STEEL

ESTABLISHED 1882

Contents

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PRODUCTION · PROCESSING · DISTRIBUTION · USE

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HIGHLIGHTING THIS ISSUE OF STEEL

■ CAREFUL check reveals **(p. 105)** that there is no foundation whatever for fears among consumers of an all-out priorities system on finished rolled steel products. This does not mean necessarily that all consumers will get steel as they want it. The basic fact is that defense comes first and steel will be available for civilian use to the extent that tonnage is left over after defense needs have been supplied. Although a few shutdowns developed last week due to lack of steel, the supply in general continues adequate for all purposes. About 30 to 40 per cent of all steel now being shipped is going, directly or indirectly, into defense. The percentage for defense is rising slowly.

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Weak Policy of Government

Industry continues to be hampered in its efforts to step up defense production by a weak government policy which permits stoppages in key plants because of strikes **(p. 21)**, largely aimed at enhancing labor's power over the industrial world. In the meantime, labor has increased enormously its share of the earnings of industry. STEEL'S tabulation **(p. 23)** shows that the hourly rate on common labor in the steel industry has moved up 260 per cent since the start of World War I. This is in contrast with a rise of 27.1 to 90.9 per cent in iron and steel prices over the same period. Since the start of the first World War **(p. 22)** average hourly earnings in the steel industry have gained 270 per cent.

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Compulsory Subcontracting

No aluminum whatever **(p. 35)** will be available in 1942 for civilian or even "indirect" military requirements, declares W. L. Batt. . . . Compulsory subcontracting of defense work may be just ahead **(p. 35)**. . . . A. H. Allen **(p. 37)** discusses trends in plating with nickel scarce. . . . Latest standards list of the General Technical Committee of the American Iron and Steel Institute **(p. 47)** identifies 94 carbon steel compositions. . . . Steel production **(p. 25)** last week regained 2 points, moving up to 99½ per cent of ingot capacity . . Consumers are urged **(p. 21)** to store coal during the summer months to avoid a shortage next winter. . . Foundries are asked **(p. 26)** to use structural steel scrap as a substitute for old rails.

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5000 Parts X-rayed Daily

Development and manufacture of small arms ammunition **(p. 56)** is discussed by Professor Macconochie this week as he continues his series on ordnance production. . . . Production X-raying at rate of 5000 airplane parts daily **(p. 68)** is a reality at Lockheed Aircraft; reflects trend toward 100 per cent X-ray examination of class I and stressed parts. . . . J. E. Jackson presents a discussion **(p. 76)** of use of copper in iron and steel today. . . . A new speed transmission **(p. 80)** is reversible without stopping or reversing the power source. . . . A new synchronizer **(p. 98)** co-ordinates welding contactor equipment to permit speeds as high as 1000 welds per minute.

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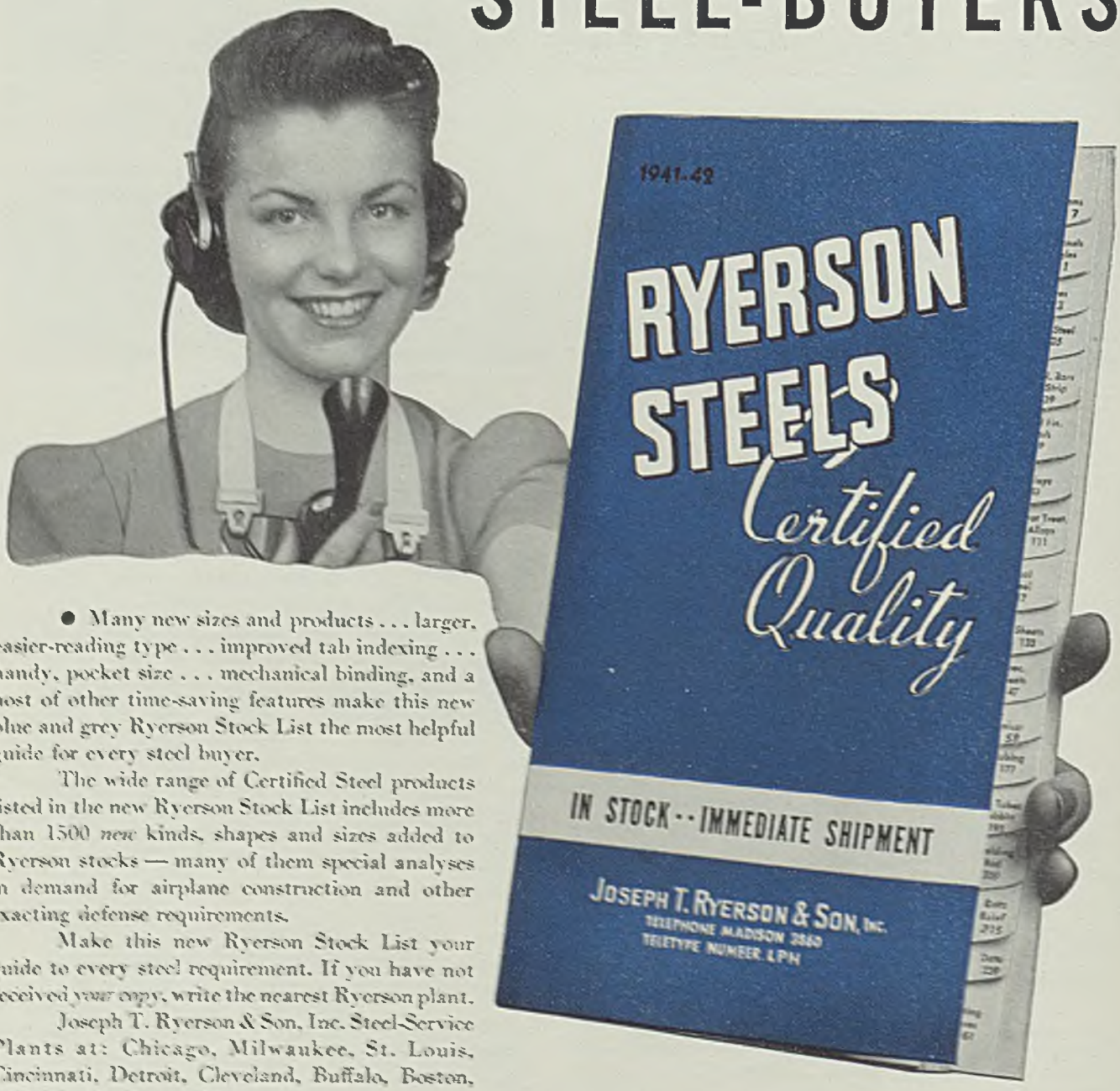
Machine Tool Electrification

Guy Hubbard, STEEL'S machine tool editor, tells **(p. 54)** how machine tool electrification is stimulating defense production by making older equipment produce at higher rates. . . . Harold Lawrence concludes his discussion of X-ray perfect welds by examining each type of defect and detailing what can be done to prevent its occurrence. . . . An unusual method is described **(p. 73)** for producing designs on objects given a bright nickel finish. Method also can be used to produce brilliant finish on dull nickel deposits. . . . The trend toward better plant layout to improve materials handling **(p. 82)** is reflected in new plant of Lindberg Engineering Co., Chicago.

New Guide for STEEL-BUYERS



● Many new sizes and products . . . larger, easier-reading type . . . improved tab indexing . . . handy, pocket size . . . mechanical binding, and a host of other time-saving features make this new blue and grey Ryerson Stock List the most helpful guide for every steel buyer.

The wide range of Certified Steel products listed in the new Ryerson Stock List includes more than 1500 *new* kinds, shapes and sizes added to Ryerson stocks — many of them special analyses in demand for airplane construction and other exacting defense requirements.

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Strikes Again Menace "All-Out" Defense Production; Wage Increases Spread

SWOC announces intention of seeking labor board elections in all "Little Steel" plants . . . Coal shortage will become acute immediately if mines stop

■ LABOR disputes, actual and potential, continue to hamper defense industries, in the absence of any firm stand against work stoppages by the national administration. While high government officials repeatedly stress the need for all-out production, strikes are disrupting output in shipbuilding, automobile manufacturing, the making of munitions and defense building.

A year-long rise in industrial production was halted in April by strikes, despite the further expansion of industries making finished defense goods, according to the Department of Commerce. Reductions were especially noticeable in coal, iron and steel, and automobiles.

In Congress, agitation for a stronger curb on labor interruptions continued, but appeared to be ineffective. Representative Leland Ford, California, asked House members to sign a petition to President Roosevelt asking him to "remove" Secretary of Labor Perkins from the cabinet. The ouster was asked on the basis of popular dissatisfaction with the manner in which strikes in defense industries are being handled; but nothing has been done about it.

While the administration emphasized that ships are the most pressing defense need now, 1900 machinists struck at West coast shipyards in violation of an agreement signed April 23. Between 15,000 and 18,000 other workers were thrown out of jobs by the strike and work on $500,000,000 in ships halted.

The striking machinists had been granted a 12-cents-an-hour increase to $1.12 an hour under the coast-wise agreement negotiated several weeks ago and which was intended to prevent tieups in the Pacific coast yards. The machinists last week decided they wanted $1.15 an hour and struck. The strike was termed "outlaw" by William Green, president of the American Federation of Labor, and by John P. Frey, head of the metals trades department of the AFL. Both urged strikers to return to their jobs. Twenty-seven destroyers, four cruisers and 43 auxiliary vessels were believed affected by the strike.

At Boston, AFL building and construction workers staged a three-day strike at the $30,000,000 navy dry dock project in protest against the use of WPA workers.

SWOC Wins at Bethlehem Plant

At Buffalo, the Steel Workers Organizing Committee won the right to represent employes in Bethlehem Steel Co.'s Lackawanna plant by a vote of 8223 to 2961 in a National Labor Relations Board election. Edward F. Entwisle, general manager of the Lackawanna plant, stated: "The company's policy is to recognize whatever agency the employes may choose to represent them. This election, therefore, settles that question for the Lackawanna plant."

Van A. Bittner, SWOC director, declared the election presaged a move for similar elections in all plants of "Little Steel."

Phoenix Iron Co., Phoenixville, Pa., was closed by a strike Thursday, in an apparent attempt by SWOC to gain recognition. Representation has been in the hands of an independent union for many years. Company officials stated SWOC members were in minority.

A new soft coal strike was threatened by John L. Lewis, president, CIO United Mine Workers, unless an early agreement is reached between the union and southern mine operators. The southern operators and the union have been negotiating the issue of a 40-cent differential between northern and southern daily rates since the strike ended in the Appalachian area.

The new strike threat came at a time when defense industries were beginning to recover from the retarding effects of the month-long coal strike of April. Appalachian mine operators last week said capacity operations of mine and transportation facilities would be necessary throughout the summer to satisfy domestic and industrial needs. Consumers were urged to build up stocks during the summer.

Threatened strike in General Motors Corp.'s 61 plants was averted when the company granted a flat 10-cents-an-hour wage increase. Company estimated the increase would amount to $50,000,000 annually. Operations were halted in four GM plants, however, when workers walked out despite a postponement of the strike call.

Brief stoppages at the Colt's Patent Fire Arms Co., Hartford, Conn., and the Winchester Repeating Arms Co., New Haven, both

manufacturing guns for the Army, were ended after wage increases were granted.

Twelve thousand workers in Chrysler Corp.'s Dodge division were laid off when the company's supplies from the New Haven Foundry Co., New Haven, Mich., were cut off by a strike.

Three Hudson Motor Co. plants were closed by a walkout staged by the United Automobile Workers.

Optional Vacations with Pay Offered by Weirton Steel

Vacations with pay or extra pay in lieu of vacations was offered by Weirton Steel Co., Weirton, W. Va., in an agreement between employes' representatives and management.

The company estimates the plan will cost $550,000, and will affect approximately 10,000 wage-earning and hourly employes.

Employes with one year service and less than three years will be entitled to a vacation of two days of eight hours each. Other service brackets will receive vacations as follows:

Three to five years, five working days of eight hours; five to ten years, six days of eight hours each; from ten to fifteen years, eight days of eight hours each and fifteen years and over, ten days of eight hours each.

Employes have the option of taking the time off with pay or of working and taking their full vacation pay in a lump sum payment. All vacations will be scheduled between July 1, and Dec. 31. Vacation payments will be made after July 1.

Under a special provision of the plan any employe who has been drafted or has volunteered for military service since Jan. 1, will receive the vacation pay to which he would have been entitled had he remained in the employ of the company.

Bonuses in Lieu of Vacations Should Be Entered as "Wages"

Defense industry employers planning to give workers added pay to forego vacations as recommended by OPM have been advised by the administrator of wages and hours to enter such added compensation on their payrolls as a temporary increase in rate.

Added compensation under wages and hours regulations must be included in the computation of overtime unless they are gifts "which are in no case compensation for services rendered." Added compensation to forego a vacation legally is not a gift.

Jobbing Foundry Minimum Wage Hearing Scheduled for June 4

Hearing on a recommendation for establishment of a minimum wage of 40 cents an hour in the gray iron jobbing foundry industry will be held in Washington June 4, it was reported last week by Gen. Philip B. Fleming, wage and hour administrator. Henry T. Hunt, examiner for the division, will preside.

Any interested person may appear by filing with the division the following information: Name and address; name and address of the person or persons whom he is representing; statement as to whether he supports or opposes the recommendation; and length of time he wishes to be heard.

Timken Ends "Week-end Blackouts"; Uses Four Shifts in 160-Hour Week

■ TIMKEN Roller Bearing Co., Canton, O., last week advised the Office of Production Management that it had ended the week-end "blackout" of industrial production.

In letters to Commissioners Knudsen and Hillman, the company said it has worked out a system of rotating shifts under which equipment, including additions recently made, are operating 160 hours per week and in some cases 168 hours. The system was worked out in co-operation with the employes and the Steel Workers Organizing Committee.

Timken is making "key" parts of most of the mechanized equipment for defense, as well as electric furnace steel for bearings and other industrial uses. Its electric furnace steel capacity has been virtually doubled recently.

The rotating system of shifts is in effect at all Timken plants in Canton, Columbus, Mt. Vernon and Wooster, all in Ohio.

Under the system which Timken began developing with the outbreak of the European war in 1939, the machines are turning constantly. When repair work or changes of mills or setups on machines are necessary, the daylight shift on Sunday is utilized.

In its letter to Mr. Knudsen, the company said: "We have received your letter of May 2 and agree to co-operate with the defense movement in every possible way. We feel certain that the complete utilization of machines is necessary during this crisis."

The Timken "antiblackout schedule" calls for three eight hour shifts per day up to 40 hours per week. By having four crews, instead of three to handle these shifts, the working time for each crew is rotated so that it works 40 hours a week, the four crews thus keeping the equipment running 160 hours a week. The schedule for the 168 hour week is as follows:

Every man works five days in a row and then is off at least 48 hours, after which he changes shift.

Over each period of 20 weeks every man works five extra days, totaling 105 shifts in 20 weeks.

Where one shift works 48 hours instead of 40, time and a half is paid for the extra eight hours.

Over each period of 20 weeks every man has five Sundays off.

Over each period of 20 weeks every man has five pay days with 10 days pay and five pay days with 11 days pay, if he works full time.

The same crews are always working together for maximum co-operation and effectiveness. No relief men are required.

Steel's Average Hourly Wages Up 270 Per Cent Since 1914

Average hourly earnings in the steel industry have increased 270 per cent since the beginning of the first World war, from an average of 26.3 cents an hour in July, 1914, to 97 cents at present. Since 1929, average hourly wages have increased nearly 50 per cent, from 65.4 cents.

Following table compares hourly wage rates and average work-week since 1914. During this period, the number of hours worked has decreased approximately 30 per cent. The buying power of the hourly steel wage has more than doubled.

Year	Average Hourly Earnings	Average Hours Worked per Week
1914 (July)	26.3c	57.0
1920	70.8	63.2
1921	52.2	54.1
1922	50.4	58.1
1923	59.6	57.7
1924	63.6	51.3
1925	63.3	53.6
1926	63.6	54.4
1927	64.4	53.1
1928	64.7	54.0
1929	65.4	54.9
1930	66.1	48.9
1931	63.6	43.4
1932	53.1	27.2
1933	52.4	34.0
1934	62.8	29.5
1935	65.5	34.2
1936	66.8	39.8
1937	81.8	36.8
1938	83.0	27.6
1939	84.2	34.8
1940	85.0	36.2
1941 (April)	97.0	40.0

Source—1914-1933: National Industrial Conference Board. 1934 to date: American Iron and Steel Institute.

Britain Takes Bids on 1,000,000 Tons Steel, Plus 600,000 Tons Tin Plate

NEW YORK

■ BIDS on 1,000,000 tons of steel for Great Britain are being filed with the Procurement Division of the Treasury Department, Washington. Deliveries are to be made in equal amounts over the next four calendar months.

This is the first major inquiry to develop under the mechanism set up by the lease-lend act.

The next outstanding inquiry may involve 240,000 tons of low phosphorus and bessemer pig iron. Low phosphorus iron is desired, but it is considered capacity is not sufficient to supply the amount requested over the last six months of this year, the period indicated. Hence, bessemer is mentioned as an alternative, in whatever amount may be necessary.

The 1,000,000-ton inquiry lists 15 major classifications, with ingots the largest single item, amounting to 266,000 tons. Other classifications and quantities: Billets 230,000 tons; slabs 100,000; sheet bars 100,000; forging quality semifinished steel 20,000; shell steel 70,000; structural shapes 50,000; bars 41,000; wire rods 30,000; tube material comprising rounds, gothics and strip and skelp 40,000; rails 20,000; shipbuilding material 15,000; wire and wire products 10,000; tubes 5000; and bolts and nuts 3000 tons.

Britain also is negotiating for about 600,000 tons of tin plate for delivery over 12 months. A study is being made as to needs and as to how much this country can spare.

At least a moderate portion of tonnage specified by the 1,000,000-ton inquiry covers items which Britain first placed early last April, which later were suspended and more recently canceled. Contemplated tin plate tonnage covers not only a portion of Britain's own requirements but those of its colonies and other countries on which England is dependent for canned goods.

Need for conserving raw steel for munitions is said to be a factor behind its interest in tin plate.

There is also the question of conserving cargo space. Instead of moving steel to Britain for making tin plate and then reshipping tin plate to colonies and other countries, its aim apparently is to have tin plate produced here and shipped direct to points of ultimate destination.

Railroads To Install 97,000 New Freight Cars in 1941

More new freight cars are on order now than at any time in the past 16 years, according to J. J. Pelley, president, Association of American Railroads.

May 1, 1941, Class I railroads had 56,502 new freight cars on order. Since then, however, preliminary reports received by the association indicate that orders are to be placed in

Iron and Steel Prices, Wages and Cost of Living in 27 Years

■ The following table shows high and low prices since the start of World War I, hourly steel wage rates, and cost of living index for each of the peak and valley periods. It also shows the percentage increase in each item from Aug. 1, 1914, to May 16, 1941.

The figures indicate clearly that the government's action in freezing prices at second quarter levels, while at the same time approving an advance of 10 cents an hour in steel wages, places labor in the best position it ever has experienced, actually and relatively to prices.

	Iron Ore Mesabi Nonb.	Basic Pig Iron, Valley	Heavy Melt. Steel, Pitts.	Bars	Plates	Shapes	Hot-Rolled sheets	Tin Plate,	Common Labor Wages,	Cost of Living
	Per Gross Ton			Cents Per Pound				Per 100-Pounds	Cents Per Hour	Index*
Aug. 1, 1914: **Start of World War**	$3.50	$13.00	$12.00	1.15	1.15	1.10	1.35	$3.25	20.0	61.3
Nov.-Dec., 1914: **Recession Lows**	3.50	12.50	10.40	1.10	1.10	1.05	1.35	3.15	20.0	...
July, 1917: **War Peaks**	5.70	52.85	40.25	4.75	9.45	4.50	8.50	10.00	30.0	77.6
Oct.-Dec., 1917: **Govt. Fixed Prices**	5.70	33.00-32.00	30.00-29.00	2.90	3.25	3.00	4.25	7.75	33.0	...
Mar.-Sept., 1919: **Aftermath Lows**	6.20	25.75	14.60	2.35	2.55	2.45	3.50	7.00	46.2	95.6
Feb.-Sept. 1920: **Post War Boom**	7.20	48.50	28.60	3.85	3.75	3.25	5.50	7.00	50.6	123.1
Apr.-Oct., 1929: **Prosperity Peaks**	4.50	18.50	18.90	1.95	1.95	1.95	2.20	5.35	44.0	99.0
Feb.-Nov., 1932: **Depression Lows**	4.50	14.00	8.35	1.50	1.50	1.50	1.50	4.50	33.7	80.3
Sept.-Oct., 1933: **NRA Begins**	4.50	17.00	13.00	1.60	1.70	1.70	1.70	4.65	40.0	78.2
Sept.-Dec., 1935: **NRA Ended**	4.50	19.00	14.05	1.85	1.80	1.80	1.80	5.25	44.0	82.4
Apr.-June, 1937: **Recovery Peak**	4.95	23.50	22.75	2.45	2.25	2.25	2.25	5.35	62.5	87.3
June-Nov., 1938: **Recession Low**	4.95	19.50	11.40	2.25	2.10	2.10	2.10	5.10	62.5	85.7
Sept. 1, 1939: **Start, World War II**	4.95	21.50	16.15	2.15	2.10	2.10	2.10	5.00	62.5	84.5
May 16, 1941: **Present Levels**	4.45	23.50	20.00	2.15	2.10	2.10	2.10	5.00	72.5	†86.9
Aug. 1, 1914-May 16, 1941: **Per Cent Gain**	27.1	80.8	66.7	87.0	82.6	90.9	55.5	53.8	260.0	41.7

*1923=100. †April, 1941.

the immediate future for 16,225 additional freight cars. All of these new cars are expected to be completed and placed in service this year.

Taking into consideration the 24,284 new freight cars which were placed in service in the first four months, this means that approximately 97,000 new cars will have been completed and installed in service within 1941.

In addition, under the program approved by the member roads in Chicago May 12, the railroads also will provide for a net increase of 120,000 cars to the supply for the anticipated rise in traffic in 1942.

The total number of new freight cars on order on May 1, 1941, was an increase of 14,167 compared with the number on order on April 1, 1941, and an increase of 39,042 compared with May 1, 1940.

New freight cars, for which orders had been placed on May 1, 1941, included 33,001 box, 20,817 coal, 1,298 refrigerator, 985 flat and 401 miscellaneous cars.

Class I railroads on May 1, 1941, also had more new locomotives on order than at any time since 1926. New locomotives on order on May 1, 1941, totaled 438, of which 211 were steam and 227 electric and diesel. On April 1, 1941, they had 335 new locomotives on order, of which 166 were steam and 169 were electric and diesel. New locomotives on order on May 1, 1940, totaled 95, which included 54 steam and 41 electric and diesel.

The railroads also put 159 new locomotives in service in the first four months of 1941, thirty-seven being steam and 122 electric and diesel. In the same period last year 115 new locomotives were installed in service, of which 27 were steam and 88 electric and diesel.

Standard Safety Signs Developed by Association

■ New standards for industrial accident prevention signs providing uniform colors and wording to increase effectiveness in preserving life was reported last week by the American Standards Association, New York.

To develop automatic reaction to standard sign designs and colors, all accident prevention notices have been divided by the committee into five major groups: Danger signs to be used to warn of specific dangers only and to be removed as quickly as the hazard ceases to exist; caution signs used to warn against possible danger or unsafe practices; safety signs to stimulate general safe practices; directional signs to point the way to staircases, fire escapes, exits; informational signs carrying a message of general nature, as rules and regulations.

Best current practice in color, design, application of all accident signs is set forth by the new standard. The committee hopes all new signs and replacements will be in accordance with recommended specifications.

1600-Ton Framework Erected in Three Weeks

■ Only slightly more than three weeks were required to complete the 1600-ton steel framework for General Electric Co.'s windowless plant under construction at West Everett, Mass. The steel was fabricated and erected by Bethlehem Steel Co.

The plant consists of a one-story blackout building with a main manufacturing section 400 x 500 feet, with attached boiler house, and a 80 x 300-foot test and forge shop. Turner Construction Co. is general contractor for the entire project.

International Harvester To Manufacture Artillery

■ Intermediate-caliber artillery for the United States Army will be manufactured at St. Paul by the International Harvester Co., Chicago, it was reported last week by Col. Donald Armstrong, executive officer of the Chicago ordnance district.

International Harvester Co. executives declared the artillery will be manufactured in a large plant used for several years as a warehouse and originally constructed as an assembly plant by Willys-Overland Co. Four stories high and 187 x 463 feet, the building is being altered for gun manufacture. About 300,000 square feet of floor space will be utilized.

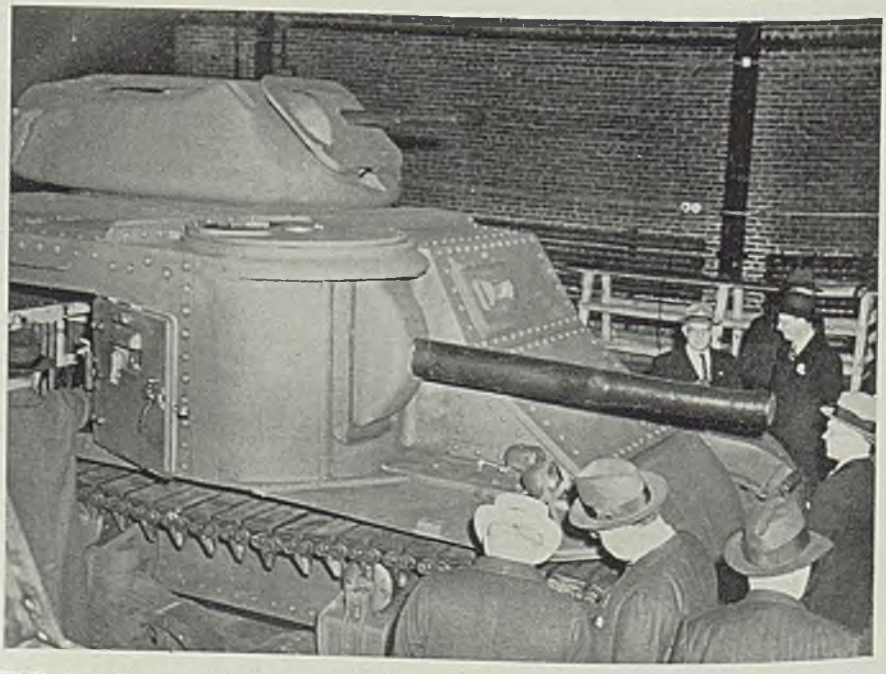
Estimated 1500 will be employed when operations reach capacity. Initial order is for approximately $12,000,000. Machines, tools and equipment totaling nearly $4,000,000 will be needed to place the gun in production.

John E. Harris, superintendent of Harvester's Milwaukee works, will be superintendent of the arms plant. M. V. Keeler, assistant to the assistant superintendent of the company's Richmond, Ind., works, will be assistant superintendent. M. J. Graham, Chicago, works manager in charge of the company's automotive plants, will have managerial direction.

International Harvester's defense contract total is increased to more than $40,000,000 by the artillery award.

The company has been producing crawler-type tractors, motor trucks, and machining 37 and 75-millimeter shells.

Pullman Standard Produces First of 500 Tanks



■ First of 500 to be manufactured for Great Britain by Pullman Standard Car Co., Hammond, Ind., this 28-ton tank rolled off the assembly line last week. Similar to the new M-3 tanks being constructed for the United States Army, these units are to be delivered at the rate of 10 per week by the end of June. NEA photo

Steel Corp. Shipments Average Higher in April

■ Finished steel shipments by the United States Steel Corp. in April totaled 1,687,674 net tons, 32,692 less than 1,720,366 tons shipped in March, the reduction being due to the shorter month. Average daily shipments in April were 56,022 tons, compared with 55,141 in March. April shipments were 779,770 tons greater than the 907,904 tons in April, 1940, an increase of 85 per cent.

For first four months total deliveries were 6,638,945 tons, against 3,994,657 tons in the period in 1940, an increase of 2,644,288 tons, 66 per cent.

(Inter-company shipments not included)
Net Tons

	1941	1940	1939	1938
Jan.	1,682,454	1,145,592	870,866	570,264
Feb.	1,548,451	1,009,256	747,427	522,395
March	1,720,366	931,905	845,108	627,047
April	1,687,674	907,904	771,752	550,551
May	.....	1,084,057	795,689	509,811
June	.....	1,209,684	807,562	524,994
July	.....	1,296,887	745,364	484,611
Aug.	.....	1,455,604	885,636	615,521
Sept.	.....	1,392,838	1,086,683	635,645
Oct.	.....	1,572,408	1,345,855	730,312
Nov.	.....	1,425,352	1,406,205	749,328
Dec.	.....	1,544,623	1,443,969	765,868
Total, by Mos.	.....	14,976,110	11,752,116	7,286,347
Adjustment	.....	.....	*44,865	†29,159
Total	.....	.....	11,707,251	7,315,506

†Increase. *Decrease.

$5,700,000 in Defense Corp. Expansion Awards

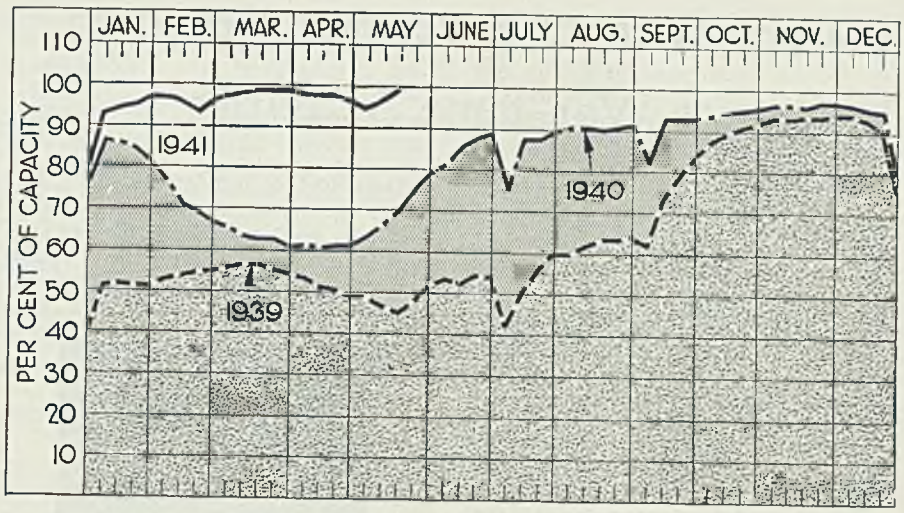
■ Defense Plant Corp. last week reported completion of several plant expansion lease agreements with companies engaged in defense manufacture. Some of the agreements represented commitments additional to prior contracts. Following authorizations were made:

Brewster Aeronautical Corp., Long Island City, N. Y., $350,000 facilities award supplementing $2,350,000 previously authorized, for manufacture of navy aircraft.

Fisher Body Division of General Motors Corp., Detroit, plant facilities expansion undertaken at War department's request at total cost of about $3,957,029. Machinery and equipment will cost about $1,271,115; land and buildings, $2,865,514. Plant will be located at Memphis, Tenn., and will engage in fabrication of aircraft subassemblies.

Packard Motor Car Co., Detroit, additional facilities commitment of $1,150,000 to previously authorized $9,183,333, at request of Navy department. Supplementary award is for marine engines and spare parts fabrication equipment, former for manufacture of aircraft engines for the army.

Air Associates Inc., Bendix, N. J., $311,706 for aircraft accessories equipment manufacturing plant.



PRODUCTION . . . . Up

■ STEELWORKS operations last week increased 2 points to 99½ per cent as effects of coke shortage were overcome. Six districts showed higher rates, one declined and five were unchanged. A year ago the rate was 70 per cent; two years ago it was 45.5 per cent.

Birmingham, Ala. — Addition of one open hearth raised the rate 5 points to 95 per cent, 23 furnaces being in production.

Cincinnati—Gained 3½ points to 92½ per cent, two producers using all open hearths.

St. Louis—Held at 98 per cent, one interest postponing scheduled open-hearth repairs in the interest of continued production.

Chicago—Advance of 1 point to 102½ per cent attained a new all-time high. The previous peak was 102 per cent in the week of April 19. Blast furnace operations are the highest in history, 36 of 40 stacks being active.

New England—Rose 10 points to 100 per cent as last idle open hearths were returned to service.

Buffalo—Relighting of its last idle furnace by Republic Steel Corp. increased the rate 2½ points to 93 per cent.

Pittsburgh—Recovered 5 points to 99 per cent, with a further increase indicated for this week.

Wheeling—Steady at 88 per cent, since late April.

Central eastern seaboard—With some producers showing better operations, strike at Phoenix Iron Co. plant held the rate at 95 per cent.

Cleveland—Removal of an open hearth for repair caused a drop of 1½ points to 95 per cent, which probably will continue this week.

Detroit—Continued at 88 per cent, awaiting completion of open-hearth repairs.

Youngstown, O.—Continued at 95 per cent, with 73 open hearths, three bessemers and 21 blast furnaces active. Carnegie-Illinois Steel Corp. and Youngstown Sheet & Tube Co. each has one open hearth off for repair. Outlook for this week is for a further rise to 96 or 97 per cent. A Carnegie-Illinois blast furnace is scheduled for relighting this week, after relining.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended May 17	Change	Same week 1940	Same week 1939
Pittsburgh	99	+ 5	65	33
Chicago	102.5	+ 1	70	45.5
Eastern Pa. ...	95	None	60	37
Youngstown ...	95	None	54	42
Wheeling	88	None	88	53
Cleveland	95	— 1.5	72	50
Buffalo	93	+ 2.5	53.5	37.5
Birmingham ..	95	+ 5	83	57
New England .	100	+10	56	45
Cincinnati	92.5	+ 3.5	61	44
St. Louis	98	None	47.5	39
Detroit	88	None	80	59
Average ...	99.5	+ 2	70	45.5

Auto Output 127,255

■ Automobile production the week ended May 17 totaled 127,255 units, compared with 132,630 in the preceding week, and 99,030 in the corresponding week a year ago. Strike threats delayed compilations last week. For comparative tabulation see page 38.

■ Simplified list of stock sizes of nonferrous range boilers has been proposed by the Nonferrous Hot Water Tank Manufacturers Association, it was reported last week by the Bureau of Standards. The proposal has been submitted to the industry for consideration and acceptance.

Foundrymen's Convention Keyed to Industry's War-Time Activities

■ ALTHOUGH not the stated keynote of the various sessions, defense activities of the foundry industry influenced considerable of the technical and commercial discussions at the forty-fifth annual convention of the American Foundrymen's Association, held last week at Hotel Pennsylvania, New York.

This was the off year in which the exposition of foundry equipment is omitted, but despite this and the fact the industry's heavy operations tended to curtail attendance, the convention's registration of more than 1400 compared favorably with that of past meetings.

Touching on the industry's role in defense efforts, L. N. Shannon, Stockham Pipe Fittings Co., Birmingham, Ala., in his annual address as association president said:

"The fundamental work of the association—improvement and development of the casting industry along lines of technical control, manufacturing methods, equipment and shop processes—has been of great importance in placing our industry on a footing whereby it can do its share in the nation's industrial preparedness program.

"We believe that in times such as these of national preparedness we have every reason to feel that our work, the work of our many members, our committees, are all of the greatest importance in the national industrial program of production for defense and preparedness."

Membership at Record Level

Attention was called by Mr. Shannon to the consistent expansion in the association's activities and membership in recent years. Membership increased by more than 700 the past year to exceed 4100, a record level, embracing 21 district chapters. New technical committees include one which is starting a five-year program on cupola research and one devoted to analysis of casting defects.

It was announced that a personnel change will be made in the association's management July 1 when C. E. Westover, manager of operations, Burnside Steel Casting Co., Chicago, will become executive vice president, succeeding C. E. Hoyt. The latter, who will continue as manager of exhibits for the association, has been prominently identified with the organization's development. He has been manager of foundry exhibits since 1908, was secretary and treasurer of the association from 1918 through 1936 and executive vice president since 1936.

In recognition of his outstanding service to the foundry industry, Mr. Hoyt was presented the Joseph S. Seaman gold medal at the convention. He was also tendered a bound volume containing testimonials of regards and appreciation from present and past officers of the association. Stating that he desired to share with his associates the honor conferred by the Seaman award, Mr. Hoyt presented bronze replicas of the medal to the following executives of the association: Secretary, R. E. Kennedy; assistant secretary, N. F. Hindle; assistant treasurer, Miss Jane Reininga; and director of safety and hygiene section, E. O. Jones.

H. S. Simpson
Elected President, American Foundrymen's Association

C. E. Westover
Executive Vice president

D. P. Forbes
Vice president

D. J. Reese, engineer, research and development division, International Nickel Co. Inc., New York, received the J. H. Whiting medal for his outstanding contributions to the foundry industry and the American Foundrymen's Association through his work in improvement of cupola melting methods. The award was made by T. S. Hammond, Whiting Corp., Harvey, Ill.

Max Kuniansky, general manager, Lynchburg Foundry Co., Lynchburg, Va., was presented the W. H. McFadden medal, for outstanding contributions to the gray iron industry and to the association. H. Bornstein, Deere & Co., Moline, Ill., made the presentation.

Fred L. Wolf, technical director, Ohio Brass Co., was the recipient of the John A. Penton medal, for his outstanding contributions to the nonferrous and malleable castings industry and the association. The presentation was made by Dr. G. H. Clamer, Ajax Metal Co., Philadelphia.

Nominations Approved

Nominations of officers and directors of the association for the coming year, as announced by the nominating committee a number of weeks ago, were approved by the convention at the annual business meeting. New officials are: President, H. S. Simpson, president, National Engineering Co., Chicago; vice president, D. P. Forbes, president, Gunite Foundries Corp., Rockford, Ill.; directors for three years, R. J. Allen, consulting metallurgist, Worthington Pump & Machinery Corp., Harrison, N. J.; J. G. Coffman, vice president and plant manager, Los Angeles Steel Casting Co. Ltd., Los Angeles; W. J. Corbett, vice president, Atlas Steel Casting Co., Buffalo; M. J. Gregory, factory manager, foundry division, Caterpillar Tractor Co., Peoria, Ill.; and L. N. Shannon, vice president, Stockham Pipe Fittings Co., Birmingham, Ala.

As retiring president, Mr. Shannon, and Henry M. Lane, Gross Isle, Mich., who has long been associated with the technical development of the foundry industry, were made honorary life members of the association.

While praising the contributions of the foundryman to industrial development of the country, the awards address by S. Wells Utley,

Detroit Steel Castings Co., called attention to steady encroachment of government on private initiative. He said in part:

"For upwards of a quarter of a century, and more especially during the last eight years, we have seen many of our fellow citizens endeavoring in every way possible to destroy the incentives which have been the touchstone of our progress. More and more we have surrendered our rights as individuals to government. More and more the central government has taken over the rights of the states and local communities.

"The freedom of the individual to manage his own life has been edged-about by constantly increasing restrictions, the rewards for initiative and daring have been constantly decreasing, while life has been made easier for the lazy and improvident. Most of us as corporate executives are working for government, in that more of the product of our labor is paid out in taxes than is paid to stockholders or used in strengthening the business.

National Wealth Lower

"A decrease in the chances of reward has decreased the hope of the ambitious; a decrease in the penalty for failure has lessened the fear of the indolent. No man up to 30 years of age has ever had any business experience under the old American way of life. No wonder that for the first time in our history a decade has closed with the national wealth appreciably lower than at its beginning, and with no single year in which the national income has equaled that of the best year in the preceding decade. We have set up an absolutely new record for this land of ours, for more than ten years we have gone backward rather than forward."

Cleveland has been selected as the site for the 1942 convention of the association. Meetings, together with an exposition, will be held there the week of April 20.

A well-balanced program of technical papers was presented before the various divisions, a number of the discussions centering around new conditions imposed by the defense program. Cupola operators were urged by D. J. Reese to substitute structural steel scrap for the more generally used rail scrap during the present period of metal conservation. In most cases structural steel scrap will do a better job, he stated, adding that the major difficulties likely to be encountered in using steel scrap other than rails are that the size is less likely to be satisfactory, or that bundles will be too large or that flat plate will tend to decrease the void space of the cupola. As indicative of the broad range in steel scrap that may be cupola melted, Mr. Reese referred to an instance in which a foundry melted 8 tons of bottle caps.

Need for training many of the 4,000,000 additional workers who will be required by defense industries before the end of the year was emphasized by W. F. Patterson, chief of apprenticeship, Division of Labor Standards. More than 30 per cent of these extra workers must be skilled men, he stated. This proportion varies in different industries, ranging up to 65 per cent in the case of construction workers and to 60 per cent for shipyard and foundry employes.

Short-term training programs are necessary to supplement apprentice activities, if the necessary workers are to be supplied quickly, and 90 per cent of this training job must be accomplished by industry, Mr. Patterson continued. However, many of the principles of apprentice training are applicable to the short-term program.

Pointing out that no compulsion in the setting up of training systems is contemplated, the speaker urged industry to seek the co-operation of the government's field technical advisory service when assistance is required in developing such programs or in improving existing practices. He admitted that the army draft has proved a stumbling block in inducing industry to enroll young men for training, and he recommended that management intercede with selective service boards in requesting deferment of men essential to defense work. It was intimated that federal intervention would be forthcoming if relief in this respect is not obtainable from the individual boards.

Apprentice training has progressed rapidly the past year, the number of enrolled apprentices in various industries doubling in that period, although principal gains have been among plants which previously conducted such programs. Mr. Patterson stated that the American Foundrymen's Association has been more active in apprentice training work than any other trade association.

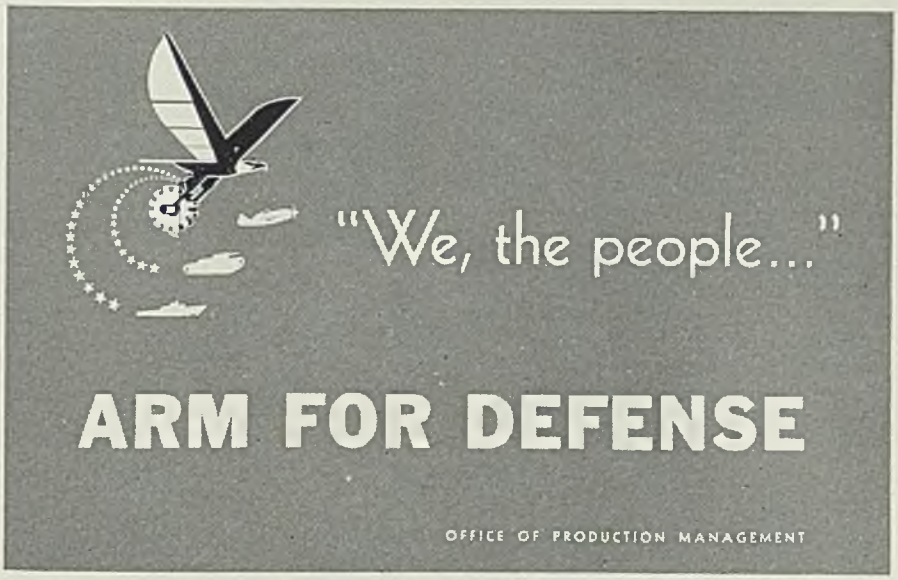
Importance of concentrating on worker training also was stressed by Glenn Gardiner, Forstman Woolen Co., Passaic, N. J., and Elliott Service Co., New York. Mr. Gardiner, who is serving as New Jersey district director, training within industry division, OPM, called attention to the fact that the man-years required to complete the defense appropriations approved by Washington are far in excess of those needed during the most active peacetime periods of the past.

Winners of the American Foundrymen's Association annual apprentice contest for the making of castings and patterns were announced as follows, the first name in each group being the first prize winner:

Gray iron: Henry L. White, Brown & Sharpe Mfg. Co., Providence, R. I.; Chester Blacksmith, Bowler Foundry Co., Cleveland; Burton Bevis, Caterpillar Tractor Co., Peoria, Ill.

Steel: Bob Bina, Crucible Steel Casting Co., Cleveland; H. Novak, Maynard Electric Steel Casting Co.,

Posters Designed To Spur Defense Production



■ First of a series of posters has been issued by the Office of Production Management to be distributed primarily to companies engaged in national defense work. They also will be displayed in postoffices. Posters will carry the official emblem of the OPM. Additional copies are available on request through the Division of Information, Office of Emergency Management, Washington

Milwaukee; Pierre McMullen, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

Nonferrous: Tony Inancich, Standard Brass Works, Milwaukee; John Jasso, Wellman Bronze & Aluminum Co., Cleveland; Kenneth Zinda, Allis-Chalmers Mfg. Co., Milwaukee.

Patternmaking: John Burcsky Master Pattern Co., Cleveland; Arthur Sirevoog, Miehle Printing Press Mfg. Co., Chicago; Albert Jazbinski, Western Pattern Works, Cleveland.

Loan Administrator Believes Overall Increase in Steel Capacity Unnecessary

WASHINGTON

■ Jesse Jones, federal loan administrator said last Friday he did not think an overall increase in steel capacity is necessary and that all requirements for steel can be met "by bolstering up a few plants here and there."

At the same time Mr. Jones announced that the Defense Plant Corp. has appropriated $200,000,000 for machine tool purchases at the request of William S. Knudsen, OPM director. He said the tools will be placed in factories, leased by the Defense Plant Corp., or sold to factories holding defense orders. Mr. Jones said the appropriation will give tool manufacturers an idea of the requirements in the near future and will provide a backlog for industry.

Referring to the steel situation, Mr. Jones told a press conference that some expansion is being considered on the West coast. He said this would probably be in the plants of United States Steel Corp. and Bethlehem Steel Co. Indicating that he did not believe a new steel industry should be established in that region, Mr. Jones stated he has not formally discussed steel construction plans with Henry J. Kaiser, West coast engineer. "Our thought is that the existing manufacturers can increase steel capacity here and there quicker and more soundly than by establishing a completely new plant," Jones said.

A $25,000,000 advance on a $63,000,000 order for aluminum has been made by the Reconstruction Finance Corp. to the Aluminum Co. of Canada Ltd., the loan administrator revealed. He said the Canadian corporation located at Shawinigan Falls, Que., will supply 170,000,000 pounds of aluminum to RFC. Mr. Jones said he was ready to make similar transactions with Canadian metal companies if they could supply United States defense needs.

Warren Lee Pierson, president of the Export-Import bank, is now in Brazil discussing purchases of metals from that country, Mr. Jones said.

Taxes on Identical Group of Major Steel Companies

■ Combined local, state and federal taxes paid by an identical group of major steel companies in 1940 totaled $199,768,613, compared with $95,601,720 in 1929. Taxes per ton of finished steel produced last year by these companies were nearly 80 per cent larger than in 1929, amounting to $4.64, against $2.60.

Per cent of taxes to gross sales in 1940 was 6.3 and 3.9 in 1929. Highest ratio of taxes to gross sales was in the deficit year 1932, calculated as 7.6 per cent.

Net earnings in 1940 were highest since 1929, but were 40 per cent lower than in 1929, although output was 6 per cent greater.

Steel companies representing 90 per cent of the industry last year earned 7.5 per cent on investment, against 9.2 per cent in 1929, and an average of 1.8 per cent for the decade 1930-39.

Dividends paid to steel companies' stockholders last year were equal to 11.7 cents for each dollar in payrolls. The foregoing figures and following table are from compilations by the American Iron and Steel Institute:

	Total Taxes Paid			Production Finished Steel (Net Tons)	Taxes Per Ton	Total Gross Sales	% Taxes To Gross Sales
	State and Local	Federal	Total				
1929...	$59,491,012	$36,110,708	$95,601,720	36,745,816	$2.60	$2,438,000,000	3.9
1930...	57,429,410	20,170,595	77,600,005	28,008,437	2.77	1,864,000,000	4.2
1931...	54,868,439	1,805,527	56,673,966	18,446,273	3.07	1,223,000,000	4.6
1932...	51,561,454	424,838	51,986,292	9,753,230	5.33	683,000,000	7.6
1933 ..	48,685,062	2,656,281	51,341,343	15,694,605	3.27	933,000,000	5.5
1934...	48,463,754	7,559,431	56,023,185	17,487,036	3.20	1,131,000,000	5.0
1935...	50,128,091	15,356,887	65,484,978	22,173,160	2.95	1,481,000,000	4.4
1936...	61,214,236	36,109,532	97,323,768	32,648,307	2.98	2,090,000,000	4.7
1937 ..	83,401,173	73,212,250	156,613,423	35,399,234	4.42	2,738,000,000	5.7
1938...	72,025,232	20,864,578	92,889,810	20,100,939	4.62	1,647,000,000	5.6
1939...	84,384,286	47,851,764	132,236,050	33,496,068	3.95	2,422,000,000	5.5
1940...	92,309,938	107,458,675	199,768,613	43,072,783	4.64	3,147,000,000	6.3

5259 Foundries in United States and Canada

■ Foundries in United States and Canada total 5259, an increase of 26 from 5233 in 1939, according to a survey by *The Foundry*. In United States the number is 4812, up 36 from 4776 in the prior year, while Canada's total decreased 10, from 457 to 447.

	Number of Foundries 1941	1939
Gray iron foundries		
United States ...	3,006	3,054
Canada	331	340
Steel foundries		
United States ...	298	299
Canada	28	28
Electrical steel foundries		
United States ...	217	215
Canada	22	24
Malleable foundries		
United States ...	141	138
Canada	14	11
Exclusive nonferrous foundries		
United States ...	1,445	1,370
Canada	86	92
Nonferrous foundries department of other shops		
United States ...	1,353	1,377
Canada	208	209
Aluminum foundries		
United States ...	2,174	2,129
Canada	250	251
Total nonferrous foundries		
United States ...	2,798	2,747
Canada	294	301
Machine shop foundries		
United States ...	2,894	2,906
Canada	328	338
Pattern shop foundries		
United States ...	2,930	2,941
Canada	305	310
Total, all foundries		
United States ...	4,812	4,776
Canada	447	457
Grand Total, U. S. and Canada	5,259	5,233

Foundry Equipment Index Higher in April

■ Foundry Equipment Manufacturers' Association, Cleveland, reports index of net orders closed for new equipment in April was 405.3, compared with 329.3 in March. Index for repairs was 292.5 in April and 272.7 in March. Total sales index was 377.2 in April and 315.2 in March.

Indexes are per cent of monthly averages of sales to metalworking industries, 1937-39.

Manganese Ore Reserve Established at Pittsburgh

■ Stockpile of 25,000 tons of manganese ore has been established by the government near the Allegheny county airport, in the Pittsburgh district. Owned by the Union Railroad, a subsidiary of United States Steel Corp., land for the stockpile was made available to the government.

Shipments of ore, which is imported, are being made from Baltimore docks, the tract having been placed under guard as a bonded customs warehouse.

"Don't Forget Normal Problems in Defense Rush," Warehousemen Advised

■ WHILE the national defense emergency has posed new and important problems to the steel warehouse industry, the industry must not forget those disturbing long-term problems that it has confronted for years.

This point was stressed at the thirty-second annual convention of the American Steel Warehouse Association, May 12-14, in San Francisco, by Walter S. Doxsey, executive secretary and new president of the association.

"Events of recent months have swept you from a doldrum into a hurricane," Mr. Doxsey told more than 200 delegates. "The gale of demand incident to the defense program has brought on a torrent of new problems which, for the moment, surpass all those that perplexed you 12 months ago. Still, every one of the problems which engaged your attention until recently is basic and fundamental. In the long run practical solutions must be found; for unless our competitive system is supplanted, entirely, these problems will return to harass you just as soon as the present emergency is over. It is possible the desired readjustments can be made more easily and with fewer disturbances during this period of peak demand than under more normal conditions.

"So while I fully realize the seriousness and urgency of the difficulties that you face today, may I ask you to keep the old problems in mind and strive as best you can, whenever you can, to make the economic position of the steel warehouse distributor ever more secure. Indeed, if history repeats, when the storm subsides these changes will be more vital to you than ever before."

Supply Problem "Pressing"

One of the most pressing problems at present is that of supply, Mr. Doxsey said.

"With mill order books virtually closed for the year and with only the haziest of hopes of getting deliveries at any time within 12 months, it takes a crystal gazer of the highest rank to determine what to order, how much to order, when to order, where to order and when to expect it," Mr. Doxsey said. "And if you order on the basis of present demand, where are you going to put the steel when you get it? When you get it, will you be able to sell it?"

He warned the distributors to keep close eye on costs; that pricing policies and methods will be put to a severe test by the avalanche of orders now being handled. The warehouse industry, he pointed out, had not made a general advance in prices and has refused to accept the premiums that have been offered. This policy, he advised, may shortly be frozen by fiat, and if so, escape from rising costs may not readily be had through the medium of higher margins.

Richmond Lewis, retiring president of the association and vice president, Charles C. Lewis Co., Springfield, Mass., outlined the association's activities during the past year, especially as regards preparing to aid in the defense program. The group has worked and is working closely with defense officials and with the Iron and Steel Industry Defense Committee.

Walter S. Doxsey
Elected president, American Steel Warehouse Association

Because of the great demands on warehouse executives' time occasioned by emergency demands, Mr. Lewis suggested a change in executive management and the election of a president who could devote his entire time to the job.

Charles S. Dickerson, general manager of sales, Edgar T. Ward's Sons Co., Pittsburgh, reviewed the association's accomplishments on mill extras over recent years. "No one concern could accomplish these things," he said. "It is the collective and continuous force of the 300 members rallied to a cause, committed to a premise, and presented through the central clearing house which gives us recognition."

"Your Specifications" was the title of an address delivered by Norman Foy, general manager of sales, Republic Steel Corp., Cleveland. E. H. McGinnis, general manager, Union Hardware & Metal Co., spoke on "Business For Profit."

Speaking on "Production and Distribution of Steel and the Public Interest," Edward L. Ryerson Jr., chairman, Inland Steel Co., Chicago, said there doesn't seem to be any real conception on the part of the general public of the distribution of steel products or of the relationship of the industry's productive capacity to the demands of both useful consumption and war requirements.

"Government experts talk in terms of a total need for approximately 89,000,000 tons of ingots for the year 1942," said Mr. Ryerson, "and issue statements indicating that they doubt the ability of the industry to produce more than 84,000,000 tons. A careful survey made by a competent engineer indicates that the industry should be able to produce 91,000,000 tons in 1942, which is more than the total thought to be required. Later, revised estimates made by the experts show that the needs for 1942 will amount to 98,000,000 tons, and therefore it is claimed that it will be impossible to obtain sufficient steel for our needs unless new capacity is added.

"What is the public's reaction to this argument among the experts? It is of far-reaching importance, as it affects not only the attitude of mind of the general public but, unfortunately, also the state of mind of others, even those making up this convention, who should be much more intelligent about the subject.

"If my interpretation is correct, the public thinks that a demand for 98,000,000 tons of steel ingots means that about 75,000,000 to 80,000,000 tons are needed for defense and war purposes, and the assumption probably is that this makes no difference to anyone excepting that it will permit the steel industry to make handsome profits out of such full capacity operations.

Will Seek Inventory Expansion

"Steel buyers, like yourselves, will interpret it to mean that deliveries will be extended and priorities applied, and with resulting difficulties in obtaining stock you and all the steel buyers in the country will enter large orders for future deliveries and attempt, in every way, to expand your own inventories so as to be sure of having adequate stocks on hand.

"The real fact, which the public fails to comprehend, is that the estimate of a demand for 98,000,000 tons is based upon a war demand of approximately 28,000,000 to 30,000,000 tons and a requirement of approximately 70,000,000 tons for peacetime needs.

"The whole point of this discus-

sion is my desire to bring to the public's attention the fact that if they expect to pursue a war production program, and, at the same time, meet every increased demand of normal consumption, based on greatly expanded national income of $90,000,000,000 or more, the steel industry will have serious difficulty in fulfilling that need unless large expenditures and essential supplies are used for expansion of existing capacity."

Mr. Ryerson said that what happens to the steel industry is more vital than what may happen to any other commercial or industrial situation. Consequently, he said, he is convinced that a better knowledge and a clearer understanding of the problem by the general public is essential.

He urged co-operative, organized public relations, acting through such mediums as the Iron and Steel Institute and the Steel Warehouse Association, as well as individual company management.

The speaker said general acceptance of the importance of the service that the steel warehouse renders has only recently become established in the minds of the steel producers. Mr. Ryerson said that for the steel producer a radical change has taken place during the past 12 months which may not as yet have reached the point where warehouses as buyers are required to obtain priorities so as to secure tonnage allotments from the producers. However, he said, it appears as though we are moving rapidly in that direction and if this continues that point will arrive all too soon. Such a situation, he declared, would be unfortunate for everyone—producers, distributors, consumers, and the general public.

He referred to mill sales practices which he criticized in an address a year ago and said some of the abuses had been corrected by developments within the past year.

Future in Alloys

Increasing armament demands will modify reserves of this or that metal or alloy which presently may appear sufficient, stated F. W. Krebs, Super Steels Inc., Cleveland, in his address, "The Immediate Future in Alloys."

He said the ingenuity of engineers, metallurgists, and men of science will be taxed to solve these problems. Habit and personal prejudices for this or that element are yielding to the necessities of the day. Mr. Krebs said the supply of strategic metals has a direct bearing upon the conduct of warehouse business.

Speaking with respect to nickel steels, he stated, the Division of Priorities has recognized the essential services which the warehouse industry provides and he is of the opinion an effort is being made to provide warehouse operators with nickel bearing steels for defense purposes and for essential industry and services with the least inconvenience to the distributor and his customer. He said, after attending a meeting at Washington, he was convinced that the requirements of the warehouse industry in relation to its position in serving defense demands for steel products would receive equitable treatment when other priorities may be necessary.

In an address, "Labor Relations and National Defense," Almon Roth, president, San Francisco Employers Council, dealt primarily with problems business men have had to contend with and the demands of unions, especially on the Pacific Coast. He pointed out it was necessary to show union officials what they and their members would actually lose from the standpoint of union labor dues and direct loss of pay to union members if business houses decided to close shop.

Mr. Doxsey, who has been executive secretary of the organization since 1934, was elected president. Other officers elected were: Vice presidents, E. D. Graff, Joseph T. Ryerson & Son Inc., Chicago, and C. H. Bradley, W. J. Holliday & Co., Indianapolis; treasurer, A. W. Herron Jr., Jones & Laughlin Steel Corp., Pittsburgh.

The executive committee of the association, in addition to the above named officers, includes: Guy P. Bible, Horace T. Potts Co., Philadelphia; Lester Brion, Peter A. Frasse & Co. Inc., New York; A. C. Castle, A. M. Castle & Co., Chicago; A. O. Fulton, Wheelock, Lovejoy & Co. Inc., Cambridge, Mass.; Charles Heggie, Scully Steel Products Co., Chicago; E. Jungquist, Percival Steel & Supply Co., Los Angeles; Richmond Lewis, Charles C. Lewis Co., Springfield, Mass.; E. L. Parker, Edgar T. Ward's Sons Co., Pittsburgh; J. F. Rogers, Beals, McCarthy & Rogers, Buffalo; I. W. Tull, J. M. Tull Metal & Supply Co., Atlanta, Ga.

