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ABP ABC

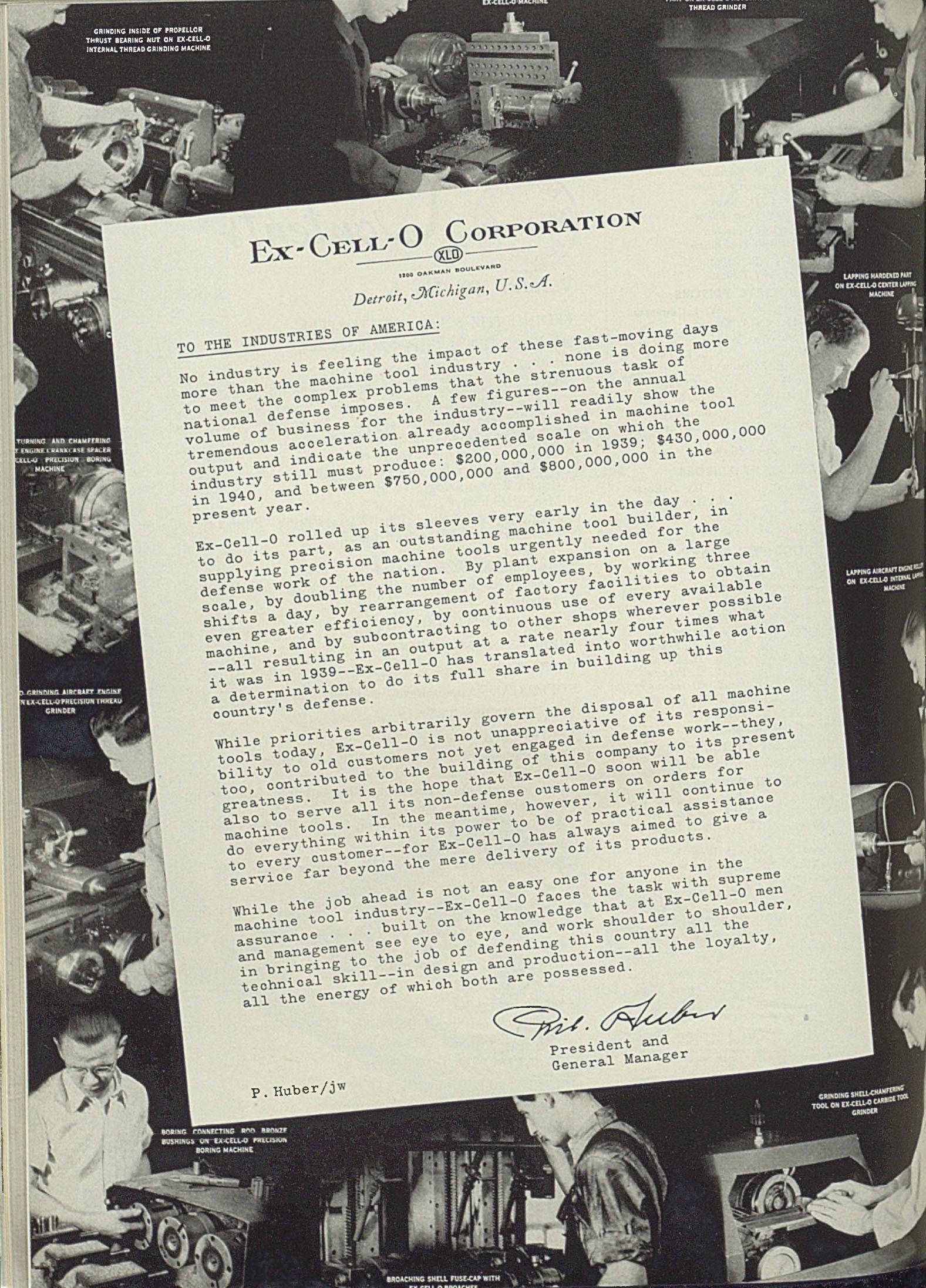
STEEL

ESTABLISHED 1882

Contents

Volume 109—No. 6 **August 11, 1941**

PRODUCTION · PROCESSING · DISTRIBUTION · USE



EX-CELL-O CORPORATION

XLO

1200 OAKMAN BOULEVARD

Detroit, Michigan, U.S.A.

TO THE INDUSTRIES OF AMERICA:

No industry is feeling the impact of these fast-moving days more than the machine tool industry . . . none is doing more to meet the complex problems that the strenuous task of national defense imposes. A few figures--on the annual volume of business for the industry--will readily show the tremendous acceleration already accomplished in machine tool output and indicate the unprecedented scale on which the industry still must produce: $200,000,000 in 1939; $430,000,000 in 1940, and between $750,000,000 and $800,000,000 in the present year.

Ex-Cell-O rolled up its sleeves very early in the day . . . to do its part, as an outstanding machine tool builder, in supplying precision machine tools urgently needed for the defense work of the nation. By plant expansion on a large scale, by doubling the number of employees, by working three shifts a day, by rearrangement of factory facilities to obtain even greater efficiency, by continuous use of every available machine, and by subcontracting to other shops wherever possible --all resulting in an output at a rate nearly four times what it was in 1939--Ex-Cell-O has translated into worthwhile action a determination to do its full share in building up this country's defense.

While priorities arbitrarily govern the disposal of all machine tools today, Ex-Cell-O is not unappreciative of its responsibility to old customers not yet engaged in defense work--they, too, contributed to the building of this company to its present greatness. It is the hope that Ex-Cell-O soon will be able also to serve all its non-defense customers on orders for machine tools. In the meantime, however, it will continue to do everything within its power to be of practical assistance to every customer--for Ex-Cell-O has always aimed to give a service far beyond the mere delivery of its products.

While the job ahead is not an easy one for anyone in the machine tool industry--Ex-Cell-O faces the task with supreme assurance . . . built on the knowledge that at Ex-Cell-O men and management see eye to eye, and work shoulder to shoulder, in bringing to the job of defending this country all the technical skill--in design and production--all the loyalty, all the energy of which both are possessed.

P. Huber

President and
General Manager

P. Huber/jw

HIGHLIGHTING
THIS ISSUE OF
STEEL

■ ALTHOUGH most consumers become more fearful each week over continuance of steel supply for civilian purposes there continues to be enough steel to go round. There are numerous pinches **(p. 119)** but in comparatively few cases has there been genuine distress so far. As defense needs continue to grow **(p. 44)** it becomes more and more necessary to obtain priority ratings; indications are that eventually nondefense consumption must suffer, but that there will be no radical change for at least a few weeks to come. . . . Gravest factor is the scrap shortage which daily becomes more acute. Blame for this condition is placed by the scrap industry **(p. 23)** squarely on the shoulders of Leon Henderson.

• • •

Lull in British Production

A lull in British iron and steel production alarms the editor of *The British Steelmaker* who **(p. 27)** alludes to the June demand for steel as being "so quiet and orders so scarce as to rouse feelings of uneasiness." A reorganization of the British iron and steel industry is under way. . . . Wing Tips this week **(p. 42)** describes the mass production system at Bell Aircraft's new Niagara Falls plant where the assembly chain moves 13/64-inch per minute. . . . Within twenty-four hours after the National Defense Mediation Board pridefully announced **(p. 21)** that all defense stoppages had been eliminated a new wave of strikes tied up important defense plants. . . . STEEL **(p. 29)** surveys the current industrialization of the Pacific Northwest.

• • •

Wants More Bessemer

OPM **(p. 32)** invites proposals for air conditioning and enlarging blast furnaces; invites proposals **(p. 33)** for increasing bessemer steel capacity; recommends that Bethlehem build a 78,000-ton high-speed plate mill at Sparrows Point; is undertaking a study to set up government-sponsored lists of standard steel specifications; has established a blanket A-1-a rating for cutting tool manufacturers; has placed the REA program under priorities; has extended the A-10 rating to maintenance and repair parts for essential industries and services **(p. 32)**; to get this rating manufacturers must apply on form PD-67. . . . OEM **(p. 33)** has established regional information offices in 10 key defense cities.

• • •

How To Build Big Guns

Professor Macconochie in the twenty-fourth article in his series on ordnance and its production **(p. 56)** examines principles employed in designing and manufacturing big guns. . . . A plant doubles its output merely by mechanizing **(p. 62)** its materials handling facilities. . . . Fred Merish tells about the advantages and applications **(p. 70)** of the amplified voice as used for plant communication work. . . . Paul J. McKimm, in discussing basic steelmaking practice and the manufacture of high quality, low cost steel, **(p. 87)** presents over 100 references in an elaborate bibliography of articles on the subject.

• • •

Discourages Tool Rebuilders

Guy Hubbard, STEEL'S machine tool editor, points out **(p. 54)** how arbitrary price limitations on used machine tools discourage the reputable and highly skilled rebuilder—the very company that should be helped to make used machine tools available as capable "pinch hitters" in the present emergency. . . . How to use butt-welded field splices—even in members subject to dynamic loading—is revealed by LaMotte Grover as he describes **(p. 80)** practice employed in a recent rigid-frame building. . . . H. J. Wills concludes his series on ultra-finish work by detailing **(p. 92)** specific blemishes encountered in grinding ultra-finish rolls and how to prevent them.

99 YEARS

● Ninety-nine years means very little! Ninety-nine years of highly specialized experience in the steel business means a great deal; especially when that experience has involved handling huge quantities of steel, in thousands of kinds, shapes and sizes, and serving the varied needs of a host of users in every industry.

Ryerson *can* and *does* pledge that all of the skill and experience gained through 99 years of successful operation, always will vigorously be devoted to the interests of Ryerson customers. In the present period of steel shortage—as in similar periods in the past—the Ryerson organization is bending every effort to meet as nearly as possible every demand being made upon it.

Later, when American industry is back to normal production, the same organization will be working just as hard to provide steels of highest quality to meet every customer's requirement, and to provide them on the immediate basis which is synonymous with the name Ryerson.

We are glad to be 99! We are grateful for the past loyalty of our customers—but more grateful, perhaps, for their cooperation now, in our effort to serve them to the full limit of our resources. Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON

Defiant Labor Groups Break Blissful Spell for Mediation Board

"Slate clean for first time," statement is quickly followed by another epidemic of strikes . . . Unions' closed shop demands, and quarrels among own organizations cripple shipbuilding and other defense industries

■ "FOR THE first time since its establishment four and a half months ago, the National Defense Mediation Board starts the week with no strikes or lockouts before the board. Settlement of three strikes last week cleaned the board's slate of defense stoppages."

Within 24 hours of the release of this congratulatory message by the board early last week, an epidemic of strikes in vital defense industries broke out along the Atlantic seaboard, in the Midwest, the Southwest and on the Pacific coast.

Shipbuilding, aluminum and boilermaking plants, all of paramount importance in the armament program, were paralyzed by the labor disputes, with union leaders taking advantage of technicalities to increase the strength of their respective organizations through demands for closed shop and higher wages.

Delaying construction on a $493,000,000 shipbuilding program of naval and merchant vessels for the government, including seven cruisers and 27 destroyers for the Navy, as well as a number of cargo ships for the Maritime Commission, was the walk-out of 16,000 workers at the Kearny, N. J., yards of the Federal Shipbuilding & Dry Dock Co., U. S. Steel subsidiary. Complete work stoppage caused by the strike made it necessary to postpone launching of the Navy's new light cruiser, U. S. S. ATLANTA, scheduled to have gone down the ways Aug. 9.

Peter Flynn, vice president of the striking local, declared that in spite of the walkout—called contrary to the government's urgent requests that all national defense work be pushed to the utmost—the union had offered to supply sufficient men to permit launching of the ATLANTA to proceed according to schedule.

This was the union's concession to the exigencies of the present world situation. Work on all the other naval and government merchant marine vessels was to be discontinued until the company met the strikers' demands.

Merchant Vessels Also Delayed

Delivery of the S. S. SANTA RITA to the Grace line also will be delayed, company officials declared, as will launching of a C-2 type cargo vessel for the Maritime Commission, scheduled for Aug. 26.

Conference called in Washington Aug. 7 by Sidney Hillman, OPM director, broke up in less than an hour with no agreement reached. Defense Mediation Board officials indicated recommendations would be made to President Roosevelt that the government take over the shipyards if production is not resumed soon.

Negotiations late in the week were deadlocked as union leaders insisted their demands, presented in violation of a contract signed six weeks ago, be met by the company. Picketing was continued, although no disorder was reported by the police on guard at the shipyards.

Principal issue was the union's demand for a closed shop.

"Calling of this strike," said L. H. Korndorff, president of the company, "is a clear and unjustified breach by the industrial union of Marine and Shipbuilding Workers of America of its solemn agreement made on June 23, 1941, by which the union agreed that there would be no strikes in the shipbuilding industry on the Atlantic coast prior to June 23, 1943.

"This obligation by the union was contained in the Atlantic Coast Zone Standards agreed to both by this company and the union under which wages were increased 12 per cent and other adjustments made, all for the sole purpose of establishing industrial peace in this most important Atlantic coast industry for a period of two years.

"These Atlantic Coast Zone Standards were made effective as of June 23, by action of the Secretary of the Navy, the Chairman of the U. S. Maritime Commission, the Director General and the Associate Director General of the Office of Production Management. Wages have since been paid at the increased rates . . .

"This strike is not because of a disagreement on wages or dissatisfaction with labor conditions, but because this company is unwilling to consent to the union's demand that we shall contract that the continued employment by this company of any employe who is now or in the future may become a member of the union shall be dependent upon his remaining a member of the union in good standing.

"In plain language this means that this company shall be obligated to discharge any employe simply because for reasons of his own he sees fit to withdraw from the union or to discontinue paying union dues.

"The policy of this company is

that the right to work in our shipyards shall not be dependent upon membership or nonmembership in any organization, and that this company recognizes the right of its employes to bargain collectively through representatives freely chosen by them without dictation, coercion or intimidation.

"Under this policy a labor contract arrived at through collective bargaining has been in effect during the past three years."

Declaring the strike's purpose is to strengthen the union through extension of closed shop principles to Eastern shipyards, Mr. Korndorff pointed out Federal Shipbuilding employes would obtain no additional advantage were it successful. "Today they are receiving the highest wages, hourly and weekly, ever paid in the history of the American shipbuilding industry."

Brief walkout involving 6000 CIO shipyard workers at two Bethlehem Steel Co. shipyards in Brooklyn, N. Y., was quickly settled Aug. 7, through negotiations with the company, after which union officials voted to return to work. Picketing of two Bethlehem yards at Brooklyn and Staten Island by AFL representatives, however, continued as a separate wage dispute remained unsettled. Construction of a number of ships for the Navy at these yards also was threatened with delay as movement of supplies was impeded.

Strike of AFL boilermakers at Todd Galveston Dry Docks Inc., Galveston, Tex., was certified to the Mediation Board for settlement by the Labor Department. Results of the board's intervention in this case have not yet been reported.

Dispute between the United Automobile Workers of America, CIO, and the Los Angeles plant of the Aluminum Co. of America was reported settled late last week by the board. Terms of the agreement, subject to ratification by the union, were not disclosed although confidence was expressed it would be approved.

Other strikes certified to the board for settlement included that of AFL electricians in New York, growing out of a dispute with the Consolidated Edison Co. Under way since July 29, the strike involves a claim by the International Brotherhood of Electrical Workers that the Edison Co. agreed to employ IBEW workers on the installation of electrical equipment at the company's new plant.

Panel hearings were also started in a closed session on the disagreement between the Packing House Workers Organizing Committee, CIO, and Armour & Co., Chicago.

In its report last week, the Mediation Board stated, "The record piled up since the board's creation March 19 now reads: In all of the 58 cases certified, involving 728,306 workers, men have either returned to work as a result of settlement or postponed threatened strikes at the request of the board."

Good Jobs Await These NYA Students

■ National Youth Administration students acquiring experience which will enable them to become United States Army air force mechanics at a salary of $1320 per year. After passing civil service examinations they receive training at the NYA aircraft center at Patterson field, Dayton, O. The trainees work in the parachute shop, machine shop, propeller shop and other stations where bombers and pursuit ships for America and Great Britain are repaired. NEA photo

CIO Sets Up "Dues Inspection Line" at Cleveland ALCOA Plant

Rigid "dues inspection line" initiated last week at the Aluminum Co. of America plants in Cleveland in an effort to compel all employes to join the local CIO branch of the National Association of Die Casting Workers, was withdrawn later when city and county officials promised protection to all employes wishing to go to work.

The inspection line, set up before the plant entrance, required every employe including members of the AFL to show a paid-up CIO membership card before he was permitted to enter. Those lacking the cards were given an opportunity to secure them on the spot by paying the $3 fee required.

Number prevented from working was not reported, although a company spokesman declared several "bottlenecks" had been created in five plants due to labor shortage.

Establishment of the line, according to the company, was in direct violation of a contract between the company and the CIO following a strike three months ago.

2,500,000 Jobs Filled by State Offices in 6 Months

About 2,500,000 jobs were filled through state employment services in the first six months of 1941, representing a 52 per cent gain over the same period in 1940, according to Federal Security Administrator Paul V. McNutt.

Placements in June totaled 471,000, compared with 500,121 in May, a reduction of 6 per cent, but 43 per cent above June last year.

Unemployment compensation benefit payments in June totaled $30,000,000, the same as in May, but 40 per cent less than in June last year. Approximately 784,000 workers received one or more payments during the month, compared with 1,400,000 workers in June, 1940.

Reports by the Social Security Board showed that all but seven states paid fewer benefits in June than in May. In these seven states, which include such states as New York, Ohio, Illinois, and Virginia the increase in benefit payments was such as to maintain the level for the country as a whole, virtually unchanged in June over May.

Charges and Counter-Charges Feature Scrap, While Supplies Continue Scarce

■ WORDS were plentiful last week in the battle over scrap, but material continued critically scarce.

First, there was a long letter from Price Administrator Leon Henderson addressed to the Department of Justice asking for an investigation of the scrap industry, and alleging that "According to information in our possession, methods and devices are being utilized by dealers and brokers in iron and steel scrap which are probably violations of the anti-trust laws and related statutes. These abuses have in our opinion artificially raised prices above those established under price schedule No. 4 issued by this office on April 3, 1941, and have curtailed the supply of scrap. . . .

"We are informed that there are approximately 15 large brokers who supply all the steel mills with approximately 90 per cent of their needs." Henderson then went on to say that these brokers in turn obtain their scrap through dealers who purchase from subdealers, and by "subsidizing" these, the brokers are able to control the collection and prices of scrap iron and steel.

In reply to this the Institute of Scrap Iron and Steel, Washington, let loose a blast at Henderson and his department that must have shaken Capitol Hill.

OPACS later in the week issued a voluminous revision of scrap prices (see page 131), intending to remove certain inconsistencies in prior orders and to expedite the flow of scrap to market, but not changing basic prices. To this, representatives of the industry replied the revision would have virtually no effect, except to still further confuse the situation. The campaign to spur automobile junk yards into more activity was extended into New England states by OPACS' agents, with representatives of the scrap institute attending and cooperating.

The institute's statement on the government's action against the brokers, in full, follows:

"Faced with responsibility for steel mills and foundries shutting down for lack of scrap and thus impeding the national defense program, Leon Henderson, price administrator, has taken refuge behind a campaign of threats, intimidations, and reprisals, and has induced the Department of Justice to institute an investigation of the iron and steel scrap industry.

"Henderson's action in asking the Department of Justice for an investigation, although directed at only 15 firms out of 15,000 engaged in the iron and steel scrap business, will tend to freeze the supply of this vital defense material instead of causing it to flow more freely, by injecting legal uncertainties.

"Damage Cannot Be Covered"

"The 15 firms, anonymous at present, will, we are certain, speak for themselves at the proper time, but on behalf of a billion dollar industry that provides nearly one-third of the raw material for the steel and foundry industries we go on record as saying that such threats will never cover up the damage done to the steel industry by Henderson's division. They will never clarify the confusing price schedules which Henderson's own lawyers cannot interpret, nor undo the inexperience of OPACS price experts who have been issuing ukase after ukase.

"For many years the scrap industry has had to finance the collection of scrap, especially during periods when mills and foundries refused to buy. Dealers found it necessary to finance peddlers and collectors so that reserves could be built up. The practice to which Henderson objects in vague terms constitutes the routine upon which the industry has been founded and which has supplied a vital raw material for steel mills and foundries at a comparatively low price over a period of years.

"As usual, Mr. Henderson beclouds the issue and fails to set out all the facts.

"The Institute of Scrap Iron & Steel Inc., composed of 750 prominent scrap iron merchants throughout the country, has been in the forefront of the defense program and for almost a year has tried to get Mr. Henderson's department to tap the benefit of its long experience.

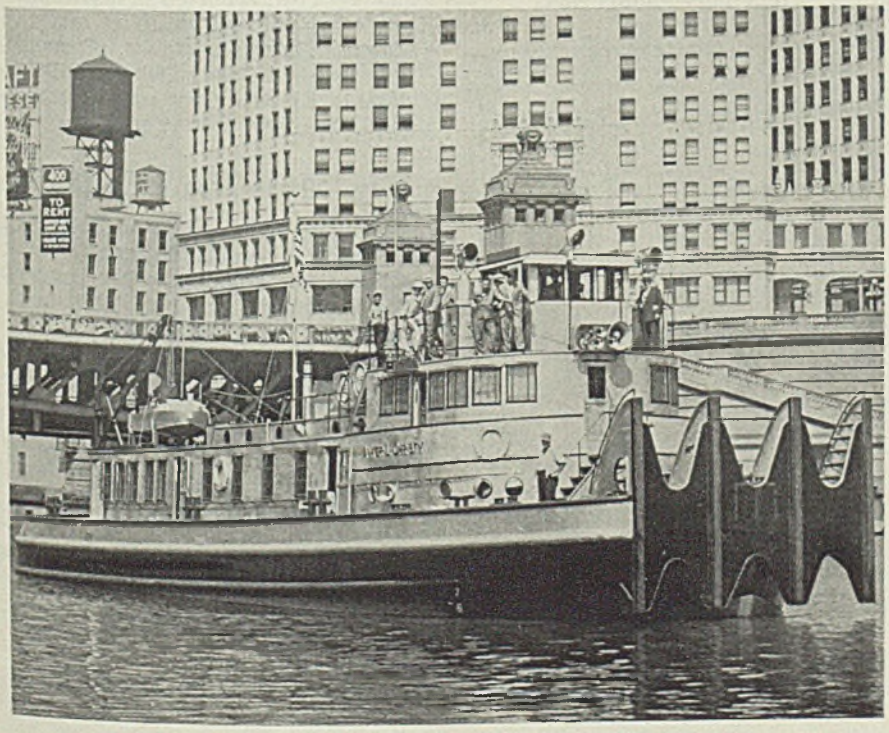
"The industry is just as anxious to help national defense and beat Hitler as Mr. Henderson or his staff, but it wants to beat him with guns and tanks and battleships and feels that a jawbone won't do the trick.

"To keep the record straight, the industry stands ready to prove that OPACS has stymied every move that has been proposed to keep an ample supply of scrap flowing to consumers.

"Months before Mr. Henderson

(*Please turn to Page* 135)

Push or Pull, in Chicago-Texas Oil Service



■ Unique prow construction enabling it to push as well as pull a string of gasoline-laden barges is one of the features in river and petroleum transportation incorporated in this new steel towboat, ANKER L. CHRISTY. Owned by Pure Oil Steamship Co., the boat is here shown entering the Chicago river, enroute to Texas to pick up its first load of gasoline barges. NEA photo

July Pig Iron Production at Record Peak; Rate Up 1.3 Points to 97.6%

■ PRODUCTION of coke pig iron in United States in July totaled 4,766,216 net tons, highest monthly output on record, as the operating rate increased 1.3 points to 97.6 per cent of capacity and daily average rose 1.4 per cent over June. Total of blast furnaces active July 31, according to operators of the nation's 229 potential stacks, was 212 and a net increase of one for the month.

Highest on record, the average daily production was 153,749 tons, up 2048 tons or 1.4 per cent over 151,701 in June. It was 17.4 per cent greater than 130,984 tons daily average in July, 1940, and compared with average daily output of 126,501 tons in the month in 1937 and 136,658 tons in July, 1929.

Total production for the month was 4.7 per cent or 215,176 tons greater than in June, when output was 4,551,040 tons, and was 17.6 per cent higher than in the month last year, 4,060,513 tons. It compared with 3,921,522 tons produced in July, 1937, and was up 12.7 per cent from total of 4,236,412 tons, output in July, 1929.

Daily average for the first seven months this year was 150,141 tons, 27.4 per cent greater than 117,884 tons in the period last year. In the comparable period in 1939 daily average was 70,647 tons; 122,950 for the seven months in 1937, and 134,295 for the period through July in 1929.

Aggregate output in the seven months, 31,829,888 tons, was 26.8 per cent greater than in the corresponding period last year, nearly double 16,662,428 tons in the first seven months of 1939. It compared with 26,065,417 tons produced in the period in 1937 and was up 11.8 per cent from 28,470,453 tons in the seven months in 1929.

Merchant Output 15% of Total

Operating rate, 97.6 per cent, increased from 96.3 per cent in June and compared with 94.1 per cent in May and 91.8 per cent in April. In July, 1940, rate was 86.1 per cent, 55.0 per cent in the month in 1939, and 82.9 per cent in July, 1937.

Merchant iron produced in the month, 717,582 tons, was 15 per cent of the combined output, and compared with 14.9 per cent in June and 13.4 per cent in July of 1940.

Number of stacks in blast at the end of July, 212, was the highest total for any month since July, 1929, when 217 were blowing. In June, 211 were active; 206 in May; and 191 in April, lowest this year. In July, 1940, stacks in blast totaled 187; 129 in the month in 1939; 192 in July of 1937.

One merchant stack was blown out in the month, and none added. In the steelworks or nonmerchant classification, one furnace was taken off and three blown in. Stacks blown out in the month:

In Alabama: One Woodward, Woodward Iron Co. In Pennsylvania: Carrie No. 4, Carnegie-Illinois Steel Corp.

Stacks blown in: In Illinois: South Works Old No. 1, Carnegie-Illinois Steel Corp. In Pennsylvania: Bethlehem A, Bethlehem Steel Co.; and Eliza No. 2, Jones & Laughlin Steel Corp.

Seventeen furnaces were out of blast July 31. Eleven, including six that have been inactive as long as 12 years, were recently reported in process of rehabilitation, and may be put into blast soon. These include: Ensley No. 5, Tuscaloosa and Rockwood 1 and 2, Tennessee Coal, Iron & Railroad Co.; One Detroit, National Steel Corp.; Duquesne No 4, Carnegie-Illinois Steel Corp.; Granite City A and B, Koppers United Co.; Colonial, United States Pipe & Foundry Co.; and the two blown out last month.

Furnaces long idle, none of which has yet been reported in active process of repair: Two Joliet and two Edgar Thomson stacks, Carnegie-Illinois Steel Corp.; Delaware, Philadelphia Electric Corp.; and Cumberland, Warner Iron Co.

PIG IRON STATISTICS

RATE OF FURNACE OPERATION
(Relation of Production to Capacity)

	1941[1]	1940[2]	1939[3]	1938[4]
Jan.	95.5	85.4	51.0	33.6
Feb.	95.3	75.0	53.5	33.6
March	96.3	69.5	56.1	34.2
April	91.8	68.9	49.8	33.4
May	94.1	74.2	40.2	29.4
June	96.3	83.6	51.4	25.5
July	97.6	86.1	55.0	28.2
Aug.	....	89.9	62.4	34.8
Sept.	....	91.5	69.7	40.5
Oct.	....	94.2	85.2	48.0
Nov.	....	96.4	90.3	55.0
Dec.	....	96.4	88.5	51.4

[1] Based on capacity of 57,503,030 net tons, Dec. 31, 1940; [2] capacity of 55,628,060 net tons, Dec. 31, 1939; [3] capacity of 56,222,790 net tons, Dec. 31, 1938; [4] capacity of 56,679,168 net tons, Dec. 31, 1937. Capacities by American Iron and Steel Institute.

MONTHLY IRON PRODUCTION
Net Tons

	1941	1940	1939
Jan.	4,666,233	4,024,556	2,436,474
Feb.	4,206,826	3,304,368	2,307,405
March	4,702,905	3,270,575	2,680,446
April	4,340,555	3,139,043	2,301,965
May	4,596,113	3,497,157	1,923,625
June	4,551,040	3,813,092	2,373,753
July	4,766,216	4,060,513	2,638,760
Tot. 7 mo.	31,829,888	25,109,304	16,662,428
Aug.	.....	4,234,576	2,979,774
Sept.	.....	4,172,551	3,218,940
Oct.	.....	4,437,725	4,062,670
Nov.	.....	4,397,656	4,166,512
Dec.	.....	4,542,864	4,219,718
Total	.....	46,894,676	35,310,042

JULY IRON PRODUCTION
Net Tons

	No. in blast last day of July	No. in blast last day of June	—Total Tonnages— Merchant	Nonmerchant
Alabama	16	17	115,375	174,545
Illinois	19	18	114,676	340,007
Indiana	19	19	39,724	504,584
New York	15	15	98,915	208,541
Ohio	48	48	152,624	971,481
Penna.	71	70	161,695*	1,362,062*
Colorado	3	3		
Michigan	4	4		
Minnesota	2	2	15,165*	189,538
Tennessee	1	1		
Utah	1	1		
Kentucky	2	2		
Maryland	6	6		
Mass.	1	1	19,408*	297,876
Virginia	1	1		
West. Va.	3	3		
Total	212	211	717,582*	4,048,634*

* Includes ferromanganese and spiegeleisen.

AVERAGE DAILY PRODUCTION
Net Tons

	1941	1940	1939	1938
Jan.	150,524	129,825	78,596	52,201
Feb.	150,244	113,943	82,407	52,254
March	151,707	105,502	86,465	53,117
April	144,685	104,635	76,732	51,819
May	148,262	112,811	62,052	45,556
June	151,701	127,103	79,125	39,601
July	153,749	130,984	85,121	43,827
Aug.	.....	136,599	96,122	54,031
Sept.	.....	139,085	107,298	62,835
Oct.	.....	143,152	131,053	74,697
Nov.	.....	146,589	138,883	85,369
Dec.	.....	146,544	136,119	79,943
Ave.	150,141	128,128	96,740	57,962

New Mine Named Mather

■ A new iron ore mine developed by the Cleveland-Cliffs Iron Co. near Ishpeming, Mich., has been named the Mather in honor of William G. Mather, 84-year-old chairman of the board of the company.

The mine is owned by Cleveland-Cliffs and Bethlehem Steel Co. It was named when visited by Mr. Mather, E. B. Greene, president of the Cleveland company, and a number of other officers and directors.

Reopening Old Mine

■ The 75-year old Clifton iron ore mine in St. Lawrence county, New York, will be reopened by the M. A. Hanna Co., Cleveland, with mining operations scheduled to start next June. The Clifton Ore Co. Inc. has been organized as a Hanna subsidiary. An annual output of 300,000 tons of high-grade magnetite lump and sinter ore, unusually low in phosphorus, is expected.

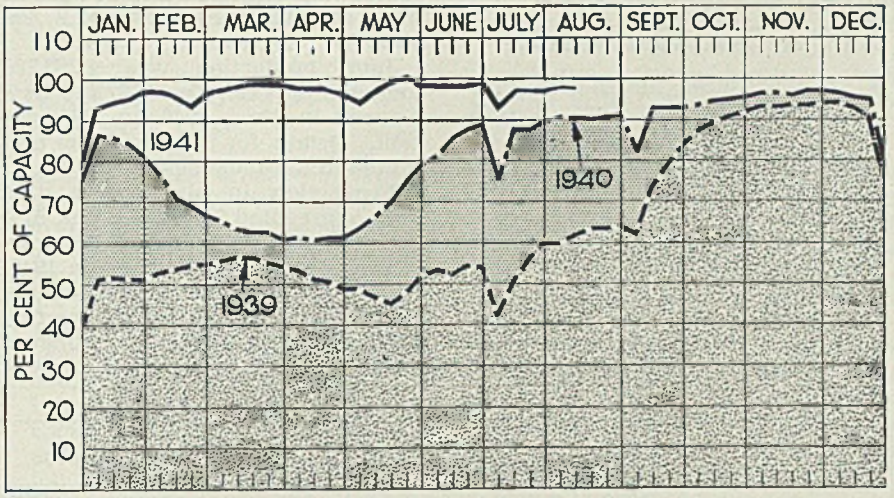
July Ingot Output Slightly Above June

■ Production of steel ingots and castings in July totaled 6,821,682 net tons, representing 95.6 per cent of capacity, according to figures by the American Iron and Steel Institute. This compares with 6,800,730 tons, at 98.2 per cent of capacity in June. The July output suffered from the Fourth of July holiday and has been exceeded by January, March and May this year. Output in July, 1940, totaled 5,724,625 tons.

Average weekly output in July was 1,543,367 tons, compared with 1,585,252 tons in June, this year, and 1,295,164 tons in July, 1940.

Seven months' output this year totaled 47,730,225 tons, compared with 35,130,027 last year.

The Institute has revised figures for January, April and May, giving effect to additional reports and added capacities. Effect of these revisions was small, total production for first half being changed from 40,911,886 tons to 40,908,543 tons, and average weekly production from 1,581,441 tons to 1,581,312.



PRODUCTION . . . . Down

■ STEELWORKS operations last week declined ½-point to 98 per cent because of necessity for open-hearth repairs. One district reported a higher rate, four made slight recessions and seven were unchanged. A year ago the rate was 90½ per cent; two years ago it was 62 per cent.

Youngstown, O.—With 75 open hearths active part of the week and 76 the remainder the rate remained at 98 per cent, which is expected to continue this week.

Chicago—Down ½-point to 100½ per cent, due to shifting equipment for repairs.

Detroit—Return of open hearths to service increased production 2 points to 89 per cent.

St. Louis—Maintained 98 per cent, the level held since April.

Cincinnati—Reduced 4½ points to 87 per cent.

New England—Loss of 1 point to 87 per cent. Two open hearths are down for repair.

Central eastern seaboard — Unchanged at 95½ per cent.

Cleveland—Furnace repairs forced a reduction of 3½ points to 92½.

Pittsburgh—Steady at 100 per cent for the third week.

Wheeling—Held production at 93 per cent for the third week.

Buffalo—Continued at 90½ per cent.

Birmingham, Ala. — Steelworks production was at 90 per cent.

