO — W. E. Gee, clerk, will take bids Aug. 12 for proposed treatment plant, including control house, digester building and equipment. Raymond J. Briggs, Boise, Idaho, engineer.

California

LOS ANGELES — Allied Engineering & Shipbuilding Corp., 501 Commercial Exchange building, Los Angeles, will rehabilitate the shipyard at Port Chicago, Calif., including a new outfitting pier and a rebuilt machine shop. Cost estimated at $200,000.

LOS ANGELES — Metal Assemblies Corp. has been organized with capital of $25,000, by Bruce Rutherford, Hugh Rogers and H. M. Dunham. The new corporation is represented by H. M. Dunham, Van Nuys building, Los Angeles.

LOS ANGELES—Tressler Wrench Co. has been incorporated with capital of $50,000, by K. L. Kendrick, O. S. McConnell and M. G. Fox. Corporation is represented by O. S. McConnell, Pacific Mutual building, Los Angeles.

LOS ANGELES—Hard Chrome Engineering Co. is erecting a factory building at 1717 East Slauson avenue, to cost about $14,000.

LOS ANGELES — Lufkin Machine & Foundry Co., 5959 South Alameda street, is erecting an addition to its machine shop at 1750 East Randolph street.

LOS ANGELES—California Cold Rolled Steel Corp., 5100 East Sixtieth street, Maywood, Calif., is erecting a new plant at 7130 Anaheim-Telegraph road, Montebello, Calif., for production of cold rolled strip steel. The new building will be 1-story and will contain about 15,000 square feet of floor space.

OAKLAND, CALIF.—Owner, care of R. F. Keefer, 770 Wesley avenue, will build 1-story, 75 x 104-foot factory, to cost $40,000.

OAKLAND, CALIF.—Southern Pacific Co., 65 Market street, San Francisco, W. H. Kirkbride, chief engineer, will make shop additions at cost of $40,000.

VERNON, CALIF.—Norris Stamping & Mfg. Co. will build a one-story 120 x 128-foot addition to plant at 5225 Boyle avenue. Cost estimated at $25,000.

Oregon

PORTLAND, OREG. — Schnitzer Steel Products Co. has acquired a 38-acre tract on Willamette river, and under name of Oregon Electric Rolling Mills Inc., recently formed with capital of $250,000, will erect a 60,000-ton annual capacity electric plant.

Washington

SEATTLE—Puget Sound Machinery Depot is building a plant boiler structure 100 x 100 feet, three stories. General Construction Co., contractor.

SEATTLE—Young & Richardson, architects, have taken bids for proposed plant addition, 64 x 132 feet for Wire Rope Mfg. Co., First avenue, south, and Hinds street.

SPOKANE, WASH.—Beralloy Corp. has been organized with $50,000 capital by Fred J. Cunningham and associates, Old National Bank building, to manufacture and deal in minerals and metal products.

Canada

VANCOUVER, B. C.—Hamilton Bridge, Western Ltd., subsidiary of Hamilton Bridge Co. Ltd., Hamilton, Ont., will start work immediately on plant addition to cost $10,000, exclusive of equipment. General contract has been let to Dominion Construction Co. Ltd., Vancouver.

DUNDAS, ONT.—Steel Fabricating & Welding Ltd., Hatt street, will build plant addition costing $10,000, exclusive of equipment, and has given general contract to A. C. Ouellette, 339 King street, west.

HAMILTON, ONT. — Wallace Barnes Co. Ltd., 274 Sherman avenue, north, maker of steel wire springs, etc., will build plant addition to cost, with equipment, $75,000. General contract awarded to W. H. Cooper Construction Co., Medical Arts building.

HAMILTON, ONT.—American Can Co., Medical Arts building, has begun erection of plant addition to cost $50,000. W. H. Cooper Construction Co., Medical Arts building, has general contract.

MERRITTON, ONT.—Hayes Steel Products Ltd. has given general contract to Ontario Construction Co. Ltd., 31 Queen street, St. Catharines, Ont., for erection of $75,000 plant addition, and has let steel contract to Standard Steel Construction Co., Port Robinson, Ont., for forge shop addition to cost $35,000.

SHAWINIGAN FALLS, QUE.—Aluminum Co. of Canada Ltd., 1155 Metcalfe street, Montreal, J. H. Alger, secretary, will let contracts, and plans to start work immediately on construction of new plant here to cost $800,000, including equipment. This will be a part of the company's $60,000,000 expansion program.

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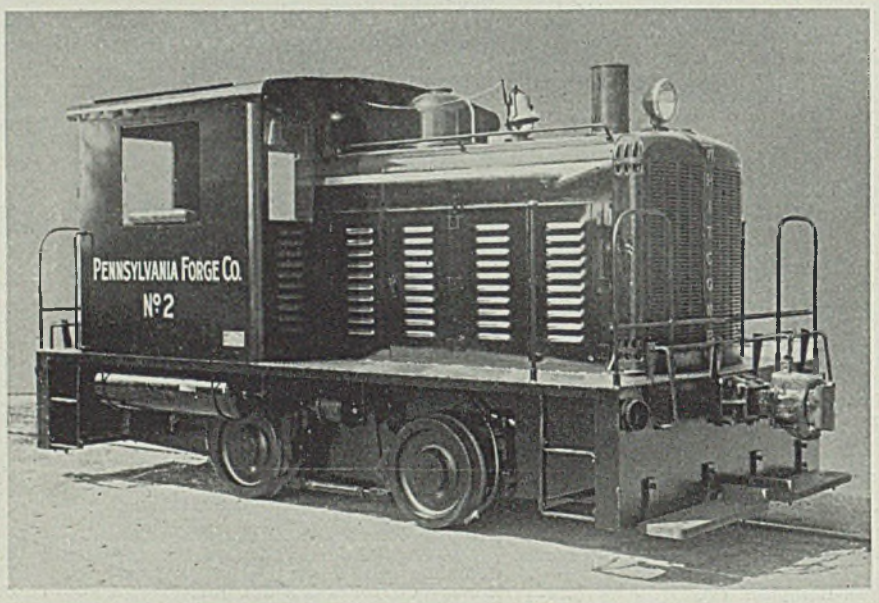

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