Giving Them Steel for Ashes

■ Symbolic of American steelworkers' contribution to the British cause was the exchange of steel for ashes in Public Square, Cleveland, when Miss Flora Wright arrived there recently with the British tea kitchen "Iron Duke," from which she and other workers of the British War Relief Society had served refreshments to their countrymen under fire for many months.

Miss Wright is seen accepting a copper-bottom stainless steel stockpot, filled with flowers, from Donald B. Gillies, vice president, Republic Steel Corp.

She is holding a block of steel presented by Harry L. Allen Jr., open-hearth worker at Republic's Cleveland plant (right), in exchange for a small vial containing some of the ashes which drifted into the tea kitchen under fire in London. The steel was inscribed "To the British War Relief Society as a symbol of our aid in the defense of Democracy." George Warburton, British pro-consul in Cleveland (left) presided.

Britain Takes 41% of March Steel Exports

■ IRON and steel exports, excluding scrap, in March totaled 512,844 gross tons, valued at $37,332,776, a reduction of 2.5 per cent from the 525,862 tons valued at $34,637,943 in February.

Despite a steady downward trend over the entire January-March period, cumulative exports at 1,692,504 tons valued at $111,661,722 were greater than the shipments of the comparable period of 1940, 1,289,701 tons valued at $98,735,419.

As in recent months the United Kingdom took the largest share of exports in March, 213,673 tons, including 110,712 tons of nonalloy and 25,281 tons of alloy ingots, blooms, billets, and 25,000 tons of pig iron.

Ranking markets among the American republics were Brazil, whose takings dropped to 22,826 tons from the February figure of 25,526 tons, and Argentina, whose purchases increased sharply to 21,100 tons from the 12,988 tons of the preceding month.

Scrap exports in March totaled 54,383 tons, compared with 74,378 tons in February and 206,928 tons in March, 1940.

Reaching their highest point in 1941, imports of iron and steel—other than scrap—totaled 872 tons, valued at $206,537 in March. Receipts in February amounted to only 646 tons valued at $143,126.

Scrap imports rose sharply to 5401 tons valued at $67,944 in March from the 150 tons valued at $2186 received in February. Imports for the first three months of 1941 stand at 5568 tons valued at $70,201, in contrast to the 744 tons valued at $8124 imported during the comparable period of 1940.

Accompanying figures are from the Durable Materials Unit of the Bureau of Foreign and Domestic Commerce.

IRON AND STEEL FOREIGN TRADE STATISTICS

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	Mar. 1941	Mar. 1940	Jan. through Mar. 1941
Pig iron	27,464	26,146	154,629
Ferromanganese and spiegeleisen	308	301	1,115
*Ferrochrome	1,177	....	5,317
Other ferroalloys	648	479	1,426
Ingots, blooms, etc:			
Not containing alloy	124,956	80,874	441,491
Alloy, incl. stainless	33,947	285	129,706
Steel bars, cold fin.	11,751	3,794	42,530
Bars, iron	831	2,651	1,138
Bars, concrete	15,380	13,880	36,701
Other steel bars:			
Not containing alloy	20,025	38,852	60,036
Stainless steel	86	65	202
Alloy, not stainless	4,774	2,193	13,522
Wire rods	11,184	19,124	34,631
Boiler plate	1,513	1,463	13,223
Other plates, not fab.:			
Not containing alloy	31,702	32,641	107,999
Stainless steel	14	51	140
Alloy, not stainless	390	148	1,143
Skelp iron or steel	15,941	2,420	37,310
Sheets, galv. iron	1,004	610	4,006
Sheets, galv. steel	10,269	14,780	26,421
Sheets, "black" steel:			
Not containing alloy	36,169	44,372	106,378
Stainless steel	167	176	295
Alloy, not stainless	775	636	1,860
Sheets, black iron	848	5,679	2,548
Strip steel, cold-rolled:			
Not containing alloy	3,858	4,299	15,975
Stainless steel	32	41	130
Alloy, not stainless	45	31	157
Strip steel, hot-rolled:			
Not containing alloy	7,976	12,868	26,896
Stainless steel	14	18	18
Alloy, not stainless	101	103	145
Tin plate, taggers' tin	19,849	44,376	43,078
Terneplate (incl. long ternes)	823	528	2,258
Tanks, except lined	1,077	2,380	7,429
Shapes, not fabricated	22,980	16,751	94,744
Shapes, fabricated	9,477	5,479	19,265
Plates, fabricated	4,425	572	9,726
Metal lath	230	182	456
Frames and sashes	143	128	591
Sheet piling	477	238	2,803
Rails, 60 lbs.	6,255	10,548	36,294
Rails, under 60 lbs.	8,248	858	14,861
Rails, relaying	1,026	1,510	2,700
Rails, fastenings	1,944	1,025	6,398
Switches, frogs, crsgs.	218	606	627
Railroad spikes	462	491	1,936
R. R. bolts, nuts, etc.	88	119	480
Boiler tubes, seamless	4,232	1,953	11,682
Boiler tubes, welded	283	167	578
Pipe:			
Seamless casing and oil-line	6,738	8,355	14,805
Do., welded	964	3,845	2,706
Seamless black	2,153	4,633	6,005
Pipe fittings:			
Mall.-iron screwed	396	392	1,240
Cast-iron screwed	103	272	269
Pipe and fittings for:			
Cast-iron pressure	5,272	1,443	9,539
Cast-iron soil	1,476	864	3,536
Pipe, welded:			
Black steel	5,393	3,542	11,265
Black wrought-iron	316	351	1,283
Galvanized steel	6,426	3,549	15,745
Galv. wrought-iron	468	848	1,578
All other pipe, fittings	1,082	1,542	8,854
Wire:			
Plain iron or steel	6,048	9,238	15,711
Galvanized	4,793	4,564	14,013
Barbed	6,894	2,060	12,561
Woven-wire fencing	294	389	929
Woven-wire sc'n cloth:			
Insect	109	85	281
Other	217	191	595
Wire rope and cable	731	1,011	3,491
Wire strand	38	161	412
Electric welding rods	471	303	1,671
†Card clothing	....	1	....
Other wire	959	1,343	3,002
Wire nails	4,191	4,254	9,664
Horseshoe nails	200	85	591
Tacks	56	65	232
Other nails, staples	986	419	1,777
Ordinary bolts, machine screws	3,948	1,199	10,059
Castings:			
Gray-iron (incl. semisteel)	813	426	2,223
Malleable-iron	394	174	1,079
Steel, not alloy	271	177	681
Alloy steel, incl. stainless	64	278	292
Car wheels, tires, axles:			
Wheels and tires	772	1,724	2,914
Axles, no wheels	182	240	292
Axles, with wheels	49	11	100
Horseshoes and calks	22	100	137
Forgings, n.e.s.:			
Not containing alloy	3,357	1,709	8,247
Alloy, incl. stainless	612	318	1,731
Total	512,844	457,052	1,692,504
Scrap, iron and steel:		205,041	
*No. 1 heavy melt.	15,155		44,643
*No. 2 heavy melt.	23,788		69,902
*Baled and bundled	2,471		8,689
*Cast and burnt	2,686		14,451
*Other	9,838		32,386
Scrap, tin plate	....	702	....
Tin plate circles, strips, cobbles, etc.	300	533	1,510
Waste-waste tin plate	145	466	1,983
Terneplate clippings and scrap	....	186	252
Total scrap	54,383	206,928	173,816
GRAND TOTAL	567,227	663,980	1,866,320
Iron ore	698	1,830	1,270

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

ORIGIN OF MARCH IMPORTS

Gross Tons

	Iron ore	Manganese ore
Canada	8,996	....
Mexico	278	43
Cuba	19,600	8,629
Chile	152,680	....
Philippine Is.	....	6,170
Brazil	....	13,844
Netherlands Indies	....	286
British India	....	6,042
Soviet Russia	....	1,625
South Africa	....	1,727
Gold Coast	....	8,975
Total	181,554	47,341

	Sheets, skelp and sawplate	Steel bars
Canada	1	1
Sweden	1	60
Total	2	61

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

Gross Tons

	1941 Exports	1941 Imports	1940 Exports	1940 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	.....	.....	612,906	6,674
May	.....	.....	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

UNITED STATES IMPORTS FOR CONSUMPTION OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	Mar. 1941	Mar. 1940	Jan. through Mar. 1941
Pig iron	.....	583	....
Sponge iron	.....	69	23
Ferromanganese (1)	.....	835	11
Spiegeleisen	.....	18	....
Ferrochrome (2)	.....	.....	.....
Ferrosilicon (3)	114	63	204
Other ferroalloys (4)	.....	14	.....
Steel ingots, blooms, etc.	.....	.....	.....
Billets, solid or hollow	55	135	55
Concrete reinforc. bars	.....	7	.....
Hollow bar, drill steel	61	186	80
Bars, solid or hollow	23	472	60
Iron slabs	.....	.....	.....
Iron bars	15	34	15
Wire rods	66	930	87
Boiler and other plate (including skelp)	.....	2	4
Sheets, skelp, saw plate	2	29	4
Die blocks, blanks, etc.	.....	2	.....
Tin plate, taggers' tin and terneplate	4	12	26
Structural shapes	.....	235	.....
Sashes and frames	24	.....	67
Sheet piling	.....	.....	.....
Rails and track material	209	2	228
Cast-iron pipe, fittings	.....	.....	.....
Mall. iron pipe fittings	.....	.....	.....
Welded pipe	.....	.....	.....
Other pipe	73	612	414
Cotton ties	.....	2	.....
Other hoops and bands	.....	100	.....
Barbed wire	.....	.....	.....
Round iron, steel wire	.....	170	24
Teleg., telephone wire	.....	.....	.....
Flat wire, steel strips	162	336	449
Wire rope and strand	31	97	71
Other wire	.....	.....	1
Nails, tacks, staples	3	21	7
Bolts, nuts, and rivets	6	53	10
Horse and mule shoes	.....	.....	.....
Castings and forgings	24	48	84
Total	872	5,067	1,924
Iron and steel scrap	5,401	29	5,568
GRAND TOTAL	6,273	5,096	7,492

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

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

Reduction in nondefense spending, tax reforms urged on Congress . . . Industry must supply own blanks in inventory control plan . . . Full priorities control by Office of Production Management voted by Senate . . . United States and Canada to exchange data on strategic materials supplies . . . New reports on adequacy of steel capacity expected soon

WASHINGTON

■ DRASTIC reduction in nondefense spending and corrections of inequalities in the taxes on durable goods industries was urged upon Congress last week by William J. Kelly, president, Machinery and Allied Products Institute, Chicago.

In a statement to the House Ways and Means Committee, Mr. Kelly submitted four recommendations:

1. Carryover of corporate net losses should be permitted for a minimum of six years under the normal income tax law.

2. Corporate normal income tax rates should be increased or surtax on normal income levied; increase in present excess profits taxes should be avoided.

3. Base years under the excess profits tax for constituting credit under the income alternative should be changed from 1936-39 to 1935-39 with privilege of selecting three of five years for computing average income credit.

4. Unused excess profits tax credit should be carried forward for at least six years instead of two years as now permitted.

Inventory Compliance Statements Distributed

More than 200,000 compliance statements have been distributed to suppliers who in turn are to give them to customers under the Priorities Division's metal inventory control, officials said last week. Customers who are unable to obtain statements from suppliers can get them from the Priorities Division, OPM, Washington. The OPM will not supply the blanks after June but is attempting to work out a uniform statement that can be printed, mimeographed, or typewritten at the expense of the suppliers or customers. According to the officials, the strain on the government's printing facilities will be too great to permit OPM to send out 200,000 blanks every 30 days. An interpretive statement based on questions dealers have been asking regarding the orders will be issued early this week.

Beryllium Plant Construction, Purchase of Ore, Proposed

A $25,000,000 appropriation for purchase of beryllium ore and erection of a reduction plant for the production of beryllium oxide and alloys by the Reconstruction Finance Corp. is proposed in a bill introduced by Senator Brewster, Maine.

The bill authorizes RFC to lease through the Defense Plant Corp. plants and equipment that may be utilized in the manufacture of beryllium alloys. It has been referred to the Committee on Banking and Currency.

Division of Defense Aid Reports Established in OEM

President Roosevelt has established in the Office for Emergency Management a Division of Defense Aid Reports, to provide "a central channel for the clearance of transactions and reports" under the lease-lend act.

Maj. Gen. James H. Burns of the United States Army has been designated executive officer of the division. The presidential order instructed the division to co-ordinate the processing of requests for aid received from foreign nations.

Issues Priorities Instructions For Nickel-Bearing Steels

A 37-page booklet containing full instructions regarding priorities for nickel-bearing steel has been issued by OPM for general distribution. Copies may be obtained from the Priorities Division, Office of Production Management, Social Security building, Washington.

Dominick To Handle Priorities For Merchant Ship Program

Priority questions involving supplies and equipment for the merchant shipbuilding program will be handled by Gayer G. Dominick, New York. Mr. Dominick has been appointed chief liaison officer between OPM's Priorities Division and the Maritime Commission.

Dexter A. Tutein, Tutein Corp., New York, has been added to the OPACS staff.

Administration Tightening Control Over Arms Output

Senate approval was expected late last week of two defense measures which would tighten the administration's control over armament production.

One would give the President authority to exercise control over the flow of virtually all articles produced by American industry.

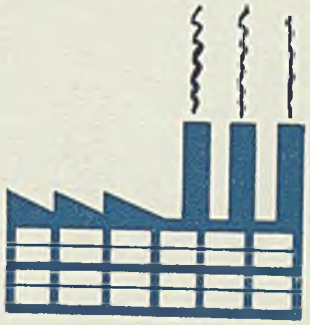
The other would add $1,500,000,000 to the Reconstruction Finance Corp.'s funds to finance the construction and operation of defense plants at that agency's discretion.

OPM Priorities Control Continued by U. S. Senate

Senate last week voted to give OPM undisputed authority to control priorities on defense materials.

The Senate struck out of a House-approved bill a provision to establish a priorities division independent of the defense agency and

WHICH SIDE OF THE FENCE WILL YOU BE ON?



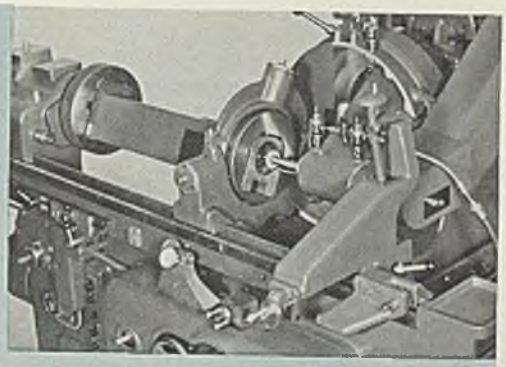
Plan now for future profits with Jones & Lamson versatile equipment

TODAY

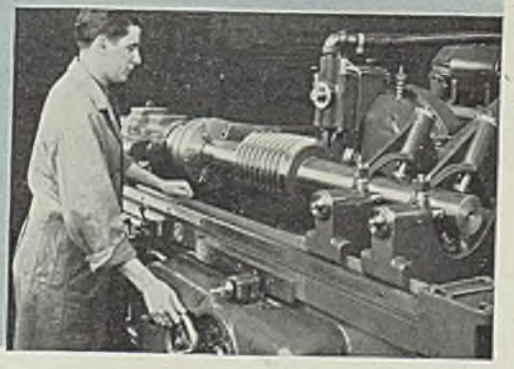
Every wheel that can be turned to speed armament production must run night and day. Under these conditions the versatility, precision, power and productiveness of Jones & Lamson equipment will enable you to make outstanding contributions to national defense.

TOMORROW

Post-war competition will relentlessly eliminate any plant whose equipment cannot easily turn to low cost production for peace-time demand. But wise purchases of Jones & Lamson equipment, made today, will leave you on the right side of the fence tomorrow. That's why it pays to put your machine tool problems up to Jones & Lamson engineers.



TODAY this Jones & Lamson Automatic Thread Grinder may be speeding armaments, grinding internal threads in Gun Breech Blocks, but—TOMORROW Jones & Lamson Automatic Thread Grinders undoubtedly will help their farsighted owners to meet peace-time competition with low production costs

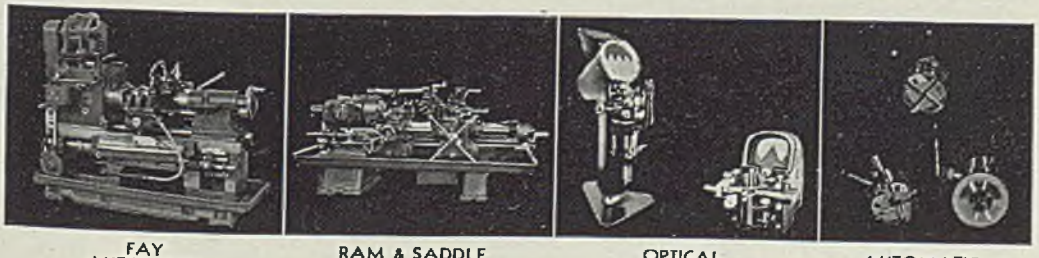


JONES & LAMSON MACHINE CO.

Springfield, Vermont, U. S. A.

Manufacturers of Ram & Saddle Type Universal Turret Lathes . . . Fay Automatic Lathes . . . Automatic Thread Grinding Machines . . . Comparators . . . Tangent and Radial, Stationary and Revolving Dies and Chasers

PROFIT PRODUCING MACHINE TOOLS



FAY AUTOMATIC LATHES

RAM & SADDLE TYPE UNIVERSAL TURRET LATHES

OPTICAL COMPARATORS

AUTOMATIC OPENING DIE HEADS

operating under the Army and Navy Munitions Board.

The proposal to remove priorities control from OPM was contained in an amendment to the Vinson bill submitted by Representative Cox, Georgia, who said the change was an attempt to "freeze Mr. Stettinius (E. R. Stettinius Jr., director of priorities) into the organization."

Mr. Stettinius asked the committee to remove the amendment from the Vinson bill. Priorities must be geared with the procurement and production of defense needs and control of prices and consumption in the civilian field to be effective, he explained. Removal of the division from OPM would upset the present balance and would be "inadvisable," he added.

William S. Knudsen, OPM director general, and Leon Henderson, OPACS administrator, also told the committee the priorities system is working well under the present setup and should not be changed.

Metals Reserve Enters Pact To Purchase Reserve Tin

Reconstruction Finance Corp. and the Metals Reserve Co. have entered into an agreement with the International Tin Committee covering purchase of pig tin for six months beginning July 1. Agreement will be extended automatically for another six months if the committee's plan for regulation of production and export is extended.

Agreement is a continuation of a similar arrangement effective from July 1, 1940, to July 1 this year. Under the new pact the Metals Reserve Co. has agreed to buy 37,500 tons of tin which it will hold as a reserve stock.

Supply of tin is controlled by the tin committee and the agreement calls for maintaining the quota of permissible tin exports established under the agreement of June 29, 1940, so that reserves can be acquired without interfering with current demand or affecting current price.

Metals Reserve has agreed to buy its reserve stock at 50 cents a pound c.i.f. United States ports to be specified by the company.

Iron, Steel Stocks Lower, Shipments Higher in March

March index of the value of iron and steel manufacturers' inventories was 123.8 compared with 127 in February and 111.1 in March of last year, taking Dec. 31, 1938, at 100 according to the monthly industry survey of the Department of Commerce.

Index of the value of new orders received by iron and steel mills in March was 295 compared with the same figure in February and 101 in March of last year taking January, 1939, at 100.

Commerce Department's figures show also that the index of the value of steel manufacturers' shipments in March was 209 compared with 198 in February and 126 in March of last year.

In March there was a 15 per cent increase over February in the value of iron and steel manufacturers' unfilled orders. There was an increase of 254 per cent in March of this year over the same month of last year in the value of the unfilled orders.

Hauck, Dunn Reports on Steel Capacity To Be Issued Soon

W. A. Hauck, OPM steel consultant, has returned from a three-week survey of the steel situation in the middle west and the Pacific coast.

His inspection of steel plants and sites for potential plants in those areas indicated possible future action by the OPM.

During his trip Mr. Hauck visited Los Angeles, San Francisco, Seattle, Salt Lake City and Provo, Utah; Pueblo, Colo., and other cities. He is preparing a report on findings for Samuel R. Fuller Jr., head of the OPM materials branch.

President Roosevelt has extended by a week the deadline for filing of the supplemental report on steel capacity by Gano Dunn, Office of Production Management consultant. The extension was requested by Mr. Dunn to enable him to include complete April tonnage figures. The report is now scheduled to be presented to the President at the end of May.

U. S. and Canada To Exchange Strategic Materials Data

United States and Canada will exchange vital information on supplies of strategic raw materials through a new joint committee announced last week. Committee will be known as the Materials Co-ordinating Committee. Members are: E. R. Stettinius Jr. and W. L. Batt of the United States; G. C. Bateman and H. J. Symington, members of the Canadian Wartime Industry Control Board. They were nominated by W. S. Knudsen and C. D. Howe, Canadian minister of munitions and supply.

Commitments for New Defense Plants Total $3,083,000,000

Commitments totaling $1,915,000,000 for new factory facilities for building an "arsenal of democracy" had been made by the government to March 30, OPM announced last week. The money is being used to construct plants and machinery to make airplanes, guns, tanks, machine tools and other defense equipment.

Commitments by private industry to build such facilities for which certificates of necessity had been issued or were pending March 15 totaled $977,000,000. This figure does not include funds spent by private industry for defense plants for which certificates of necessity were not requested.

All commitments by the government, plus private financing under certificates of necessity, amount to $2,892,000,000. If to this are added British commitments amounting to $191,000,000, the total reaches $3,083,000,000.

Allocations Made for 87,260 National Defense Housing Units

Allocations have been made for 87,260 family dwelling units under the defense housing program, according to C. F. Palmer, co-ordinator. Of these, 61,512 units are for civilian workers and 25,748 for enlisted personnel.

The houses are located in 144 localities in 47 states and territories. Largest allocation was for 5000 units in the Pittsburgh area for workers in the iron and steel industry.

Thirteen new localities were added to the list of defense areas in which houses for defense workers can be financed under the national housing act upon recommendation of Defense Housing Co-ordinator C. F. Palmer.

The areas include: Rockford, Ill.; Kingsbury-LaPorte, Ind.; Leesville-DeRidder, La.; Jackson and Meridian, Miss.; Greenport, Long Island, N. Y.; Jacksonville, N. C.; Lorain-Elyria, O.; Monessen, Pa.; Newport and Quonset Point, R. I.; Anchorage and Sitka, Alaska.

Simplified List of Copper Conductors Proposed

Adoption of a simplified list of stock sizes of copper conductors as a means of reducing unnecessary inventories of copper wire has been proposed, according to the National Bureau of Standards of the Department of Commerce. The simplified list was drafted at a conference held under auspices of the Division of Simplified Practice and is being submitted to the industry for acceptance.

National Electrical Contractors Association, sponsors of the proposed recommendation, stated that appreciable copper tonnages now are tied up in inventories of slow-moving sizes, mainly in larger sizes, whose place could be more efficiently filled by smaller cables in multiple. The association suggested the adoption of a list of 19 stock sizes from No. 14 (American wire gage) to 500,000 circular mills.

Military Requirements To Take All Aluminum Supplies by 1942, Says Batt

■ ALL AVAILABLE aluminum will be required for the armed forces in 1942, leaving none for civilian or even "indirect" military requirements, W. L. Batt, deputy director of OPM's production division, told a Senate committee last week.

At the peak of the armament program, Mr. Batt estimated, aircraft aluminum needs will be 900,000,000 pounds a year and other military requirements will total about 300,000,000 pounds.

The United States, he said, can meet the military requirements of 1,200,000,000 pounds in 1942 provided it has "complete control over 310,000,000 pounds of scrap and secondary aluminum." This country can import from Canada 110,000,000 pounds.

Aluminum constitutes from 54 to 80 per cent of the weight of airplanes, including motors. Last fall the National Defense Advisory Committee stated that aluminum supplies would be adequate for both military and civilian needs. Mr. Batt said the estimates of supplies had proved reliable but that estimates of needs were inadequate.

The heavy bomber program recently announced by President Roosevelt has put a new face on the aluminum situation, he remarked. If the Douglas B-19 heavy bomber becomes the tactical weapon of the future, aluminum demand will be raised further as each B-19 requires 80,000 pounds.

He testified that OPM now is proceeding to obtain an additional 500,000,000 pounds per year.

Steel Raised for Reynolds Aluminum Plant in Washington

Steel has been raised for the new Reynolds Metals Co. aluminum plant near Longview, Wash., and production will be under way by early fall. The new plant will have capacity for 60,000,000 pounds.

Secondary Aluminum Outlook Rapidly Becoming Critical

DETROIT

With half the country's sources for secondary aluminum ingot shut down and the remainder operating on a sharply curtailed schedule, the supply situation soon will become acute.

One smelter here reports scrap receipts for the past month were only 65,000 pounds, or 18 per cent of the normal volume. Already six months behind on orders from automotive accounts, this company has been closed for the past week and now has on hand less than one day's run of scrap. Normal inventory is about 60 days' supply.

Smelters blame the situation on government attempts to regulate scrap aluminum. They say their advice was disregarded entirely, with the result that users of aluminum now are buying material from some of the 10,000 dealers and 25,000 peddlers handling aluminum scrap, on a cash basis, with no records kept of transactions and obviously no reports going to Washington.

For example, builders of slot machines are reported getting all the aluminum they need for their machines, while a supplier of castings for defense equipment is forced to close because he cannot buy from smelters.

Large banks of secondary aluminum have permitted automobile engine builders to continue without hold-up. Users of virgin aluminum for pistons have switched to No. 12 secondary. Companies using high-grade secondary have reinforced their supplies with lower grade material and so far have experienced no interruptions.

Answer to the situation, suggested by local interests, is rigid licensing of all aluminum in the country, requiring all scrap material to clear through smelters, and making all other transactions illegal. Similar practice is understood to be followed in warring nations at present.

Compulsory Subcontracting May Be Provided in New Defense Orders

■ COMPULSORY subcontracting to enforce fuller utilization of the country's total productive capacity may be effected by the government unless voluntary subcontracting by primary defense contractors spreads more rapidly.

This warning was voiced last week by Robert L. Mehornay, chief of OPM's Defense Contract Service and by Joseph L. Trecker, co-chief of subcontracting in the Defense Contract Service.

Mr. Trecker, speaking before a regional meeting of the National Association of Manufacturers in San Francisco, estimated that not more than 50 per cent of productive capacity is being used at present, and advocated new measures, if necessary, to increase subcontracting.

Want Voluntary Co-operation

"We are attempting to obtain production in the democratic way by voluntary co-operation and are depending on the holder of the prime contract to do his utmost in attaining that production. However, I may say advisedly that faced as we are with the need for production, if we are unable to obtain that production and what we know to be the necessary volume of assistance by subcontracting on a voluntary basis, then we will have but one alternative and that is to employ the necessary means to accomplish our ends.

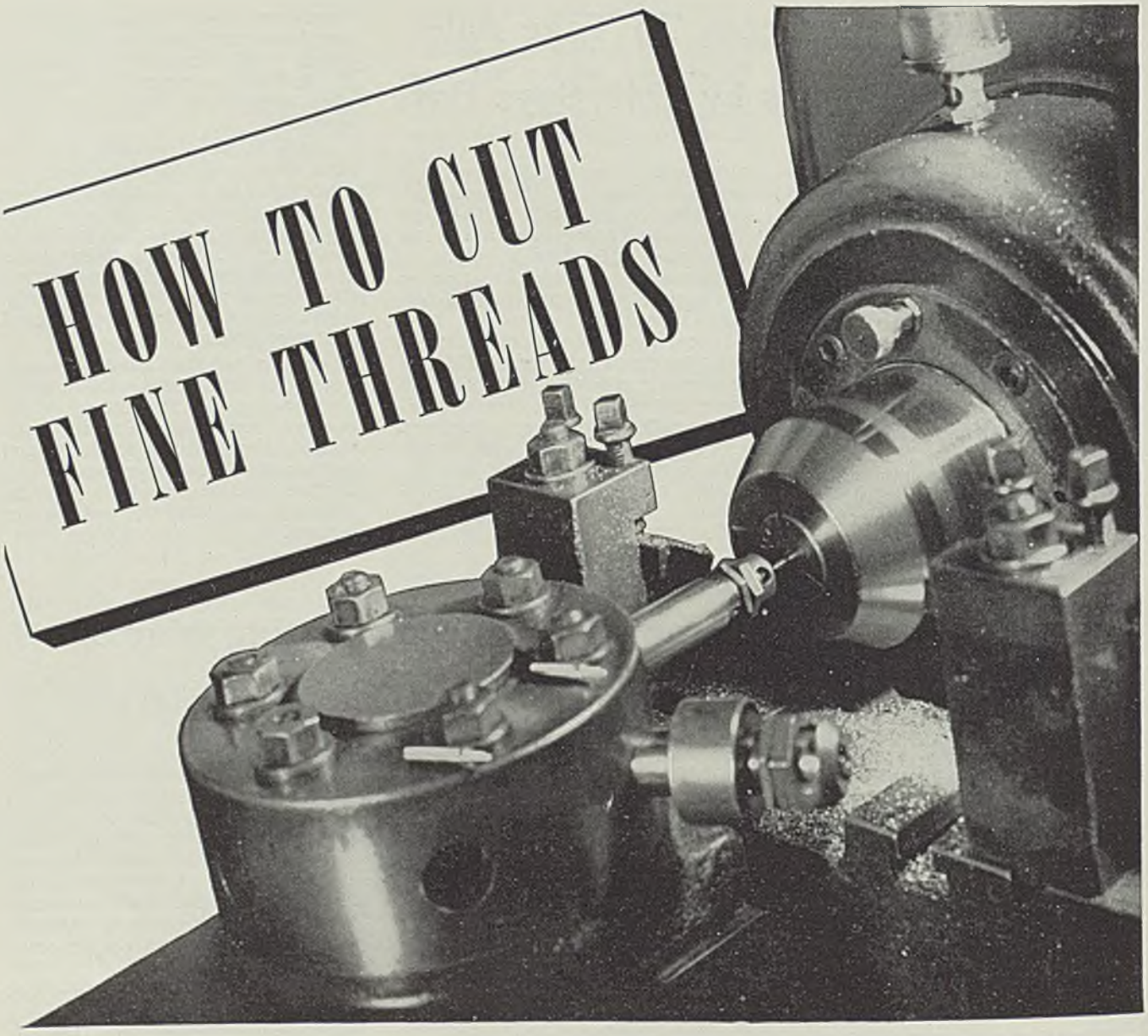
"There are several ways in which this may be done. On new contracts we can decree that a certain portion of the work must be given to the small producer or the otherwise unengaged producer. We can employ the use of priorities on the distribution of machinery necessary to perform the contract. We can employ other restrictives or accelerating means."

Mr. Trecker assured prime contractors they cannot "run out of a job" because the task is so tremendous that there will be all the work any plant can handle. Subcontractors were advised to "go out and get a job."

Mr. Mehornay, in an address before the Mid-Central War Resources Board at Kansas City, Mo., said that 4750 direct contractors are using some 28,000 subcontractors and sub-subcontractors. Urging manufacturers to overcome the practical and theoretical difficulties in farming out work, he pointed out several examples of where highly intricate jobs had been divided among many subcontractors. The Allison airplane engine, he said, is being built by 100 different subcontractors, of whom only eight are subsidiaries of General Motors Corp. which holds the primary contract.

Mr. Mehornay said he was convinced that a fixed percentage of subcontracting might well be specified in new contracts and that machine tools and materials be rationed to enforce subcontracting.

HOW TO CUT FINE THREADS



LOOK at this brass stud—used for mounting instrument magnets. After being formed and the long end threaded on an automatic screw machine, the two threads on the short end are cut on a No. 1 W & S Turret Lathe—speed 1200 R.P.M. The larger thread is .112″-40, the smaller one only .057″-104.

The manufacturer, one of the largest concerns in the country, finds High Speed Steel "*Acorn*" Dies the best solution for this job.

"*Acorn*" Dies, because of their accuracy and their positive, finely controlled adjustment, are the ideal tools for cutting fine threads. Originally invented and manufactured by "G.T.D. Greenfield," they are typical of the contributions to modern manufacturing methods that have made "G.T.D. Greenfield" the country's leading and largest manufacturer of screw threading tools. Our complete catalog will be sent gladly on request.

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Mirrors of MOTORDOM

By A. H. ALLEN
Detroit Editor, STEEL

Chromium plating specifications revised to permit reduction in amount of nickel required. Not feasible to eliminate nickel entirely . . . New copper plating processes developed which would relieve shortages of sodium cyanide and Rochelle salt . . . Electrolytic color plating of metals offers wide range of finishes, suitable in some cases to replace chromium . . . Pattern plate another recent development

DETROIT

■ BY FAR the most popular type of decorative electroplating in use today is chromium, which in most cases comprises a "flash" layer of chromium over an underplate of nickel or copper and nickel. In addition to automobiles, refrigerators, household appliances and a host of other consumer products make extensive use of this type of plating which, applied to zinc, steel, copper or brass, is at once decorative and fairly corrosion resistant.

Depending as it does upon nickel, which is now being rationed because of demands of the defense program, chromium plating faces either elimination or some revision. Many users of chrome plating, automotive included, are wondering how to proceed and are searching for substitutions or for some way to conserve on the nickel required.

Tentative specifications for nickel and chromium plating on steel adopted by the American Electroplaters Society and the American Society for Testing Materials, and followed until recent restrictions on nickel, are as follows:

	General service	Mild service
	Minimum thickness on significant surfaces	
	Inch	Inch
Copper and nickel.....	0.00075	0.0004
Final nickel	0.0004	0.0002
Average chromium*....	0.00002	0.00002

*Recently it has been suggested that this requirement might be changed to 0.00001-inch minimum, measured by the spot test with concentrated HCl.

General Motors Corp. specifications for chromium plating on steel are divided into six classifications as follows:

	Minimum thickness on significant surfaces, inch					
	AAA	AA	A	AB	B	C
Copper and nickel	0.002	0.0015	0.001	0.00075	0.0005	0.0002
Final nickel	0.0006	0.0006	0.0003	0.0003	0.0002	*
Chromium	0.000015	0.000015	0.000010	0.000010	0.000010	0.000010

*Combined copper and nickel coating is practically all nickel.

AAA and AA specifications apply only to Cadillac and General Motors Truck products. A and AB limits apply to exterior parts on cars produced by other divisions, B and C to interior applications.

Revising Specifications

It should be pointed out that these minimum specifications currently are in process of revision because of the nickel shortage. What is being done is to maintain the same limits on combined copper and nickel, but to reduce the nickel about one-half or a little more and increase the copper.

In view of the shortage of nickel it might be argued: Why not put the chrome plate directly on copper and dispense with nickel altogether? While chromium can be plated on copper, leading platers strongly advise against such procedure. Such platings suffer both in appearance and corrosion resistance.

In an effort to eliminate nickel entirely and to avoid the serious shortcomings of a thin chromium plate on copper, tests have been made on chromium deposits on copper where the deposit is from 10 to 20 times thicker than the normal deposit, or around 0.0001 to 0.0002-inch. Thick chromium deposits of this type are brittle, have a network of cracks and tend to flake off from the underlying copper plate. Such deposits therefore will not provide comparable service with the three-layer plates.

There are two types of copper plating baths in general use: (1) Acid bath, used in electrotyping and for intermediate layers of copper, or for copper on brass; and (2) cyanide bath, used for plating copper directly on steel, as well as on brass or zinc. The Rochelle salt-cyanide bath, used especially for plating copper on zinc-base die castings, is a modification of the ordinary cyanide bath.

The acid copper process, despite relatively poor throwing power (ability to plate into recesses, crevices and other remote spots), when properly applied provides a good plate, as far as ductility and buffing properties are concerned. The bath usually contains 27 ounces of copper sulphate per gallon of solution and 8 ounces of sulphuric acid, is operated at from 75-120 degrees Fahr. and at a current density of 20-40 amperes per square foot.

The cyanide bath, most widely used in copper plating, has excellent throwing power but imposes certain operating limitations. A typical bath contains 3 ounces of cuprous cyanide, 4.5 ounces of sodium cyanide, 2 ounces of sodium carbonate per gallon of solution, providing 2 to 3 ounces of free sodium cyanide per gallon. It is operated at 95-120 degrees Fahr.

with current density of 3 to 20 amperes per square foot. The bath is toxic, generally requires ventilation and the free cyanide in it breaks down during use into carbonate.

To overcome the disadvantages of high free sodium cyanide in such a solution, the Rochelle salt-cyanide bath was introduced, containing 6 ounces of cuprous cyanide, 7.5 ounces of total sodium cyanide, 6 ounces or less of Rochelle salt and 2 to 4 ounces of sodium carbonate per gallon of solution, which is held at 130 degrees Fahr. with current density of 15 to 25 amperes per square foot. Free cyanide in this solution ranges from 0.5 to 1 ounce per gallon.

New Acid Copper Bath Finding Acceptance

A shortage of sodium cyanide is developing, principally because of insufficient equipment for processing it and not because of any lack of raw material. However, the tightness is enough to cause platers some concern. To circumvent a possible tieup of cyanide supply, General Motors, for example, has developed a new acid copper bath which overcomes some objections to the regular type of acid copper.

Incidentally, the present supply of Rochelle salt is limited and future supplies are doubtful, since practically all the raw material comes from countries bordering on the Mediterranean.

Other copper plating processes include the ammoniacal copper baths of the type sponsored by Hanson-Van Winkle-Munning Co., the high-speed cyanide copper plating process of DuPont and a new Unichrome alkaline copper process now being offered to platers by United Chromium Inc. The last of these is an alkaline bivalent copper bath, free from cyanide, and is the outgrowth of several years of research by United Chromium.

The Unichrome alkaline copper process uses standard electroplating equipment and is operated at temperatures of from 120 to 140 degrees Fahr., with current density of 20-40 amperes per square foot or more. Bath is made from a proprietary mixture of chemicals, all of which are readily available and not subject to priorities for defense purposes. The copper plate can be applied to all of the commonly plated metals, and when used on steel or zinc a preliminary copper strike is used.

Full Range of Color Effects Obtained by Oxide Plate

Inasmuch as it is related to metal finishing, Electrocolor, a finish obtained by the electrolytic color plating process of United Chromium, is of pertinent interest. It involves electrodeposition of thin, uniform films of transparent copper oxide which, because of their light interference effects, produce a complete range of colors on metal, the color being dependent upon the thickness of oxide plate or in other words the time the piece is left in the plating bath.

Under the usual operating conditions, virtually the complete range of the spectrum is passed through several times in a 10-minute plating period, each time a different "order" of the color spectrum being obtained. The process can be stopped at any desired color, and because of the several "orders" of color, a wide range of finishes is made possible.

As the plate builds up, the colors develop in reverse order to the spectrum, that is, violet, blue, green, yellow, orange, red and repeat. In the first order or cycle, all of these colors do not result, because of the thinness of the plate, but in succeeding cycles they do become observable, although each order produces different shades of color. A full range of colors thus can be obtained, and a myriad of unusual effects is possible by varying the condition of base material. For example, copper base will produce one range of shades, brass another, while a bright polished surface will show a different series of colors than a brushed or satin surface.

When the desired color is arrived at—and the bath can be calibrated so that duplication is easy—the parts are rinsed and coated with clear lacquer as a protective finish.

A feature of the electroplating equipment used is the exceptionally low voltage, around 0.5 volt, and the low current density, around 0.5-ampere per square foot. Bath is alkaline and noncorrosive, operated normally at room temperatures.

This color treatment is now being applied to a wide range of objects, such as belt buckles, tableware, ashtrays, lamp pedestals, metal dishes, and similar items. A beautiful two-tone effect can be obtained by buffing or "relieving" the color around edges.

An interesting variation of the color plating method is what is termed "Patternplate." By proper control of bath conditions and time, the deposit can be made to assume a definite pattern of what appear to be polygonal crystals, each with a series of fine hairlines radiating from a central nucleus. Size of these crystals can be varied up to about ½-inch across. After the design or "pattern plate" is produced, the piece may be color plated and lacquered, or given a straight metallic plate such as nickel, chromium, silver, gold, copper, rhodium, etc. Examples of this type of work are the "Peacock-Plate" ware manufactured by Manning-Bowman and displayed in leading department stores.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1939	1940	1941
Jan.	356,962	449,492	524,126
Feb.	317,520	422,225	509,233
March	389,499	440,232	533,912
3 mos.	1,063,981	1,311,949	1,567,271
April	354,266	452,433	.....
May	313,248	412,492	.....
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†
April 12	99,260	101,940
April 19	99,945	103,725
April 26	108,165	101,405
May 3	130,610	99,305
May 10	132,630	98,480

Production figures for the week ended May 17 will be found on Page 25.

†Comparable week.

Gear Sales Index 292 in April, Up 1.4 Per Cent

■ Sales of industrial gears in April were 1.4 per cent higher than in March, and 129 per cent greater than in the month last year. In the first four months this year, total sales were 130 per cent above the corresponding period in 1940, according to the American Gear Manufacturers Association, Wilkinsburg, Pa.

Comparative index figure of sales in April was 292, against 128 in the month last year. Index figure in March was 288; 262 in February, and 259 in January. The index is based on 1928 as 100.

Compilation applies only to industrial gears. Automotive gears and gears used in high-speed turbine drives are not included.

Uses Anthracite Coal To Make Ferromanganese

■ Anthracite coal is being used in the production of ferromanganese by E. J. Lavino & Co., Philadelphia. Due the coke shortage the company started using a portion of the natural fuel at its Sheridan, Pa., stack, starting with 10 per cent and advancing gradually to 47 per cent at the end of the coal strike. At present about 25 per cent of the natural fuel is being used.

CONTROLLED QUALITY
JUNIOR BEAMS

Strong—economical—light-weight steel I-Beams for reducing dead load in floors and roofs of factories, hangars, cantonment buildings, housing projects and other light-occupancy structures.

JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS • PITTSBURGH, PENNSYLVANIA

MEN of INDUSTRY

■ **FOWLER McCORMICK,** second vice president in charge of manufacturing operations, International Harvester Co., Chicago, has been elected president. **Sydney G. McAllister** has been advanced from president to chairman of the executive committee, succeeding the late Addis E. McKinstry. **Maurice F. Holahan** remains first vice president.

Fowler McCormick is the son of Harold F. McCormick, chairman of the board, and is the third generation of the family to head the company founded by his grandfather, the late Cyrus Hall McCormick.

The new president joined the company in 1925 as a student employe in the Milwaukee factory. After serving in various capacities he was made second vice president in 1935 and was elected a director a year later. Since 1938 he had been in charge of all manufacturing operations.

♦

John D. Porter has been named works manager, Federal Motor Truck Co., Detroit.

♦

George E. Bock has been appointed chief engineer, aviation department, Whiting Corp., Harvey, Ill.

♦

M. L. Kotch has been appointed district manager in the Chicago office, Norwalk Lock Co. division, Segal Lock & Hardware Co. Inc., South Norwalk, Conn. He succeeds **E. W. Bush.**

♦

John A. Dillon has been elected vice president, O. C. Duryea Corp., New York. Mr. Dillon formerly was vice president, Pittsburgh Screw & Bolt Co., Pittsburgh, in charge of eastern sales, with headquarters in New York.

♦

Dr. Thomas Swinden, director of research, United Steel Companies Ltd., England, has been awarded the Bessemer gold medal for 1941 by the Iron and Steel Institute (British). Dr. Swinden has made many important contributions to ferrous metallurgy, including researches on tungsten and molybdenum steels, development of refractory materials, determination of

Fowler McCormick

oxygen in steel, and in the improvement of welding methods. He is a director of Samuel Fox & Co. Ltd., Distington Hematite Iron Co. Ltd. and the British Magnesite Corp. Ltd., and a member of many scientific and technical organizations, including American Society for Metals.

♦

G. S. Mican has been appointed assistant division superintendent of rolling, and **D. F. Farnsworth,** superintendent of the No. 1 40-inch and 35-inch blooming mills and the 28-32-inch and 22-inch structural mills, South works, Carnegie-Illinois Steel Corp. Mr. Mican has been employed at South works about 22 years and since 1940 has been superintendent of structural and blooming mills. Mr. Farnsworth joined the South works in 1930, and since 1939 has been assistant superintendent of structural and blooming mills.

Dr. Thomas Swinden

♦

Leland H. Grenell has joined Battelle Memorial Institute, Columbus, O., as research engineer. The past five years he has been engaged in process engineering and materials development, Frigidaire division, General Motors Corp., Dayton, O.

♦

Forrest G. Sharpe, formerly assistant to sales manager, Pangborn Corp., Hagerstown, Md., has been appointed Philadelphia sales engineer, succeeding the late William T. Randall. The Philadelphia office has been moved to 901 Beury building, 3701 North Broad street.

♦

Charles R. Hook, president, American Rolling Mill Co., Middletown, O., has been elected president of Junior Achievement, a national youth program to help boys and girls prepare for business through operation of their own small manufacturing companies.

♦

R. W. Turnbull, first vice president, Hotpoint Co., Chicago, has been elected executive vice president. **J. C. Sharp** has been named vice president in charge of engineering, and **I. A. Rose,** vice president in charge of manufacturing.

♦

George H. Dowding and **Elmer A. Johnson** have been appointed superintendent and assistant superintendent of industrial relations, respectively, South works, Carnegie-Illinois Steel Corp. Mr. Dowding succeeds **A. L. Armantrout,** now superintendent of industrial relations, Lorain division.

♦

H. W. Graham, director of research, Jones & Laughlin Steel Corp., Pittsburgh, has been named chairman of the Committee on Iron and Steel of the National Research Council's South American Committee. He was a member of the group of 21 industrial executives, research

directors and banking representatives who, under sponsorship of the National Research Council, New York, recently visited South American countries to observe industrial progress and to make a report which will be submitted to the secretary of commerce in June.

♦

Charles R. Rall recently was elected president and treasurer, Pittsburgh Piping & Equipment Co., Pittsburgh. Other officers are: Vice president, **Louis K. Hamilton;** secretary, **Joseph G. Gardner;** director of purchases and estimates, **Karl F. Tiegel;** chief engineer, **G. Sinding Larsen.**

♦

W. C. Pinkerton, the past six years assistant technical editor, *Chemical Engineering Catalog,* has resigned to join the monel and rolled nickel advertising department of International Nickel Co. Inc., New York.

♦

Schuyler Herres has been appointed research associate in the Research Education division of Battelle Memorial Institute, Columbus, O. He is making an extensive review of technical literature on cupola design and operation and will compile data and information on cupola melting practice for the Cupola Research committee, American Foundrymen's Association. Mr. Herres was formerly employed in the laboratories and foundry of Mack Mfg. Corp., New Brunswick, N. J.

♦

F. F. Seaman, general manager, Robbins & Myers Inc., hoist and crane division, Springfield, O., has been elected chairman, Electric Hoist Manufacturers Association, New York, succeeding **H. S. Strouse,** Harnischfeger Corp., Milwaukee. **A. S. Watson,** vice president, Detroit Hoist & Machine Co., Detroit, has been elected vice chairman.

♦

George B. Svenson, head of the Platers Supply Co., Cleveland, has rejoined Hanson-Van Winkle-Munning Co., Matawan, N. J., and will represent the company in Ohio, with headquarters in Cleveland. The Platers Supply Co. will continue under direction of Mr. Svenson's son, **George B. Svenson Jr.**

♦

W. R. Swoish has been named vice president in charge of sales, and **James E. Bevan,** vice president in charge of manufacturing operations, Roller-Smith Co., Bethlehem, Pa. Mr. Swoish joined Roller-Smith in January, 1939, as sales manager, and Mr. Bevan became associated with the company in 1928.

♦

F. C. Jones, formerly assistant to **J. C. Travis,** assistant to president, Handy & Harman, New York, has been appointed manager, Bridgeport, Conn., plant. **J. L. Christie** has been named metallurgical manager, and **J. W. Colgan,** manager of the Toronto, Canada, plant, has become sales manager of the parent company. **Thomas H. Gallagher,** formerly in charge of the Chicago sales office, has been named assistant treasurer of the company and manager of the Toronto plant. All officers of the parent company and its Canadian subsidiary have been re-elected.

♦

R. E. Griffin has been named production manager in general charge of the Oldsmobile defense program, shell and machine gun manufacture. The government order for $13,000,000 received by Olds Motor Works has made necessary reorganization of the Olds management personnel. Assisting Mr. Griffin will be **H. J. Cupper** as assistant defense production manager; **K. C. Plasterer** as manufacturing manager of defense plants; **J. G. Hickman,** standards engineer; **C. B. Dakin,** defense plant manager, and **J. H. Alfes,** plant manager, gun division.

♦

G. H. Bendell, superintendent, Waukegan, Ill., works of American Steel & Wire Co., Cleveland, has been transferred to Joliet, Ill., as assistant general superintendent. He has been succeeded at Waukegan by **S. R. Snow,** heretofore assistant superintendent there. Mr. Snow's position is taken by **J. R. Gaut,** who is being transferred from the vice president's office in Cleveland.

Van H. Leichliter, formerly superintendent of wire mill, Cuyahoga works, Cleveland, has been appointed superintendent, wire mills, South works, Worcester, Mass., and will be in charge of the consolidation of Worcester wire mills under the present rehabilitation program. He succeeds **F. P. Leahey,** who has been appointed superintendent, wire mill, Cuyahoga works.

Daniel Lynch has been named superintendent, Rockdale division, Joliet, and **R. E. Camp,** superintendent of the Scott street division. Both have been assistant superintendents of these divisions.

R. L. Lewis has been named superintendent of engineering and maintenance; **W. B. McShane,** superintendent of wire mills; **J. H. Thomas,** superintendent of spring mills, and **Thomas Tyrrell,** superintendent of rod mills, at Waukegan.

National Tube Executives Move Up as One Retires

C. R. Cox

E. N. Sanders

B. C. Moise

■ National Tube Co., Pittsburgh, last week announced the election of C. R. Cox as executive vice president, succeeding B. C. Moise who has retired after more than 50 years' continuous service.

E. N. Sanders, formerly assistant vice president, operations, has been elected vice president in charge of operations, succeeding Mr. Cox.

Mr. Cox, born in Schenectady, N. Y., April 27, 1891, educated at New York University, started his business career in 1914 as an accountant. From 1918 to 1920 he was affiliated with United States Shipping Board Emergency Fleet Corp.; 1920 to 1930, Crucible Steel Co. of America; 1930 to 1934, Babcock & Wilcox Tube Co., and joined National Tube in 1934.

Mr. Sanders, born in Durham, N. H., Feb. 4, 1897, educated at the University of New Hampshire, started in 1919 as a chemist and became associated with National Tube in 1935.

Mr. Moise, born in Louisville, Ky., Sept. 19, 1875, entered the service of Riverside Iron Works (later National Tube) in 1890. In 1901 he was made cashier of National and subsequently served as auditor, secretary and vice president.

Week's Defense Contracts $106,138,921; Plant Expansion Awards Substantial

■ LARGE part of defense contracts totaling $106,138,921 last week reported by the War and Navy departments was for plant construction and expansion and for equipment for fabrication of ordnance items. Army's contracts totaled more than half the week's awards, and most individual contracts were small. Department of War last week reported the following awards:

Bloomfield Tool Corp., Bloomfield, N. J., lease agreement with Defense Plant Corp. for acquisition and installation of additional machinery and equipment for manufacture of gages and production tools, $220,177

Chrysler Corp., Detroit, agreement of lease with Defense Plant Corp. for acquisition and installation of machinery and equipment for production of aluminum forgings, $753,974.

Curtiss-Wright Corp., Curtiss Aeroplane Division, Buffalo, airplanes and spare parts, $13,360,562.

Eaton Mfg. Co., Saginaw, Mich., lease agreement with the Defense Plant Corp. for acquisition and installation of additional machinery and equipment at the existing plant of the Wilcox-Rich Division at Saginaw, for production of aircraft engine parts, $133,337.

General Motors Corp., Delco Division Dayton, O., lease agreement with Defense Plant Corp. for acquisition of machinery and equipment to be installed in a plant now under construction for manufacture of struts and aircraft parts, $5,482,510.

Houde Engineering Corp., Buffalo, agreement of lease with Defense Plant Corp. for acquisition and installation of machinery and equipment in existing plant for manufacture of aircraft parts, $38,865.

Hunkin-Conkey Construction Co., Cleveland, and Wilbur Watson & Associates, Cleveland, supplemental contracts for construction and engineering work at shell-loading plant at Ravenna, O., $1,969,530.

McDonnell Aircraft Corp., Robertson, Mo., lease agreement with Defense Plant Corp. for acquisition of land and plant facilities including machinery for manufacture of aircraft parts, $512,717.

Revere Copper & Brass Inc., New York, lease agreement with the Defense Plant Corp., for establishment of additional facilities at or near the company's Chicago plant, for production of cartridge brass and cases. Agreement covers acquisition and installation of necessary machinery and equipment at cost of $10,000,000.

Thompson Products Inc., Cleveland, lease agreement with Defense Plant Corp. for acquisition and installation of machinery and equipment at the company's existing plant at Bell, Calif., for production of engine and aircraft parts, $249,492.

Ordnance Department Awards

Accurate Tool & Die Co., Newark, N. J., tools, $25,713.47.

Acetylene & Oxygen Supply Co. Inc., Long Island City, N. Y., oxyacetylene outfits, $6398.50.

Alloy Fabricators Inc., Welin Davit & Boat Corp. Division, Perth Amboy, N. J., mixing kettles, $5994.

American Cutter & Engineering Co., Detroit, punches and punch holders, tools, $27,156.

American Gas Furnace Co., Elizabeth, N. J., parts for hardening furnace, $1900.

American Smelting & Refining Co., Federated Metals Division, New York, solder, $9807.50.

Ampco Twist Drill Co., Jackson, Mich., drills and countersinks, $1221.12.

Artility Metal Products Inc., Elkhart, Ind., chairs, $1134.

Atlantic Saw Mfg. Co. Inc., New Haven, Conn., hacksaw blades, $2451.10.

Austin-Hastings Co. Inc., Cambridge, Mass., lathes, $33,220.

Auto-Ordnance Corp., Bridgeport, Conn., small arms materiel, $5347.97.

B. G. Corp., New York, test kits, $1987.85.

Barber-Colman Co., Machine & Small Tool Division, Rockford, Ill., mills, $2952.

Barker Tool, Die & Gage Co., Detroit, gages, $2590.

Bath, John, & Co., Worcester, Mass., taps, $1250.

Beaver Pipe Tools Inc., Warren, O., pipe threading sets, $1160.70.

Belmont Smelting & Refining Works Inc., Brooklyn, N. Y., antifriction ingots, $1529.10.

Bethlehem Steel Co., Bethlehem, Pa., splice bolts and bars, $1610.76.

Billings & Spencer Co., Hartford, Conn., milling machines, $3250.

Blanchard Machine Co., Cambridge, Mass., grinders, $8210.

Blaw-Knox Co., Blawknox, Pa., floor grating, $1848.32.

Bohn Aluminum & Brass Corp., Detroit, bodies for signals, $2867.20.

Bonney Forge & Tool Co., Allentown, Pa., tools, $8354.04.

Breeze Corporations Inc., Newark, N. J., winter starting cartridges, $14,219.

Bridgeport Brass Co., Bridgeport, Conn., case cups, $1,574,275.

Brown Brockmeyer Co. Inc., Dayton, O., bench grinders, $6531.40.

Brown & Sharpe Mfg. Co., Providence, R. I., grinders, repair screw machines, $4444.80.

Buffalo Forge Co., Buffalo, drill presses, $6388.

Christiansen, C. B., Newark, N. J., air testing apparatus, cutters and adapters, $4800.

Circular Tool Co., Providence, R. I., tools, $2100.

Clemson Bros. Inc., Middletown, N. Y., hacksaw blades, $2760.48.

Cleveland Cutter & Reamer Co., Cleveland, reamers and counterbores, tools, $18,201.20.

Coffing Hoist Co., Danville, Ill., tripods and hoists, $4173.40.

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., jacket assemblies, $3015.

Consolidated Expanded Metal Co., Wheeling, W. Va., steel ladders, $5450.55.

Continental Motors Corp., Muskegon, Mich., tools, $13,855.

Copperweld Steel Co., Warren, O., steel, $15,445.

County Supply Co., Plainfield, N. J., oil cans and surface plates, $9420.

Covel Mfg. Co., Benton Harbor, Mich., grinders, $2088.

Detroit Broach Co. Inc., Detroit, broaching equipment, $22,730.

Detroit Tap & Tool Co., Detroit, hand taps, $1915.20.

Dictaphone Corp., Boston, dictaphone machines, $1569.50.

Doehler Die Casting Co., Pottstown, Pa., castings, $91,232.

Edgcomb Steel Co., Philadelphia, tool steel, $3918.86.

Edwards, J. R., Machinery Co., Newark, N. J., precision lathes, $2680.

Elliott-Lewis Electrical Co. Inc., Philadelphia, stranded wire, $1288.44.

Faries Mfg. Co., Decatur, Ill., parts for primer, $225,673.40.

Firth-Sterling Steel Co., Philadelphia, tool steel, dies, $2356.50.

Foss, W. J., Co., Springfield, Mass., drives, $2448.

General Electric Co., Bridgeport, Conn., cable, $1609.70.

General Fireproofing Co., New York, chairs and desks, $4088.40.

General Machinery Corp., Niles Tool Works Division, Hamilton, O., machine tools, $660,981.13.

Gilman Fan Form Co., Niagara Falls, N. Y., fanfold forms, $1264.40.

Grandahl Tool & Machine Co., Hartford, Conn., gages, $1012.

Great Lakes Steel Corp., Detroit, steel, $21,490.04.

Greenerd Arbor Press Co., Nashua, N. H., arbor presses, $1260.

Hampden Electric Supply Co., Springfield, Mass., steel conduits, $3094.14.

Hanson-Whitney Machine Co., Hartford, Conn., gages, $2817.44.

Hardinge Bros. Inc., Elmira, N. Y., lathes, $13,689.

Hayes, C. I., Inc., Providence, R. I., furnaces, $2215.

Heppenstall Co., Bridgeport, Conn., steel, $1445.40.

High Speed Hammer Co. Inc., Rochester, N. Y., drills, $1295.

Homelite Corp., Port Chester, N. Y., portable generators, $62,086.

Illinois Tool Works, Chicago, broaches, $1800.

Industrial Engineering Equipment Inc., Davenport, Iowa, motor drive equipment, $1215.

J. C. H. Automatic Machine Works, Philadelphia, heading posts, bumpers and bumper plugs, $4234.80.

Jones & Lamson Machine Co., Springfield, Vt., parts for automatic machine, tooling, $5780.45.

Kayel Engineering Co., Newark, N. J., tank pumps, $4230.

Kerrigan Ornamental Iron Works Inc., Nashville, Tenn., welding screens, $4288.

Keystone View Co., Meadville, Pa., stereoscopic testers, $2176.

Leland-Gifford Co., Worcester, Mass., drill presses, $1815.

Lufkin Rule Co., Saginaw, Mich., gages and calipers, $2818.20.

Magnus Tool & Die Co., Newark, N. J., extractor bases, $4375.

McKinney Mfg. Co., Pittsburgh, hinges, hasps, and swivel assemblies, $8999.40.

Metal & Thermit Corp., New York, welding electrodes, $5170.

Modern Tool & Die Co., Philadelphia, gages, $1257.

Morris Truck & Wheel Co. Inc., Philadelphia, steel trucks, $5190.