Steel Ingot Statistics

	Estimated Production—All Companies								Calculated weekly produc- tion, all companies Net tons	Number of weeks in month
	—Open Hearth— Net tons	Per cent of capacity	—Bessemer— Net tons	Per cent of capacity	—Electric— Net tons	Per cent of capacity	—Total— Net tons	Per cent of capacity		
Based on Reports by Companies which in 1940 made 92.91% of the Open Hearth, 100% of the Bessemer and 85.82% of the Electric Ingot and Steel for Castings Production										
1941										
Jan. ..	6,276,429	99.1	451,637	76.0	200,019	91.0	6,928,085	96.9	1,563,902	4.43
Feb. ..	5,673,289	99.2	378,330	70.5	186,281	93.9	6,237,900	96.6	1,559,475	4.00
Mar. ..	6,461,936	102.0	460,169	77.4	209,536	95.4	7,131,641	99.7	1,609,851	4.43
1st quar	18,411,654	100.1	1,290,136	74.8	595,836	93.4	20,297,626	97.8	1,578,353	12.86
Apr. ..	6,135,941	100.0	395,009	68.6	225,999	106.2	6,756,949	97.6	1,575,046	4.29
May ..	6,365,172	100.5	444,361	74.8	243,705	110.9	7,053,238	98.7	1,592,153	4.43
June .	6,103,767	99.5	458,242	79.6	238,721	112.2	6,800,730	98.2	1,585,252	4.29
2nd qtr	18,604,880	100.0	1,297,612	74.3	708,425	109.8	20,610,917	98.2	1,584,237	13.01
1st half	37,016,534	100.1	2,587,748	74.5	1,304,261	101.6	40,908,543	98.0	1,581,312	25.87
July ..	6,089,859	96.3	489,239	82.5	242,584	110.6	6,821,682	95.6	1,543,367	4.42
Based on Reports by Companies which in 1940 made 98.43% of the Open Hearth, 100% of the Bessemer and 85.82% of the Electric Ingot and Steel for Castings Production										
1940										
Jan. ..	5,356,444	85.7	285,447	56.1	122,832	77.0	5,764,723	83.4	1,301,292	4.43
Feb. ..	4,208,249	72.1	205,458	43.2	112,090	75.2	4,525,797	70.0	1,093,188	4.14
Mar. ..	4,078,843	65.3	191,568	37.6	118,772	74.5	4,389,183	63.5	990,786	4.43
1st quar	13,643,536	74.4	682,473	45.7	353,694	75.6	14,679,703	72.3	1,129,208	13.00
Apr. ..	3,808,031	62.9	176,419	35.8	116,024	75.1	4,100,474	61.2	955,821	4.29
May ..	4,583,771	73.4	258,741	50.8	125,270	78.5	4,967,782	71.8	1,121,395	4.43
June .	5,222,120	86.3	305,115	61.9	130,208	84.3	5,657,443	84.5	1,318,751	4.29
2nd qtr.	13,613,922	74.2	740,275	49.5	371,502	79.3	14,725,699	72.5	1,131,875	13.01
1st half	27,257,458	74.3	1,422,748	47.6	725,196	77.4	29,405,402	72.4	1,130,542	26.01
July ..	5,269,701	84.5	322,567	63.5	132,357	83.2	5,724,625	83.0	1,295,164	4.42
Aug. ..	5,670,932	90.8	369,770	72.6	145,681	91.3	6,186,383	89.5	1,396,475	4.43
Sept. .	5,535,198	91.7	365,289	74.2	155,759	101.1	6,056,246	90.6	1,415,011	4.28
3rd qtr.	16,475,831	89.0	1,057,626	70.1	433,797	91.7	17,967,254	87.7	1,368,412	13.13
9 mos.	43,733,289	79.2	2,480,374	55.1	1,158,993	82.2	47,372,656	77.5	1,210,339	39.14
Oct. ..	6,059,792	97.0	408,317	80.2	176,433	110.6	6,644,542	96.1	1,499,897	4.43
Nov...	5,872,162	97.1	420,448	85.3	176,497	114.2	6,469,107	96.6	1,507,950	4.29
Dec. ..	5,907,840	94.8	399,434	78.6	188,083	118.2	6,495,357	94.1	1,469,538	4.42
4th qtr.	17,839,794	96.3	1,228,199	81.3	541,013	114.3	19,609,006	95.6	1,492,314	13.14
Total ..	61,573,083	83.5	3,708,573	61.7	1,700,006	90.3	66,981,662	82.1	1,281,210	52.28

The percentages of capacity for 1940 are calculated on weekly capacities of 1,410,130 net tons open hearth, 114,956 net tons Bessemer and 36,011 net tons electric ingots and steel for castings, total 1,561,097 net tons; based on annual capacities as of Dec. 31, 1939 as follows: Open hearth 73,721,592 net tons. Bessemer 6,009,920 net tons, electric 1,882,630 net tons.

The percentages of capacity for 1941 are calculated on weekly capacities of 1,430,102 net tons open hearth, 134,187 net tons Bessemer and 49,603 net tons electric ingots and steel for castings, total 1,613,892 net tons; based on annual capacities as of Dec. 31, 1940 as follows: Open hearth 74,565,510 net tons. Bessemer 6,996,520 net tons, electric 2,586,320 net tons.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Aug. 9	Change	Same week 1940	Same week 1939
Pittsburgh	100	None	86	52
Chicago	100.5	— 0.5	96.5	56
Eastern Pa. ...	95.5	None	89	43
Youngstown ..	98	None	82	55
Wheeling	93	None	99	79
Cleveland	92.5	— 3.5	85	80
Buffalo	90.5	None	88.5	60.5
Birmingham ..	90	None	88	70
New England..	87	— 1	80	70
Cincinnati	87	— 4.5	78	57
St. Louis	98	None	62.5	54.5
Detroit	89	+ 2	93	64
Average	98	— 0.5	90.5	62

Steel for Sale in June

6.5 Per Cent Below May

■ Steel produced for sale in June totaled 5,036,210 net tons, 358,025 tons or 6.5 per cent less than the revised figure of 5,444,235 tons in May, according to the American Iron and Steel Institute.

Exports in June were 327,357 tons, 9915 tons more than the revised total of 317,442 tons in May, a gain of 3.1 per cent. Shipments to other members of the industry for further conversion were 331,988 tons, compared with 359,388 tons in May, as revised, a decline of 27,400 tons, 7.6 per cent.

June production was 1,283,725 tons greater than the 3,802,485 tons shipped in June, 1940, up 33.7 per cent. Details for the month are presented in the table below.

Production in six months this year aggregated 31,284,263 tons, 51.4 per cent more than 20,657,771 tons in the corresponding period in 1940. Production for sale, less shipments to members of the industry for further conversion, related to estimated yield of 71.1 per cent of ingots, was 100.4 per cent of capacity in June and 102.6 per cent for six months.

1940	Output	Exported	Pct. Exported
Sept.	4,446,555	951,555	21.4
Oct.	4,937,388	783,652	15.87
Nov.	4,760,948	562,587	11.82
Dec.	4,909,448	713,802	14.5
Year	48,584,860	7,683,858	15.8
1941			
Jan.	5,163,912	558,198	10.8
Feb.	4,864,936	560,035	11.5
March	5,411,319	491,519	9.07
April	5,269,748	331,942	6.29
*May	5,444,235	317,442	5.8
June	5,086,210	327,357	6.4

* Revised.

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

June - 1941 (period)

		Number of companies	Items	Annual Capacity Net tons	Production for Sale—Net Tons: Current Month: Total	Current Month: Per cent of capacity	Current Month: Shipments: Export	Current Month: Shipments: To members of the industry for conversion into further finished products	Year to Date: Total	Year to Date: Per Cent of capacity	Year to Date: Shipments: Export	Year to Date: Shipments: To members of the industry for conversion into further finished products
Steel Products	Ingots, blooms, billets, slabs, sheet bars, etc.	35	1	xxxxxxx	415,375	xxx	43,070	168,297	2,939,207	xxx	580,840	944,106
	Heavy structural shapes	8	2	4,948,200	372,884	91.6	2,460	xxxxxxx	2,203,149	89.7	91,556	xxxxxxx
	Steel piling	4	3	422,000	26,798	77.2	2,358	xxxxxxx	177,255	84.7	14,186	xxxxxxx
	Plates—Sheared and Universal	19	4	6,168,590	467,843	92.2	19,245	2,194	2,715,602	88.7	199,082	13,298
	Skelp	8	5	xxxxxxx	88,875	xxx	22,528	36,295	529,946	xxx	91,877	216,794
	Rails—Standard (over 60 lbs.)	4	6	3,613,600	152,433	51.3	12,211	xxxxxxx	933,695	52.1	44,355	xxxxxxx
	Light (60 lbs. and under)	6	7	302,800	11,946	47.9	2,063	xxxxxxx	93,096	62.0	33,814	xxxxxxx
	All other (Incl. girder, guard, etc.)	2	8	102,000	3,207	38.2	359	xxxxxxx	13,034	25.8	1,858	xxxxxxx
	Splice bar and tie plates	15	9	1,300,200	61,076	57.1	1,330	xxxxxxx	388,558	60.2	9,663	xxxxxxx
	Bars—Merchant	35	10	xxxxxxx	495,780	xxx	24,680	56,522	3,182,801	xxx	276,439	356,820
	Concrete reinforcing—New billet	16	11	xxxxxxx	125,809	xxx	14,340	xxxxxxx	716,830	xxx	111,309	xxxxxxx
	Rerolling	17	12	xxxxxxx	19,398	xxx	1,770	xxxxxxx	87,259	xxx	6,623	xxxxxxx
	Cold finished—Carbon	19	13	xxxxxxx	100,600	xxx	1,510	xxxxxxx	607,682	xxx	10,821	xxxxxxx
	Alloy—Hot rolled	16	14	xxxxxxx	139,451	xxx	10,548	10,618	833,719	xxx	73,771	75,782
	Cold finished	16	15	xxxxxxx	15,928	xxx	1,467	xxxxxxx	95,782	xxx	11,339	xxxxxxx
	Hoops and baling bands	5	16	xxxxxxx	11,722	xxx	546	xxxxxxx	54,740	xxx	2,236	xxxxxxx
	TOTAL BARS	53	17	12,193,785	908,758	90.6	54,867	67,140	5,578,813	92.2	492,598	432,602
	Tool steel bars (rolled and forged)	16	18	127,870	10,505	99.8	568	xxxxxxx	55,659	87.7	3,921	xxxxxxx
	Pipe and tube—B. W.	13	19	2,049,200	124,035	73.3	10,996	xxxxxxx	764,733	75.2	62,529	xxxxxxx
	L. W.	8	20	885,260	42,916	58.9	2,526	xxxxxxx	240,220	54.7	16,570	xxxxxxx
	Electric weld	4	21	466,020	47,071	122.8	1,242	xxxxxxx	222,279	96.4	12,612	xxxxxxx
	Seamless	15	22	3,003,840	184,886	74.8	24,862	xxxxxxx	1,043,796	70.0	105,812	xxxxxxx
	Conduit	6	23	152,145	12,569	100.4	255	xxxxxxx	68,450	90.7	1,120	xxxxxxx
	Mechanical Tubing	12	24	461,725	37,527	98.8	2,525	xxxxxxx	233,634	102.0	21,892	xxxxxxx
	Wire rods	19	25	xxxxxxx	117,624	xxx	11,851	19,727	755,100	xxx	80,911	129,022
	Wire—Drawn	37	26	2,291,250	195,281	103.6	14,513	1,599	1,100,259	96.2	79,403	11,055
	Nails and staples	19	27	1,120,610	65,254	70.8	7,834	xxxxxxx	411,907	74.1	37,693	xxxxxxx
	Barbed and twisted	16	28	458,210	23,151	61.4	5,193	xxxxxxx	142,471	62.7	32,720	xxxxxxx
	Woven wire fence	15	29	771,180	28,031	44.2	195	xxxxxxx	168,761	44.1	1,112	xxxxxxx
	Bale ties	10	30	110,980	8,553	93.7	-	xxxxxxx	40,641	73.8	92	xxxxxxx
	All other wire products	5	31	24,280	593	29.7	-	xxxxxxx	3,248	27.0	-	xxxxxxx
	Fence posts	13	32	136,195	6,569	58.6	55	xxxxxxx	37,099	54.8	534	xxxxxxx
	Black plate	11	33	341,235	36,682	128.5	3,694	-	203,659	119.9	12,657	43
	Tin plate—Hot rolled	7	34	352,700	26,670	91.9	2,311	xxxxxxx	138,301	79.0	9,273	xxxxxxx
	Cold reduced	10	35	3,520,640	265,073	91.5	23,107	xxxxxxx	1,371,975	78.5	120,721	xxxxxxx
	Sheets—Hot rolled	24	36	xxxxxxx	586,368	xxx	20,648	15,585	3,915,570	xxx	160,206	112,419
	Galvanized	14	37	xxxxxxx	125,279	xxx	9,761	xxxxxxx	820,777	xxx	62,935	xxxxxxx
	Cold rolled	16	38	xxxxxxx	236,959	xxx	7,068	xxxxxxx	1,652,641	xxx	35,585	xxxxxxx
	All other	14	39	xxxxxxx	66,130	xxx	2,102	xxxxxxx	406,981	xxx	11,626	xxxxxxx
	TOTAL SHEETS	27	40	13,154,510	1,014,736	92.8	39,579	15,585	6,755,990	103.5	270,352	112,419
	Strip—Hot rolled	23	41	3,200,380	174,802	66.4	6,445	21,151	1,037,368	65.3	40,151	134,250
	Cold rolled	34	42	1,385,260	102,257	89.7	1,322	xxxxxxx	601,287	87.5	9,304	xxxxxxx
	Wheels (car, rolled steel)	5	43	422,825	20,934	60.2	61	xxxxxxx	127,078	60.6	299	xxxxxxx
	Axles	4	44	472,280	14,208	36.6	498	xxxxxxx	86,111	36.7	1,374	xxxxxxx
	Track spikes	11	45	327,275	15,776	58.6	250	xxxxxxx	90,071	55.5	1,668	xxxxxxx
	All other	4	46	24,100	1,912	96.4	-	xxxxxxx	11,401	95.4	79	xxxxxxx
	TOTAL STEEL PRODUCTS (a)	134	47	xxxxxxx	5,036,210	xxx	327,357	331,988	31,284,263	xxx	2,597,347	1,923,659
	Pig iron, ferro manganese and spiegel	24	48	xxxxxxx	619,530	xxx	54,981	214,836	3,792,447	xxx	280,797	1,144,992
	Ingot moulds	4	49	xxxxxxx	61,395	xxx	778	xxxxxxx	363,039	xxx	1,931	xxxxxxx
Iron Products	Bars	5	50	109,195	7,046	78.4	4	623	32,832	60.6	20	2,092
	Pipe and tubes	3	51	109,300	5,735	63.8	315	xxxxxxx	32,456	59.8	1,204	xxxxxxx
	All other	2	52	71,000	1,450	24.8	428	-	9,249	26.3	1,669	-
	TOTAL IRON PRODUCTS (ITEMS 50 to 52)	11	53	224,995	14,231	76.9	807	623	74,537	66.8	2,893	2,092

Total Number of Companies Included - 151

(a) Reported by Companies which in 1940 produced 96.5% of that year's total output of Finished Rolled Products.

The estimated average yield of products for sale from ingots produced by the companies included above is 71.1%, which applied to their total ingot capacity equals 57,546,000 net tons of finished rolled products.

Production for sale, less shipments to members of the industry for further conversion, related to the estimated yield is as follows:

Current month 4,754,222 *N. T.;* 100.4 %

Year to date 29,290,504 *N. T.;* 102.6 %

Britain Reorganizing Steel Industry; Concentrating Production Resources

■ LONDON—(*By Cable*)—Reorganization of the iron and steel industry in Great Britain now is under way. Included in the plan are makers of castings.

Steelworks, equipment and labor will be concentrated on the most needed products, unessential works will be closed, and in some instances labor moved to areas where plants will be continued in operation.

The proposed plan is to make Great Britain more self-sufficient. All requirements for raw steel now are said to be met "satisfactorily."

"Feelings of Uneasiness" Caused By Quiet Steel Demand

Steel demand in Britain in June was "so quiet and orders so scarce as to rouse feelings of uneasiness," states the editor of *The British Steelmaker*, London, in the July issue of that publication. British steel demand in June was the quietest since the war began.

"How could we afford, at this crucial stage of the war, to have any of our steel plants or rolling mills working at less than capacity? What possible reason could justify any slackening of shipbuilding demand for steel when the Battle of the Atlantic was still raging, when every ship we possessed was required to bring in the foodstuffs, the munitions and the oil to carry us on?" asked the editor, continuing:

"Various unofficial explanations have been offered for this phenomenon, which has no precedent in the last war. From America, however, comes an explanation which would account, at least partially, for the lull in orders.

"According to the American magazine STEEL, the British Iron & Steel Corp., in the course of their heavy buying of American steel last year, bought an extra amount for use in the event of British steel production failing to come up to schedule. It is claimed now, however, that, despite bombing raids, British production has exceeded the schedules originally set around the middle of last year. Not only have the British buyers asked for a two-month suspension of steel shipments but they have made relatively few American purchases this year. The stocks accumulated are apparently regarded as a sufficient safeguard against any interruption.

"This explanation makes very satisfactory reading, but no doubt the British Iron & Steel Corp. will realize the advisability of keeping the steel reserve stocks intact in case the German bombers should prove to be more destructive in the future than they have in the past.

"The coming winter, with its added dangers to shipping from tempests and enemy action, is bound to be weighing heavily in the minds of the officials in the Ministry of Supply charged with the responsibility of keeping the wheels of the steel industry turning, and they are doubtless anxicus to hold as long as possible the accumulated stocks of pig iron, steel ingots and semis. Rather than that the re-rolling industry should work short time, however, it appears to us that it would be better to operate rolling mills to capacity and convert these semis into finished form.

Worked on More Slender Reserves

"A favorite and plausible explanation was that the huge stocks of American finished steel products, accumulated most wisely by the British Iron & Steel Corp. to safeguard the consumers' position in case a number of British steelworks should be bombed out of production, had given such a sense of security to consumers, that they were content to work on much more slender stock reserves than usual. Assured that whatever might happen to their usual supplies, steel materials would be available in plenty, consumers were only ordering their immediate and urgent requirements, and literally working from hand to mouth.

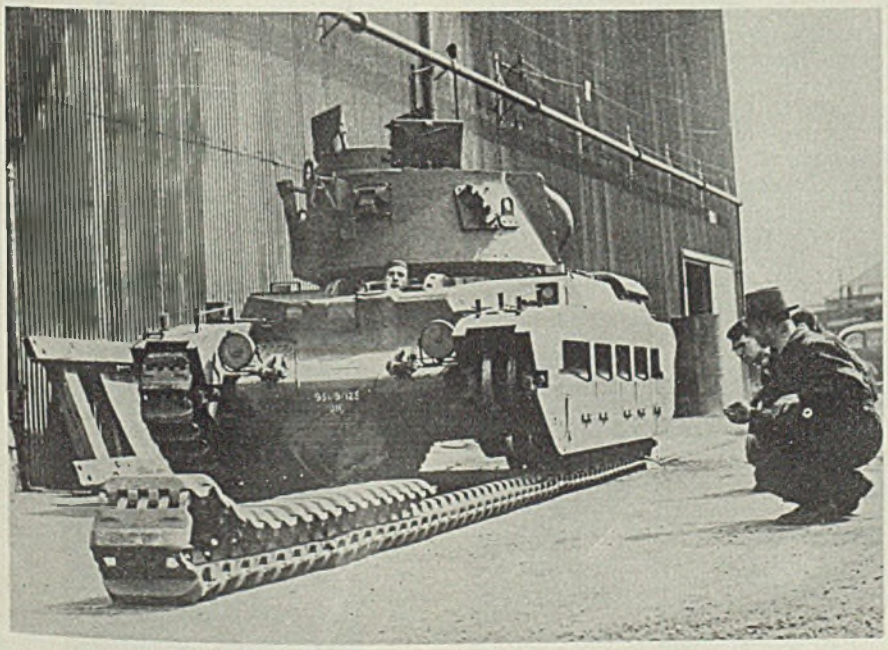
"Another explanation which gained currency was that the rigid refusal of licenses or authorizations for all but the most urgent and essential war work, and the consequent stoppage of all other steel construction, had effected a drastic curtailment in steel consumption. As part and parcel of this second explanation the refusal of all export licenses for steel represented a further negation of items in makers' order-books.

"Cited as, at least, an additional cause of the slackness in orders was the fact that stock merchants' licensed tonnages had been drastically cut for the second quarter. Most merchants, it was said, had exhausted their meager quotas by the middle of the quarter, and were therefore obliged to defer ordering any more steel until the beginning of the third quarter.

"A fourth explanation was based on the emphasis placed by the Iron and Steel Control on the need for conserving raw materials, the import of which would of necessity be curtailed to permit the reservation of shipping space for the more essential foodstuffs, American planes,

(*Please turn to Page* 137)

Final Step in Assembly of British Tank



■ Mounting the track is the last step in production of this heavy tank, manufactured in England. The tread is extended and the tank driven onto it, after which the ends are fastened together to form an endless track. NEA photo passed by the British censor

MEN of INDUSTRY

■ **L. B. WORTHINGTON** has been appointed manager of sales, bar, strip and semifinished materials division, Carnegie-Illinois Steel Corp., Pittsburgh. He succeeds the late Thomas J. Bray Jr. Mr. Worthington's entire business career has been spent with Carnegie-Illinois. He began at the South Chicago works as a sales apprentice in 1923, and after serving in various positions in the general sales department in Chicago, he subsequently was made assistant manager of sales at Chicago; manager of sales, St. Paul district; and assistant manager of sales at Detroit.

♦

Henry L. Charlton has been appointed vice president, Reynolds Metals Co., in charge of building and operating Longview, Wash., and Listerhill, Ala., plants.

♦

John Heywood Smith, who joined Cramp Shipbuilding Co., Philadelphia, in June, as assistant to the president, has been appointed manager of procurement, in charge of all purchases and storekeeping activities. He succeeds **H. W. Schweizer.**

♦

Jay L. Hench, since 1922, vice president, Hillside Fluor Spar Mines, Chicago, has been elected president and treasurer, to succeed the late George H. Jones. Other officers include **R. J. Jarratt,** vice president, and **M. J. Lundberg,** secretary.

Mr. Hench has also been elected president and treasurer, Mid-West Forging & Mfg. Co., Chicago, succeeding the late Mr. Jones. Officers of the Mid-West company are: Vice president, **R. C. Hench;** secretary and assistant treasurer, **J. R. Wilson.**

A. C. Meixner

L. B. Worthington

♦

Frank R. Burnett has been appointed assistant chief engineer, Carnegie-Illinois Steel Corp., Pittsburgh. Associated with United States Steel Corp. subsidiaries many years, Mr. Burnett has been construction superintendent for Carnegie-Illinois since November, 1939.

♦

Park G. Forcier has been elected executive vice president and general manager, Carpenter Metal Products Co., Cleveland. Mr. Forcier joined the company two years ago as industrial sales representative, and later was promoted to sales manager and general superintendent.

♦

J. B. Walker has been named sales manager, transportation and generator division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., to succeed the late Ralph O. Watson. He has been associated with Westinghouse since 1925 and was manager of the generator section in the transportation and generator division since 1939. He has been succeeded in that post by **A. C. Meixner,** who has been identified with the company since 1930.

♦

Carl E. Cromer, associated with Granite City Steel Co., Granite City, Ill., about 20 years, has been appointed open-hearth superintendent, succeeding **Maj. J. W. Mills,** who will remain in an advisory capacity. Mr. Cromer has served successively as chief chemist, assistant metallurgist and assistant open-hearth superintendent.

♦

George B. Ewing Jr. has joined the Houston, Tex., sales staff of Foxboro Co., Foxboro, Mass.

♦

Sampson O. Miller has been appointed supervisor, engineering and research, electric cable works, American Steel & Wire Co., Worcester, Mass., while **Evald O. Wahlstrom** has been named to succeed Mr. Miller as transmission engineer. **Robert S. Horner,** an electrical engineer in the electric cable works, has been made products engineer, and **Walter T. Pierce,** chief operating and development engineer at the cable works, has become consulting electrical engineer.

♦

Donald G. Millar, chairman of the board, Greenfield Tap & Die Corp., Greenfield, Mass., has been elected president to fill a vacancy created by resignation of **Howard M. Hubbard,** effective Aug. 31. Mr. Hubbard will become president, Elliott Co., Jeannette, Pa., maker of turbo-electric equipment, Oct. 1.

♦

W. B. Marshall, heretofore assistant sales manager, Conveying and Engineering Products Division, Chain Belt Co., Milwaukee, has been promoted to sales manager of that

J. B. Walker

division. He has been associated with the company since 1920.

B. E. Sivyer, formerly San Francisco branch manager, has been transferred to Milwaukee as assistant sales manager, Chain Belt and Transmission Division. He has been with Chain Belt ten years.

S. Y. Warner, recently in the company's Los Angeles office, replaces Mr. Sivyer as manager at San Francisco.

♦

Edward M. Kimball has been appointed New England representative for McKenna Metals Co., Latrobe, Pa., with headquarters at 50 Church street, New York.

♦

E. F. Watts, advertising and sales promotion manager, Binks Mfg. Co., Chicago, has been elected a vice president. **P. L. Griffin,** until recently auditor, Edison General Electric Appliance Co. Inc., Chicago, has been elected a director of Binks and will take charge of the industrial division of the company.

First Half Malleable Castings Up 67.6%

■ Sharp increase in production and shipments of malleable iron castings during first half this year is reported by the Bureau of the Census. A total of 415,938 net tons was produced in the first six months this year, compared with 248,156 tons in the same period last year, a gain of 67.6 per cent. Shipments in first half this year were 410,350, compared with 255,215 tons in the corresponding period last year.

Orders booked, less cancellations, totaled 486,481 tons, compared with 218,425 tons.

Disband Defense Group

■ At a meeting of representatives of iron and steel companies in New York last Friday it was decided to disband the Iron and Steel Industry Defense Committee which was named by the industry May 7.

The action was taken as a result of the recent appointment by OPM of an advisory committee of 16 iron and steel executives.

Townspeople Save Plant

■ H. K. Porter Co., Pittsburgh, manufacturer of locomotives, has taken an option on a defunct foundry at Blairsville, Pa., which had been sold by its owners to a wrecking concern. Townspeople bought the plant from the wrecker, and rehabilitated it as far as possible with voluntary labor. Plans for operation of the plant are indefinite, according to the company, but action may be taken shortly.

Bonneville and Coulee, Plus Defense, Bring "Prosperity" to Northwest

SEATTLE

■ INDUSTRIAL developments in Washington and Oregon, stimulated by low-cost power, are keeping pace with the tempo of national defense. Activity in the two states, measured by employment and production, has already equalled the peak of World War I and promises to far surpass it.

Power output at Bonneville and Grand Coulee on the Columbia river now overshadows in importance the various irrigation projects which were the deciding factors when the improvements were proposed. Completion of these projects has been timely, as they are serving industries that are essential to national defense.

Generating capacity at both dams is being increased as rapidly as possible. The two plants now produce a total of 208,400 kilowatts of power, and this will be stepped up to 518,400 by Jan. 1, 1942.

In April, 1942, a third generating unit at Grand Coulee will be placed in service, raising the combined capacity to 626,400 kilowatts.

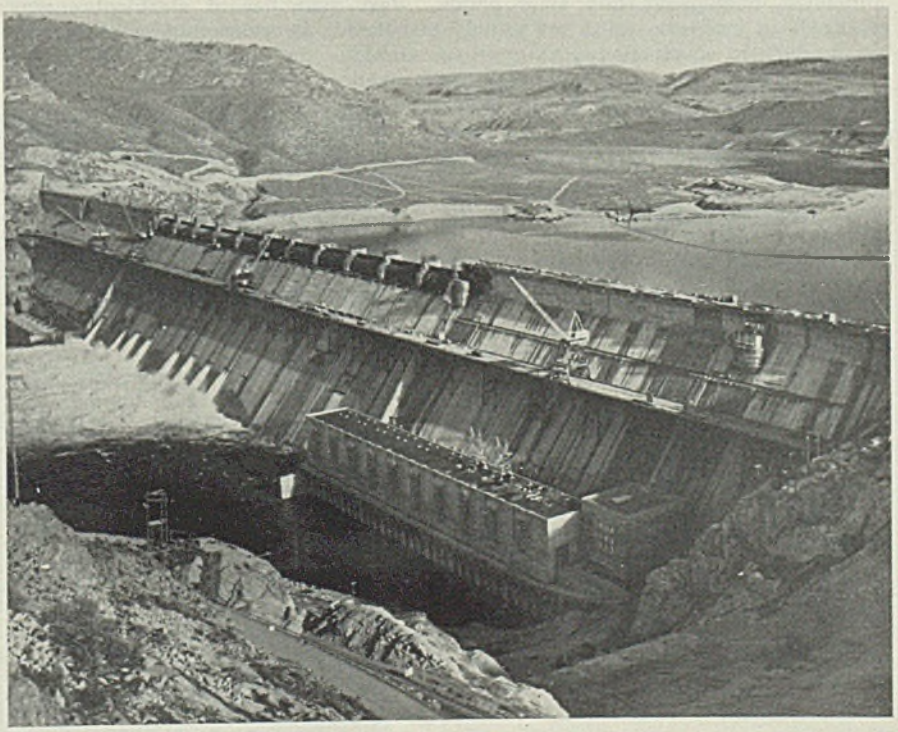
The government recently ordered three 108,000-kilowatt generators for Grand Coulee from Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., on a bid of $2,697,785. These will be installed by the fall of 1943. Ultimate capacity of the Bonneville-Grand Coulee system will be approximately 2,500,000 kilowatts.

To date the Bonneville Power Administration has negotiated contracts to sell Columbia river power to six industries important to defense. These are concerned mainly with production of electro-metallurgical and electro-chemical materials. Following is a list of Bonneville power commitments to these industries:

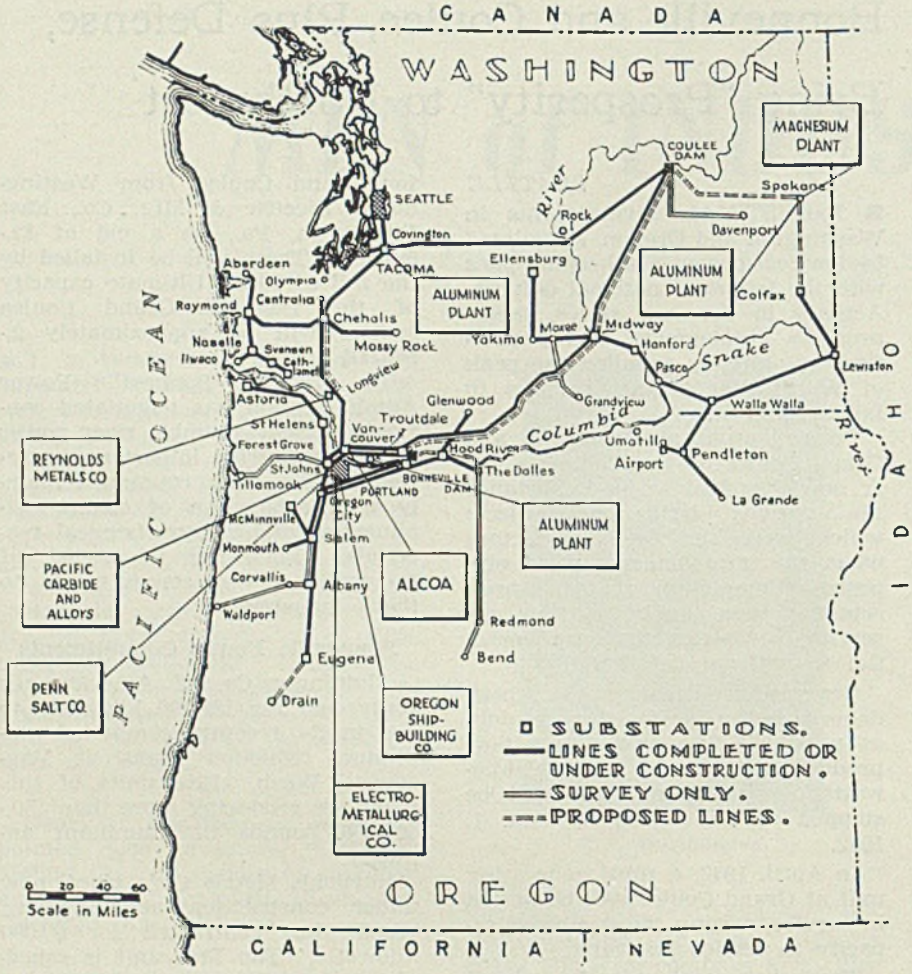
Bonneville Power Commitments

Aluminum Co. of America has contracted for 182,500 kilowatts to use in its recently completed aluminum reduction plant at Vancouver, Wash. Five units of this plant are producing more than 150,000,000 pounds of aluminum annually.

Reynolds Metals Co.'s plant, now under construction at Longview, Wash., has contracted for 60,000 kilowatts. The first unit is scheduled to begin production in August, using 20,000 kilowatts. Present



■ Grand Coulee power is now on the Bonneville-Coulee line which is furnishing electricity to the Northwest, principally large electro-chemical and electro-metallurgical industries of primary importance to the national defense program. The Bureau of Reclamation supervised construction of this dam, on the Columbia river, Washington



■ **Importance to defense of the Bonneville-Grand Coulee power projects is graphically illustrated in this map of the Pacific Northwest showing location of the dams and generating stations, power lines completed and proposed and aluminum, magnesium and other plants. Vast quantities of electrical energy, available at moderate rates, are mainly responsible for concentration of facilities for production of aluminum, magnesium, carbides and other materials in this area. NEA photo**

plans call for completion of the three-unit plant by April, 1942. Production is designed for 60,000,000 pounds annually.

Pacific Carbide & Alloys Co.'s plant at Portland, Oreg., is in full operation using 2000 kilowatts in production of carbide, ferromanganese, ferrochrome and ferrosilicon.

Electro Metallurgical Co., unit of Union Carbide and Carbon Corp., New York, is erecting a plant near Portland, and plans to start operations in February, 1942, with initial delivery of 10,000 kilowatts, increasing to 13,000 kilowatts by next May. The plant will produce ferroalloys and alloying metals important to steel manufacture, and calcium carbide, the raw material from which acetylene, acetone and other defense requirements are made.

The Pennsylvania Salt Mfg. Co. of Washington, with a large plant at Tacoma, is constructing a sodium chlorate factory at Portland and has contracted for 2000 kilowatts of Bonneville power, initial delivery before Jan. 1.

Oregon Shipbuilding Co., Portland, now using 2500 kilowatts in government shipbuilding contracts, has an agreement with Bonneville for delivery of 6000 to 10,000 kilowatts.

When in full operation, it is said these six plants will consume a total of 265,000 kilowatts of Bonneville-Grand Coulee power.

Government plans call for construction of four more defense industries in the Pacific Northwest. These include:

One near Bonneville dam to have capacity for producing 100,000,000 pounds of aluminum annually, using 97,000 kilowatts.

Two at Spokane, Wash., one to produce 60,000,000 pounds of aluminum a year using 65,000 kilowatts, the second a plant to produce 24,000,000 pounds of magnesium annually, using 35,000 kilowatts; an aluminum plant at Tacoma, Wash., with capacity for 30,000,000 pounds, consuming 32,500 kilowatts.

The Todd California Shipbuilding Corp., through its chemical engineering division, has requested reservation of 40,000 kilowatts until Sept. 30, 1941, for a proposed magnesium plant to be erected in the Bonneville-Grand Coulee area, contingent on successful operation of a similar plant now nearing completion at Permanente, Calif. Administrator Paul J. Raver is considering reservation of 35,000 kilowatts, upon approval of OPM.

In view of increased aluminum and magnesium production in the Pacific Northwest, the Department of the Interior and Bonneville Power Administration have initiated discussions with the object of establishing in this region fabricating plants to process these defense materials. This would eliminate the present practice of shipping pig metal to eastern mills to be processed and shipped back to airplane factories and other industries on the Pacific coast.