Morse Twist Drill & Machine Co., New Bedford, Mass., hand taps, $2535.

Morton Mfg. Co., Chicago, cabinet bins, $54,412.80.

Mueller Brass Co., Port Huron, Mich., brass forgings, $2857.14.

National Lock Washer Co., Newark, N. J., forgings and die equipment, $1114.78.

New Brunswick General Sheet Metal Works Inc., New Brunswick, N. J., welding frames, $1329.25

Norco Metal Products Co., Philadelphia, punches, $2565.

Norton Co., Worcester, Mass., grinder machines, $26,676.58.

Ocean City Mfg. Co., Philadelphia, primers, $26,460.

Onsrud Machine Works Inc., Chicago, lathes, $10,756.

Owens-Illinois Glass Co., Alton, Ill., tool parts, $6437.80.

Patterson Foundry & Machine Co., East

Liverpool, O., agitating equipment, $6480.
Philadelphia Engineers, Philadelphia, draw stripper leaves, $1122.
Poor & Co., Canton Forge & Axle Division, Canton, O., drop forgings, $1893.36.
Prentiss Vise Co., Watertown, N. Y., jaw vises, $2252.30.
Pringle Electrical Mfg. Co., Philadelphia, safety type base, $1469.
Quality Hardware & Machine Corp., Chicago, motor drives, $2056.
Ransohoff, N., Cincinnati, tumbling and cleaning machine, $1795.
Republic Steel Corp., Buffalo, barrel blanks, $109,140.
Revere Copper & Brass Inc., Baltimore, brass rod, $2397.51.
Rockwell, Stanley P., Co. Inc., Hartford, Conn., parts for gas furnace, $2491.82.
Roeper Crane & Hoist Works Inc., Reading, Pa., traveling cranes, $5692.
S & R Grinding & Machine Co., Pittsburgh, targets, $3565.
Schramm Inc., West Chester, Pa., portable power plant, $13,875.
Seneca Falls Machine Co., Seneca Falls, N. Y., lathes, $24,837.30.
Sheffield Gage Corp., Dayton, O., gages, $3288.10.
Sheldon, E. H., & Co., Muskegon, Mich., cabinets, $71,292.
Shipley Machinery Co., Boston, lathes, $37,620.80.
S K F Industries Inc., Philadelphia, bearings, $7846.
Smith, Thomas, Co., Worcester, Mass., machining and forming channels, $1396.08.
South Bend Lathe Works, South Bend, Ind., lathe, $1860.50.
Specialty Auto Fabric Corp., Sioux City, Iowa, axle presses, $9415.81.
Sperry Gyroscope Co., Brooklyn, N. Y., adapter and helmet assemblies, $2889.
Standard Alloy Co., Cleveland, pickling baskets, $8080.
Stewart-Warner Corp., Chicago, compressors, $21,704.
Sullivan Machinery Co., Boston, compressors, $21,704.
Templeton, Kenly & Co., Chicago, handle jacks, $3330.24.
Thurston Mfg. Co., Providence, R. I., metal saws, $1738.10.
Timken-Detroit Axle Co., Wisconsin Axle Division, Oshkosh, Wis., parts for tanks, $66,762.45.
Timken Roller Bearing Co., Philadelphia, bearings, $1950.
True Alloys Inc., Detroit, castings, $1465.20.
Turl Engineering Works Inc., New York, structural steel, $2220.
Union Steel Chest Corp., LeRoy, N. Y., tool chests, $1342.98.
Union Twist Drill Co., Athol, Mass., hobs, $4040.50.
Unique Specialties Co., Long Island City, N. Y., fixtures, dies, punches, and gages, $2394.
Veit & Young, Philadelphia, punches, $16,011.
Weidenhoff, Joseph, Inc., Chicago, benches, fixtures, $7813.80.
Weiss, Albert, New York, pneumatic machines, $1718.54.
Weldon Tool Co., Cleveland, tools, $3150.
Wellman, S. K., Co., Cleveland, parts for tanks, $18,019.86.
White Motor Co., Cleveland, parts for scout car, $38,778.95.
Wiedemann Machine Co., Philadelphia, heading post bolts, gages, $10,098.40.
Wood, John, Mfg. Co. Inc., Muskegon, Mich., equipment for machine gun, $658,803.58.
Yale & Towne Mfg. Co., Stamford, Conn., padlocks, $100,611.
Zimmerman Steel Co., Bettendorf, Iowa, steel castings, $9058.78.

Quartermaster Corps Awards

Baker & Co., Boston, insect screens at Fts. Strong, Warren, Revere, Standish, Heath, Banks and Andrews, Massachusetts, $15,105.27.
City Electric & Fixture Co., Seattle, electric substations and transmission system extensions, Ft. Lewis, Washington, $186,943.
Lapenta & Gressani Construction Co., Syracuse, N. Y., incinerator, Ft. Ontario, New York, $12,476.
Myers Bros., Los Angeles, nurses' quarters, Ft. MacArthur, California, $9350.

Chemical Warfare Service Awards

Empire Plating Co., Cleveland, seamless brass tubing sleeves, $2590.50.
Johnson & Johnson, New Brunswick, N. J., canisters, $125,942.52.
Salta Corp., Jersey City, N. J., outlet valves, $9960.

Medical Corps Awards

Aluminum Cooking Utensil Co., New Kensington, Pa., mess equipment, $46,420.
Buck X-Ograph Co., St. Louis, X-ray field equipment, $22,697.50.
Cleveland Dental Mfg. Co., Cleveland, dental equipment, $27,556.80.
Grieshaber Mfg. Co., Chicago, surgical instruments, $902.50.
Metal, H. K., Craft Mfg. Corp., New York, card holders, $6054.36.
Meyrowitz, E. B., Surgical Instruments Co. Inc., New York, knives, $1050.
Phillips-Drucker, St. Louis, centrifuges, $18,160.
White, S. S., Dental Mfg. Co., New York, tooth extracting forceps and pliers, $3343.75.

Air Corps Awards

Champion Spark Plug Co., Toledo, O., spark plugs, $1,419,004.32.
General Motors Corp., A. C. Spark Plugs Division, Flint, Mich., spark plugs, $1,149,987.12.

Corps of Engineers Awards

Acme Iron Works, Washington, wire and iron picket fence, Washington national airport, Washington, $4310.
Advance Building Co., Nashville, Tenn., houses, General Joe Wheeler Lock, Tennessee river, Alabama, $36,000.
American Monorail Co., Cleveland, cranes, carriers, hoisting equipment, for aircraft assembly plant, Tulsa, Okla., $313,182.73.
Anchor Post Fence Co., Baltimore, chain link type fence wire and gates, $7575.80.
Bates Chevrolet Corp., New York, automobiles and trucks, $9270.05.
Buell, B. B., & Co., Seattle, oven type ranges, Sunset field, Spokane, Wash., $13,697.
Christy & Baskett, San Antonio, Tex., temporary telephone building and link trainer building, Brooks field, Texas, $5570.
Curry, B. F., Co., New York, trucks, $2646.24.
Dohrmann Hotel Supply Co., Portland, Oreg., kitchen equipment, Portland-Columbia Air Corps cantonment, Portland, Oreg., $6600.10.
Gardner, Curtis, Portland, Oreg., airport control room, Pendleton airport, Pendleton, Oreg., $10,467.
Graybar Electric Co., Salt Lake City, Utah, electrical and power line supplies, Boise Air Corps cantonment, Boise, Idaho, $4472.36.
Great Northern Railway Co., Seattle, materials for house track and spur, Sunset field, Spokane, Wash., $3652.
Harris-McBurney Co., Jackson, Mich., electrical distribution system, Air Corps cantonment, Ft. Wayne, Ind., $24,729.40.
Honeycutt, A. J., Co. Inc., Birmingham, Ala., heating systems, MacDill field, Fla., $16,181.
Luck Construction Co., Richmond, Va., sewage treatment plant, Langley field, Virginia, $164,157.81.
McKay, William O., Co., Seattle, trucks, $57,413.50.
Merrill Stevens Dry Dock & Repair Co., Jacksonville, Fla., wave break and towing equipment on dredge, $14,510.
Monarch Machine Tool Co., Sidney, O., engine lathes, aircraft assembly plant, Kansas City, Kans., $17,002.
Montgomery Elevator Co., Moline, Ill., freight elevator, Bonneville, Oreg., $8761.
Northern Commercial Co., Seattle, generating sets, power units for gravel plants, $7977.
Palma Motor Sales & Service Corp., Staten Island, N. Y., canopy type trucks, $6554.16.
Perham, E. G., Los Angeles, bridge, Balboa boulevard, Los Angeles, $43,782.50.
Portland Wire & Iron Works, Portland, Oreg., structural steel, $5427.
Tampa Shipbuilding Co. Inc., Tampa, Fla., equipment for Bridge street pumping station, West Springfield, Mass., $2850.
Thorp-Rogoff Co., Chicago, service club and guest house, Chanute field, Illinois, $62,880.
Worthington Pump & Machinery Corp., Harrison, N. J., equipment for Bridge street pumping station, West Springfield, Mass., $23,298.
Wray Air Conditioning Corp., Dallas, Tex., air-conditioning system, Barksdale field, Louisiana, $4898.
Wyoming Construction Co., Laramie, Wyo., sewage disposal plant, Wendover bombing range, Utah, $35,918.
Ziebarth, Fritz, Long Beach, Calif., pumping plant, Phoenix military airport, Litchfield park, Arizona, $31,935.

Signal Corps Awards

Acorn Insulated Wire Co. Inc., Brooklyn, N. Y., wire, $1860.
American Automatic Electric Sales Co., Chicago, central office equipment, $295,694.30.
Bell & Howell Co., Chicago, motion picture equipment, $890.45.
Breeze Corporations Inc., Newark, N. J., sockets, $480.
Collins Radio Co., Cedar Rapids, Iowa, oscillator coils, $1360.
Continental Electric Co. Inc., Newark, N. J., armatures, $3000.
Dicke Tool Co. Inc., Downers Grove, Ill., bars, $2064.
Ferris Instrument Corp., Boonton, N. J., signal generators, $740.
General Fireproofing Co., New York, office equipment, $343.20.
General Insulated Wire Co., Providence, R. I., wire, $1355.20.
Graybar Electric Co. Inc., Chicago, grips, $1014.30.
Hammarlund Mfg. Co. Inc., New York, radio receivers, $996.
Hobb Electric Supply Co. Inc., Jonesboro, Ind., wire, $556.10.
Irish, W. F., Co., New York, ringer coils, $480.
Karp Metal Products Co., Brooklyn, N. Y., carriers and frames, $718.20.
Kellogg Switchboard & Supply Co., Lorain, O., subcycle ringing machines, switches, terminals, $2209.67.
Kennecott Wire & Cable Co., Phillipsdale, R. I., cables and reels, $492.
Merit Supply Co., Cincinnati, cranks, $7975.
Remington Rand Inc., Buffalo, filing cabinets, $399.96.
Roebling's, John A., Sons Co., Trenton, N. J., cables and reels, $22,334.97.
Seaboard Steel & Engineering Corp., Newark, N. J., axles, $2560.
Underwood Elliott Fisher Co., New York, machine parts, $2230.
Westinghouse Electric & Mfg. Co., Baltimore, transformers, $423.

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Navy department last week reported the following contracts:

Foote Bros. Gear & Machine Corp., Chicago, supplementary contract of $103,-

814 for acquisition and installation of additional machinery and equipment for manufacture of aircraft engine parts.

General Electric Co., Schenectady, N. Y., acquisition and installation in the company's plants at Erie, Pa., Schenectady, and Pittsfield, Mass., of special additional equipment and facilities for production of ordnance equipment at total cost not to exceed $18,367,706.

Hooven, Owens, Rentschler Co., Hamilton, O., propelling machinery for 13 submarine chasers at unit price of $499,500 and total of $6,493,500.

Lawson Machine & Tool Co., Malden, Mass., $116,876 for acquisition and installation of additional machinery and equipment for the manufacture of aircraft engine parts.

Ohio Crankshaft Co., Cleveland, entered into a contract with the Defense Plant Corp. for acquisition of additional plant facilities comprising machinery and equipment for manufacture of diesel engine parts at cost of $1,720,000.

Bureau of Yards and Docks Awards

Anchor Post Fence Co., Baltimore, fence at radio station of naval academy, Annapolis, Md., $2005.

General Electric Co., Schenectady, N. Y., 7500-kilowatt turbo-alternator at navy yard, Philadelphia, $173,500.

Harnischfeger Corp., Milwaukee, seven bridge cranes at navy yards at Boston, Norfolk (Portsmouth), Va., and Charleston, S. C., $159,975.

Manning, Maxwell & Moore Inc., Shaw-Box Crane & Hoist Division, Muskegon, Mich., seven bridge cranes at Norfolk navy yard, Portsmouth, Va., $86,240.

Moore, C. C., & Co., San Francisco, improvement of power plant at navy yard, Mare Island, California, $900,000.

Bureau of Supplies and Accounts Awards

Air Reduction Sales Co., New York, oxyacetylene welding torches, $15,055.

Allegheny Ludlum Steel Corp., Brackenridge, Pa., corrosion-resisting steel, $85,360.50.

Allen, H. F., Co. Inc., New York, lathes, $17,430.

Allen, S. W., Co., Orange, N. J., bomb arming wire assemblies, $8500.

Aluminum Cooking Utensils Co., New Kensington, Pa., food carrier frames, aluminum containers, steam jacketed kettles, $59,190.58.

American Automatic Electric Sales Co., Chicago, telephone equipment, ship service, and spare parts, $78,174.52.

American Bearing Corp., Indianapolis, bearings, $8727.60.

American Chain & Cable Co. Inc., American Chain Division, York, Pa., various chains and fittings, $78,097.35.

American Metal Co. Ltd., New York, grade A pig lead, $111,062.25.

American Smelting & Refining Co., New York, pig and sheet lead, $67,831.43.

American Steel & Wire Co., Cleveland, electric cable, $46,226.30.

Anaconda Wire & Cable Co., New York, electric cable, $1,705,558.72.

Armstrong Bros. Tool Co., Chicago, clamps, $23,096.79.

Atkins, E. C., & Co., Indianapolis, hack saws, compasses, keyholes, rip and miter boxes, $8030.09.

Austin-Hastings Co. Inc., Cambridge, Mass., surface grinder, $14,340.

Austin-Western Road Machinery Co., Aurora, Ill., street sweepers, $7218.10.

Automatic Transportation Co., Chicago, crane trucks, $114,480.50.

Baker-Raulang Co., Cleveland, heavy duty crane truck, $5910.

Ballantyne, Wm. C., Washington, wire paper clips, $11,562.

Bay City Shovels Inc., Bay City, Mich., cranes, $9400.

Bendix Aviation Corp., Pioneer Instrument Division, Bendix, N. J., sextants, $52,000.

Borg-Warner Corp., Ingersoll Steel & Disc Division, New Castle, Ind., shovels, $10,299.90.

Brandtjen & Kluge Inc., St. Paul, printing presses, $9091.50.

Brass, J. B., Foundry Corp., New York, boat hooks, $13,731.

Brown & Sharpe Mfg. Co., Providence, R. I., automatic screw machines, $36,580.35.

Buss Machine Works, Holland, Mich., surfacers, $10,977.60.

Carnegie-Illinois Steel Corp., Pittsburgh, bar steel, $21,134.65.

Caterpillar Tractor Co., Peoria, Ill., gasoline-engine-driven tractors, $5626.

Cincinnati Galvanizing Co., Cincinnati, waste paper receptacles, $57,000.

Cincinnati Planer Co., Cincinnati, double housing planer, $21,875.

Cincinnati Shaper Co., Cincinnati, motor-driven press brakes, $17,359.

Cincinnati Tool Co., Cincinnati, clamps, $27,090.78.

Climax Molybdenum Co., New York, ferromolybdenum, $13,465.12.

Collyer Insulated Wire Co., Pawtucket, R. I., electric cable, $98,986.80.

Columbia Steel Co., San Francisco, steel anchors, $117,660.

Consolidated Expanded Metals Co., Wheeling, W. Va., expanded metal, $44,594.04.

Covington Electrical Mechanical Co., Bowling Green, Ky., cranes, $37,180.

Crescent Insulated Wire & Cable Co., Trenton, N. J., cable, $348,025.

Crescent Truck Co., Lebanon, Pa., industrial trucks, $5244.

DeLuxe Metal Furniture Co., Warren, Pa., steel shelving, bin dividers, bin fronts, and label holders, $9697.80.

Denman & Davis, North Bergen, N. J., pearlitic manganese steel, $10,839.54.

Durabilt Steel Locker Co., Aurora, Ill., metal lockers, $10,720.30.

Electric Heating Equipment Co., Philadelphia, resistance units, $62,325.

Electro Metallurgical Sales Corp., New York, grades B and D ferrosilicon, ferrovanadium, $14,181.75.

Engineering & Research Corp., Riverdale, Md., sheet metal forming and flanging machines, other equipment, $17,324.

Enterprise Engine & Foundry Co., San Francisco, generator sets and spare parts, $298,560.

Erie Foundry Co., Erie, Pa., hammers, $16,215.

Fairchild Aviation Corp., Jamaica, N. Y., combination mapping and oblique aircraft cameras, $19,140.

Flemm Lead Co. Inc., Long Island City, N. Y., sheet lead, $21,119.20.

Folmer Graflex Corp., Rochester, N. Y., cameras, $27,285.86.

Foster Bros. Mfg. Co., Utica, N. Y., metal bedsteads, springs, $9494.30.

General American Transportation Corp., Chicago, railroad box and tank cars, $11,934.

General Cable Corp., New York, electric cable, $2,057,647.65.

General Electric Co., Schenectady, N. Y., diesel locomotives, motors, brakes, switches, $59,573.

General Motors Corp., Harrison Radiator Division, Lockport, N. Y., oil cooler, $20,063.13; Diesel Engine Division, Cleveland, spare parts for Winton diesel engines, main engine assembly crankshafts, connecting rod bearing shells, portable pneumatic crankpin grinder, $189,895.95.

Gould & Eberhardt, Newark, N. J., gear hobbing machine, $8678.

Gray, G. A., Co., Cincinnati, openside planers, $56,694.

Graybar Electric Co. Inc., New York, electric cable, $19,581.03.

Greenfield Tap & Die Corp., Greenfield, Mass., pipe dies, die bolt and screw pipe stocks, bolt and screw threading sets, wrenches, $36,114.14.

Gruendler Crusher & Pulverizer Co., St. Louis, green garbage grinders, with motors, controls and spare parts, $65,689.

Haffner-Thrall Car Co., Chicago, railroad flat cars, $13,713.60.

Hamilton Watch Co., Lancaster, Pa., chronometers, $78,475.

Handy & Harman, New York, silver brazing steel alloy, $40,925.60.

Hardinge Bros Inc., Elmira, N. Y., screw feed lathes, $6791.50.

Harrisburg Steel Corp., Harrisburg, Pa., compressed gas cylinders, $1,173,000.

Hercules Food Service Equipment Inc., New York, refuse cans, $11,700.

IDL Mfg. & Sales Corp., New York, shears, $18,000.

International Nickel Co. Inc., New York, electrolytic nickel, $32,080.

International Resistance Co., Philadelphia, rheostats, $7567.50.

Irwin Auger Bit Co., Wilmington, O., augers, $8795.52.

Jones & Lamson Machine Co., Springfield, Vt., thread grinding machine, $10,865.

Jones & Laughlin Steel Corp., Pittsburgh, bar steel, $7403.68.

Kearney & Trecker Corp., Milwaukee, vertical milling machine, $9889.

Keyzer Laboratories Inc., New York, projector, $5000.

Kirk & Blum Mfg. Co., Cincinnati, drying ovens, $8744.

Kraeuter & Co. Inc., Newark, N. J., punches, $6532.33.

Lamson Corp., Syracuse, N. Y., shop trucks, frames and stands, $14,181.25.

Landis Tool Co., Waynesboro, Pa., grinding machines, $125,837.

Lionel Corp., New York, compensating binnacles, $52,500.

Lodge & Shipley Machine Tool Co., Cincinnati, lathes, $520,779.

Lufkin Rule Co., Saginaw, Mich., woven, metallic measuring tapes, $6037.50.

Lynch, Edward A., Machinery Co., Philadelphia, hydraulic presses, jack-knife routers, $12,234.

Master Rule Mfg. Co. Inc., Bronx, N. Y., rules, $15,963.76.

Mattatuck Mfg. Co., Waterbury, Conn.,

California Leads in Total Defense Awards

Forty per cent of $14,561,342,981 defense contracts, total awarded between July 1, 1940, and April 30, 1941, were received by companies in four states, California, New York, New Jersey and Pennsylvania. Each state's aggregate was, respectively, 10.6 per cent, 10.6 per cent, 9.8 per cent, and 8.8 per cent of the grand total. California's lead was due to the large aircraft and shipbuilding contracts placed by the government.

Contracts for the latest period reported and for the period from July 1 through April 30, for the 13 states possessing highest totals, are given in the following table:

	April 16—30	July 1—April 30
California	$193,385,121	$1,543,525,163
New York	55,069,952	1,541,663,899
New Jersey	12,843,668	1,420,269,113
Pennsylvania	206,824,628	1,285,956,561
Massachusetts	6,054,761	871,284,964
Virginia	2,526,033	860,344,987
Michigan	13,895,031	768,799,213
Connecticut	6,706,285	574,147,009
Washington	21,291,721	545,309,983
Ohio	17,287,509	510,361,902
Maryland	22,831,902	451,758,368
Indiana	2,719,990	435,933,274
Illinois	4,425,642	365,781,590
Total, all awards	$759,364,851	$14,561,342,981

wire bottoms for pipe berths, helical springs, $22,096.70.
McKay Co., Pittsburgh, chains and fittings, $117,386.69.
Medart, Fred, Mfg. Co., St. Louis, metal lockers, $20,817.44.
Mercury Mfg. Co., Chicago, electric truck, fork trucks, $24,803.75.
Mergenthaler Linotype Co., Brooklyn, N. Y., type setting machines, including installation, test, and spare parts, $10,907.64.
Milburn, Alexander, Co., Baltimore, oxyacetylene cutting torches, $36,300.
Millers Falls Co., Greenfield, Mass., spring-tempered steel rules, $5618.25.
Minneapolis-Moline Power Implement Co., Minneapolis, tractors, $7714.
Montague Co., San Francisco, oil burning ranges, $9450.
Morse Diving Equipment Co. Inc., Boston, helmets, diving apparatus, $10,398.80.
National Electrical Machine Shops Inc., Washington, azimuth circles, $6800.
National Electric Products Corp. Pittsburgh, electric cable, $113,196.40.
National Electric Welding Machines Co., Bay City, Mich., spot welding machines, $20,420.
National Tube Co., Pittsburgh, seamless steel or galvanized welded tubing, steel flasks, $253,345.35.
Niles-Bement-Pond Co., Pratt & Whitney Division, Hartford, Conn., shaper, $8103.
North Bros. Mfg. Co., Philadelphia, ratchet screwdrivers, $5042.20.
Northwest Lead Co., Seattle, sheet and pig lead, $8670.70.
Norwalk Co. Inc., South Norwalk, Conn., air compressor, $43,986.75.
Okonite Co., Passaic, N. J., electric cable, $545,205.87.
Oliver Farm Equipment Sales Co., Chicago, tractors, $21,730.
Peff, Peter, T/A Superior Air Products Co., Newark, N. J., acetylene gas cylinders, $5292.
Phelps Dodge Copper Products Corp., Habirshaw Cable & Wire Division, New York, electric cable, $581,146.
Pittsburgh Steel Foundry Corp., Glassport, Pa., steel anchors, $81,984.
Powder Metals & Alloys Inc., New York, dry cuprous oxide, $43,500.
Prentiss, Henry, & Co. Inc., New York, horizontal boring, drilling and milling machine, $30,846.
Republic Chemical Corp., New York, ferromanganese, $12,592.93.
Republic Steel Corp., Massillon, O., bar steel, $46,991.83.
Risdon Mfg. Co., Naugatuck, Conn., brass grommets, $103,500.
Roberts Numbering Machine Co., Brooklyn, N. Y., numbering machines, $11,000.
Rockbestos Products Corp., New Haven, Conn., electric cable, $322,391.90.
Roe, Justus, & Sons, Patchogue, N. Y., steel measuring tapes, $6561.
Romec Pump Co., Elyria, O., portable refueling units, $16,467.55.
Selas Co., Philadelphia, hot air, gasoline-fired heaters, $138,440.
Seneca Engineering Co., Montour Falls, N. Y., crane system, $27,020.
Silent Hoist Winch & Crane Co., Brooklyn, N. Y., cranes, $14,835.
Simmons Co., New York, metal furniture, $5864.62.
Somerville, Thomas, Co., Washington, pipe threading sets, $5690.80.
Spencer Lens Co., Buffalo, binoculars, $181,800.
Spengler-Loomis Mfg. Co., Automatic Pencil Sharpener Co. Division, Chicago, pencil sharpeners, $15,142.50.
Spen, Henry, Inc., New York, water carts, $16,161.12.
Stanley Works, Stanley Tool Division, New Britain, Conn., rules, wood workers' chisels, $17,310.31.
Starrett, L. S., Athol, Mass., steel measuring tapes, $29,346.20.
Steel Conversion & Supply Co., Pittsburgh, chisel blanks, chisels, $90,436.62
Stevens Metal Products Co., Niles, O., galvanized steel drums, $43,971.
Swind Machinery Co., Philadelphia, drill machine, $11,442.
Swindell-Dressler Corp., Pittsburgh, electric steel furnace, $62,103.
Taylor, James L., Mfg. Co., Poughkeepsie, N. Y., clamps, $9682.06.
Taylor-Parker Inc., Norfolk, Va., saws, $21,939.53.
Tinius Olsen Testing Machine Co., Philadelphia, Hatt-Turner machine, $6150.
Troy Chain Co. Inc., New York, various chains and fittings, $30,422.50.
Tuthill & Co. Inc., Sales Agents Tin Sales Office, Netherlands Indies Government, New York, grade A pig tin, $288,960.
Union Twist Drill Co., S. W. Card Division, Mansfield, Mass., dies, taps and pipe, $25,072.50.
U. S. Axle Co. Inc., Pottstown, Pa., engine stands, $24,358.60.
United Wire Goods Mfg. Co., New York, screwdrivers, $10,881.20.
Utica Drop Forge & Tool Corp., Utica, N. Y., end cutting nippers and pliers, $71,074.26.
Wadell Engineering Co., Newark, N. J., rod-boring, hand-operated fixtures, $26,713.21.
Ward Leonard Electric Co., Mt. Vernon, N. Y., rheostat and spare parts units, $76,582.50.
Wiss, J., & Sons Co., Newark, N. J., sailmakers' or tailors' shears, $7618.65.
Yale & Towne Mfg. Co., Philadelphia, electric trucks, $29,789.80.

Canada Restricts 1941 Model Automobiles

TORONTO, ONT.

■ Canadian motor manufacturers received an order last week from John H. Berry, motor vehicles controller, calling for substantial reduction from the 1940 output. Trucks, commercial vehicles or units for war purposes are not affected by the order.

Number of automobiles that may be produced in 1941 is based upon the foreign currency requirements of each model. Manufacturers will have their total foreign currency requirements reduced 20 per cent, but the number of cars built in Canada may be decreased to a lesser extent if "economy" cars possessing a low foreign currency content are manufactured. Purpose of the order is to conserve foreign exchange, induce concentration upon low cost transportation rather than luxury models, and release machine tools and skilled labor for vital war work.

First keels in Canada's greatest shipbuilding program have already been laid, and in a few weeks five major shipyards will be operating at capacity on construction of 100 steel merchant ships of 9500 tons each. Total expenditure will be more than $180,560,000, and orders for 70,000 tons of plate have been placed with Hamilton, Ont., steel mills. British Columbia yards will undertake major portion of the work.

Department of Munitions and Supply reported it will immediately call tenders for erection of an $8,000,000 plant, with equipment, at Windsor, Ont. Browning machine guns, complete except for barrels, are to be manufactured, with the barrels fabricated at other Canadian plants. Border Cities Industries Ltd., a subsidiary of General Motors Corp. of Canada Ltd., will operate the factory.

Contracts totaling $5,100,948 were awarded in the week ended May 2 by the Department of Munitions and Supply. Orders placed with United States companies aggregated $137,692. Orders include:

Capital expenditure: Ontario Electrical Construction Co. Ltd., Toronto, $46,465; Canadian Westinghouse Co. Ltd., Hamilton, Ont., $31,477.

Munitions: Dominion Arsenals, Ottawa, Ont., $908,500; Defence Industries Ltd., Montreal, Que., $147,100; Canadian Industries Ltd., Montreal, $17,091; Canadian Tube & Steel Products Ltd., Montreal, $12,415; Parmenter & Bulloch Co. Ltd., Gananoque, Ont., $20,737; Anaconda American Brass Ltd., New Toronto, Ont., $87,345; Rogers-Majestic Corp. Ltd., Toronto, $33,523; Steel Co. of Canada Ltd., Hamilton, Ont., $33,264.

Ordnance: Canadian Elevator Equipment Co. Ltd., Toronto, $212,447; General Steel Wares Ltd., Toronto, $18,912.

Tools: Canadian Trade Corp. Ltd., Montreal, $5392; Ottawa Car & Aircraft Ltd., Ottawa, $26,618.

Machinery: Canadian National Railways Co., Montreal, $119,566.

Electrical equipment: Northern Electric Co. Ltd., Ottawa, $16,240; Vivian Engine Works Ltd., Vancouver, B. C., $85,000.

Instruments: Ontario Hughes-Owens Co. Ltd., Ottawa, $10,250; R. C. A. Victor Co. Ltd., Ottawa, $60,122; Neptune Meters Ltd., Toronto, $16,922; Research Enterprises Ltd., Toronto, $8000; Sutton-Horsley Ltd., Toronto, $22,680.

Land transport: Eastern Steel Products Ltd., Montreal, $117,612; Goodyear Tire & Rubber Co. of Canada Ltd., Toronto, $12,120.

Aircraft: Air Ministry, England, $432,864; Anglo-Canadian Wire Rope Co. Ltd., Montreal, $14,147; Aviation Electric Ltd., Montreal, $5175; Canadian Car & Foundry Co. Ltd., Montreal, $5481; Dominion Wire Rope & Cable Co. Ltd., Montreal, $13,493; Coleman Lamp & Stove Co. Ltd., Toronto, $14,406; Cordage Distributors Ltd., Toronto, $12,292; B. Greening Wire Co. Ltd., Hamilton, Ont., $5259; Doon Twines Ltd., Kitchener, Ont., $13,537; Weaver Industries Ltd., Chatham, Ont., $26,550; Macdonald Bros. Aircraft Ltd., St. James, Man., $85,146.

Shipbuilding: British Admiralty, England, $77,000; F. X. LaChance, St. Laurent d'Orleans, Que., $6900; Louis Gagnon, Grandes Bergeronnes, Que., $7500; Canots Cadorettes, St. Jean des filles, Que., $10,000; McCall & Co., St. Williams, Ont., $5000; Alexander Fleck Ltd., Ottawa, $21,835.

Miscellaneous: Enamel & Heating Products Ltd., Sackville, N. B., $8200; Miner Rubber Co. Ltd., Granby, Que., $82,500; B. F. Goodrich Rubber Co. of Canada Ltd., Kitchener, $30,476; Federal Typewriter Co. Ltd., Ottawa, $7688; National Cash Register Co. of Canada Ltd., Ottawa, $19,187; Ottawa Typewriter Co. Ltd., Ottawa, $7688; Underwood, Elliott, Fisher Ltd., Ottawa, $7688; General Steel Wares Ltd., Ottawa, $6017; Ainsworth Electric Co., Toronto, $21,500.

■ Curtiss-Wright Corp. will employ Negro skilled workers in the manufacture of military aircraft at its Buffalo factory, company officials have informed OPM. Other leading defense industries recently have adopted similar policies.

Standards Proposed by American Iron and Steel Institute

Basic Open-Hearth and Acid Bessemer Carbon Steels

Subject to Standard Variations for Check Analyses

Table I

Designation	Used For			Chemical Composition Limits, per cent			
	Semi-finished	Bars	Rods	C	Mn	P Max.	S Max.
C 1005			√	0.06 max.	0.35 max.	0.04	0.05
C 1006	√	√	√	0.08 max.	0.25/0.40	0.04	0.05
C 1008	√	√	√	0.10 max.	0.30/0.50	0.04	0.05
CB 1008		√	√	0.10 max.	—	—	—
C 1010	√	√	√	0.08/0.13	0.30/0.50	0.04	0.05
C 1012	√	√	√	0.10/0.15	0.30/0.50	0.04	0.05
CB 1012		√		0.15 max.	—	—	—
C 1013			√	0.11/0.16	0.60/0.90	0.04	0.05
C 1014	√	√	√	0.13/0.18	0.30/0.50	0.04	0.05
C 1015	√	√	√	0.13/0.18	0.40/0.60	0.04	0.05
C 1016	√	√	√	0.13/0.18	0.60/0.90	0.04	0.05
CB 1017	√	√		0.10/0.25	—	—	—
C 1017	√	√	√	0.15/0.20	0.40/0.60	0.04	0.05
C 1018	√	√	√	0.15/0.20	0.60/0.80	0.04	0.05
C 1019	√	√	√	0.15/0.20	0.70/1.00	0.04	0.05
C 1020	√	√	√	0.18/0.23	0.30/0.50	0.04	0.05
C 1021	√	√	√	0.18/0.23	0.40/0.60	0.04	0.05
C 1022	√	√	√	0.18/0.23	0.70/1.00	0.04	0.05
C 1023	√	√	√	0.20/0.25	0.30/0.50	0.04	0.05
C 1025	√	√	√	0.22/0.28	0.30/0.50	0.04	0.05
C 1026	√	√	√	0.22/0.28	0.40/0.60	0.04	0.05
C 1027			√	0.24/0.30	0.40/0.60	0.04	0.05
C 1029	√	√		0.25/0.31	0.60/0.90	0.04	0.05
C 1030	√	√	√	0.28/0.34	0.60/0.90	0.04	0.05
CB 1032		√		0.25/0.40	—	—	—
C 1033	√	√		0.30/0.36	0.60/0.90	0.04	0.05
C 1034			√	0.32/0.38	0.50/0.70	0.04	0.05
C 1035	√	√		0.32/0.38	0.60/0.90	0.04	0.05
C 1038	√	√	√	0.35/0.42	0.60/0.90	0.04	0.05
C 1040	√	√	√	0.37/0.44	0.60/0.90	0.04	0.05

Table I.—Continued

Designation	Used For			Chemical Composition Limits, per cent			
	Semi-finished	Bars	Rods	C	Mn	P Max.	S Max.
C 1041			√	0.36/0.44	1.35/1.65	0.04	0.05
C 1043	√	√		0.40/0.47	0.70/1.00	0.04	0.05
C 1044			√	0.43/0.50	0.50/0.70	0.04	0.05
C 1045	√	√		0.45/0.55	0.60/0.90	0.04	0.05
C 1051			√	0.45/0.56	0.85/1.15	0.04	0.05
C 1054			√	0.50/0.60	0.50/0.70	0.04	0.05
C 1055	√	√		0.50/0.60	0.60/0.90	0.04	0.05
C 1057			√	0.50/0.61	0.85/1.15	0.04	0.05
C 1059			√	0.55/0.65	0.50/0.70	0.04	0.05
C 1060			√	0.55/0.65	0.60/0.80	0.04	0.05
C 1061		√		0.54/0.65	0.75/1.05	0.04	0.05
C 1062			√	0.54/0.65	0.85/1.15	0.04	0.05
C 1064			√	0.60/0.70	0.50/0.70	0.04	0.05
C 1066			√	0.60/0.71	0.80/1.10	0.04	0.05
C 1068		√		0.65/0.75	0.50 max.	0.05	0.05
C 1069			√	0.65/0.75	0.50/0.70	0.04	0.05
C 1073		√	√	0.68/0.78	0.50/0.70	0.04	0.05
C 1074		√	√	0.70/0.80	0.50/0.70	0.04	0.05
C 1078		√	√	0.70/0.85	0.30/0.50	0.04	0.05
C 1080		√		0.70/0.85	0.60/0.90	0.04	0.05
C 1083		√	√	0.80/0.95	0.30/0.50	0.04	0.05
C 1085	√	√		0.80/0.95	0.60/0.90	0.04	0.05
C 1095		√	√	0.90/1.05	0.30/0.50	0.04	0.05
B 1006			√	0.08 max.	0.45 max.	0.11	0.06
B 1008		√		0.10 max.	0.30/0.50	0.11	0.06
B 1011		√	√	0.13 max.	0.50/0.70	0.11	0.06

NOTE: The listed standard open-hearth steels only may be ordered with a silicon content of 0.07 per cent maximum; 0.07 to 0.15 per cent; 0.10 to 0.20 per cent; or 0.15 to 0.30 per cent.

Table II

Basic Open-Hearth Sulphurized Carbon Steels

Subject to Standard Variations for Check Analyses (See Note 2)

Designation	Used For			Chemical Composition Limits, per cent			
	Semi-finished	Bars	Rods	C	Mn	P Max.	S
C 1108			√	0.08/0.13	0.50/0.70	0.045	0.07/0.12
C 1109	√	√	√	0.08/0.13	0.60/0.90	0.045	0.08/0.13
C 1110		√	√	0.08/0.13	0.60/0.90	0.045	0.10/0.15
C 1111			√	0.08/0.13	0.60/0.90	0.045	0.16/0.23
C 1112		√		0.10/0.16	1.00/1.30	0.045	0.08/0.13
C 1113	√	√		0.10/0.16	1.00/1.30	0.045	0.23/0.32
C 1115	√	√	√	0.13/0.18	0.70/1.00	0.045	0.08/0.13
C 1116	√	√	√	0.13/0.18	0.70/1.00	0.045	0.10/0.15
C 1117		√	√	0.14/0.20	1.00/1.30	0.045	0.08/0.13
C 1118	√	√	√	0.14/0.20	1.30/1.60	0.045	0.08/0.13
C 1119			√	0.14/0.20	1.35/1.65	0.045	0.16/0.23
C 1120	√	√	√	0.18/0.23	0.60/0.90	0.045	0.08/0.13
C 1121	√	√	√	0.18/0.23	0.70/1.00	0.045	0.08/0.13
C 1122	√	√	√	0.17/0.23	1.35/1.65	0.045	0.08/0.13
C 1132	√	√	√	0.27/0.34	1.35/1.65	0.045	0.08/0.13
C 1137	√	√	√	0.32/0.39	1.35/1.65	0.045	0.08/0.13
C 1140	√	√		0.37/0.44	0.60/0.90	0.045	0.04/0.07
C 1145	√	√		0.42/0.49	0.70/1.00	0.045	0.04/0.07

NOTE 1: The standard steels C 1140 and C 1145 listed in Table II may be ordered with a silicon content of 0.07 per cent maximum; 0.07 to 0.15 per cent; 0.10 to 0.20 per cent; or 0.15 to 0.30 per cent.

NOTE 2: Sulphurized steel is not subject to check analysis for sulphur.

Table III

Acid Bessemer Sulphurized Carbon Steels

Subject to Standard Variations for Check Analyses (See Note)

Designation	Used For		Chemical Composition Limits, per cent			
	Bars	Rods	C	Mn	P	S
B 1106		√	0.09 max.	0.50 max.	0.11 max.	0.04/0.09
B 1110	√	√	0.13 max.	0.60 max.	0.11 max.	0.045/0.075
B 1111	√	√	0.08/0.13	0.60/0.90	0.09/0.13	0.10/0.15
B 1112	√	√	0.08/0.13	0.60/0.90	0.09/0.13	0.16/0.23
B 1113	√	√	0.08/0.13	0.60/0.90	0.09/0.13	0.23/0.32

NOTE: Sulphurized steel is not subject to check analysis for sulphur.

Table IV

Basic Open-Hearth Phosphorized Carbon Steels

Subject to Standard Variations for Check Analyses (See Notes 1 and 2)

Designation	Used For			Chemical Composition Limits, per cent				
	Semi-finished	Bars	Rods	C	Mn	P	S	Si
C 1205	√		√	0.08 max.	0.25/0.40	0.04/0.07	0.05 max.	—
C 1206			√	0.08 max.	0.25/0.40	0.06/0.10	0.05 max.	0.05/0.10
C 1209			√	0.08/0.13	0.30/0.50	0.04/0.07	0.05 max.	—
C 1210	√		√	0.08/0.13	0.30/0.50	0.06/0.10	0.05 max.	0.05/0.10
C 1211			√	0.08/0.13	0.60/0.90	0.09/0.13	0.10/0.15	—

NOTE 1: Phosphorized steel is not subject to check analysis for phosphorus.

NOTE 2: Sulphurized steel is not subject to check analysis for sulphur.

Table V

Acid Open-Hearth Carbon Steel Wire Rods

Subject to Standard Variations for Check Analyses

Designation	Chemical Composition Limits, per cent				
	C	Mn	P Max.	S Max.	Si Max.
D 1034	0.32/0.38	0.50/0.70	0.05	0.05	0.30
D 1049	0.43/0.50	0.50/0.70	0.05	0.05	0.30
D 1054	0.50/0.60	0.50/0.70	0.05	0.05	0.30
D 1059	0.55/0.65	0.50/0.70	0.05	0.05	0.30
D 1064	0.60/0.70	0.50/0.70	0.05	0.05	0.30
D 1069	0.65/0.75	0.40/0.60	0.05	0.05	0.30
D 1074	0.70/0.80	0.40/0.60	0.05	0.05	0.30
D 1078	0.70/0.85	0.30/0.50	0.05	0.05	0.30
D 1083	0.80/0.95	0.30/0.50	0.05	0.05	0.30
D 1095	0.90/1.05	0.30/0.50	0.05	0.05	0.30

NOTE: The standard steels listed in Table V may be ordered with a silicon content of 0.10 to 0.20 per cent; or 0.15 to 0.30 per cent.

Analyses of Proven Merit, Wide Use Comprise Standard Carbon Steels List

■ DETAILS of the 94 carbon steels selected by the General Technical Committee of the American Iron and Steel Institute as standards (STEEL, May 12, p. 31) are presented in the five accompanying tables. These were chosen as representing grades of proven merit and now in extensive use for a wide variety of purposes.

Purpose of this new list, as also was the case in connection with the list of 76 standard alloy steel compositions and the list of 257 standard pig iron compositions (STEEL, May 5, p. 44) is to enable steel producers through concentrating upon a limited number of standardized grades, instead of the many thousands heretofore demanded, to produce more efficiently and to expedite deliveries and give better service to customers.

The new list covers carbon steels in all forms, including semifinished products.

It is the belief of the committee that in most cases the standard grades successfully can replace other grades without detriment to fabricating methods or impairment of quality of manufactured products.

Described in Manual

The 94 standard carbon steels are completely covered in a new manual, copies of which may be had from the institute, New York.

The prefix letters are explained in the manual as follows: B denotes acid bessemer carbon steel; C denotes basic open-hearth carbon steel; CB denotes either of the above at the option of the manufacturer; D denotes acid open-hearth carbon steel.

A four-numeral series designates carbon and alloy steels specified to chemical composition ranges. The series is essentially like the system used originally by the Society of Automotive Engineers Inc. but is extended to include other grades of steel. Five numerals are used for grades the mean carbon of which is 1.00 per cent or higher. The last two digits of the four-numeral series are intended, so far as feasible, to indicate the approximate middle of the carbon range; for example, 20 represents a range of 0.18 to 0.23 per cent. It is necessary, however, to deviate from this rule and to interpolate numbers in the case of some carbon ranges and for variations in manganese, phosphorus or sulphur with the same carbon ranges.

The basic numbers for the four-numeral series of the various grades of carbon steel and their meanings are as follows:

Series Designation	Types and Classes
10xx	Basic open-hearth and acid bessemer carbon steel grades, nonsulphurized and nonphosphorized.
11xx	Basic open-hearth and acid bessemer carbon steel grades, sulphurized but not phosphorized.
12xx	Basic open-hearth carbon steel grades, phosphorized.

Similarly the four-numeral designations are used to signify grade characteristics of alloy steels. Alloy steels are described in a separate section.

A two numeral series designates steels required to meet tensile test values. The numbers represent approximately the specified minimum tensile strength in pounds per square inch; for example, 50 denotes a minimum tensile strength of 50,000 pounds per square inch.

The manual includes a table of standard and restricted ranges and limits for chemical composition. It also includes a check analysis table for use in cases where a high degree of uniformity in composition is essential. Another section covers standard methods of sampling for check analysis, also standard variations from specified chemical limits of rolled and forged steel products. The methods of analysis are to be in accordance with the latest edition of *Methods of Chemical Analysis of Metals* published by the American Society for Testing Materials, or the methods approved by the National Bureau of Standards. The manual contains a table of expected differences between analysts.

Other subject matter covered in the manual includes physical test requirements, fundamental requirements for physical test properties of hot-rolled carbon steel bars, restricted physical test requirements, definitions of carbon and alloy steels, and killed, semikilled and rimming steel.

Great Britain Establishing Standard Steel Specifications

Establishment of a list of standard steel specifications for Great Britain now is in its final stages, according to a report from STEEL'S London office.

For a considerable time the Technical Advisory Committee has been working with the Iron and Steel Institute's Alloy Steel Research Committee, of which Dr. W. H. Hatfield is chairman, to reduce from some 2000 to a much smaller number the special and alloy steels in general use. The TAC is composed of steel manufacturers, representatives of the fighting forces and representatives of the British Standards Institute.

Goal is to save time and expense in the manufacture of steel by a process of rationalization. The scheme also is intended to help the consumer in choosing the type of steel most suitable for his requirements.

Up to now the TAC has set up a list of about 80 groups of steels, including carbon steels. From these the BSI has drawn up specifications for 57 alloys and special steels forming 29 groups. A few more specifications may be added before the lists are definitely available.

Specifications are based on the chemical compositions of the steels and on the mechanical characteristics such as tensile strength, yield point, notch bar test and others. This contrasts with the American list of standard alloy steel compositions which takes into consideration only chemical composition.

U. S. Co-operation Desired

In a month or six weeks, two complementary publications will be issued for the trade, one by the TAC and one by the BSI. The latter will give the list of the 57 (or more) special and alloy steels, with their chemical compositions, physical characteristics, heat treatments, uses and other details.

Those responsible for the work here stress how desirable, in fact, how essential it is that the American and British steel industries should co-operate on this subject of rationalization of steel products, and how desirable it would be for a combined scheme to be arrived at. This is considered most important and easily can be understood.

The British organizations are in touch with the Americans through J. G. Morrow, of the Canadian Steel Corp. Furthermore, an eminent steel metallurgist will be in the United States to co-operate still more directly with the Americans. The wish is expressed here that one or two no less prominent American metallurgists will come to England and help build up a closer contact between the two sides.

The method of application of the scheme to the industry has not yet quite been decided. Co-operation with the Americans, and agreement with them on the specifications, is considered extremely desirable in order to co-ordinate the productive work in the two countries.

Put on Long Pants To Sell First Pig Iron; Dean, at 76

NEW YORK

■ SIXTY-TWO years in the pig iron business is the record of James C. Alley, now 76 years of age and still active. Each business day finds him at his office at 261 Broadway in the city where he started his career as a boy of 14, first on the docks fracturing pig iron for grading as it arrived from England or Scotland, and soon thereafter as a salesman.

The veteran salesman recalls that he has sold thousands of tons of iron whose brand names now are only memory. He has witnessed the expansion of domestic pig iron production from slightly more than 3,000,000 net tons in 1879 to 47,400,000 tons in 1940.

Mr. Alley's first affiliation was with the New York branch of Stevenson, Peirson & Co., Boston, and when this company was succeeded in 1885 by C. L. Peirson & Co. and it in turn by J. Brooks, Fenno & Co., about 1905, he continued on, serving for a number of years as head of the New York office.

With the passing of J. Brooks, Fenno & Co., he and Rufus W. Page formed the partnership of Alley & Page in 1911. Fifteen years later Mr. Page retired and Mr. Alley carried on the business under his own name. He is now eastern representative for Pickands Mather & Co., Cleveland.

Foreign Brands Predominant

When Mr. Alley first started in the business, Scotch and English brands dominated the market—such brands as Gartsherrie, Glengarnock, Coltness, Carnbroe, Eglinton, Dalmelington, Middlesboro, Red Car, Clarence, Cleveland, Shotts, Summerlee, Govan and Langloan. He sold these irons for shipment as far west as Chicago and Milwaukee, and to Canada.

His company imported silicospiegel and ferrosilicon, and old rails. Not infrequently it had as much as 75,000 tons of scrap rail in storage in Brooklyn.

Domestic irons also were handled. Mr. Alley's first sale was a carlot of No. 1 B Temple iron to I. J. Baxter, proprietor, Baxter Iron Works, Peekskill, N. Y., stovemakers. It was a sale he has never forgotten, for he not only had to buy long trousers to make a dignified impression on a trip upstate, but he had to stay away from home over night, a thing he had vowed he would not do.

That day he visited Peekskill and was continuing on to Poughkeepsie when he discovered he would not be able to be home that night. He promptly sent in his resignation. It was ignored, and soon he was traveling through eastern states from lower New England as far south as Charleston, S. C., and west as far as Buffalo. Later he made a business trip to Great Britain and Continental Europe.

During his early years there was a steady increase in the number of

James C. Alley
. . His career started with Scotch and English brands

domestic brands. Those he did not sell, his competitors sold. There were the eastern Pennsylvania irons, mainly foundry grades from Temple, Hokendauqua, Reading, Catasauqua, Mt. Laurel, Pottstown and other points; the charcoal irons from Alabama, and from Murkirk, Md., Richmond, Mass., and Lime Rock, Conn. Furnaces at the latter two points supplied iron for cannon during the Revolutionary war.

There also were the Virginia foundry irons, which until the end of the last World war supplied New England with perhaps one-third of its requirements; high phosphorus from Rockwood, Tenn.; gray forge from Oxford, N. J.; foundry iron produced by the Parrott Iron Co., near Tuxedo, N. Y.; Secaucus foundry iron from Jersey City, N. J.; and similar brands from Poughkeepsie and Hudson, N. Y. At one time there was a stack on Manhattan island.

All iron in those early days was sand cast and was sold by fracture, but about 1900, Edgar S. Cook, president, Warwick Iron & Steel Co., Pottstown, Pa., developed machine casting, which led to sales by analysis. The introduction of machine-cast iron was difficult as many melters feared "the chill in the pig iron" would continue through the cupola and affect their castings.

During the eighties, eastern furnaces shifted from anthracite to coke, and were increasing in number. Stone furnaces were giving way to steel units of larger capacities. About 1900 the newer stacks were averaging 400 to 600 tons daily, compared with 150 to 200 tons in the late seventies. During this period there was a 5-fold increase in output to 15,500,000 net tons in 1900.

Foreign irons, which were in great demand when Mr. Alley first entered the business, passed their peak of popularity in the late eighties, and by 1900 were being bought in relatively small quantities. This was due in large measure to southern irons and to higher tariffs.

Mr. Alley recalls when charcoal iron was used by manufacturers of car wheels, later to give way to "coke malleable" of similar analysis. This also was the fate of charcoal in the malleable industry. Today charcoal iron is produced only in Michigan and Tennessee.

Mr. Alley was born in Jerusalem, Long Island, June 9, 1865, and for many years resided in Brooklyn. He is a member, American Iron and Steel Institute, American Institute of Mining and Metallurgical Engineers, Electro-Chemical Society, and Army Ordnance Association, and is a veteran of the 22nd Regiment, New York National Guard, now the 102nd Engineers.

"Raw Materials Money" For French Steel Industry

■ "Raw materials money," or coupons for the purchase of materials for the French steel industry, was instituted by the Vichy government last week. The new system is designed to eliminate the elaborate mechanism of control that had been instituted to supervise distribution for each individual contract since the armistice with Germany.

The new system provides that raw materials money to the amount of the materials available will be issued for a three-month period. At the end of that period the coupons become obsolete unless there is an excuse for the failure to utilize the materials, in which case the coupons may be renewed for another three months.

The government agency in announcing the scrip plan stressed the fact that supplies of raw materials are far below normal and that to obtain the new raw materials money it will be necessary to prove the importance of the contracts involved. No contracts can be entered into that have not been foreseen by the issue of the scrip.

First All-Welded Cargo-Passenger Ships Expedited

■ DAY and night shifts are rushing toward completion the first all-welded cargo-passenger ships in the world, at Ingalls Shipbuilding Corp. yard, Pascagoula, Miss.

Scheduled for service between the United States and South and East Africa, each vessel will not only have accommodations for 116 passengers but will also be able to carry 12,000 tons of freight. The freight movement to this country will be strategic materials, principally manganese and chrome ore.

The ships are being built through the United States Maritime Commission for the American South African Line. Displacing 17,000 tons each, they will be the fastest and largest ships ever placed in service on their intended route. The New York-Capetown trip will be made in the record time of 16½ days. The first boat will be launched June 28 as the AFRICAN COMET, and all three will be in service before the end of the year.

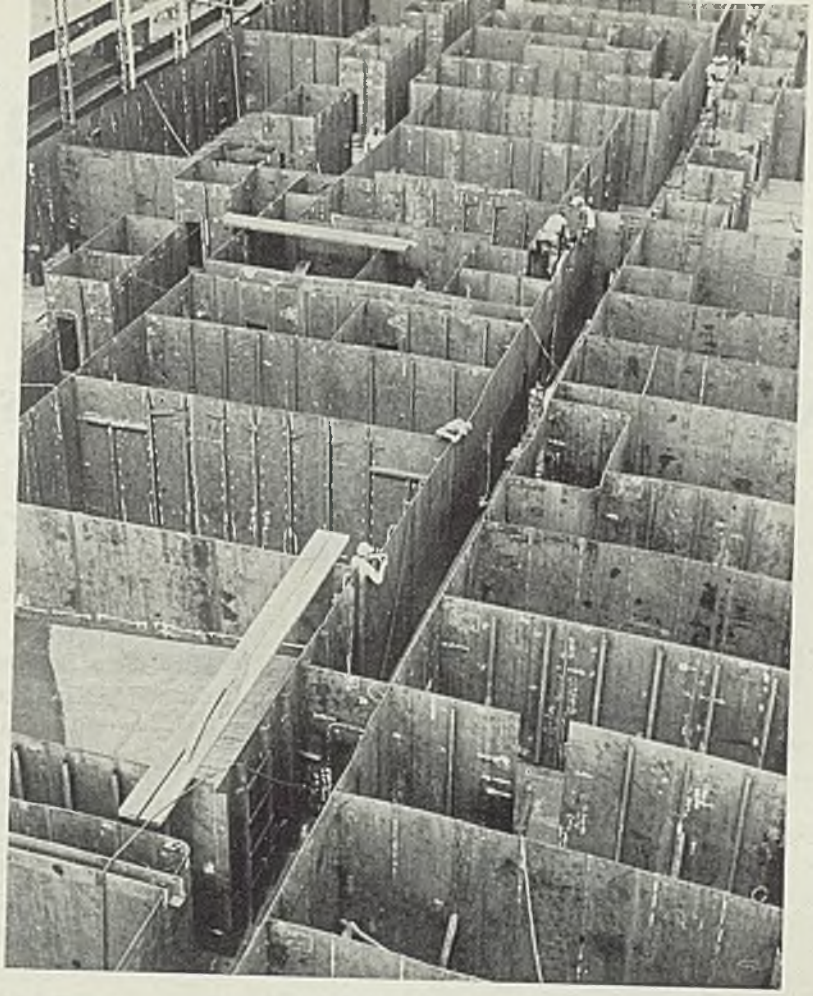
American South African Line is headed by James A. Farrell Jr., president, and John J. Farrell, chairman, sons of James A. Farrell, former president of United States Steel Corp.

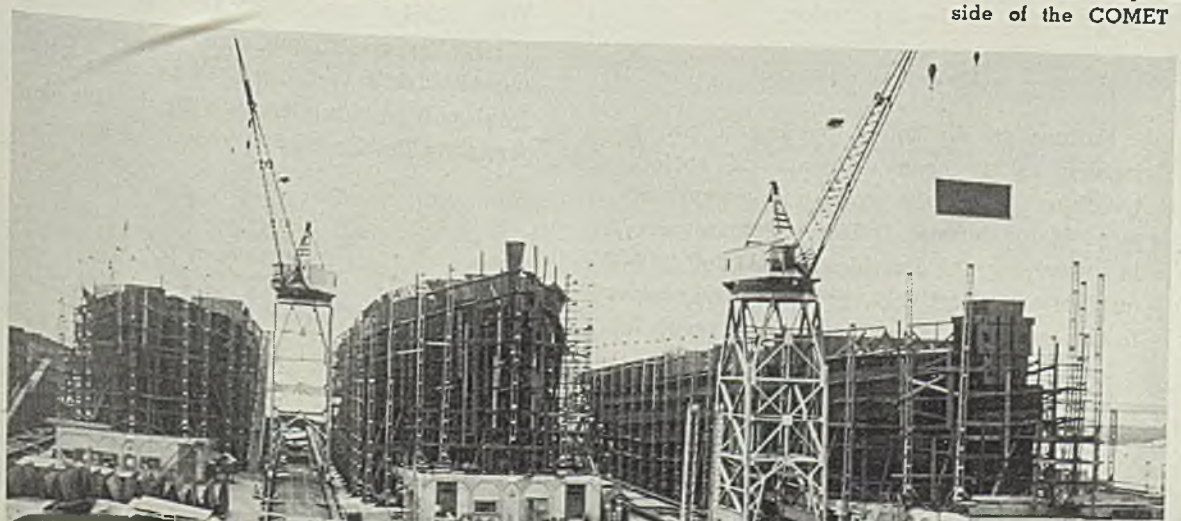
While these are the first all-welded passenger ships, their method of fabrication is similar to the practice employed previously in building welded cargo vessels. Instead of laying a keel, the entire flat bottom of the ship is placed in position. Seams are butted, no lap joints being used throughout the hull plating.

After being tacked into position, the flat bottom plates are welded lightly with a seal bead over head. Plates are V'd on the inside surface for the automatic Unionmelt method of welding. This method is applied so rapidly that there is practically no shrinkage or distortion of the plates. Consequently, prefabricated sections of the inner bottom can be laid on the plating in their proper locations for downhand manual welding.

The Ingalls company fabricates the floors or inner bottom frames at its Birmingham, Ala., plant, and the inner bottom plating is cut to size and the edges dressed. At the yard these prefabricated floors are placed upon patterns and assembled. Inner bottom pre-assembled sections for the midship section of the vessel are assembled in half ship widths. Floors or inner bottom frames are welded to the inner bottom plating in the downhand position. Inner bottom seams or butts then are welded automatically by the Unionmelt method, and the sections are lifted into their proper position on the vessel.

These sections are tacked together and welded either by hand or automatically. Deck plating is pre-assembled into sections similar to the inner bottom sections, while the bow and stern also are built up of pre-assembled sections.





■ **Unusual pattern of the fireproof partitions being welded in place on the AFRICAN COMET, above, first of three all-welded passenger ships being built at Pascagoula, Miss. Below, a crane lifts a 10-ton plate to be welded into the side of the vessel. The other two ships are shown in ways on either side of the COMET**

Dangerous Disunion from New Deal Entanglements

■ THIS NATION needs some sort of a shock to jar it out of its state of complacency and into one of unity of purpose.

Events in recent weeks indicate all too clearly that we have not yet developed the spirit of teamwork essential to success of the defense program.

Numerous reasons can be advanced for this state of confusion. Disagreement as to what extent the United States should engage in hostilities is one. The division of government interest between defense and continued social experiment is a disconcerting factor. Inability to deal effectively with labor disputes is another. The timidity with which Congress tackles the tax the defense program.

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These reasons involve questions which go back to the political policies of the New Deal administration. In its formulation of a war policy, in its direction of defense activity, in its handling of the labor problem and in its recommendations for financing defense, Mr. Roosevelt's administration is fettered by commitments dating back to the heyday of social experiment. Its leaders do not seem to be able to divorce the present emergency of war from the entanglements of the depression.

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Failure to do so is putting a heavy burden upon those elements of society which are trying sincerely to do everything possible for defense. Industry, for instance, is answering the President's call for "all-out" effort effectively, yet the advantage to the nation of this wholesome response is being dissipated by mistakes in other directions.

For instance, many branches of industry went into high gear in the first quarter of this year. Steel operations were almost 100 per cent. Railroad carloadings averaged better than 112,000 daily.

Then, despite all precautions, coal mining was permitted to suspend for 30 days. Precious stores of coal, coke, pig iron and scrap were depleted. Steel production dropped hundreds of thousands of tons due to this interruption.

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Following the opening of the mines, the steel industry worked furiously to make up for lost time. It has succeeded in restoring operations to 98 per cent of capacity—a remarkable achievement. The railroads and other carriers likewise are trying to make up for lost time. They are taking the extra burden of hauling 35,000,000 tons of coal that was not mined in April (when cars and locomotives were idle). It is forced to move 600,000 extra carloads—piled on top of the seasonally rising volume.

Despite all this havoc, Mr. Lewis now threatens another coal strike. More strikes seem imminent in the automobile industry. West coast shipyards are tied up.

Isn't it time to put aside social experiment? Can't we break away from New Deal politics long enough to do this defense job in the way it should be done?

E. L. Shaner

EDITOR-IN-CHIEF

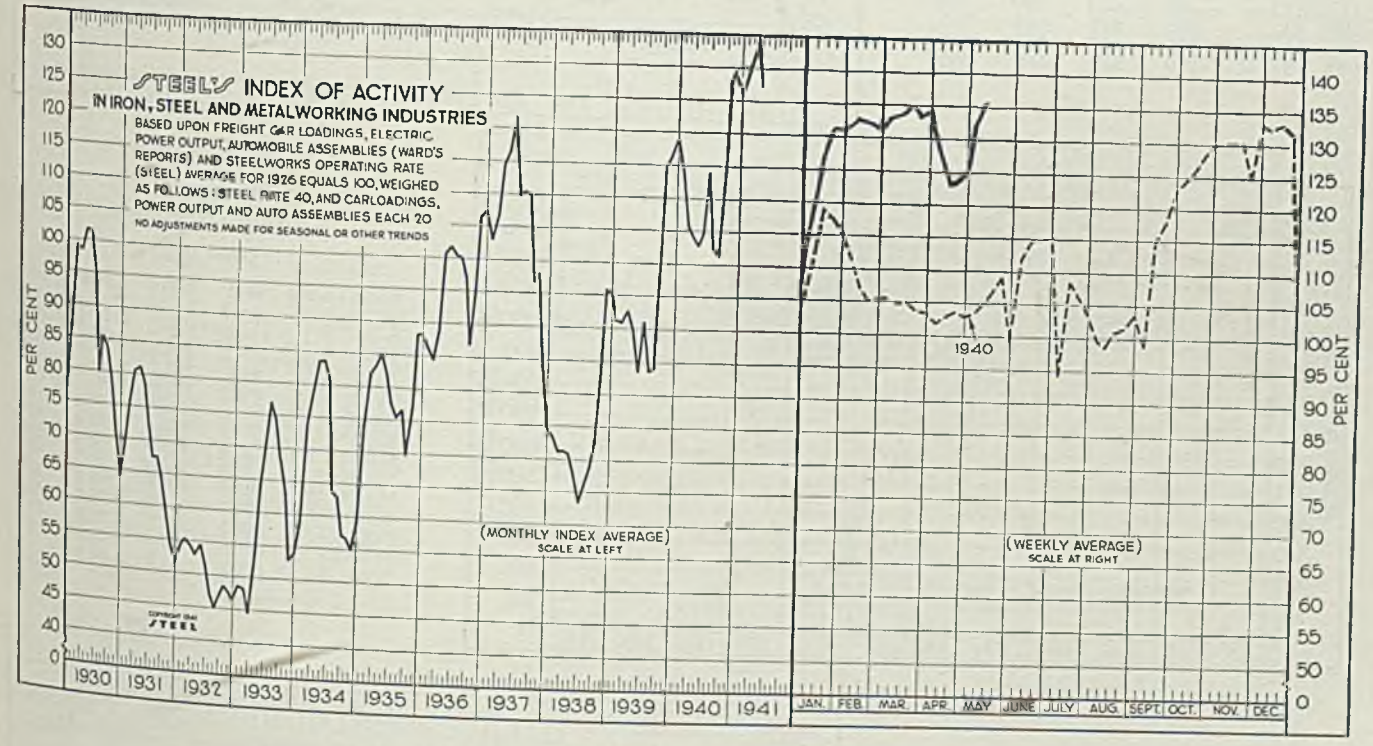
The BUSINESS TREND

Index of Industrial Activity at New Peak

■ SHARP upturn in industrial production since the war began has been widespread, although more pronounced in some industries than in others. Part of the increase in activity has been due to efforts to build inventories. Tooling and expansion of plant facilities also are important factors. Orders in hand, and prospective, will in many instances more than absorb expanded capacities.

For the week ended May 10, STEEL's index of activity climbed to a new peak of 135.9, a gain of 3.3 points over the preceding week. The previous high recorded by the index was 135, during the week of March 15. A year ago the index stood at 104.8.

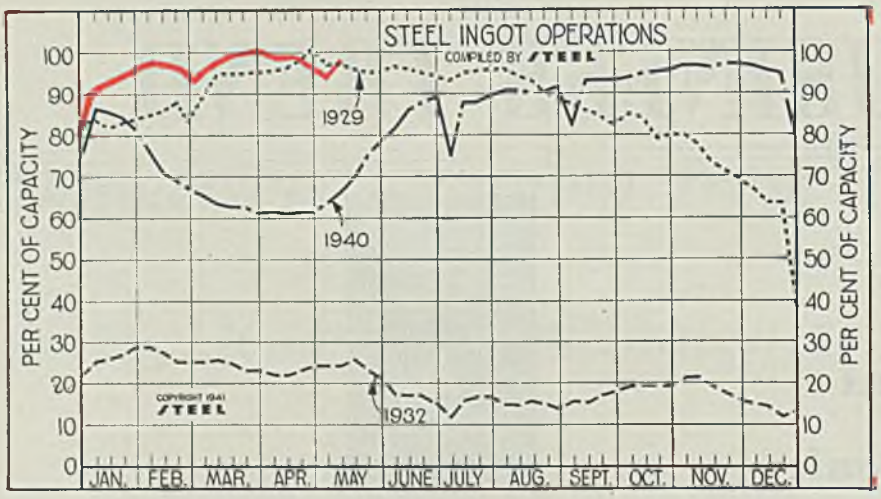
Each of the industrial indicators composing the index moved upward. Freight carloadings attained the highest level for the year to date, exceeding any weekly total recorded since the period ended Oct. 26 last year. Electric power output, automobile production and steelmaking operations also recorded encouraging gains. The steel ingot rate has rebounded sharply to about the peak level reached prior to the bituminous coal strike.



STEEL'S index of activity gained 3.3 points to 135.9 in the week ended May 10:

Week Ended	1941	1940
Feb. 22	131.2	105.4
March 1	133.0	105.6
March 8	133.1	104.7
March 15	135.0	104.9
March 22	133.5	103.7
March 29	133.9	103.2
April 5	128.9	101.8
April 12	123.8	102.7
April 19	124.2	103.4
April 26	126.5	102.8
May 3	132.6	103.3
May 10	135.9	104.8

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	.....	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2
June	.....	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8
July	.....	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9
Aug.	.....	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4
Sept.	.....	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7
Oct.	.....	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8
Nov.	.....	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0
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

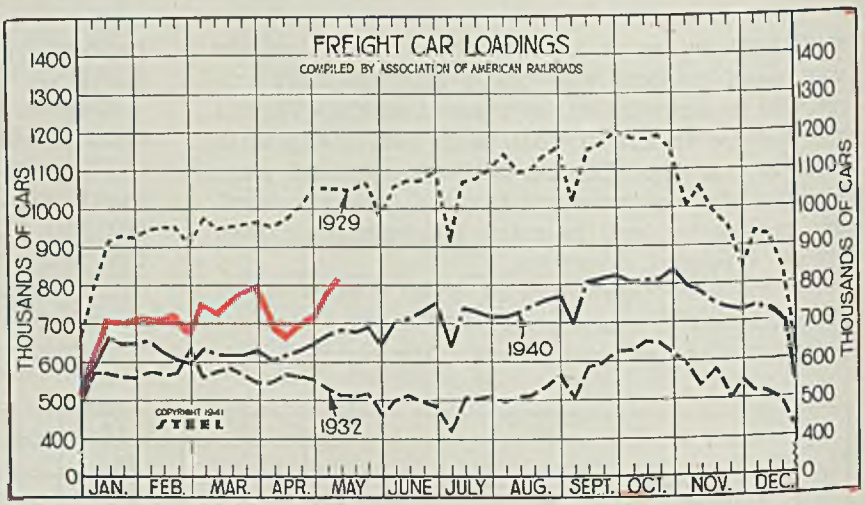
(Per Cent)

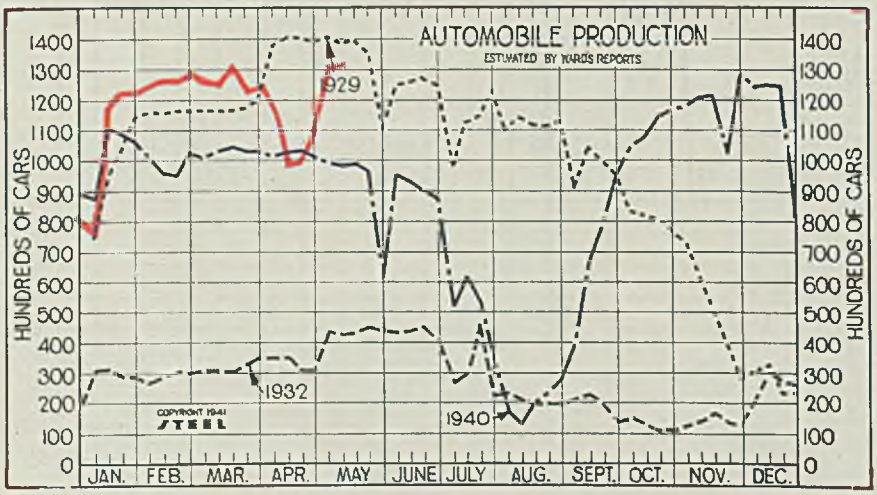
Week ended	1941	1940	1939	1938
May 10....	97.5	66.5	47.0	30.0
May 3....	95.0	63.5	49.0	31.0
April 26...	96.0	61.5	49.0	32.0
April 19...	98.0	61.5	50.5	32.5
April 12...	98.0	61.0	51.5	32.0
April 5...	98.0	61.5	53.5	32.0
March 29..	99.5	61.0	54.5	36.0
March 22..	99.5	62.5	55.5	35.0
March 15..	98.5	62.5	56.5	32.0
March 8...	97.5	63.5	56.5	30.0
March 1...	96.5	65.5	56.0	29.5
Feb. 22....	94.5	67.0	55.0	30.5
Feb. 15....	96.5	69.0	55.0	31.0
Feb. 8....	97.0	71.0	54.0	30.0

Freight Car Loadings

(1000 Cars)

Week ended	1941	1940	1939	1938
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
March 22....	769	619	605	573
March 15....	759	619	595	540
March 8.....	742	620	592	557
March 1.....	757	634	599	553
Feb. 22.....	678	595	561	512
Feb. 15.....	721	608	580	536
Feb. 8.....	710	627	580	543





Auto Production

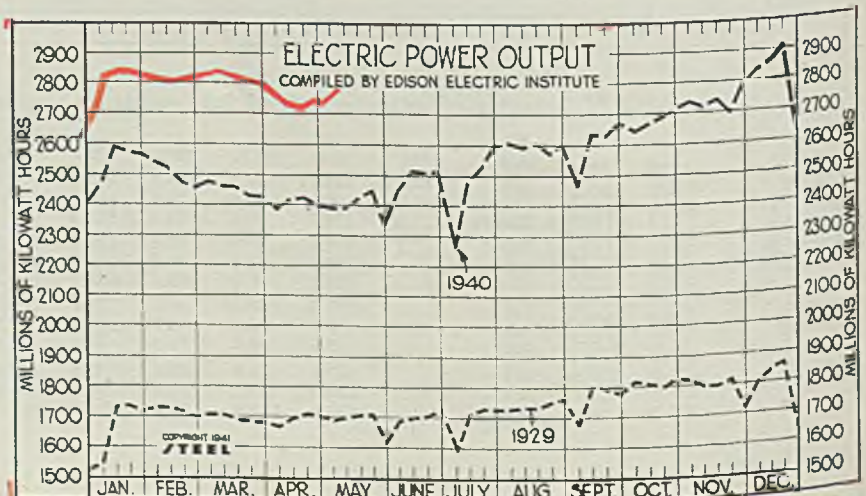
(1000 Units)

Week ended	1941	1940	1939	1938
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
March 22..	123.8	103.4	89.4	56.8
March 15..	131.6	105.7	86.7	57.6
March 8...	125.9	103.6	84.1	57.4
March 1...	126.6	100.9	78.7	54.4
Feb. 22....	129.2	102.7	75.7	57.0
Feb. 15....	127.5	95.1	79.9	59.1
Feb. 8....	127.7	96.0	84.5	57.8

Electric Power Output

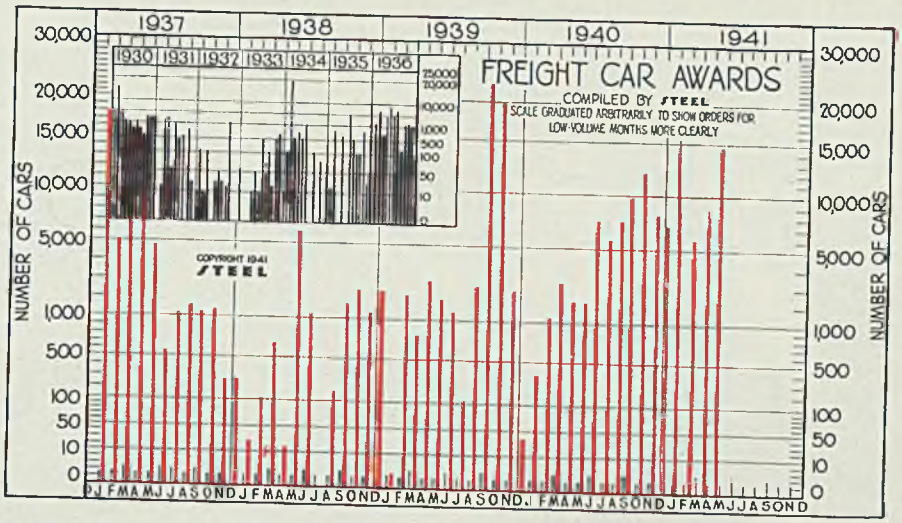
(Million KWH)

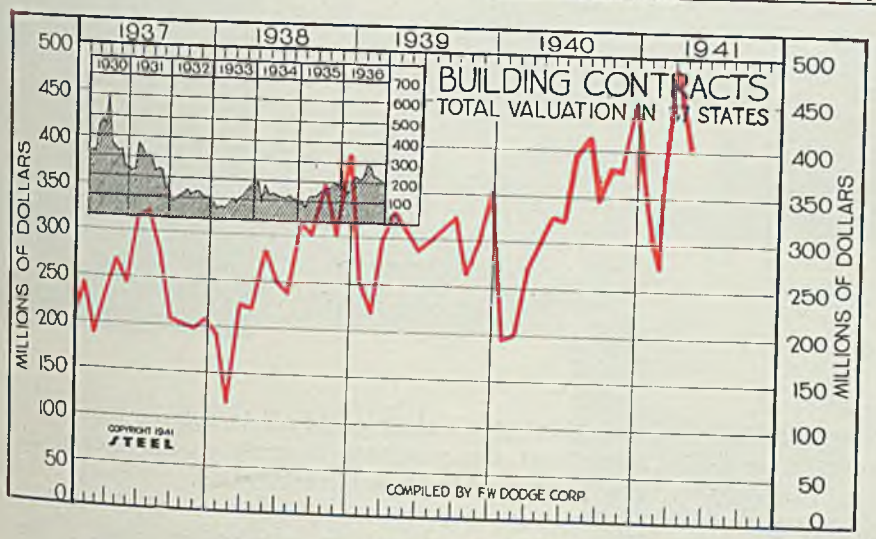
Week ended	1941	1940	1939	1938
May 10...	2,792	2,388	2,171	1,968
May 3...	2,734	2,386	2,164	1,939
April 26..	2,750	2,398	2,183	1,939
April 19..	2,702	2,422	2,199	1,951
April 12..	2,721	2,418	2,171	1,958
April 5...	2,779	2,381	2,174	1,990
March 29.	2,802	2,422	2,210	1,979
March 22.	2,809	2,424	2,199	1,975
March 15.	2,818	2,460	2,225	2,018
March 8..	2,835	2,464	2,238	2,015
March 1..	2,826	2,479	2,244	2,036
Feb. 22...	2,820	2,455	2,226	2,031
Feb. 15...	2,810	2,476	2,249	2,059
Feb. 8...	2,824	2,523	2,268	2,052



Freight Car Awards

	1941	1940	1939	1938
Jan.	15,169	360	3	25
Feb.	5,508	1,147	2,259	109
March	8,074	3,104	800	680
April	14,645	2,077	3,095	15
May	.....	2,010	2,051	6,014
June	.....	7,475	1,324	1,178
July	.....	5,846	110	0
Aug.	.....	7,525	2,814	182
Sept.	.....	9,735	23,000	1,750
Oct.	.....	12,195	19,634	2,537
Nov.	.....	8,234	2,650	1,232
Dec.	.....	7,181	35	2,581
Total	.....	66,889	57,775	16,303





Construction Total Valuation In 37 States

(Unit: $1,000,000)

	1941	1940	1939	1938	1937
Jan.	$305.2	$196.2	$251.7	$192.2	$242.7
Feb.	270.4	200.6	220.2	118.9	188.3
Mar.	479.9	272.2	300.7	226.6	231.2
April	406.7	300.5	330.0	222.0	269.5
May	.....	328.9	308.5	283.2	243.7
June	.....	324.7	288.3	251.0	317.7
July	.....	398.7	299.9	239.8	321.6
Aug.	.....	414.9	312.3	313.1	281.2
Sept.	.....	347.7	323.2	300.9	207.1
Oct.	.....	383.1	261.8	357.7	202.1
Nov.	.....	380.3	299.8	301.7	198.4
Dec.	.....	456.2	354.1	389.4	209.5
Ave.	.....	$333.7	$295.9	$266.4	$242.8

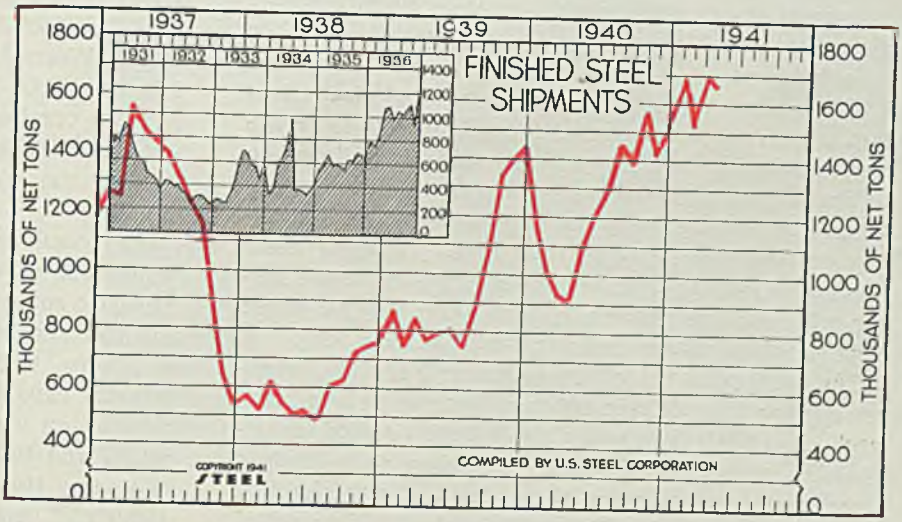
Finished Steel Shipments

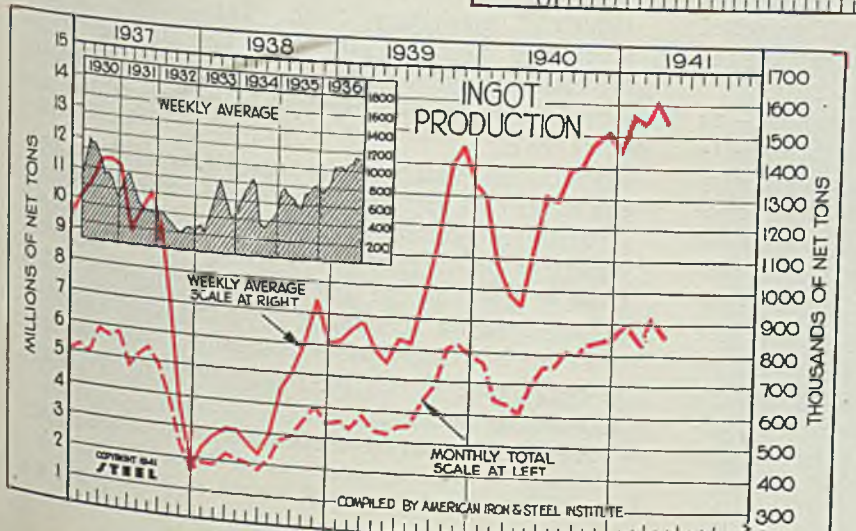
U. S. Steel Corp.

(Unit 1000 Net Tons)

	1941	1940	1939	1938	1937
Jan.	1682.5	1145.6	870.9	570.3	1268.4
Feb.	1548.5	1009.3	747.4	522.4	1252.8
Mar.	1720.4	931.9	845.1	627.0	1563.1
Apr.	1687.7	907.9	771.8	550.5	1485.2
May	.....	1084.1	795.7	509.8	1443.5
June	.....	1209.7	807.6	525.0	1405.1
July	.....	1296.9	745.4	484.6	1315.3
Aug.	.....	1455.6	885.6	615.5	1225.9
Sept.	.....	1392.8	1086.7	635.6	1161.1
Oct.	.....	1572.4	1345.9	730.3	876.0
Nov.	.....	1425.4	1406.2	749.3	648.7
Dec.	.....	1544.6	1444.0	765.9	539.5
Tot.†	.....	14976.1	11707.3	7315.5	14097.7

†After year-end adjustments.





Steel Ingot Production

(Unit 100 Net Tons)

	Monthly Total		Weekly Average	
	1941	1939	1941	1940
Jan.	6,928.8	5,764.7	1,564.1	1,301.3
Feb.	6,237.9	4,525.8	1,559.5	1,093.2
Mar.	7,131.6	4,389.2	1,609.9	990.8
Apr.	6,757.7	4,100.5	1,575.2	955.8
May	.....	4,967.8	.....	1,121.4
June	.....	5,657.4	.....	1,318.8
July	.....	5,724.6	.....	1,295.2
Aug.	.....	6,186.4	.....	1,396.5
Sept.	.....	6,056.2	.....	1,415.0
Oct.	.....	6,644.5	.....	1,499.9
Nov.	.....	6,469.1	.....	1,507.9
Dec.	.....	6,495.4	.....	1,469.5
Total	.....	66,981.7	.....	1,281.2†

†Weekly average.

MACHINE TOOL ELECTRIFICATION

stimulates defense production

By GUY HUBBARD
Machine Tool Editor

■ MANY OF the early models of electrified machine tools were mongrels. They were the results of crossing machines of belt-driven type, either with unduly ponderous electrical apparatus designed for power plant or railway applications, or with unduly flimsy apparatus suitable only for light duty industrial or household use.

These pioneer attempts at machine tool electrification might well be compared to early efforts to create automobiles by installing in road vehicles designed to be drawn by horses, steam or internal combustion engines whose design was based on locomotive, stationary or powerboat engine traditions. None of these "horseless carriages" ever was a very dependable motor vehicle. Some pioneer builders admitted that when they provided whipsockets and whiffletree hooks.

Not until road vehicle designers and engine designers got together, did the automobile cease to be a mongrel. Not until then was chassis design suited to mechanical propulsion and not until then were engines developed especially for these definitely mechanical types of road vehicles. Not until then did self-propelled road vehicles cease to be "horseless carriages" and become automobiles in the true sense of that term.

By the same token, electrified machine tools—as we are familiar with them today—did not begin to take form even on the drafting boards of the industry until machine tool engineers began to think of electrical drive and control as vital factors to be included in the basic conception of a new machine. That condition did not come about until far-sighted electrical engineers and manufacturing specialists won the friendship and confidence of forward-looking machine tool builders to the extent that not only were they encouraged to fraternize with the machine tool engineers but also were allowed to go out into the machine tool plants with their coats off to get the real "low-down" on the practical as well as the theoretical angles of machine tool electrification.

Growing out of this meeting of mechanical and electrical minds came such notable undertakings as the Machine Tool Speed Show staged by General Electric Co. in Worcester, Cincinnati and Rockford; and the Machine Tool Electrification Forum which annually attracts one hundred or more delegates from throughout the machine tool industry to technical sessions held at the Westinghouse works at East Pittsburgh, Pa.

The result of this meeting of minds has been that a number of companies in the electrical industry—and also some in the machine tool industry—have developed and have put on the market specialized lines of precise, rugged and compact motor and control apparatus capable of being designed and built into high production machine tools with full assurance that it will stand the gaff of service more gruelling and at the same time more exacting than any other in the industrial machinery field. This development of specialized electrical apparatus, plus its understanding use by machine tool builders in designs engineered especially for it, has resulted in real electrified machine tools.

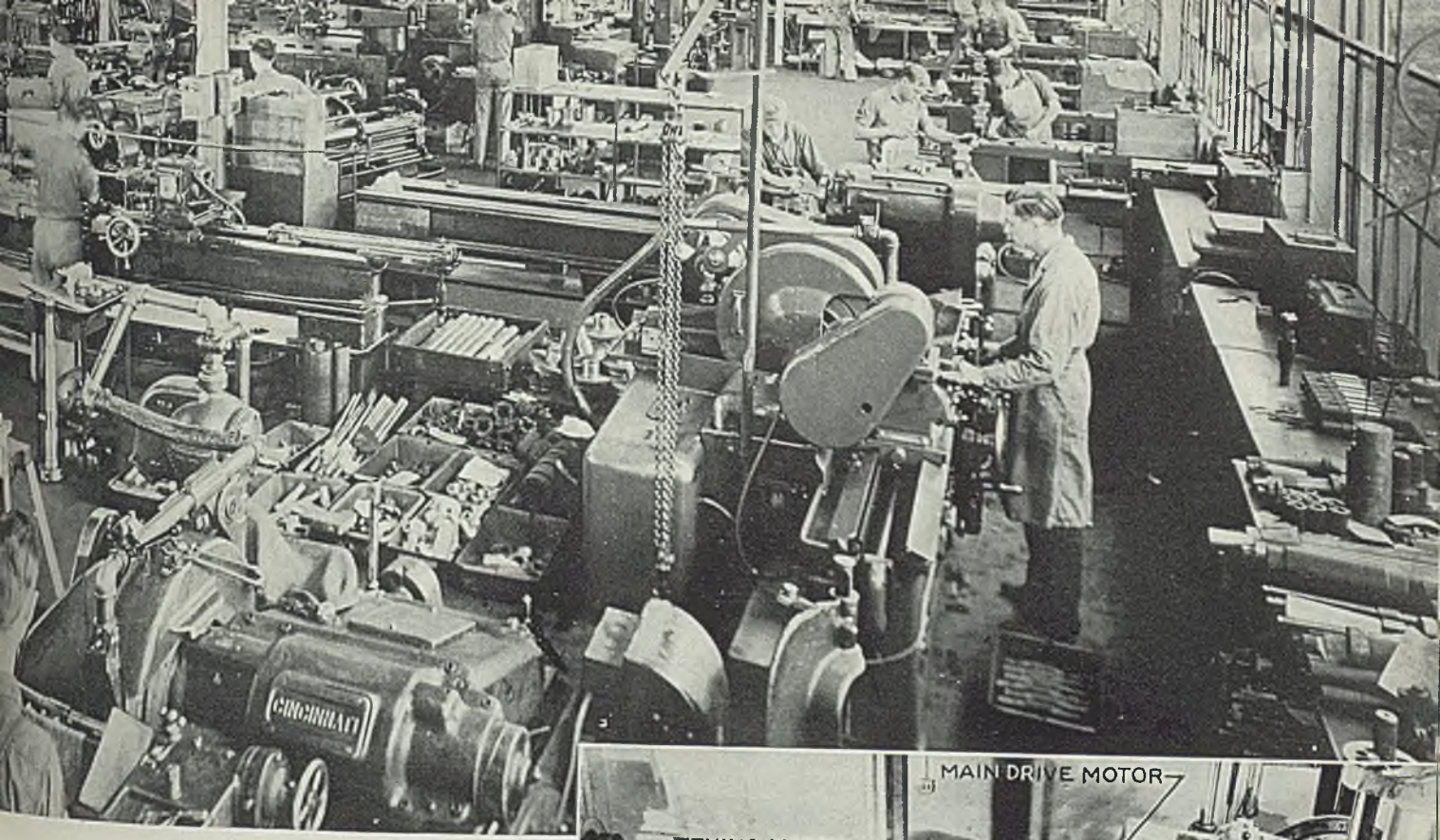
Practically universal user acceptance of these modern electrified machine tools has in a few short years virtually revolutionized the interior arrangement of American production metalworking plants—including those of the machine tool builders themselves. Gone are the flapping, screaming, flickering jungles of overhead and down-drive belts. No longer must machines be regimented to suit the requirements of line shafts and countershafts.

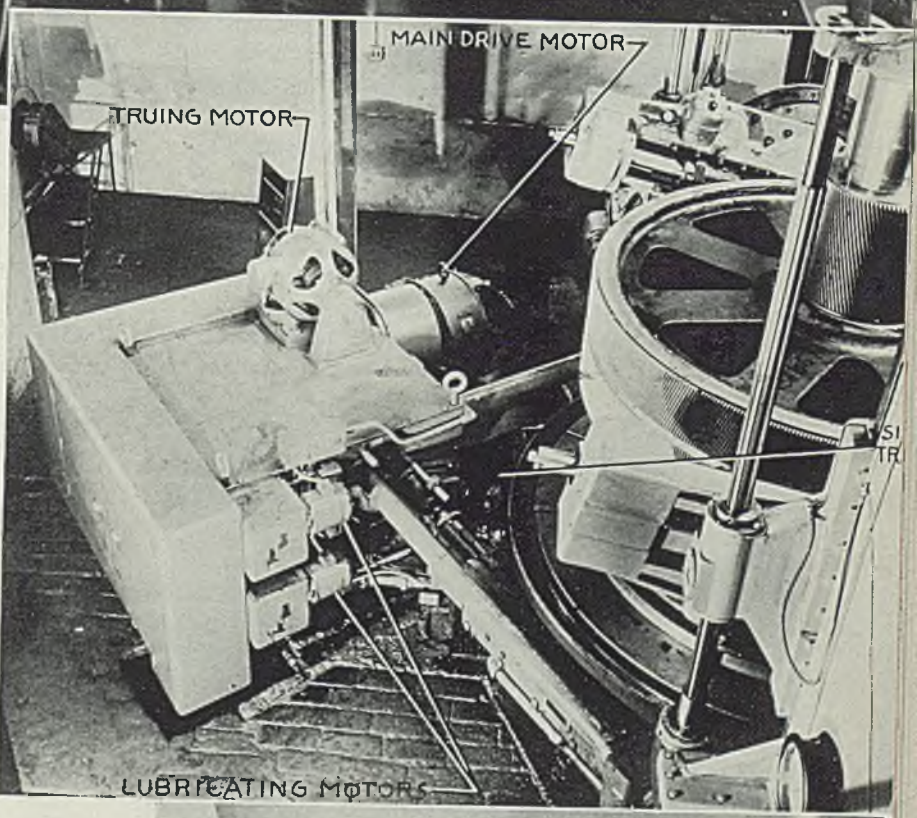
Electrified machine tools have made possible plant

layouts such as that of Monarch Machine Tool Co., Fig. 1, with machines arranged first and foremost for operating convenience and effective flow of work; with unobstructed illumination, both daylight and artificial; and with the space above the machines free and clear for the mechanical handling of work by means of extensive systems of overhead cranes and hoists. This view is typical not only of practically every new plant, but also of thousands of older plants which have been modernized.

Wide prevalence of plant conditions such as this, make it almost mandatory that older belt-driven equipment—a considerable amount of which is now being resurrected to meet the shortage of machine tools due to the rush of defense production—not only must be recondi-

(*Please turn to Page* 83)





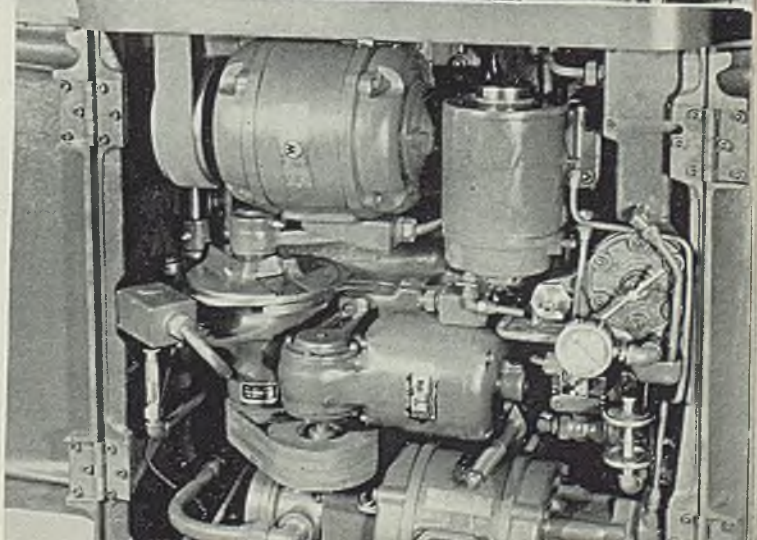


Fig. 1. (Top)—Electrification permits arrangement of equipment for maximum operating convenience and effective production flow: it insures unobstructed illumination and leaves things free and clear overhead for mechanical handling of work. Photo courtesy Monarch Machine Tool Co.

Fig. 3. (Center)—In case of large machine tools such as this Gould & Eberhardt precision hobber for marine gearing up to 10 feet in diameter, electrical drive and control provide relatively simple solutions for difficult problems involved in exact co-ordination of many units. Main drive unit, shown here, is segregated from machine to keep heat away from working units and entire machine is housed in constant-temperature enclosure

Fig. 2. (Bottom)—Growing tendency toward combined electrical-mechanical-hydraulic-pneumatic drive and control in machine tools is exemplified by Landis ball race grinder, in whose cabinet base an amazing amount of apparatus is housed in limited space without crowding

Development and Manufacture of

SMALL-ARMS AMMUN

(Section 15 In A Series On Modern Ordnance Production Methods)

■ THE TOWER of London houses one of the earliest evidences of fire-arm cartridges—a metal case dated 1537 to contain the charge and the bullet, and designed to fit a breech loading harquebus, an old-fashioned hand-gun fired from a forked rest. Muzzle loading weapons, however, continued to be the standard equipment for all armies up until the 17th century and even as late as 1851 the construction was very primitive.

The Minie rifle (1852) utilized cartridges made by wrapping a paper tube around the bullet which had its point in the tube, adding the powder charge, closing the tube and lubricating the paper around the bullet with a mixture of tallow and beeswax. See Fig. 1. In action, the tube was torn open, the powder poured into the rifle barrel, the paper above the bullet discarded and the latter rammed home, base first. The cartridge of the Enfield (England) rifle, of similar construction, gave rise to the Indian Mutiny when the natives were led to believe that fat from the cow, a sacred animal in India, was being used by the Dum-Dum factory.

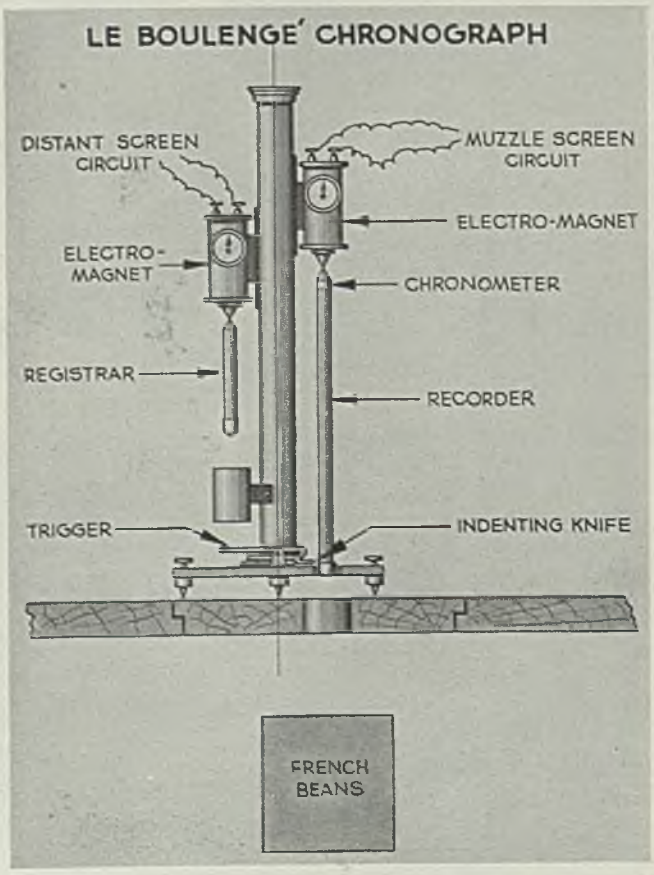


Fig. 2—The Le Boulenge chronograph for measuring bullet velocity. Its operation is described in accompanying text

This type of cartridge was first superseded by that for the needle gun, the first military rifle cartridge to contain its own means of ignition. In 1866, on the adoption of the Snider rifle by Britain, a cartridge with a metal case was introduced. This type of case was made possible by the invention of the percussion cap in 1835 by Alexander Forsyth, a Scottish clergyman. At first, cases were made by rolling strips of brass into cylinders and closing the ends by means of an iron disk containing the primer; but drawn cases appeared in Austria in 1873 and later in Great Britain in 1886. Thus the escape of gas from the breech, a great disadvantage in earlier weapons, was entirely eliminated.

As might be imagined, progress in cartridge development has tended to keep pace with improvements in the rifle itself. Bullets at first were made round, like the first cannot shot, a good fit in the barrel being ensured by pounding with the ramrod and thus flattening the original spherical form somewhat. This, of course, led to inaccuracy of fire and rifling was finally adopted to turn the bullet into a miniature gyroscope in flight. Even after the adoption of rifling, bullets were still muzzle loaded, but now they had an elongated form and were hollowed out in the base so the force of the explosion would press the skirt into the grooves in the barrel.

However, the many obvious advantages of fixed ammunition for small arms caused all other earlier arrangements to disappear; until nowadays the designs adopted by all countries follow a familiar pattern. The brass cartridge case has permitted the development of the machine gun—a forward step

By ARTHUR F. MACCONOCHIE
Head, Department of Mechanical Engineering
University of Virginia
University Station, Va.

ITION

Read about: Early types of cartridge; cause of Indian mutiny; invention of the percussion cap; how cartridge case prevents escape of gas from the breech; evolution of the bullet; modern design; functions of the bullet; description of tracer attack on Zeppelin over London in 1916; design of tracer and armor-piercing bullets; measurement of muzzle velocity with the Le Boulenge chronograph; powder chamber pressures; factors causing inaccuracy in fire; development trends in small-arms ammunition

utterly impossible without a highly efficient and reliable means of assembling bullet and propellant together into a single compact round.

Bullet Metallurgy: The first departure from the spherical form of bullet gave us the elongated projectile with hollowed out base to permit expansion of the skirt into the grooves in the barrel. This principle, in somewhat different form, is still retained for a modern bullet consists of a cupro-nickel or gilding metal envelope enclosing a lead core, or a lead core together with a hard pressed paper or aluminum point. Gilding metal is an alloy of 95 per cent copper and 5 per cent zinc; while the cupro-nickel used by the British in 1914-18 consisted of 79 to 81 parts of copper and 21 to 19 parts of nickel and contained neither lead nor antimony and not more than 0.0005 per cent of bismuth, 0.15 per cent iron, 0.20 per cent manganese and 0.05 per cent arsenic. Cupro-nickel forms a solid solution and after working up into an envelope acquires a hardness of 125 brinell at 0.1-inch from the base and 150 brinell at 0.5-inch from the base.

The core metal was composed of lead 98 per cent and antimony 2 per cent, the combination having a specific gravity of 11.3. Points were made of aluminum, but, as this metal became scarcer, paper was substituted. The use of the paper point in the British 0.303-inch was associated both with ballistics and the preservation of the form of the ogive, the lead core tending to "set up" under the action of the exploding propellant, thus forcing the envelope into the rifling and producing a gas check as opposed to the tendency of the more resilient paper to preserve its original form.

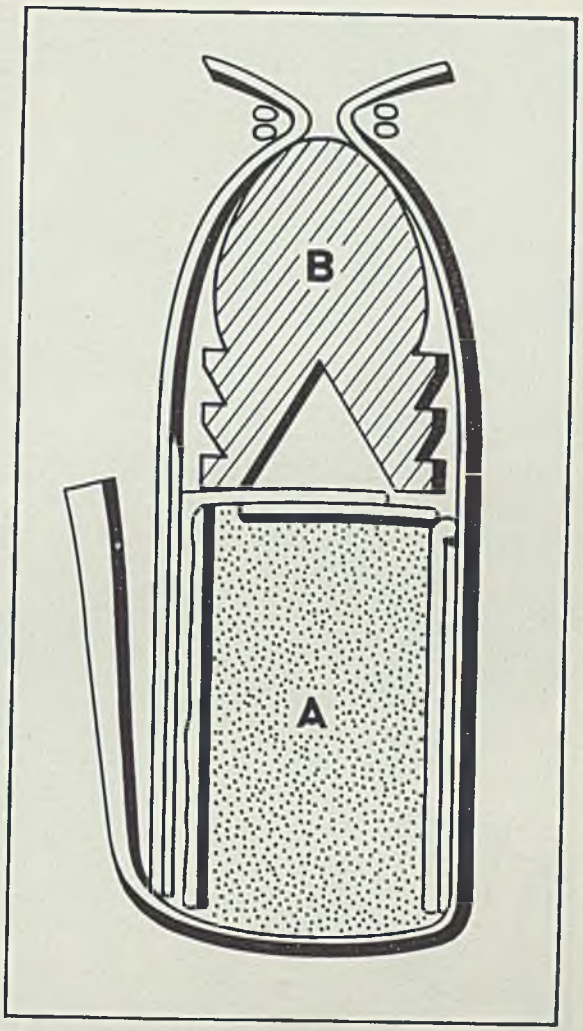


Fig. 1—Rifle-musket cartridge consisted of cylinder a, bullet b and wrapper. In use the fold of the wrapper was torn off, the powder poured into the bore, the cartridge broken at junction of bullet and powder cylinder, bullet forced out by pinching between thumb and forefinger, the bullet inserted in bore, base first, and then rammed home. From "Ordnance and Gunnery," by Benton (1867)

"Dum-Dum" Bullets: Usually the type of bullet used against personnel is designed to drill a clean hole in the human body without spreading to cause a jagged wound. Any weakness in the nose of the envelope, whether accidental or deliberate, may result in a "dum-dum" or spreading of the jagged portions of the envelope on entry. But bullets are required to perform other functions besides attack on human units. One is to ignite enemy balloons. The writer recalls very vividly the Zeppelin raid on London in the late summer of 1916 when one of the German ships was burned over the center of the city, probably by airplane attack with tracer bullets.

For an hour or more the Zeppelin had crept up the river, braving the ground batteries successfully and evading their fire by hiding in light clouds. Toward midnight she appeared in a clear space above the heart of London, lit up by scores of searchlights whose streamers resembled the ribbons of a great maypole, anti-aircraft batteries hammering the while from every quarter of the compass. Then silence,

Fig. 3—Many women as well as men are speeding munitions work. Here a woman is feeding 0.50 caliber cartridge cases into a machine which will taper them, part of the process of making antitank ammunition at Frankford Arsenal, Philadelphia. Figs. 3 and 4 from National Defense Advisory Commission, photos by Palmer

and for five breathless minutes five million people watched a tiny orange light follow the desperate maneuvers of the giant gas bag. The tracers, if indeed these were responsible, must have struck nearly amidships and high up in the envelope for a tiny red flame appeared near the center of the upper part of the fabric and shot upwards for perhaps a thousand feet until the outlines of the city emerged as though bathed in a blood-red sunset. While the burning fragments of the raider fell slowly toward the earth, the watching crowds clapped and cheered in wild enthusiasm.

"Tracer" Bullets: These tracer bullets formerly were made in two patterns. One had a hole through the axis for supplying atmospheric oxygen; the other consisted of an ordinary 0.303-inch bullet fitted with a copper cylinder in place of the lead core, into which the pyrotechnic mixture was compressed. This latter is the type used now. The tracer compound consists of fuel, an oxygen carrier, some form of color intensifier, and binding and waterproofing agents. The explosion of the propellant, of course, is responsible for ignition of the compound which burns fiercely during the flight of the bullet. The color used may be pale purple, green or perhaps more commonly nowadays, red.

The other important application of the small-arms bullet is for armor piercing. In earlier British designs, the paper point was replaced with a hardened steel point. But in this country, almost the entire body of the bullet inside its envelope of gilding metal is taken up by the hardened tungsten-chromium steel core. The balance of the space, especially in the region of the nose, is filled with lead alloy, partly for ballistic reasons but also to increase the sectional density of the projectile. This lead filler performs a somewhat similar function to the cap on the nose of armor piercing projectiles. On impact, the gilding metal with its lead alloy backing "splashes" against the armor, permitting the exceedingly hard core to punch its way through. Armor-piercing bullets are standard in this country in calibers 0.30 and 0.50 and can be used in any gun designed to use the corresponding ball ammunition.

Both during manufacture and after final assembly, the cartridge is inspected in its several parts for apparent defects, missing fireholes and so forth and is carefully gaged lest worn dies permit the passage of oversize parts. Figs. 3 and 4 show two typical operations in Frankford Arsenal on 0.30-inch ammunition.

One of the most interesting tests applied to the round—or rather to a small percentage of each batch—is the determination of muzzle velocity with the LeBoulenge chronograph shown in Fig. 2. The central brass pillar supports the two coils included in the muzzle screen and distant-screen circuits, respectively. These coils are wound on soft iron cores which remain magnetic only while current flows in the circuit. The "recorder" is a copper or zinc tube enveloping the "chronometer" of soft iron which hangs from one coil. The "registrar" is a shorter rod which hangs from the other coil. Its function is to release the trigger above which it hangs suspended until the "distant screen" circuit is broken.

The sequence of events on the passage of the bullet through the first muzzle screen, which takes the form of a strip of tinfoil stretched across the path close to the barrel, is as follows. First the muzzle screen is broken, releasing the chronometer which drops freely under the acceleration of gravity. A fraction of a second later the distant screen circuit is broken and the registrar falls upon the trigger which in its turn releases the indenting knife. Now if means are at hand for breaking the two circuits simultaneously a certain interval will elapse between the breaking of the circuits and the marking of the recorder by the knife. This is known as the instrumental dead time. If this interval is represented by t_1, the relationship between t_1 and the distance fallen by the chronometer, h_1 let us say, is given by:

$$t_1 = \sqrt{\frac{2h_1}{g}}$$

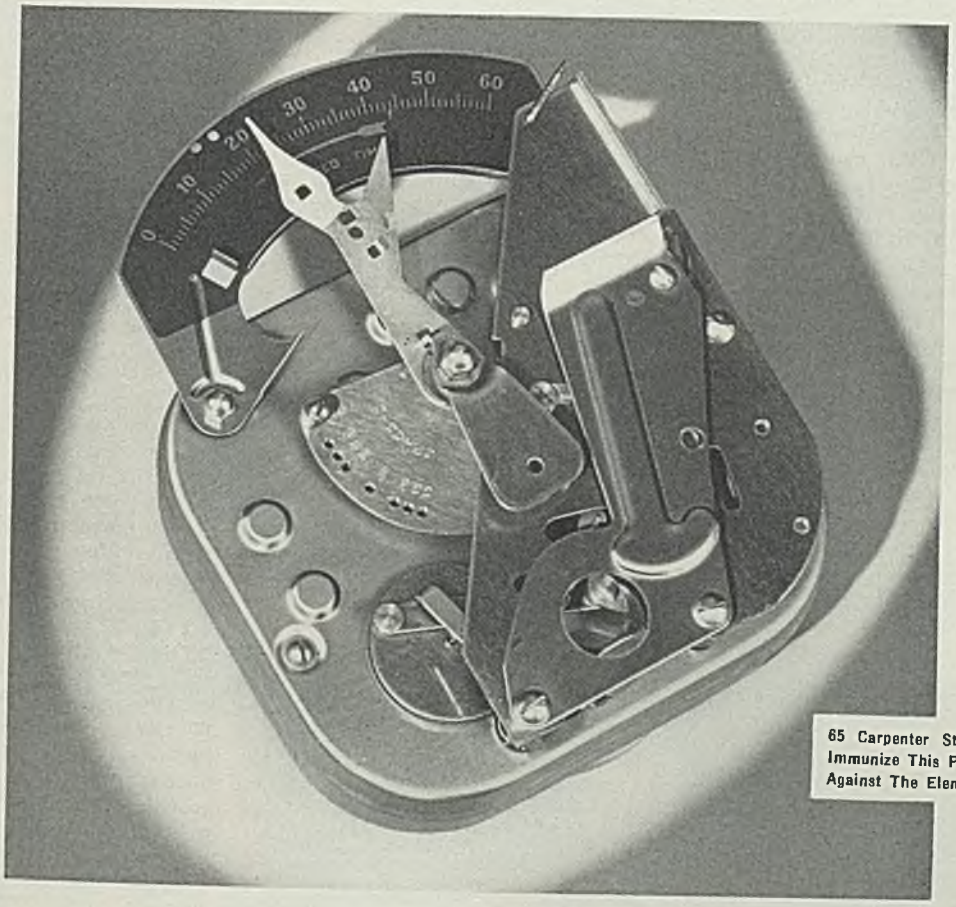
"g" being the acceleration of gravity in feet per second per second.

If a short interval separates the breaking of the two circuits, clearly the chronometer will fall a longer distance, h_2, before the knife indents it and the relation between total distance fallen and total elapsed time is:

$$t_2 = \sqrt{\frac{2h_2}{g}}$$

If "t" be the interval between the

IT TAKES *Stainless Steel* TO LICK A HURRICANE!



65 Carpenter Stainless Parts Immunize This Parking Meter Against The Elements.

This story starts in New England with the big wind of '38. After the storm had whirled its violent course up the valley of the Connecticut, hundreds of parking meters were found destroyed. In one wild night, corrosion equal to years of normal service had penetrated to vital mechanisms hitherto supposed to be inaccessible to the elements.

Now 65 vital parts—every part where corrosion could possibly cause operating failure or even poor appearance—are being made from Carpenter Stainless. Formed parts are fashioned from clean blanking, ductile, Carpenter Stainless Strip. Machined parts are turned out from Carpenter Free-Machining Stainless Steels. To meet the various technical problems, 3 different analyses of stainless are being employed.

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passage of the bullet through the near and distant screens, then:

$$t = t_2 - t_1$$

The mean velocity of flight over the measured distance "d" between the screens is then given by:

$$v = \frac{d}{t}$$

In actual tests, however, the actual muzzle velocity is read from ballistic tables already computed. With t_1 standardized, t_2 is the only variable so such tables are easily prepared.

Error Less Than 1 Per Cent: The accuracy of this device may be as high as 99 per cent or more in estimating velocities of flight, the corresponding error in the measurement of the time interval being around one ten thousandth (0.0001) of a second. The method by which both circuits are broken simultaneously to determine t_1 includes the use of two small weights mounted side by side on two flat horizontal springs. These weights rest on electric contacts set in a base plate which is also sprung in its turn with respect to the instrument base. By pressing down upon the assembly of weights, base plate, etc., and then releasing it, the plate is brought up sharply against a stop which causes both weights to rise off their contacts at the same instant, thus breaking both circuits at once and providing us with the "disjunction" mark on the recorder.

Gas Pressure Test: Among the many other tests to which small arms ammunition is subjected is the pressure test in which the maximum gas pressure is determined by the amount of the compression of a copper cylinder. These cylinders are cut from rods of the most uniform material obtainable. The characteristics of the copper are determined by static tests and tables are prepared showing the amount of the compression produced by each static load. From these figures are obtained the "tarage" table which indicates the relation between the pressure in tons per square inch and the corresponding change in length of the copper cylinder as measured by a micrometer.

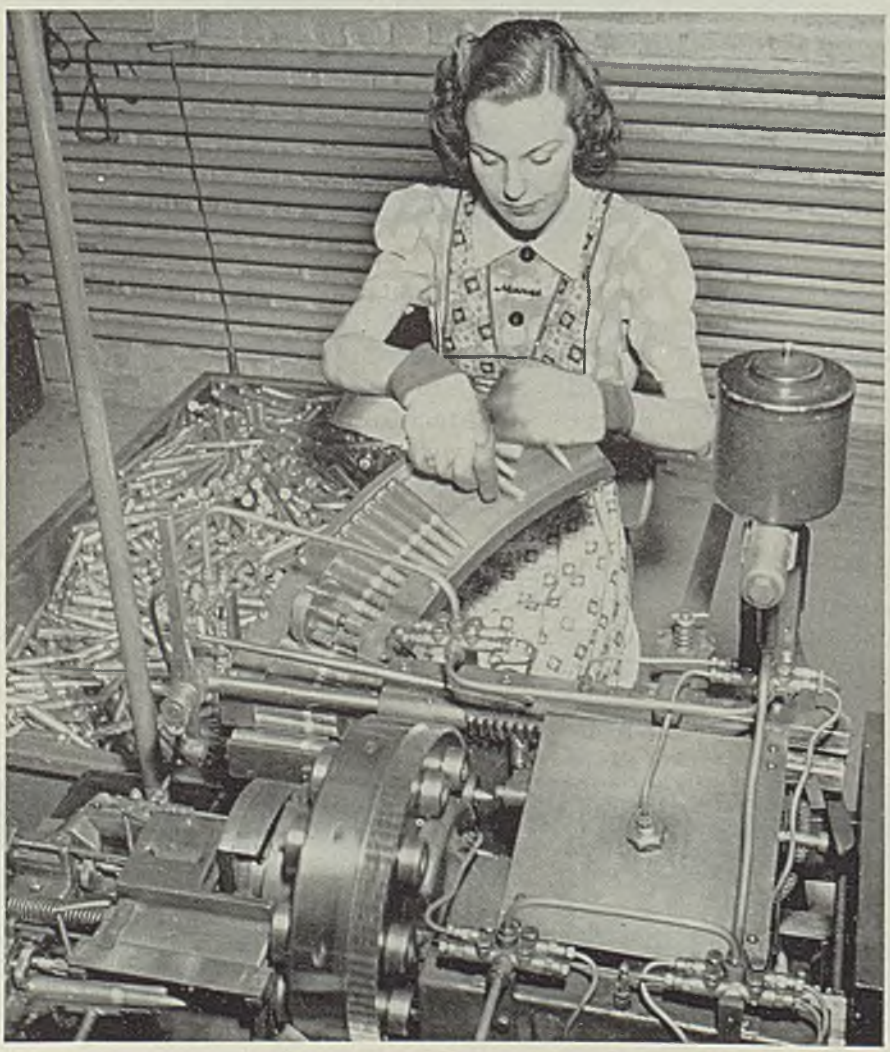
Other tests include immersion in water for 24 hours prior to firing: accuracy trials in which an effort is made to eliminate all other dispersion factors than those originating in the ammunition itself. One familiar cause of irregularities in flight is failure to dispose the several components of the bullet symmetrically with respect to the longitudinal geometric axis. "Thick and thin" envelopes and lack of care in placing armor-piercing cores are sometimes responsible. Then after the test rounds have been fired, the cases are examined for splits, pierced or blown caps, etc., and a record is made of any misfires, jamming in the breech and so forth.

Among improvements since 1914-18 is increased muzzle velocity. The British 0.303-inch bullet in 1914-18 had a standard mean velocity of 2180 feet per second. Nowadays we think in terms of 2700 feet per second or more in order to reduce time of flight on speedy targets and to secure penetration in the case of armor piercers. Then research has been conducted on primer mixtures with a view to improving stability and reducing corrosion.

Primer Caps: The cap of the British 0.303-inch in the last war was filled with a wafer consisting of 18 parts of sulphide of antimony, 14 parts of chlorate of potash, 8 parts of fulminate of mercury, 1 part of sulphur and 1 part of mealed powder. In this country, we use a primer mixture consisting also of potassium chlorate and antimony sulphide, but including lead sulphocyanate and TNT. The primer or "cap" of the small-arms cartridge did not come into general use in this country until after the Civil War. It finally displaced the flint lock —a 200-year standby.

Next week, a detailed step-by-step presentation of manufacture of the British 0.303-inch bullet and cartridge will be given.