Proposed Plant Expansions

While there has been considerable talk regarding the possible location of new iron and steel mills in this area nothing has developed. Government officials have been the principal proponents of such plants. More conservative sentiment favors expansion of existing facilities. Prior to the present emergency rolling mill capacity in the Pacific Northwest has exceeded normal requirements. However, the combination of abundant low-cost hydroelectric power and tidewater shipping facilities on the Columbia river has stimulated interest.

Increased need for steel is reflected in the proposal to expand the capacity of three Seattle plants. OPM has allocated $2,000,000, to include an additional open-hearth furnace at the four now in operation at Bethlehem Steel's Seattle plant, and other facilities there; new foundry for Pacific Car & Foundry Co., and expansion of heavy forging facilities at the plant of Isaacson Iron Works. Northwest Steel Rolling Mills Inc. is adding an electric furnace to its equipment.

Following investigations in the state of Washington, the United States Bureau of Mines reports that the ability of local coals to yield suitable coke is an important factor in favor of new iron and steel plants here. Dr. R. R. Sayers, director of the bureau, says the coals found in this area would yield a sufficient quantity of coke for the purpose. Except for a higher ash content, it is stated, this coke would be equal in quality to coke generally used in the East. Dr. Sayers further indicates that

locally-produced coke would be suitable for certain electro-chemical and electro-metallurgical industries which might be attracted to the region.

Experiments at Washington State College, Pullman, are reported to have developed a new process whereby magnesium of exceptionally high purity may be produced in commercial quantities "at 10 cents a pound" from raw materials found in abundance in this state. This is reported to be an "outstanding discovery," and seems to presage the production of magnesium on a large scale. The electrothermic process perfected at the pilot plant at Pullman produces magnesium 99.07 per cent pure.

As a result of experiments at Pullman, Manganese Products Inc. plans to establish in the near future a plant at Tacoma to process manganese silicate ores found in quantity on the Olympic Peninsula. Near Enumclaw, Wash., a large body of alunite ore has been discovered sufficient to supply the proposed plant for 15 years.

Interchange Contracts In Effect

To form an integrated system covering the Pacific Northwest, interchange contracts are in effect between the Bonneville Power Administration and the municipal plants at Tacoma and Seattle in an interconnection circuit. The Tacoma interchange contract extends for a 10-year period and provides for interchange of power on a repayment-in-kind basis up to 50,000,000 kilowatt-hours. The capacity of the Tacoma system at the time the agreement was signed was 140,000 kilowatts.

The Seattle City Light system signed a similar contract for mutual interchange up to 100,000,000 kilowatt hours. Its capacity at the time was rated at 231,556 kilowatts.

The Seattle system is interconnected with the Puget Sound Power & Light Co., although Bonneville has no direct connection with that system. Both the Tacoma and Seattle contracts contain clauses for emergency relief.

The transmission network serving the Puget Sound area consists of the Vancouver-Covington 230,000-volt line, the Covington substation, a 230,000-volt 11-mile line north from the latter point to Renton for the Seattle interconnection and a 115,000-volt line 13 miles west to the Tacoma interconnection.

In addition to the above lines, the Covington-Grand Coulee 230,000-volt line is scheduled for completion in 1942. It will complete the circuit connecting four of the area's public power plants, Tacoma, Seattle, Grand Coulee and Bonneville.

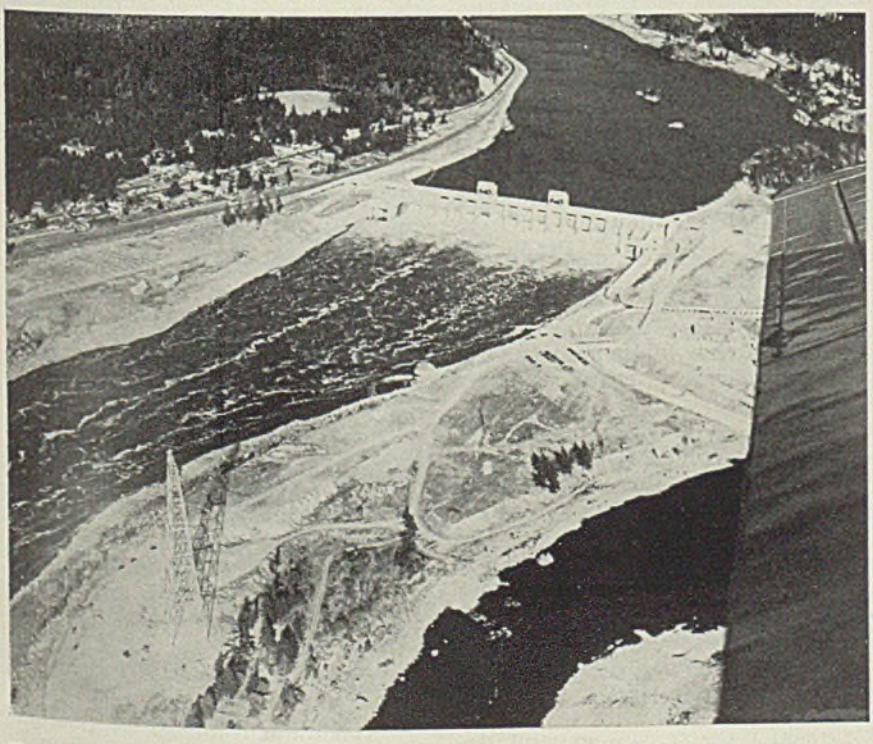
To serve the plant of the Aluminum Co. of America at Vancouver, two 115,000-volt lines carry power into the Alcoa substation from the North Vancouver substation. Two additional 115,000-volt lines are now under construction.

Shipbuilding and airplane manufacture have been major beneficiaries of the defense program. The Boeing Aircraft Co. in the last 18 months has trebled its capacity at Seattle. OPM plans now include another factory for this firm to produce special types of planes for military purposes. Details are not available at this time.

It is estimated that with contracts in hand and work yet to be placed the steel shipbuilding plants in Washington and Oregon would be kept busy eight or ten years.

Private plants here have taken a large amount of Navy construction work. Rebuilding the American merchant marine and constructing freighters for the Allies are taxing yard and ways capacity. New steel shipbuilding plants have been established at Seattle, Tacoma and Portland. Others are contemplated. The emergency also has revived wooden shipbuilding.

Such activities are reflected throughout the industrial fabric of the entire region. Many subcontracts for shipbuilding and federal projects of various kinds have been awarded to smaller plants, and "prosperity" is here again!



■ Air view of Bonneville dam on the Columbia river near Portland, Oreg.

Shenango Tin Mills To Operate at Capacity

■ Carnegie-Illinois Steel Corp. has scheduled capacity operation at its Shenango tin plate plant, New Castle, Pa., Aug. 18, when ten additional hot mills will be put in operation. This will be the first time all 40 hot mills at this plant have been in production since 1939.

The plant had been idle 18 months when 20 mills were started June 16, to meet increased demand for hot-rolled tin plate. Ten more units were started July 14. Total employment at the plant will be 3500 men, many recalled former employes.

Molybdenum Steels To Be Subject of Lecture

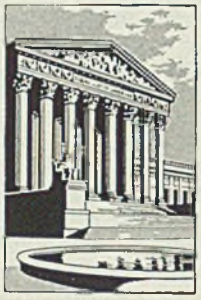
■ With industry facing a growing shortage of tungsten, the Office of Production Management has issued an urgent call to the country's metal technical societies to organize courses of instruction in the heat treatment of substitute molybdenum-type "high speed" tool steels.

The appeal was made simultaneously with a recent OPM priorities order requiring everyone ordering conventional tungsten-type high speed steels to accept half their requirements in molybdenum steel.

The first such lecture in the New Jersey district will be given at Essex House, Newark, Monday evening, Aug. 18, by J. V. Emmons, metallurgist, Cleveland Twist Drill Co. Title of the lecture will be "The Current Types, Heat Treatment and Uses of Molybdenum High Speed Steels."

Windows of WASHINGTON

New rating issued by Priorities Director Stettinius to assure flow of repair and maintenance parts to essential industries . . . OPM seeks increase in bessemer steel production to conserve scrap . . . Construction of 78,000-ton plate mill at Sparrows Point recommended . . . OPACS grants REA limited allocations for aluminum, zinc, copper and steel to continue electrification program



By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ ASSURING steady flow of maintenance and repair parts to essential industries, E. R. Stettinius Jr., Director of Priorities, announced last Friday that a new maintenance and repairs rating plan is being made available at once to more than 150,000 producers, manufacturers and agencies in nine industrial classifications.

Additional industrial classifications will be added to the list as rapidly as facilities permit.

Those granted use of the plan will get an A-10 rating which they can apply to their orders for necessary repair and maintenance parts. Industrial classifications in which plan is being made immediately available are:

1. Commercial air lines maintaining regular scheduled service.
2. Explosives; plants engaged principally in manufacturing explosives.
3. Metallurgical plants engaged in the production of metals and alloys.
4. Mines; including ore dressing and processing plants and smelting facilities.
5. Federal, state, county and municipal services—Protective services (fire and police); utilities, electrical energy, production and distribution; gas production and distribution (manufactured and natural); water production and distribution; sewer service; common carrier passenger transportation by urban, suburban, and interurban electric railways, also by urban and suburban motor and electric coach.
6. Public utilities (privately owned)—electrical energy (production and distribution); gas production and distribution (manufactured and natural); water production and distribution, and sewer service.
7. Railroads.
8. Coke converters.
9. Common carrier passenger transportation by urban, suburban and interurban electric railways, also by urban and suburban motor and electric coach (privately owned).

A-10 rating is not automatically available to any producer, manufacturer or agency in one or more of these classifications. Before any person may use the rating, he must apply for its use on special form, PD-67, which may be obtained by writing to Priorities Division, Maintenance and Repairs Section, or by writing to any one of the Priorities Division's field offices.

Copies of application forms will be available in these offices this week. If an application is granted, the approved firm or agency will receive an authenticated copy of the new order, P-22-A. Each producer or agency granted use of the rating must agree to its terms in writing, executing copy of order and filing it with Priorities Division before the rating can be applied.

Steel Valve Defense Industry Committee Named

Appointment of nine members of a Steel Valve Defense Industry Advisory Committee was announced last week by the Bureau of Clearance of Defense Industry Advisory Committees, Office of Production Management.

The committee is composed of manufacturers of cast steel valves, which are vital in the construction and equipment of naval and merchant ships.

Carl M. Lynge, of the Division of Production, has been designated government presiding officer of the committee. Membership follows:

W. B. Holton Jr., president, Walworth Co. Inc., New York.
Ernest Cochran, sales manager, Chapman Valve Mfg. Co., Indian Orchard, Mass.
J. P. Ferguson, sales manager, Reading-Pratt & Cady Co. Inc., Hartford, Conn.
O. F. Gang, vice president, William Powell Co., New York.
Bernard J. Lee Sr., vice president, Jenkins Bros., Bridgeport, Conn.
W. H. Pape, manager of sales, valves and fitting division, Crane Co., Chicago.
Charles W. Burrage, secretary, Lunkenheimer Co., Cincinnati, O.
W. G. Swaney, general manager, Kerotest Mfg. Co., Pittsburgh.
W. F. Crawford, president, Edward Valve & Mfg. Co., East Chicago, Ind.

OPM Seeks Proposals for Air Conditioning Furnaces

In line with the government's policy to improve present facilities in the interest of speed as supplements to building entirely new plants, OPM has sent out another set of telegrams to steelmakers, asking them to submit proposals for air-conditioning blast furnaces; also for lists of blast furnaces which might be enlarged.

Again it is requested that lists be made up of steels which could be produced from bessemer instead of open-hearth grades. The program ties in with the proposition of expanding pig iron capacity some 6,500,000 tons yearly.

Priorities Division Opens Three More Field Offices

Three new field offices are being opened by the Priorities Division, Office of Production Management, in addition to 13 offices opened recently.

The three will be in Los Angeles, Seattle and Kansas City. The latter is a branch of the St. Louis office and will be operated by Clifford H. Carr as assistant district manager.

The Seattle district office will be in charge of William D. Shannon as district manager.

The Los Angeles office will be operated by G. Howard Hutchins as district manager.

Appointment of A. V. Bourque, Tulsa, Okla., as tank car consultant

was announced by Ralph Budd, transportation commissioner, Office for Emergency Management.

Government May Sponsor List of Standard Steels

A government-sponsored list of standard steels may be issued as a result of discussions by the Office of Production Management with steel producers and consumers.

This is expected to clarify uncertainties arising from the fact that the government, suppliers and fabricators now are confronted with several sets of specifications, namely, the American Iron and Steel Institute's lists of significant steels; specifications formulated by the American Society of Automotive Engineers, American Society of Testing Materials, by the Army and Navy and other groups.

The advisability of simplifying the matter with a list approved by the government was considered at a preliminary meeting in Washington last week. Another meeting at which it is hoped practically all industries participating in government work will be represented is to be held later.

In the meantime, Donald Nelson, in charge of purchases, is working on the problem.

Asks for Proposals on Expanding Bessemer Capacity

The office of Production Management has asked steel companies to submit proposals for expanding capacity to produce bessemer ingots.

A first step toward increasing bessemer capacity was taken by the Office of Production Management July 23, when it recommended an initial expansion of 6,508,950 tons in annual pig iron capacity. This program included construction of two new bessemer converters, with an annual steel capacity of 600,000 tons, at the Edgar Thomson works of the Carnegie-Illinois Steel Corp. at Braddock, Pa. Construction of the new facilities is to begin immediately. It is expected construction of additional bessemer capacity will require 12 months, air conditioning of blast furnaces 6 to 12 months, and enlargement of blast furnaces about 6 months.

Recommends Construction of Plate Mill at Sparrows Point

OPM has recommended construction of a 78,000-ton high speed plate mill at the Sparrows Point plant of the Bethlehem Steel Co., to cost an estimated $23,097,000. The recommendation was made at the request of Eugene G. Grace, president of Bethlehem, as a partial solution of the critical plate situation.

William S. Knudsen, director general of OPM, stated the Sparrows Point project would supply additional plates several months earlier than any other proposals recently submitted to OPM.

The proposed construction includes, in addition to the 132-inch continuous plate mill, an open-hearth furnace with an annual capacity of 180,000 tons. Steel to operate the mill would be obtained from this furnace and additional furnaces existing at the plant, besides three other company financed open-hearth furnaces now being completed.

REA Assured Limited Supplies for Continuing Electrification Program

Office of price administration and Civilian Supply last week took action to enable the Rural Electrification Administration to continue its construction program by granting it limited allocations for copper, steel, zinc and aluminum. Extension of rural electrification and continuation of the REA's plans is considered by OPACS an essential contribution to the maintenance of public welfare and civilian morale.

REA has proposed to wire 400,000 farms in the next 18 months at the rate of approximately 22,000 farms per month. Allocation program will furnish sufficient material to enable REA to make up the existing five months' lag and to proceed with plans at the reduced rate of 11,000 farms a month.

Allocation program, subject to certain stipulations, specifies that in each of the six months beginning with August, 1941, the following amounts of material shall be made available to REA: copper, 4500 net tons; steel, 3100 tons; zinc, 140 tons; and aluminum, 3.5 tons.

OEM Establishes Ten Public Relations Bureaus

At least ten regional offices have been set up as public relations bureaus under the Office of Emergency Management, Division of Information. Information on defense projects is given through these offices by radio, press and speakers. Individuals who apply to the offices are "steered" to the proper channels. In charge at Washington is Robert Horton, Social Security building, as director.

Most of the men are former newspaper workers. They have titles of regional information officers except two who are known as regional information consultants—Samuel Slotky, Cleveland, and Tams Bixby III, Dallas. Listed are:

Dowsley Clark, 1800 Rand Tower building, Minneapolis, for Montana, North Dakota, South Dakota and Minnesota.

Marvin Cox, Federal Reserve Bank building, Atlanta, for Florida, Georgia, Alabama, Tennessee and Mississippi.

W. J. Dougherty, Federal Reserve Bank building, Philadelphia, for Pennsylvania, Delaware, Maryland and New Jersey.

Dudley Hovey, Federal Reserve Bank building, Boston, for New England.

Dean Jennings, Federal Reserve Bank building, San Francisco, for Washington, Oregon, Idaho, California and Utah.

Paul Jordan, 2105 Merchandise Mart, Chicago, for Wisconsin, Michigan, Illinois and Indiana.

Marvin McAlister, Federal Reserve Bank building, St. Louis, for Missouri, Iowa, Nebraska and Kansas.

Clifton Read, Federal Reserve Bank building, New York, for New York.

L. L. Sisk, Federal Reserve Bank, Dallas, for Oklahoma, Arkansas, Texas and Louisiana.

Tams Bixby III, Federal Reserve Bank building, Dallas, for territory as noted above, and assisting Mr. Sisk.

Samuel Slotky, Federal Reserve Bank building, Cleveland, for Ohio and Kentucky.

Cutting Tool Manufacturers Are Given A-1-a Rating

E. R. Stettinius Jr., director of pri-priorities, has issued a limited blanket preference rating to approximately 100 cutting tool manufacturers, who may apply a rating of A-1-a to deliveries from their suppliers.

Provisions are made so that suppliers may extend the rating to their own suppliers.

The A-1-a preference rating, however, is to be used by the manufacturers only for the production of specified defense products. These defense products are defined as:

"Drills of all types and sizes; reamers; countersinks; counterbores; milling cutters of all sizes and types; hobs of all sizes and types; taps; high speed chasers for self-opening die heads; high-speed chasers for collapsing taps; machine broaches; and cemented carbide cutting tools of all types."

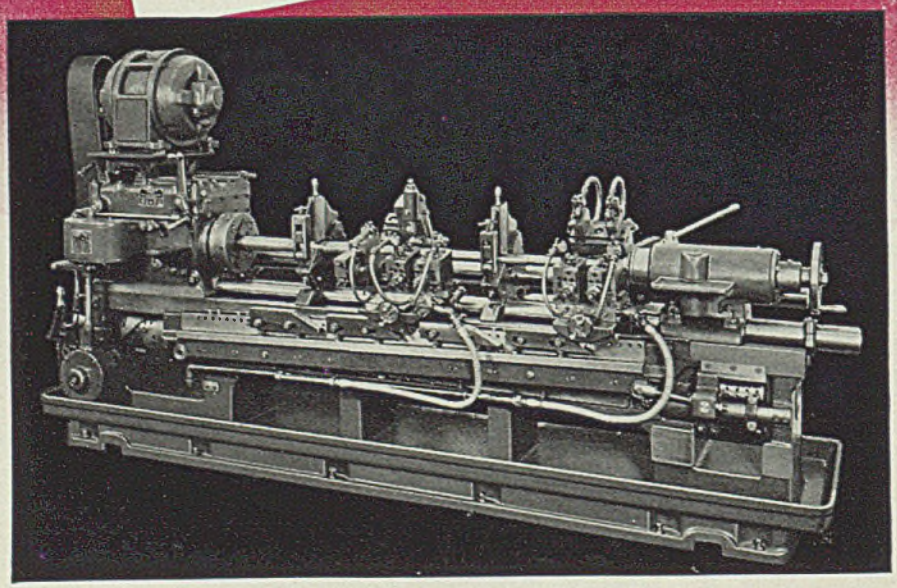
In addition, it is stipulated the rating may only be applied to deliveries of certain specified materials set forth in an exhibit A of the order. The materials to which the preference rating may be applied are:

High speed steel, carbon tool steel and alloy steel bars, sheets, rods, shapes, forgings and castings; cutting tools, including cemented carbides; abrasives; measuring instruments and gages; maintenance and shop supplies (restricted to items necessary for proper operation and maintenance of manufacturing equipment and facilities).

The blanket preference rating is P-18. Use of the rating applied to future orders as well as to present orders, is designed to eliminate much paper work involved in making individual applications. The new order affects materials going into cutting tools. Another order issued on July 25, relates only to the distribution of these tools.

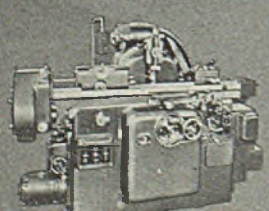
JAMES NASMYTH

IN 1851 at the Crystal Palace, London, the Duke of Wellington, James Nasmyth and Joseph Whitworth saw six American rifles taken apart, saw the parts shuffled and six rifles quickly assembled from parts chosen at random. Thus was interchangeable manufacturing introduced to England from a Vermont shop, of which the Jones & Lamson Machine Company is a direct successor. Thus also did this Vermont machine tool shop win the contract for equipping Britain's Enfield Armory — an early and bright chapter in Anglo-American cooperation.



Jones & Lamson 12 x 81" Fay Automatic Lathe tooled to machine an aircraft cannon

AUTOMATIC THREAD GRINDERS



OPTICAL COMPARATORS

RAM TYPE UNIVERSAL TURRET LATHE

knew a good thing

when he saw it.

NINETY years have passed since James Nasmyth, famous British engineer, arranged for a Vermont machine tool shop to equip the Enfield Armory for interchangeable manufacturing.

Today Britain again needs weapons and needs them desperately, and the same Vermont machine tool builders are gladly playing their part in the nation-wide effort to arm their friends in England.

The original shop has long since disappeared. The name of the firm has changed more than once. Three generations of eager, active, highly trained men have followed each other to eternal peace, each leaving behind an improved, advanced, more precise, more rapid machine tool technique.

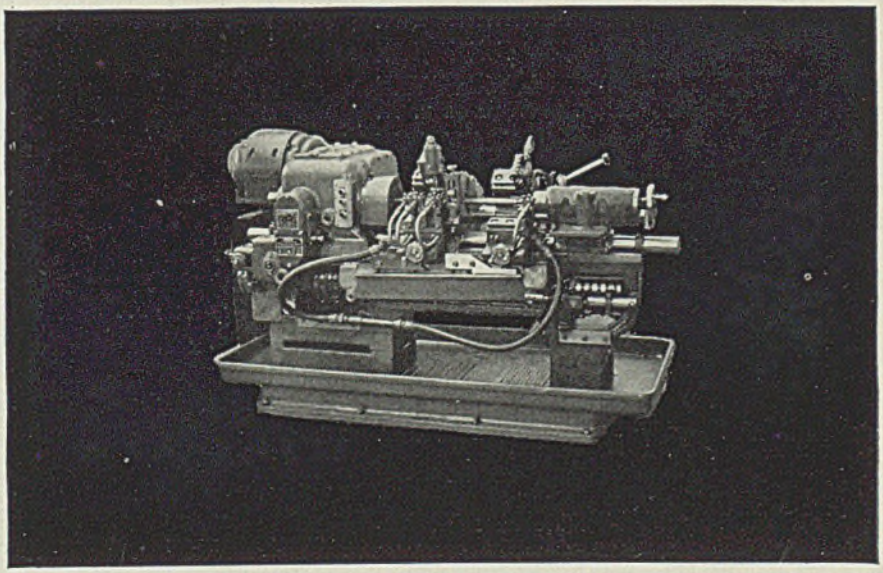
That technique survives, but not even that survives unchanged, for the present generation of Jones & Lamson engineers is continuing to advance, refine and speed it up — with the same spirit and thoroughness displayed by its predecessors.

Herein lie many of the reasons why it pays to put your production problems up to Jones & Lamson engineers. Are you equipping for defense work or planning to keep down costs in postwar competition — OR BOTH? Let Jones & Lamson help you. Inquiries from large plants or small receive careful, thorough study, and illustrated catalogs of Jones & Lamson equipment are available.

JONES & LAMSON

MACHINE COMPANY • Springfield, Vermont. U. S. A.

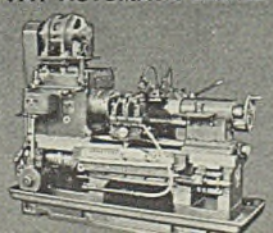
Manufacturers of Ram & Saddle Type Universal Turret Lathes . . . Fay Automatic Lathes . . . Automatic Thread Grinding Machines . . . Comparators . . . Automatic Opening Threading Dies and Chasers



Jones & Lamson 8 x 33" Fay Automatic Lathe tooled to machine an automatic rifle barrel

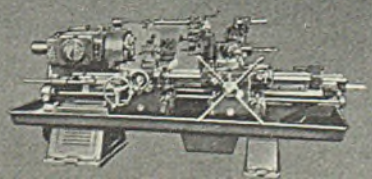
PROFIT PRODUCING MACHINE TOOLS

FAY AUTOMATIC LATHES



AUTOMATIC OPENING

SADDLE TYPE UNIVERSAL TURRET LATHE



FINANCIAL

58 Consumers' Combined Net Income Increased 28 Per Cent

■ COMBINED net income earned by 58 iron and steel consumers in the quarter ended June 30 totaled $55,507,932, compared with aggregate earnings for the same companies of $43,358,816 in the corresponding quarter of last year. Increase in combined net profits was 28 per cent. None of the companies reported deficits in the quarter, against four that operated at a loss in the period in 1940.

All but five of the fabricators reported individual earnings for the quarter were greater than in the quarter of 1940. Increases varied from a few to several hundred per cent.

In the first half, the same companies' total net profit was $103,440,918, and compared with $82,944,905 in the six months ended June 30, 1940, an increase of 24.7 per cent. None reported a loss for the half in 1941, against two in the period last year.

Individual profit in the first half was greater, for 54 companies, than in the corresponding period in 1940. Five reported lower net incomes.

$789,159 Second Quarter Reported by Pittsburgh Steel Co.

Pittsburgh Steel Co., Pittsburgh, reports net profit in the quarter ended June 30 totaled $789,159 after depreciation, depletion, amortization, interest, state and federal income taxes under existing laws and reserve for anticipated increases under the proposed new federal law. This was equal to $1.12 per share on common after dividend requirements on the preferred stocks.

It compared with net income of $176,399, equal to 59 cents per share on Pittsburgh's 7 per cent class B preferred after dividend requirements on the 5½ per cent prior preferred and the 5 per cent Class A preferred, in the period a year ago. In the quarter ended March 31, 1941, net income was $889,700 or $1.32 per common share.

For six months ended June 30, net income was $1,678,859 or $2.44 per share on common, against $379,407 or $1.94 per share on the 7 per cent Class B in the half last year.

Provision for federal taxes for the June quarter totaled $870,000; for the first half, $1,240,000.

Wheeling Steel Corp.'s Net Income in First Half $4,689,196

Wheeling Steel Corp., Wheeling, W. Va., reports consolidated net income in the quarter ended June 30, after depreciation, depletion, provision for federal income taxes and other charges, was $2,708,187. This was equal, after dividend requirements on the company's $5 prior preferred, to $3.96 per common share.

In the corresponding quarter in 1940, net income was $1,019,426 or 95 cents per share on common after dividend requirements on the $5 prior preferred and 6 per cent preferred stocks then outstanding. Net profit in the first period this year was $1,981,009, equal to $2.64 per common share.

For the first six months, net profit was $4,689,196 and was equal to $6.60 a share on common, compared with $1,664,078 or $1.24 per common share in the period last year.

Provision for federal income taxes for the quarter and six months ended June 30, the corporation reported, was approximately $180,000 and $790,000, respectively, greater than income tax liability as required by federal tax laws as of June 30.

Youngstown Sheet & Tube Co.'s Second Quarter Net $4,765,997

Youngstown Sheet & Tube Co., Youngstown, O., reports net profit in the second quarter ended June 30 was $4,765,997 after all charges, including federal taxes and a provision of $685,500 for expected tax increases.

Equal to $2.72 per share on common stock after preferred dividend requirements, this compared with net income of $1,169,283 or 57 cents per share on common in the period in 1940. Earnings in first quarter, 1941, totaled $4,576,197 or $2.61 per share on common.

Net income in the first half was $9,342,194 or $5.33 per common share, against $2,423,212 or $1.20 per share in the corresponding period last year.

Steel Consumers' Reports Summarized

	Second 1941 Quarter	Second 1940 Quarter	First 1941 Half	First 1940 Half
American Brake Shoe & Foundry Co., New York	$592,578	$ 644,075	$1,479,340†	$1,266,636†
American Steel Foundries, Chicago	1,088,193	405,565	2,067,719	1,666,525
Atlas Tack Corp., Fairhaven, Mass.	56,011†	24,449†	90,314	53,186
Babcock & Wilcox Co., New York	628,763	645,340	1,850,063	1,474,905
Bendix Aviation Corp., South Bend, Ind.	3,603,033	2,361,539	6,672,574†	4,295,419†
Bliss & Laughlin Inc., Harvey, Ill.	211,328†	144,766†	424,298	348,218
Budd, E. G., Mfg. Co., Philadelphia	957,466	644,419	1,840,972	965,351
Budd Wheel Co., Philadelphia	437,200	182,050	915,973	394,445
Byers, A. M., Co., Pittsburgh	336,951	59,820	627,512†	125,127†
Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.	204,635	150,462	404,143	369,233
Central Foundry Co., New York	116,679	53,151	174,053	40,677
Checker Cab Mfg. Corp., Kalamazoo, Mich.	69,254	286,844	202,933	177,590
Chicago Railway Equipment Co., Chicago	197,674	7,612	352,450	147,737
Clark Equipment Co., Buchanan, Mich.	475,862	373,057	981,054	921,252
Cutler-Hammer Inc., Milwaukee	512,002	336,069	939,103	742,363
Doehler Die Casting Co., Toledo, O.	340,588	290,159	699,141	593,934
Driver-Harris Co., Harrison, N. J.	198,114	88,440	390,620†	231,476†
Eaton Mfg. Co., Cleveland	997,052	970,470†	1,979,764†	1,908,348†
Emsco Derrick & Equipment Co., Los Angeles	175,005	11,062*	305,518	69,626
Ex-Cell-O Corp., Detroit	550,125	503,106	1,088,707	829,884
Federal Screw Works, Detroit	123,609	22,386	181,865	53,861
Ferro Enamel Corp., Cleveland	180,114	125,785	323,899	249,194
Florence Stove Co., Gardner, Mass.	321,637	245,115	564,033	443,145
Gabriel Co., Cleveland	47,971	18,170*	44,661	31,419*
General Electric Co., Schenectady, N. Y.	14,625,696†	14,030,122†	26,003,665	25,981,572
General Railway Signal Co., Rochester, N. Y.	195,904†	122,037†	277,376	237,919
General Steel Castings Corp., Eddystone, Pa.	1,243,824†	4,032*†	1,690,900	72,958
Gillette Safety Razor Co., Boston	788,724†	637,004	1,391,790	1,333,451
Hoskins Mfg. Co., Detroit	164,107	128,368	330,625	277,646
Jackson, Byron, Co., Huntington Park, Calif.	152,997	94,185	177,846	241,318
Johns-Manville Corp., New York	1,457,213	1,110,319	3,018,801	1,888,013
Kingston Products Corp., Kokomo, Ind.	48,341	30,106*	99,551	53,836*
Lynch Corp., Anderson, Ind.	153,922	96,303	281,712	216,248
Martin, Glenn L., Co., Baltimore	1,088,850	2,128,820	2,950,640	4,291,490
Micromatic Hone Corp., Detroit	85,489	45,153	153,107	77,021
Minneapolis-Honeywell Regulator Co., Minneapolis	550,153	316,112	1,104,278	603,921
Mullins Mfg. Corp., Salem, O.	306,886†	113,469†	536,931	166,420
Nash-Kelvinator Corp., Kenosha, Wis.	2,606,589	901,939	3,734,246	1,307,878
National Acme Co., Cleveland	651,334	721,504	1,572,467	1,237,050
National Cash Register Co., Baltimore	828,618	618,960	1,324,691	1,099,831
National Malleable & Steel Castings Co., Cleveland	473,529	148,132	943,570†	618,757†
New York Air Brake Co., New York	642,511	291,401§	1,121,446	832,818
Noblitt-Sparks Industries Inc., Columbus, Ind.	283,118	165,017†	572,530	451,066
North American Aviation Inc., Inglewood, Calif.	2,114,899	1,846,979	3,900,745	2,367,638
Otis Elevator Co., New York	748,337	662,629	1,490,419	1,783,629
Simonds Saw & Steel Co., Fitchburg, Mass.	564,622	365,049	1,188,703	758,371
Studebaker Corp., South Bend, Ind.	1,133,417	405,806	1,313,877	957,309
Symington-Gould Corp., Rochester, N. Y.	279,691	103,313	470,384	603,284
Transue & Williams Steel Forging Corp., Alliance, O.	81,644	15,645	138,053	37,779
Underwood Elliott Fisher Co., New York	1,143,388§	484,656	1,883,042	1,073,384
United-Carr Fastener Corp., Cambridge, Mass.	249,829	103,512	563,101	261,612
United States Hoffman Machinery Corp., New York	165,271	113,829	402,415	165,242
Victor Equipment Co., San Francisco	102,316	71,817	53,233	36,669
Warner & Swasey Co., Cleveland	1,263,356	1,126,011	2,303,433†	2,136,920†
Westinghouse Air Brake Co., Wilmerding, Pa.	1,906,018	1,356,860	4,011,380†	3,204,000
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.	5,941,137†	5,795,581††	11,568,400	9,837,012
Worthington Pump & Machinery Corp., Harrison, N. J.	609,666	526,117	1,309,858	1,078,922
Yale & Towne Mfg. Co., Philadelphia	434,692	210,858	956,994	424,880

† Indicated; § before provision for excess profits tax; †† before federal income taxes; * loss.

MEETINGS

Ceramic Society Will Discuss Methods of Bricklaying

■ REFRACTORIES division of the American Ceramic Society will hold its autumn meeting at Granville, O., Sept. 5. At the technical session in Life Science building, Denison University, 1:30 o'clock, L. B. Lindemuth, consulting engineer, New York, will speak on "Design, Construction and Operation of Open-Hearth Furnaces with Basic Roofs"; and Alex Morton, superintendent of construction Pittsburgh Steel Co., Monessen, Pa., on "Bricklaying and Steel Plant Refractories."

Convention Calendar

Aug. 25-29—National Association of Power Engineers, Inc. Fifty-ninth annual convention at Lord Baltimore hotel, Baltimore. Exhibit and power show at Fifth Regimental Armory. F. W. Raven, 176 W. Adams street, Chicago, is secretary.

Aug. 27-29—American Institute of Electrical Engineers. Pacific coast convention, Canyon hotel, Yellowstone National Park. H. H. Henline, 33 W. 39th street, New York, is secretary.

Sept. 1-6—National Industrial Advertisers Association. Nineteenth annual conference, Royal York hotel, Toronto, Canada. M. R. Webster, 100 E. Ohio street, Chicago, is secretary.

Sept. 5—American Ceramic Society. Autumn meeting of Refractories Division at Life Science building, Denison University, Granville, O. Gilbert Soler, 2525 N. High street, Columbus, O., is chairman.

Sept. 18-20—Concrete Reinforcing Steel Institute. Seventeenth annual meeting at Broadmoor hotel, Colorado Springs, Colo. H. C. Dazell, 2257 Builders building, Chicago, is executive secretary.

Sept. 23-25—Association of Iron and Steel Engineers. Annual convention and exposition, Public Auditorium, Cleveland. Brent Wiley, 1010 Empire building, Pittsburgh, is managing director.

Sept. 25-26—Powdered Metallurgy Conference. Second annual meeting at Massachusetts Institute of Technology, Cambridge, Mass. John Wulff, Massachusetts Institute of Technology, Cambridge, Mass., is secretary.

Sept. 25-26—Society of Automobile Engineers Inc. National tractor meeting, Hotel Schroeder, Milwaukee. John A. C. Warner, 29 W. 39th street, New York, is secretary.