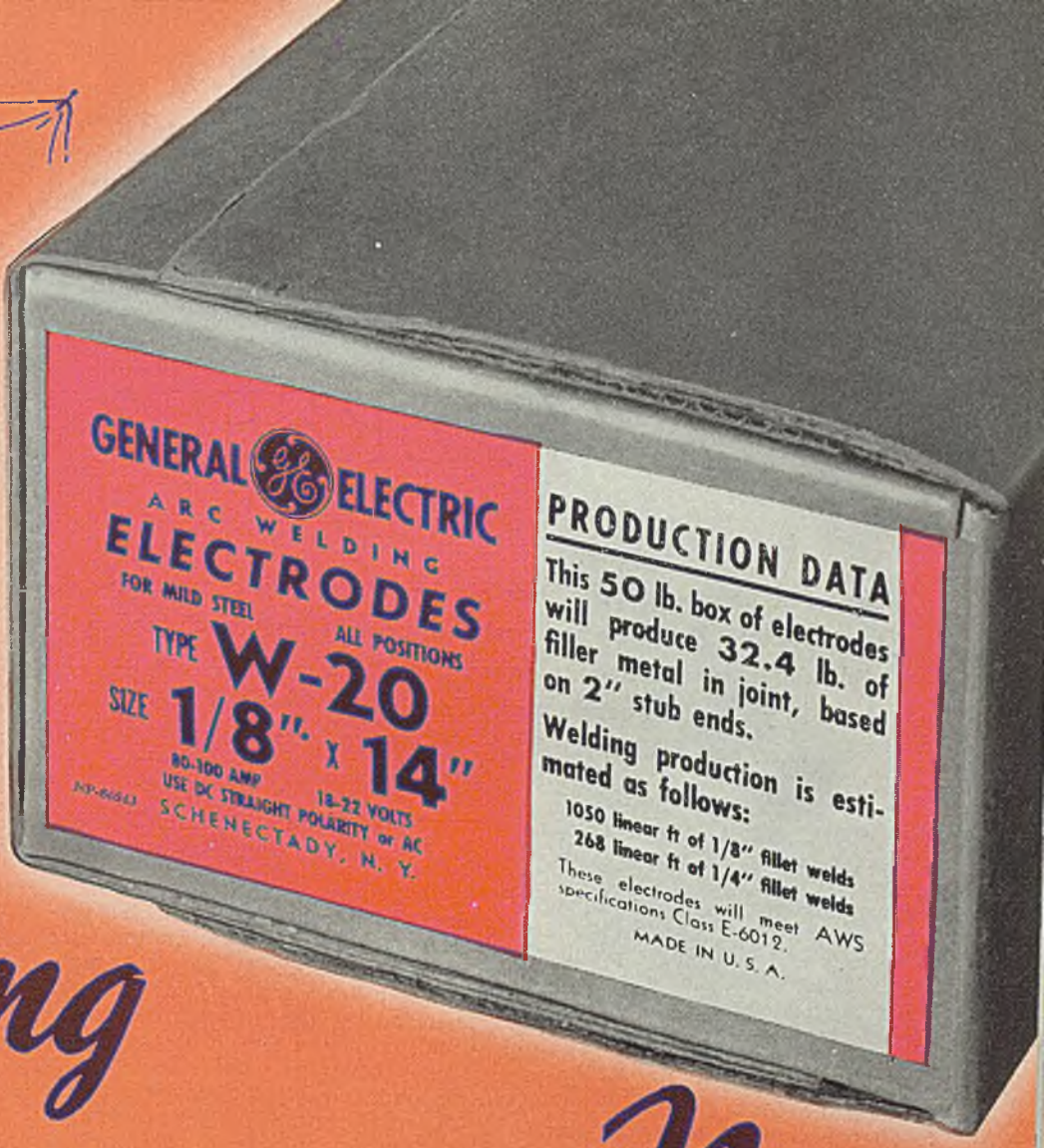
Fig. 4—Here is a machine typical of the specialized units developed for manufacture of small-arms ammunition. It automatically gages and weighs 0.50 caliber ball cartridges almost as fast as the operator can load them into the tray feeding the machine



Story Covers "Why's" and Types of Grinding

■ The principal types of grinding and some of the "why's" for the high status of this machining process in modern production are embodied in a 5-page feature article which appears in the March-April issue of *Oakite News Service*, house organ of Oakite Products Inc., 57 Thames street, New York.

Entitled "The Grinding Process and Its Dependence on Efficient Cooling," the story is written by G. Russel Hersam of the company's research laboratories. It gives considerable data on the essential part that proper coolants play in assuring desired standards of accuracy, speed and economy.



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GENERAL ELECTRIC

How To Make

X-RAY PERFECT WELDS

Here Mr. Lawrence concludes his 3-part analysis of what to do to obtain X-ray perfect welds by considering each possible defect, examining its cause and detailing what can be done to prevent its occurrence. For first two parts of this article, see STEEL, May 5, p. 76 and May 12, p. 77

By HAROLD LAWRENCE
Metallurgist

■ BEFORE going into a trouble-by-trouble enumeration of causes and effects, consider the whole X-ray welding picture for a moment. What quantity of bad welds are to be expected in regular practice? The answer to this question is based upon observations in a number of plants where X-ray welding has been introduced without any previous experience in the field. Cutouts at first ranged from 25 to 50 per cent. Usually the welders were not at fault.

Simple groove design changes and a better explanation of the steps necessary to good results from a predetermined welding procedure reduced the footage cut-out considerably. Applying the principles outlined in this article should enable the plant to reduce cut-outs to a steady level of about 2 per cent. Cut-outs that remain will be occasioned by man failures or by laxity of supervision.

Porosity: One of the most troublesome defects revealed by the X-ray inspection method in the past has been porosity. Usually porous welds may be traced to faulty electrodes. Be sure that the supplier of electrodes has a well established testing procedure that will prevent unsound products from reaching the consumer. Furthermore, make certain that the type of welding electrode specified for the job meets the specifications discussed before. There are many electrodes manufactured for special applications where the X-ray standard of quality is neither expected nor required. A mistaken application of one of these is inexcusable.

All electrodes, no matter what the type, produce gas in the weld metal. Materials are incorporated in the coating to promote the elimination of all gas formed in the pool. But operating technique must be perfected to keep the pool molten long enough to allow the gas to escape. Uncap a bottle of carbonated beverage and the gas arises through the fluid. Uncap a frozen bottle of this same beverage and the gas is trapped. Gas in molten weld metal follows the same laws. Be sure that the metal remains in the molten state long enough to allow the gas to rise and escape before the solidifying metal holds it in place. Puddling and oscillating are methods used to keep the pool in the desired molten condition for the requisite length of time.

Frequent mention has been made of the need for using recommended welding currents. Prevention of excessive porosity in welded joints depends on this oft mentioned factor, among other things. Electrode coatings are developed to perform certain functions under well established conditions. To disturb these conditions by trying to employ exceptionally high currents, for example, frequently destroys the balance of coating and weld pool reactions and so brings about an unsatisfactory state of porosity.

Dirty Steel? Emphasis has been laid upon the contributions of dirty steel to porosity. Truly this factor has been over-emphasized far more than collegiate football. With the usual procedures adapted to the metallic arc welding of steel, a moderate amount of either dirt or segregation may be taken in full stride. In fact, the extreme importance of ultra clean steel has only been mentioned of late in connection with some automatic welding processes that aggravate an unclean steel condition by virtue of the high heats encountered in conjunction with holding the weld metal at high temperature for a long period. Present mill practice with its constant attention to cleanliness is assurance that the steel will meet the requirements of radiographic inspection. Rare indeed is the location of porosity in a straight line along the fusion zone as a direct result of dirt in the steel.

Most of the time porosity appears on the exographs as small black spots of circular shape. At other times they may appear to have a definite length due to the angle at which the radiation passes through the weld. Another defect that has almost the same appearance but white in color is spatter. Unless all spatter is removed before the radiographs are taken, these white and annoying, although both harmless and meaningless, spots will be found in the film.

Slag: Another bothersome weld defect is trapped slag. This defect is associated with errors in procedure brought about by incorrect welding technique or by improper joint preparation or chipping. Of course poor chipping will lead to trapped slag. Or the attempted application of too large an electrode as demonstrated in the accompanying illustration may bring about slag inclusions. In the first case a single elongated black streak, or a series of them, will denote the trapped slag. The second difficulty brings forth a pair of streaks about the same distance apart and running along the weld like a railroad track. Slag inclusions springing from either of these two causes are quickly recognized and steps may be taken to prevent their recurrence.

Slag located along one sidewall or the other, as distinguished from that discovered along both edges of the scarf, indicates faulty electrode manipulation or incorrect current, most likely the first. The electrode must be operated in a manner that guarantees adequate slag control. Whenever the slag is allowed to run ahead of the arc, a nasty hole forms along the sidewall. This hole must be chipped clean before going ahead

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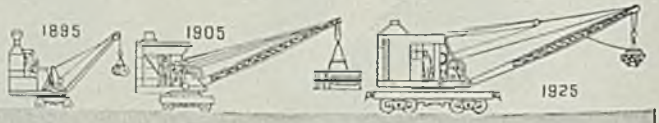

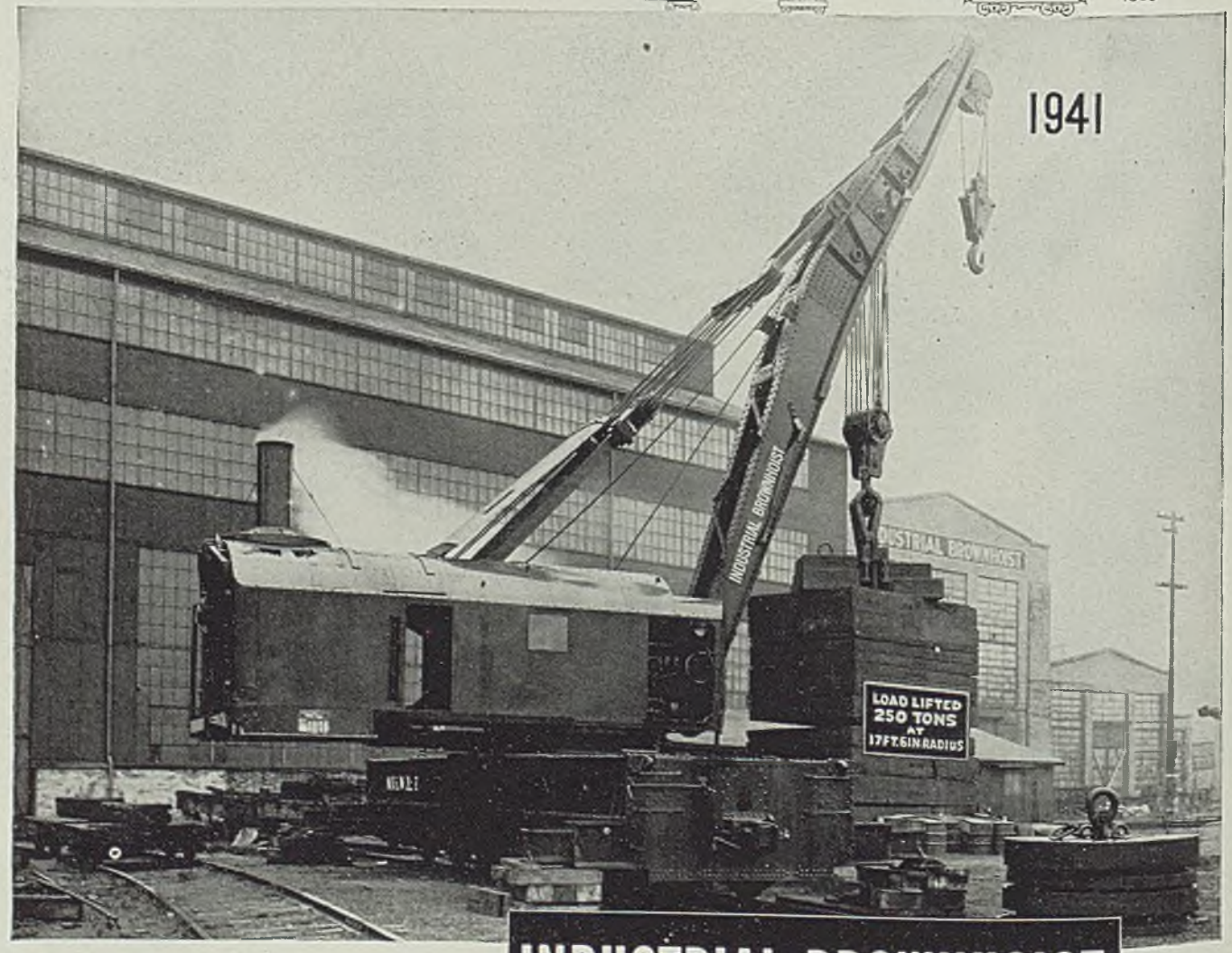

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with the remainder of the weld. Frequently it becomes necessary to repair this one damaged spot before proceeding with the next pass. Never under any circumstances should the welder attempt to float out or burn out this hole in the subsequent pass. If he succeeds in obliterating all evidence of the hole, the X-ray will reveal the error of his way of thinking later.

Sometimes when slag runs ahead of the arc, holes are formed in the center of the weld deposit. These holes, too, must be chipped clean exactly as the ones just mentioned. Truly, an ounce of weld metal removed at this crucial point will save many pounds of curative metal after the flaw has been disclosed by X-ray. One apparent advantage of the multipass weld lies in the easy discovery and correction of potential bad spots during welding operation.

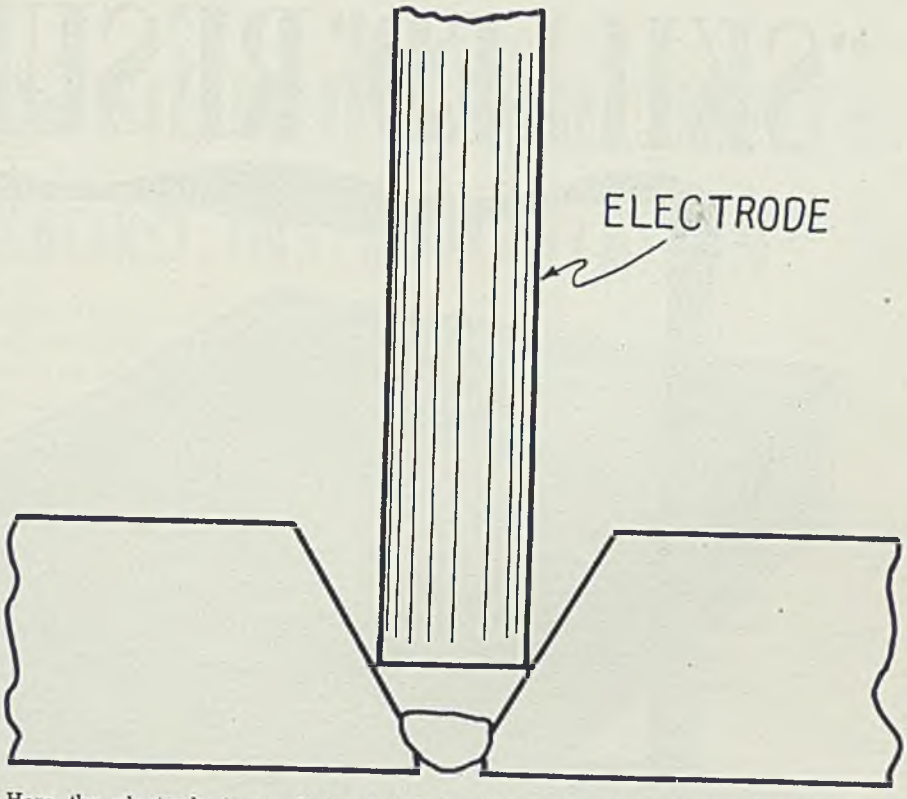
Before leaving the subject of slag inclusions, mention must be made of those inclusions that occur at the extremities of straight runs. Magnetic blow is a frequent cause of such inclusions. The remedy is alternating-current welding, which materially reduces magnetic disturbances, allowing welds of good quality to be made clear to the ends of straight seams.

Undercut: One defect that may be seen with the unaided eye is undercut. As X-ray film is moderately expensive, inspection prior to radiographing should locate and repair all places that are undercut. But better yet is the development of a plan of operation that will prevent the undercut from forming at all.

Once more attention to welding current may do much to do away with a tendency toward undercut. Too high a current melts metal away from the edges of the groove more rapidly than the pool can provide filler metal. Near the top of the groove undercut is found; down in the groove the undercut may lead to a slag inclusion. On the film these two defects appear quite the same in size and shape.

Some specifications require the removal of the finish or cover bead. Extreme care is required in this operation to make sure that no more than the necessary amount of metal is removed. Otherwise a wide undercut condition, in reality a place where the thickness of metal has been reduced excessively by chipping or grinding, will apear on the exograph. Similarly tool marks made during peening or chipping must be patched before taking any radiographs.

Incomplete Penetration: Lack of penetration is seen on the X-ray film as a slag inclusion that is unusually straight. Really the term is a misnomer as a better descriptive term might be incomplete chipping. Knowledge of the scant penetrating



Here the electrode is much too large for the width of the joint. This leads to excessively high arc voltage and often results in trapped slag. Watch for it. An electrode even a little too large can cause trouble

ability of electrodes in V-joints at the root along with a sound idea of the depth of the lip brings to mind the need for chipping control. When has the opposite side of a butt weld been chipped to sound metal? Only when the depth of chipping at the shallowest point exceeds the thickness of the lip.

The extent to which chipping is to be carried is best measured with a chipping gage, using either a gage with a fixed point or one with a variable extension scribed for each different type of joint. The tools are inexpensive and simply made. Usually the cost of one repair justifies the expense of a chipping gage. As previously mentioned, the unwelded region of the butt joint may be cleaned out with a gouging torch.

When oxygen gouging is adopted for cleaning to sound weld metal, the chipping gage is no longer needed. The experienced gouger will recognize unwelded spots when they appear in the stream of molten metal and will automatically adjust the depth of gouging to clean them up. Even where he fails to notice the flaws during gouging, the defective locations are quite apparent after the flame gouging has been completed. Then it becomes an easy job to touch up the faulty places. For the gouging torch, unlike the chipping chisel, does not cover up any poor work.

Cracks are rarely found in X-ray pictures. When they are discovered, sequence of welding is quite generally the offender. Structures, either subassemblies or main assemblies, must be welded in an orderly manner leaving the material free to move. Thus stresses during welding are held to a minimum well below the ultimate strength of either the weld metal or the parent plate.

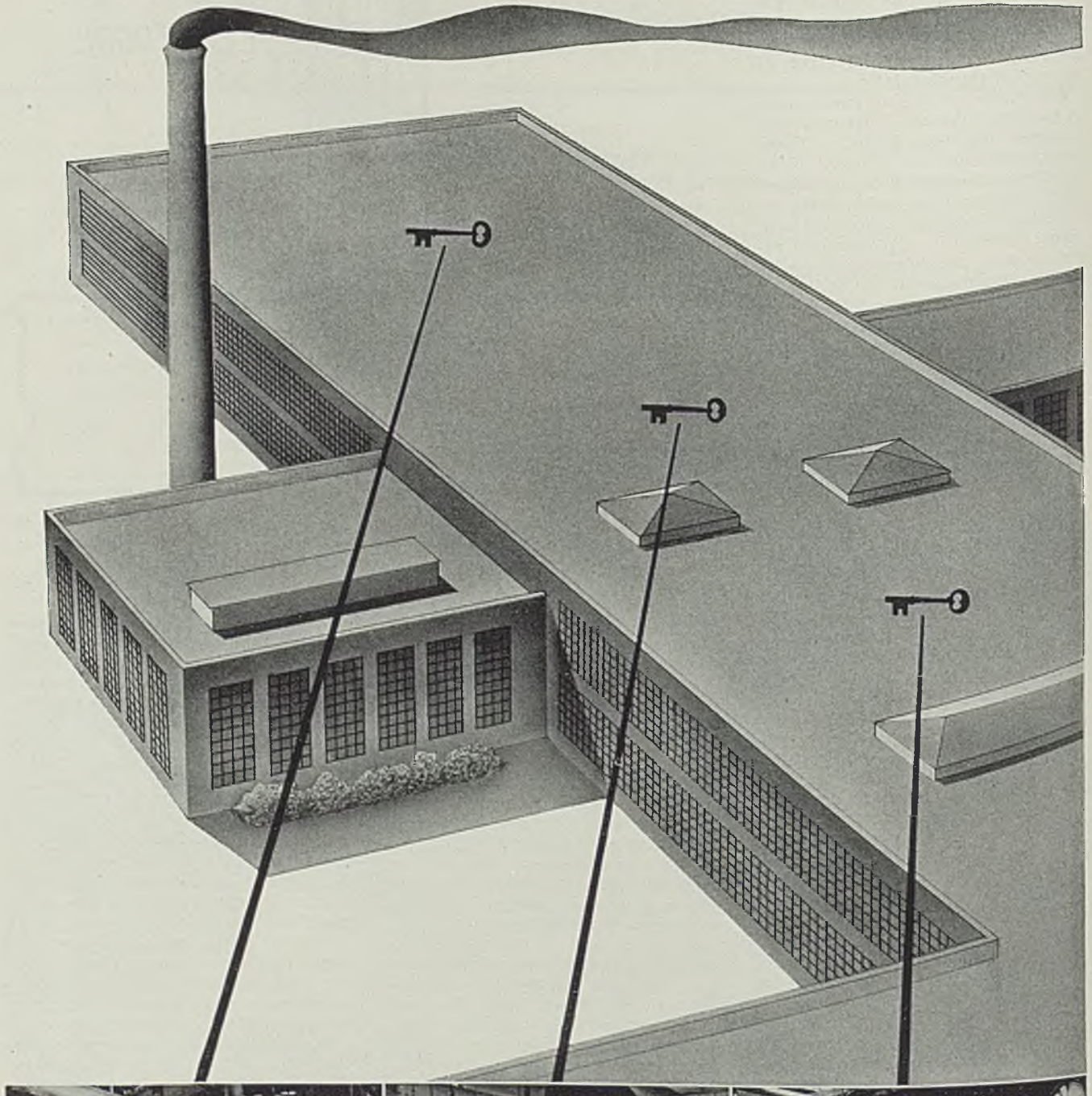
At times cracks are caused by an insufficiency of weld metal in the first pass. Shrinkage stresses are greater than the ability of a thin section of weld to withstand them. A crack appears. An observant welder or cleaner will notice this fault and remedy the defect at once.

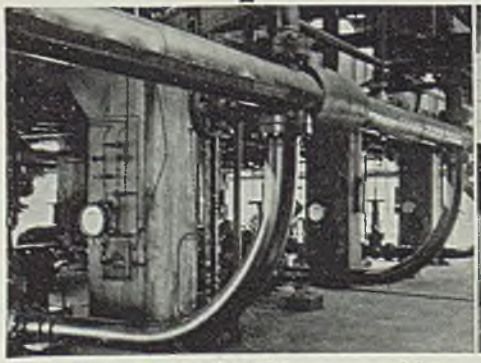
Where heavy stresses must be borne by the weld metal, block welding may be employed to provide ample strength. A section of from 6 to 12 inches is welded to a considerable thickness, or even to the full thickness of the joint, prior to filling in the intervening spaces. In this fashion the weld metal is strong enough to overcome the high shrinkage stresses.

Incomplete fusion—the last defect to be discussed in this series—is the least common. Lack of fusion has the appearance of a thin slag inclusion or crack. Insufficient welding current may bring about lack of fusion, particularly on heavy sections. Where the higher ranges of current are needed to burn into the plate. Frequently an unsound condition results from too narrow a weave. The proper weave is carried to both sides of the joint, tak-

(*Please turn to Page* 88)

"SKILLED" RESULTS from





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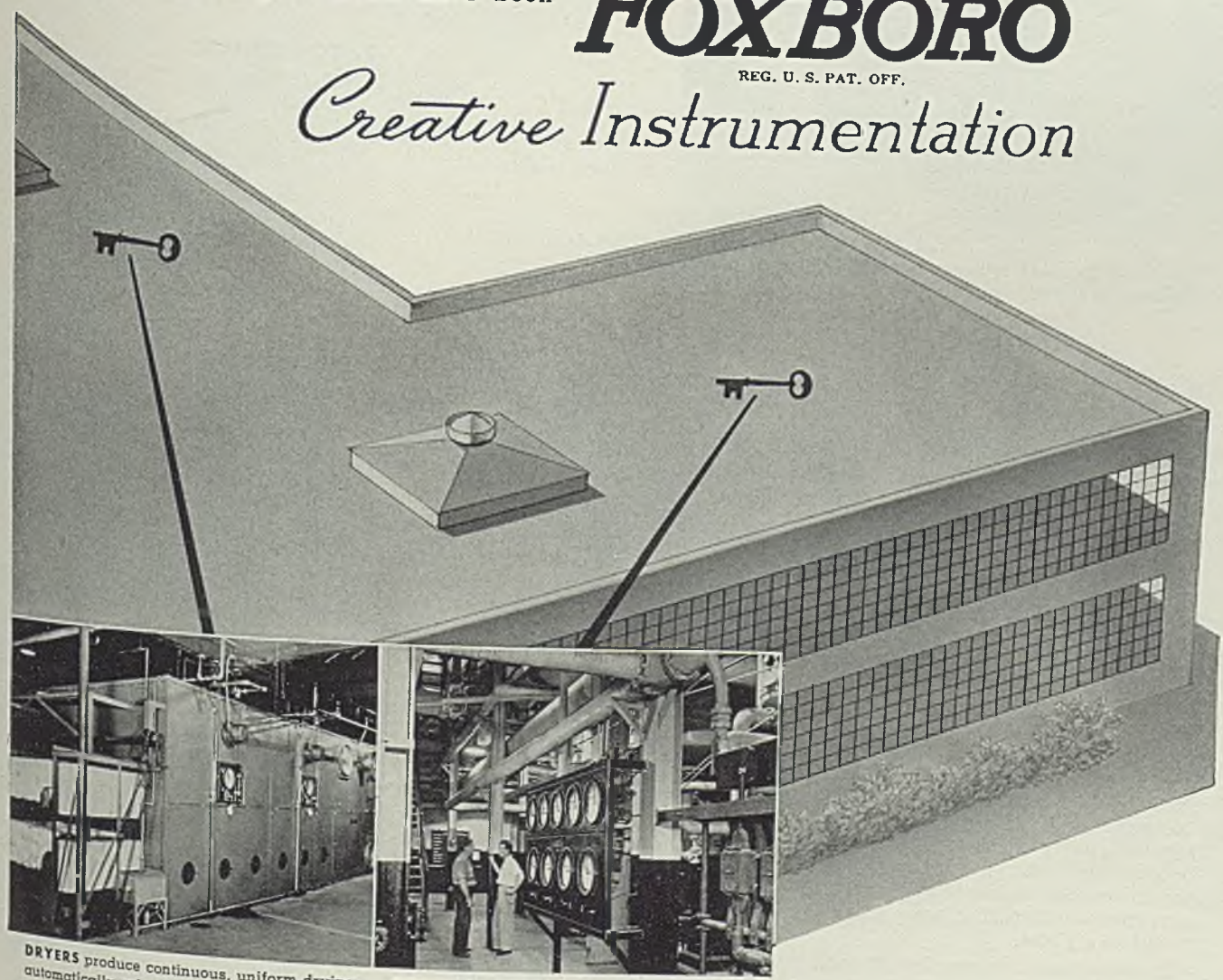

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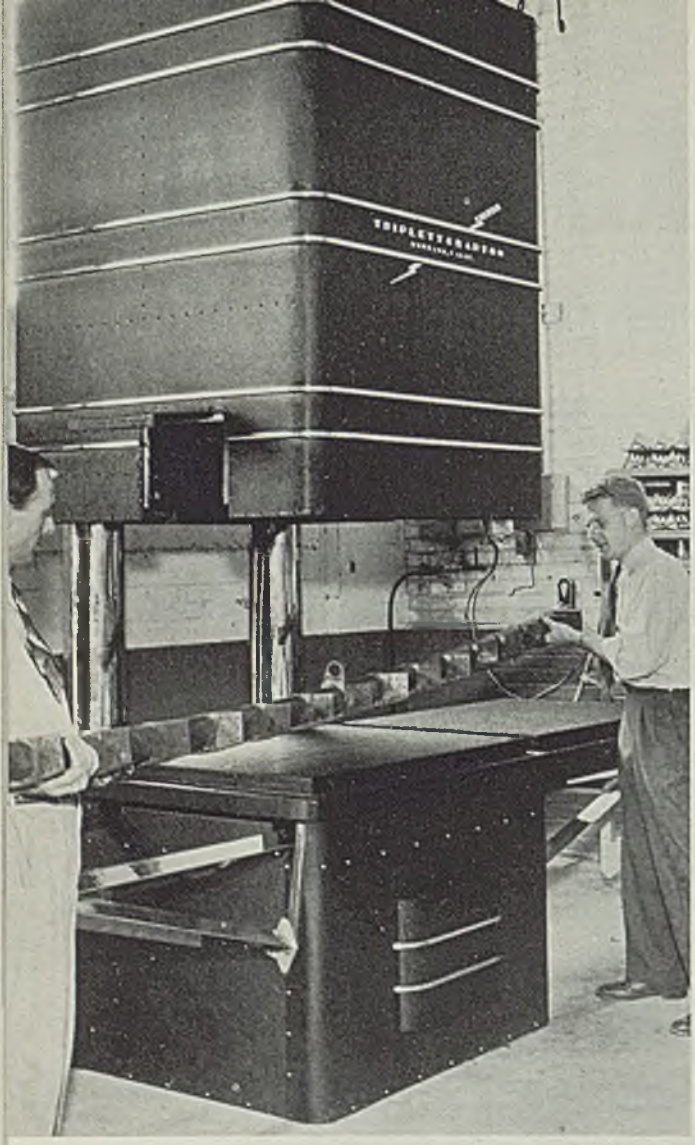
By TOM TRIPLETT
Triplett & Barton Inc.
Burbank, Calif.



This X-ray machine will photograph 5000 parts a day automatically and can handle the largest structural parts now being used

■ FOR A long time aircraft manufacture has involved unusually severe inspection requirements. A good many parts would be X-ray inspected 100 per cent if some high-production method to handle this work were possible.

As a matter of fact, such a program has actually been worked out and is now in operation at the Burbank, Calif., plant of Lockheed Aircraft Corp.

Five years ago X-ray examination of class I and stressed parts was limited to 10 per cent of the total used. In those days, inspectors of machine shops were expected to detect flaws in the metal parts handled. Experience soon proved that 100 per cent X-raying of class I and stressed parts actually saved time because it assured that no time would be lost in handling parts on a production line that were unsafe to put in a plane.

In more than one case has it been found necessary to turn back a major portion of a foundry order because of flaws revealed by the penetrating X-ray. With up to 100,000 parts in a modern plane, it is exceedingly important that any that might cause structural failure be eliminated.

During the first stages of X-ray in metallurgical research, radiographing 100 parts a day was considered an achievement. The average was 30 or 40. Contrast this with the recently developed machine which automatically X-rays 5000 average parts per day. It is a compact unit with all essential parts housed in a cabinet 10 feet high and 4 feet square. Some 1500 pounds of lead permit the operator to stand beside the machine without being exposed to dangerous X-rays.

We estimate that ten of these new X-ray machines can handle the X-raying of all stressed parts that would be used in 50,000 planes a year. This extremely high production is made possible only by continuous conveyor belt feeding arrangement synchronized with automatic exposure controls. The operators merely load parts on to and remove them from the belt, all other operations being done automatically.

One of the greatest improvements that the X-ray specialist will appreciate is the fact that the operator can work alongside the cabinet as this eliminates the time previously required to wheel parts in and out of the lead-lined X-ray chamber previously employed in the interests of safety. Now the X-ray tube and transformer is encased in the upper portion of the cabinet, which is raised and lowered over the work by an automatically controlled electric lift.

To eliminate high voltage cables, the X-ray tube is plugged directly into the transformer. This permits replacing a tube in one minute in case it should burn out. The machine's automatic control is a small, compact separate unit. In case of breakdown of one control unit, it is possible to switch to an entirely separate one in a few minutes. The operator can select the exposure he wishes, the speed at which the conveyor feeds the machine, and then set the control accordingly. He only needs to concentrate his attention thereafter on getting parts on and off the conveyor table.

This machine will handle the largest airplane castings made. Special

Abstracted from *Aviation*, January, 1941.

DISSTON

famous maker of saws, cuts costs 25% with a PENNSALT CLEANER

By changing to a Pennsalt Cleaner about two years ago, Henry Disston & Sons, Inc., leading manufacturer of saws and other tools, achieved remarkable savings.

The cleaner is used to remove cutting oils from brass fittings for the handles of Disston saws before polishing the brass or nickel-plating. With this Pennsalt Cleaner, Disston saves three ways:

1. **Initial cost of cleaner is about 25% lower.**
2. **Less cleaner is required to handle the same volume of cleaning.**
3. **Labor costs have been reduced. With the previous cleaner, Disston had to use steel balls in the tumbling operation and then sort out the balls from the brass pieces after cleaning. With the Pennsalt Cleaner, no steel balls need be used . . . sorting is eliminated.**

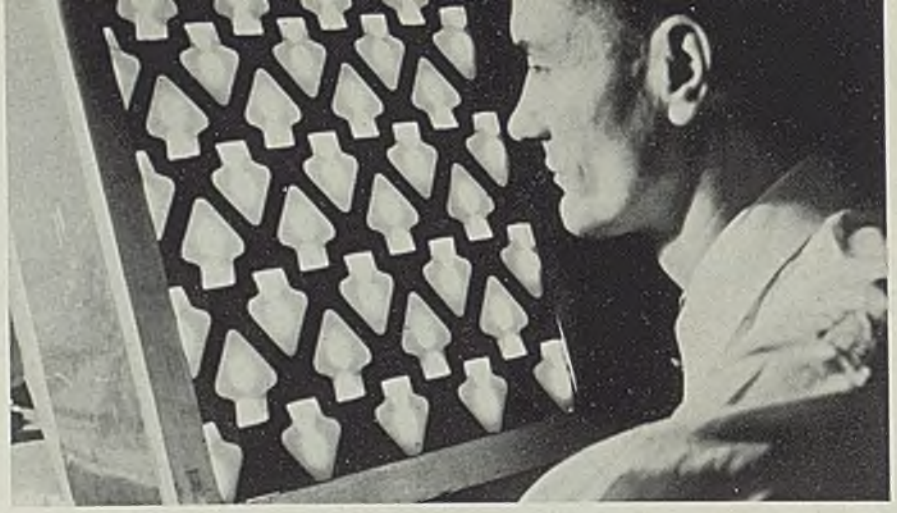
Since cleaning requirements vary from one plant to another, we have many Pennsalt Cleaners . . . each with proved power to make metals "come clean" quickly and economically.

Have you checked your metal cleaning operations lately? If not, we would be glad to have your permission for our serviceman to call on you. If he can't serve you, he will frankly tell you so. Write today to Department E, Pennsalt Cleaner Division, Pennsylvania Salt Manufacturing Co., Widener Bldg., Philadelphia, Pa. Stocks of Pennsalt Cleaners in Boston, Chicago, Hartford, Philadelphia, Pittsburgh, Providence, Springfield, Mass., St. Louis, Wyandotte and Tacoma.

Brass saw fittings cleaned at a saving of 25% with a Pennsalt Cleaner.

PENNSYLVANIA SALT MANUFACTURING COMPANY

Chemicals



A highly trained diagnostician studies an X-ray plate showing 41 parts. Each plate is checked five times to prevent any defect from slipping through

gates on either side of the cabinet make it possible to radiograph fabricated pieces up to 30 feet long and 2 feet in diameter.

Growth of X-ray as an inspection tool is indicated by the fact that in 1939 we X-rayed more than half a million parts, the same number X-rayed in the previous four years. In 1941 we expect to X-ray over a million. Today we are the largest single user of film in the country.

The tremendously increased capacity of this X-ray equipment is due not only to improved machines but to improved methods of handling the parts in and out of the X-ray department, development of a foolproof procedure and building up of a personnel capable of functioning on a 24-hour basis.

Procedure is as follows: Parts brought into the laboratory for testing are immediately identified with a number. A work order then is issued covering a description of the parts, how and where they are to be used. Each part is die numbered to correspond to work order number, and entire lot is placed on mobile carts to be taken to the X-ray machine. The die number remains on the part throughout its life. A record is made of the plane into which it goes so a continuous history of its performance may be recorded.

This system of keeping track of each individual part has greatly aided aircraft manufacturers and foundries in carrying out their study of the performance of different materials. It often makes possible the removal of parts from

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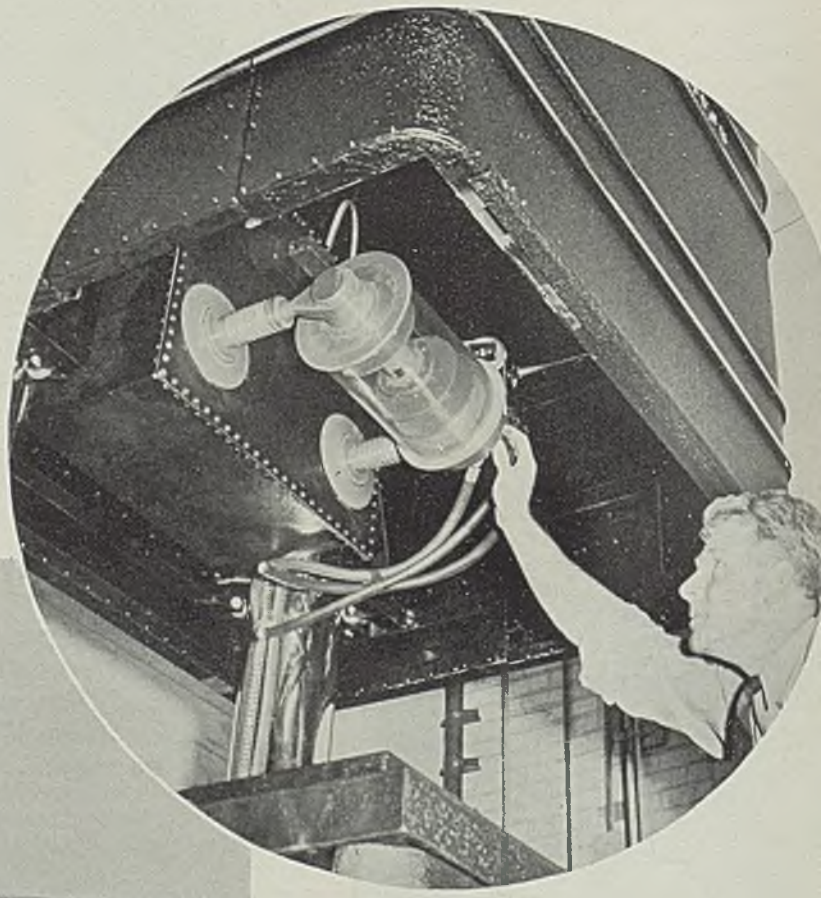
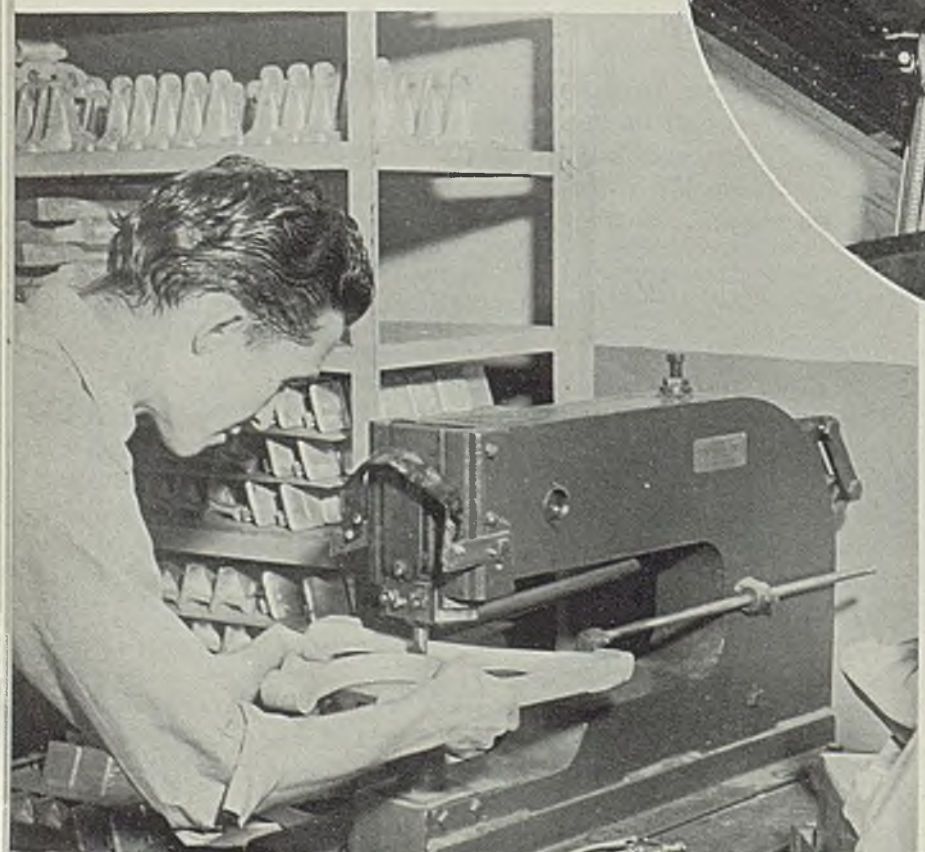


X-ray tube and transformer, above, are housed in upper portion of cabinet. Tube is plugged directly into transformer, can be replaced in one minute if it burns out



Every part sent to the X-ray laboratory is first die-numbered as shown at left here. This permits future identification at any time. A record is kept of each part and the plane on which it is used. Portable rack for parts is at left

OXY-ACETYLENE FLAME-PRIMING makes paint go on faster and last longer . . .

1. What it is and does

Oxy-acetylene flame-priming is performed by passing the flame from an Oxweld heating head over structural steel before the first protective coating is applied. The quick heat causes rust and loose scale to pop off, and drives out the surface moisture, thus leaving a clean, dry surface for the paint. Structures of any size or shape can be flame-primed in the shop or on the job.

2. How it helps

Flame-priming is followed by wire-brushing, and close behind this comes the painting. As a result the metal is clean, dry, and still warm—making the paint go on faster, bond tighter, dry quicker, and last longer.

3. What you need to use it

All you need to use this method is an Oxweld W-26 heavy-duty welding blowpipe and an Oxweld flame-priming head, connected to an adequate source of oxygen and acetylene supply. Any operator can learn the technique quickly.

With standard welding heads, you can use your flame-priming equipment for heavy welding, and for straightening, forming, and other heating operations.

and Linde can help you use it!

Linde can supply the gases, the apparatus, and help in using flame-priming. If you are interested in giving longer life to paint jobs—or if you are confronted with bottlenecks in using sand-blasting equipment—*talk it over with Linde!*

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

General Office: New York, N. Y. UCC Offices in Principal Cities

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LINDE OXYGEN . . . PREST-O-LITE ACETYLENE . . . UNION CARBIDE
OXWELD, PUROX, PREST-O-WELD APPARATUS . . . OXWELD SUPPLIES

The words "Linde," "Prest-O-Lite," "Union," "Oxweld," "Purox," and "Prest-O-Weld" are trade-marks of Units of Union Carbide and Carbon Corporation.

THOUGHTS ON POPULAR COATS NO. 12 *By Hanlon-Gregory Galvanizing Co.*

THE FUR COAT

We're simply galvanizing men; we know more about industry and trade than we do about the feminine mind, so when, in our rambling thoughts, we come to the fur coat, it behooves us to think cautiously. Shop philosophy is seldom compatible with that of the drawing room. Well, it appears to us that a fur coat serves more for appearance than utility; in the public mind it is listed with diamonds, jewelry, rich ornaments, gems, silver, gold and other things that feed human vanity. Fur coats are made of pelts stripped from a variety of little animals, assembled in the form of garments, and sold for many times their actual value to ladies who regard them practically equal in importance to eternal salvation. As a covering, a fur coat is 90% class and 10% utility. HANLON GREGORY HOT DIP GALVANIZING is 100% utility; it covers ferrous products so well that even time itself has to work for generations before the galvanized coating is affected. By the HANLON GREGORY HOT DIP GALVANIZING PROCESS, the zinc coating becomes an inseparable part of the base metal—and the forces of corrosion can whistle for a lifetime before they can attack the ferrous base.

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PROTECTED BY GENUINE HOT-DIP GALVANIZING
AMERICAN HOT DIP GALVANIZERS ASSOCIATION, INC.

HANLON-GREGORY GALVANIZING CO.
PITTSBURGH PENNA.

ANODIC POLISHING

of electroplated nickel

Recent investigation has shown that a brilliant finish can be produced on dull nickel deposits by a brief anodic treatment in sulphuric acid. It is claimed that the quality of the finish is at least equal to that obtained by bright nickel plating and that by localizing the area polished, designs can be formed on the surface

WHILE bright nickel plating has done much to reduce polishing costs incident to the plating process, the use of the bright and semibright plating solutions involves certain drawbacks such as higher cost, greater difficulty of control and possibly brittle deposits or inferior throwing power. Thus an alternative method of reducing polishing costs which would enable standard nickel baths to be retained with their well established methods of control offers certain attractions.

For some years it has been known that certain metals can be given a brilliant polished appearance by an anodic treatment in a suitable electrolyte by a selective attack on raised points of the surface, resulting in a general leveling effect and finally a high degree of polish. While anodic polishing of aluminum and stainless steel has received considerable attention, anodic polishing of nickel is not so well known. However, it has been found that dull nickel deposits produced in ordinary plating solutions can be given a brilliant finish by a brief anodic treatment in a solution of sulphuric acid.

Localized Polishing: The process also may be used to produce decorative designs by applying a suitable stopping-off material before anodic polishing. The design may also be produced as a polished surface with a matte background in relief and the finish may be made permanent by subsequently plating with chromium or rhodium or by lacquering. Localized polishing also may find application in the preparation of printing and embossing surfaces.

From an article by A. W. Hothersall and R. A. F. Hammond in *The Metal Industry*, London, England.

Outline of Method: The article, after being subjected to the usual cycle of polishing, cleaning and nickel plating, is immersed in the polishing bath and is centrally arranged between two or more symmetrically disposed cathodes, preferably of nickel. Lead cathodes are less suitable because the solution would become rapidly fouled with lead sulphate. A polished appearance may be produced over a fairly wide range of concentrations of sulphuric acid, current density, temperature and time of treatment. But limitations are imposed by the necessity for restricting the amount of metal removed to the minimum, by the tendency under certain conditions for the finish to be marred local variations in the rate of dissolution the nickel and by the voltage required. It should be noted that the causes of some minor imperfections in the polished surface have not yet been completely investigated, and further study is indicated. Conditions provisionally recommended are: Solution containing 73 per cent by weight of sulphuric acid; temperature, 30 degrees Cent.; current density, 250 amperes per square foot; time, 0.5 to 2.5 minutes.

Electrolyte: While polishing has been achieved in solutions containing more than 60 per cent sulphuric acid by weight, experience indicates that the most satisfactory results are generally obtained with 73 per cent sulphuric acid by weight. The specific gravity is 1.64 at 15 degrees Cent. The solution is prepared by adding three parts of concentrated acid to two parts of water by volume. This will give a concentration well above the minimum required for polishing action to occur. This is desirable since the solution tends to become more dilute with use. Higher concentrations than this are less practical because of high bath voltage and slow rate of polishing.

The behavior of this solution may be improved in some respects by certain additions, but unless otherwise stated, the work described here was carried out with the 73 per cent sulphuric acid solution. Gentle agitation is provided by a slow oscillating movement of the anode rod in a horizontal position.

Current Density: At room temperatures, a polishing action is obtained at all current densities above 20 amperes per square foot. At low current densities, however, the surface becomes pitted, and at temperatures around 30 degrees Cent. current densities above 150 amperes per square foot are desirable to avoid this defect. In laboratory work, current densities in a range of 150 to 300 amperes per square foot have been employed, the usual value being about 250.

Temperature: The temperature of the electrolyte appears not critical as polishing action has been obtained in the range from 10 to over 50 degrees Cent. Below 20, the high resistivity of the solution results in an excessive voltage drop across the bath, involving a high operating voltage and making it difficult to control temperatures due to the heating effect of the current on the bath. Crystallization of nickel salts also may occur on the surface being treated, spoiling the finish.

Temperature range generally recommended is from 20 to 40 degrees Cent. with 30 degrees as possibly the best.

Time of Treatment: At a given current density and temperature, the time required to produce a brilliant polish depends upon the smoothness of the deposited surface. This in turn varies with the conditions of deposition such as composition and pH of the nickel depositing solution, the thickness of the deposit and the degree to which the base metal was polished before plating. With 250 amperes per square foot

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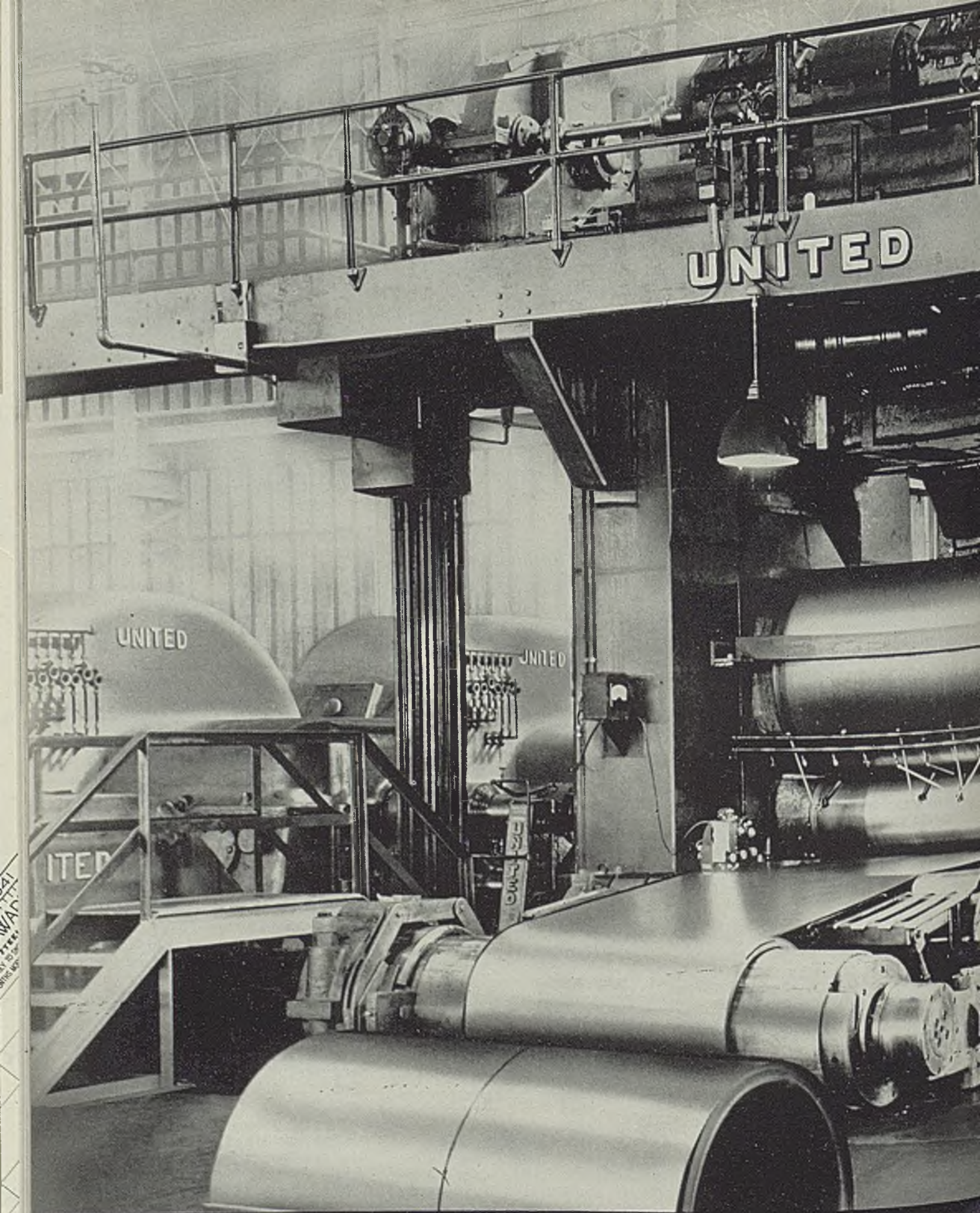

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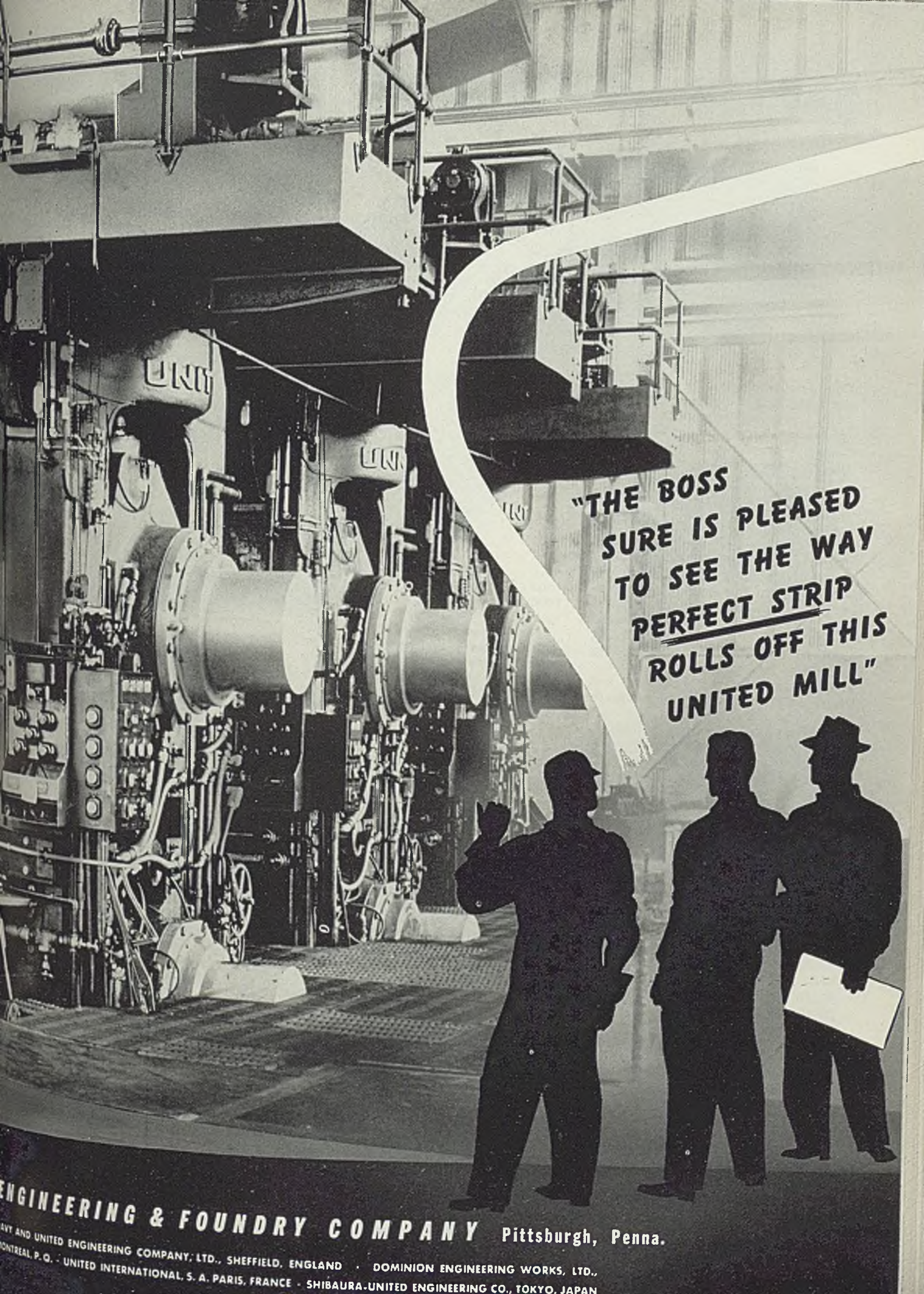

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Use of

COPPER

In Iron and Steel

Considerable progress has been made in the manufacture of iron and steel by the application of copper as an alloying element. Edge cracking of copper-bearing steels is avoided by working them at low and controlled temperatures. Addition of copper to certain grades of alloy steel improves the mechanical and corrosive-resistance properties. This element also serves to enhance the fluidity and castability of cast iron as well as the physical properties of castings

By J. E. JACKSON
Metallurgical Engineer
Copper Iron and Steel Development Association
Cleveland

■ IN THE early days of the steel industry, the eastern iron ores which contain appreciable amounts of copper were widely used in the manufacture of steel. Many of these steels contained as much as 0.5 per cent copper. The presence of copper was not looked upon with favor. The early steelmakers blamed poor rolling qualities, bad finish, and in fact most of their rolling troubles on copper. Copper was said to make steel "hot short" and that belief persists in many quarters even today.

It was noted, however, that the copper steels were superior to the ordinary steels in resistance to atmospheric corrosion, and in 1911, the first deliberate additions of copper were made to steel to improve its corrosion resistance. In the ordinary industrial atmospheres, the life of copper bearing steel sheets is about three times the life of plain carbon steel sheets of the same gage. This is probably due to the type of self protective seal which is formed on the copper steels. When this scale is constantly removed as it is formed, as for example when the steel is immersed in water, the life of the copper steels is about the same as that of the plain steels. The so-called copper bearing steels have become a standard grade. It was found that about 5 pounds of copper per ton of steel or about ¼ of 1 per cent was just as effective in improving atmospheric corrosion resistance as larger quantities, and that the smaller amounts of copper did not introduce problems in the rolling mills. About 2,500,000 tons of these steels containing about 6000 tons of copper were produced last year.

The investigation of the production problems encountered in the manufacture of copper bearing steels led to research and the development of corrective measures to overcome certain difficulties. It was found that edge cracking could be prevented by rolling the copper bearing steels at lower and carefully controlled temperatures. It was also discovered that the addition of small quantities of nickel to copper bearing steels reduced surface cracking with consequent improvement in the finish of the steel.

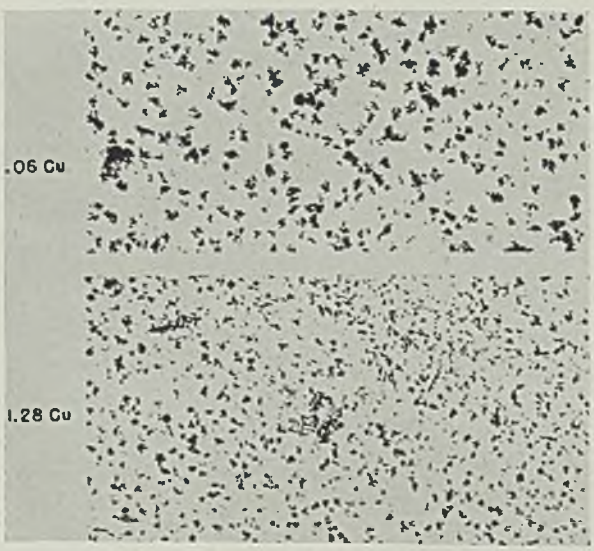


Fig. 1—Effect of copper in reducing the size of the graphite nodule

Having the knowledge that was gained in the manufacture of corrosion-resistant wrought steels it was not difficult for the steel mills to utilize copper in a new type of steel, the low-alloy, high-yield strength steels. Nearly all steel producers make at least one of these steels.

In the steels which contain one or more of the elements, chromium, manganese, nickel, molybdenum and phosphorus, it was found that copper improves the mechanical properties as well as the corrosion resistance of the steel.

These steels are characterized by high yield strengths. In general, a yield strength of at least 50,000 pounds per square inch may be obtained, compared to a yield strength of about 30,000 to 35,000 pounds in ordinary structural steels. When proper provision is made to maintain stiffness in the structure, this increase in strength permits notable savings in weight.