Oct. 1-2—Farm Equipment Institute. Forty-eighth annual convention at Edgewater Beach hotel, Chicago. R. A. Jones, 608 S. Dearborn street, Chicago, is secretary.

Oct. 6-10—National Safety Council. Thirtieth annual meeting at Hotel Stevens, Chicago. W. H. Cameron, 20 N. Wacker Drive, Chicago, is managing director.

Oct. 8-10—Porcelain Enamel Institute, Inc. Sixth annual forum at Ohio State University, Columbus, O. C. S. Pearce, 612 N. Michigan avenue, Chicago, is managing director.

Oct. 14-17—American Institute of Steel Construction, Inc. Annual convention at White Sulphur Springs, W. Va. V. Gilmore Iden, 101 Park Place, New York, is secretary.

Oct. 16-18—American Society of Tool Engineers. Semiannual meeting, Toronto, Canada. Ford R. Lamb, Room 428, Boulevard Temple building, 2567 W. Grand boulevard, Detroit, is executive secretary.

Oct. 19-24—American Welding Society. Annual meeting at Bellevue-Stratford hotel, Philadelphia. M. M. Kelly, 33 W. 39th street, New York, is secretary.

Oct. 20-24—American Society for Metals. Annual meeting at Benjamin Franklin hotel, Philadelphia. W. H. Eisenman, 7301 Euclid Ave., Cleveland, is secretary.

Oct. 20-24—Wire Association. Annual meeting at Philadelphian hotel, Philadelphia. R. E. Brown, Stamford Trust building, Stamford, Conn., is executive secretary.

Oct. 20-22—American Gas Association. Annual meeting at Auditorium, Atlantic City, N. J. K. R. Boyes, 420 Lexington avenue, New York, is secretary.

Oct. 23-24—Society of Automobile Engineers, Inc. National Fuels and Lubricants meeting at Mayo hotel, Tulsa, Okla. John A. C. Warner, 29 W. 39th street, New York, is secretary.

Farm Equipment Exports Down 13 Per Cent

■ Totaling $8,309,217, United States exports of farm implements and machinery in May were 13 per cent below $9,555,833 in May, 1940, Department of Commerce reports.

Shipments of tractors, parts and accessories were valued at $6,519,451 in May, a decline of 9 per cent from the May, 1940, figure of $7,139,935. Shipments of wheel tractors dropped to $2,405,123 compared with $3,131,052 in the month last year.

Tillage implements were valued at $601,929, or 37 per cent below $958,004. Plows dropped to $151,745 from $351,732.

Harvesting machinery was valued at $615,211, down from $784,864 in May, 1940.

UNITED STATES IMPORTS FOR CONSUMPTION OF IRON AND STEEL PRODUCTS

(Gross Tons)

Articles	May 1941	May 1940	Jan. through May 1941
Pig iron	.....	317	.....
Sponge iron	.....	.....	23
Ferromanganese[1]	.....	971	11
Spiegeleisen	9	5,877	1,681
Ferrochrome[2]	.....	.....	67
Ferrosilicon[3]	926	769	1,214
Other ferroalloys[4]	.....	.....	.....
Steel ingots, blooms, etc.	.....	3	.....
Billets, solid or hollow	.....	.....	55
Concrete reinforc. bars	2	.....	2
Hollow bar, drill steel	27	31	153
Bars, solid or hollow	12	82	120
Iron slabs	.....	.....	.....
Iron bars	.....	5	15
Wire rods	.....	.....	91
Boiler and other plate (including skelp)	1	2	7
Sheets, skelp, saw plate	1	15	18
Die blocks or blanks, etc.	1	1	1
Tin plate, taggers' tin and terneplate	7	14	45
Structural shapes	.....	107	40
Sashes and frames	20	.....	87
Sheet piling	.....	.....	.....
Rails and track material	642	44	1,275
Cast-iron pipe, fittings	.....	.....	.....
Malleable iron pipe fittings	.....	.....	.....
Welded pipe	.....	.....	.....
Other pipe	36	91	544
Cotton ties	.....	.....	.....
Other hoops and bands	.....	30	.....
Barbed wire	.....	.....	.....
Round iron, steel wire	3	1	27
Teleg., telephone wire	.....	.....	.....
Flat wire, steel strips	149	60	1,270
Wire rope and strand	7	50	78
Other wire	.....	1	1
Nails, tacks, staples	1	12	12
Bolts, nuts, rivets	2	20	16
Horse and mule shoes	.....	.....	.....
Castings and forgings	29	46	138
Total	1,875	8,549	6,991
Iron and steel scrap	3,758	33	10,420
GRAND TOTAL	5,633	8,582	17,411

[1] Manganese content.
[2] Chrome content.
[3] Silicon content.
[4] Alloy content.

Iron, Steel Imports Show Further Reduction

■ Iron and steel imports, excluding scrap, in May totaled 1875 gross tons, valued at $264,591, compared with 3192 tons, valued at $602,372, in April and with 8549 tons, valued at $1,026,425, in May, 1940, according to Metals and Minerals Division, Department of Commerce.

Cumulative imports for five months were only 6991 tons, valued at $1,373,910, against 34,107 tons, valued at $3,969,234, in the comparable period last year.

Ferrosilicon, 926 tons, all from Canada, rails and track material, 642 tons, also from Canada, and 149 tons of flat wire and steel strip made up most of the May receipts. Canada supplied 1628 tons, Sweden 176 tons and the United Kingdom 54 tons.

Iron and steel scrap imports, 3758 tons, valued at $42,798, were sharply increased over 1094 tons, valued at $11,116, in April. Canada was the chief supplier, 2066 tons, followed by Cuba, 1197 tons, and the Netherlands West Indies, 400 tons.

ORIGIN OF MAY IMPORTS
Gross Tons

	Iron ore	Manganese ore
Brazil	10,700	7,158
Canada	36,580	.....
Mexico	221	64
Cuba	11,300	12,671
Chile	120,800	140
Netherlands Indies	.....	286
British Indies	.....	14,164
Soviet Russia	.....	4,624
Phillipine Is.	.....	3,767
South Africa	.....	1,668
Gold Coast	.....	7,930
Total	179,601	52,472

	Sheets, skelp and sawplate	Steel bars
Canada	1	12
Total	1	12

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

	1941		1940	
	Exports	Imports	Exports	Imports
Jan.	698,853	423	583,521	8,274
Feb.	600,240	796	671,301	6,740
Mar.	567,227	6,273	663,980	5,096
April	635,809	4,286	612,906	6,674
May	472,734	5,633	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

Tapping Trouble?

CHECK THESE POINTS

If your taps are breaking, or not cutting smooth, proper size threads, it may not be the taps' fault. Here are a few things to check to help you locate and correct tap trouble

TYPE OF HOLES TO BE TAPPED

If a blind hole, is there sufficient untapped space at the bottom for the accumulation of chips?

Is a "Gun" tap that shoots the chips ahead being used? (In a blind hole tapped very nearly to the bottom and having no recess, the "Gun" tap is not recommended.)

Do conditions call for a two or three fluted tap?

CLASS OF FIT REQUIRED

If the tap produces an oversize hole, has the proper tap been selected for the class of fit desired?

If proper tap is being used, is there any play in the work or tap holding spindles (provided rigid spindles are being used)?

Do the work and tap line up accurately?

Is the tap dull?

TYPE OF MACHINE

Is drive uneven because of slipping belts?

Is machine powered properly?

Are tap and drilled hole in alignment?

Is there undue wear on sliding parts?

TAPPING SPEEDS

Is the speed too slow?

Is the speed too fast?

TAPPING DIFFERENT MATERIALS

Has the tap proper cutting face for the particular material being tapped?

Is the tap of the proper design or type?

This is one of a series of advertisements published by Greenfield Tap & Die Corporation to help users get greater production from their small tools in these critical times, through making useful facts more widely known

PROPER HOLE SIZES BEFORE TAPPING

Is the drilled hole of the proper size?

Is the drilled hole perfectly round?

Is the axis of the hole parallel to the axis of the tap?

LUBRICATION

Has the proper lubricant been employed?

Does the lubricant flood the tap sufficiently while engaged in the hole?

Is there sufficient force behind the lubricant to wash away the chips?

If applied with a brush has the lubricant a sufficiently heavy body to adhere to the tap? (A light lubricant will be thrown off the revolving tap before it enters the hole.)

TAP HOLDING DEVICE

Is worn or wrong type of holder being used?

Is holder in alignment with drilled hole?

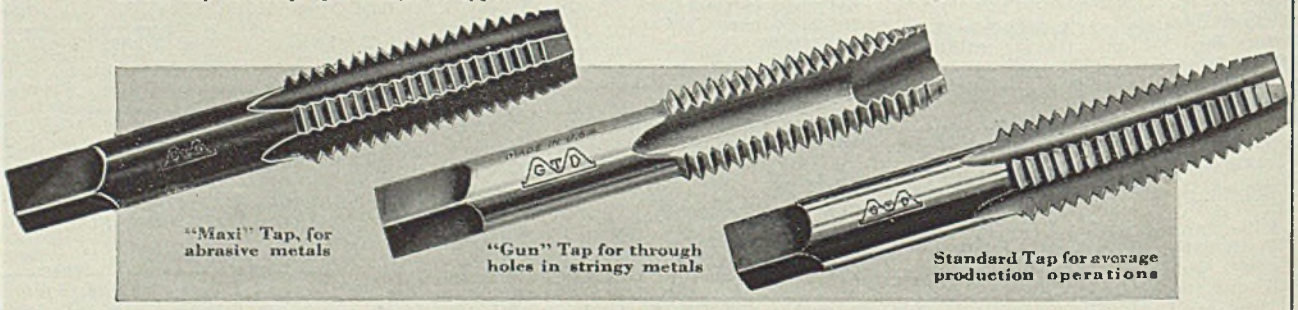
CHAMFER

Is the point diameter of tap correct for the size of hole being tapped? Does the tap enter the hole an excessive number of threads before taking hold, thereby losing the full benefit of the entire chamfered portion?

Is the chamfer the correct length?

Is the chamfer chipped or dull and in need of regrinding?

Is the chamfer relief too great or not sufficient?



"Maxi" Tap, for abrasive metals

"Gun" Tap for through holes in stringy metals

Standard Tap for average production operations

GREENFIELD TAP AND DIE CORPORATION
GREENFIELD, MASSACHUSETTS
DETROIT PLANT: 2102 West Fort St.
WAREHOUSES in New York, Chicago and Los Angeles
In Canada: GREENFIELD TAP & DIE CORP. OF CANADA, LTD., GALT, ONT.

GTD GREENFIELD

TAPS · DIES · GAGES · TWIST DRILLS · REAMERS · SCREW PLATES · PIPE TOOLS

Mirrors of MOTORDOM

Large reserves of molybdenite appear to guarantee sufficiency of molybdenum for steel alloying. Chrysler, with Amola steels in wide use, holds fortunate spot in minimizing need for alloy steel substitutions. Dodge was once 18 per cent chrome-vanadium steel, all of which is now replaced by Amola . . . Automobile builders thankful for ingenuity of engineers . . . Carbon dioxide smothers accidental fires in engine test cells

By A. H. ALLEN
Detroit Editor, STEEL

■ FEW manufacturers using alloy steel in production of nondefense equipment find themselves in the fortunate position of Chrysler Corp. with its Amola steels. Only about eight years old, these steels supply what qualities of strength, hardness and toughness are needed in applications where other alloy steels could be used but because of defense priorities either are not available now or at least in only limited amounts.

Out near Denver, Colo., there is a deposit of billions of tons of molybdenite, molybdenum sulphide ore, running about 8 pounds of metallic molybdenum to the ton, which as yet has been barely touched. Molybdenum this year is being consumed at a rate of about 25,000,000 pounds annually and it is estimated that ore supplies are sufficient for 50 years, even assuming sharp increase in consumption.

After mining, the ore is crushed, ground to 100 mesh, separated by flotation and the molybdenum sulphide roasted to drive off the sulphur. The resulting oxide then is converted to either ferromolybdenum or to a calcium molybdate, or is left as oxide, for use in iron and steel alloying.

Contain 0.25% Molybdenum

Getting back to the Amola steels, they contain only 0.25 per cent molybdenum, and differ from the common carbon-molybdenum steels by virtue of a special open-hearth or electric furnace practice involving a deoxidizing treatment which serves to reject carbides into discontinuous grain boundaries. This is productive of a "controlled abnormality" in the steel as well as a controlled grain size, resulting in a product which is tough, deep hardening and with higher strength than carbon steel, capable of being produced at considerably less cost than the more complex alloy steels.

For several years, there was an aura of mystery about the Amola steels among metallurgists, but continued duplication of results in production steels has convinced many of them of the definite advantages of the steels. They are now melted under license by many of the leading steel companies and in carbon contents from 0.20 to 0.70 per cent. There appears to be consistent uniformity both from heat to heat and between different producers.

The story of Amola—and it would be an interesting one if told in detail—is intimately connected with at least three men—the late C. Harold Wills, pioneer Dodge metallurgist, F. E. McCleary, now metallurgist with Chrysler Corp., and a former associate of Mr. Wills, and Fred Griffiths, one time head of Timken Steel & Tube Co., recently with Copperweld Steel Corp., and a well-known figure in steel production circles. Of the three, Mr. McCleary probably has accounted for most of the actual routine research and testing incident to the development of Amola. He is inclined to be rather close-mouthed about the entire development, but recently unburdened himself of some observations published in a number of newspapers, and no doubt designed by Chrysler publicists to explain the company's peculiarly fortunate position with respect to high-strength steel for automobile use.

Anyway, Mr. McCleary says, "The best of the early automobiles owed much of their toughness and long wearing qualities to the fact they were largely made of chrome-vanadium steel. It happened that I was chief metallurgist for Dodge Bros. when they were planning their first car. I can well remember in 1914 asking John Dodge whether he intended building the car to a price or whether he wanted the best materials to go into it. He almost threw me out of his office.

"'You put the best there is in that car,' he shouted, 'Never you mind the price—that's my business.'

"So the first Dodge appeared with 18 per cent of its total weight in chrome-vanadium steel—the greatest percentage of alloy steel that had been used in any car that had appeared on the market.

"But chrome-vanadium had one serious drawback which gained in importance as competition lowered automobile prices and made it absolutely necessary to manufacture economically while maintaining quality—it was comparatively expensive.

Conducted 750 Trial Heats

"Years later, in 1933 to be exact, Mr. Wills and I were discussing the metallurgical field. He was dissatisfied because there was no available alternate for chrome-vanadium steel at a reasonable price. He thought such a steel could and should be developed. Wills then went into action. Under his direction, 750 experimental heats were conducted and in early 1933 we had what we were looking for. We had an alloy that was as tough and long wearing and satisfactory over a long range of uses as chrome-vanadium, but which could be manufactured for $26 a ton less than vanadium steel.

"Soon after this discovery we were confronted with the need of designing coil springs for Chrysler Corp. cars. Of course we had tested the new steel for performance of every type and we knew it would fill the bill, so we specified Amola steel for coil springs. The use in springs was a remarkable success. It performed five to one over any other. . .

"We argued that if Amola was good for coil springs it must be good for flat springs so we introduced Amola into some of our flat springs. Later we made our axles of Amola. From axles we advanced to rear axle gears, proving the worth of

each step before it was taken. Then we introduced Amola into construction of steering arms and pitman arms. In 1938 Amola was made the material for Dodge and Plymouth transmission gears and that move marked the complete supplanting of chrome-vanadium steel by the new product.

"Amola steel already is playing an important part in defense manufacturing. Among other things, experiments with armor plate, guns and various other ordnance articles are in progress."

First standard specification for molybdenum steel—not Amola—in an automobile plant was in 1920. Molybdenum alloy steels as such have been known since 1831, with the first commercial production coming in 1880.

Short Layoffs This Year For Changeover Period

Last week was the low ebb for motor car production in a full twelve months, all producers being either closed down for a quick model changeover or making just a feeble start on 1942 models. In another week, assemblies should be moving up to a fairly good level again.

Motor companies have been making intense efforts to get deliveries of all needed materials for at least ten weeks of good production and there is reason to believe they have been fairly successful. In the case of certain parts, mostly small parts of standard types, shipments have been made on as much as six months' requirements on the advice of suppliers who have been urging the automobile people to take everything they possibly could manufacture pending descent of an additional defense load on such suppliers.

Buick's final 1941 car was tagged No. 377,430 and it was appropriately "launched" as it rolled off the final assembly line. On the occasion, H. H. Curtice, president and general manager of the division, took time out to remark that 1942 models will astonish many people with their room, comfort, roadability and styling.

"One thing for which America can be grateful," he said, "is that there is no bottleneck in brains. There is no limitation on American ingenuity, no ceiling on resourcefulness, fresh imagination or seasoned brainpower capable of great accomplishment.

"Automobile engineers have given ungrudgingly of their time, effort and inventiveness to further the defense program. They have recognized and fully accepted the necessity for conserving critical materials, shifting acceptable machinery, transferring men of useable skills. Even with all of that, they still believed that American enterprise could turn out top-notch automobiles with what was left to work with."

Proof of this achievement will be available shortly, previews of most of the General Motors lines being scheduled for early in September, with some others coming along this month.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1939	1940	1941
Jan.	356,962	449,492	524,058
Feb.	317,520	422,225	509,326
March	389,499	440,232	533,849
April	354,266	452,433	489,854
May	313,248	412,492	545,333
June	324,253	362,566	546,274
6 mos.	2,055,748	2,539,440	3,148,694
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

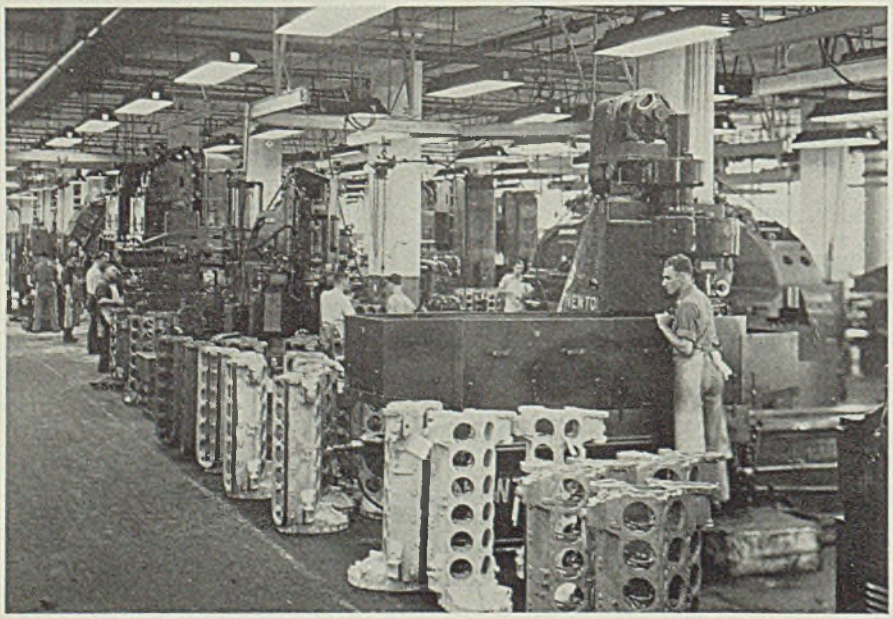
Week ended:	1941	1940†
July 12	114,318	62,176
July 19	109,912	53,020
July 26	105,635	34,822
Aug. 2	62,146	17,373
Aug. 9	41,795	12,635

†Comparable week.

Ford Now Testing Two Types of Air Engines

Test cells No. 1 and No. 2 at the Ford Pratt & Whitney aircraft engine plant are occupied with the first completed P & W engine and the first Ford V-12 liquid cooled airplane engine, respectively, which are being put through test paces. On one of the first days of testing the radial, it was opened up near full throttle and the exhaust flames were pouring out of the stub exhaust manifolds into the swift airstream blown past the engine to simulate flight conditions. Suddenly an oil line burst and the whole test stand was enveloped in a mass of blasting flame. An alert engineer released valves admitting carbon dioxide gas under pressure from two outlets, quickly smothering the flames and preventing damage either to the new engine or to the white porcelain enameled steel interior of the test cell. There are 18 test cells at the plant, and 14 more are being built.

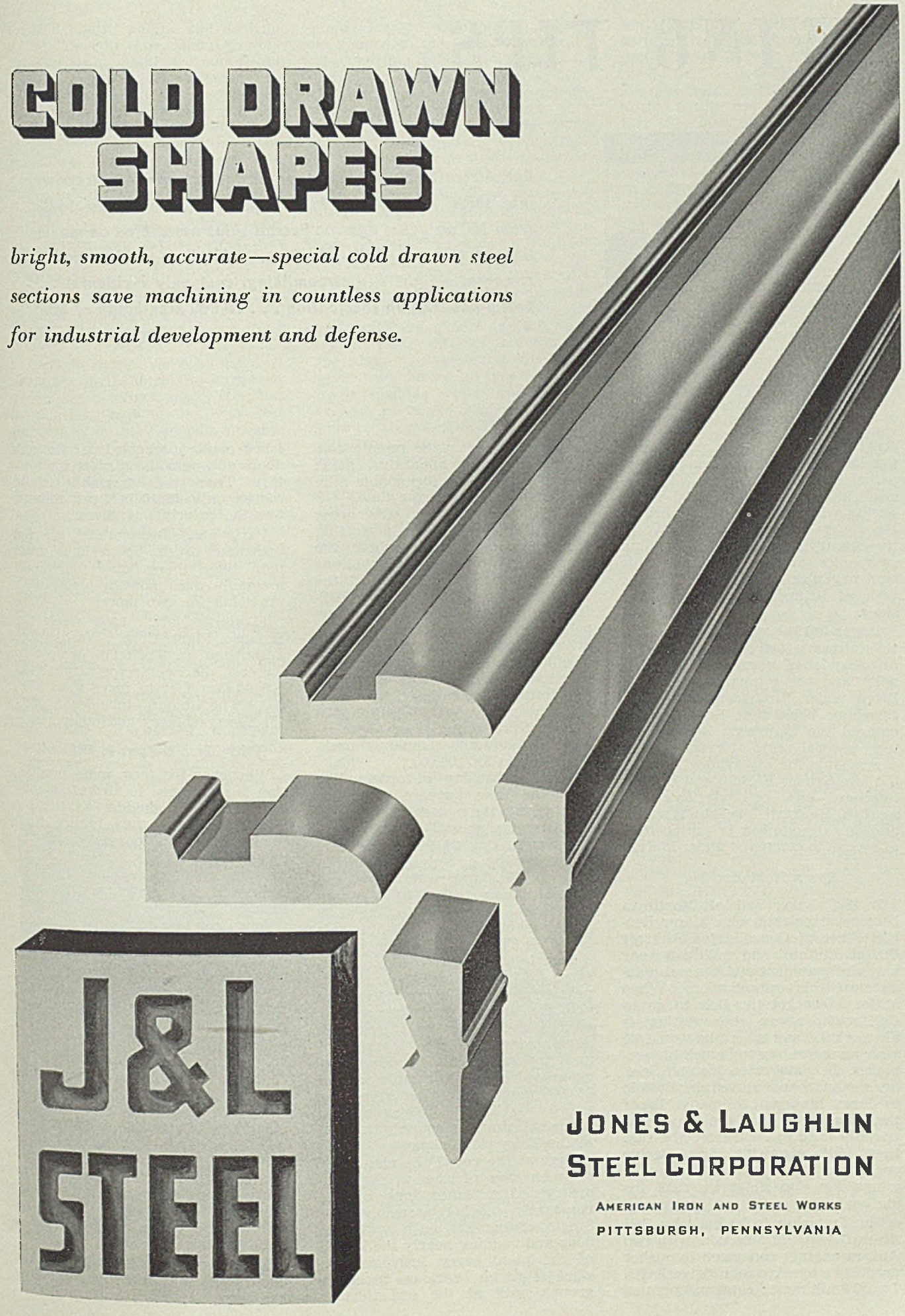
Carbon dioxide systems have proved to be one of the most effective methods of smothering fires in engine tests. Gas is stored in liquid form in large tanks, the one at Ford holding 12,000 pounds. Extinguishing the above fire consumed about 1000 pounds. Outlets are provided with both manual and thermostatic releases.



Just ten months after first contracts were signed for 9000 Rolls-Royce aircraft engines, Packard Motor Car Co. Aug. 2 began production in its $62,000,000 plant in Detroit. Officials of the British Air Commission, the OPM, the Army Air Forces, suppliers and other dignitaries, numbering nearly 500, gathered in the plant to hear an international broadcast celebrating the start of production on the 12-cylinder in-line power plant which generates in excess of 1100 horsepower. Here is a view in the cylinder block machining department, showing a few of the 3000 machines which eventually will be required to bring the plant to its capacity of better than 800 engines a month

COLD DRAWN SHAPES

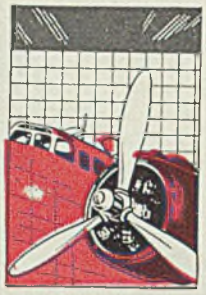
bright, smooth, accurate—special cold drawn steel sections save machining in countless applications for industrial development and defense.



JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS
PITTSBURGH, PENNSYLVANIA

WING TIPS



Bell Aircraft advances new conceptions of bringing firepower into skies, employment in two plants advancing to 16,000 from 300 six years ago . . . Pursuit ships assembled on moving line at Niagara Falls plant . . . Airplane design tied to strength, weight and streamlining, cost only incidental . . . Lofting speeds up fabrication . . . 10,000 man-hours of labor in Airacobra

■ Although still in his middle forties Lawrence Bell has been part and parcel of the nation's growing aircraft industry for almost 30 years, during which period he climbed to the general managership of two of the country's largest plane building companies, and in 1935 headed his own organization, dedicated to the task of lifting firepower into the skies.

It was in 1912, when Glenn L. Martin's aircraft factory was located in an abandoned church in Los Angeles and the company name was listed under "amusements" in the telephone book, that Bell formally entered the industry. Behind him were several years of experience as a mechanic for his aviator brother, the late Grover E. Bell, and Lincoln Beachey, one of aviation's immortals. He started as shop foreman and quickly climbed to the position of second in command under Martin.

Has a Neat Backlog

In 1928, Larry Bell left Martin to become associated with Major Reuben Fleet of Consolidated Aircraft Co. at Buffalo, and within a year was vice president and general manager of this organization. When Major Fleet got the itch to go to California, where the weather is always mild and where he would be near an ocean bay to launch his seaplanes, Bell discarded Horace Greeley's advice and stayed in Buffalo to form his own company. Proof that the parting of the ways was friendly is to be seen from the fact that Bell Aircraft's first sizable order was for the construction of wings for Consolidated's PBY flying boats.

The first ship to be built by Bell Aircraft was the Airacuda, with two Allison engines connected to pusher propellers by extension driveshafts. Two 37-millimeter cannon, operated in power turrets with remote control and aiming apparatus, made this ship the most formidable military aircraft built at the time.

While the Airacuda was being built, Bell Aircraft was perfecting the design of another fighter, the Airacobra. Its design innovations included tricycle landing gear, the location of an 1150-horsepower Allison engine behind the pilot, the propeller being driven by a 10-foot driveshaft, and the installation of a 37-millimeter cannon firing through a hollow propeller hub. Construction and testing of this model took time and it was not until the fall of 1939 that first production orders were received. Today the company's backlog is a neat $100,000,000.

With a backlog of orders like this, the time appeared ripe for looking into the matter of mass production of planes. Bell two years ago was leasing 200,000 square feet in a building owned by American Radiator & Standard Sanitary, and now has more than 800,000 square feet in the same building. In 1939 employment was several hundred; now it is 9500 and still going up.

Last fall it was considered necessary to have more plant space, near an airport. Sixteen miles away was the Niagara Falls airport; so, with a facility contract from the government to insure loans, Bell undertook a $1,200,000 building program which is now completed, and 240,000 more square feet have been added to facilities, with eventual employment running possibly to 3500 in the Falls plant alone.

Here at the new Falls plant may be seen one of the aviation industry's first conceptions of the constantly moving assembly line. Single chains set flush with the floor and running nearly the length of the plant carry fuselages forward through various assembly groups until at the end the finished plane is wheeled out through doors and onto the airport for testing. True the assembly chain moves only 13/16-inch per minute, but the principle is there.

Parts and subassemblies are fed crosswise to the main lines from both sides, there being four main assembly lines now in place, with provision for two more.

(Editor's Note: Last week the Defense Plant Corp., Washington, authorized an $3,456,175 project to increase the Bell factory from 240,000 square feet to more than 950,000. The amount includes $2,859,251 for machinery and equipment.)

Why Mass Output Is Difficult

Whenever the term mass production is mentioned to aircraft manufacturers, they shudder a little inwardly, because they realize that mass production to most people is synonymous with hundreds of shiny new automobiles rolling down a conveyor line as swarms of workmen build up a bare chassis into a finished car in a matter of minutes. To a large section of the public there does not appear any reason why you cannot substitute airplane fuselages for automobile chassis and thus have mass output of planes.

However, such things just cannot be. It took the auto industry about 35 years to attain its present mass production output. Each year designs are standardized for the ensuing 12 months. And, say what you will about designs, engines, bodies or whatnot, the auto industry is tied up primarily with the factor of cost, other things being incidental. Not only that, but the auto builders reasonably can expect continued business for years ahead.

In airplane manufacturing, an industry still in its early years, there are three far more important fac-

tors—strength, weight and streamlining. Designs are changing continually from month to month and there is no way to get around this, for in a war, military equipment must keep up with that of the enemy. Adding several machine guns or a cannon to plane armament, or installing armor plate here and there, or changing gasoline tanks from metal to self-sealing bullet-proof construction sometimes throws plane design completely out of balance and often necessitates starting all over again in the engineering department.

Special Techniques Aid Mass Output of Planes

It is a rather remarkable commentary on the airplane industry's accomplishments to say that it has gone a long way toward mass production in spite of unending design changes. To do this calls for a rather complete integration of engineering and production talent, as well as the perfection of new tools and equipment which will accommodate sudden changes in design without too seriously interfering with the smooth flow of materials and parts to assembly stations; and after all, that is what mass production is—the perfect co-ordination of materials and parts production so that the right parts arrive at the right place at the right time and in the right quantity.

Bell Aircraft has been fortunate in its approach to mass production by virtue of having developed special methods, techniques and equipment which facilitate this type of manufacture. First might be mentioned the technique of lofting as applied to the initial translation of blueprints into actual parts. Lofting has nothing to do with lofts, but is a term carried over from the shipbuilding industry where full-scale drawings of ship elements were laid out in lofts preparatory to assembling some of the basic sections of keel, hull, etc.

Introduced some years ago to the aircraft industry, the technique was brought to Bell by a protege of the man who first conceived lofting for airplanes, and it has now been developed to a fine degree. Essentially what it involves is the preparation of master sheet steel templates for practically every part of wing, fuselage and tail construction going into the plane. On these flat steel templates are spotted all holes and cutaway sections which must be incorporated in the final parts going into the plane. They are so calculated that even if a piece must be bent to a certain contour before assembly the holes will be spotted so accurately that when pieces are fitted together, they will match perfectly and rivets can be driven home with ease.

Master templates prepared in the lofting department are used to make duplicate shop templates, and the latter are used in the actual shaping and drilling of the aluminum parts. The shop template usually goes to a device known as a pantograph router-driller, a duplicating device by which the outline and holes in a template are duplicated in a stack of sheets bolted to a table, through the pantograph arrangement.

Templates also are prepared for cross sectional contours of plaster patterns in which forming dies are cast. These likewise are made in the lofting section of the engineering department. The importance of lofting can be appreciated from the fact that over 50 men on the Bell engineering staff of 350 devote all their time to the technique. To prove its value, the instance may be cited of a complete airplane being assembled in the Bell shops without the use of a single jig or fixture, simply because all rivet holes and other locating holes were spotted so accurately by the lofting method. In normal production, some 220 jigs and 430 fixtures are required.

It should be pointed out that holes spotted by the lofting and pantograph method are not of the final size necessary to admit rivets. Final drilling of holes, together with countersinking or dimpling for flush-type heads, are done after the sheet nas been formed to its ultimate shape; however the guide holes spotted by lofting give perfect location of the final drilled holes.

All outside rivets, that is, rivets on exposed surfaces of the plane are of the flush type, with 105-degree angle heads, to eliminate wind resistance. Thin sheets of dural are dimpled to accommodate rivet heads; thicker sheets are countersunk. There are 54,000 rivets in the Bell Airacobra and 9000 parts in the ship's construction.

Aluminum and Steel Are Combined in Airacobra

Some details of the construction of the Airacobra may be of interest. The structural core of the ship comprises two longitudinal main beams built up and riveted of aluminum alloy strips and angles. These beams extend from the propeller back through the nose and under the pilot's compartment and finally under the 12-cylinder Allison engine which is placed amidships just back of the pilot. To the rear of the engine is an oval monocoque fuselage assembly carrying the tail surfaces. The main section of the fuselage is built around the two main beams, the outer covering below the beams being so-called stressed-skin construction of riveted duralumin, while that above the beam is practically all removable cowling of alclad sheet, held in place with a special type of flush-mounted cam-lock fastener, of which there are over 1000 per plane.

Transverse beams of pressed steel provide the wing "carry-through" for the two detachable outer wing panels. The wings themselves are of multiple-spar construction, spars being aluminum alloy extrusions. Internal ribs and bulkheads are stamped aluminum alloy. The skin

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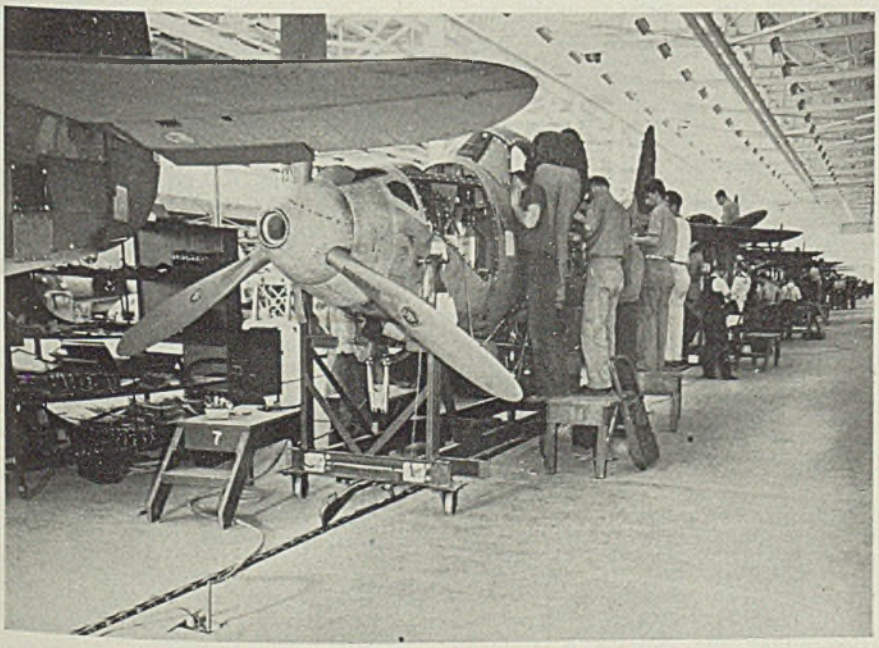


■ Though it moves only 13/16-inch per minute, this assembly line in the new Niagara Falls plant of Bell Aircraft represents one of the first applications of mass production to aircraft

War Department's National Defense Awards Total $286,453,873 in Week

■ DEFENSE contracts reported last week by the War Department totaled $286,453,873. Ordnance Department awards were most numerous, but Quartermaster Corps and Corps of Engineers' purchases were also heavy. Contracts show continued emphasis is being placed upon improvement and extension of airports throughout the nation. Housing and recreational facilities at army cantonments are also being expanded. Orders reported included:

Barnes, James I., Construction Co., Dayton, O., two temporary air corps storage warehouses with necessary utilities at Fairfield air depot, Patterson field, Ohio, estimated to cost $835,220.

Cage Bros. and F. M. Reeves & Sons Inc., Austin, Tex., primary construction on a twin engine and bombardier training school at Midland, Tex., at estimated cost of $2,800,000.

Federal Cartridge Corp., Minneapolis, $86,058,331 for Twin Cities ordnance plant at St. Paul. Contract includes designing, constructing, equipping and operating the plant, and provides for training of the personnel. Machinery and equipment are estimated to cost $11,985,000.

Kershow, C. G., Construction Co., Birmingham, Ala., construction of Chemical Warfare Service arsenal at Huntsville, Ala., including 11 manufacturing plants, four chemical loading plants, one depot, one plant storage building, laboratories, shops, offices, one hospital, fire and guard installations, utilities and all necessary appurtenances. Total estimated cost is $29,000,000. Whitman, Requardt & Smith, Baltimore, have the architect-engineers' contract.

Messer, Frank, & Sons Inc., Cincinnati, construction of a temporary equipment warehouse, aircraft supply warehouse and armament laboratory at Wright field, Dayton, O., at estimated cost of $908,100.

Rock City Construction Co. and T. M. Strider & Co., both of Nashville, Tenn., $5,254,968 for a barrage balloon training center at Paris, Tenn., including 408 buildings, roads and necessary utilities. R. H. Hunt Co., Chattanooga, Tenn., is furnishing architectural-engineering services.

United States Rubber Co., New York, $86,058,331 prime contract for management, operation and construction of an ordnance plant at Des Moines, Iowa. Subcontracts for construction work to be awarded later. Approximately $57,500,000 is to be used in the first year's operation, and provides for production of ball, tracer and armor-piercing ammunition.

War Supplies Ltd., Ottawa, Ont., four letter contracts totaling $16,346,840 and including advanced trainers with spare parts and technical data, British-type link trainers for instrument flying and landing, primary trainers with spare parts.

Willys Overland Co., Toledo, O., $13,411,864.40 for ¼-ton reconnaissance trucks.

Ordnance Department Awards

Accurate Tool Co., Newark, N. J., punches, supports, holders and screws, $18,584.50.

Adirondack Foundries & Steel Inc., Watervliet, N. Y., steel castings, $2874.90.

Aetna Standard Engineering Co., Youngstown, O., pilot chassis, $11,686.

Ahlberg Bearing Co., Chicago, bearings, parts for tanks, $24,976.35.

Aircraft Inc., Santa Monica, Calif., shells, $730,800.

Ajax Electrothermic Corp., Ajax Park, Trenton, N. J., furnaces, $10,232.50.

All Tool Co., Hillside, N. J., supports, punch guide holders and punch guides, $4800.

Allegheny Forging Co., Pittsburgh, forged steel, steel discs, axles and rims, $5417.

Allis-Chalmers Mfg. Co., Milwaukee, gasoline operated tractors and services to install trail-builders, $84,050.

American Brass Co., Waterbury, Conn., hard seamless bands, shell bands, Aluminum bronze, brass, rod, $13,485.08.

American Can Co., New York, cans, $4267.30.

American Fork & Hoe Co., Cleveland, shovels, single bit chopping axes, $14,100.

American Instrument Co., Silver Spring, Md., camera oscillograph, $2800.

American Machine & Metals Inc., East Moline, Ill., hydraulic testing machine, $4465.

American Spring & Wire Specialty Co., Chicago, springs, $3569.06.

American Steel & Wire Co., Cleveland, steel nails, $4060.50.

Anchor Coupling Co. Inc., Waukegan, Ill., hose assembly, $3950.

Armstrong Bros. Tool Co., Chicago, wrenches, $4035.25.

Arter Grinding Machine Co., Worcester, Mass., grinders, $4525.

Athey Truss Wheel Co., Chicago, trailers, $131,300.60.

Auto-Ordnance Corp., Bridgeport, Conn., machine guns and parts, $12,030.19.

Autovent Fan & Blower Co., Chicago, exhaust and ventilating systems, $2380.

Axelson Mfg. Co., Los Angeles, engine lathes, $6598.30.

Backes, N., & Sons Inc., Wallingford, Conn., aircraft signals, $237,136.36.

Bailey Products Corp., Union City, Ind., housings for shells, $125,860.

Barber-Colman Co., Machine & Small Tools Division, Rockford, Ill., milling machines, $6224.70.

Barbour-Stockwell Co., Cambridge, Mass., assemblies, tachometer head and parts for tanks, $2736.

Barker Tool Die & Gauge Co., Detroit, gages, $7472.

Barnes, W. F., & John, Co., Rockford, Ill., boring, drilling and counter-boring machines, $22,346.

Barwood & Co., Philadelphia, parallels, blocks, irons, wire, tools, $4151.90.

Bearings Co. of America, Lancaster, Pa., bearings, $13,404.85.

Bendix Aviation Corp., Eclipse Machine Division, Elmira, N. Y., shell assemblies, $405,000; Eclipse Aviation Division, Philadelphia Division, Philadelphia, starters, $2760; Eclipse Aviation assemblies and shields, $6693.90; Marine Division, Brooklyn, N. Y., transmitters, $2062.50; Scintilla Magneto Division, Sidney, N. Y., pullers and tools, parts for tanks, $16,578.35.

Bethlehem Steel Co., Bethlehem, Pa., nickel steel, $3510.

Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., steel castings, $93,836.

Blanchard Machine Co., Cambridge, Mass., grinders, $7374.

Bliss, E. W., Co., New York, parts for machines and crankshafts, trimming press, $59,323.

Bonney Forge & Tool Works, Allentown, Pa., wrenches, $9270.83.

Breeze Corp. Inc., Newark, N. J., manifolds, engine radio shield assembly, parts for tanks and engine starters, $125,957.50.

Bridgeport Brass & Copper Co., Bridgeport, Conn., brass discs, $59,920.96.

Bridgeport Brass Co., Bridgeport, Conn., cartridge cases, $2750.

Brown-Lipe Gear Co., General Drop Forge Division, Buffalo, forgings, $2064.40.

Brown & Sharpe Mfg. Co., Providence, R. I., grinding and milling machines, turning blades, gages, hand screw machines, $103,430.18.

Brunswick-Balke-Collender Co., Muskegon, Mich., miscellaneous chests, $2832.

Bucyrus-Erie Co., South Milwaukee, Wis., pilot carriage and recoil mechanism, $135,000.

Budd, E. G., Mfg. Co., Philadelphia, shells, $1,507,872.

Budd Wheel Co., Detroit, nuts, caps, hub assemblies, automobile wheels, studs, brake assemblies, $25,456.94.

Buffalo Forge Co., Buffalo, forge shop work machine, $3075.

Carlson, C. O., Inc., New York, chrome nickel and stainless steel, $12,543.43.

Carpenter Steel Co., Reading, Pa., tool steel, $8865.

Cedar Rapids Engineering Co. of Delaware, Cedar Rapids, Iowa, cylinder boring machines, $3744.

Chambersburg Engineering Co., Chambersburg, Pa., hammers, $67,280.

Chase Brass & Copper Co., Waterbury, Conn., cartridge cases, $1,484,625.

Chase Metal Works Plant, Waterville, Conn., brass rods, seamless bands, $126,571.77.

Chemurgic Corp., Richmond, Va., primers, $48,585.

Chicago Flexible Shaft Co., Chicago, fuzes, $573,844.60.

Chisholm-Ryder Co., Niagara Falls, N. Y., ammunition boxes, $768,750.

Christy Park Works, McKeesport, Pa., projectiles, $14,625.

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

Cleveland Cutter & Reamer Co., Cleveland, reamers and counterbores, tools, $10,935.

Comtor Co., Waltham, Mass., inspection gages, $2607.78.

Conmar Products Corp., Newark, N. J., gages, $11,669.

Consolidated Steel Warehouse Co., Philadelphia, bar steel, $9791.

Continental Machines Inc., Minneapolis, band saw and file cutting-off machine, $2210.

Continental Motors Corp., Aircraft Engine Division, Muskegon, Mich., repair cylinder and head assemblies, parts for tanks, gages, cones, pins, couplings, throwers, nuts, valves, rocker assemblies, $77,603.70.

Continental Roll & Steel Foundry Co., Coraopolis, Pa., bomb bodies, $41,900.

Conveyor Engineering & Supplies Corp., Clifton, N. J., conveyors, $2886.

Crane Co., Philadelphia, pipes, $5807.84.

Crescent Electric Supply Co., Davenport, Iowa, pressure water coolers, $2230.

Crucible Steel Co. of America, Pittsburgh, nickel steel bars, drill rods, $12,688.55.

Cunningham, James, Son & Co., Rochester, N. Y., carriage assemblies, $124,087.20.

Cutter, Wood & Sanderson Co., Cambridge, Mass., carriage bolts, nuts, and screws, $2614.47.

Davenport Machine Co., Rochester, N. Y., collets, grinders, lathes, milling and drilling machines and shapers, $1650.

Detroit Seamless Steel Tube Co., Dearborn, Mich., steel, $5805.60.

Du Mont, Allen B., Laboratories Inc., Passaic, N. J., oscillograph, $2500.

Duro Metal Products Co., Chicago, wrenches and sockets, $8036.22.

Dutton-Lainson Co., Hastings, Nebr., oil guns, $6310.

Edgemcor Iron Works Inc., Edgemoor, Del., shells, $7,031,000.

Edgewater Steel Co., Verona, Pa., alloy steel forgings, $17,364.40.

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

Essex Specialty Co., Berkeley Heights, N. J., aircraft signals, $237,137.85.

Ex-Cell-O Corp., Detroit, machines,

tools, broaches, grinders, $11,368.80.
Ex-Cell-O Aircraft & Tool Corp., Detroit, thread grinders, $33,459.
Faultless Caster Corp., Evansville, Ind., fuzes, $552,500.
Federal Products Corp., Providence, R. I., gages, $4200.
Federal Tool Corp., Chicago, gages, $29,281.
Fellows Gear Shaper Co., Springfield, Vt., gear burnishing machines, $5314.
Firth-Sterling Steel Co., McKeesport, Pa., dies, $2150.
Foote-Burt Co., Cleveland, machines, $12,729.
Ft. Pitt Bedding Co., Pittsburgh, metallic belt links, $720,000.
Fosdick Machine Tool Co., Cincinnati, drilling machine, $8494.
Gaertner Scientific Corp., Chicago, microscopes, $6250.
General Electric Co., Schenectady, N. Y., amplifier with photo electric tube equipment, control system, welding electrodes, automatic compensators, $70,675.36.
General Industries Inc., Elyria, O., fuzes, $925,000.
General Motors Corp., Cadillac Motor Division, Detroit, engines, $33,200; Chevrolet Motor Division, Detroit, spare parts for trucks, $64,600.85; Delco Brake Division, Dayton, O., metal parts, boosters, shells, $2,214,260.40.
General Motors Sales Corp., Hyatt Bearings Division, Harrison, N. J., bearings, $6622.08; New Departure Division, Bristol, Conn., bearings, $1652.75.
General Railway Signal Co., Rochester, N. Y., shells, $28,650.
Gibbs, Thomas B., & Co., Delavan, Wis., power generator, $3500.
Gibson, G. M., Co., Bellevue, Iowa, chests, $17,450.
Gilbert & Barker Mfg. Co., West Springfield, Mass., water jackets, $523,792.12.
Gisholt Machine Co., Newark, N. J., lathes, $37,020.
Gleason Works, Rochester, N. Y., machines, $28,070.41.
Globe Machine & Stamping Co., Cleveland, cartridge cases, $1,137,500.
Gold Seal Electric Supply Co., Buffalo, transformers, $3271.50.
Grapho Products Inc., Indianapolis, shells, $947,200.
Graybar Electric Co., New York, ammeters, voltmeters and other electrical equipment, $3811.29.
Grayson Heat Control Ltd., Lynwood, Calif., fuzes, $130,000.
Greenfield Tap & Die Corp., Greenfield, Mass., gages, $53,420.98.
Guiberson Diesel Engine Co., Chicago, parts for tanks, engines, $4,273,573.10.
Hajoca Corp., Philadelphia, pipe parts and plumbing supplies, $2879.84.
Hannifin Mfg. Co., Chicago, recoil mechanisms, equilibrators, tools, $2,005,000.
Hanson-Whitney Machine Co., Hartford, Conn., taps, $2523.
Hanssen's, Louis, Sons, Davenport, Iowa, screws, funnels, wrenches, screwdrivers, turnbuckles, $9723.80.
Harding Machine Screw Co., East Liberty, O., primers, $86,338.
Hardinge Bros. Inc., Elmira, N. Y., lathes, $2713.75.
Heald Machine Co., Worcester, Mass., grinding machines, $23,907.40.
Heller Bros. Co., Newark, N. J., hammers, $2464.
Hesse Machine & Mfg. Co., Boston, gages, $18,627.50.
Hoover Co., North Canton, O., fuzes, $1,086,400.
Illinois Tool Co., Chicago, gears, $2763.
Index Machine & Tool Co., Jackson, Mich., milling machines, $9344.
Indianapolis Drop Forging Co., Indianapolis, shot, $1,800,500.
International Business Machines Corp., New York, fuzes, machines, $197,420.
International Harvester Co., Chicago, adapter boosters, tractors, $135,844.54.
International Silver Co., Meriden, Conn., rifle clips, $483,898.
Interstate Plumbing Supply Co., Albany, N. Y., steel and wrought iron pipes, $2105.90.
Jackson, Byron, Co., Los Angeles, recoil mechanisms, $1,395,000.
Jahn, C. R., Co., Chicago, trailers, $8952.
J. C. H. Automatic Machine Works, Philadelphia, die tools, $2868.
Johnson Claflin Corp., Marlboro, Mass., gages, $6217.85.
Jones & Lamson Machine Co., Springfield, Vt., turret lathes, comparator, grinding machines, $93,978.
Jones & Laughlin Steel Corp., Pittsburgh, steel, $74,310.99.
Jones, R. A., & Co., Covington, Ky., detonator loading machine, $15,000.
Joslyn Co., Baltimore, underground cable racks, $3501.70.
Kearney & Trecker Corp., Milwaukee, N. Y., milling machines, $43,156.
Kidde, Walter, & Co. Inc., New York, fire extinguishers, $11,630.64.
Kilgore Mfg. Co., International Flare-Signal Division, Tipp City, O., aircraft signals, $1,422,824.16.
Kramer Trenton Co., Trenton, N. J., cartridge cases, $595,720.
Landau, A., Co., Philadelphia, tools, $2592.
Landis Tool Co., Waynesboro, Pa., grinders, $13,197.60.
La Salle Steel Co., Hammond, Ind., cold drawn steel, $156,600.
LeBlond, R. K., Machine Tool Co., Cincinnati, lathes, $227,225.
Leeds & Northrup, Philadelphia, furnace and accessory equipment, $3766.
Leidy Electric Co., Phillipsburg, N. J., cable and wire, $3989.88.
Liberty Tool & Die Corp., Rochester, N. Y., dies, $16,800.
Lincoln Park Tool & Gage Co., Lincoln Park, Mich., gages, $8750.
Lindberg Engineering Co., Chicago, furnaces, $5263.
Linde Air Products Co., New York, nitrogen valves, $3800.
Long Reach Machine Works, Houston, lathes, $420,480.
Maclane Hardware Co., New York, oilers, $3249.
Magnus Tool & Die Co., Newark, N. J., tools, $3850.
Majestic Tool & Mfg. Co., Detroit, grinding machines, $11,557.50.
Marburg Bros. Inc., New York, borers and grinders, $23,650.50.
Marchant Calculating Machine Co., Oakland, Calif., fuzes, $219,700.
Marsh, J. P., Corp., Chicago, gages, $2504.25.
Mattison Machine Works, Rockford, Ill., grinders, $73,228.
McGill Mfg. Co., Valparaiso, Ind., bearings, $10,239.32.
McQuay-Norris Mfg. Co., St. Louis, parts for tanks, $1033.02.
Midvale Co., Nicetown, Philadelphia, steel billets, $2415.62.
Midwestern Tool Co., Chicago, gages, $9279.60.
Miller Co., Meriden, Conn., lighting fixtures, $4929.57.
Minster Machine Co., Minster, O., press, $4954.
Modern Bond Corp., Wilmington, Del., chronographs, universal receiver, $3640.
Modern Tool & Die Co., Philadelphia, gages, $62,286.70.
Moore Special Tool Co. Inc., Bridgeport, Conn., precision jig grinder, $8397.50.
Morris Wheeler & Co. Inc., Philadelphia, floor plate, $3648.80.
Mueller Brass Co., Port Huron, Mich., primer heads for percussion primers, $19,519.25.
Mullins Mfg. Co., Warren, O., cartridge cases, $2,311,944.
Multi-Products Tool Co., Newark, N. J., fixtures, shanks, spreaders, sliders, punches, etc., $2000.
Murphy, A. F., Die & Machine Co., Boston, slides, $11,460.36.
National Pneumatic Co., Rahway, N. J., boosters, $362,880.
National Stamping Co., Detroit, metallic belt links, $1,628,625.
National Wire & Cable Co., Pittsburgh, wire and conduit, $10,153.70.
Nicholson File Co., Anderson, Ind., files, $5019.78.
Niles-Bement-Pond Co., Pratt & Whitney Division, West Hartford, Conn., modernization chambering machine, gages, micrometers, blocks, lathes, drilling machines, rotary tables, taps, machines, $119,771.14.
Norris Stamping & Mfg. Co., Los Angeles, cartridge cases, $1,935,200.
Norton Co., Worcester, Mass., grinding wheels, $3761.74.
Nun Mfg. Co., Evanston, Ill., shells, $192,387.50.
Ohio Brass Co., Mansfield, O., primers, $340,000.
Otis Steel Co., Cleveland, sheets, $2236.61.
Parent Metal Products Co., Philadelphia, work benches, metal partitions, doors and tables, $4529.25.
Phosphor Bronze Smelting Co., Philadelphia, bronze, $3516.34.
Pick Mfg. Co., West Bend, Wis., bars, fastening blocks, braces, cross-pieces, rails, track assemblies, target rods, target discs, $49,807.50.
Porter, H. K., Co. Inc., Pittsburgh, narrow-gage locomotive, $5125.
Precise Tool & Mfg. Co., Farmington, Mich., gages, $61,877.20.
Precision Mfg. Co., Philadelphia, ammunition testing equipment, gages, $13,950.
Prentiss, Henry, & Co., New York, machines, $23,783.25.
Prescott Co., Menominee, Mich., lathes, $4500.
Prest-O-Lite Battery Co. Inc., Indianapolis, storage batteries, $6366.
Pringle Electrical Mfg. Co., Philadelphia, power panels, $2600.
Quality Aluminum Casting Co., Waukesha, Wis., aluminum castings, $4283.20.
Quality Tool & Die Co., Indianapolis, gages, $21,554.80.
Rahaim Machine & Tool Co., Gardner, Mass., gages, $2387.50.
Rainear, C. J., & Co. Inc., Philadelphia, pipes and fittings, $3006.33.
Rapp, W. B., Machine Co., Philadelphia, lathes, shaper, grinder and arbor presses, $6945.
Rehberger, Arthur, & Son Inc., Newark, N. J., buggies, $3010.
Remington Arms Co. Inc., Findlay, O., skeet outfits, $10,713.
Republic Steel Corp., Cleveland, armor plate, cold-drawn steel, $5,485,640.
Revere Copper & Brass, Baltimore, brass discs, $199,903.20.
Reynolds Metals Co., Louisville, Ky., aluminum powder, $2150.
Rivett Lathe & Grinder Inc., Brighton, Boston, Mass., grinder, $3969.75.
Robertshaw Thermostat Co., Youngwood, Pa., metal parts, boosters, $112,077.
Rock Island Metal Foundry, Rock Island, Ill., castings, $9690.
Rockford Machine Tool Co., Rockford, Ill., shapers, $11,226.60.
Roessler Machine Co., Elkins Park, Pa., tools, $7296.
Ryerson, Joseph T., & Son Inc., Chicago, steel, $3486.91.
Sager Spuck Supply Co. Inc., Albany, N. Y., wrenches, $3328.50.
Sargent & Co., New Haven, Conn., fuzes, $2,319,660.
Schwitzer-Cummins Co., Indianapolis, cartridge cases, $526,320.
Scovill Mfg. Co., Waterbury, Conn., cartridge cases, boosters, primers, fuzes, $7,558,839.80.
Scullin Steel Co., St. Louis, bomb materiel, $1,485,000.
Seamless Products Co. Inc., New York, miscellaneous cans, $38,250.
Servel Inc., Evansville, Ind., cartridge cases, $561,600.
Seymour Mfg. Co., Seymour, Conn., bronze, $2456.64.
Sheet Metal Products Inc., Newark, N. J., elevator hoppers, $15,648.
Sheffield Corp., Dayton, O., gaging and weighing machines, gages, $117,116.76.
Shipley, W. E., Machinery Co., Cincinnati, grinding machines, $37,719.
Sieg Co., Davenport, Iowa, wrenches and adapters, $50,050.
Simonds Saw & Steel Co., Boston, hack

saw blades, $2093.04.
Simplex Wire & Cable Corp., Cambridge, Mass., cable and reels, $6140.
S K F Industries Inc., Philadelphia, bearings, $11,910.54.
Smith, A. O., Corp., Milwaukee, bomb bodies, $4500.
Smith, H. A., Machinery Co., Hopewell, N. J., lathes, $43,122.60.
Snap-On Tools Corp., Kenosha, Wis., sockets and wrenches, $5925.
South Bend Lathe Works, South Bend, Ind., lathes, $2531.20.
Southern States Equipment Corp., Birmingham, Ala., boosters, $561,370.
Specialty Engineering Co., Philadelphia, testing equipment, $4764.
Standard Gage Co. Inc., Poughkeepsie, N. Y., gages, $5806.18.
Standard-Knapp Corp., New York, carton packing machine, $3310.
Standard Pressed Steel Co., Jenkintown, Pa., parts for cabinet, tools, benches, bar rack, shelving, steel nuts, screws, tool stands, lockers, $28,381.42.
Stanley Works, New Britain, Conn., rifle clips, $487,986.
Strong Steel Foundry Co., Buffalo, steel castings, $57,360.75.
Sullivan Machinery Co., Michigan City, Ind., air compressor, $48,544.90.
Taft-Peirce Mfg. Co., Woonsocket, R. I., parts for hand tools, gages, grinders, $33,272.90.
Templeton, Kenly & Co., Chicago, jacks, $16,500.
Thomson-Gibb Electric Welding Co., Lynn, Mass., parts for welding machine, $3167.50.
Timken-Detroit Axle Co., Wisconsin Axle Division, Oshkosh, Wis., bearings for chests, etc., $7125.72.
Titeflex Metal Hose Co., Newark, N. J., parts for tanks, $3160.50.
Tools & Gages Inc., Cleveland, gages, $17,432.
Topping Bros., New York, bases, jacks, bar levers, chains and sky hooks, $27,390.
Tri-Metal Products Co., Conshohocken, Pa., bronze castings, $6361.20.
Triad Tool & Die Co., Newark, N. J., pins, staking pins, holders, punches, cutters, clamps, $13,072.50.
True Alloys Inc., Detroit, castings, $2050.
Tungsten Electric Corp., Union City, N. J., carbide tipped turning tools and carbide blanks, $22,500.
Uchtorff Co., Davenport, Iowa, mortar hangers and ammunition hangers, $9830.40.
Ulmer, J. C., Co., Cleveland, inspection gages, $6232.
Ulmer, Theodore, Co. Inc., Worcester, Mass., grinding machines, $7494.
United States Gauge Co., Sellersville, Pa., pressure gages, $9151.
U. S. Metals Refining Co., Carteret, N. J., solder, $3975.
Vandyck Churchill Co., Springfield, Mass., milling machine, $6909.
Velt & Young, Philadelphia, punches, $14,400.
Vickers Inc., Waterbury Tool Division, Waterbury, Conn., gears, $267,684.
Vinco Gage Co., Detroit, gages, $3667.10.
Vinco Corp., Detroit, gages, $3046.80.
Vulcan Mold & Iron Co., Latrobe, Pa., cast iron molds, $5694.
Wadell Engineering Co., Newark, N. J., tools, $21,224.50.
Walker Mfg. Co. of Wisconsin, Racine, Wis., automobile hoists, $5400.
Warner Electric Brake Mfg. Co., Beloit, Wis., armatures, brake bands, magnet assemblies and springs, $5471.40.
Warner & Swasey Co., Cleveland, lathes, $6713.50.
Warren Foundry & Pipe Co., Phillipsburg, N. J., pipe, $4535.78.
Waterbury-Farrell Foundry & Machine Co., Waterbury, Conn., machines, $5445.
Webster, Warren & Co., Camden, N. J., boosters, $320,000.
Weldon Tool Co., Cleveland, end milling cutters, tools, $3932.96.
Wellman Bronze & Aluminum Co., Cleveland, castings, $5533.50.
Whitman & Barnes, Detroit, drills, $4739.64.
Wiedemann Machine Co., Philadelphia, gages, $20,214.
Willys-Overland Motors Inc., Toledo, O., shells, $480,000.
Wilson-Brown Co., Rockford, Ill., drilling machines, $6972.
Wood, John, Mfg. Co. Inc., Muskegon, Mich., springs, rods, stems, boxes, etc., $51,111.72.
Worthington Pump & Machinery Corp., Holyoke, Mass., air compressors, $3876.
Wright Aeronautical Corp., Paterson, N. J., manifold, exhaust assemblies, tools, timing discs, $78,459.89.
Wyckoff Drawn Steel Co., Pittsburgh, steel, $59,147.65.
Wylam Metal Products Inc., Philadelphia, stacking trays, $2520.
Zeh & Hahnemann Co., Newark, N. J., tapering press, $7600.
Zimmerman Steel Co., Bettendorf, Iowa, steel castings, $2431.07.
Zuhr, Henry, Inc., New York, fatigue testing machine, $2135.

Corps of Engineers Awards

Adams Motor Co., Mobile, Ala., pick-up trucks, $11,240.
Alteneder, Theo., & Sons, Philadelphia, scales, straightedges and triangles, $7595.50.
American Screw Co., Providence, R. I., screws, $12,615.65.
American Steel & Wire Co., Cleveland, nails, fence, gates, $176,341.65.
American Type Founders Sale Corp., Mt. Vernon, N. Y., lithographic presses, $12,998.
Ames Baldwin Wyoming Co., North Easton, Mass., shovels, $40,112.50.
Aqua Systems Inc., New York, gasoline fueling system, Gunter field, Montgomery, Ala., $69,928.
Armstrong Bros. Tool Co., Chicago, pipe and fittings, $9197.75
Bakker & Robinson, San Bernardino, Calif., hangars, Victorville, Calif., $242,740.
Barnes, James I., Construction Co., Santa Monica, Calif., 14 warehouse units and appurtenant facilities, McClellan field, Sacramento, Calif., $782,000.
Barnes Mfg. Co., Mansfield, O., pumping sets, $54,750.
Bechtel-McCone-Parsons Corp., Los Angeles, central steam plant, Ogden air depot, Ogden, Utah, $199.200.
Bethlehem Steel Co., Bethlehem, Pa., structural steel, Biloxi airport, Mississippi, $235,500.
Brown, Arthur & Bro., New York, scales, $2941.
Bruning, Charles, Inc., New York, steel sectional cases, $4086.
Brunson, E. A., Construction Co., St. Louis, incinerator, Jefferson barracks, St. Louis, $22,772.
Bucyrus-Erie Co., Evansville, Ind., scraper and push bumper, $3782.40.
Bunting Hardware Co., Kansas City, Mo., drill presses, aircraft assembly plant, Kansas City, Kans., $8664.10.
Caldwell Foundry & Machinery Co. Inc., Pascagoula, Miss., cast steel pump shell and impeller, $3285.
Caterpillar Tractor Co., Peoria, Ill., presses, compressors, sprocket pullers, graders, tractors, diesel engine, $91,242.24.
Chicago Bridge & Iron Co., Houston, Tex., elevated steel water tank and appurtenant facilities, flying cadet reception center, Kelly Field, Texas, $51,540; Greenville, Pa., Division, steel water tank, $35,040.
Clow, James B., & Sons, National Cast Iron Pipe Division, Kansas City, Mo., cast iron water pipe, Jefferson Barracks, Missouri, $5035.
Clyde Iron Works Inc., Duluth, Minn., furnishing steam hoisting engine, $1960.
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., dishwashers, $11,960.75.
Darby Products of Steel Plate Corp., Kansas City, Kans., construction and erection of elevated water tanks and appurtenant facilities, Mesa military airport, Higley, Ariz., $59,434.
DeVan Motor Co., Mobile, Ala., station wagons, $4950.
Dicke Tool Co. Inc., Downers Grove, Ill., wire, $4312.50.
Dohrmann Hotel Supply Co., San Francisco, puree mixers, $0970.88.
Fargo Motor Corp., Detroit, automobiles, $6552.
Flour City Ornamental Iron Co., Minneapolis, Minn., trestles, hoists and chests, $80,940.
Froelich, S., Co. Inc., New York, nailheads, $8330.
General Electric Co., Schenectady, N. Y., locomotive, $36,800.
Graham, James, Mfg. Co., San Francisco, ranges, $11,683.62.
Gurley, W. & L. E., Troy, N. Y., engineers' dumpy level, $71,232.
Haslam, John H., Salt Lake City, Utah, radio repair and signal corps warehouse, Hill field, Ogden, Utah, $168,102.
Layne & Bowler Inc., Memphis, Tenn., pumping sets, $4824.90.
Linde Air Products Co., New York, flood lights, $2054.
Lufkin Rule Co., Saginaw, Mich., steel tapes, $9897.
McClung-Logan Equipment Co. Inc., Baltimore, tractor equipped with bulldozer, Edgewood arsenal, Maryland, $3915.50.
McGowin Lyons Hardware & Supply Co., Mobile, Ala., electric cable, Brookley field, Mobile, Ala., $13,497.17.
Moloney Electric Co., St. Louis, transformers, $2520.
Nicholson, H. B., Los Angeles, sewage disposal plant and appurtenant facilities, Merced, Calif., $74,800.
Nicholson, H. B., Los Angeles, control tower and night lighting vault, Phoenix military airport, Litchfield Park, Arizona, $24,600.
O'Driscoll & Grove Inc., New York, 6 radio buildings, Scott field, Belleville, Ill., $980,000.
O'Leary, Arthur J., & Son Co., Chicago, bolts, bolt machine and nuts, $11,923.12.
Oswald Bros., Los Angeles, standard steel road forms, Phoenix military airport, Litchfield park, Arizona, $1200.
Paving Supply & Equipment Co., Milwaukee, pumps, $4103.85.
Pioneer Contract Co. Inc., Evansville, Ind., pumping plants and appurtenant works, Evansville, Ind., $310,713.
Pitman, J. C., & Sons Inc., Lynn, Mass., deep fat fryers, $6342.50.
Pittsburgh-Des Moines Steel Co., Des Moines, Iowa, elevated steel water tank and appurtenant facilities, Ft. Logan, Denver, $53,775.
Porter, H. K., Inc., Everett, Mass., wire cutters, $64,548.
Roebling's, John A., Sons Co., Trenton, N. J., wire rope, $3898.40.
Scheinert Bros. Inc., New York, screws, $15,635.80.
Smith, L. B., Motor Co. Lemoyne, Pa., pickup trucks, station wagons, Ft. McHenry, Baltimore, $2940.
Somerville, Thos., Co., Washington, pipe fittings, $25,521.82.
Southern Railway Co., Washington, railroad cars, $29,000.
Trewhitt-Shields & Fisher, Fresno, Calif., three hangars, control tower and appurtenant facilities, Merced, Calif., $218,900; three hangars, control tower and appurtenant facilities, Taft field, Taft, Calif., $215,000; three hangars, control tower and appurtenant facilities, Lemoore, Calif., $215,000.
United States Steel Export Co., New York, three steel hopper barges, $45,000.
Virginia Bridge Co., Roanoke, Va., portable steel bridge, $187,394.
Walton, Jack, Co., Houston, Tex., air corps oil storage system, Ellington Field, Houston, Tex., $15,536.51.
Webster & Webster, East Hartford, Conn.,

fence and gates at Windsor Locks airfield, Windsor Locks, Conn., $38,813.70.
Weil, J. H., & Co., Philadelphia, drawing pens, $4110.
Wheeling Steel Corp., Wheeling, W. Va., terneplate sheets, $1906.38.

Medical Corps Awards

Becton, Dickinson & Co., East Rutherford, N. J., needles for dental syringe, $958.38.
Carrollton Metal Products Co., Carrollton, O., cake covers, $4912.50.
Cleveland Dental Mfg. Co., Cleveland, forceps and lancets, $4328.70.
Doehler Metal Furniture Co. Inc., Plainfield, Conn., cabinets, $14,892.50.
Kirsten, Hugo R., Brooklyn, N. Y., wire ladder splint, $4575.
Marietta Chair Co., Marietta, O., chairs, $12,450.
Mercury Mfg. Co., Chicago, tractor and trucks, $50,069.30.
Spencer Lens Co., Buffalo, microscopes, $4792.46.

Quartermaster Corps Awards

Plowden & Roberts, Columbia, S. C., chain link fence, Ft. Bragg, North Carolina, $72,351.
Randall Electric Co., Spartanburg, S. C., flood lighting critical areas, Camp Croft, South Carolina, $6793.

Chemical Warfare Service Awards

Bethlehem Steel Co., Bethlehem, Pa., tinplate, $10,351.80.
Continental Can Co., New York, canisters, $16,500.81.
Columbiana Boiler Co., Columbiana, O., steel containers, $251,629.
United-Carr Fastener Corp., Cambridge, Mass., hardware and tools, $18,182.88.

Canada Gets $16,346,840 War Orders from U. S.

TORONTO, ONT.

■ United States War Department last week placed with Canadian firms orders totaling $16,346,840 in keeping with the new policy of establishing closest possible economic relations between the two countries. Agreement is that each nation will place orders for war materials in the other country if delivery can be made more quickly than would be possible at home. Orders placed with United States companies by Canada in the week totaled $12,296,171.

Department of Munitions and Supplies reported contracts awarded in the period July 11-22 totaled 9012. Combined value of the awards was $41,330,346. Orders included:

Shipbuilding: Yarrows Ltd., Victoria, B. C., $7,440,000; Pictou Foundry & Machine Co. Ltd., Pictou, N. S., $15,000; MacDonald Bros. Aircraft Ltd., Ottawa, Ont., $31,120; National Steel Car Corp. Ltd., Hamilton, Ont., $5040.