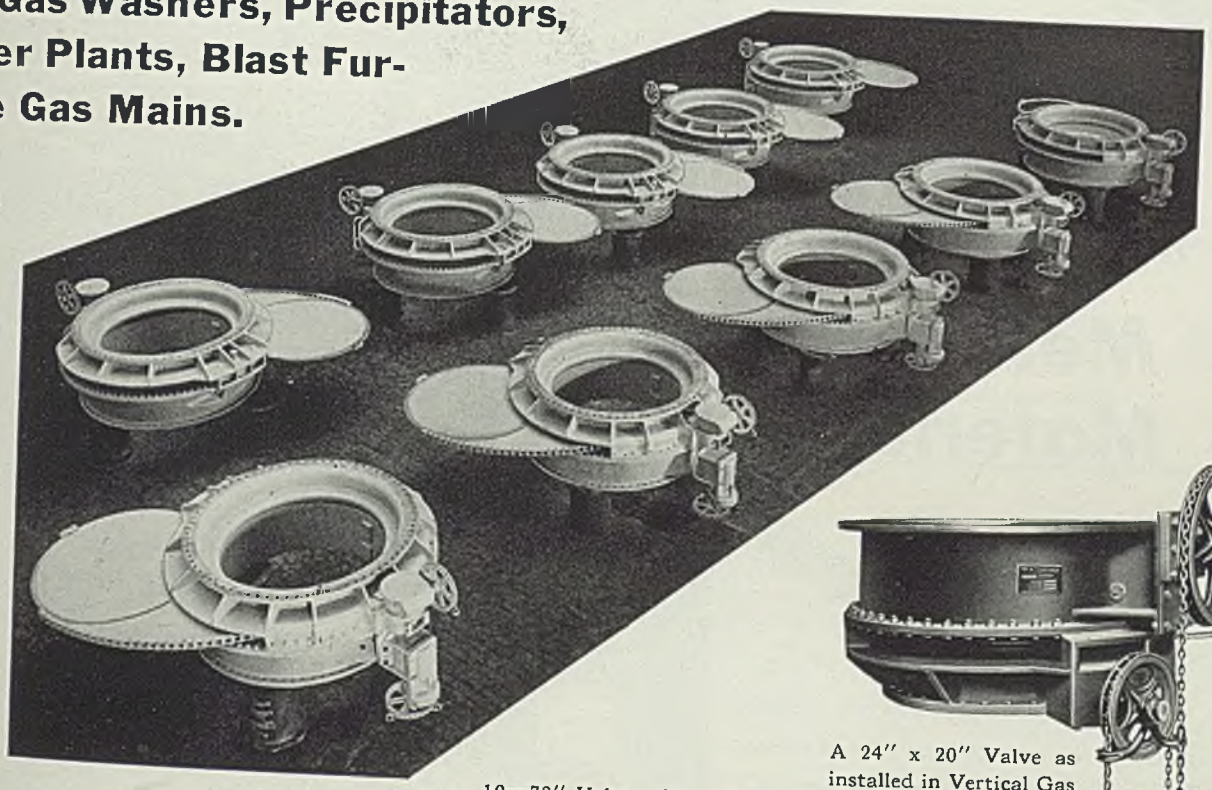
The precipitation hardening heat treatment may be utilized to increase the physical properties of the copper-containing castings. Yield strength is increased 10,000 to 20,000 pounds per square inch by the addition of 1 to 2 per cent copper in the unheat-treated casting and an additional 10,000 to 20,000 pounds per square inch may be obtained by this precipitation hardening heat treatment without fear of distortion of the casting. The lower the carbon content, the higher the precipitation hardening effect of copper on the mechanical properties.

The second class of ferrous castings to be discussed are the nor-

From a paper presented at the ninth regional conference of the Birmingham chapter, American Foundrymen's Association, Birmingham, Ala.

DEPENDABLE MECHANICAL VALVES

For Gas Washers, Precipitators, Boiler Plants, Blast Furnace Gas Mains.



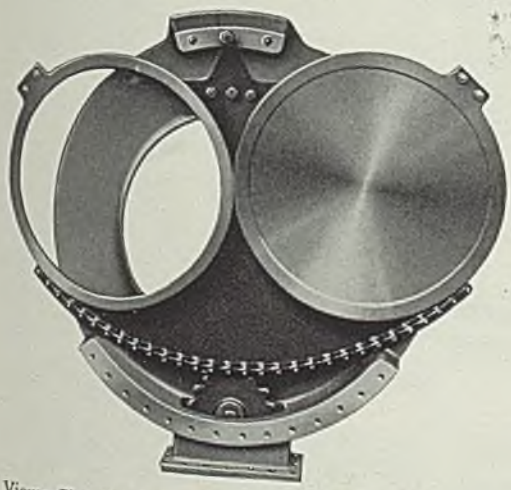
10—72″ Valves shipped to India for installation in horizontal gas mains.

A 24″ x 20″ Valve as installed in Vertical Gas Main to Blast Furnace Stove Burners.

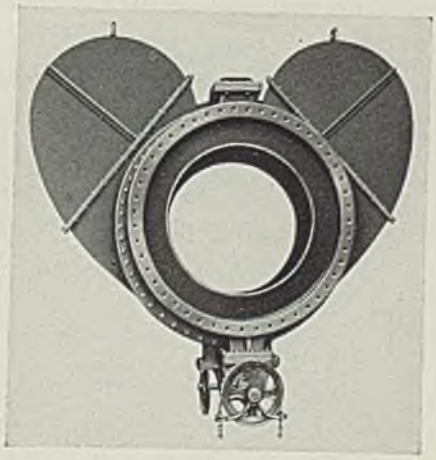
VALVE SIZES:

24″ Diameter
30″ Diameter
36″ Diameter
42″ Diameter
48″ Diameter
54″ Diameter
60″ Diameter
66″ Diameter
72″ Diameter

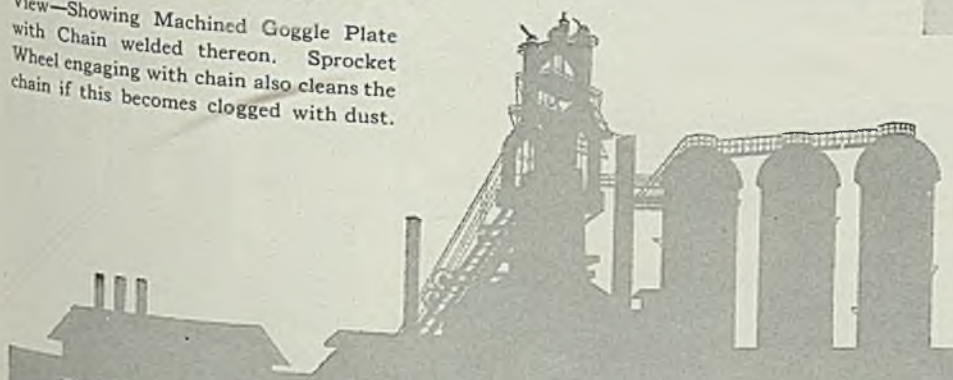
Write for our Valve Bulletin.



View—Showing Machined Goggle Plate with Chain welded thereon. Sprocket Wheel engaging with chain also cleans the chain if this becomes clogged with dust.



With Totally Enclosed Goggle Plate. No gas escapes to atmosphere when plate is swung to opposite position, providing safe working conditions for your men.



WILLIAM M. BAILEY COMPANY . . . *Engineers*

PITTSBURGH PENNSYLVANIA

mal malleable and pearlitic malleable iron castings. To date there has been very little technical literature published on the effect of copper on malleable iron.

Increases Physical Qualities

The fact that copper is being used for corrosion resistance by some malleable foundries, in quantities up to 1.5 per cent is well established. Its effect on increasing of tensile and yield strengths has been conclusively proven. With a 1 per cent addition of copper it is reliably reported that tensile strengths increase 5000 to 10,000 pounds per square inch and yield strengths increase 7000 to 12,000 pounds per square inch. The slight reduction in elongation, say from 15 to 12 per cent is a normal sacrifice that does not handicap the engineering application of the casting, in view of the improvement obtained in the tensile and yield strengths. Here again the value of the precipitation-hardening effect of copper may be utilized to great advantage.

Copper's effect on the physical properties of malleable iron is shown in Fig. 4. These results confirm the earlier work of Smith, Palmer, Lorig and others. Effect of copper in reducing the graphite nodule size is shown in Fig. 1. This information was obtained from an unpublished research now being conducted on the shortening of the first and second stages of the malleablizing heat treatment cycle.

It was not until 1935 that copper in gray cast iron began to be used to any noticeable extent. In cast iron, particularly, copper serves a two-fold purpose: First, it has a beneficial effect on what might be called the quality of the molten iron; better fluidity and improved castability are secured in the foundry; and second, the engineering properties of the castings may be improved by the use of copper.

Table I shows how the addition of 2.25 per cent copper raised the tensile strength of medium carbon cast iron about 7000 pounds per square inch and improved the transverse strength about 150 pounds. The hardening of the pearlitic matrix is apparent by the increase in the brinell hardness.

Fig. 2 is a composite chart showing an increase in the tensile strength from 33,000 to 40,750 pounds per square inch with the addition of 2.25 per cent copper, while the deflection was reduced only 0.07-inch. The transverse strength and brinell hardness increased along with the improvement in tensile strength.

Fig. 3 shows the same general curves that are obtained with a medium carbon iron to which increasing amounts of copper were added. In each of these cases, the copper was added to the hand ladle and the molten iron stirred after the hand ladle was filled from the holding ladle.

While no statistics are available, it has been estimated that the production of alloyed cast irons

Table I—Effect of Copper on Medium Carbon Cupola Cast Irons

C	Si	Cu	Tensile lb./sq. in.	Transverse Strength	Transverse Deflection	Brinell Number
3.32	1.45	....	33,500	2400	0.275	185
3.32	1.50	0.83	35,500	2400	0.252	207
3.31	1.49	1.48	38,500	2450	0.233	217
3.28	1.48	2.38	40,000	2600	0.236	229
3.33	1.86	....	33,000	2500	0.340	187
3.32	1.72	0.74	36,000	2550	0.297	198
3.31	1.81	1.40	40,000	2700	0.273	214
3.26	1.82	2.13	40,500	2700	0.272	221

Table II—Iron and Steel Production in Net Tons

Year	Steel Ingots*	Foundry Prod. (est.) Ratio 4/1 of Steel Ingot Prod.	Est. Ratio of Alloyed Castings	Alloyed Castings (est.)	Alloying Element Consumption (est.)†
1936.....	45,000,000	11,250,000	8/1	1,400,000	11,900
1937.....	56,400,000	14,100,000	7/1	2,070,000	17,600
1938.....	32,000,000 est.	8,000,000	6½/1	1,230,000	10,500
1939.....	51,600,000	12,900,000	6/1	2,150,000	18,300
1940.....	66,000,000 est.	17,660,000¶	5/1	3,532,000	30,022

*American Institute of Iron & Steel Annual Published Statistics.
†Based on an estimate of 0.85% alloy per alloyed casting.
¶Includes gray iron, malleable and steel castings.

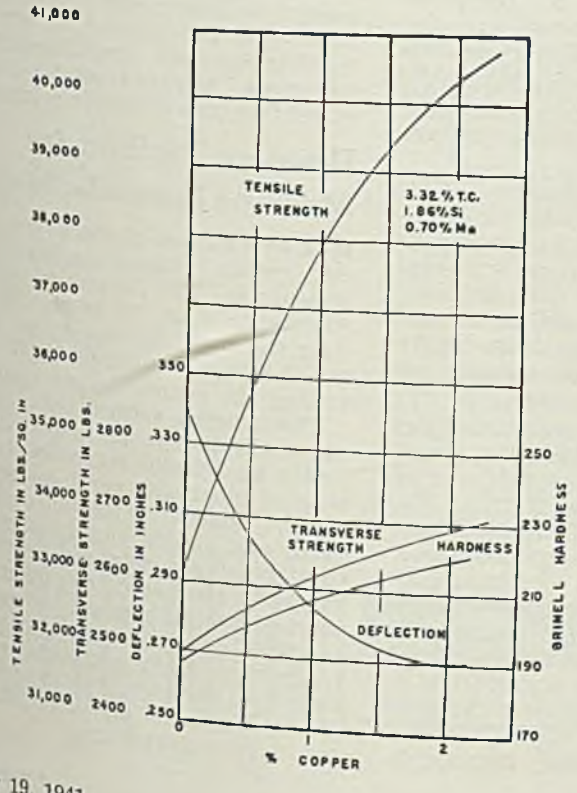
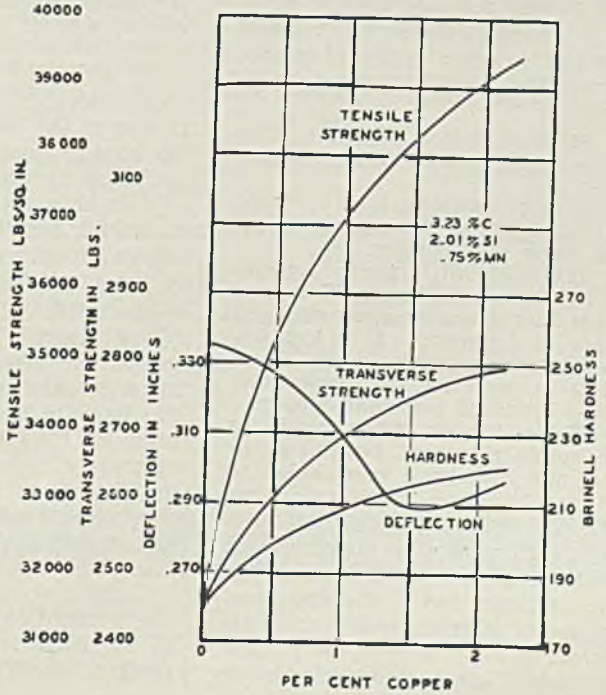


Fig. 2. (Left)—Effect of copper on properties of cupola cast iron. Fig. 3. (Right)—Effect of copper on properties of cupola cast iron



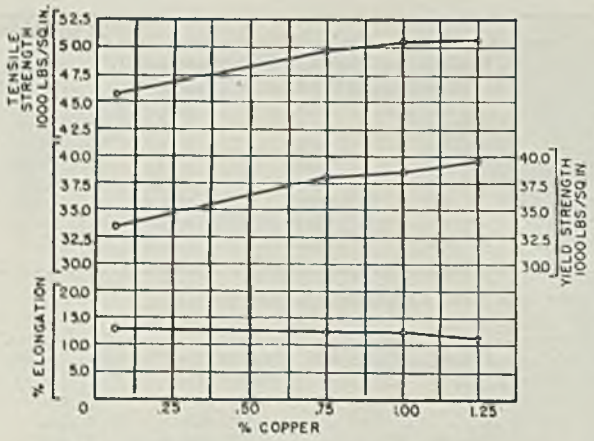


Fig. 4—Effect of copper on the mechanical properties of malleable iron

amounts to between 15 and 20 per cent of all the cast iron produced in 1940. This is equivalent to about 2,500,000 to 3,000,000 tons. The copper alloy cast irons account for a fair share of this but the amounts cannot be estimated with any degree of accuracy.

Forms of Copper Used

Three general types of copper are used in making copper alloyed steels.

Adventitious ore found in eastern Pennsylvania that contains about 0.25 per cent copper. The copper is not removed during the smelting process or in the bessemer and open-hearth refining processes.

Refined ingot can be either the primary copper made from the refined ores or the secondary copper made from refined copper scrap or copper alloy scrap.

Solid scrap such as buss bars or tightly baled light scrap for example cable, trolley wire, trimmings, etc.

Two general methods are used in making alloy additions in the foundry industry. Copper may be added to the furnace charge or it may be added at the spout or ladle.

The four types or forms of copper added to the furnace charge are as follows:

1. Refined ingot copper. This may be either primary or secondary ingot.
2. Copper bearing steel or cast iron scrap either purchased or returns from the foundry.
3. Commercially made copper bearing silvery pig iron. The present product contains approximately 3.5 per cent copper. It is contemplated by the manufacturer to produce it in two standard grades containing 5 and 10 per cent copper.
4. Pure copper scrap such as wire, solids, clippings, punchings, or trimmings that have been baled to facilitate handling in charging the furnace.

The last types or forms of copper are those added to the spout or ladle. Copper has a melting temperature of 1981 degrees Fahr. and thus will rapidly melt in the molten iron which has a temperature of around 2700 degrees Fahr. Copper is heavier than iron and will not float on the surface but will combine readily with the molten iron. Furthermore, copper's low affinity for oxygen eliminates the possibility of loss through oxidation.

Four types or forms of copper are added to the spout or ladle.

1. Refined blister copper that has been sheared in pieces of ¼-pound or less, to insure accurate weighing, easy handling, and quick melting.
2. Copper shot. This is made from either refined copper ingot or partially refined copper scrap. Shot is made either by the steam blast, hot air blast, or water drop methods. Occasionally one or two hundredths of a per cent of phosphorus is added to the molten copper before shotting to inhibit the slight discoloring oxidation of the shot and thus keep it bright.
3. Scrap bare copper wire such as clipped trolley wire, electrical leads, cable, etc. Generally the scrap copper wire is sheared to 3-inch lengths or less for the same purpose as is blister copper.
4. Scrap clippings, punchings, trimmings, tubing, turnings, etc. No pieces should be over ¼-pound and should be free from oils, floor sweepings, or contamination by other nonferrous alloys.

Considerable importance is attached to the use of only pure copper shot or copper scrap. Contamination of the copper scrap with other elements such as zinc, tin, lead, tellurium, beryllium and others that are commonly alloyed with copper in the nonferrous industry may result in defective castings.

The Copper Iron and Steel Development Association is sponsoring a research program this year at the Battelle Memorial Institute, Columbus, O., to investigate the effects of these elements mentioned above, on alloyed cast irons containing copper. The results will be published and distributed to the foundry industry.

Table II shows the annual trend in the production of alloyed castings, in the ratio to the annual foundry production. The steady increase in the ratio of alloyed castings in the yearly foundry business volume, denotes a trend to higher strength castings.

New Steel Catalog Marks Anniversary

■ "Disston Tool Steels" is the title of catalog No. 100-S recently issued by Henry Disston & Sons Inc., Philadelphia. Written in a free, easy style that makes reading more entertaining than the usual form of technical copy associated with such literature, the publication paints a word portrait of the founder and introduces important individuals in the plant. It also incorporates photographs of manufacturing operations and various steel applications.

The last ten pages of the catalog are devoted to tables of "useful information" for anyone interested in buying steels. Publication of this book constituted one of the company's activities in observing its 100th anniversary.

Offers Reversible Speed Transmission

■ Graham Transmissions Inc., 2711 North Thirteenth street, Milwaukee, reports the availability of a reversing feature on some of its variable speed transmissions. This enables them to deliver equal speeds forward or reverse (both sides of zero) without stopping or reversing the motor. The reversing feature is of special value in applications to sighting, aiming and steering devices.

In addition to the three sizes of units now available, ⅛ to 1½ horsepower, a 3-horsepower drive will soon be in production. All are offered in standard, geared reduction and geared step-up types for either built-in or coupled motor mounting.

Develops Method for Marking EnameledMetals

■ A new method of marking enameled metals without engraving is announced by Acromark Corp., Elizabeth, N. J. It is said to reduce the marking time by at least ten to one without cracking or distorting the enamel in any manner.

The process consists of a steel die application to the coated metal under electrically controlled conditions. Binocular parts, enameled tubes, camera parts, instrument cases and a wide variety of enameled metal products can be trademarked, numbered or otherwise marked by this method. A special machine simplifies the marking procedure. First successful applications of the new process were on army binoculars and cameras for the British government.

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Interchangeable with present pyrometer installations . . . utilizes standard thermocouples and wiring.

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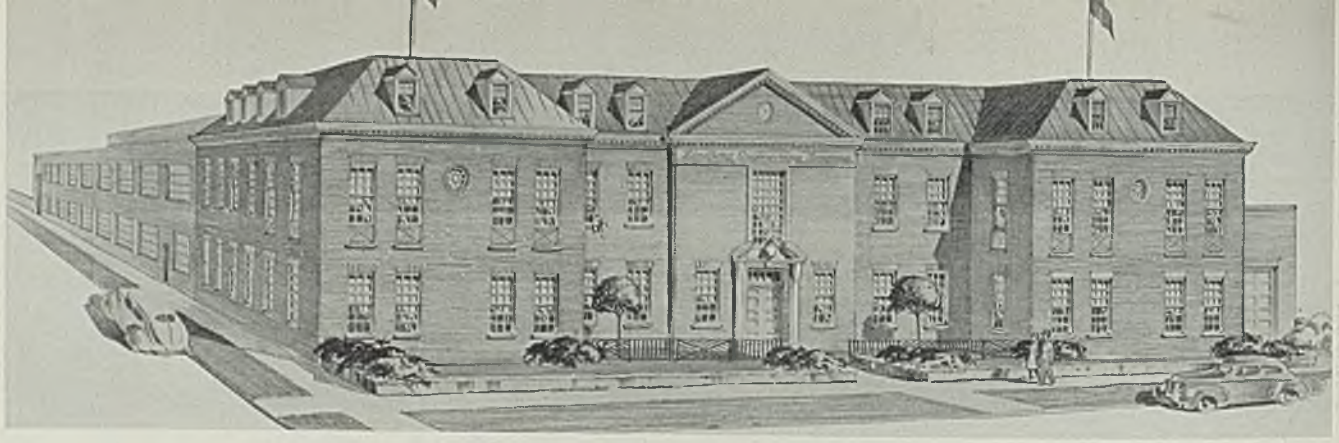

Plant of Lindberg Engineering Co., Chicago, now being completed, doubles present plant capacity and irons out kinks in production line so work flows smoothly through all departments. Reflects trend toward better plant layout to improve materials handling

NEW PLANT

provides for efficient handling

■ MORE and more, new plants are being laid out with the emphasis on straight-line or continuous flow of material in production. Elimination of all backtracking and even provision of some duplicate equipment, if necessary to obtain this end, is being realized as most important for efficient materials handling and effective plant layout.

One of the most recent examples of this trend is the new plant and office building of the Lindberg Engineering Co., located at Campbell and Hubbard streets, Chicago. As shown in the accompanying sketch, the plant includes a 3-story office building of Georgian architecture. The urgent need of immediate additional capacity for handling numerous defense orders made the new plant necessary as the company manufactures heat-treating equipment used extensively in making airplanes, gun parts, and shell cases as well as for a wide range of industrial heat-treating applications. The new $250,000 plant, now partially finished, is being occupied in the order of completion with sections of both old and new plants now operating simultaneously. The current expansion, more than doubling the production capacity, marks the sixth plant expansion since the company was organized in 1935.

Total floor space of new plant is over 50,000 square feet, the factory occupying approximately 40,000 square feet of this area.

While at first one might expect considerable difficulty would be encountered in laying out a plant for straight-line production to manufacture heat-treating furnaces, which of course, vary widely in size, shape and other characteristics, this aim has been attained with straight-line production a fact on most furnaces. In the new plant, an inclined driveway from the street, a second driveway from the alley and a monorail system facilitate receiving operations. Immediately adjacent is a large stock room where surplus inventories will be carried when possible. From this point material flows to the layout department and then to the welding department, where the furnace shells are assembled.

Crane Helps to Load

After the shells have been welded, they are moved to the insulation department, where the refractory bricks and slabs are put into place. Next the furnace goes to the assembly department where bearings, belts, motors and other auxiliaries are installed.

The assembly department also is fed by the machine shop and electrical department situated next to the main production line. Here doors, burners, valves, controls, and the like are installed in or mounted on the furnace units. From the assembly department, the completed furnaces go to shipping section, where they can be loaded inside the building on freight cars or highway trucks. Here a 15-ton crane facilitates loading operations.

Storage space for lumber for crating is located conveniently nearby and over a portion of the shipping department.

The efficient, rapid and completely streamlined production setup presents a marked contrast to the company's old quarters which, due to necessity for a number of unexpected expansions, now deviates considerably from straight-line production methods. Some departments are even located in separate buildings.

An increase of 200 per cent over the lighting efficiency of the old plant is secured by the use of mercury vapor and incandescent lamps mounted in pairs in the new plant. A battery of 17 downdraft heaters maintains the correct temperature in the plant.

A special pit 12 feet square and 8 feet deep is used in the construction of the larger sized furnaces. This pit eliminates the danger of accident that might exist from the use of ladders or scaffolding as it is much easier to lower material safely to workers in the pit than to raise it to workers on scaffolds or ladders.

Materials handling facilities in the plant include two 5-ton cranes in addition to the 15-ton crane at the loading area. Other plant facilities are a storage shed 17 by 80 feet, located just back of the main plant, an experimental heat-treating department located on the first floor of the new plant, a completely equipped research laboratory on the mezzanine floor, where also is located the control manufacturing department. Locker and shower room accommodations for 250 men also are provided.

The offices occupy a 3-story air-conditioned section at the front of the plant. An attractive Georgian architecture is employed to add to, rather than detract from, the neighborhood. Production offices are on the main floor with executive and

general offices on the second floor.

Office lighting fixtures are of the fluorescent type, flush-mounted. Sound-absorbing rubber tile flooring minimizes echoes and sound travel. Engineering and drafting departments occupy the second floor right wing, which is built with a 2-story studio ceiling incorporating a 25-foot studio window in the hipped roof to provide the north lighting desired. Abell & Howe, Chicago contractors, designed and are erecting the plant.

Tool Electrification

(*Continued from Page* 55)

tioned mechanically but also must be fitted up with some kind of unit motor drive and push button control. Electrification of these belt-driven machines, and likewise the drive and control rejuvenation of early vintage electrified equipment, is something which right now deserves the careful attention of electrical engineers—not merely the casual attention of millwrights and electrical maintenance men.

While there is little or no possibility of building much electrical equipment into the belt-driven machines, they can be made usable in shops without line shafting and at the same time can be tremendously improved, by application of properly selected bracket-mounted or top-mounted motor drive units of short center flat or V-belt type; by motorized infinitely variable speed transmissions; or by modern gear motors. Independently motor driven coolant and lubricating oil systems should also be applied in some instances. Choice and location of controls and design of the wiring systems also should be given professional attention. Where motorized direct drives, V-belt drives or chain drives are applied to any of these once counter shaft and flat belt-driven machine tools, care must be taken not to overpower them. Otherwise the results are liable to be as surprising and disastrous as those attending thoughtless use of a heavy charge of smokeless powder in firearms of the black powder era.

When it comes to the rejuvenation of early vintage electrified machine tools, electrical engineers in many instances will be familiar with newer and better types of electrical apparatus which profitably can be substituted for that which is on the machines. For instance, open knife switches certainly should be replaced by enclosed push button starters. Oftentimes it will be well to replace old style finger-operated push button starters by modern palm-operated, liquid-proof units designed to withstand the buffets of fists, wrenches and even shovels wielded by operators of limited experience, whose physical power ex-

ceeds their appreciation of fine machinery.

On large machines such as planers, boring mills and horizontal boring, drilling and milling machines, it may be found possible and advantageous to replace fixed multiple push button stations by those of pendant type. Also, on these machines, inaccessible controls should be examined with the idea of replacing them by remote controls through solenoids or torque motors if practical and not too expensive. Limit switches likewise have possibilities on these and other machines involving limitation of slide and tool head travel.

In all this rebuilding and rejuvenation work, however, don't lose sight of the fact that these old model machines — especially those of belt driven type—in most cases are back in active service in production lines only because of shortage of newer and better equipment in an emergency. When the new machines do become available to meet national defense demands, or when the emergency eventually is over, the old machines should be returned promptly to less demanding work—or scrapped. Therefore, don't spend any more time and money on them than sound common sense and thoughtful long-term planning dictates. Above all, don't let them stand in the way of new and better machines if and when the latter can be obtained. Remember, at best they are only makeshifts.

Now let's get back again to recent designs. There is one sure sign that continued co-operation of the machine tool and the electrical industries has resulted in meeting of minds and merging of methods comparable to that which has made the automotive industry great and successful. It is the ever-increasing tendency to employ ingenious combinations of mechanical, electrical, hydraulic and pneumatic methods. In many of the most outstanding new machine tools, each system is applied where its distinctive characteristics make it particularly effective. Used in combination with one or more of the other systems—especially with electrification—any one of these systems is likely to be far more effective than when used by itself.

Remote Functions Easily Watched

For example, remote control of important mechanical clutches and brakes; slide binder mechanisms; gear shifts; unit electrical drives; hydraulic control valves; pneumatic or hydraulic chucking and work clamping devices; in many cases is accomplished economically and dependably through use of solenoids, small gear motors or torque motors. Thus the remote functions—even on multiple station machine tools and those of very great size—are put right under instantaneous, one-man, fingertip control from strategic centers of operation from which tools and work can best be watched. At the same time, simple wiring takes the place of complicated mechanical connections or extensive systems of plumbing.

A striking example of such combined mechanical-electrical-hydraulic-pneumatic engineering is depicted by Fig. 2. At the same time, this represents a truly remarkable achievement in designing a lot of apparatus—a considerable amount of which is not itself of special design—into limited space, without undue crowding.

In the neatly styled cabinet base of this Landis ball race grinder—whose smooth, closely fitting doors were swung open to enable this photograph to be taken——are the following:

Upper left, wheel-driving motor; left center, a mechanical work head oscillator driven through short multiple V-belts from gear motor at center; rear left of oscillator, cam operated automatic wheel feeding drive, actuated by double lobe edge

Immediate Shipment

On DoAll Contour Machines

BECAUSE our manufacturing facilities were increased 400% early in 1940, before the defense program started.

BECAUSE we use arc welded construction for greater speed, and have developed a process of attaching pads that have machined surfaces, which eliminates handling and machining heavy frame work.

Every 40 minutes we take a DoAll off our 1,000-foot assembly line.

Like Detroit's auto plants—DoAlls are built as fast as needed—giving you higher value.

Now recognized as the indispensable machine tool, this new shape-cutting process has revolutionized machine shop practice throughout the world.

Again the progressiveness and foresight of the DoAll Organization is demonstrated in making immediate shipment to aid American industry in meeting today's demand for greater and faster production.

NO MACHINE TOOL "BOTTLENECK" HERE

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Associated with the DoAll Co., Des Plaines, Ill. Manufacturers of Band Saws and Band Files for DoAll Contour Machines

cam integral with oscillator; front left of oscillator, tappet switch which center headstock at proper location; directly below this switch, gage showing level of hydraulic system oil in reservoir in bed; bottom, motorized pump-compressor unit, with Vickers hydraulic pump at left for handling wheelbase movement and reset on feed, and with vane-type compressor at right for supplying air for the Landis-Solex automatic work sizing apparatus which is one of the outstanding features of this machine; top center, air filter and regulator for removing oil and moisture from gaging air and for insuring uniform pressure; top right, solenoid-operated hydraulic valve for controlling feed; right center, Cuno filter for hydraulic oil, with relief valve integral at left and with oil pressure dial gage directly below; directly below this dial gage, a solenoid-operated coolant valve for turning coolant on and off at proper points in operating cycle (coolant ordinarily is delivered to battery of machines from central station, as in this case); and at right below dial gage, lubricator for air pump.

R. S. Elberty, one-time specialist on machine tool electrification with Westinghouse company, is electrical engineer with Landis Tool Co., sponsor of the foregoing "composite design." He is one of many competent electrical engineers who have within recent years "gone over" to the machine tool industry. Tell Berna, formerly with G. A. Gray Co. and National Acme Co., and new general manager of the National Machine Tool Builders' Association, began his engineering career with Cutler-Hammer, Inc. S. G. Leonard, formerly with Westinghouse, is with Fellows Gear Shaper Co. D. K. Frost of Mattison Machine Works; A. L. Krause of Brown & Sharpe Mfg. Co.; E. E. Opel of National Automatic Tool Co.; and G. A. Spohn of General Machinery Corp., at one time were with General Electric Co. These are but a few on a constantly lengthening list.

At the recent Machine Tool Electrification Forum at East Pittsburgh, Howard W. Dunbar, technical chief, machine tool section, Office of Production Management, Washington, put special emphasis on the vital role played by recent developments in electrification, not only in making possible better machine tools for defense production but also in hastening their delivery by simplifying their design. He had reference in particular to machines of unusually large size.

Driven by Eleven Motors

A case in point is presented by the gear hobber just developed by Gould & Eberhardt, Irvington, N. J., for generating turbine reduction gears for the navy. This machine — whose driving mechanism is shown in Fig. 3—weighs 138,000 pounds and occupies 20 x 30 feet of floor space. It has nominal capacity to generate gears up to 120 inches in diameter, 48-inch face width at 45 degrees and 2½ diametral pitch, but at low helix angles it actually will accommodate work up to 160 inches in diameter.

Flexible modern electrical drive and control apparatus has provided successful solutions for many complex problems involved in co-ordinating the various units in this big precision machine. When it is considered that eleven separate motors—six of direct current type and five alternating—are used on this hobber, the extent of its electrification on the unit drive system becomes obvious. It should be mentioned here that the primary reason for selection of direct current for the main drive, lubricating and coolant motors, is to insure against accidental stopping of the machine in the course of a finishing cut, which would mar the teeth. This insurance is provided by a standby storage battery installation. In the event of interruption of the regular power supply, automatic switches instantly connect the motors to the storage batteries which keep them run-

THESE are truly the days when service is reflected by the foresight and progressiveness of the past—when the keeping of one's house in order during depression periods now pays dividends to customer, dealer and distributor.

The piling-up of unfilled orders, the mad scramble for raw materials and machinery, the breakdown of production facilities, the broken promises on deliveries—all these are the result of lack of confidence and stability, and of delay in the preparation of proper service perspective during slow periods.

For almost a century—since 1845—R B & W has pursued an inflexible policy of keeping its house in order. During many depressions, many booms—and many wars—R B & W has constantly built a background of plant facilities, production methods, raw material sources, and sound sales-engineering service—in bad times as well as good.

Today, therefore, R B & W can offer a true service perspective and is in an enviable position to help those needing stable facilities for bolts, nuts and other threaded industrial fastenings.

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ning steadily until the regular power service is restored.

A secondary, but also highly important, advantage of this direct current is that it permits ready variation of speed on the main drive, a four-to-one range being attained without resorting to change gears. Hob speed settings from 18 to 72 revolutions per minute are graduated directly on the field rheostat plate on the control panel.

Referring again to Fig. 3, it will be noted that this hobber is unique in that its main drive mechanism is separated from the body of the machine. This segregation of gear case and driving motors primarily is to keep the heat unavoidably generated by the drive units away from the working units, where it would cause distortion and impair accuracy of alignment. Furthermore, all driving shafts are journaled outside the machine proper so that heat from them will not affect main base and stanchions.

All this might seem like undue precautions, unless it be realized that the large diameters and wide faces of the work make it necessary to run this machine continuously for several days to finish the teeth in a single gear to required accuracy and smoothness. As a matter of fact, uniform temperature is so highly important in the cutting of accurate marine gearing, that the entire machine has to be housed in an air conditioned enclosure in which constant temperature is maintained day and night by thermostatic control. All motor starters and rheostats are mounted in a case set into the wall of the air conditioned room in such a way that while the front panel faces the operator within the room, all heat is dissipated outside.

X-Ray Perfect Welds

(*Concluded from Page 65*)

ing care to assure complete fusion along the edges. It is not desirable to melt out a large amount of the metal comprising the edge of the joint, although enough metal must be melted to guarantee fusion. Should the weld metal tend to roll off the side of the groove rather than stick to it, all factors warrant checking to discover why the welder is not getting fusion. A poor and arcing ground may have reduced the effective power at the arc. Or some other factor may be detracting from the welding efficiency.

By this time it should be apparent that there is nothing unusual about welding that is subjected to radiographic examination. Really this type of welding is no different from any other class. Quite naturally, quality welding demands meticulous attention to details.

Experienced operators watch the many welding variables as a matter of course as the auto driver on the highway adjusts the motion of his car to the changes in the scene before him. No special training in X-ray welding is indicated. Once the engineering and shop practices are established on a sound basis, good welds become routine. Where lapses and slips occur, the defects may be considered in the light of what has been said here. The combination of correct and prompt diagnosis serves to remedy any lapses before they grow to alarming proportions. And the dictates of cost and need for speed in defense activities will both be served when X-ray welding achieves a regular pattern of uniformity and soundness.

Introduces Economical Hot-Forging Compound

■ A new economical Drawco hot-forging compound that provides a faster, cleaner-finished forging is reported by Industrial Lubricants Co. Inc., Detroit. Applied with either a brush or swab, it eliminates the smoke nuisance and prevents "stickers," saving time involved in releasing material from die.

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"Because," says the maintenance engineer, "you're holding me responsible for keeping the mill in continuous operation . . . and I want a coupling I can depend on." He *knows* that he'll get it . . . with "Fast's."

Dependability is *designed-into* and *built-into* Fast's Couplings. The load-carrying surfaces are protected against wear by a positive film of oil. This oil is kept permanently clean by the rocking bearings which make precise metal-to-metal contact, and are in the *one position* where they form permanent dust and moisture-proof seals.

Continuous operation is of extra importance today. Prevent operating troubles by specifying *genuine* Fast's Couplings on the machinery you purchase.

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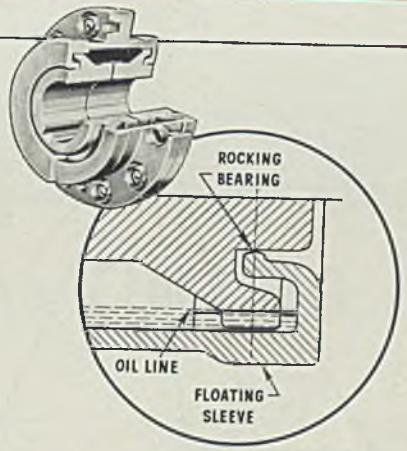

This detail drawing and "cut-away" view show Fast's construction. Note that no perishable materials are required to make it dust and moisture proof. This vital feature is found *only* in *genuine* Fast's Couplings.

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Anodic Polishing

(*Continued from Page 73*)

and temperature of 30 degrees Cent., time required varies from 0.5 to 2.5 minutes. With well polished base metal, the variation depends upon condition and thickness of the deposit.

Equipment and Control: Power supply is similar to that for chromium plating. Provision for exhausting spray and gas is necessary for continuous operation of the process on a large scale. Standard or chromium plating equipment, perhaps modified slightly, would be suitable. Rubber or lead lined tanks provided with a moving anode rod appear satisfactory. A cooling coil might be required to provide against undue temperature rise with heavy currents and continuous working.

Composition of the solution changes with use due to drag-in, dilution and accumulation of dissolved nickel and other metals. Diluted solutions may be rectified by additions of the concentrated acid. Contamination by nickel and other metals such as copper, zinc and iron are not detrimental until the solution becomes saturated, when crystals may form on the surface of the article, producing a characteristic defect. The solution then must be replaced or treated to remove the bulk of the nickel salts, as by freezing.

Quality of Finish Obtainable: Comparative measurements using a photoelectric cell of the amount of light reflected at 45 degrees, indicate anodically polished nickel has a higher reflectivity than mechanically polished nickel. These results agree with comparative tests on reflectivity of copper polished anodically and mechanically. These measurements do not take into account small local imperfections in the surface which may detract from the finished appearance without reducing the overall reflectivity. Under suitable conditions, however, even surface luster equal or superior to that of a good mopped finish can be obtained by anodic polishing. To achieve this result, care must be taken in preparing the base metal and conditions of plating and anodic polishing must be controlled to avoid certain defects as will be described.

Preparation of Base Metal: During anodic polishing, the smoothness of the surface increases progressively with the thickness of metal removed. Since this should be as small as possible to avoid reducing the protective properties of the deposit, precautions should be taken to secure the maximum smoothness of nickel deposits before anodic polishing. Therefore, it is desirable that the base metal be highly polished before nickel plating and that this polish not be impaired during cleaning by undue etching. This is a requirement similar to that for bright nickel plating, which also demands a high standard of polish in the base metal.

The preparatory cleaning treatments normally applied before decorative nickel plating are satisfactory for articles to be anodically polished after plating. If greater adhesion of deposit is required, brass and copper surfaces may be etched anodically in citrate solution, provided the current does not exceed about 10 amperes per square foot for 15 seconds. Longer treatment involves a risk that the contour of the grains exposed in etching may be geometrically reproduced in the nickel deposit and that the anodic polishing may fail to remove the pattern.

Anodic polishing of nickel deposited directly upon steel generally gives a somewhat inferior finish to that obtained on nonferrous metals, owing to the greater difficulty of polishing the steel before plating. Here an undercoat of copper or bronze, which can be polished to a high finish before nickel plating,

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Speeding-up an important step in the manufacture of shells is one of the defense jobs assigned to this Airco Radiagraph Gas Cutting Machine. 65 blanks an hour are being cut from 3½-inch thick billets of .45-.50 carbon steel. *Due to the slightly rounded edges of the billets, this illustration shows a hand torch being used as a preheating medium;* otherwise the notched effect between the parallel billets would lower the efficiency of the bil'et-cutting operation. » » » This is but one of the many ways in which Airco gas cutting machines are helping to accelerate the defense program. Where quantities of machine gas cut parts are required — whether large or small — there's an Airco machine to do the job, quickly, accurately, economically. Visible evidence of this can be seen in hundreds of plants where Airco machines are daily speeding production on thousands of different products. A new booklet describing the No. 4 Radiagraph shown above may help end your metai-cutting headaches. A request on your company letterhead will bring a copy promptly.

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becomes desirable. Often preliminary polishing of steel may be dispensed with when a bronze undercoat is used due to the great ease with which the bronze deposit is polished.

Conditions of Nickel Deposition: Nickel deposits from the single and double salt type of solution at both high and low pH and also from a bath buffered with formate have been polished successfully. Work so far carried out has, however, indicated that fine grain deposits are likely to be more advantageous than coarse grain deposits. This is because of their greater smoothness for a given thickness, in turn involving removal of less nickel in polishing, and because of their smaller tendency to show a "bloom" after chromium plating.

Apart from adequate thickness, the most important requirement of the nickel deposit is freedom from defects such as pits, small growths, and the like as these tend to be emphasized by the anodic polishing treatment. Preferably the surface should be dry when immersed in the anodic polishing bath to avoid dilution of the bath. Care should be taken to avoid contamination, for example, by handling. If wet, the articles should be swilled in the polishing solution to displace the water film before applying the current.

Defects: The two chief defects liable to be produced in the surface finish during anodic polishing are parallel streaks and pits. Other less important defects are the presence of a bloom or haze after anodic polishing and independently after subsequent chromium plating.

How To Avoid Streaks: This defect is due to furrows in the nickel, which are oriented at right angles to the surface of the polishing solution. If the furrows are shallow and wide, the polished surface will appear highly lustrous but with waves. If steep and narrow, they destroy the lustrous appearance. These defects tend to become more pronounced with increased current density.

Streaks appear to be caused by accelerated attack due to increased local agitation resulting from the rupture of the anolyte by streams of rising gas bubbles. The heating effect of the current near the anode face and the gas evolution cause the anolyte to stream upward except at low current densities when the usual downward streaming occurs. The lower edges of flat, vertically supported specimens are usually free from the defect. Neither does it occur in places where the uniform upward flow of gas bubbles is destroyed by turbulence.

Streaks May Be Eliminated

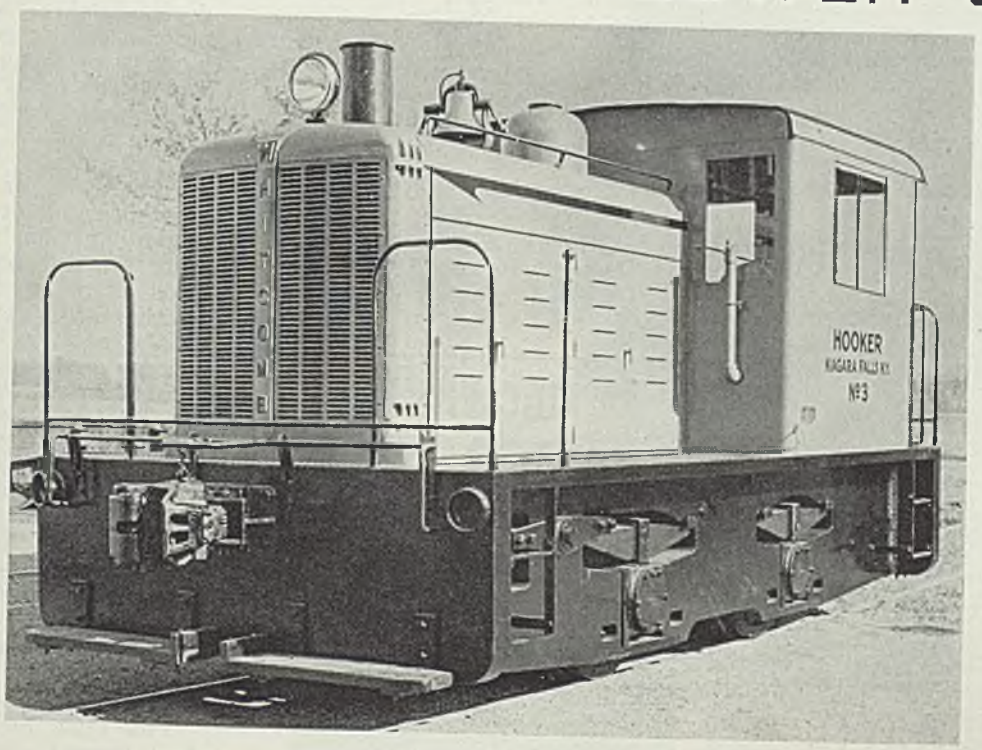
Streaks appear less apt to occur at higher solution temperatures. They may be prevented completely on flat specimens by a gentle horizontal movement of the specimen during polishing. This may be done, for example, by means of a moving anode rod. Simple backward and forward motion in one plane may produce uneven polishing in the shaded areas of certain shapes, making it necessary to superimpose an additional sidewise motion. Air agitation of the solution is not so effective as movement of the cathode.

Ordinary streaks also may be prevented without recourse to agitation if suitable additions to the solution are made—for example, glycerol, or sodium salts of bezene or toluene sulphonic acids. Likewise nitric acid or chromium trioxide have been found partially effective. These additions have no visible effect upon the amount of gas discharged and presumably operate by changing the surface tension and viscosity of the anolyte or by reducing the size of the gas bubbles.

Glycerol, and to a lesser extent the sulphonates, also lower the bath voltage (at 19 degrees Cent.). At 30 degrees Cent. or over, this difference is less pronounced. The use of these additions in a still bath, however, results in a somewhat less perfect finish than obtainable under

Whitcomb LOCOMOTIVES

PROVIDING BETTER SERVICE AT A LOWER COST



In peace or war, efficiency is the watchword of industry. In any endeavor, it means the difference between profit and loss, success and failure. In the matter of switching and haulage service, equipment is put to a severe strain, and here's where trouble begins: if the locomotives don't stand up under long hours of continuous service—if they don't operate with the greatest economy while requiring the least in maintenance attention—then something should be done to correct these conditions. WHITCOMB designers know these problems, and they have solved them successfully by producing locomotives that provide better service at lower cost. The most recent development along these lines has been the application of fluid drive in our mechanical units, replacing the conventional clutch. This arrangement provides a smooth continuous flow of power through a hydraulic coupling. Torsional vibrations or shock loads are eliminated because of the absence of any mechanical connection between the driving and driven members. This reduces wear on the engine and mechanical parts of the locomotive. No clutch maintenance required—no engine stalling encountered. The hydraulic coupling insures even smoother starting, and takes the "shock" out of shock loads.

DIESEL or GASOLINE POWER

MECHANICAL, HYDRAULIC, or ELECTRIC DRIVE

BLW THE BALDWIN GROUP

THE WHITCOMB LOCOMOTIVE CO.

ROCHELLE, ILL.

Subsidiary of THE BALDWIN LOCOMOTIVE WORKS

similar conditions in the plain sulphuric acid solution with gentle agitation. Microscopic examination of a nickel surface after anodic polishing without agitation in a bath containing glycerol shows the presence of short, slightly wavy and shallow channels, closely and evenly spaced and oriented vertically. Glycerol thus appears to have refined the streaking defect until it was almost imperceptible, although not entirely eliminated.

Agitation to prevent streaking, however, has the disadvantage that attack of the deposit is locally increased on the prominent areas such as at edges and corners where there is greater turbulence. This effect is offset to some extent by the normal tendency for the nickel thickness in such positions to be greater than the average. On articles of certain shapes, it may be difficult to secure sufficient agitation on shielded surfaces without unduly increasing the rate of attack on unshielded surfaces. On such work, solutions containing additions such as glycerol appear more attractive than the plain sulphuric acid bath.

How To Prevent Pits: Two apparently distinct types of polishing pits, designated as annular pits and fine pits have been observed. Annular pits may be prevented by operating at sufficiently high current densities. No positive method of preventing fine pits has yet been found, although defects may be reduced by careful filtration of the plating bath.

Annular pits consist of annular depressions in the surface of the nickel and are produced when treating horizontal surfaces at low current densities. When the surface is vertical, the annulus becomes elongated in the direction of flow of the anolyte, downward at low current densities and upward at higher current densities.

Annular pits appear to result from the presence of inert projections on the surface of the anode which modify the streamlined flow of the anolyte, causing local turbulence and subsequent increased rate of attack in accordance with the effect of agitation on anode efficiency. Probably adherent gas bubbles are the most usual form of projection, but any other stable form of obstruction tends to produce the same effect. Since annular pits generally form at current densities below 100 amperes per square foot, it is necessary to use current densities well above this value with 150 amperes per square foot as a minimum.

Fine Pits: As the current density is increased, size of annular pits becomes progressively smaller until they no longer can be recognized with the unaided eye. Close inspection may reveal speck-like markings. Microscopic examination may show a proportion of very small annular pits among these markings, but the majority appear to be simple depressions, often of irregular shape. This type of depression is referred to as a fine pit.

Cause is not known, and attempts to produce them deliberately have not been successful. The number of fine pits can be reduced considerably by careful filtration of the nickel plating solution. This result suggests that fine pits may be formed at the side of minute growths or pores in the deposit. It is possible that solid matter in suspension in the polishing solution may cause fine pits, but the defect has frequently been produced in clear, freshly prepared sulphuric acid solution. On small articles or on sharply curved surfaces, the defect is not readily seen and is relatively unimportant.

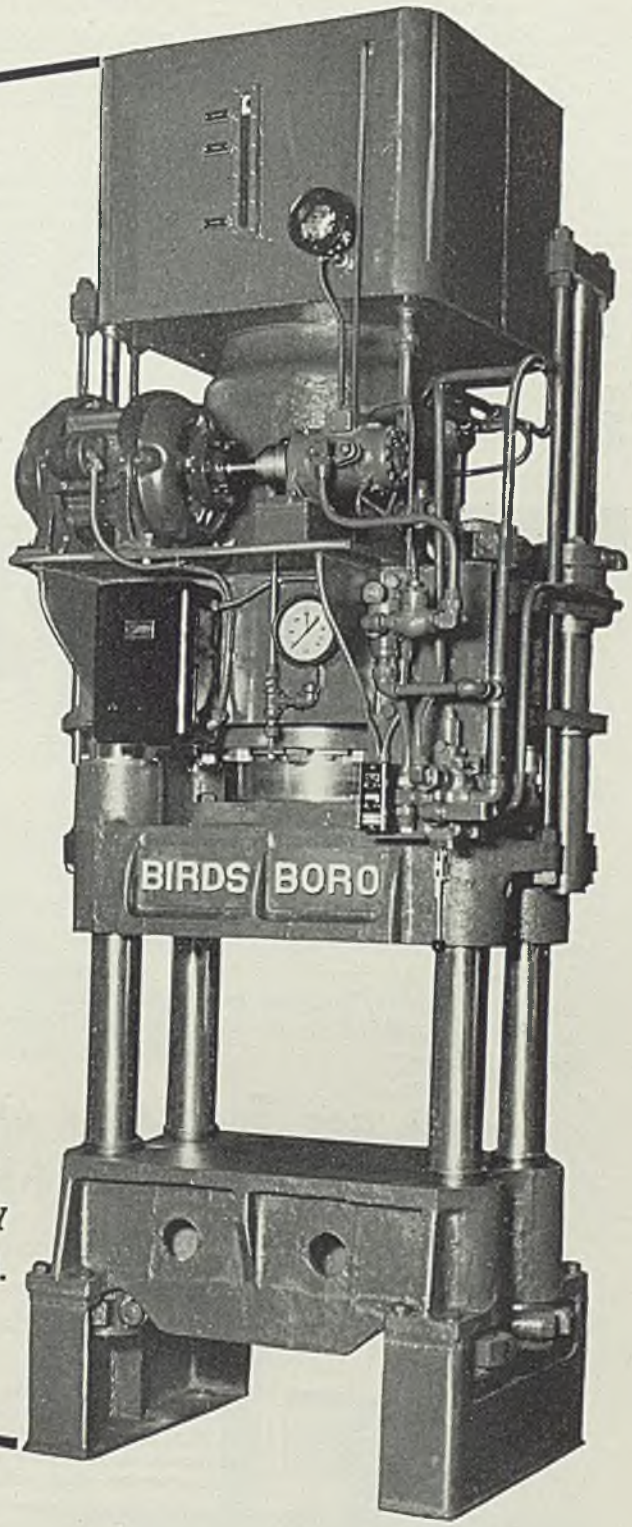
Bloom: The brilliance of anodically polished nickel specimens produced in the course of this work has occasionally been marred by a faint bloom or fog. This tendency appears to increase with the grain size of the nickel deposit, but also

The "All-around Tool" OF THE PRESS ROOM

Here is a "basic" tool for the press room—useful for a large variety of jobs—fast in operation—inexpensive to maintain—responsive to control—easy to change tools—perfected to a point of maximum simplicity and minimum cost—manufactured in numerous sizes and capacities—easy to install or to shift as production requirements change.

Scores of these modern, efficient, basic presses have been built by Birdsboro and are now serving both domestic and National Defense needs. Birdsboro engineers will be glad to discuss their adaptation to the production of your products.

BIRDSBORO STEEL FOUNDRY AND MACHINE COMPANY
PLANTS AT BIRDSBORO AND READING, PA.



The 300-ton self-contained Birdsboro Press is drawing alloy steel parts for airplanes. Features include fast opening and closing speeds and automatic protections against overheating and dropping of the platen in case of power failure.

BIRDSBORO Hydraulic Presses

BUILDERS OF: HYDRAULIC PRESSES MILL EQUIPMENT ROLLS
SPECIAL MACHINERY CRUSHING MACHINERY

fine-grain deposits have developed a pronounced bloom. Its occurrence is intermittent and cause not known.

Anodically polished nickel free from bloom may develop a bloom on chromium plating which, however, is superficial and may be removed by light mopping. Preliminary experiments have indicated that the appearance of bloom on chromium plating is associated with the structure of the nickel deposit, but further work is required to determine more precisely the conditions of nickel deposition in which freedom from bloom on chromium deposits of ordinary commercial thickness is to be secured.

New ASTM Standards Issued in Supplement

■ *The* 1940 *Supplement to ASTM Standards, Including Tentative Standards, Part I Metals;* cloth, 478 pages, 6 x 9 inches; published by the American Society for Testing Materials, Philadelphia, at $3.

This volume is a supplement to Part I of the 1939 *Book of ASTM Standards,* and contains all the newly adopted and revised standards and tentative standards in the metals field that have been accepted since the appearance of the latter: Of the 40 standards published in this volume 14 are newly adopted and 26 are replacements of existing standards in the 1939 book. Similarly 44 of the 59 tentative standards are replacements while the remaining 15 appear for the first time. Current tentative revisions of standards on metals also are given. Yellow stickers also accompany the supplement for attachment to the appropriate pages of the 1939 volume to call attention to such standards which have been superseded or withdrawn completely.

Ferro Clay Features "Controlled Consistency"

■ Latest feature of Ferro clay, used in processing porcelain enameled metal products, is "controlled consistency"—meaning that the "set" or "consistency" characteristics of the clay are now laboratory-controlled and kept within very narrow limits according to Ferro Enamel Corp., 4150 East Fifty-sixth street, Cleveland.

This uniformity is made possible by processing and testing methods, developed over a period of nearly fifteen years' time, and offers the porcelain enameler an opportunity for closer control of "setting-up" procedures in the mill room and likewise the reduction of reject-hazards.

Waterproof Material Protects Metal Parts

■ Corroflex, a flexible corrugated packing material for metal products, is now available in waterproof form according to Sherman Paper Products Corp., Newton Upper Falls, Mass.

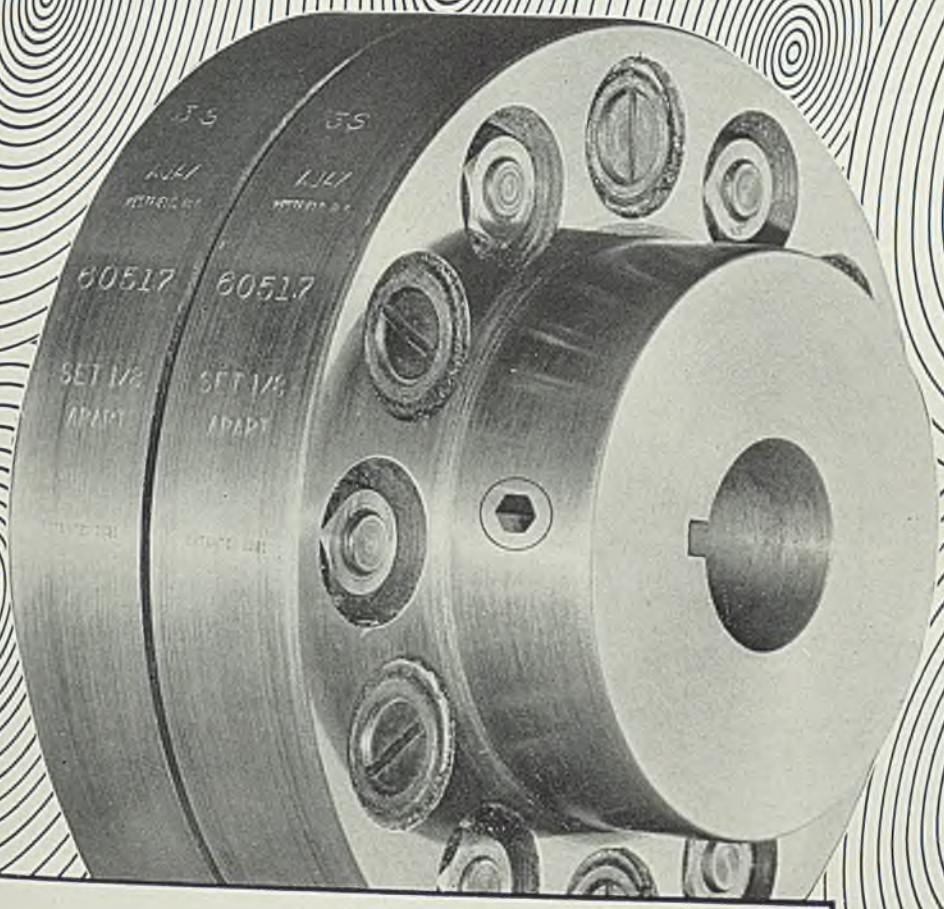
In addition to its waterproof qualities, the improved material is now stronger and offers greater resistance against puncturing, abrasion and breakage. These qualities are said to be due to the embodiment of a duplex sheet with asphalt lining.

The material is available in a special all-purpose weight in rolls from 6 to 72 inches and in sheets cut to size.

Distributes Selector Of Physical Properties

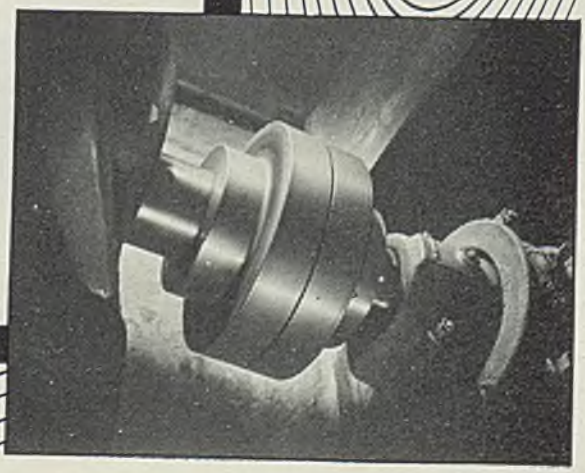
■ A cardboard slide selector by which physical properties and chemical composition of all grades of Ampco metal may be quickly ascertained is being distributed by Ampco Metal Inc., Milwaukee. It enables a prospective user of the company's metal to ascertain which grade most closely meets his requirements.

The reverse side of the selector also contains a table listing the general uses of the alloy by grades.



Keep The Wheels Turning With
AJAX FLEXIBLE COUPLINGS

This is no time for shutdowns! Safeguard your production with Ajax Flexible Couplings! Their exclusive, rubber bushed, bronze bearings combine positive drive, resilient protection against misalignment, free end float, no lubrication problem, no noise, no backlash. Sizes from ½ inch bore up. Write for Catalog. Sales Offices in all Principal Cities . . . Look for Ajax in your phone book.



All the horsepower goes through this Ajax Coupling in the main power drive of a large flour mill as shown at right.

AJAX FLEXIBLE COUPLING CO.,
4 ENGLISH ST., **WESTFIELD, N. Y.**

Even your children will be interested in making these wheels keep turning. Write for reprints of this ad.

Industrial Equipment

Tool Room Lathe

■ South Bend Lathe Works, South Bend, Ind., reports a new model A 9-inch swing tool room precision lathe adapted by its size and design for small diameter work requiring a high degree of accuracy. It has a maximum collet capacity of ½-inch, maximum swing over bed ways of 9⅛ inches and a maximum swing over saddle cross slide of 5½ inches. It also is available with one of three bed lengths providing center distances of 16, 22 and 28 inches respectively. Twelve spindle speeds ranging from 41 to 1270 rev-

olutions are provided on the motor-driven models, and smooth operation is attained by using a direct-belt drive to the spindle for speeds above 400 revolutions per minute. A wrenchless bull gear lock permits engaging the back gears quickly when slow speeds are required. A series of 48 power longitudinal feeds, 48 power cross feeds and 48 pitches of screw threads, right or left hand, are provided by the quick change gear mechanism. The full automatic apron is equipped with a worm drive and friction clutch for operating both the automatic power cross feeds and the automatic power longitudinal feeds. An automatic safety interlock prevents engagement of the half nuts when the power carriage feeds are in use. Equipment supplied with this lathe include hand wheel draw-in collet chuck, collet rack, taper attachment, thread dial indicator, micrometer carriage stop and chip pan. Other attachments supplied to order include an electric grinding attachment, milling attachment, oil pump and piping, chucks and accessories. The lathe is available either as a floor type with pedestal motor drive, or as a bench type with motor drive.

Lighting System

■ Benjamin Electric Mfg. Co., Des Plaines, Ill., has placed on the market a new Lite-Line fluorescent lighting system which increases illumination 35 to 100 foot-candles without changing existing wiring. It utilizes 48-inch Mazda fluorescent lamps and is available in single and

double reflector lengths. Furthermore, this type unit may be joined with others of the same type to form a continuous fixture of any desired length. It may be installed on the ceiling or suspended from the ceiling to the required mounting level for either general or localized lighting. Units also may be installed in multiple rows to form unbroken lines of light from one end of the room to the other or they may be used in shorter lengths for localized lighting over work tables, assembly lines, etc. Illumination provided by twin lamp units can be increased approximately 1/3 at any time after installation because of an important constructional feature. This changeover from twin lamp to triple lamp operation can be effected when two lamp units are purchased with triple lamp reflectors.

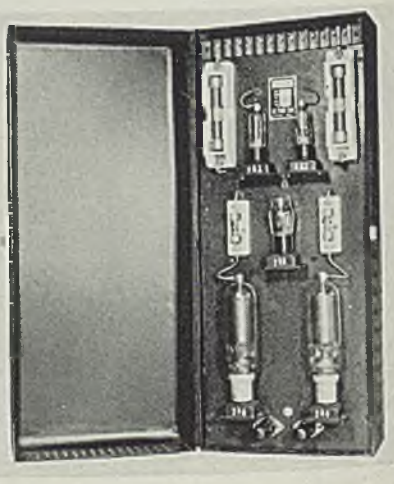
Reclosing Equipment

■ Westinghouse Electric & Mfg. Co., Dept. 7-N-20, East Pittsburgh, Pa., has placed on the market a new

standardized automatic reclosing equipment for use with small outdoor oil circuit breakers of from 50,000 to 250,000 kilovolt amperes interrupting capacity, 400-600 amperes at 7500 volts, and 600-1200 amperes at 15,000 volts alternating current. These units use the RC recloser, and include complete breaker accessories, such as current transformers, breaker trip coils, rectox, etc., and a control cabinet and panel completely wired and mounted on the breaker frame. They will meet 95 per cent of all application requirements.

Electronic Synchronizer

■ Weltronic Corp., 3080 East Outer drive, Detroit, has introduced a new synchronizer for use with any nonsynchronous timer and power tube contactor to obtain synchronous operation. Small and compact, it is supplied in a dust-proof 12 x



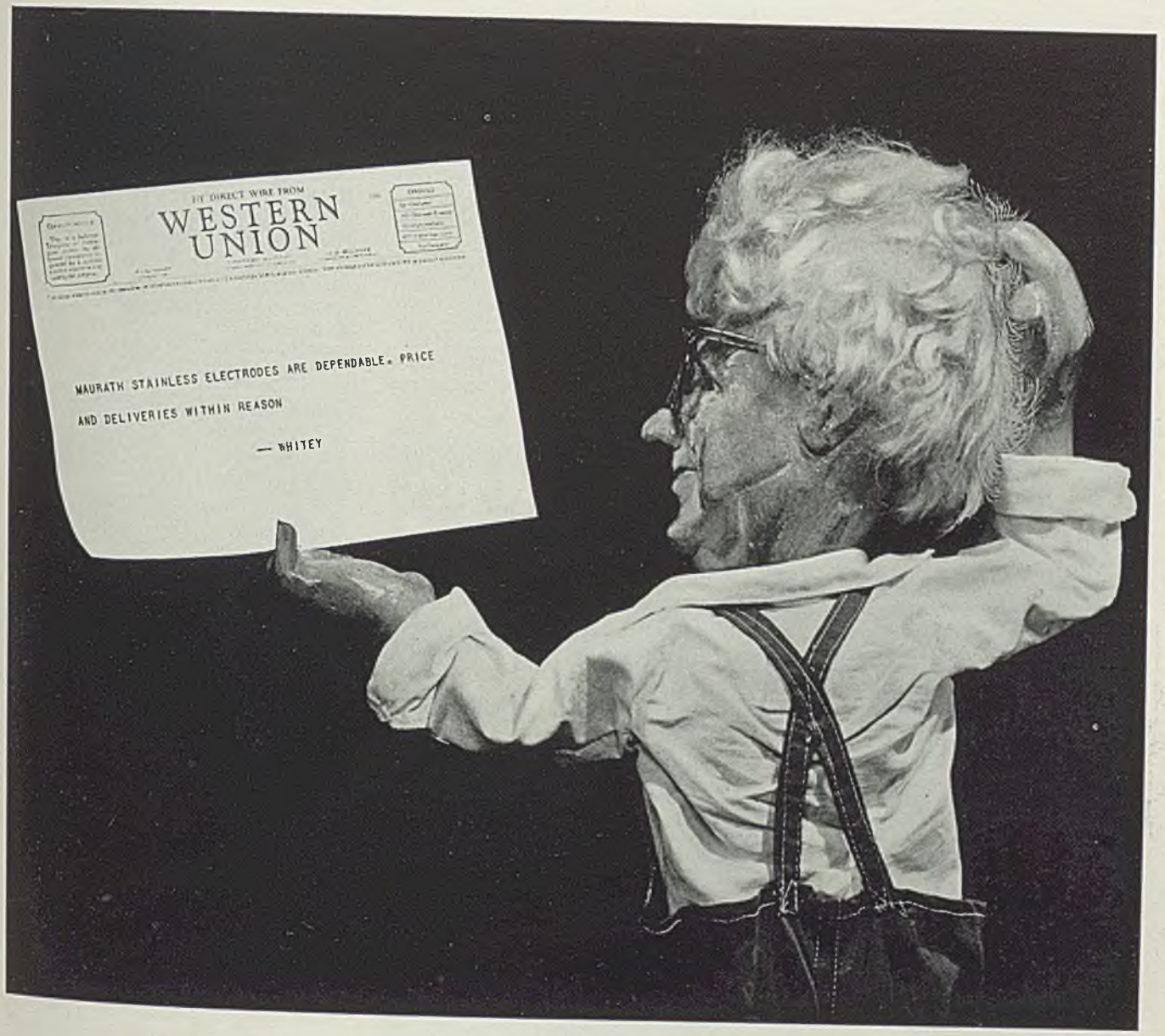
12 x 12-inch cabinet, for wall mounting, and is easily wired to any existing nonsynchronous timer. It is said to provide accuracy in timing, even at a rate of operation as high as 1000 welds per minute. The device has an adjustment for any value of power factor encountered in welding transformers.

Arc Welding Electrodes

■ General Electric Co., Schenectady, N. Y., has introduced three shielded-arc electrodes, types W-30, W-83 and W-93, for specific types of arc welding work. They are heavily coated and will operate on either direct or alternating current. The type W-30 is an A. W. S. E-6012 all position electrode, especially designed for automotive and piece work industries where high currents are desired for high-production speed on lap or fillet welds.

For job welders or manufacturers engaged in the fabrication or repair of cast iron, the type W-83 is ideally suited. It is an all-position electrode and its outstanding advantage is its ability to operate at relatively low currents.

The type W-93 is for building up



WHITEY SEZ: *IF WORDAGE IN ADVERTISING SPACE WERE SOLD ON A TOLL RATE BASIS, MOST OF US COULD GET OUR THOUGHTS OVER IN A SURPRISINGLY FEW NUMBER OF UNITS.*

STAINLESS
Type Numbers Available

302-B	316	330
308	316-Cb.	347
309	317	410
309-Cb.	321	430
310	325	442
311	329	446
312	•	502

15% Cr.—65% Ni.
20% Cr.—80% Ni.

MAURATH, Inc.
Builder of better welding

CLEVELAND
electrodes in all analyses

May 19, 1941

steel surfaces to resist wear from shock, abrasion and rolling impact. It has smooth arcing characteristics, is free from spatter, and has a wide coverage (74 square inches per pound).

Ratchet Relay

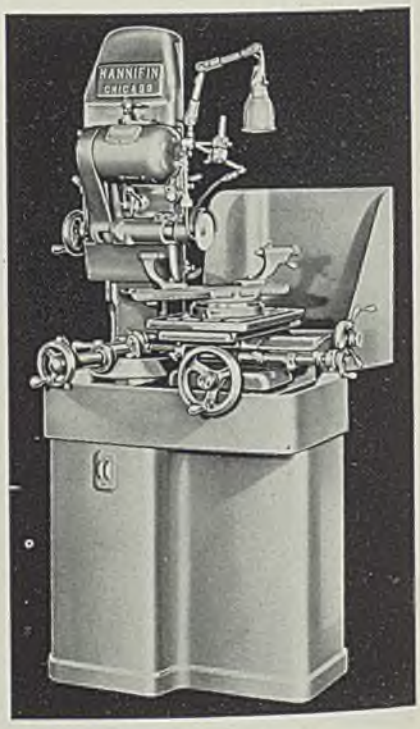
■ Struthers Dunn Inc., 1335 Cherry street, Philadelphia, reports a type CX2600 ratchet relay for both intermittent and continuous duty. It has two independent poles and, by factory adjustment of its cams, may be made single pole, double break, single throw; double pole, single break, single throw; or single pole, single break, double throw. Its base size is only 3 13/16 x 2 inches, the relay being designed for front-connected vertical mounting.

Contact rating for noninductive load is 110 volts, 6 amperes, or 220 volts, 3 amperes alternating current; or 115 volts, 1 ampere direct current. Coils are available from 6 to 220 volts alternating current, at approximately 4 watts; or 2 to 230 volts direct current, at approximately 2 watts.

Tool Grinder

■ Hannifin Mfg. Co., 621 South Kolmar avenue, Chicago, announces a No. 5 universal precision tool grinder for more rapid, accurate grinding of modern cutting tools. Its grinding wheel spindle is built for either dry or wet grinding, and it is held solidly in place on the vertical head by a split bearing housing.

The machine is driven by a balanced heavy duty ¾-horsepower motor with built-in air filter and forced ventilation system. The drive is through an endless herringbone weave belt. Interchangeable pulleys provide ten spindle speeds ranging from 3600 to 35,000 revolutions per minute under load. Both spindle carriage and table slides are manually operated, with both the rapid traverse and micrometer feed.



For greater accuracy, fine pitch lead screws are used. The machine also has a built-in coolant pump. This is driven by a separate 1/15-horsepower universal motor. The surface of the working table is 9 x 13 inches, the table being provided with three slots for mounting of attachments and special fixtures.

Standard fixtures furnished with the tool grinder include fixtures J-27 plain angle wheel dresser and J-25 subtable with J-26 centers.

Multiple Spot Welder

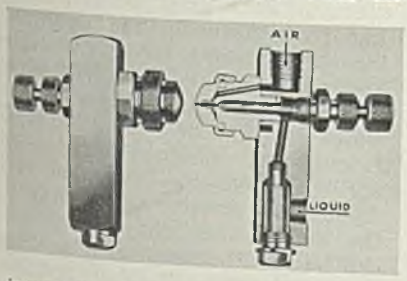
■ Eisler Engineering Co., 740 South Thirteenth street, Newark, N. J., has introduced a new multiple spot welder capable of being used for a number of multiple spot welding setups. The insets lettered from A to H show a few of the various setups possible. Adjustments can be made to make cir-

cular, straight, square, rectangular or any odd shape welds, to conform with any need. From 2 to 12 spots can be made simultaneously. The

unit is primarily intended for the spot welding of light sheet metal work.

Atomizing Nozzle

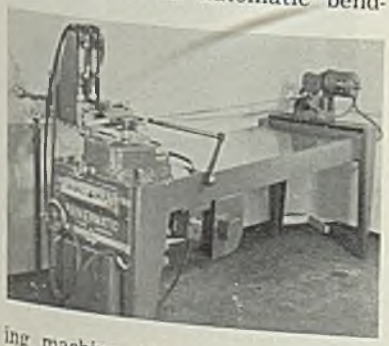
■ Spraying Systems Co., 4021-R West Lake street, Chicago, reports a new pneumatic atomizing nozzle for chemical and industrial processes. Shown in the accompanying illustration, it is available with an



internally mixed round or flat spray. Inclusion of a fluid shut-off is optional. The unit has a ¼-inch air connection and a ⅛-inch fluid intake. It is equipped with a removable strainer and its standard stock construction is brass.

Bending Machine

■ Parker Appliance Co., 17325 Euclid avenue, Cleveland, announces a new power-driven automatic bend-



ing machine for bending up to 3-inch outside diameter copper, aluminum alloy and 2½-inch outside diameter annealed steel tubing. Shown for the first time at the ASTE show recently, it also is applicable for bending structural shapes. The machine operates in two automatic cycles, the bending and the return cycle. The bending cycle consists of automatic clamping of material, bending, automatic stopping at a predetermined angle, extraction of mandrel, if used, and unclamping. The return cycle is the simultaneous return of mandrel and bending accessories to starting position. Changeover from left to right hand bending can be made quickly. Correct rotation is automatically established by a selectro switch actuated by position of the arms. According to the company, production of 250 right angle bends per hour is easily maintained on this new machine.

Measuring Valves

■ York Oil Burner Co. Inc., York, Pa., has introduced 24-inch measuring valves for use in large gas mixing and conditioning plants. By their use gas entering the mixing chamber can be held to a very close

B. t. u. content. This content is then retained by a special division which actually burns a sample of the gas. In response to this device, the metering valve is actuated by a hydraulic cylinder and the setting of the valve is instantly changed to suit variation in the gas condition.

Molding Press

■ Hydraulic Mfg. Co., Mount Gilead, O., has placed on the market a 12-ounce single nozzle plastic injection molding press for quickening production of plastic parts. It is designed for injection molding of large plastic parts where multiple injection molding is not required. Design of this press embodies powerful straightline hydraulic clamp vital for molding large parts. The clamp also automatically adjusts itself for molds of any thickness, keeping die set-up time to a minimum. Injection plunger speed of the press is more rapid than that of smaller capacity units, giving a full injection output. Its circulating fluid heating system assures uniform heating of the plastic material, thus eliminating flow marks and discoloration in the finished product.

Due to the press's force-feed of material with its positive measuring feature, it can be used for producing smaller moldings. Thus this machine can "pinch hit" for smaller capacity machines if need be. Its Hydro-Power radial piston type pressure generator requires little maintenance, bearing take-up, however, can be accomplished without dismantling the pump. The machine has a clamp pressure of 200 tons and a maximum mold size of 16½ x 24 inches. Its maximum opening between plates is 18 inches. It exerts a pressure on the material of 30,000 pounds per square inch.

Test Pump

■ American-LaFrance-Foamite Corp., Elmira, N. Y., has developed a Test-all pump—a device for determining the maximum safe life of fire extinguishers. It tells exactly the condition of each extinguisher by testing hydrostatically the shell and hose for strength through the hose and nozzle. It is approved by the Factory Mutual Laboratories with a definite procedure for testing extinguishers, engines, hose and sprinkler systems. As the unit flushes the interior and exterior of the extinguisher, the testing work can be readily combined with regular maintenance. Flushing and testing water flows automatically through the pump. Only a few strokes are required to bring the extinguisher up to the test pressure. The pump is light in weight and can easily be carried by one man.

X-Rays 5000 Parts Daily

(*Concluded from Page 70*)

planes after various periods of use for further X-raying and fatigue testing.

Occasionally parts considered on the border line between acceptance and rejection are passed purposely. Then studies made possible by these records assist in determining what is safe practice and help establish more precise specifications.

After an X-ray exposure has been made, the film together with pertinent information about time, angles and exposure and the material photographed is set aside to be analyzed by high trained diagnosticians. With the complete file of X-ray information in front of him including the facts regarding the stresses, strains and corrosion the parts will encounter in actual use, the diagnostician is able to determine whether the part pictured on the X-ray film will meet the requirements.

Plates Checked Five Times

To assure the utmost accuracy, every X-ray plate is checked at least five times. No chance is taken that a defect will be overlooked or misinterpreted.

X-ray work is backed up by spectrographic records for accurately determining the composition of the alloys.

A portable X-ray machine is also used in checking parts after they have been installed in planes. This is usually done after a plane has been in operation for some time and serves as a method of determining how the parts have stood up in actual service. Tripplett & Barton also operate complete testing service which includes physical tests such as fatigue, tensile, impact and compression, which are correlated with the X-ray findings. Other equipment used includes a Busch Metaphot, which permits microscopic enlargement up to 2200 diameters, a General Radio Strobotac and Strobolux and a complete Edgerton high-speed spark camera capable of taking exposures of 0.00001-second. Radium also is utilized in taking gamma-ray pictures. A complete chemical testing laboratory supplements these facilities.

Over a period of 5 years, the metallurgical diagnoses this equipment and methods have made possible have affected to some extent airplane designing and construction.

For example, in the interest of safety the government requires manufacturers to use a 100 per cent safety factor for all castings. That is, they are made just exactly twice as strong as loads would indicate. Due to the accuracy of analysis made possible by X-ray and other laboratory equipment, it has been possible to reduce this safety factor to 50 per cent. This enables the manufacturer to use lighter materials and lighten the weight of the plane without impairing its service strength. Further, the X-raying of parts makes it possible to substitute castings for forgings in many instances, thus reducing the number of parts required and cutting weight further.

Since the inauguration of 100 per cent X-raying of all class I and stressed parts, not a single mechanical failure due to faulty parts has been recorded. Eliminating all guess work in this manner brings to mass production the highest possible factor of safety.

There is one thing of which I am firmly convinced, and that is that all aircraft manufacturers will soon come to 100 per cent inspection by X-ray of all class I and stressed parts. The Army now demands it on all its planes. Lockheed was the first to adopt it as part of its construction routine. Douglas, Consolidated, Boeing, North American and Vultee have added it within the past 2 years. Markham and Bell Aircraft are using X-ray inspection on their Army contracts.

It appears the only nondestructive method of being certain of the soundness of materials going into a plane.

Here's one Insurance Policy

that

doesn't call for premiums!

Modern **GAS** *equipment is your insurance of speed, flexibility, close control and economy*

Whether to speed production, improve quality and hold unit costs down in the defense industries—or in the hundreds of other industries where uniformity, speed and low cost are just as important—Gas fuel, equipment and engineering knowledge are proving their worth to American enterprise.

Gas—high in heat value and capable of precise control—is the preferred fuel for carburizing, annealing, hardening, drawing, melting, forging, tinning, galvanizing, spheroidizing, malleableizing, bonderizing, baking, drying and many other industrial applications.

Ask your Gas company and its experienced technical staff for new ways by which to apply Gas for heat treating and scores of other heating processes in manufacturing metal products. They will be glad to give you information and assistance.

AMERICAN GAS ASSOCIATION
INDUSTRIAL and COMMERCIAL GAS SECTION
420 LEXINGTON AVE., NEW YORK

No General Priorities On Steel Are Indicated

But defense needs come first. About 35 per cent shipments for defense. Policy on 1942 sales is widely varied.

■ CAREFUL checks in authoritative quarters reveal that there is no foundation whatever for fears among many consumers that there shortly will be an all-out priority system on finished rolled steel products. This does not mean necessarily that all consumers will get steel as they want it.

Approximately 30 to 40 per cent of steel now being shipped is for purposes essential to defense. Nearly half of this is for direct defense and is covered by preference ratings. The other half is for railroads, merchant ships and for many other items necessary to implement defense. While this latter half is not in most cases covered by preference ratings, it might as well be, because steel companies, in full co-operation with Washington, continually scrutinize their rolling schedules to make sure that all defense needs come first.

Realizing that steel-using manufacturers who are engaged solely in civilian work will have less material available as time goes on, more and more are seeking defense work to make sure they will be able to keep their plants going under all conditions. A number of shutdowns or curtailments were forced at consuming plants the past week because of lack of material.

Whether to sell steel freely for 1942 is one of the prime problems now. This is an issue which cannot be postponed much longer since makers are virtually sold out for 1941. One important maker has opened 1942 books quite freely to regular customers. Others have taken the opposite attitude, refusing to place on books under any consideration, though assuring customers they will be "taken care of." Majority of makers have a modified plan whereby under certain circumstances they will enter orders on books. In several cases such "bookings" are rather informal filing of requests to soothe customers.

The most persistent inquirers for 1942 are those with standard specifications year after year such as bolt and nut makers. The great bulk of users are showing no interest, being uncertain as to own requirements and realizing the futility of anticipating needs so far ahead in this rapidly-changing scene. Orders for 1942 will not necessarily be put on books in chronological order of receipt but rather from term of years of patronage and nature of requirement, defense or otherwise.

Apparently for the first time this year some users of both pig iron and carbon steel have shut down or greatly curtailed operations because of lack of materials. In pig iron this has applied to lack of a specialty, such as silvery iron, rather than to bulk requirements. In finished steel apparently users of plates, sheets and strips have suffered worst. Moreover several other consumers are said to be on the edge of shutdowns.

Commandeering of ships has a repercussion similar to that noted a week ago when it was reported that railroads must have thousands of more cars to carry all rail transcontinental traffic in the place of former rail and water. This time oil lines would be substituted for tankers which have been taken by the government. Thus one company has lost 35 tankers to the government and contemplates an oil line from Texas to Atlantic ports as a substitute if it can get the plates.

Bids on 1,000,000 tons of steel for Great Britain are now being filed by American producers with the procurement division of the Treasury Department, Washington. Deliveries are to be made in equal amounts over the next four calendar months. This is the first major inquiry to come out under the mechanism set up by the Lease-Lend law (See Page 23).

In an era of few price changes the advance of $1 per ton in charcoal pig iron by one maker stands out, a change designed merely to bring charcoal iron into line with coke iron prices.

Steelmakers are often astonished by the speed with which steel is fabricated and frequently have to revise their conception of consuming capacity.

Scheduled automobile production for last week was 127,255 units, down 5375 for the week, comparing with 99,030 for the corresponding week of 1940.

The national rate for steel ingot production gained 2 points last week to 99½ per cent. Increases took place as follows: Pittsburgh by 5 points to 99 per cent, Chicago 1 point to 102½, Buffalo 2½ points to 93, Birmingham 5 points to 95, New England 10 points to 100 and Cincinnati by 3½ points to 92½. The only drop was at Cleveland, 1½ points, to 95. Unchanged were: eastern Pennsylvania at 95, Wheeling at 88, St. Louis at 98 and Youngstown at 95.

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.

MARKET IN TABLOID ★

Demand

Lighter pending opening o 1942 books.

Prices

Rise in charcoal pig iron of $1.

Production

Up 2 points to 99½.

COMPOSITE MARKET AVERAGES

	May 17	May 10	May 3	One Month Ago April, 1941	Three Months Ago Feb., 1941	One Year Ago May, 1940	Five Years Ago May, 1936
Iron and Steel	$38.15	$38.15	$38.15	$38.15	$38.22	$37.33	$32.92
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.60	52.20
Steelworks Scrap..	19.16	19.16	19.16	19.16	19.95	16.00	14.39

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

	May 17, 1941	April 1941	Feb. 1941	May 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	2.21	2.225	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 $\frac{5}{32}$-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	May 17, 1941	April 1941	Feb. 1941	May 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	24.00	24.00	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	30.34	30.34	30.34
Gray forge, del. Pittsburgh	24.19	24.19	24.17	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	105.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.20	$20.75	$18.00
Heavy melt. steel, No. 2, E. Pa.	17.75	18.00	18.50	16.00
Heavy melting steel, Chicago	18.75	18.80	19.25	17.25
Rails for rolling, Chicago	22.25	22.65	23.75	21.25
Railroad steel specialties, Chicago	23.75	23.75	23.55	20.25

Coke

Connellsville, furnace, ovens	$5.50	$5.50	$5.50	$4.75
Connellsville, foundry, ovens	6.00	6.00	6.00	5.75
Chicago, by-product fdry., del.	12.25	11.75	11.75	11.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.10c
Chicago, Gary	2.10c
Cleveland	2.10c
Detroit, del.	2.20c
Buffalo	2.10c
Sparrows Point, Md.	2.10c
New York, del.	2.34c
Philadelphia, del.	2.27c
Granite City, Ill.	2.20c
Middletown, O.	2.10c
Youngstown, O.	2.10c
Birmingham	2.10c
Pacific Coast ports	2.65c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast ports	3.70c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill	3.60c
Middletown, C.	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
Philadelphia, del.	2.15c
Boston, delivered	2.43c-2.57c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.10c
Sparrows Point, Md.	2.10c
Claymont, Del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast ports	2.65c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	4.00c

Structural Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast ports	2.75c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Roofing Ternes

Pittsburgh base, package 112 sheets 20 x 28 in., coating I.C.

8-lb.	$12.00	25-lb.	$16.00
15-lb.	14.00	30-lb.	17.25
20-lb.	15.00	40-lb.	19.50

Bars

Soft Steel

(Base, 20 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Rail Steel

(Base, 5 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Detroit, delivered	2.25c
Cleveland	2.15c

Buffalo	2.15c
Birmingham	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Iron

Chicago	2.25c
Philadelphia, del.	2.37c
Pittsburgh, refined	3.50-8.00c
Terre Haute, Ind.	2.15c

Reinforcing

New Billet Bars, Base

Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Rail Steel Bars, Base

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birm.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails	$2.55

(Per Pound)

Polished fence staples	2.55c
Annealed fence wire	3.05c
Galv. fence wire	3.40c
Woven wire fencing (base C. L. column)	67
Single loop bale ties, (base C.L. column)	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

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.65c	3.35c
Cleveland	2.70c	*3.45c
Buffalo	2.65c	3.35c
*Delivered.	2.65c	3.35c

Alloy Bars (Hot)

(Base, 20 tons or over)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.70c
Detroit, delivered 2.80c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.70	3300	3.80
2500	2.55	3400	3.20
4100	0.15 to 0.25 Mo.		0.55
4600	0.20 to 0.30 Mo. 1.50-2.00 Ni.		1.20
5100	0.80-1.10 Cr.		0.45
5100	Cr. spring flats		0.15
6100	bars		1.20
6100	spring flats		0.85
	Cr. N. Van.		1.50
	Carbon Van.		0.85
9200	spring flats		0.15
9200	spring rounds, squares		0.40

Electric furnace up 50 cents.

Alloy Plates (Hot)

Pittsburgh, Chicago, Coatesville, Pa. 3.50c

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	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	68 off
Do., ⅝ and ⅝ x 6-in. and shorter	66 off
Do., ¾ to 1 x 6-in. and shorter	64 off
1⅛ and larger, all lengths	62 off
All diameters, over 6-in. long	62 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts separate 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	60 off
Plow bolts	68.5 off

Nuts

	U.S.S.	S.A.E.
Semifinished hex. ½-inch and less	66	70
⅝-1-inch	63	65
1⅛-1½-inch	61	62
1⅝ and larger	60	..

Hexagon Cap Screws

Upset 1-in., smaller 68 off

Square Head Set Screws

Upset, 1-in., smaller	74.0 off
Headless set screws	64.0 off

Piling

Pitts., Chgo., Buffalo 2.40c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural	3.40c
½-inch and under	65-10 off

Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off

Welded Iron, Steel, Pipe

Base discounts on steel pipe. 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

In.	Blk.	Galv.
Steel		
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

	Blk.	Galv.
Iron		
¾ butt weld	25	4
1 and 1¼ butt weld	29	10
1½ butt weld	33	12½
2 butt weld	32½	13
1½ lap weld	23½	4
2 lap weld	25½	6
2½ to 3½ lap weld	26½	8½
4 lap weld	28½	12
4½ to 8 lap weld	27½	11
9 to 12 lap weld	23½	6

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cutlengths 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. fittgs., 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.	6.50- 7.00
Wise county fdry.	5.50- 6.50
Wise county fur.	5.00- 5.25

By-Product Foundry

Newark, N. J., del.	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.	11.25
Cincinnati, del.	11.00
Cleveland, del	12.65
Buffalo, del.	11.75
Detroit, del.	11.50
Philadelphia, del.	12.13

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	14.00c
Toluol, two degree	27.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.)	13.75c
Do. (1000 lbs. or over)	12.75c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	7.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$30.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$25.00	$25.50	$24.50	$26.00
Birmingham, Ala.§	20.38	.....	19.38	24.00
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	24.50
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	.....	23.62	.....
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	†24.12	.....	23.62	.....
St. Paul from Duluth	26.63	26.63	.....	27.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50, base; $30.74 delivered Philadelphia.

Gray Forge		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: 6-6.50 per cent $29.50; 6.51-7—$30.00; 7-7.50—$30.50; 7.51-8—$31.00; 8-8.50—$31.50; 8.51-9—$32.00; 9-9.50—$32.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo, is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	26.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$50.00
Chem. bonded chrome	50.00
Magnesite brick	72.00
Chem. bonded magnesite	61.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$25.00-$26.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	20.00-21.00
Do. barge	20.00
No. 2 lump	20.00-21.00

Ferroalloy Prices

Ferromanganese, 78-82%, carlots, duty pd. $120.00; Ton lots 130.00; Less ton lots 133.50; Less 200 lb. lots 138.00; Do., carlots del. Pitts. 125.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot. 36.00

Ferrosilicon, 50%, freight allowed, c.l. 74.50; Do., ton lot 87.00; Do., 75 per cent 135.00; Do., ton lots 151.00; Spot, $5 a ton higher.

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

Ferrotitanium, 40-45%, lb., con. ti., 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%, ti., 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% ti., 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, according to grade, spot shipment, 200-lb. drum lots, lb. 2.50; Do., smaller lots 2.60

Vanadium Pentoxide, contract, lb. contained 1.10; Do., spot 1.15

Chromium Metal, 98% cr., contract, lb. con. chrome, ton lots 80.00c; Do., spot 85.00c

98% 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	4.75	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	4.35	5.00	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.18	4.23	4.73	3.54	3.88	8.38	6.98
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	....	5.54	....	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	4.00	4.00	5.75	4.00	6.50	5.25	....	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	4.65	6.45	4.15	4.15	6.40	4.30	6.50	5.50	....	6.60	10.55	9.80
San Francisco	3.90	4.40	6.00	3.90	3.90	5.60	3.90	6.40	5.65	....	6.80	10.65	9.80

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	5.85	....	8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	9.05
San Francisco	5.25	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300 pounds and over, Portland, Seattle; 400-14,999 Twin Cities; 400-3999 Birmingham; 400 pounds and over in Memphis.

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; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

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	2.79c	15	10	0
Ship plates	2.90c	16	2	6
Boiler plates	3.17c	17	12	6
Sheets, black, 24 gage	4.00c	22	5	0
Sheets, galvanized, corrugated, 24 gage	4.61c	25	12	6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.29	1	11	4

British ferromanganese $120.00 gen erld Atlantic seaboard duty paid.

Domestic Prices Delivered at Works or Furnace—

		£	s	d
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$25.79	6	8	0(a)
Basic pig iron	24.28	6	0	6(a)
Furnace coke, f.o.t. ovens	7.15	1	15	6
Billets, basic soft, 100-ton lots and over	49.37	12	5	0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14	10	6
Merchant bars, rounds and squares, under 3-inch	3.17c	17	12	0††
Shapes	2.77c	15	8	0††
Ship plates	2.91c	16	3	0††
Boiler plates	3.06c	17	0	6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22	15	0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26	2	6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	23	15	0
Bands and strips, hot-rolled	3.30c	18	7	0

(a) del. Middlesbrough 3s 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, cif.	$43.00-46.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	.....
So. African, 48%	68.00-70.00
Brazilian, 46%	63.00-65.00
Chilean, 47%	65.00
Cuban, 50-51%, duty free	67.50

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

IRON AND STEEL SCRAP PRICES

Maximum Prices Announced by Office of Price Administration and Civilian Supply

	Pittsburgh, Wheeling, Steubenville	Youngstown, Canton, Sharon	Chicago, Kokomo, Peoria	S. Bethlehem	*East. Pa.	Sparrows Pt.	Cleveland	Buffalo	South Ohio†
No. 1 heavy melting	$20.00	$20.00	$18.75	$18.25	$18.75	$18.25	$19.50	$19.25	$18.50
No. 1 hyd. comp. black sheets	20.00	20.00	18.75	18.25	18.75	18.25	19.50	19.25	18.50
No. 2 heavy melting	19.00	19.00	17.75	17.25	17.75	17.25	18.50	18.25	17.50
Dealer No. 1 bundles	19.00	19.00	17.75	17.25	17.75	17.25	18.50	18.25	17.50
Dealer No. 2 bundles	18.00	18.00	16.75	16.25	16.75	16.25	17.50	17.25	16.50
Mixed borings and turnings	15.25	15.25	14.00	13.50	14.00	13.50	14.75	14.50	13.75
Machine shop turnings	15.50	15.50	14.25	13.75	14.25	13.75	15.00	14.75	14.00
Shovel turnings	16.50	16.50	15.25	14.75	15.25	14.75	16.00	15.75	15.00
No. 1 busheling	19.50	19.50	18.25	17.75	18.25	17.75	19.00	18.75	18.00
No. 2 busheling	15.50	15.50	14.25	13.75	14.25	13.75	15.00	14.75	14.00
Cast iron borings	15.75	15.75	14.50	14.00	14.50	14.00	15.25	15.00	14.25
Uncut structurals and plate	19.00	19.00	17.75	17.25	17.75	17.25	18.50	18.25	17.50
No. 1 cupola	21.00	21.00	20.00	22.50	23.00	22.00	22.00	20.00	21.00
Heavy breakable cast	19.50	19.50	18.50	21.00	21.50	21.00	20.50	18.50	19.50
Stove plate	19.00	.....	16.00	18.00	18.50	18.00	15.75	19.00	13.00
Low phos. billet, bloom crops	25.00	25.00	23.75	23.25	23.25	23.25	24.50	24.25	23.50
Low phos. bar crops and smaller	23.00	23.00	21.75	21.25	21.75	21.25	22.50	22.25	21.50
Low phos. punch., plate scrap	23.00	23.00	21.75	21.25	21.75	21.25	22.50	22.25	21.50
No. 2 cupola	20.00	20.00	19.00	21.50	22.00	21.50	21.00	19.00	20.00
Machinery cast cupola size	22.00	22.00	21.00	23.50	24.00	23.50	23.00	21.00	22.00
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
Clean auto cast	22.50	22.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50
Punchings and plate scrap‡‡	22.00	22.00	20.75	20.25	20.75	20.25	21.50	21.25	20.50
Punchings and plate scrap§§	21.00	21.00	19.75	19.25	19.75	19.25	20.50	20.25	19.50
Heavy axle and forge turnings	19.50	19.50	18.25	17.75	18.25	17.75	19.00	18.75	18.00
Medium heavy elec. furnace turnings	18.00	18.00	16.75	16.25	16.75	16.25	17.50	17.25	16.50

	St. Louis	Kansas City	Detroit	Duluth	Birmingham¶	Chattanooga	Radford, Va.	New England‡	Pacific Coast§
No. 1 heavy melting	$17.50	$16.00	$17.85	$18.00	$17.00	$.....	$.....	$15.50	$14.50
No. 1 hyd. comp. black sheets	17.50	16.00	17.85	18.00	17.00	.....	.....	15.50	14.50
No. 2 heavy melting	16.50	15.00	16.85	17.00	16.00	.....	.....	14.50	13.50
Dealer No. 1 bundles	16.50	15.00	16.85	17.00	16.00	.....	.....	14.50	13.50
Dealer No. 2 bundles	15.50	14.00	15.85	16.00	15.00	.....	.....	13.50	12.50
Mixed borings and turnings	12.75	11.25	13.10	13.25	12.25	.....	.....	10.75	9.75
Machine shop turnings	13.00	11.50	13.35	13.50	12.50	.....	.....	11.00	10.00
Shoveling turnings	14.00	12.50	14.35	14.50	13.50	.....	.....	12.00	11.00
No. 1 busheling	17.00	15.50	17.35	17.50	16.50	.....	.....	15.00	14.00
No. 2 busheling	13.00	11.50	13.35	13.50	12.50	.....	.....	11.00	10.00
Cast iron borings	13.25	11.75	13.50	13.75	12.75	.....	.....	11.25	10.25
Uncut structurals and plate	16.50	15.00	16.25	17.00	16.00	.....	.....	14.50	13.50
No. 1 cupola	20.00	15.00	19.00	21.00	17.75	20.00	21.00	22.00	18.00
Heavy breakable cast	18.50	13.50	17.50	19.50	16.25	.....	.....	20.50	17.00
Stove plate	14.50	12.50	12.75	.....	12.00	.....	.....	14.00	14.00
Low phos. billet and bloom crops	22.50	21.00	22.85	23.00	22.00	.....	.....	20.50	.....
Low phos. bar crops and smaller	20.50	19.00	20.85	21.00	20.00	.....	.....	18.50	.....
Low phos. punch. and plate scrap**	20.50	19.00	20.85	21.00	20.00	.....	.....	18.50	.....
No. 2 cupola	19.00	14.00	18.00	20.00	16.75	19.00	20.00	21.00	17.00
Machinery cast cupola size††	21.00	16.00	20.00	22.00	18.75	21.00	22.00	23.00	19.00
No. 1 machine cast, drop broken, 150 pounds and under	21.50	16.50	20.50	22.50	19.25	21.50	22.50	23.50	19.50
Clean auto cast	21.50	16.50	20.50	22.50	19.75	21.50	22.50	23.50	19.50
Punchings and plate scrap‡‡	19.50	18.00	19.85	20.00	19.00	.....	.....	17.50	.....
Punchings and plate scrap§§	18.50	17.00	18.85	19.00	18.00	.....	.....	16.50	.....
Heavy axle and forge turnings	17.00	15.50	17.35	17.50	16.50	.....	.....	15.00	14.00
Medium heavy elec. furnace turnings	15.50	14.00	15.85	16.00	15.00	.....	.....	13.50	12.50

*Claymont, Del., Coatesville, Phoenixville, Harrisburg, Pa. †Portsmouth, Middletown, O., Ashland, Ky. ‡Worcester, Mass.; Bridgeport, Conn.; Phillipsdale, R. I. §Los Angeles, San Francisco, Portland, Oreg., Seattle; ¶Prices are for scrap delivered to the Birmingham, Ala., consuming point, excepting scrap for Birmingham consumption originating west of the western boundary of Alabama. In the latter case the Birmingham, Ala., consumer may pay $1 more than the prices indicated under "Birmingham"; **⅜-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.

Maximum Prices for Iron and Steel Scrap Originating from Railroads

	Pittsburgh, Wheeling, Steubenville	Youngstown, Canton, Sharon	Chicago, Kokomo, Peoria	S. Bethlehem	*East. Pa.	Sparrows Pt.	Cleveland	Buffalo	South Ohio†
No. 1 Railroad grade heavy melting steel	$21.00	$21.00	$19.75	$.....	$19.75	$19.75	$20.50	$20.25	$19.50
Scrap rails	22.00	22.00	20.75	.....	20.75	20.75	21.50	21.25	20.50
Rerolling quality rails	23.50	23.50	22.25	.....	22.25	22.25	23.00	22.75	22.00
Scrap rails 3 feet and under	24.00	24.00	22.75	.....	22.75	22.75	23.50	23.25	22.50
Scrap rails 2 feet and under	24.25	24.25	23.00	.....	23.00	23.00	23.75	23.50	22.75
Scrap rails 18 inches and under	24.50	24.75	23.50	.....	23.50	23.50	24.25	24.00	23.25

	St. Louis	Kansas City	Detroit	Duluth	Birmingham	Chattanooga	Radford, Va.	New England‡	Pacific Coast§
No. 1 Railroad grade heavy melting steel	$18.50	$17.00	$18.85	$19.00	$18.00	$.....	$.....	$16.50	$15.50
Scrap rails	19.50	18.00	19.85	20.00	19.00	.....	.....	17.50	16.50
Rerolling quality rails	21.00	19.50	21.35	21.50	20.50	.....	.....	19.00	18.00
Scrap rails 3 feet and under	21.50	20.00	21.85	22.00	21.00	.....	.....	19.50	18.50
Scrap rails 2 feet and under	21.75	20.25	22.10	22.25	21.25	.....	.....	19.75	18.75
Scrap rails 18 inches and under	22.25	20.50	22.60	22.75	21.75	.....	.....	20.25	19.25

*Philadelphia, Wilmington, Del. †Portsmouth, Middletown, O., Ashland, Ky. ‡Worcester, Mass.; Bridgeport, Conn.; Phillipsdale, R. I. §Los Angeles, San Francisco, Portland, Oreg., 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 consuming points shall be the maximum price at consumer's plant at any point on the railroad's line, except: Where a railroad from which scrap originates operates in two or more consuming points having different switching charges, the price of such railroad scrap: (1) To a consumer located within a consuming point having the highest switching charge, shall not exceed the maximum on-the-line price established above; (2) To a consumer located within a consuming point not having the highest switching charge, shall not exceed the maximum on-the-line price established above less the difference between the switching charges at that consuming point and at the consuming point having the highest switching charges; (3) To a consumer located on the line of the railroad at a point having no switching charges, shall not exceed the maximum on-the-line price established above less the highest switching charge at any consuming point on the line; and (4) To a consumer located off the line of the railroad, shall not exceed the maximum off-the-line price established below less the highest switching charge at any consuming point on the line.

Sheets, Strip

Sheet & Strip Prices, Pages 106, 107

Sheet users still press mills for shipment despite liberal anticipation months ago for current requirements. In most cases where producers are unable to meet delivery promises, insertion of defense orders, which are given preferential treatment, is responsible. Orders have fallen off, largely because mills are filled for 1941 and are not ready to sell for 1942 delivery. Some instances have been reported of consumers curtailing production or shutting down because of lack of sheets and strip, especially of galvanized. Full production by mills seems to have little effect on backlogs.

Defense requirements are estimated at 10 to 20 per cent of production, much of this being galvanized sheets, production of which is shrinking because of zinc shortage. Wide strip, 2½ to 8 inches, which has been available in eight to nine months, has moved back to nine to ten months.

Stamping shops find difficulty in obtaining sufficient material and some engaged in non-defense production have been forced to curtail.

Changes in specifications involving slight revisions in analysis are prevalent and complicate shipping. This is due in part to forward buying done weeks ago when definite specifications were uncertain and have been revised since.

Incoming orders for narrow cold-rolled strip are slightly lower, due in part to refusal of most rerollers to accept more than a fraction of tonnage offered and general discouragement of continued forward buying. Orders taken by some producers currently balance shipments and in these cases backlogs are held even. Some bookings are being adjusted for first quarter delivery, with few producers able to take much tonnage for 1941 shipment.

Automobile builders resist efforts to reduce shipments for this year and ask shipment of all tonnage now on books for their account. Defense orders are more frequent and some priority slips are appearing for straight carbon strip. Consumers fabricating so-called nonessential goods are concerned over future strip supply, notably producers of kitchenware. Sellers are promising delivery subject to defense needs.

Fluorspar

Fluorspar Prices, Page 108

Possible fluorspar shortage is seen by some experienced observers and the present range of $20 to $21 per ton is regarded as lower than circumstances justify. Operators in Kentucky and Illinois have been unable to find funds to continue exploration for further deposits, it is stated. Supplies from Norway, Spain and France have been shut off from the outside world and fluorspar has been bought in the United States recently for shipment to India.

Bars

Bar Prices, Page 106

Defense buying continues to crowd out tonnage for commercial use and deliveries are becoming more remote. Currently no better promise than six months is possible and in some sizes of hot-rolled carbon steel bars, particularly largest and smallest sizes, it is difficult to obtain any promise.

A further complication for non-defense users is uncertainty whether deliveries now scheduled will be met as full force of government requirements comes into play, with more and more capacity devoted to that end.

Sections included in warehouse classifications of hot-rolled bars are still obtainable, although in many cases this involves freight charges from other points, warehouses no longer absorbing carriage charges. In fact, basing point quotations are disappearing in large measure, even on mill shipments.

In New England, where normally warehouses supply the greater part of tonnage, current shipments direct from mill are heavier than normal, due to defense requirements on which priorities apply, notably on alloys. Small arms manufacturers take most alloy bar shipments in that area, forward orders extending into next year in some instances, particularly in chromium-molybdenum. Forging shop consumption is heavy and growing. A forgings producer in the Worcester, Mass., district has subcontracts for gun carriages produced in the midwest.

Some producers of aircraft material requiring alloy steel are dipping into inventories, which are not being replaced. In many lines bar consumption exceeds deliveries and even tonnages covered by priorities extend far into the future, with shipments constantly delayed further.

Merchant bar producers are seeking to induce buyers to accept bessemer grade material wherever possible, as an aid in improving shipments. Substitution would not permit shipment of larger tonnages but buyers are told better delivery would result.

In general, bar producers refuse to quote beyond the end of the year on anything other than special defense jobs, which usually run over an extended period, or on such products as alloy bars, especially those requiring special treatment. As a general rule makers are not quoting for 1942.

Wire

Wire Prices, Page 107

Somewhat to the relief of most producers, forward orders for wire products are irregular and slower. Nevertheless, volume of tonnage offered mills is in excess of bookings, orders being turned down by some, notably those unwilling at this time to take orders for shipment beyond the end of this year. On an increasingly small number of products are such shipments now possible. Releases by the automobile industry are maintained at a high rate. Producers of rods in numerous cases are out of the market and non-integrated mills have difficulty in securing a range for full schedules. Export business is also being refused by other mills.

Certain farm steel items are among the few which still can be sold for 1941 delivery, such as fencing, plain and woven; nails and plain wire. Wire rope can still command a prompt delivery.

Plates

Plate Prices, Page 106

The sold out condition of plate mills and realization that little material will be available for non-defense purposes during the next three to six months tends to curtail various types of fabricated work involving this form of steel. Deliveries appear likely to become more extended because of rearmament work.

Delays are being reported from all sections of the country on bridges, building construction and other civilian projects. Efforts are being made to have road and bridge building placed on priority on the ground of its value to military transport.

Shipyard construction on the Atlantic seaboard is being pushed but several months will be needed before ship construction is fully under way. The machine shop of the Cramp Shipbuilding Co. at Philadelphia was slightly damaged Thursday by a lumber yard fire adjacent to the plant but this will not interfere with construction of six 10,000-ton cruisers, the keel for the first of which will be laid this summer.

Barge fabricators in the Pittsburgh district have been in fairly good position because of large inventories built up in anticipation of the present shortage but most of these stocks have been depleted and operations are being hampered by present delay in shipments.

Boiler and other fabricating shops generally are getting sufficient tonnage to support operations but inventories are low as a rule and no reserve can be accumulated.

Orders were placed last week for 3000 tons of plates, shapes and bars for construction of eight mine sweepers by the American Shipbuilding Co., Cleveland.

That plate mills generally are meeting heavy demand for ship construction with satisfactory deliveries is indicated by the experience of the South Portland, Me., yard, an emergency unit recently organized. Before shipways are completed, plates estimated at 25,000 tons have been delivered for preliminary fabrication by machine welding. Fabrication is approaching 500 tons per day of assemblies to be completed on the ways. Schedules for keels and launching are being expedited at a rate rivaling speed of World war days.

Makers of floor plates are able to deliver in five weeks or slightly less, although schedules are lengthening under heavy demand.

PLATE CONTRACTS PENDING

400 tons, two 55,000-barrel tanks, fuel oil storage, navy yard, Charleston, S. C.; bids May 27, to public works officer, yard.

Unstated, gasoline and fueling storage systems, Portland-Columbia airport, Pendleton, Oreg., and Boise, Idaho, airports; bids to United States engineer, Portland, May 23 and May 27, respectively.

Pipe

Pipe Prices, Page 107

Merchant steel pipe, black and galvanized, the former in ample supply with fairly prompt delivery until recently, is tightening and mills in some instances are beginning to turn away inquiries or allocate tonnage. This situation to a great degree is a result of short supply of steel to pipe mills. Most makers are covering regular customers but refusing new accounts. In spite of this situation pipe deliveries are better than the average of steel products. Some mills can promise July delivery and occasionally a better delivery can be found. A Youngstown, O., maker is in especially good position.

A Cleveland mill finds May sales 15 per cent greater than in the corresponding April period. Part of this is due to demand from aircraft motor builders and new cantonments and defense buildings are off engineers' boards and reaching the bidding stage.

Line pipe inquiry is stimulated by diversion of oil tankers from coastwise trade to trans-Atlantic. One such inquiry involves several thousand tons for a 14-inch line from Texas to Atlantic ports. The company issuing this inquiry is said to have lost 35 tankers by diversion.

Alloy tubing is moving on a priority basis, the aircraft industry being a leading consumer and getting preference.

Defense requirements have bolstered cast pipe sales in the face of lower municipal demand and releases and specifications against blanket contracts are more numerous, though in small lots. Southern cast pipe foundries are operating at five days a week, with orders about equal to production, largely for smaller sizes.

Because of necessity for conserving tanker tonnage, the Standard Oil Co. of New Jersey contemplates the construction of more than 200 miles of pipe line from Portland, Me., to Montreal, Que. The pipe may be either 10 or 12 inches in diameter.

CAST PIPE PLACED

1100 tons, 3 to 16-inch water mains for projects at Fort Lewis, Wash., 800 tons to Pacific States Cast Iron Pipe Co., Provo, Utah, and 300 tons, to American Cast Iron Pipe Co., Birmingham, Ala.

CAST PIPE PENDING

260 tons, 6 to 12-inch and fittings, Umatilla ordnance depot, Hermiston, Oreg.; bids in to J. A. Terteling & Sons, contractors.

200 tons, 3 to 12-inch, Shelton, Wash.;

Valley Construction Co., Seattle, contractor.

Unstated, 6 and 12-inch, for local districts 5078 and 5174, Tacoma, Wash.; bids in.

Rails, Cars

Track Material Prices, Page 107

Steel supplies, principally plates, needed by freight car builders to complete orders now on books and to cover programs in the making will run to heavy totals and without better priority delivery will be difficult. Railroads plan purchase of an unusual number of cars to meet expanding demands for transportation.

CAR ORDERS PLACED

Baltimore & Ohio, 27 seventy-ton gondolas, to Bethlehem Steel Co., Bethlehem, Pa.

Chicago & North Western, 500 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago; in addition to 500 previously reported to American Car & Foundry Co., New York.

Kansas City Southern, 50 fifty-ton automobile cars to Pullman-Standard Car Mfg. Co., Chicago.

Lehigh & New England, 15 seventy-ton bulk cement cars, to American Car & Foundry Co., New York.

Louisiana & Arkansas, 200 fifty-ton box cars and 75 seventy-ton hoppers, to Pullman-Standard Car Mfg. Co., Chicago.

Minneapolis, St. Paul & Sault Ste. Marie, 250 fifty-ton box cars and Wisconsin Central 150, to Pullman-Standard Car Mfg. Co., Chicago.

Missouri Pacific, 100 fifty-ton steel auto parts cars, to American Car & Foundry Co., New York.

New York Central, 100 well cars, to Despatch Shops Inc., East Rochester, N. Y.

New York Central, 3000 fifty-ton steel box cars, to Despatch Shops Inc., East Rochester, N. Y. These are in addition to 1000 box and 1000 gondolas recently awarded these shops.

Philadelphia Transportation Co., 90 trolley cars, to St. Louis Car Co.

South African Railways & Harbors, 1000 high side gondolas; reported placed with Canadian Car & Foundry Co., Montreal.

Southern, 2500 fifty-ton box cars to Mount Vernon Car Mfg. Co., Mount Vernon, Ill.; 1500 fifty-ton box cars to Pullman-Standard Car Mfg. Co., Bessemer, Ala., shops; 25 seventy-foot baggage-express cars, to St. Louis Car Co., St. Louis; 1500 box cars, 500 flats, 400 auto cars and 100 gondolas, all to Mt. Vernon Car Co.

CAR ORDERS PENDING

Detroit, Toledo & Ironton, 50 hoppers; bids asked.

Lehigh Valley, 1010 freight cars; bids asked soon.

Lehigh-New England, 200 to 400 hopper cars.

RAIL ORDERS PENDING

Missouri Pacific, 57,600 tons; court approval granted.

LOCOMOTIVES PLACED

Reading, two 1000-horsepower and two 600-horsepower diesel-electric locomotives to Electro Motive Corp., La-Grange, Ill.; two 600-horsepower to American Locomotive Co., New York; four 400-horsepower to Baldwin Locomotive Co., Philadelphia.

LOCOMOTIVES PENDING

Alabama Tennesse & Northern, one 300-horsepower diesel-electric locomotive; court approval granted.

Western Pacific, three 5400-horsepower diesel-electric locomotives; contemplated, with company to apply for court permission.

BUSES BOOKED

A.c.f. Motors Co., New York: Eleven 36-passenger for Harrisburg Railways Co., Harrisburg, Pa.; ten 36-passenger for San Diego Electric Railway Co., San Diego, Calif.; ten 39-passenger for A. B. & W. Transit Co., Alexandria, Va.; nine 33-passenger for Southeastern Greyhound Lines, Lexington, Ky.; four 33-passenger for Interurban Transportation Co. Inc., Alexandria, La.; three 33-passenger for Bowen Motor Coaches, Fort Worth, Tex.; three 34-passenger and one 28-passenger for Valley Transportation Co., LeMoyne, Pa.; three 31-passenger for Chicago, North Shore & Milwaukee railroad, Chicago; two 31-passenger for San Francisco Municipal Railway, San Francisco.

Structural Shapes

Structural Shape Prices, Page 106

Deliveries are about holding their own, five or six months for fabricated, and ten to twelve weeks for plain material. Many contracts are for further plant expansion. Navy work is still substantial part of the total. An award of more than passing interest, since it may denote a new trend, is of 2500 tons of light shapes for bomb shelters to be erected in the East.

Boston reports that open bids on fabricated material frequently reveal a spread in quotations of as much as $15 per ton, fabricated and erected. Highway programs, involving bridges, are getting under

way in several states, being the most conspicuous form of peacetime projects.

SHAPE CONTRACTS PLACED

26,000 tons, aircraft assembly plant, Consolidated Aircraft Corp., Tulsa, Okla., to Midland Structural Steel Co., Chicago; bids April 25, to be divided among several fabricators.

1520 tons, public school No. 120, New York, Harris Structural Steel Co., New York, through Depot Construction Co., New York.

900 tons, buildings, naval base, Newfoundland, divided between Harris Structural Steel Co., New York, and Belmont Iron Works, Philadelphia, bulk to the former through George H. Fuller Co. and Merritt-Chapman & Scott, New York, joint contractors.

800 tons, sheet piling, Oaklandon reservoir, Indianapolis, for city, to Carnegie-Illinois Steel Corp., Chicago; Smith & Johnson, Indianapolis, contractor; bids March 31.

775 tons, sheds, general army depot, Columbus, O., to Mt. Vernon Bridge Co., Mt. Vernon, O.

580 tons, pier, ordnance depot, Pedricktown, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

575 tons, sheet piling, flood control section 1, Elmira, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; Binghamton Construction Co., Binghamton, N. Y., contractor.

525 tons, building, Hygrade Sylvania Corp., Salem, Mass., to Harris Structural Steel Co., New York, through Austin Co., New York.

500 tons, state bridge RC-41-3, Lakewood, N. Y., to American Bridge Co., Pittsburgh.

500 tons, hangar, LaGuardia field, New York, to Harris Structural Steel Co., New York, direct to Department of Docks.

450 tons, building, Philadelphia Savings Fund, to Phoenix Bridge Co., Phoenixville, Pa.

440 tons, grade separation, Six-Mile road, Highland Park and Detroit, Mich., Wayne county road commissioners, to American Bridge Co., Pittsburgh.

400 tons, weaving mill, Collins & Aikman, Providence, R. I., to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., Boston, contractor.

350 tons, bridge 979.58, Weber river, Wyoming division, Union Pacific railroad, to American Bridge Co., Pittsburgh.

325 tons, bridges 28.11, 30.27, 32.31, Opal and Folger, Idaho, Union Pacific railroad, to American Bridge Co., Pittsburgh.

300 tons, machine shop, Park Drop Forge Co., Cleveland, to American Bridge Co., Pittsburgh.

290 tons, air corps hangar, U. S. engineer, Baltimore, divided, Bethlehem Fabricators, Inc., Bethlehem, Pa., and American Bridge Co., Pittsburgh; George H. Evans & Co., Philadelphia, contractor.