Aircraft: Canadian Pratt & Whitney Aircraft Ltd., Longueuil, Que., $4,389,742; Air Ministry, England, $119,498; Canadian Traction Ltd., Ottawa, $22,950; J. H. Connor & Sons Ltd., Ottawa, $8131; Link Mfg. Co. Ltd., Gananoque, Ont., $17,836; Casselman Co., Toronto, $16,454; John Leckie Ltd., Toronto, $7651; National Steel Car Corp. Ltd., Hamilton, $6603; A. J. Carter Mfg. Co. Ltd., London, Ont., $20,000; Fleet Aircraft Ltd., Ft. Erie, Ont., $8849; MacDonald Bros. Aircraft Ltd., St. James, Man., $8081.

Land transport: International Harvester Co. of Canada Ltd., Ottawa, $5525; General Motors Products of Canada Ltd., Oshawa, Ont., $7500; Ford Motor Co. of Canada Ltd., Windsor, Ont., $17,942; Gar Wood Industries Ltd., Windsor, $20,150.

Ordnance: Air Ministry, England, $13,750; War Office, England, $30,000; Dominion Bridge Co. Ltd., Lachine, Que., $513,000; H. W. Cooey Machine & Arms Co. Ltd., Cobourg, Ont., $5262; Atlas Steels Ltd., Welland, Ont., $794,880; Dominion Foundries & Steel Ltd., Hamilton, $1,442,811; International Harvester Co. of Canada Ltd., Hamilton, $8540.

Munitions: British Admiralty, England, $22,010; Canadian General Electric Co. Ltd., Quebec, Que., $51,425; Robert Mitchell Co. Ltd., Montreal, Que., $6696; Renfrew Electric & Refrigerator Co. Ltd., Renfrew, Ont., $12,960; Canadian Acme Screw & Gear Ltd., Toronto, $754,000; Parker Fountain Pen Co. Ltd., Toronto, $16,000; Viceroy Mfg. Co. Ltd., Toronto, $60,107; Hoover Co. Ltd., Hamilton, $6804; Chatham Malleable & Steel Products Ltd., Chatham, Ont., $149,232; Mueller Ltd., Sarnia, Ont., $234,838.

Electrical equipment: Northern Electric Co. Ltd., Halifax, N. S., $5024; Aviation Electric Ltd., Montreal, $14,736; Canada Wire & Cable Co. Ltd., Montreal, $6607; Canadian Marconi Co., Montreal, $15,192; Dominion Engineering Co. Ltd., Montreal, $19,703; Terry Machine Co. Ltd., Montreal, $14,760; Canadian General Electric Co. Ltd., Ottawa, $20,832; Canadian Fairbanks-Morse Co. Ltd., Ottawa, $41,000; Canadian Westinghouse Co. Ltd., Ottawa, $6781; Northern Electric Co. Ltd., Ottawa, $76,369; Atlas Polar Co. Ltd., Toronto, $20,592; Nepco, Canada Ltd., Toronto, $5801; Canada Wire & Cable Co. Ltd., Toronto, $13,560; Canadian Telephone & Supplies Ltd., Toronto, $14,880; Exide Batteries of Canada Ltd., Toronto, $12,920; Milton-Thompson, Electric Engineers, Toronto, $5918; Robers Majestic Corp. Ltd., Toronto, $46,373; Cummins England, Eastern Canada, Owen Sound, Ont., $23,795; Boston Insulated Wire & Cable Co. Ltd., Hamilton, $10,695; Federal Wire & Cable Co. Ltd., Guelph, Ont., $11,417; Robbins & Meyers Ltd., Brantford, Ont., $7472; Babcock-Wilcox & Goldie-McCulloch Ltd., Galt, Ont., $51,897.

Machinery: Canadian Liquid Air Co. Ltd., Montreal, $18,665; Williams & Wilson Ltd., Montreal, $7670; Canadian Fairbanks-Morse Co. Ltd., Ottawa, $11,681; Canadian General Electric Co. Ltd., Ottawa, $31,185; George W. Crothers Ltd., Leaside, (Toronto); $20,717; Dominion Oxygen Co. Ltd., Toronto, $26,790; Herbert Morris Crane & Hoist Co. Ltd., Niagara Falls, Ont., $14,880.

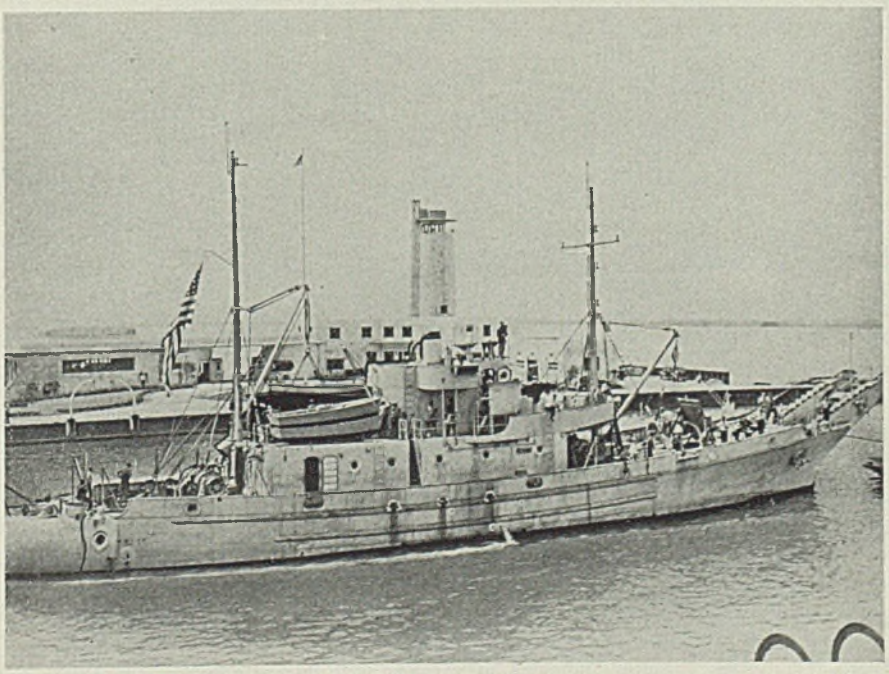
Instruments: Air Ministry, England, $27,538; Instruments Ltd., Ottawa, $81,330; Ontario Hughes-Owens Co. Ltd., Ottawa, $490,250; Outboard Marine & Mfg. Co. Ltd., Peterborough, Ont., $154,275; Neptune Meter Co. Ltd., Toronto, $153,328; Stark Electrical Instruments Co. Ltd., Toronto, $8360; Leeder's Ltd., Winnipeg, Man., $17,175.

Metals: Consolidated Mining & Smelting Co. of Canada Ltd., Montreal, $159,884.

War construction projects: Hill-Clark-Francis, New Liskeard, Ont., wireless school, $230,000; New Brunswick Contractors & Diamond Construction Co., Fredericton, N. B., repair depot at Scoudouc, N. B., $118,000; H. G. Mac Donald & Co., Edmonton, Alta., initial training school, $50,000; Marwell Construction Co., Vancouver, B. C., RCAF station, $80,000; Bennett & White Construction Co., Calgary, Alta., experimental station, Suffield, Alta., $155,000; Bennett Pratt, Toronto, $70,000; Coast Construction Co., Vancouver, B. C., $210,768; E. J. Ryan Construction Co. Ltd., Vancouver, B. C., $134,178; Ralph & Arthur Parsons, Windsor, $219,065; Rayner Construction Co. Ltd., Leaside (Toronto), $281,740; Richard & E. J. Ryan, Montreal, $220,420; J. P. Porter & Sons Ltd., Montreal, $128,060; Atlas Construction Co. Ltd., Montreal, $1,025,000; M. F. Schurman Co. Ltd., Summerside, P.E.I., $227,720.

Miscellaneous: Canadian Industries Ltd., Montreal, $26,236; Aluminum Co. of Canada Ltd., Montreal, $24,323; Viceroy Mfg. Co. Ltd., Toronto, $6864; General Steel Wares Ltd., Toronto, $239,197; Wrought Iron Range Co. Ltd., Toronto, $7323; Manitoba Bridge & Iron Works Ltd., Winnipeg, Man., $8198; Western Steel Products Corp., Ottawa, $15,190.

Sturdy Antisubmarine Net Tenders Built on Lakes



■ Powered by diesel engines, the U. S. S. LOCUST, shown in its first trial run recently, is the first of 12 antisubmarine net tenders being built at Cleveland and Lorain, O., by the American Shipbuilding Co. Delivery to the Navy is to be made soon. NEA photo

Activities of Steel Users, Makers

■ MACKINTOSH-HEMPHILL CO., Pittsburgh, is assembling 16 heavy duty engine type lathes for machining big guns and other defense items for the United States Navy. Reported to be among the largest in the world, the lathes will be shipped to various naval ordnance plants and steel mills throughout the nation.

♦

Plants of Reynolds Metals Co. Inc., Richmond, Va., by early fall will have facilities for fabricating strong aluminum sheet, rod and extruded shapes equal to the total of those defense items manufactured in the entire United States as late as 1940, according to R. S. Reynolds, president. Almost all of the company's 25 plants in 13 states are engaged mainly in defense production. The new aluminum plant at Listerhill, Ala., is now in operation, less than six months after construction started.

♦

National Youth Administration recently purchased 329 arc welding generator sets from Lincoln Electric Co., Cleveland, to provide instruction in welding to youth throughout the nation. The machines are the same as those employed in defense production, and will be distributed among 68 branches of the NYA.

♦

Air Hygiene Foundation of America Inc. has changed its name to Industrial Hygiene Foundation of America Inc. Sixth annual meeting of the foundation will be held at Mellon Institute, Pittsburgh, Nov. 12 and 13.

♦

Ohmite Mfg. Co., Chicago, manufacturer of rheostats, resistors, tap switches and chokes, has completed an addition to its factory on West Flournoy street, which doubles production space.

♦

Miniature Precision Bearings is now located in its new plant at Keene, N. H.

♦

Allegheny Ludlum Steel Corp., Pittsburgh, broke ground recently for a new "defense plant" at Dunkirk, N. Y., to expand facilities for production of alloy steels for defense. Plant, to cost approximately $4,000,000 instead of the original $2,500,000 estimated, will produce alloy steel bars and special rods. Gillmore-Carmichael-Olson Co., Cleveland, will construct the plant. Ingalls Iron Works, Verona, Pa., will supply 2000 tons of structural steel; United Engineering & Foundry Co., Pittsburgh, is to provide rolling mill equipment, and Cincinnati Grinders Inc., Cincinnati, will furnish 20 centerless grinders.

♦

Foxboro Co., Foxboro, Mass., has moved its St. Louis office to new quarters in the Continental building, 3615 Olive street.

♦

Lone Star Defense Corp., subsidiary of B. F. Goodrich Co., Akron, O., was recently organized to engage immediately in constructing and operating a $35,000,000 government ordnance plant. About 8000 will be employed in building the plant, near Texarkana, Tex. Shells and bombs will be loaded, it is reported.

♦

Talon Inc., Meadville, Pa., slide fastener manufacturer, has announced a reduction of 25 per cent in production effective Aug. 10, made necessary, according to officials, by a shortage of metals, principally copper.

♦

York Ice Machinery Corp., York, Pa., reports orders booked in the first three quarters of the fiscal year ended June 30 totaled $17,529,352, an increase of 39.5 per cent over 1940. Orders billed amounted to $12,784,963, an increase of 20 per cent over last year.

♦

Peerless Pump division of Food Machinery Corp., San Jose, Calif., has moved its eastern offices and manufacturing facilities from Massillon, O., to a new and modern plant at 1250 Camden avenue, Southwest, Canton, O.

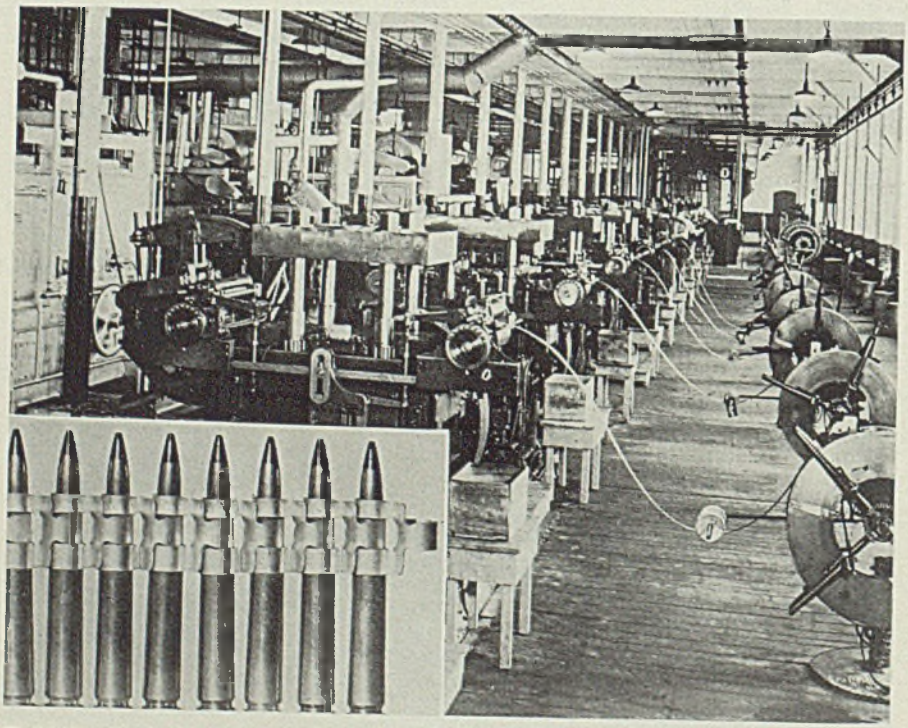
♦

William A. Force & Co., Brooklyn, N. Y., manufacturer of numbering and marking equipment, has completed 11 power-driven rotary marking machines for Procter & Gamble Defense Corp. They are to be used for numbering and marking conical fuze caps.

♦

Houston Compressed Steel Corp., recently organized by Max Byer, president, and A. M. Byer, both of Cincinnati, is building a plant for hydraulically compressing sheet steel scrap at Houston, Tex. The compressed scrap will be melted at the new plant of Sheffield Steel Corp. on Houston Ship channel. Buildings and equipment of the scrap plant will cost about $100,000.

Manufacturing Machine Gun Clips



■ Millions of machine gun cartridge links, like those shown in the inset of this photograph holding 50-caliber cartridges chained together, are being produced in this battery of presses in the plant of Firestone Rubber & Latex Products Co., Fall River, Mass. Similar batteries of presses will be installed in its plants in Akron, O., and Wyandotte, Mich. The company reports that it then will be the largest manufacturer of this defense item in the country. Oven for annealing and heat-treating the clips is at left, galvanizing tanks and generators in the background

Defense Corp. Finances War Plant Expansions

■ Additional lease agreements were authorized last week by Defense Plant Corp., a subsidiary of the Reconstruction Finance Corp., to expedite the defense program. Many of the lease authorizations made in recent weeks have been at the War Department's direct request. The federal government, through the Defense Plant Corp., in most cases, retains title to the facilities constructed under lease agreements. Authorizations reported last week by Jesse Jones, federal loan administrator:

Allegheny Ludlum Steel Corp., Pittsburgh, $1,500,000 additional to an original authorization of $2,500,000 for its plant at Dunkirk, N. Y. Of the increased amount, $1,018,950 is for machinery and equipment, remainder for land and buildings.

American Bosch Corp., Springfield, Mass., increase of $2,118,608 for additional facilities for production of aircraft equipment. Machinery and equipment are to cost about $1,248,675; land and buildings, $869,933.

Bell Aircraft Corp., Buffalo, $8,456,175 for a plant at Niagara Falls airport, Wheatfield, N. Y., to produce aircraft parts. Of the total, $2,859,251 is for machinery and equipment.

Chrysler Corp., Detroit, $403,022 supplemental grant for tools and machinery to be used in development and servicing of aircraft engines.

Cone Automatic Machine Co. Inc., Windsor, Vt., $350,000 for additional machinery and facilities to be used in production of machine tool equipment.

Eaton Mfg. Co., Wilcox-Rich Division, Cleveland, $173,950 for machinery and equipment for its Battle Creek, Mich., plant; and $116,583 for machinery and equipment for its Saginaw, Mich., plant, both engaged in producing aircraft parts.

General Motors Corp., New Departure Division, $2,442,355.19 for machinery and equipment for its Bristol, Conn., plant, producing aircraft parts.

Hanson-Whitney Machine Co., Hartford, Conn., $325,000, for machinery and equipment for plant at Hartford, producing machine tool equipment.

Lukenweld Inc., Coatesville, Pa., $310,000 increase in agreement to cover increased costs of plant for manufacture of diesel engine parts. Original agreement was for $2,400,000.

Singer Mfg. Co., New York, $665,000 increase in its present agreement for additional equipment and machinery for production of ordnance equipment at Elizabeth, N. J., and Bridgeport, Conn.

Weatherhead Co., Cleveland, $1,018,200 for machinery for Cleveland plant, manufacturing aircraft.

Exposition Will Feature National Defense Work

■ A Civilian and National Defense Exposition will be held in the Grand Central Palace, 480 Lexington avenue, New York, Sept. 20 through Oct. 18. It is sponsored by Defense Exposition Inc., a non-profit organization. Receipts above actual expense will be divided between the United Service Organization and Office of Civilian Defense.

Four floors, about four acres, will be occupied, two-thirds of the exhibits to be provided by the government and the remainder by manufacturers of defense materials. It is designed to present a comprehensive picture of commercial activity for national defense; to educate the public through interesting exhibits and graphic demonstrations on its part in the program; and offer opportunity to manufacturers to show how they are co-operating.

City Celebrates Delivery of 1000th American Car & Foundry Tank

■ A 12-ton combat tank, the 1000th to be built by the American Car & Foundry Co. for the United States and Great Britain, was delivered to the government with elaborate ceremonies in Berwick, Pa., Aug. 2. Sixty-five thousand persons, about five times the population of Berwick, attended.

The tank is powered with a radial airplane motor of 250 horsepower, giving three miles to the gallon of gasoline. It has five forward speeds and one reverse speed. Thirty per cent of its weight is comprised of armor plate ranging up to 1.25-inch for the turret.

The company installed 32 heat treating furnaces at Berwick to meet its armor plate requirements, part of a $3,000,000 expansion program at American Car plants, which is being financed entirely by itself. Increasing the capacity ten-fold, the company is said to have the largest plant in the world for carburized armor plate. It has been producing approximately 2000 tons of armor plate a month.

Under the present schedule one tank rolls off the 1100-foot assembly line every 45 minutes, with 43 in process between start of hull and the acceptance test. Each tank contains 2865 different parts. There are 14,318 individual pieces, exclusive of engines and accessory equipment. Machine work is performed on 705 individual items, requiring 2728 machine operations. Orders have been booked to date for 4685 12-ton tanks.

■ Delivery of American Car & Foundry's 1000th tank was featured by a three-mile-long parade, with 5500 workmen and 29 bands in line, along with the tank painted white. Fifteen other tanks built at Berwick later staged a sham battle

STEEL

Appeasement—at Home and Abroad

■ APPEASEMENT has become a word of ugly connotation.

In England poor Neville Chamberlain died of a broken heart because his sincere attempts to win peace by appeasement failed.

In the United States no one has condemned appeasement more vigorously than President Roosevelt did in his campaign for the third term in 1940.

Notwithstanding this apparent aversion to appeasement everywhere, it still is being practiced today in the United States on a larger scale than anywhere else; its chief proponents are the President and his advisers; and it probably constitutes the greatest single menace not only to national unity but to the success of the entire defense program.

♦ ♦ ♦

Nationally we are ardent appeasers abroad as well as at home. Thus far our appeasement has been a failure no less dismal than Mr. Chamberlain's.

To appease Japan, we sold her goods from 1937 to date valued at $1,034,026,000, which included iron and steel, scrap, machine tools, automobiles, airplanes and copper, much of which we could use to good advantage if we had retained it.

We helped finance Japan, not only by purchasing from her from 1937 to date goods to the value of $695,756,000 but also by paying her $710,019,474 for gold and silver specie.

Has this appeasement eased the threat of a war in the Far East?

If that attempt to appease was folly, it is trivial compared to our appeasement at home.

In the days of severe depression we spent billions for relief, unemployment, bonuses, etc. That distinctly was not appeasement.

But the habit of extending aid to persons especially hard hit by depression led to abuses. Class lines were intensified. Some classes were favored at the expense of others.

Favored classes got into the habit of asking for more favors and more favors. They were powerful politically.

Somewhere along the line our distribution of favors to them changed from an act of emergency to an act of downright appeasement.

For some months we have been appeasing the farm *bloc*. Its only response has been to ask for more favors.

For several years we have been appeasing union labor, or rather certain leaders of union labor. Their only response has been to ask for more favors, to make more trouble and to display more arrogance.

(Think of the effrontery of a minor local union official in "offering" to provide men to "permit" the launching of the cruiser ATLANTA!)

♦ ♦ ♦

Appeasement as a national policy at home and abroad has failed. It has failed so thoroughly that even the brave, courageous words of our leaders cannot obscure the fact.

It is time to call a halt to class appeasement at home and economic appeasement overseas.

E. L. Shaner

EDITOR-IN-CHIEF

August 11, 1941

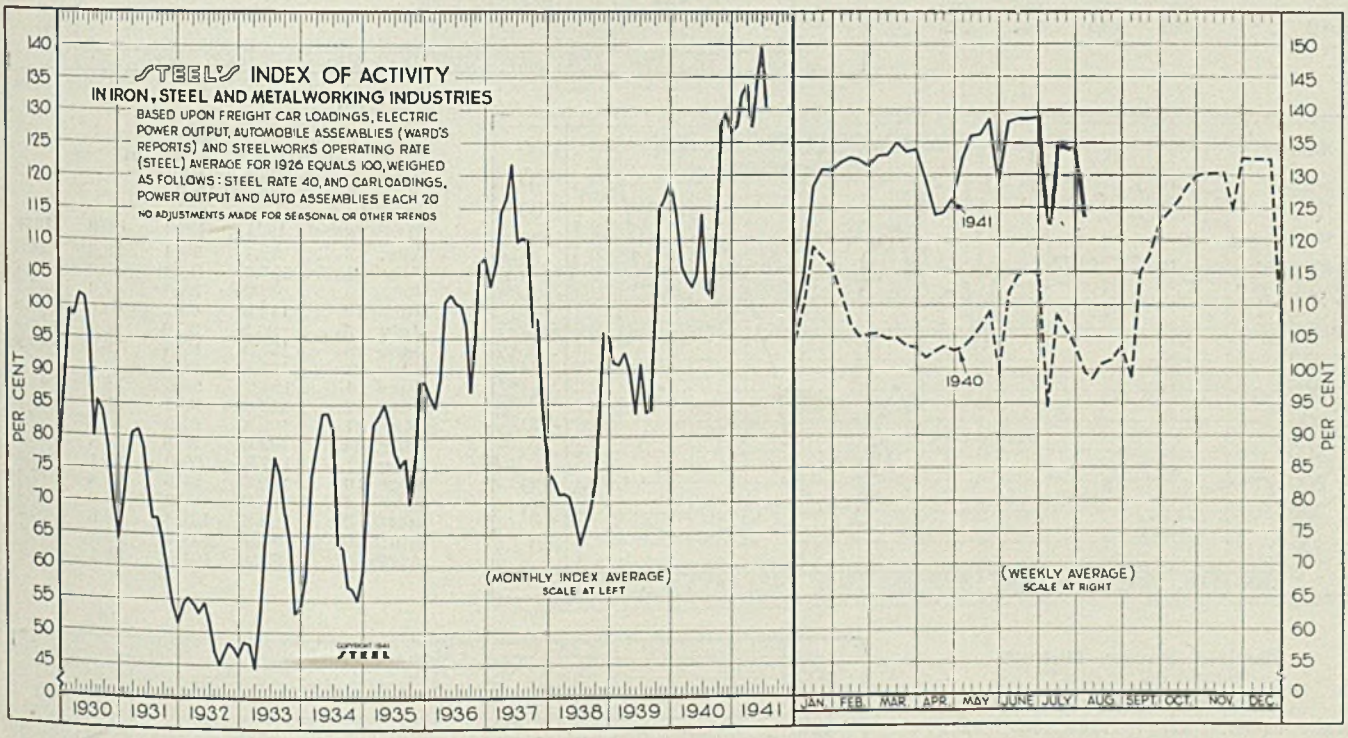
The BUSINESS TREND

Activity Index Reflects Drop in Auto Output

■ THE EXTENT to which the defense effort may be expected to interfere with the normal business process is becoming more evident daily. Buyers of consumers' durable goods, such as automobiles, refrigerators, vacuum cleaners, washing machines, and other appliances have been anticipating such a dislocation in output of these products for some time. Sharply expanded consumers' buying power has also spurred retail sales over the past few months.

Reflecting the sharp drop in automobile production during the week of Aug. 2, STEEL's index of activity declined 9.6 points to 123.7. This compares with 133.3 recorded in the preceding week and 99.7 in the like 1940 period. The all time peak of 138.8 recorded by the index occurred during the week ended June 28.

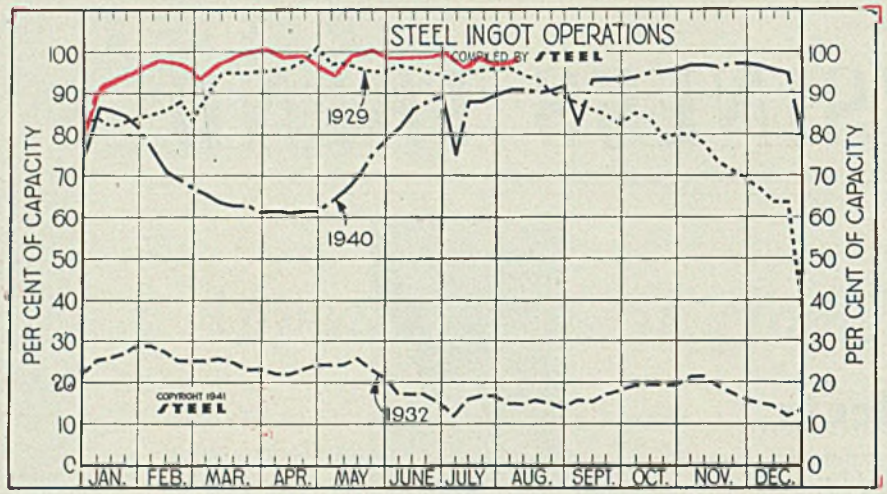
Steelmaking operations advanced 1½ points to 98.5 per cent during the week ended Aug. 2, while electric power consumption established a new all time record of 3,226,141,000 kilowatts. Freight traffic declined more than normally to 883,065 cars during the latest period. Automobile assemblies were off sharply to 62,146 cars and trucks during the week ended Aug. 2, reflecting declining operations as the model year draws to a close.



STEEL'S index of activity declined 9.6 *points to* 123.7 *in the week ended Aug.* 2:

Week Ended	1941	1940
May 17	136.1	106.8
May 24	138.6	109.1
May 31	128.4	99.2
June 7	138.4	111.9
June 14	138.7	114.6
June 21	138.7	114.8
June 28	138.8	115.3
July 5	122.9	94.2
July 12	134.5	108.5
July 19	134.1	106.0
July 26	133.3	103.4
Aug. 2	123.7	99.7

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	98.5
April	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7
May	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101 2
June	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8
July	131.2	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

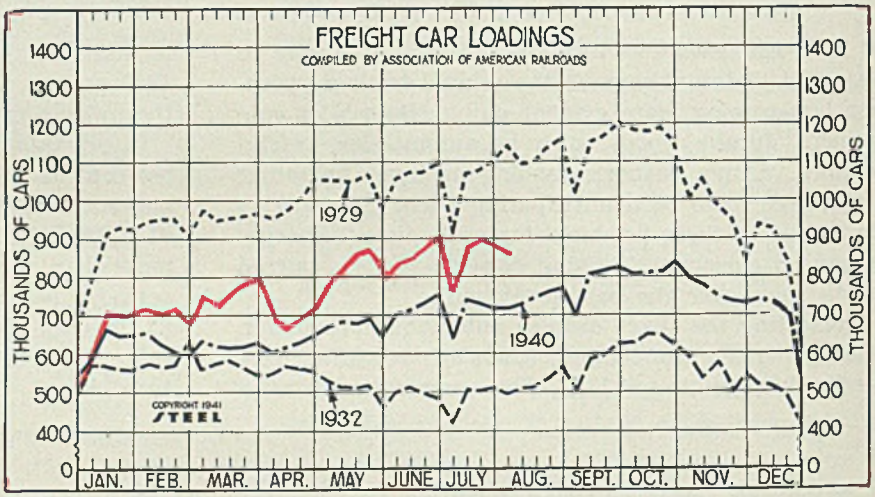
(Per Cent)

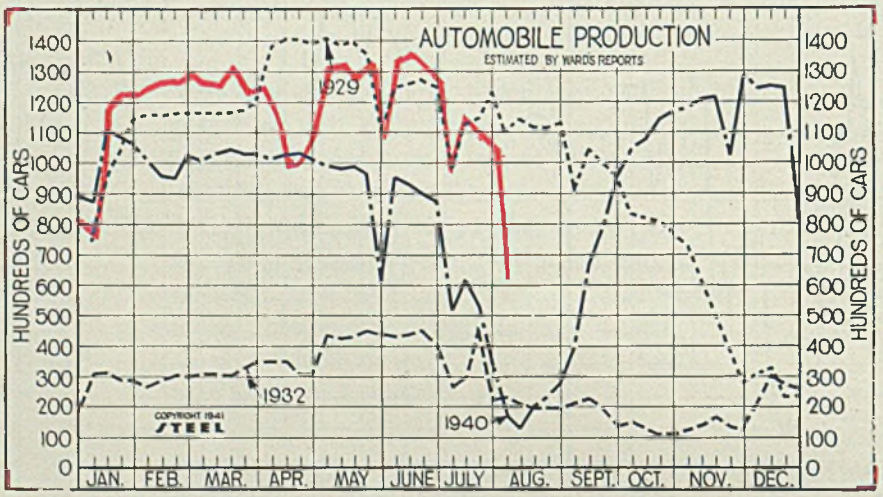
Week ended	1941	1940	1939	1938
Aug. 2....	98.5	90.5	60.0	40.0
July 26....	97.0	89.5	60.0	37.0
July 19....	97.0	88.0	56.5	36.0
July 12....	97.5	88.0	50.5	32.0
July 5....	96.5	75.0	42.0	24.0
June 28....	99.5	89.0	54.0	28.0
June 21....	99.0	88.0	54.5	28.0
June 14....	99.0	86.0	52.5	27.0
June 7....	99.0	81.5	53.5	25.5
May 31....	99.0	78.5	52.0	25.5
May 24....	100.0	75.0	48.0	28.5
May 17....	99.5	70.0	45.5	30.0
May 10....	97.5	66.5	47.0	30.0
May 3....	95.0	63.5	49.0	31.0
April 26...	96.0	61.5	49.0	32.0
April 19...	98.0	61.5	50.5	32.5
April 12...	98.0	61.0	51.5	32.0

Freight Car Loadings

(1000 Cars)

Week ended	1941	1940	1939	1938
Aug. 2.....	883	718	661	584
July 26.....	897	718	660	589
July 19.....	899	730	656	581
July 12.....	876	740	674	602
July 5.....	740	636	559	501
June 28.....	909	752	666	589
June 21.....	886	728	643	559
June 14.....	863	712	638	556
June 7.....	853	703	635	554
May 31.....	802	639	568	503
May 24.....	886	687	628	562
May 17.....	864	679	616	546
May 10.....	837	681	555	542
May 3.....	794	666	573	536
April 26.....	722	645	586	543
April 19.....	698	628	559	524
April 12.....	680	619	548	538





Auto Production

(1000 Units)

Week ended	1941	1940	1939	1938
Aug. 2....	62.1	17.4	28.3	14.8
July 26....	105.6	34.8	40.6	30.4
July 19....	109.9	53.0	47.4	32.1
July 12....	114.3	65.2	61.6	42.0
July 5....	96.5	52.0	42.8	25.4
June 28....	127.9	87.6	70.7	40.9
June 21....	133.6	90.1	81.1	40.9
June 14....	134.7	93.6	78.3	41.8
June 7....	133.6	95.6	65.3	40.2
May 31....	106.4	61.3	32.4	27.0
May 24....	133.6	96.8	67.7	45.1
May 17....	127.3	99.0	80.1	46.8
May 10....	132.6	98.5	72.4	47.4
May 3....	130.6	99.3	71.4	53.4
April 26...	108.2	101.4	86.6	50.8
April 19...	99.9	103.7	90.3	60.6
April 12...	99.3	101.9	88.1	62.0

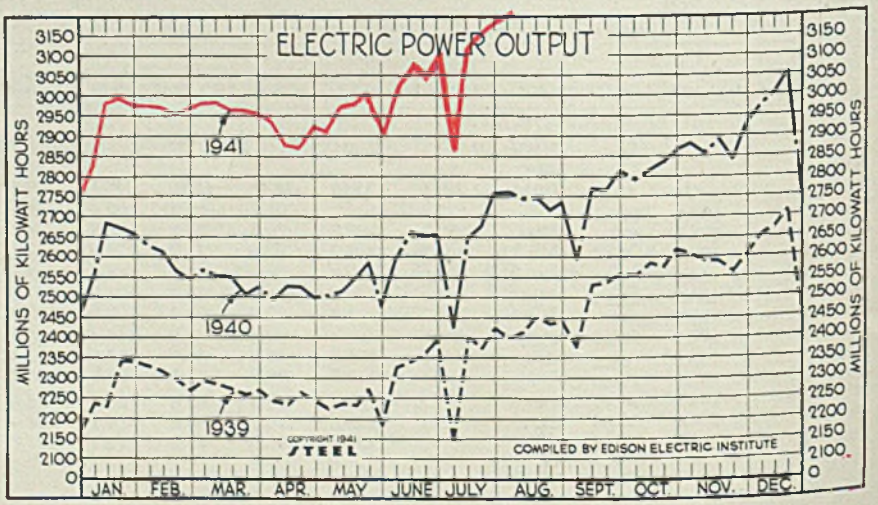
Electric Power Output

†

(Million KWH)

Week ended	1941	1940	1939	1938
Aug. 2.....	3,226	2,762	2,400	2,194
July 26.....	3,184	2,761	2,427	2,160
July 19.....	3,163	2,681	2,295	2,085
July 12.....	3,141	2,652	2,403	2,154
July 5.....	2,870	2,425	2,145	1,937
June 28.....	3,121	2,660	2,396	2,074
June 21.....	3,056	2,654	2,362	2,082
June 14.....	3,057	2,665	2,341	2,051
June 7.....	3,042	2,599	2,329	2,057
May 31.....	2,924	2,478	2,186	1,937
May 24.....	3,012	2,589	2,278	2,031
May 17.....	2,983	2,550	2,235	2,024
May 10.....	2,975	2,516	2,239	2,019

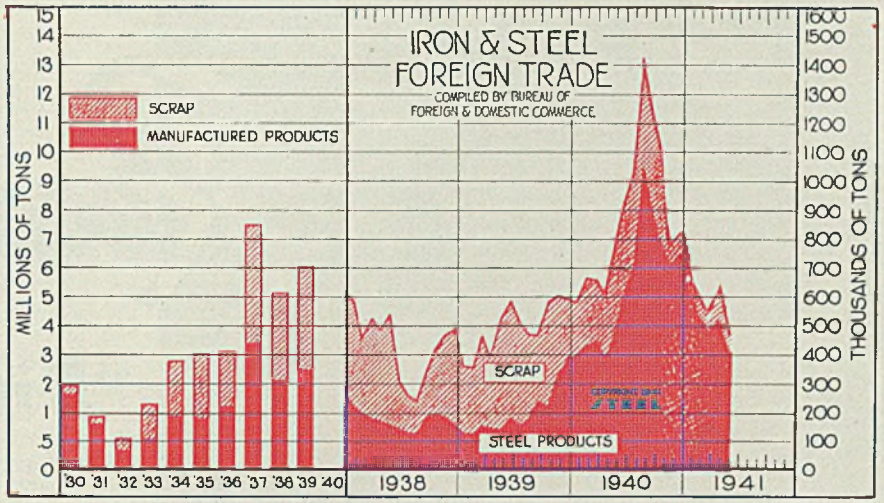
†New series: Includes additional governmental and power generation not previously reported.

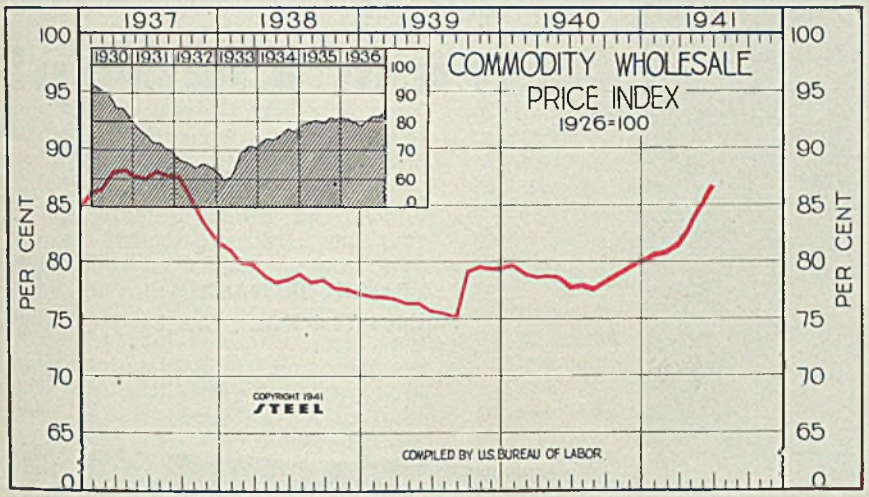


Iron and Steel Exports

(Thousands of Gross Tons)

	Steel Products		Scrap		Total
	1941	1940	1941	1940	1941
Jan.	653.8	396.1	45.1	187.5	698.9
Feb.	525.9	436.6	74.4	234.7	600.2
Mar.	512.8	457.1	54.4	206.9	567.2
April	515.7	391.8	120.2	221.2	635.8
May	409.8	471.5	62.9	312.5	472.7
June	.....	617.7	.....	318.4	.....
July	.....	707.8	.....	327.1	.....
Aug.	.....	1046.1	.....	346.1	.....
Sept.	.....	965.4	.....	251.1	.....
Oct.	.....	846.6	.....	258.5	.....
Nov.	.....	713.8	.....	74.3	.....
Dec.	.....	735.2	.....	70.0	.....
Total	.....	7,785.5	.....	2,823.1	.....





All Commodity Wholesale Price Index

U. S. Bureau of Labor

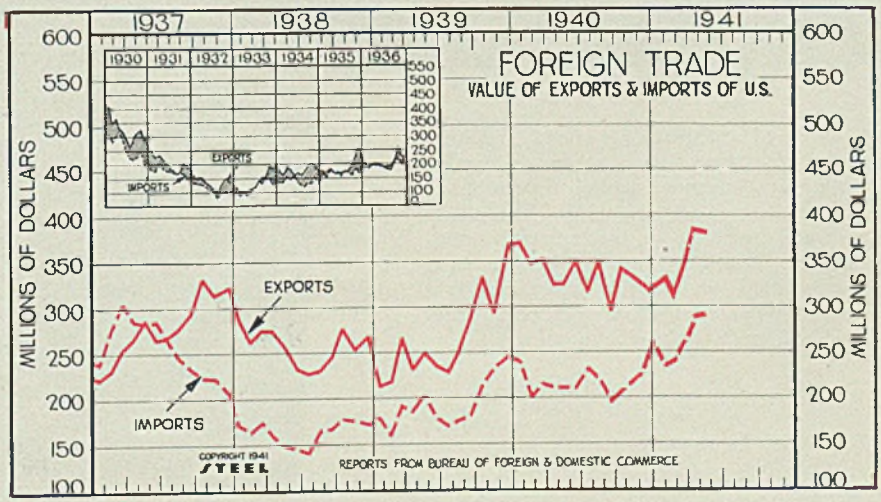
(1926 = 100)

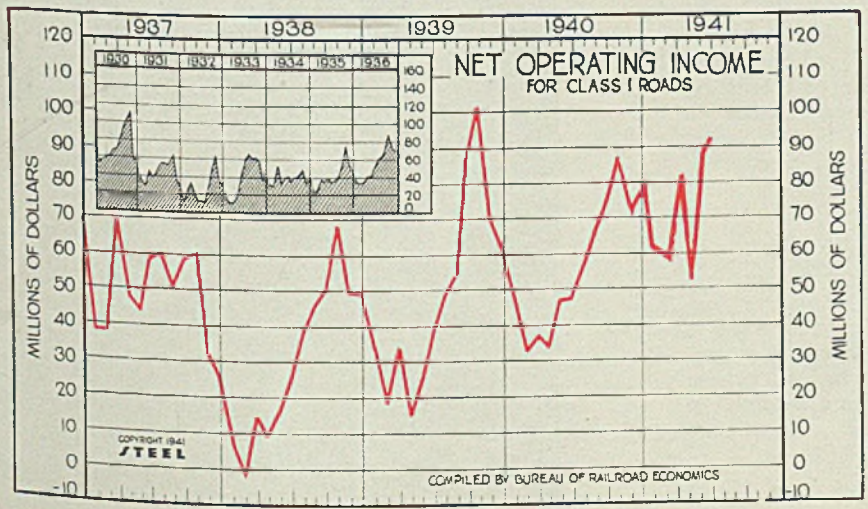
	1941	1940	1939	1938	1937
Jan.	80.8	79.4	76.9	80.9	85.9
Feb.	80.6	78.7	76.9	79.8	86.3
March	81.5	78.4	76.7	79.7	87.8
April	83.2	78.6	76.2	78.7	88.0
May	84.9	78.4	76.2	78.1	87.4
June	86.9	77.5	75.6	78.3	87.2
July	....	77.7	75.4	78.8	87.9
Aug.	....	77.4	75.0	78.1	87.5
Sept.	....	78.0	79.1	78.3	87.4
Oct.	....	78.7	79.4	77.6	85.4
Nov.	....	79.6	79.2	77.5	83.3
Dec.	....	80.0	79.2	77.0	81.7
Ave.	....	78.5	77.1	78.6	86.3

United States Foreign Trade

(Unit: $1,000,000)

	Exports		Imports	
	1941	1940	1941	1940
Jan.	$325.4	$368.6	$228.7	$241.9
Feb.	303.4	347.0	233.7	199.8
Mar.	357.6	352.3	267.8	216.7
April	385.5	324.0	287.6	212.2
May	384.6	325.3	296.9	211.4
June	.....	350.2	.....	211.4
July	.....	317.0	.....	232.3
Aug.	.....	349.9	.....	220.5
Sept.	.....	295.2	.....	194.9
Oct.	.....	343.5	.....	207.1
Nov.	.....	327.7	.....	223.4
Dec.	.....	322.3	.....	253.1
Total	.....	$4,021.6	.....	$2,625.4





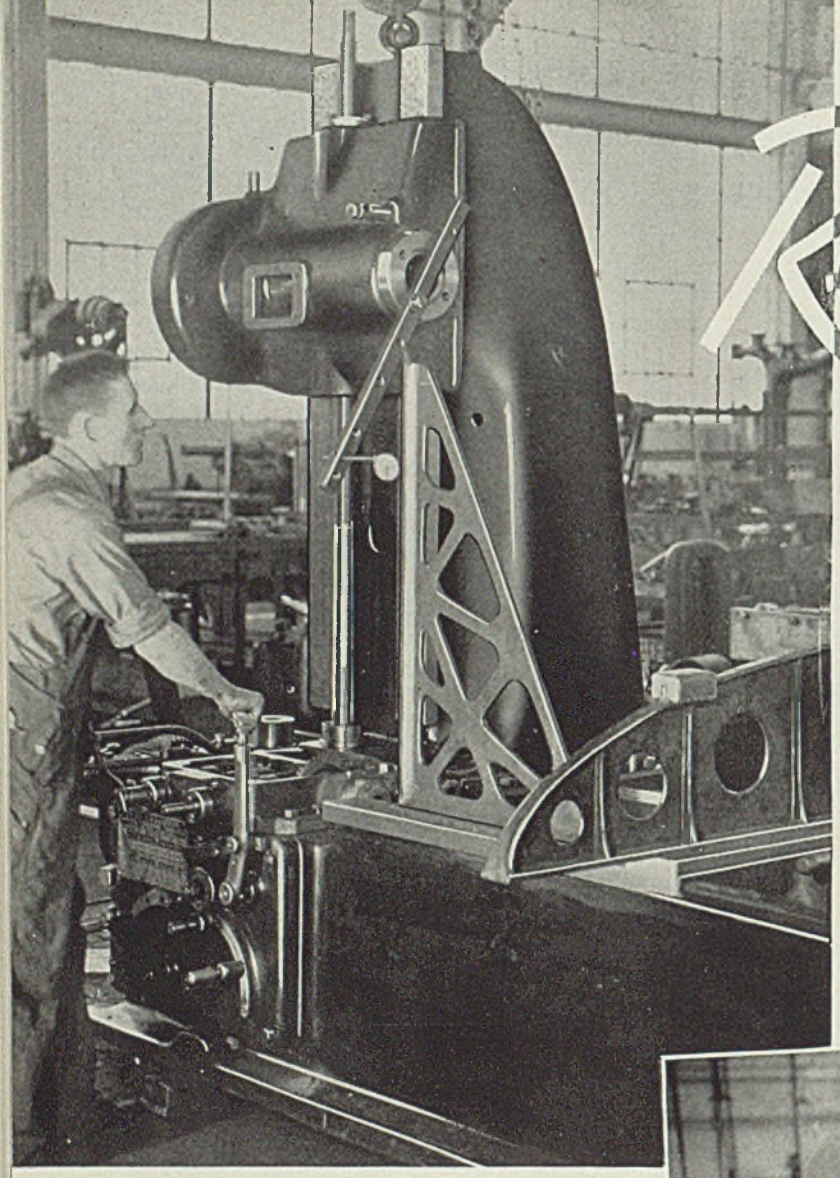
Class 1 Railroads

Net Operating Income

(Unit: $1,000,000)

	1941	1940	1939	1938
Jan.	$62.36	$45.57	$32.89	$7.14
Feb.	58.49	32.86	18.59	1.91*
Mar.	80.63	36.73	34.32	14.73
April	52.57	33.82	15.32	9.40
May	88.63	47.08	25.10	16.67
June	93.26	47.42	39.10	25.16
July	.....	57.08	49.01	38.43
Aug.	.....	66.01	54.59	45.42
Sept.	.....	74.19	86.43	50.36
Oct.	.....	86.99	101.62	68.57
Nov.	.....	71.10	70.35	49.67
Dec.	.....	78.79	60.95	49.37
Average	.....	$56.84	$49.02	$31.02

*Indicates deficit.



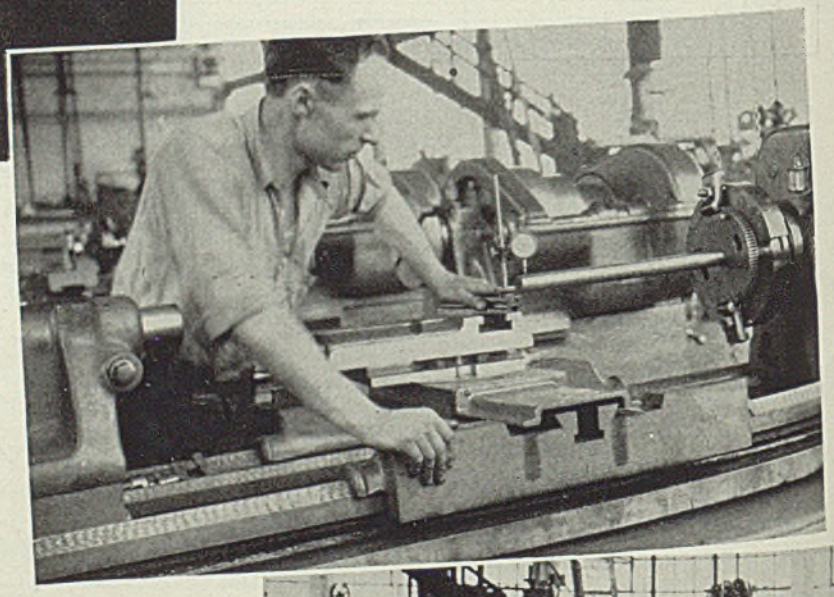
Reconditioned

"Pinch-Hitters"

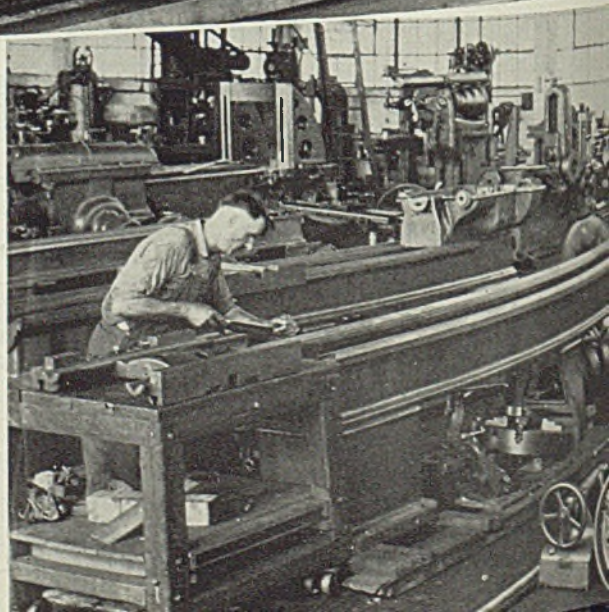
In the

Defense Line-up!

By GUY HUBBARD
Machine Tool Editor, STEEL



Restoration of accuracy to used machine tools involves more than mere decorative scraping. It demands careful repetition of the machining and finishing operations which were involved in the original building of the machine, under guidance of the same kind of special tools and precision instruments used by machine tool builders. Note above view



Checking of reconditioned machine tools in the shops of competent rebuilders follows essentially the same procedure with the same equipment as is involved in machine tool building practice. In this case, center illustration, the relation between spindle and bed of a lathe—after refinishing the bed—is being checked by a test bar in the chuck and a dial gage on the carriage

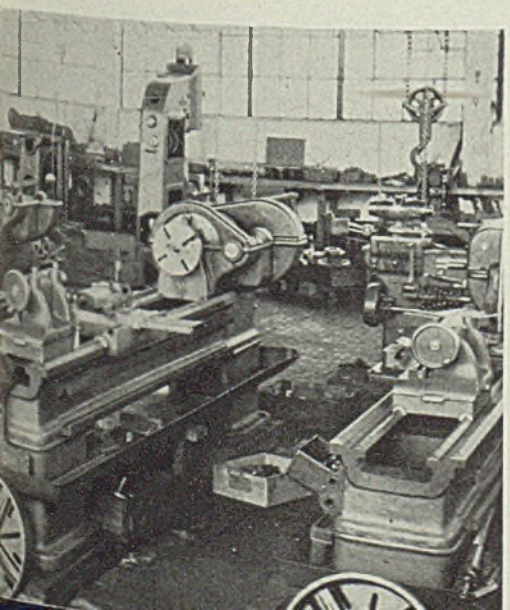
Class of workmen employed by reputable machine tool rebuilding organizations is on a par with that employed in machine tool building. The same skill and patience is involved in scraping a remachined lathe bed as was involved in its original scraping. Completely dismantled and badly worn or broken parts discarded, the machine literally is born again before it is returned to production

Used Machines—

■ MANDATORY price limitations placed over used machine tools on March 1, 1941, at the instance of Leon Henderson as head of the Division of Price Stabilization, National Defense Advisory Commission, and now under the jurisdiction of Mr. Henderson as Administrator, Office of Price Administration and Civilian Supply (OPACS), unquestionably nipped in the bud one of the greatest orgies of speculation at the expense of national security which ever threatened this country.

The situation called for prompt use of strong medicine, and that was what it got. As a result, there have been casualties as well as cures. Most of the casualties were among speculators who got what was coming to them. For them we hold no brief. Unfortunately, however, this mass-medication in some cases has had the unintended result of lowering the vitality of a relatively small but highly important branch of the machine tool industry—that of rebuilding and modernizing used machines.

For many years a number of fairly large, well equipped, and highly reputable companies have specialized in that kind of work. Today those substantial companies would be contributing to a much greater degree than they are toward relieving the serious shortage of high grade production machines and tool room equipment—were it not for the fact that their business—by its very nature—is allergic to the overly strong doses of price medicine under the OPACS formula which too many machinery owners attempt to force upon the rebuilders when the latter seek to purchase used equipment for reconditioning and subsequent resale.



There is nothing quite comparable to the complete rebuilding of used machine tools—as carried out by these companies—unless it be those painstaking jobs which in years gone by were done by some of the old-fashioned men's tailors in cutting apart, reversing and resewing the material, and relining the sturdy Harris tweed suits of some of their thrifty customers who didn't mind paying top price for a first-class garment, but who at the same time didn't choose to discard such a garment until both sides of its excellent material had yielded full measure of service.

There is just about as much difference between a used machine tool which merely has been put into "usable condition," and one which has been completely "reconditioned" in one of these reputable machine tool rebuilding shops, as there is between an old suit of clothes which merely has been cleaned and pressed and one which has been given that 100 per cent "tearing down and rebuilding" treatment mentioned in the foregoing paragraph. Not only that, but also there is a vast amount of difference in the grade of talent required on these different grades of jobs, and in relative costs of those jobs.

Companies Deserve Fair "Break"

There is where the rub comes between top-quality machine tool reconditioning and the price limitations which have been set upon the used machines. After all, used machines are merely the "raw material" with which machine tool reconditioning craftsmen work. It is a basic axiom of private enterprise that if cost of raw material, plus cost of processing, plus overhead and marketing expenses involved, amounts to almost as much, or more, than the price for which the finished product can be sold, then there is no sense in continuing that business—unless perchance some government department can be found to subsidize the enterprise. As a matter of fact, the government has subsidized many enterprises far less important to the welfare of the country than is this machine tool rebuilding industry during the present defense crisis.

However, the reputable companies in the machine tool rebuilding industry do not desire to lean on the government financially or any other way. What they do want simply is sufficient latitude in used machine tool prices—based primarily on sensible interpretation of the price ceilings—so that they can afford to purchase used tools and put them into such good condition that they will serve as capable "pinch-hitters" in the national defense line-up. What they will be pinch-hitting for, will be some of the untold thousands of new machine tools now on order by the government and suppliers to the government—new tools which cannot be delivered for months because of the appalling load which national defense has saddled upon the machine tool builders.

"Retired" Men Aid Defense

There is a great deal of discussion these days about the advisability of calling back into service in defense industries hundreds of skilled men between 45 and 75 years of age who went into retirement—either voluntarily or unvoluntarily—during the lean years of the 1930's, or who left the metalworking industries to go into other lines of endeavor. That not only is being talked about—it is being done. Were it not being done, a large reservoir of America's productive power would remain untapped.

There also is a great deal of discussion these days about the advisability of "upgrading" many of the older and more experienced men who have remained on the active list but who now must assume larger responsibilities as foremen and supervisors on greatly expanded regular shifts or on added second or third shifts. That also is being done. If it were not done, how—may we ask—would these personnel problems be met under existing conditions?

In both these cases a certain amount of "reconditioning" is involved. The older men who have been away from the shop for a considerable period, have to work the arthritis out of their joints, limber up their mental functions and their rusty skills and regain

(*Please turn to Page* 112)

Principles of

GUN CONSTRU

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■ IT IS necessary to have virtually flawless material where gun tubes are concerned, lest some minor imperfection initiate a crack, resulting in rupture of the tube. Since the consequences of gun-tube failure are always grave, only the highest excellence in all that pertains to their manufacture will answer. Hence the electric furnace, despite its generally higher cost of operation, is preferred on account of the increased probability of blow-holes and gas bubbles in steel converted by the basic open-hearth process.

Before proceeding to the discussion of the machining and assembly procedures followed in one of our

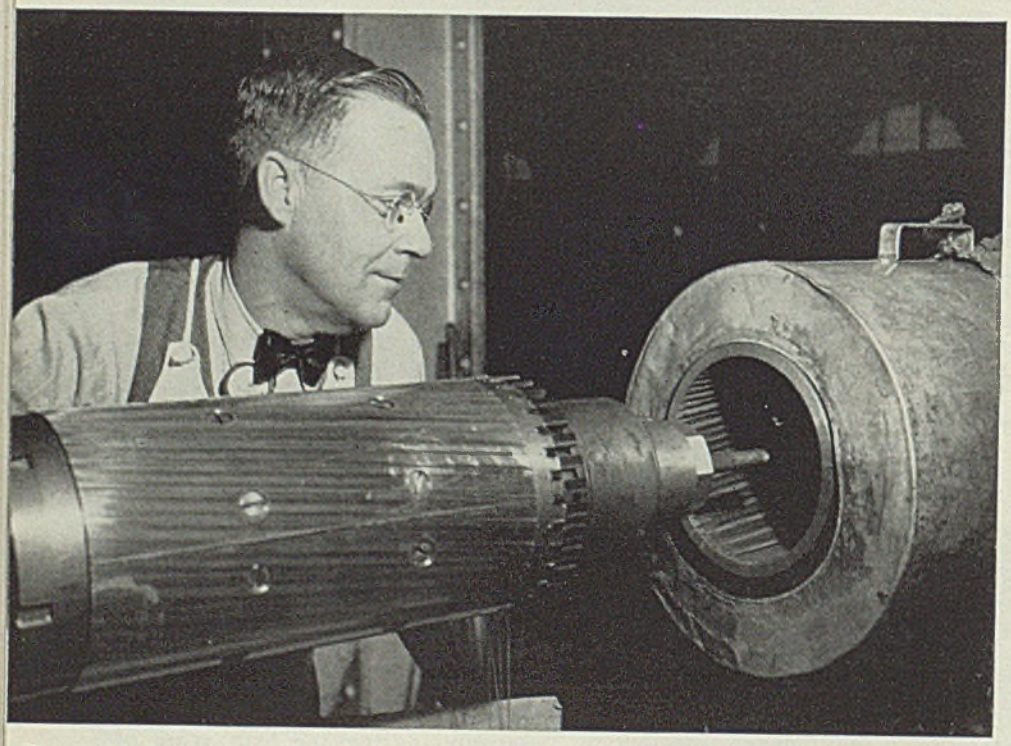


Fig. 1—This is a rifling head, left, for machining the rifling grooves in large-caliber guns shown in operation at Watervliet Arsenal, Watervliet, N. Y. Half as many cutting tools are employed as grooves since head is indexed to cut second set of grooves after first set is cut. Depth to which tools cut is adjusted by moving the central cone upon which the tool slides bear. O.E.M. photo by Palmer

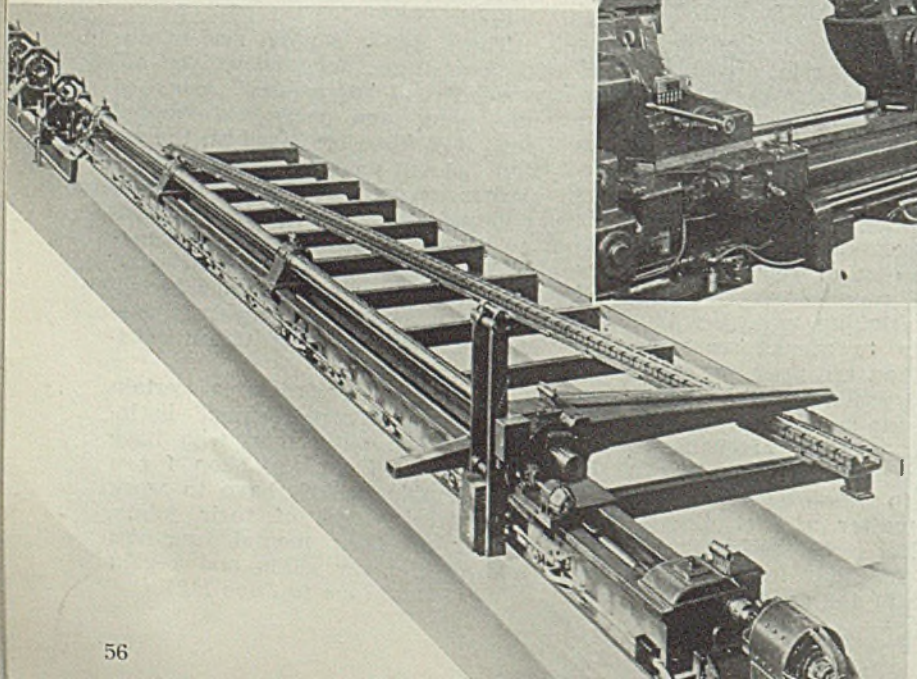


Fig. 2—Method, below, of cutting slots in rifling bar: An extension of the bed plate carries a steel spline which is set to the form of the development of the lands by means of set screws. Rifling bar is rotated by the spline, pinion and rack, one end of which is held against spline

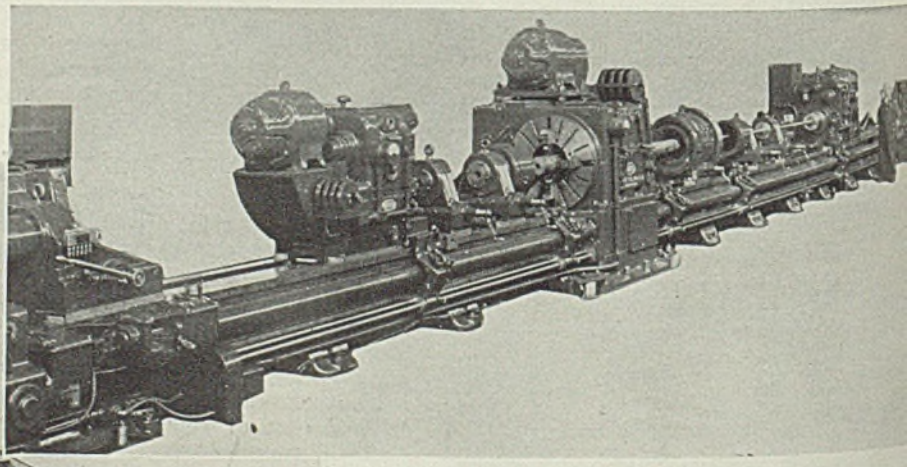


Fig. 3—Double-ended boring lathe, above, of the hollow-spindle type for the rough boring of gun-tube forgings from both ends at once. Tools revolve in one direction and the work in the other to ensure concentricity of the hole

TION

How is it possible to have the wall of a gun barrel too thick? What is influence of lateral strain? How are hoop stresses and radial stresses determined? What are principles of initial stress and varying elasticities

This Is Number 24 in a Series on Ordnance and Its Production, Prepared for STEEL *by Professor Macconochie.*

largest arsenals making big guns, the more important considerations governing gun design should be pointed out in order that these manufacturing methods may be completely intelligible. See STEEL, July 14, 1941, p. 54 and July 21, 1941, p. 50 for background material on big guns.

For purposes of analysis a gun may be considered as a tube—closed at one end and exposed to high internal pressures which vary rapidly both in time and in their distribution throughout the length of the barrel. The manner in which these internal pressures behave belongs in the realm of interior ballistics, a subject to which we hope to make fuller reference in a subsequent article in this series. Let it suffice for the moment that modern requirements for both naval and military service demand guns capable of muzzle velocities from 2600 to 3200 feet per second, with corresponding increases in chamber pressures up to nearly 100,000 pounds per square inch.

High muzzle velocities are important in many classes of field artillery and are always important for naval purposes since the flatter the trajectory the greater the probability of hitting the target and also because the striking energy increases as the square of the remaining velocity.

Walls Can Be Too Thick: Even were mobility not a prime consideration and hence the weight of the gun of the first consequence, a point would rapidly arrive where no increase in wall thickness would measurably increase the resistance of the tube to internal pressure. Thus in a simple tube, composed of homogeneous material in a neutral state of stress at the outset of the action, maximum pressure resistance is determined by composition and the treatment given the steel—rather than wall thickness. The reason is that a thick-walled tube cannot be treated as though it were a boiler shell, for example, in which the thickness of the plate is small compared with the diameter of the shell. Customarily, in this latter case, the stress is assumed to be uniformly distributed across the cross section of the plating and the intensity of the stress is arrived at by dividing the total bursting load over a ring of unit width by twice the thickness of the plate. When the case of the thick-walled tube is investigated by considering a series of elementary concentric rings of which the tube may be imagined composed, the distribution of stress is found to be far from uniform, the greatest intensity of stress occurring in a tangential direction at the inner surface of the tube.

In the familiar analysis of this problem, a thin or "elementary" ring, concentric with the axis and within the metal of the tube, is selected and the equilibrium of a segment—preferably a half—considered. For the sake of simplicity this ring is usually assumed to be of unit width. If the inner or radial pressure on the inner surface of the ring be denoted by "p" and on the outer surface by p + dp, the force tending to burst this thin ring is p.2r where "r" is the inner radius; and the force opposing bursting is (p + dp)2(r + dr) + f.2dr. where "f" is the hoop stress. Unless rupture takes place, these forces are equal and opposite. Thus—p.dr — r.dp — dp.dr equals f.dr. Hence f equals—p — r.dp/dr.

If we had no further information concerning the behavior of the tube under pressure, this latter equation is as far as we would get. However, observations tend to confirm the simple hypothesis that the longi-

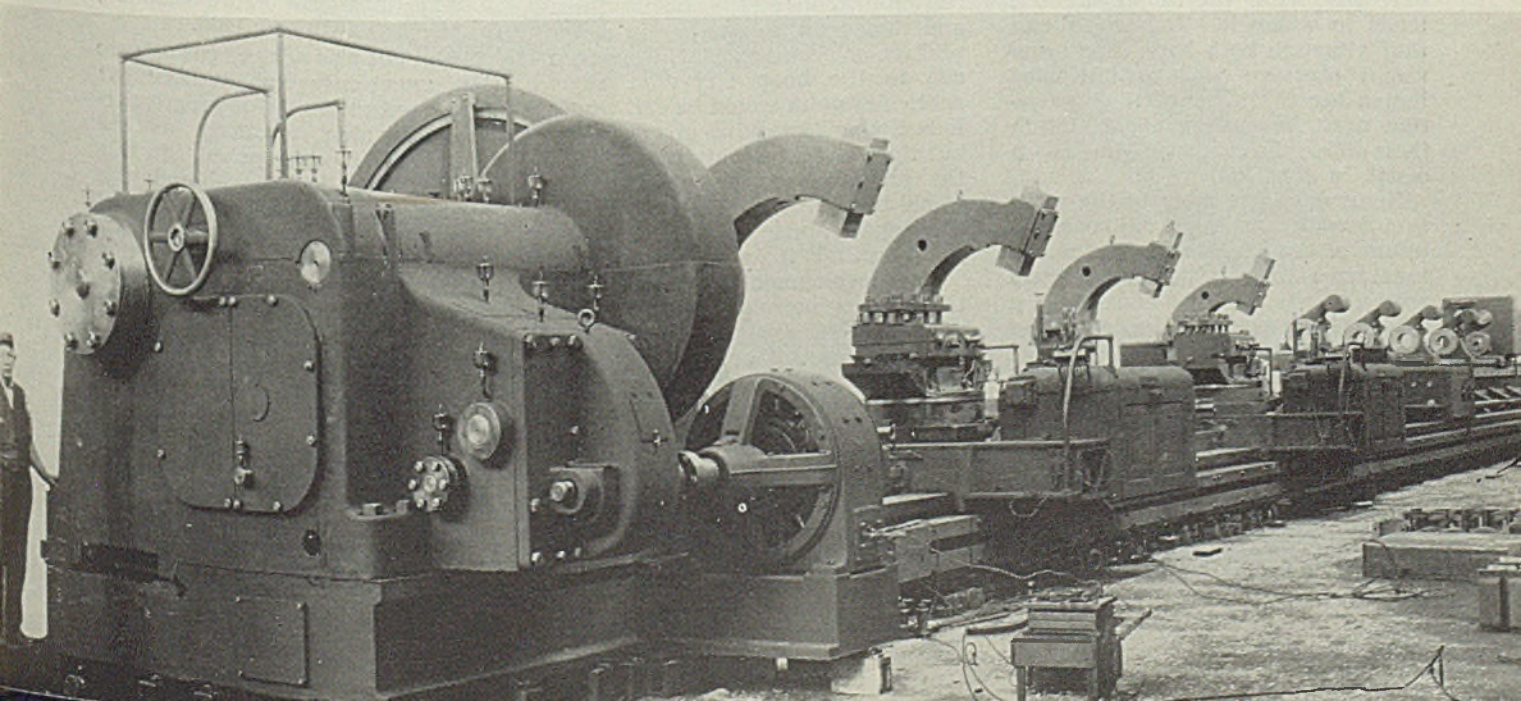


Fig. 4—Large gun lathe now being installed will finish turn and bore guns up to 20-inch caliber (diameter of bore), outside diameter of 7 feet, maximum length of 87 feet

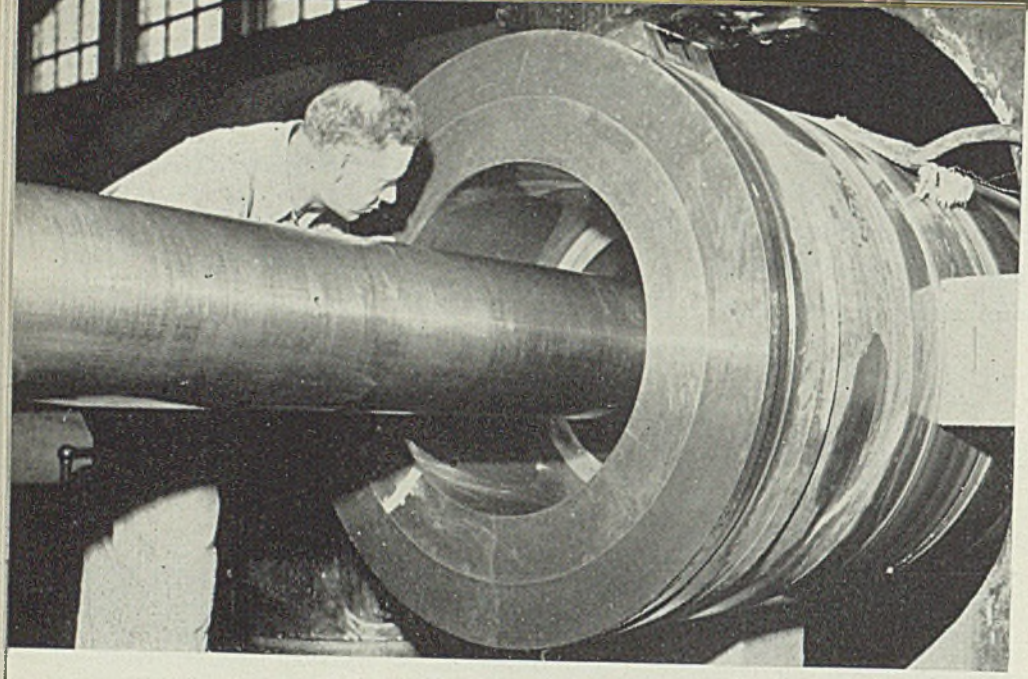


Fig. 5—Closeup of boring operation o major caliber weapon at Watervlie Arsenal: This shot affords some ide of the size of the work involved. O.E.M photo by Palmer

tudinal expansion of the tube remains sensibly constant—in other words a plane cross section remains flat after the application of the pressure. If this be acceptable, it follows that the longitudinal strain in our elementary ring of any radius will be independent of the radius and thus the forces which produce this strain must, when added up, equal a constant.