280 tons, army hangar, Fort Lewis, Wash., to Paxton-Vierling Iron Works, Omaha, Neb.; Sound Construction & Engineering Co., Seattle, contractor.

250 tons, bridges 1.61 and 5.33, Donovan and Moxa, Idaho, Union Pacific railroad, to American Bridge Co., Pittsburgh.

200 tons, building, National Motor Bearing Co., Van Wert, O., to International Steel & Iron Co., Evansville, Ind.

200 tons, steel piling, generating plant, Public Service Co. of Northern Illinois, Waukegan, Ill., to Inland Steel Co., Chicago.

200 tons, conversion tunnel supports, Delaware Aqueduct, Valhalla, N. Y., to American Bridge Co., Pittsburgh, contract 306, Board of Water Supply, New York; George M. Brewster & Son, Bogota, N. J., contractor.

175 tons, machine shop addition, Ingersoll-Rand Co., Athens, Pa., to American Bridge Co., Pittsburgh.

160 tons, addition to machine and electric shop building 431, Bremerton, Wash., for navy, to American Bridge Co., Pittsburgh.

150 tons, Winslow S. E. station, Superior Water, Light & Power Co., Superior, Wis., to American Bridge Co., Pittsburgh.

145 tons, bridge 3 over Pleasant run, Indianapolis, Ind., for Indianapolis Union railway, to American Bridge Co., Pittsburgh.

125 tons, building, Acme Rubber Co., Trenton, N. J., to American Bridge Co., Pittsburgh.

115 tons, state bridge, Malad river, FAP-205-B (2), Garland, Utah, to American Bridge Co., Pittsburgh.

112 tons, state highway bridges 470-F, Tempieau county, and 6310, Pepin county, Minnesota, to Hobbs Supply Co., Wisconsin.

100 tons, bridge, Columbus, O., for Franklin county, to J. T. Edwards, Columbus fabricator.

SHAPE CONTRACTS PENDING

5000 tons, tremie wall and bottom forms, dry dock 5, Philadelphia, for navy.

4000 tons, Atlantic avenue improvement, contract 7, Brooklyn, N. Y., for Long Island railroad.

925 tons, miscellaneous buildings, naval base, Newfoundland; George A. Fuller Co. and Merritt-Chapman & Scott, New York, joint contractors.

800 tons, extension, diesel locomotive shop, American Locomotive Co., Schenectady, N. Y.

775 tons, building No. 18 extension, General Electric Co., Erie, Pa.

700 tons, building, Plasken Co. Inc., Danbury, Conn.

652 tons, 938-foot Bureau of Roads bridge, Lincoln county, Montana; McNutt Bros., Eugene, Oreg., contractor.

625 tons, viaduct, Wawarme and Van Dyke avenues, New York, New Haven & Hartford railroad, Hartford, Conn., for state.

540 tons, bridge, Richland county, Ohio, for state.

525 tons, manufacturing building, Hygrade Sylvania Corp., Danvers, Mass.

460 tons, state bridge, Big Horn river, FAP-1880-A, Hardin, Mont.

450 tons, state bridge 59-A, Lake Forest, Ill., American Bridge Co., Pittsburgh, low; bids May 9.

440 tons, trash racks, specification 1510-D, Friant dam, California, for Bureau of Reclamation.

423 tons, three steel truss spans, Big Horn River, Hardin, Mont.; bids opened.

420 tons, factory building, Munitions Mfg. Co., Poughkeepsie, N. Y.

400 tons, state bridge, Baltimore & Ohio railroad, Richland county, Ohio.

340 tons, Hartford by-pass, Wethersfield, Conn., for state.

325 tons, piers, submarine base, Key West, Fla., for navy.

324 tons, miscellaneous plain material for repairs, department of public works, city of Chicago; bids May 22, readvertised from March 26.

300 tons, hangars and barracks, Pine Camp, Great Bend, N. Y.; John W. Cowper Co. Inc., Buffalo, contractor.

280 tons, battery storehouse, Philadelphia, for navy.

270 tons, foundry buildings, American Car & Foundry Co., Huntington, W. Va.

260 tons, power house, Monsanto Chemical Co., Springfield, Mass.

255 tons, plate girder bridge, Centre county, Pennsylvania; bids to state highway department, Harrisburg, Pa., May 23.

240 tons, state bridge FAP-227-D, Colorado Springs-Pueblo, Colo.

240 tons, steel walls for tunnels, Cresta and Pulga, Calif., Pacific Gas & Electric Co., San Francisco; work held up by Federal Power Commission.

232 tons, earthfilled dam, San Gabriel River near Azusa, Calif.; bids June 9, U. S. engineer, Los Angeles.

175 tons, building, Sperry-Gyroscope Co., Brooklyn, N. Y.

160 tons, state bridge RC-41-14, Ft. Covington, N. Y.

150 tons, powerhouse, Philadelphia navy yard, Philadelphia.

150 tons, state bridge 30, FAS-160-A (1), Green Bay, Wis.

150 tons, bridge, Northbridge, Mass.; bids May 27, department of public works, Boston 500 tons, state highway bridges, New York, bids May 28, Albany.

140 tons, crane runway, Cincinnati Milling Machine Co., Cincinnati.

135 tons, bridge, Illinois Central System, Coldwater, Miss.

130 tons, state bridge, Blackfoot river, FAP-237-F-1, Greenough, Mont.

128 tons, two 327-foot cutters for navy, Seattle; Birchfield Boiler Works, Tacoma, Wash., low.

125 tons, state bridge RC-41-8, Marcy, N. Y.

125 tons, bridge, Blue Ridge Parkway, Rockbridge, Va.; bids May 22, Federal Works Agency, Washington.

120 tons, state bridge, route FA-31, section 59-SF, Warrenhurst, Ill.

116 tons, Big Blackfoot River bridge, Missoula county, Montana, for state; bids opened.

110 tons, boiler house, hospital, St. Louis, for government.

108 tons, state bridge, route FA-31, section 59-SF, Warrenhurst, Ill.; bids May 9.

105 tons, department store building, Forman Stores, Rochester, N. Y.

100 tons, canopies and tank tower, Philadelphia, for government.

100 tons, South Horicon bridge, Riverside, N. Y., for Warren county.

100 tons, power house addition, armory, Springfield, Mass.

100 tons, shapes and bars, wide flanged beam bridge, route 108, Vermont; bids May 23, Montpelier.

Unstated, ten 135-foot broadcast towers and three antenna masts, for C. A. A. stations Big Delta and Boundary, Alaska; bids to Washington, D. C., May 27.

SHAPE AWARDS COMPARED

	Tons
Week ended May 17	37,442
Week ended May 10	29,710
Week ended May 3	49,393
This week, 1940	22,911
Weekly average, 1941	33,899
Weekly average, 1940	28,414
Weekly average, April 1941	28,441
Total to date, 1940	354,967
Total to date, 1941	677,978

Includes awards of 100 tons or more.

Tin Plate

Tin Plate Prices, Page 106

Carnegie-Illinois Steel Corp., Pittsburgh, May 13 announced reaffirmation of its present price on coke

tin plate of $5 per base box, Pittsburgh or Gary, Ind., for shipment to and including Sept. 31, 1941, for delivery and consumption in the United States. Transportation charges at time of shipment will determine the delivered price during this period.

Reinforcing Bars

Reinforcing Bar Prices, Page 107

Usual spring demands for highway construction are superimposed on defense projects. In the Boston-Providence district new work in sight for various projects is easily 10,000 tons, including 2500 tons for three housing projects. Many suppliers are refusing non-defense jobs, finding sufficient outlet in defense work.

Pittsburgh notes that there is concerted action on the part of jobbers to get relief on the spread between mill price to jobber and price to ultimate consumer. Now standing at $5, jobbers feel increasing costs warrant greater leeway. However, mill prices are firmly established, so the only available way out would be a higher price to consumers, which might be difficult to justify. In addition, there is no intent on the part of mills to increase prices on jobs sold direct to consumers, so it is only in the relatively rare cases where mills do not bid direct that jobbers dare increase the top price. This has been done in a few scattered instances, all small jobs not attractive to mills.

Boston reports that while prices are firmer than usual, sellers in a few cases who took orders at shaded quotations in the recent past, found it difficult to get bars at a price which allowed a profit. Nearby stocks are low, but in most instances sufficient to meet small-lot demand.

Deliveries of mesh are much better than for bars, at around five weeks. Demand has improved materially. Mesh prices are firmer as a result of freezing of steel prices. Export demand is strong, notably for defense bases. Export shipments, most of which are wanted promptly, are heavier, especially for Newfoundland.

REINFORCING STEEL AWARDS

2000 tons, shipyards, New Orleans, to Laclede Steel Co., St. Louis; R. P. Farnsworth & Co., New Orleans, contractor.

1100 tons, brass plant, Bridgeport Brass Co., Indianapolis, 800 tons to Truscon Steel Co., Youngstown, O., and 300 tons to Hugh J. Baker Co., Indianapolis; Stone & Webster Co., Boston, engineer.

900 tons, two pumping stations, Huntington, W. Va., U. S. engineer, to West Virginia Rail Co.

900 tons, superstructure, airplane engine parts plant, Studebaker Corp., South Bend, Ind., 800 tons to Jones & Laughlin Steel Corp., Pittsburgh, and 100 tons to Olney J. Dean Steel Co., Cicero, Ill.; Consolidated Construction Co., Chicago, contractor, bids April 2. This is in addition to 266 tons to Ceco Steel Products Corp., Chicago, reported in STEEL, May 5; 726 tons still to be awarded.

880 tons, Valencia housing project, San Francisco, to Bethlehem Steel Co., San Francisco.

600 tons, blast furnace, Ashland, Ky., American Rolling Mill Co., to Pollak Steel Co., Cincinnati, through Arthur G. McKee, Cleveland.

550 tons, warehouse, Sears-Roebuck & Co., Somerville, Mass., to Truscon Steel Co., Youngstown, O.

500 tons, office building, Newark, N. J., to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., New York, contractor.

315 tons, airport, Madison, Ind., to Laclede Steel Co., St. Louis; Connor & Simmons, contractor.

300 tons, Buick dyanamometer and test building, Chicago, to Calumet Steel Co.; Thorgerson & Erickson, contractors.

300 tons, shop, Brooklyn navy yard, to Joseph T. Ryerson & Son Inc., Chicago, through Thompson Starrett Co., New York.

278 tons, square twisted bars, tunnel, Board of Water Supply, New York, at Valhalla, N. Y. to Bethlehem Steel Co., Bethlehem, Pa., through George M. Brewster & Son Co. Bogota, N. J.

CONCRETE BARS COMPARED

	Tons
Week ended May 17	15,532
Week ended May 10	8,965
Week ended May 3	5,534
This week, 1940	10,647
Weekly average, 1941	12,054
Weekly average, 1940	9,661
Weekly average, April, 1941	18,030
Total to date, 1940	163,854
Total to date, 1941	241,087

Includes awards of 100 tons or more.

268 tons, bridge 5875, Minnesota State highway commission, to Ceco Steel Products Corp., Omaha, Neb.; Feller Bros., contractor; bids April 18.

260 tons, arsenal shop buildings, Rock Island, Ill., to Inland Steel Co., Chicago; Preister Construction Co., contractor.

250 tons, grade crossing eliminations, Herkimer, N. Y., to Truscon Steel Co., Youngstown, O.; Lane Construction Co., Meriden, Conn., contractor, $1,401,-319.25.

210 tons, store building, W. T. Grant Co., Portland, Me., to Truscon Steel Co., Youngstown, O.

208 tons, Oaklandon reservoir, Indianapolis, for city, to Hugh J. Baker Co., Indianapolis, Smith & Johnson, Indianapolis, contractor; bids March 31.

186 tons, Bureau of Reclamation, inv. 49,213-A, Concord, Calif., to Columbia Steel Co., San Francisco.

175 tons, two additional warehouses, Jeffersonville, Ind., for government, to Ceco Steel Products Corp., Chicago; Pearson Construction Co., Benton Harbor, Mich., contractor; bids May 6.

150 tons, mesh, highway proj. RC-41-4, Erie and Genessee counties, New York, to Bethlehem Steel Co., Bethlehem, Pa., through Potter Dewitt Corp., Pavilion, N. Y.

135 tons, Bonneville project, Covington substation, to Seattle Steel Co., Seattle; C. F. Davidson, Tacoma, contractor.

110 tons, shop building, navy yard, South Boston, Mass., to Concrete Steel Co., Boston.

108 tons, bridge 5955, Minnesota state highway commission, to Cowin Co., St. Paul; Pederson Bros., contractor.

102 tons, state highway contract 2154, Huntington, Ind., to Bethlehem Steel Co., Bethlehem, Pa.; Grace Construction Co., Ft. Wayne, Ind., contractor.

REINFORCING STEEL PENDING

2500 tons, drydock, navy yard, Brooklyn.

2000 tons, Yorktown mine depot, Norfolk, Va.

2000 tons, tunnels, Pulga and Cresta, Calif., Pacific Gas & Electric Co., San Francisco; project held up by Federal Power Commission.

1800 tons, Cramp shipways; Turner Construction Co., New York, contractor.

1700 tons, extensions and alterations, West-Southwest sewage treatment works, division J, Stickney, Ill., for city of Chicago; bids May 22.

1300 tons, bridge, York river, Yorktown, Va.

1200 tons, sewage treatment works, division J, Stickney, Ill.; bids May 22.

1200 tons, grade elimination, Long Island railroad, Brooklyn, N. Y.; bids May 20.

1200 tons, housing project, Roxbury district, Boston; M. S. Kelliher Co., Boston, low.

850 tons, flood wall, sec. B, unit 2, Paducah, Ky.

805 tons, Bureau of Reclamation, inv. A-44,318-A, delivery to Earp, Calif.; bids opened.

700 tons, veterans' hospital, Baltimore.

575 tons, housing project, Providence, R. I.; Patsy-Fuhrman Co., New York, low.

440 tons, Bureau of Reclamation, inv. 44,826-A, for delivery to Friant, Calif.; bids May 20.

396 tons, laboratories, Searl & Co., Skokie, Ill.; bids May 16.

361 tons, Ohio state projects as follows: 114 tons, proj. 31, Scioto county; 120 tons, proj. 32, Wayne county; proj. 33, Wood county; bids May 16.

350 tons, viaduct and bridges, Hartford, Conn.

350 tons, jail, Fresno, Calif.; L. H. Hanson & Son, Fresno low.

300 tons, housing project, Quincy, Ill., for government; bids May 26.

300 tons, building, Cleveland Graphite Bronze Co., Cleveland.

280 tons, naval base, fuel pier, Norfolk, Va.

210 tons, wire mesh, U. S. engineer office, Los Angeles, delivery to Hill Field, Utah; bids opened.

200 tons, sewage disposal plant No. 5, Cheektowaga, N. Y., C. E. Knowles, Gowanda, N. Y., contractor.

158 tons, highway work, Whitman, Adams, Ferry and Pierce counties, Wash., for state; bids opened.

150 tons, bridge, navy yard, Portsmouth, N. H.; bids in May 14.

132 tons, over-crossing, Multnomah county, Oregon, for state; bids May 22.

126 tons, Bureau of Roads bridge, Libby, Mont.; McNutt Bros., Eugene, Oreg., contractor.

114 tons, concrete bars and channel steel, U. S. engineer, Portland, and Puget Sound navy yard; Bethlehem Steel and Columbia Steel, low.

110 tons, dike, East Hartford, Conn.

107 tons, Bureau of Reclamation, inv. 33,507-A, delivery to Granger, Wash.; bids opened.

100 tons, two concrete storage reservoirs, Fort Lewis, Wash.; Valley Construction Co., Seattle, low.

Unstated, approaches Hawthorne state bridge, Portland, Oreg.; Lindstrom Bros., Portland, low.

Unstated, 90-foot viaduct, Washington county, Oregon, J. F. Johnston, New-

berg, low; overcrossing at Eugene, E. C. Hall Co., Eugene, low; both Oregon state projects.

Scrap

Scrap Prices, Page 110

Following strenuous effort on the part of dealers to make delivery on contracts entered into before April 3 at prices above the ceiling then announced, dealers spent last week studying the new price announcement of OPACS, effective May 7. By far the greater part of tonnages under contract were shipped before the May 10 deadline but some were carried over and cancellations resulted.

The amended price ceiling announcement cleared up many difficulties arising from application of the first schedule but has developed others which the trade is seeking to unravel. As a result there is a pause in trading until full understanding can be reached. Principal trouble seems to be disruption of former channels feeding scrap to certain districts, diverting usual supplies to other centers where a higher price can be obtained. This is expected to result in shortages. Another difficulty is experienced in setting prices on grades not specifically mentioned in the schedule, under the rule that usual differentials relative to quoted grades be applied. It will require time to develop these relationships.

Collection of scrap in outlying districts apparently is being interfered with by the low level of prices, which are said to make returns unremunerative.

Considerable doubt is apparent among sellers and buyers regarding adequacy of scrap supply at present fixed quotations. It is believed the next 60 days will demonstrate whether some additional measures may be necessary to bring out all the scrap required by heavy steelmaking rate.

Consumption is at a high rate but supplies of steelmaking grades have been augmented by recent shipments under old contracts, so that melters have ample supply for all needs. In cast grades the situation is less secure and foundries find supplies far from comfortable, occasional cases of interference with castings production being noted.

Some buying is being done at the new ceiling prices but for most part tonnages are small and no real movement is under way. Railroad offerings are light, the carriers apparently seeking fuller understanding of the new regulations before marketing their accumulations freely.

New England melters find the new regulations retard movement of scrap to outside points and assist them in obtaining supplies. Barge movement is restricted by maintaining brokers' buying price on a basis of f.o.b. cars for water shipments.

Two steelmakers in the Buffalo district have closed for 20,000 and 15,000 tons of steelmaking grades during the past week, at the government ceiling price. Further buying in that area is forecast. Heavy tonnages are arriving by lake, aiding in meeting needs of consumers.

Although confusion still reigns in the scrap market at Pittsburgh, some business is being done under the new rules. Particularly active are smaller mills and foundries in outlying towns, heretofore stymied by the old rules and slowly being starved because of unfavorable freight differentials. Under the new plan, these plants are allowed up to $1 differential and are taking advantage of it. Allowance of split commissions has tightened the hold of buying monopolies held by certain brokers on Pittsburgh mills. During the interim period there had been reports of some sales to these mills by brokers other than those holding the monopoly rights, but apparently all brokers will again have to sell through these factors, splitting the commissions.

Pig Iron

Pig Iron Prices, Page 108

Pig iron production, not yet fully recovered from effects of the coal strike, is in poor position to meet a second interruption in coke supply should miners stage another walkout. More stacks would be involved than in the previous case as coke supply is smaller, stocks being cut

into deeply to maintain production of iron.

Merchant iron output is increasing, and although shipments from stock are smaller, increased furnace production may supply current demand. Foundry demand is larger than supply and probably not all melters can be satisfied. Part of present demand is believed to be for stock and some represents duplicate buying, which the buyer does not expect to be met.

Some consumers are seeking with little success to obtain increased shipments before inventory control is effective, June 10. This is especially true in the effort to build stocks of some special analyses. Foundry inventories differ widely but many are operating hand-to-mouth, though they are receiving sufficient to maintain production. Small lot shipments are increasing in the effort to spread the tonnage as widely as possible.

Southern Ohio foundries are feeling the pinch as they are dependent almost entirely on iron from outside the district. Shipments are adequate to current needs but no inventory can be accumulated and future needs can not be covered.

In the Buffalo area Wickwire Spencer Steel Co. has blown in a second blast furnace, which had been idle since 1929. Part of this output will be taken by Republic Steel Corp., which is understood to have borne part of the cost of rehabilitation. Bethlehem Steel Co. is considering erection of a sixth stack at its Lackawanna plant. Only two furnaces in this district are idle, both being under repair. In the Birmingham, Ala., district all 18 furnaces are blowing but some interruption for relining seems imminent.

Lake Superior charcoal iron producers have advanced prices $1 per ton, to $28, furnace, and $31.34, delivered, Chicago. This is the first advance in this grade for some time, the price remaining unchanged at the time coke iron moved up $1 recently.

Some sellers are accepting orders for delivery over the remainder of the year but do not name definite prices. In most cases orders are being accepted only from regular customers but in occasional instances tonnage has been booked at premium prices from consumers unable to obtain sufficient supplies from nearby producing points.

Pacific Coast

San Francisco—Awards were not heavy but pending business in shapes, plates and reinforcing bars exceed 68,000 tons, 75,000 tons and 12,000 respectively. Most structural and plate requirements are expected to be placed through producers' New York offices.

Shape awards aggregated only 718 tons and brought the total to date to 167,560 tons, compared with 70,077 tons for the corresponding period in 1941.

Plate bookings were confined to lots of less than 100 tons and no new inquiries of size developed. To date this year 211,051 tons have been placed, compared with only 24,786 tons for the same period a year ago.

Although demand for cast iron pipe from stock remains exceptionally strong distributors find it difficult to maintain a well rounded supply. The only award of size involved 507 tons for a water system at Las Vegas, Nev. Bids have just been opened by the contractors of an ordnance plant at Hermiston, Oreg., on 209 tons of 6 to 12-inch pipe. All other inquiries are limited to lots of less than 100 tons. Awards aggregated 966 tons and brought the year's total to 22,046 tons as compared with 13,713 tons for the corresponding period in 1940.

Reinforcing bar awards included 880 tons for the Valencia housing project, San Francisco, placed with Bethlehem Steel Co. and 186 tons for the bureau of reclamation for delivery at Concord, Calif., booked by Columbia Steel Co. Awards totaled 948 tons and brought the aggregate for the year to 42,790 tons, compared with 56,382 tons for the same period last year.

Seattle — Jobbing houses have eliminated the 10,000-pound and over bracket, which leaves only two brackets, under 300 pounds and over 300 pounds. This action was taken to compensate for increasing costs due to scarcity of intercoastal water

space and the necessity of shipping considerable tonnage by rail at higher freights. Deliveries from Atlantic centers run about 60 days now, compared with 30 to 45 days before the emergency, restricted transportation resulting in congestion at eastern terminals. Wholesale stocks are considerably depleted. A few customers have bought in advance of needs, worried over the situation. Some stock items are short and jobbers are making every effort to meet the situation. Volume of sales continues heavy and steady.

Steel scrap dealers report the ceiling of $13.50 and $14.50 for No. 2 and No. 1 melting, fixed by the government, is too low to attract material from the interior. Consequently receipts are smaller, while demand from rolling mills remains unabated. This situation is also affecting cast iron scrap, which is increasingly scarce. Foundries are buying cast iron as quickly as available, prices ranging from $17 to $18.50.

Plates are arriving in heavy tonnages for navy and ship construction but no large pipe line projects are up for figures. Shops are busy with small lots, many having ship construction subcontracts, for boilers, tanks and smokestacks, reporting a fair backlog and three to four months and increasing delays in delivery of materials.

Cast iron pipe inquiries have increased but local agencies in some cases are unable to bid because deliveries are too far forward or too uncertain. Concrete bars continue to be placed in less than 100-ton lots, defense projects calling for immediate delivery.

Canada

Toronto, Ont.—No slackening in orders of a widely diversified nature is manifest but new buying is developing on a much broader scale in a few specialties, and producers are forced to turn down orders on some materials in which delivery is required before the end of the year. In many lines demand is well in excess of production, resulting in piling up of backlogs that will take many months to clear.

With Canadian shipbuilders entering upon a larger ship construction program orders for plate, sheets and other materials, boilers, and equipment, are pouring in. Most of the construction of new merchant ships will be done on the Pacific coast, but much of the steel will be provided by eastern Canada plants with the surplus buying going to the United States. Heavy demand for plates for tank construction and other war work also is reported. Plate output of Canadian plants for the remainder of this year is now under contract.

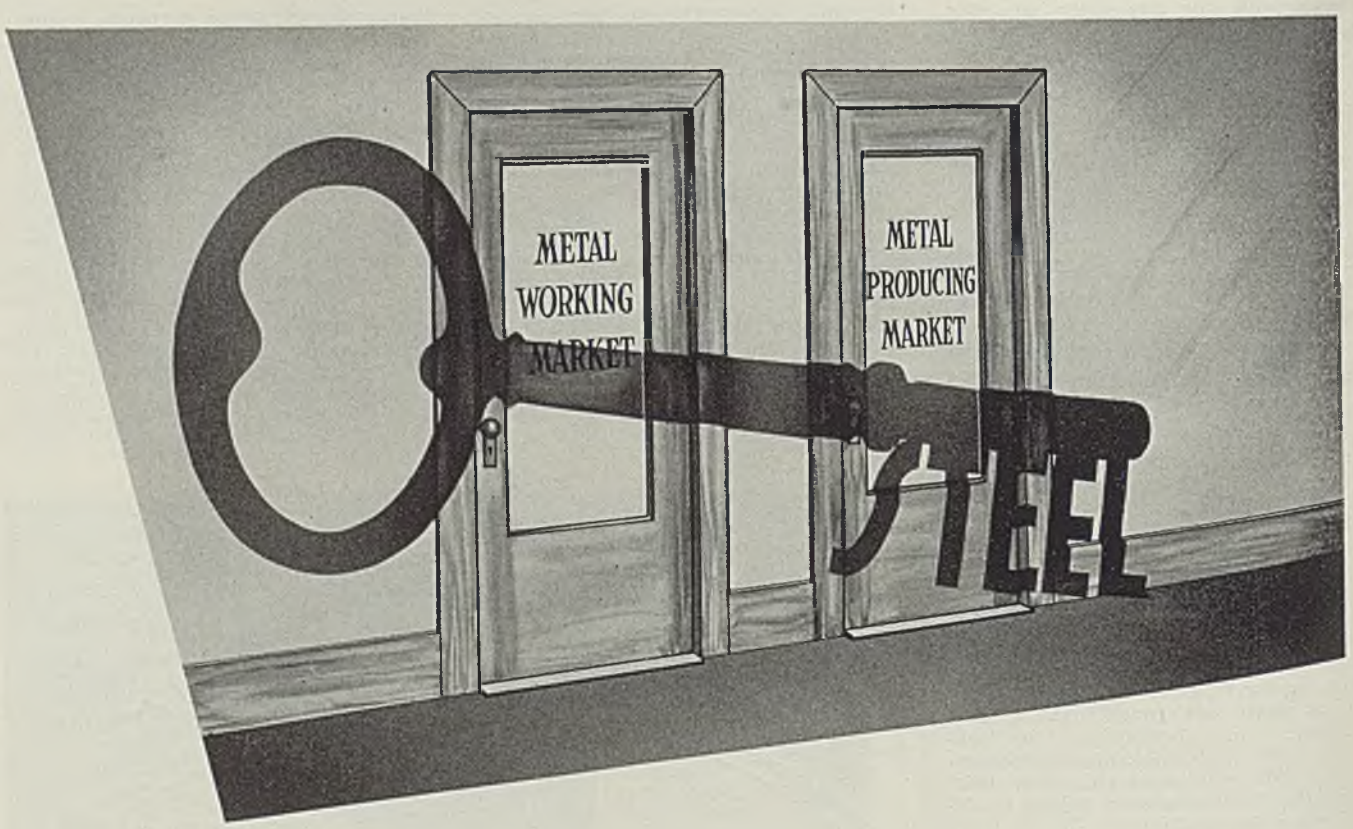
Despite the fact that most Canadian production of sheets has been booked to the end of the year with some delivery dates set into 1942, inquiries for sheets continue and some producers are turning down orders.

With war industry being steadily geared to higher production levels, demand for merchant bars is increasing and producers report record backlogs with no slackening in orders. Plants engaged in shell and munitions production are seeking larger deliveries.

While there was some minor slackening in structural steel awards during the week, a number of large contracts are pending, involving a total of more than 20,000 tons.

Sales and delivery of merchant pig iron are well sustained with some improvement in inquiries. Melters are talking their full allotment of foundry and malleable iron and some are seeking deliveries of larger tonnages than previously.

Business is moving steadily in the iron and steel scrap markets. Heavy demand is reported and despite the fact that dealers report increased offering both from urban and rural districts, supplies are not keeping pace with demand. Steel mills at Hamilton and Sault Ste. Marie are making more pressing demands on dealers and brokers for heavy melting steel and other steel grades, and also are said to be negotiating for deliveries of large tonnages from the United States. Canadian Institute of Secondary Materials has submitted new price list dealing with machinery cast and stove plate to the Canadian steel controller, and an announcement of a new range of prices is expected within a few days.



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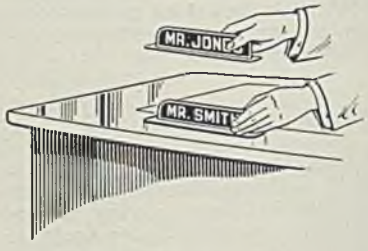

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Nonferrous Metal Prices

May	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
10	12.00	12.00	12.25	52.12½	51.75	5.85	5.70	7.25	17.00	14.00	35.00
12	12.00	12.00	12.25	52.12½	51.75	5.85	5.70	7.25	17.00	14.00	35.00
13	12.00	12.00	12.25	52.12½	51.62½	5.85	5.70	7.25	17.00	14.00	35.00
14	12.00	12.00	12.25	52.12½	51.62½	5.85	5.70	7.25	17.00	14.00	35.00
15	12.00	12.00	12.25	52.25	51.75	5.85	5.70	7.25	17.00	14.00	35.00
16	12.00	12.00	12.25	52.25	51.87½	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	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.73

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York	9.25
Cleveland	9.50-10.00
Chicago	9.00-9.25
St. Louis	9.00

Heavy Copper and Wire

New York, No. 1	10.25-10.37½
Cleveland, No. 1	10.00-10.50
Chicago, No. 1	10.00-10.25
St. Louis	10.00

Composition Brass Turnings

New York	9.00

Light Copper

New York	8.25-8.37½
Cleveland	8.00-8.50
Chicago	8.00-8.25
St. Louis	8.00

Light Brass

Cleveland	4.50-5.00
Chicago	6.25-6.50
St. Louis	5.00

Lead

New York	4.85-5.00
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

Nonferrous Metals

New York—Plans are being made for the United States, Great Britain and China to absorb the entire nonferrous metal production in the western hemisphere. The United States already has taken over the 500,000-ton Latin American copper output.

Copper—This country is consuming copper at the annual rate of 1,620,000 tons, about double what was considered normal in recent years and about 120,000 tons in excess of visible supplies. Refined stocks rose 7868 tons during April as refined output declined to 88,669 tons while deliveries eased to 123,580 tons to domestic consumers and increased to 49 tons to foreign consumers. Priority ruling on copper shipments is expected soon.

Lead—Total consumption is estimated at close to 70,000 tons a month, being supplied by both domestic and foreign metal. The chief problem facing the industry is the lack of shipping space for importing metal and rising ocean freight rates.

Zinc—Galvanized sheet output continues to taper as brass mills receive a higher priority rating. The supply situation remains extremely tight but stocks rose 239 tons during April to 7311 tons. Cerro de Pasco Copper Corp. plans to build an electrolytic smelter in Peru.

Tin—Navy department continues to buy large tonnages, having asked for bids on Wednesday for 250 long tons. This buying has taken a considerable amount of metal off the market and prices have advanced well above Metals Reserve Co.'s standing bid of 50.00c. Straits spot closed at 52.25c.

Aluminum—Richard S. Reynolds, president of the Reynolds Metals Co., testified before a senate committee last week that he expects to start his first plant this month and that it will produce aluminum at a price over 12.00c a pound.

DIED:

John C. Glass, Chicago district sales manager, Midvale Co., Nicetown, Philadelphia, in Chicago, May 8.

♦

Charles Bernhardt Jahnke, president and general manager, Cooper-Bessemer Corp., Mount Vernon, O., May 6. Associated with Cooper-Bessemer since 1935, he served successively as chief engineer, vice president and general manager, and in December, 1940, became president and general manager. He was a member, American Society of Mechanical Engineers and Society of Automotive Engineers. Prior affiliations included Fairbanks, Morse & Co., with which company he was associated 21 years, and International Harvester Co.

♦

George R. Munschauer, 61, president, Niagara Machine & Tool Works, Buffalo, April 24. He had been associated with the company 44 years and had served as president 23 years. Mr. Munschauer was also treasurer, Heinz & Munschauer, Buffalo, maker of electric refrigerators.

♦

Warren H. Walker, 61, vice president, Walker Mfg. Co., Racine, Wis., May 7, in Rochester, Minn.

♦

Rudolph J. Ketz, 56, the past three years treasurer, Pressure Castings Inc., Cleveland, in that city, April 11. He formerly was secretary, Gabriel Co., Cleveland.

♦

Arthur M. Nutt, 67, an engineer, metallurgist and executive of Aluminum Corp. of America, until his retirement a year ago, in Daytona Beach, Fla., May 9.

♦

Hugh J. McKenna, district manager, in Santa Monica, Calif., for International Harvester Co., Chicago, April 29, in Santa Monica.

♦

Victor Lee Emerson, 78, in Philadelphia, May 6. A mechanical and chemical engineer, Mr. Emerson held patents covering nearly 100 inventions, many in the automotive field.

♦

Louis T. Lott, associated with the sales department of Weirton Steel Co., Weirton, W. Va., 15 years, in New York, May 11. We was district manager of sales, Pittsburgh district, with offices in Weirton.

Paterson-Leitch Co., Cleveland, steel distributors, entertained 200 customers and friends at luncheon at its plant, May 10.

♦

Production of alloy steel billets and bars is slated to begin June 15

in the new electric furnace being installed at the Ambridge, Pa., plant of A. M. Byers Co., Pittsburgh. Work has been pushed, now six weeks ahead of schedule, due to heavy demand for alloy products for national defense.

Select Most Beautiful Bridges Built in 1940

Awards for the most beautiful steel bridges completed in 1940 were announced last week by the American Institute of Steel Construction. In the monumental size class, the Susquehanna river bridge between Havre de Grace and Perryville, Md., was awarded first place. Total cost was $4,085,000. It was engineered by the J. E. Greiner Co. and fabricated by Bethlehem Steel Co.

The Dunnings Creek bridge on the Pennsylvania Turnpike in Bedford township, Pennsylvania, was selected the most beautiful in the medium size class. Engineers were Parson, Klapp, Brinckerhoff & Douglas. American Bridge Co. was the fabricator.

Most beautiful small bridge was the Klamath River bridge at Orleans, Calif. It was engineered by C. H. Purcell, state highway engineer, and F. W. Panhorst, department of public works, California. Judson-Pacific Co. fabricated the span.

In the movable bridge class, the Oceanic bridge over Navesink river between Locust Point and Rumson, New Jersey, was awarded first place. Engineers were Howard Needles, Tammen & Bergendoff, Bethlehem Steel Co. was the fabricator.

Semifinished Steel

Semifinished Prices, Page 107

Nonintegrated mills are being notified of further reductions in semifinished steel shipments henceforth, due to increasing demand from Britain and from our own defense program. Ingots, slabs, billets and sheet bars are primarily affected, with deep cuts in tonnage placed with integrated producers.

Some smaller mills have been actively looking for new sources of supply, of any nature. One producer has reported several new inquiries for forged or rolled billets or slabs in any quantity, but virtually all capacity is already being pushed to the limit.

Wire rod production is still running heavily behind demand, particularly on alloy products. Nonintegrated cold drawing concerns report considerable difficulty in obtaining sufficient supplies to keep drawbenches running full.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 107

Bolt and nut makers are working

toward a price in effect at delivery basis. Some are applying this system to all tonnages they can not deliver within 30 days while others have notified customers such action may be taken soon. This policy is new in bolt and nut quotations and is regarded as foreshadowing a possible price advance because of increased costs. It also is a protection against possible advance in steel prices by the time deliveries are made on current contracts, which are being booked on the same basis.

Steel supply for bolt and nut production is becoming a problem and some business is being turned away because of inability to obtain stock in time to meet delivery demands. Efforts are being made to obtain better preference rating as the present situation is of little aid in establishing priority standing.

Coke Oven By-Products

Coke By-Product Prices, Page 107

Coke oven by-product suppliers are short, with demand heavy. Prices are firm and unchanged. Toluol and xylol are moving briskly, current production being absorbed directly into consuming channels, mostly against contracts, with little spot material available. Heavy consumers include the lacquer trade, with munitions accounting for considerable volume. The latter situation will prevail until new toluol plants get into production, the first in the early fall. Plastics take a large part of phenol production while chemical demand for naphthalene is strong, entering into more products. Seasonal demand for household naphthalene is larger than usual, due to the lack of imports.

Cold-Finished Steel

Cold Finished Prices, Page 107

Deliveries of cold-finished bars under six months are practically impossible in either alloy or carbon, for non-defense use. Part of this condition is due to tight supply of hot-rolled bars for cold finishers and to choke points in cold processing. In face of this condition, demand is increasing steadily, especially for use in defense work.

Steel in Europe

Foreign Steel Prices, Page 109

London—(*By Cable*)—Iron and steel requirements for war purposes in Great Britain are being met satisfactorily by intensive domestic production and increasing American shipments, including some finished products. The pig iron situation is satisfactory and inquiries from light foundries are expanding. Demand for heavy structurals is better. Sheet mills are operating almost entirely on war contracts. Tin plate export inquiry is large but much is being refused, owing to steel restrictions. The government has stopped the use of steel for certain luxury and semi-luxury consumption.

Iron Ore

Iron Ore Prices, Page 109

Ore boats in commission on the Great Lakes May 15 were 292, full number available, according to C. C. Lindeman, M. A. Hanna Co., Cleveland. Trip capacity stood at 2,688,040 gross tons, against 2,722,740 a year before. However tonnage in commission was superior to 2,464,540 a year before. A year ago ships in commission numbered 263, with the fleet engaged 88.26 per cent.

Metallurgical Coke

Coke Prices, Page 107

Resumption of coke production in beehive fields brought output last week to substantial proportions. Delay was encountered because many ovens were cold, requiring considerable time to warm up.

Demand for by-product foundry coke is heavy but shipments have been sufficient to meet demands, though no stocks are being accumulated. Coal reserves were utilized to bridge the period of the coal strike, when no coal was being received. Prices of by-product coke are being advanced generally.

A further interruption of coal

mining, now threatened, would find coal stocks depleted to an extent that would soon close by-product ovens in most areas.

Equipment

Seattle—Steady volume of sales is reported by all lines, automotive and electrical items probably in strongest demand although heavy construction machinery is moving well. Westinghouse is low to Bonneville project at $271,002 for furnishing 1200-kva transformers for Vancouver, Wash., station, and Corning Glass Works, Corning, N. Y., low at $120,000, for insulator units for Covington-Coulee line. Puget Sound navy yard opened tenders May 14 for electric distribution system, a $327,000 project. A. G. Rushlight Co., Portland, Oreg., has the award to install a 107-horsepower boiler and facilities for post laundry, Vancouver, Wash. Seattle Housing Authority has called bids May 29 for furnishing 890 electric ranges and meters for Yesler Terrace project.

CONSTRUCTION and ENTERPRISE

Ohio

CLEVELAND—Wean Engineering Co., Warren, O., is acquiring control of Broden Construction Co., 22800 Lakeland avenue, Cleveland, manufacturer of steel mill and wire drawing machinery and plans considerable expansion, plans now being drawn.

CLEVELAND—Warner & Swasey Co., 5701 Carnegie avenue, is taking bids on boiler plant improvements at 2059 East Fifty-fifth street, including power piping, coal-handling equipment and revamping ash-handling equipment. John Paul Jones, engineer, Terminal Tower, will award contract.

CLEVELAND—Edgar A. Brown Inc., Carnegie avenue and East Fortieth street, spring manufacturer, Edgar A. Brown, president, will build addition 57 x 97 feet, by filling space between two existing buildings, at cost of $14,000.

CLEVELAND—Acme Electric & Mfg. Co., 1440 Hamilton avenue, James A. Comstock, vice president and manager, will begin operations in fall in new $60,000 plant at Clyde, N. Y. Part of operations at Cleveland plant may be moved to Clyde.

CLEVELAND—Aero Electric Co. Inc., 3167 Fulton road, John S. McCombe, president, has leased 7000 square feet manufacturing space and is installing equipment for production of electric snap switch used in machine tool, aviation and other fields.

CLEVELAND—Cleveland Tractor Co., Euclid avenue and East 193rd street, has started construction of a further addition 20 x 36 feet.

CLEVELAND—Key Tool & Equipment Co. has filed incorporation papers at Columbus, O., through George A. Hodgman, Pierce building, St. Louis, attorney.

CUYAHOGA FALLS, O.—Ohio Shim & Gasket Co. is establishing a plant at 2060 Water street for defense production. R. E. McMahon, 1848 Cadwell avenue, Cleveland, is owner of principal interest.

ELYRIA, O.—Harrison Tool & Mfg. Co., 317 Prospect avenue, Harry L. Harrison, president, 1630 Lewis drive, Lakewood, O., has been incorporated with $100,000 capital. Company will take over business of Whidden Mfg. Co., manufacturer of small tools, and probably will enlarge capacity.

Connecticut

NEW HAVEN, CONN.—Colonial Beacon Oil Co., 30 Rockefeller Plaza, New York, will build an oil terminal on East Shore, to cost $250,000.

New York

BROOKLYN, N. Y.—United Brooklyn Corp., 70 Franklin avenue, will build a two-story 50 x 95-foot factory and machine shop building, general contract to

Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 114 and Reinforcing Bars Pending on page 116 in this issue.

L. G. Muntz Co., 166 Montague street, costing about $60,000. (Noted April 21.)

BROOKLYN, N. Y.—Atlantic Warwick Corp., 2923 Atlantic avenue, has let general contract to I. H. Meyer, 590 Sterline place, for a one-story plant and office building 74 x 99 feet, costing about $70,000. (Noted April 28.)

BROOKLYN, N. Y.—Sperry Gyroscope Co. Inc., 40 Flatbush avenue extension, has plans by G. A. Boehm, 2 West Forty-fifth street, New York, for a two-story 100 x 208-foot plant at 2252 Chapel street, costing about $125,000.

BROOKLYN, N. Y.—Robins Drydock & Repair Co., Erie Basin, has let general contract to Irons & Reynolds, 420 Lexington avenue, New York, for a one-story 100 x 150-foot blacksmith shop costing over $40,000.

LOCKPORT, N. Y.—Norton Laboratories, Mill street, will build a plant addition costing more than $40,000, with equipment.

NIAGARA FALLS, N. Y.—Niagara Falls Power Co., R. R. McLeod, executive vice president, will build distributing substations, transmission lines and conduits at cost of about $800,000.

PENN YAN, N. Y.—New York State Electric & Gas Corp., Penn Yan, will build a power plant addition costing over $500,000. W. W. Perry, care owner, is engineer.

SCHENECTADY, N. Y.—General Electric Realty Corp., River road, will build a shop building 60 x 340 feet, general contract to James E. Lowe & Sons Inc., 243 State street, costing about $40,000.

New Jersey

BENDIX, N. J.—Air Associates Inc., Bendix airport, has let general contract to Brown & Matthews Inc., 122 East Forty-second street, New York, for a one-story plant addition to cost about $125,000.

IRVINGTON, N. J.—Art Tube Co., 500 Lyons avenue, has let general contract to D. G. Douglas Co., 605 Broad street, Newark, N .J., for a one-story 20 x 300-foot warehouse, to cost about $400,000.

SPRING LAKE, N. J.—Borough will take bids May 26 on electric equipment to change pumping operations on three 700-foot wells from steam, at estimated cost of $100,000. Runyon & Carey, 33 Fulton street, Newark, N. J., are engineers.

TRENTON, N. J.—Thermoid Co., Whitehead road, will build a plant addition 100 x 200 feet, costing about $50,000. Micklewright & Mountford, 224 East Hanover street, are architects.

Pennsylvania

BIRDSBORO, PA. — Birdsboro Steel Foundry & Machine Co. will build a foundry 82 x 300 and 60 x 200 feet, general contract to C. H. Schwestner, Race street, Philadelphia, costing about $100,000. Day & Zimmerman, Packard building, Philadelphia, are architects and engineers.

ERIE, PA.—Northern Equipment Co., 1945 Grove street, will let contract soon for a one-story plant addition costing about $40,000, with equipment.

JOHNSTOWN, PA.—Bethlehem Steel Co., R. E. Hough, general manager Cambria plant, is increasing its electric power capacity, including installation of a 20,000-kw electric turbine and equipment.

PHILADELPHIA—Pennsylvania Galvanizing Co., 2201 East Tioga street, will build a plant 58 x 240 feet, costing $40,000, with equipment.

PHILADELPHIA—Midvale Co., Nicetown, Philadelphia, will let a contract soon for a machine shop extension costing about $100,000.

WILKES-BARRE, PA.—Barnard Aviation Equipment Co., Ashley, will build an addition and make improvements to its plant on Waller street at cost of $75,000.

Michigan

DETROIT—Eureka Plating Co., 630 Beaubein street, has been incorporated with $3000 capital to conduct an electroplating business, by Homer VanFossan, 5269 Bewick avenue.

DETROIT—A. C. Haberkorn Machinery Co. has been incorporated with $50,000 capital to deal in machine tools, by Arthur R. Wood, 3503 Barlum Tower, Detroit.

DETROIT — Metal Mouldings Corp., West Chicago boulevard, has given general contract to Cooper Construction Co., Detroit, for a factory building to cost $225,000.

HILLSDALE, MICH.—Hillsdale Foundry Co. has been incorporated with $10,000 capital to operate a foundry, by Wilbur S. Walters, Lewis street, Hillsdale, Mich.

MONROE, MICH.—La-Z-Boy Chair Co.

has been incorporated with $200,000 capital to deal in tools and dies, by the Floral City Furniture Co., 1314 North Telegraph road, Monroe.

MONROE, MICH. — Monroe Patent Service Inc. has been incorporated with $50,000 capital to deal in tools and dies, by Floral City Furniture Co., 1314 North Telegraph road, Monroe.

Illinois

ELGIN, ILL.—McGraw Electric Co. has given contract for $200,000 plant addition to C. E. Gertz & Son, Elgin. Will be one-story 100 x 250 feet for production and a one and two-story warehouse 150 x 230 feet. E. O. Sessions, 120 South LaSalle street, Chicago, is in charge of plans. (Noted March 3.)

SPRINGFIELD, ILL.—City, John W. Kapp Jr., clerk, has rejected bids on construction of filter bed extensions, estimated to cost about $40,000 and will take new bids. Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., is consulting engineer.

Indiana

MUNCIE, IND.—Superior Steel Products Inc., Mound and Cleveland streets, has been incorporated with $10,000 capital, to manufacture steel and metal products, machinery, firearms, by Arlie N. Beeler, same address.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department will open bids as follows: May 23, schedule 6731, motor-driven geared head metalworking precision lathe, for San Diego, Calif.; schedule 6837, three motor-driven plain and universal shapers for Charleston, S. C. and Portsmouth, N. H.; May 27, schedule 6768, eight gasoline engine-driven portable two-stage air compressors for Sewalls Point, Va., and San Diego, Calif.; schedule 6796, two motor-driven internal grinders for San Diego, Calif.; schedule 6825, seven motor-driven bench lathes for various deliveries; schedule 6831, two motor-driven milling machines for various deliveries; schedule 6834, motor-driven bending roll for Pacific Coast delivery; schedule 6797, motor-driven contour metal-sawing, filing and polishing machine for Seattle; May 29, schedule 6826, four motor-driven bench lathes for various deliveries; schedule 6830, six electric furnaces for various deliveries.

Kentucky

LOUISVILLE, KY.—E. I. du Pont de Nemours & Co., Wilmington, Del., will erect plant for production of neoprene with annual capacity of 10,000 gross tons, costing about $15,000,000, of which $2,500,000 represents cost of calcium carbide plant of Air Reduction Co., providing raw material for neoprene.

Wisconsin

FOUNTAIN CITY, WIS.——War department, Major J. W. Moreland, district engineer, 1217 Postoffice building, St. Paul, will open bids May 23 for one-story boiler and engine building at United States boatyard at Fountain City.

Minnesota

EVELETH, MINN.—Board of education, T. P. Nankervis, clerk, will open bids May 20 for manual training machinery and equipment for machine shop, forge shop, welding department and automobile mechanics department.

KEEWATIN, MINN. — Village, John Rebrovich, recorder, is taking bids on materials for construction of a sewage disposal plant on plans by J. C. Taylor, Hibbing, Minn., consulting engineer. (Noted Dec. 23.)

WASECA, MINN.—City, L. E. Peterson, clerk, is making preliminary survey for sewage disposal plant costing $65,000, with WPA aid. Toltz, King & Day, 1509 Pioneer building, St. Paul, are consulting engineers.

WASECA, MINN.—Waseca county, Art Brisbane, auditor, has awarded contract for a one-story county highway machine shop and storage building 80 x 120 feet.

WILLMAR, MINN.—City, Einar H. Brogren, clerk, has selected Williams & Burlingame, 418 West Willard street, Stillwater, Minn., as consulting engineers to prepare plans for improvement of municipal electric generating plant.

Texas

ALICE, TEX.—Black, Sivalls & Bryson Inc., 2131 Westwood street, Oklahoma City, Oklahoma, will build a machine and welding shop costing $70,000. K. B. Banks, Oklahoma City, is engineer.

BLESSING, TEX.—Texas Co., Texas building, Houston, Tex., will build a 40-million cubic foot capacity recycling plant to cost $400,000.

HOUSTON, TEX.—Houston Lighting & Power Co., 1016 Walker street, will improve its power and light plant at cost of about $500,000.

HOUSTON, TEX.—Reed Roller Bit Co., Mack street, has given general contract to A. Ness, 200 Portwood street, for a

one-story 93 x 250-foot plant costing $40,000.

Kansas

CLAY CENTER, KANS.—City has awarded contract for power piping and other improvements at municipal light and power plant to Groeschel Co., Marshall, Mo., at $30,173.

North Dakota

LISBON, N. DAK.—City, W. R. Sandager, auditor, is making preliminary survey for municipal light plant to cost about $240,000. Ray R. Gauger & Co., 2635 University avenue, St. Paul, are consulting engineers. (Noted April 14.)

South Dakota

SIOUX FALLS, S. DAK.—Standard Oil Co. of Indiana has let contract to Jones & Brooks, Oklahoma City, Okla., for 85 miles of six-inch gasoline pipe line from Bronson, Iowa, to Sioux Falls, S. Dak., to connect with line from Council Bluffs, Iowa.

Nebraska

GRAND ISLAND, NEBR.—Southern Nebraska rural public power district, R. O. Adams, superintendent, has let contract to Snyder & Johnson, Humboldt, Iowa, for 160 miles rural transmission lines to serve 295 customers. Raymond H. Reed & Co., Abilene, Kans., are engineers.

Iowa

BOONE, IOWA—Iowa Electric Light & Power Co., Security building, Cedar Rapids, will improve its plant, including a high-pressure steam generator, at cost of $750,000.

CEDAR RAPIDS, IOWA—Universal Crusher Co., manufacturer of gravel and rock crushing machinery, has let contract to Max Mildenstein for a one-story plant addition.

OTTUMWA, IOWA—John Morrell Co., meat packer, will award contract soon for four-story packing plant addition 80 x 90 feet and conveyor between buildings. Henschien, Everds & Cromble, 59 East Van Buren street, Chicago, are architects and engineers.

WATERLOO, IOWA—Hinson Mfg. Co., manufacturer of automobile specialties, has given contract to C. W. Hutton & Son for a plant addition 100 x 100 feet.

Wyoming

CHEYENNE, WYO.—Frontier Refining Co., H. M. Robineau, Denver, president, has started construction of a cracking plant at Second street and Duff avenue, costing $200,000. R. R. Rankin is construction superintendent.

LUSK, WYO.—Village has approved $60,000 bond issue for construction of municipal light and power plant.

SUPERIOR, WYO.—Union Pacific Coal Co. has let contract to Superior Lumber & Construction Co. for mine buildings, including shop, office, warehouse, etc. H. C. Livingston is chief engineer.

Idaho

BOISE, IDAHO—Idaho Power Co., C. J. Strike ,president, is making engineering studies for hydroelectric power plant on Snake river, state officials having approved two sites.

California

LOS ANGELES—Alliance Welding & Mfg. Co., 6819 Compton avenue, has been formed by M. I. Watkins and associates, to conduct a welding business.

PASADENA, CALIF.—Latisteel Corp. of California will build a fabricating plant costing $5000 at 3170 Foothill boulevard.

Oregon

PORTLAND, OREG.—Columbia Aircraft Industries, manufacturer of airplane parts, has taken options near Swan Island airport and may build plant there.

Washington

SEATTLE—Savage Metal Products Co., 5421 First avenue South, is building a plant addition.

SEATTLE—Young Iron Works, 2955 first avenue South, is building a plant addition 60 x 88 feet.

Canada

VANCOUVER, B. C.—Vivian Engine Works Ltd., 1090 West Sixth street, has awarded general contract to E. E. Brethour for plant addition to cost $30,000, without equipment.

ARVIDA, QUE.—Abrasive Co. of Canada Ltd., Drake street, is having plans prepared by Lamontagne & Gravel, Racine street, Chicoutami, Que., architects, for a plant addition to cost $40,000.

MONTREAL, QUE.—R. C. A. Victor Co. Ltd. has let general contract to J. L. E. Price & Co. Ltd., 680 Sherbrooke street, for a plant addition at 976 Lacasse street to cost $100,000. W. K. G. Lyman, 2058 Victoria street, is architect.

MONTREAL, QUE.—Robert Mitchell Co. Ltd., 750 Belair avenue, has given contract to Anglin Norcross Corp. Ltd., 892 Sherbrooke street West, for a plant addition costing $30,000.

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Includes chuck face plate and steady rests

20 x 8 L & S QCG MD
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2—5 HP. 100 RT Cleveland ratio 15:1
1—5 HP. 400 AH Cleveland ratio 70:1
1—7½ HP. 200 AH Cleveland ratio 80:1
2—7½ HP. 400 RT Cleveland ratio 80:1
3—7½ HP. National Tube Co. ratio 46.67:1
5—10 HP. 600 AT Cleveland ratio 90:1
2—50 HP. D. O. James ratio 3.4:1
1—150 HP. R. D. Nuttal ratio 1.6:1

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DIE SINKER, E-3 Keller, M.D.
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Write

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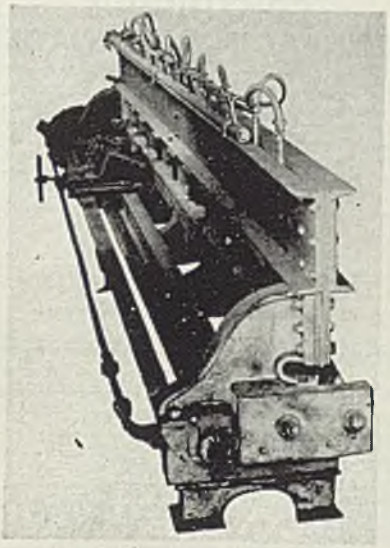

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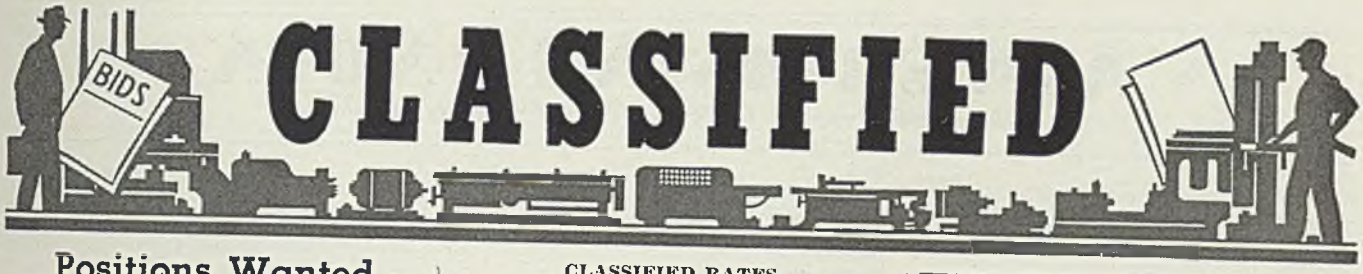

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◆ ◆ ADVERTISING INDEX ◆ ◆

Where-to-Buy Products Index carried in first issue of month.

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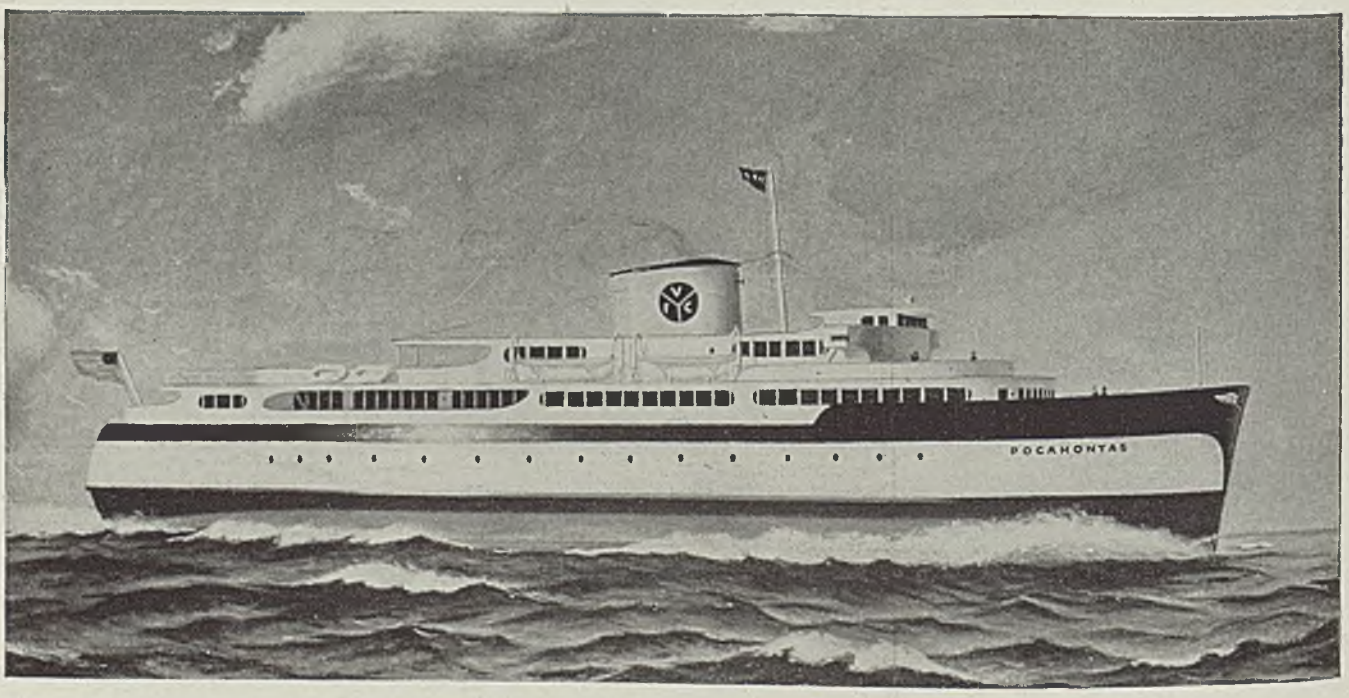

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Hubbell & Co.

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Cleveland, Ohio
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Los Angeles, Calif.
Ducommun Metals & Supply Co.

Seattle, Wash.
Barde Steel Company

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Barde Steel Company

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Drummond, McCall & Co., Ltd.