Obviously a primary cause of longitudinal stretch of the tube is the frictional resistance to the motion of the shell; but a further cause arises from the known tendency of solids to contract or expand, as the case may be, in a direction at right angles to the axis of tensile or compressive stress. The ratio of the strain produced in a lateral direction to the strain measured along the line of action of the force acting on an element of the body at any particular point varies for different materials, being about 0.333 for brass, 0.270 for cast iron and 0.303 for steel. Now consider our elementary ring and note that the hoop stress tends to make it narrower, while the radial pressure tends to widen it. Thus it follows that although both hoop stress and radial pressure vary within wide limits, the character of their variation must be such as to maintain their difference constant. Thus f — p equals a constant.

Returning once more to the equation developed above from considerations of the equilibrium of the elementary ring in which f, the hoop stress, was found to be equal to — p (the radial stress) — r.dp/dr, r being the radius of the ring, we observe that a constant 2.A, let us say for convenience in integrating, may be substituted for f — p. If this is done our equation becomes: 2.A equals — 2.p — r.dp/dr. This may also be written:

$$-2.dr/r = dp/(A + p)$$

Integrating,

$$-\log r^2 - \text{const.} = \log (p + A)$$

and thus

$B/r^2 = p + A$ in which B is also a constant.

Since also

$$f - p = 2.A$$

therefore we have,

$p = -A + B/r^2$ .....(1)

and

$f = A + B/r^2$ .....(2)

With these equations as a basis we readily see that A and B can be found from (1) if the radial pressures at the inner and outer radii are known. Hence equations for both f and p can be set up. The stresses obtained from such equations are known as the "simple" stresses, since no account has thus far been taken of the stresses accompanying the lateral deformation of each tiny element of the tube. It will be obvious that these "lateral" stresses, being internally balanced, in no wise affect the equilibrium of the segment of the elementary ring already considered.

Without delving too deeply into algebraic complexities, we recall that these lateral strains are about 30 per cent of the strain in the direction of the stress producing them and they may, of course, be either positive or negative. Thus the strain due to the hoop stress at some particular point would be f/E where E is Young's modulus of elasticity; but the total strain at the point, in the direction of the hoop stress, would be $(f + p/3)/E$ if we neglect the longitudinal stress, or $(f + p/3 - q/3)/E$ if we considered it.

The development of these equations gives perhaps the most important relationship of all the various fundamental equations of gun design—a relationship in which the resultant circumferential or "hoop" stress is expressed in known terms for any given radius:

$$f = 2/3\ [(p_i r_i^2 - p_e r_e^2)/(r_e^2 - r_i^2)] + 4/3\ [r_i^2 r_e^2 (p_i - p_e)/(r_e^2 - r_i^2)]\ 1/r^2,$$

the subscripts "i" and "e" referring, of course, to the inside and the outside of the tube respectively. This equation, be it noted, is applicable equally to the case where the pressure is applied to the interior of the tube; to the exterior; and to both the interior and the exterior.

Of course this equation can be used to determine the hoop stresses set up in the tube by the application of interior pressure. Doing this with a simple tube in a state of neutral stress, it is easy to verify the suggestion already offered—namely, that a point would quickly be reached where no further addition of metal to the tube wall appreciably increases its resistance to internal pressure. This limit is very generally taken as about half a caliber (bore diameter). For instance if the wall of the tube were equal to half the bore, its strength would be very nearly as great as though the wall were ten times as thick as the bore. Also it is quickly discovered that a simple tube, even if of the very best material, has insufficient strength to withstand modern demands. Therefore it is necessary to devise some other plan to use the steel more effectively.

Steel Suits Purpose Best

Now there is nothing in the stress analysis offered above which would prevent its application to a tube already in a state of stress. Thus a basic idea which had its origin when guns were cast with chilled cores finds modern expression in built-up wire-wound and radially expanded gun tubes, in all of which the layers of metal nearest the bore are held under an initial compression by the tension of the outer layers. Thus on firing, the inner layers must first be expanded sufficiently to remove the initial compression before beginning to take their working load.

We might also achieve our purpose (but apparently less successfully) if we used materials of progressively diminishing elasticity as the outer layer is approached. In this way the inner layers while offering resistance to internal pressure would transmit to the outer layers their fair share of the load. Since this principle is only applicable to tubes made of different metals, and since none approach steel in their suitability for our purpose, this latter proposal needs no further mention.

Ideally, the principle of initial states of strain, if carried to the limit would require an infinite number of infinitely thin hoops shrunk one upon another in such fashion that the initial distribution of stress across the cross section of the tube was exactly the reverse of

that imposed upon it by the firing of the gun. In this way the metal would be uniformly stressed to its maximum safe capacity during action; the gun would be as light as possible for the service required; and, theoretically at least, no limit exists to the powder chamber pressures which may be employed.

Practically, of course, there is a limit to the number of such hoops or "layers." In naval practice, for instance, no more than four are employed, and of these perhaps only one or two extend as far as the muzzle. The inner member, known as the tube, always extends in one piece from breech to muzzle and in some designs the next (B) layer does also but in two or more pieces. The C and D layers extend from the breech only a part of the way to the muzzle since it is the breech end which has to support the heaviest internal pressures.

Machining these huge guns involves number of unusual considerations.

The rifling in smaller caliber guns may be cut by means of a series of broaches mounted one at a time on the end of a bar which is given the proper helical movement by means of a fixed feather sliding in a spiral groove in the bar. As many as 30 of these cutters may constitute the complete series. Backlash is avoided by applying a torque to the bar with a drum, a leather belt passing over an elevated pulley, and a weight attached to the end of the belt. The method employed to cut the groove in the bar is shown in Fig. 2, The "former ribbon" having been set, the rifling bar is rotated by rack and pinion as it moves forward. A planer type tool on the front bar support does the cutting. An arrangement of this kind may be used to do the actual cutting of the grooves, but the grooved-bar method is simpler and more positive, although a little more expensive, at least in first cost. Damage to the gun through improper setting of the rack, failure of the gearing and the like are also eliminated.

For larger calibers the rifling head shown in Fig. 1 is used. This consists of a hollow cylinder, slightly smaller than the bore of the gun and keyed in a socket in the end of the rifling bar. The cutting tools, which number half the grooves to be cut, are set in pockets at equidistant intervals around the forward rim of the head and are adjustable radially by means of a cone moved axially by a screw. This screw, which has a vernier to enable the operator to set the tools, is reached through an opening in the side of the head. Arrangements are also provided for the collapse of the cutters in order that the head may be withdrawn without injury to the bore. Grooves are usually cut from the muzzle, light cuts being taken to avoid tearing. Some 200 to 300 passes are required to machine the rifling in a 14-inch gun.

Some idea of the size and type of the machine tools required for guns up to the largest caliber may be gained from the accompanying illustrations. Fig. 3 shows a double ended boring lathe of the hollow-spindle type. In this machine the forging is rough bored from both ends at once, the work being rotated in one direction and the tools in the other. This is a familiar plan and tends to insure concentricity of the hole. High-pressure coolant is fed through the boring bars to keep both cutters and work cool and to wash away the chips. The 30-horsepower main motor drive may be started, stopped or reversed and the boring bar tailstocks moved in feed or rapid traverse in either direction from the control levers, which can be slid along the front of the bed.

Fig. 4 illustrates a large lathe just being installed to finish turn and finish bore guns UP TO 20-INCH CALIBER (diameter of bore). It handles guns with an outside diameter of SEVEN FEET; and 87 FEET in length. This lathe has a total length of 212 feet, weighs 421 tons, yet is capable of working to 0.002-inch limit on the bore. Fig. 5 shows a "close-up" of boring operations on a major caliber weapon.

(Concluded Next Week)

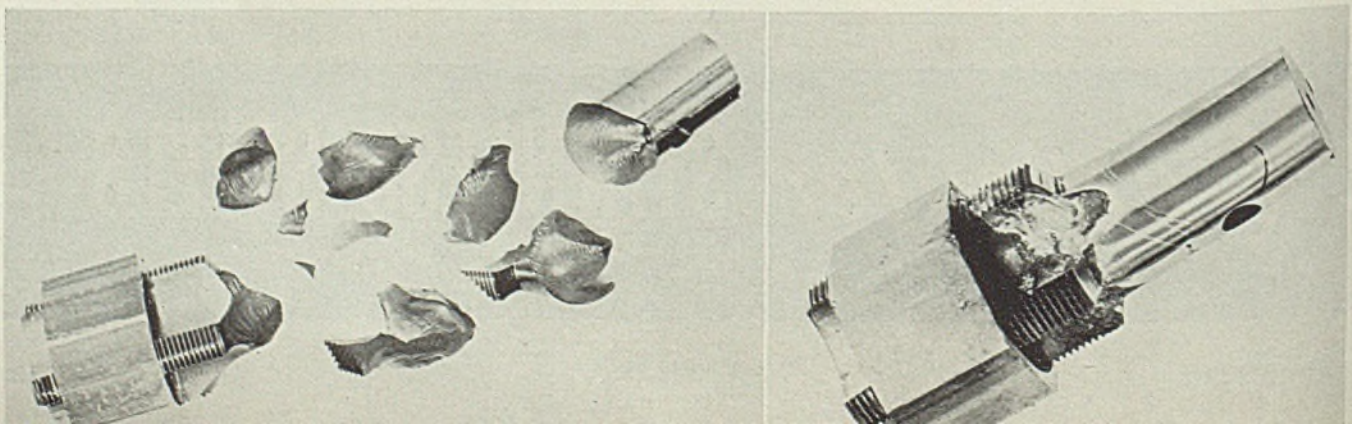
Emergency Tap Repair

■ In the present emergency when every possible method of keeping tools in production must be employed, it is interesting to note how many articles previously regarded as impossible of satisfactory repair are now being utilized after a serious break.

Typical of the advanced repair methods now being employed is that shown by the accompanying illustration. As will be seen at left, a special 1⅜-inch tap was shattered in service. It broke in ten pieces of various sizes and shapes and threatened to tie up entire production of an important job. A check up with tool manufacturers brought the information that a new tap could not be delivered for six weeks; thus a repair was required.

The head of the tool maintenance department, being familiar with high-speed steels, knew that welding was impossible, but had a hunch that low-temperature silver brazing alloys might do the trick. He had all parts cleaned carefully and fluxed with a low-temperature flux. Parts then were assembled, held closely together in a milling machine vise, and heated with an oxy-acetylene torch. Brazing was done with Easy-Flo, a medium silver alloy flowing freely at 1175 degrees Fahr. and made by Handy & Harman, New York. Due to the exceptional penetrating qualities of this alloy, it was found to flow throughout the many surfaces that had to be joined. How well this repair was completed can be judged from the fact that the tap was back in service in 4 hours and since then has completed 3 months' use and still is in operation.

Actual brazing time for this job was but ½-hour, and only 3 inches of 1/16-inch diameter brazing wire was needed to make the repair. The only fault detected after brazing was that the tap is 0.005-inch out of center, which made no great difference on this particular job.



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CONSTRUCTION AND AGRICULTURE THROUGHOUT THE W

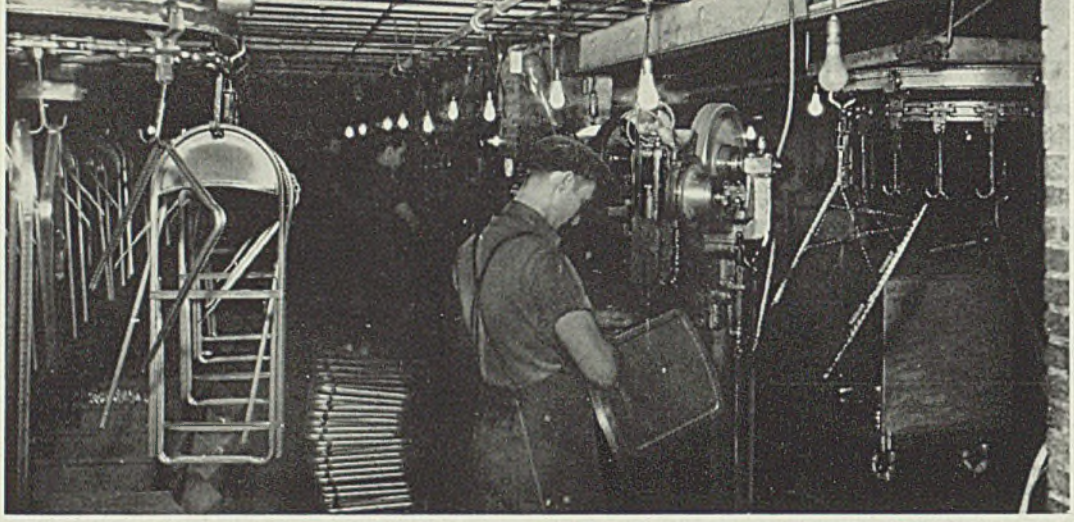

Fig. 1—Part of initial assembly line on first floor showing final assembly station where operator rivets seat frame to chair, after which he hooks it onto storage conveyor No. 2, the loading of which is at the right. Photos show Link-Belt conveyor equipment

Mechanized

MATERIALS HANDLING

Doubles Plant Output

■ DURHAM Mfg. Co., Muncie, Ind., employs about 300 men and women in the manufacture of a broad line of metal furniture, consisting mainly of bridge tables, chairs, public seating equipment and modern steel outdoor furniture.

Seeking some means of increasing their plant capacity, they recently installed five overhead chain conveyors which will be described. Formerly about 200 hand floor trucks had been used to move material and finished products through the plant on the various floors, supplemented by three platform elevators for handling materials between floors.

It was desired to double the capacity of the plant, but there was some question as to whether or not it could be done within the existing structure. Also, there was a question as to whether it would be more economical to enlarge the structure than try to increase the capacity of the present plant facilities.

As in many plants, one of the most serious bottlenecks in production was in the flow of materials. Already trucks and truckers were in each other's way so it was not possible to add more hand trucks. At the same time, a certain amount of unavoidable bumping and knocking about of the painted products in trucking resulted in objectionable chipping of the paint. Also, the large volume of trucking was not doing the floors any good.

Careful study of the problem by Link-Belt engineers resulted in replacing all the trucks by overhead conveying system described here. This removes all hauling from the floors and places transfer of the work on equipment hung from the ceilings. Of course there were a number of problems involved in rearranging the work for greatest operating efficiency since the path of the conveyor system must be designed to avoid needless handling of the work in process and to approach straight-line production as closely as possible.

The overhead conveyor system eliminates all the floor trucks and two of the three platform elevators in this 3-story plant. The conveyors now handle the work in process from the assembly line on the first floor, to storage, to the washer, to paint dipping tanks and drying oven, and to the final assembly and packing department—covering all three floors of the building.

The work is divided among five overhead chain conveyors, all endless and individually power operated. They are as follows: 1—Assembly line conveyor on first floor; 2—Conveyor from assembly line conveyor (No. 1) up to second floor storage; 3—Conveyor from second floor storage to the washer on this same floor and then up to the dipping tanks and drying oven on third floor, down to and through the final assembly and packing department on second floor, from which point the packed articles are sent down a chute to the shipping department; 5—Outdoor-furniture storage conveyor on third floor which handles paint-dried parts from drying oven.

Conveyor No. 1: The steel stock arrives in the receiving department on the first floor. The press department is nearby. Such press work consists, for example, of turning the edges of sheet steel up to form a U-channel or trough like bar for such parts as main frame, leg and seat frame of a folding bridge chair. This is done in a large press which in the same operation also notches each end of the main frame for the foot slide and punches as many as 12 rivet holes in the leg, seat frame or frame braces as the case may be. Another press arches the channeled main frame section to form the top of the chair.

The leg requires forming to the channel cross section, punching four holes and flattening both ends, trimming the ends round and punching two more holes, grinding sharp burrs or edges off the ends, making into an arch. The seat frame requires three similar operations, while the frame braces require only two.

From here the parts are sent to the nearby first-assembly line—a row of riveting machines on which the main metal parts of the chair are assembled. Sequence of riveting is first to rivet the braces to the frame. This is followed by

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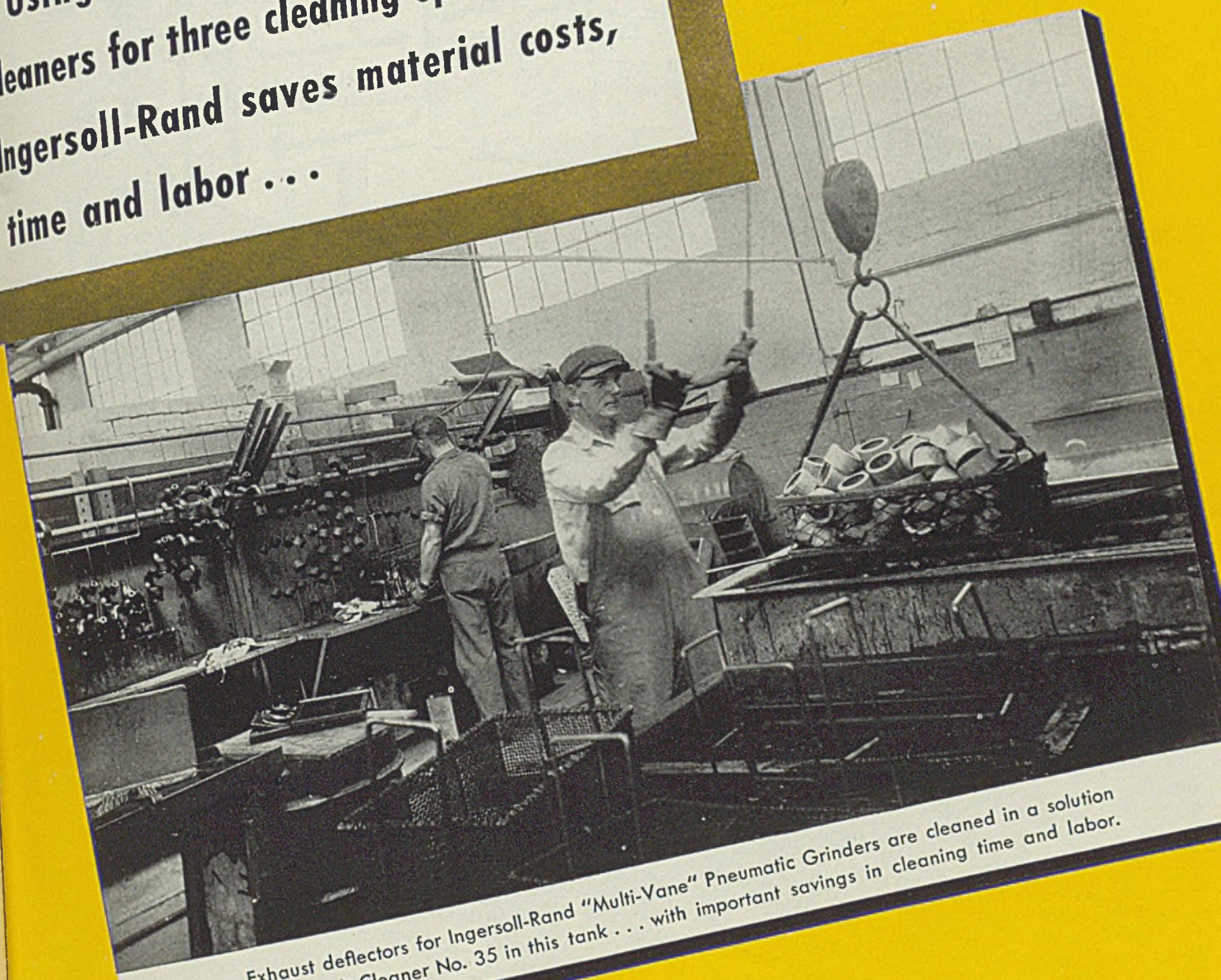

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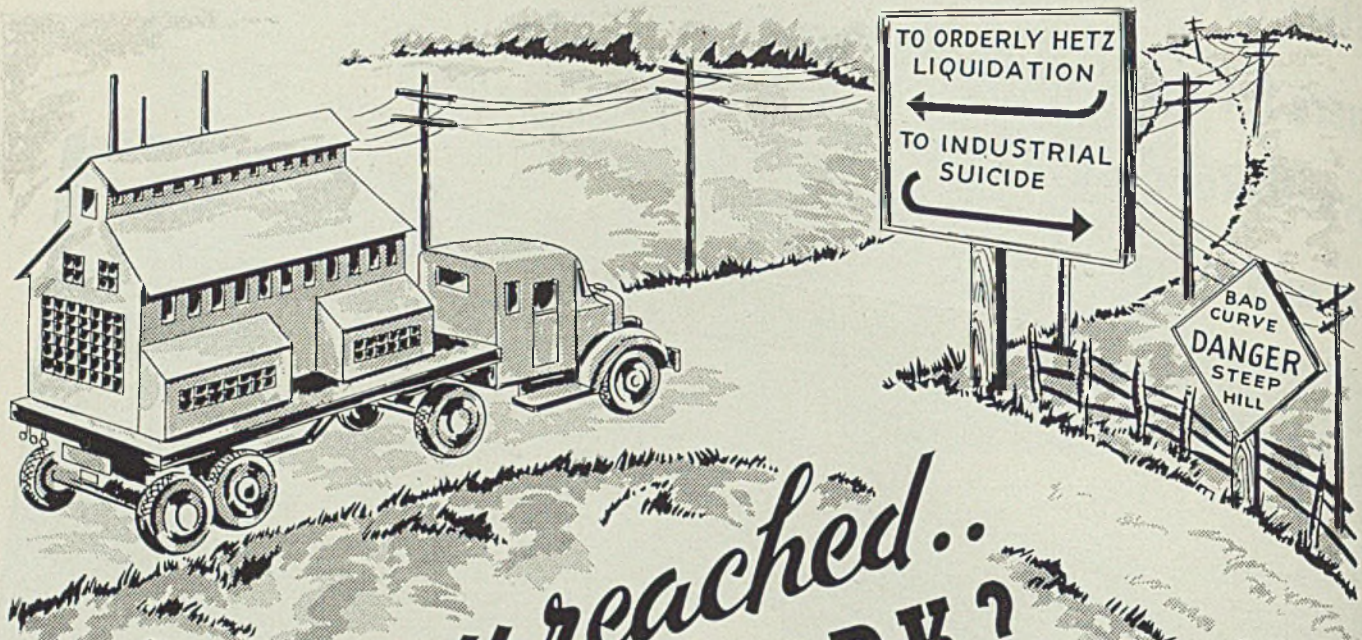

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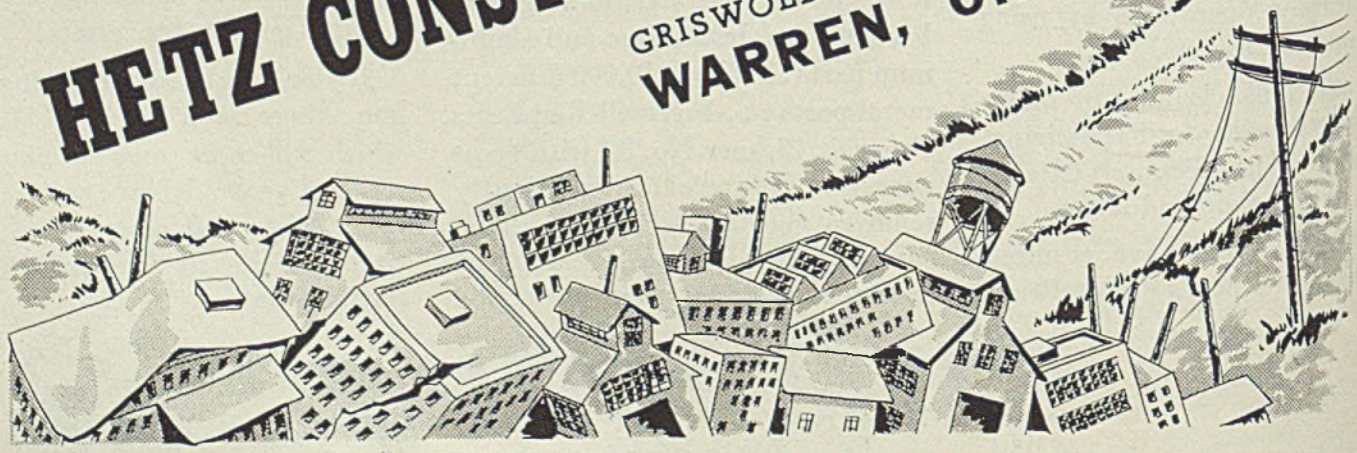


riveting leg to the main frame. Then the slide is riveted to the seat frame and the seat frame riveted to the main frame at leg.

Riveting machine operators have a pile of main frames or legs or sides or seat frames within convenient reach. The part of the chair to which the operator is to rivet the part in his pile is right in back of him, always moving along slowly while suspended from an overhead conveyor—the No. 1 assembly conveyor. After riveting his part onto the assembly, he returns the work onto the conveyor which carries it to the next operation. In fact, the work will make a complete loop and return if the final assembler fails to remove the unit from the line.

Several operations take place in forming, riveting and assembling bridge tables and outdoor furniture.

Conveyor No. 2, Storage: Fig. 1 shows an operator riveting a seat frame of a chair to the main frame and leg assembly. The No. 1 assembly conveyor is at his back, and to his right in the corner is the receiving end of the storage conveyor No. 2. When the operator completes the last riveting operation, he hangs the bolted unit on one of the carrying hooks of the No. 2 conveyor.

Conveyor No. 2 now carries the work to the second floor storage room where work is removed and stored temporarily while the conveyor line continues, returning down to the loading point on the first floor.

The overhead chain conveyor is especially adaptable to changing over old plants such as this since it can be installed easily to travel up and down through floors, around corners, around vertical obstructions such as sprinkler risers, and will dip down under ceiling obstructions wherever necessary to clear them. Thus it is a form of conveyor that is indeed flexible and well adapted to many conditions.

Conveyor No. 3: This unit handles chairs, table legs and other parts from the second-floor storage down the length of the department several times and off through a long washer with hot-water sprays at the entrance end and a gas-burner drier at the exit end. All grease and dirt are removed here in preparation for painting.

This conveyor then rises to the third floor, where it carries the work to the paint spray booth and the paint dipping tanks. Then it returns through the third floor back to the second floor ceiling where its empty hooks again are loaded.

The washed, dried and degreased parts are either removed from the conveyor at the third floor and stored temporarily or, as is usual practice, allowed to continue into the paint dipping tanks—white, yellow, red, blue, green or other colors. There an attendant removes the work, attaches a number of chairs or other units to an air hoist which slowly lowers them into the tank selected and withdraws them at an equally slow speed, allowing the paint to drain.

In Fig. 3, an operator is transferring painted work to the feed end of the long drying oven. Large units like the white outdoor-furniture table top seen here are paint sprayed in a booth past which the conveyor line travels immediately after ascending from the second floor.

Various types of hooks have been developed for attaching a wide va-

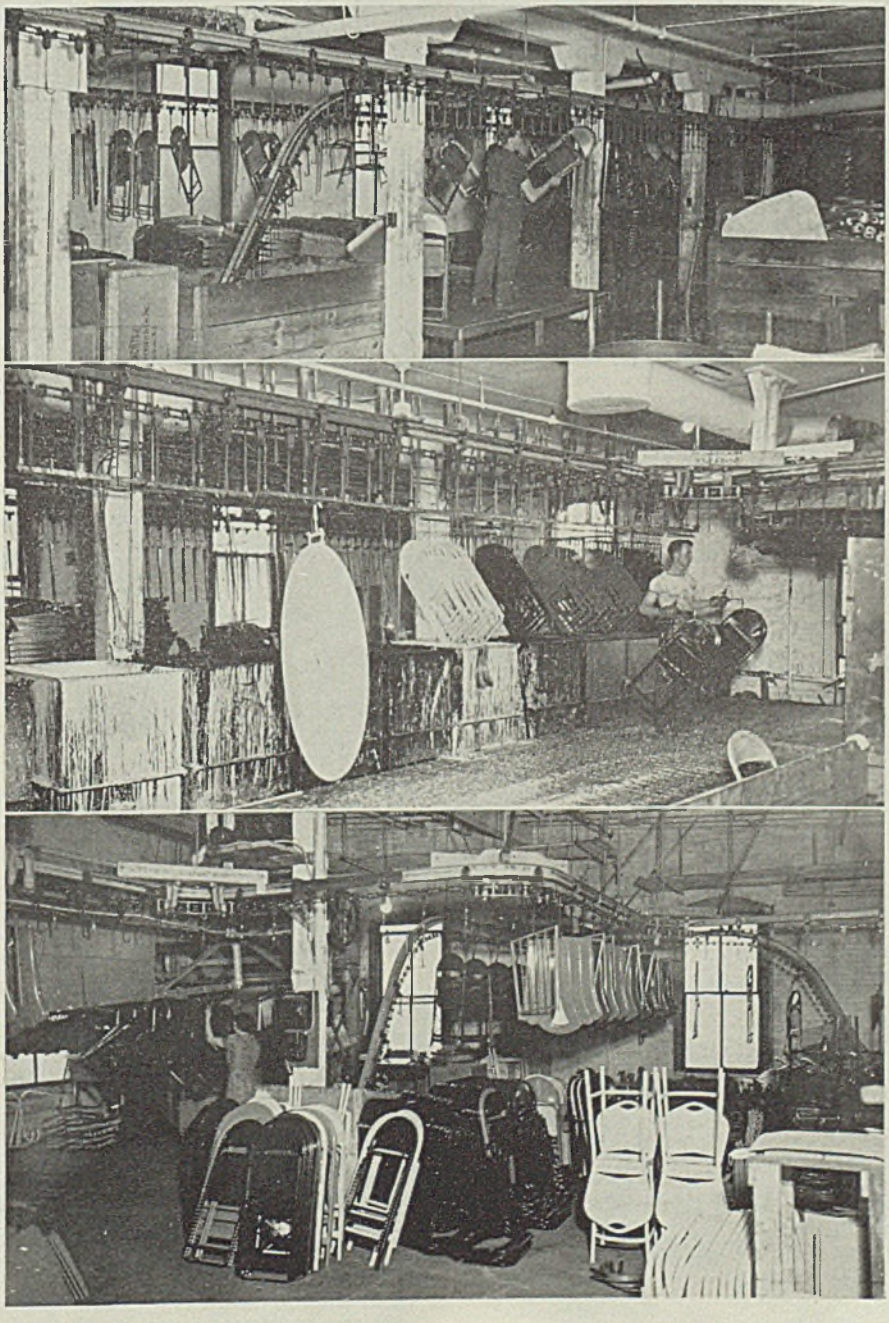
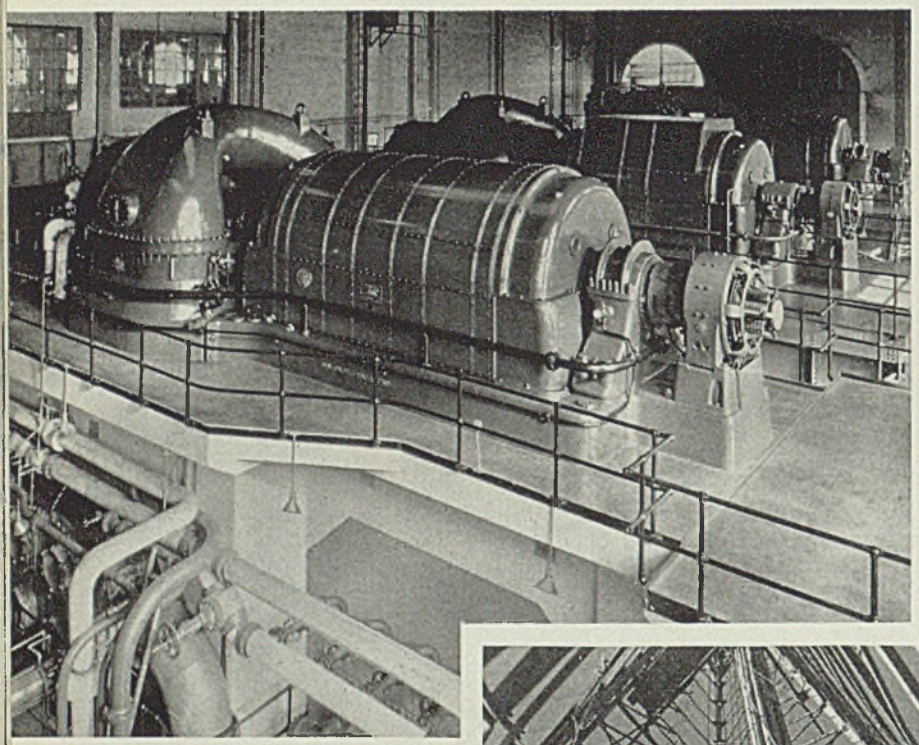


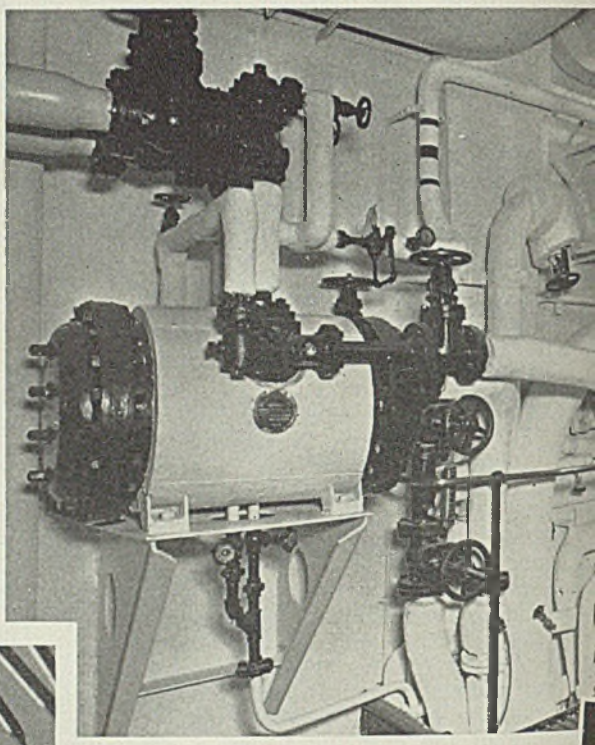
Fig. 2—Here is view on second floor, top photo, showing the storage conveyor No. 2 coming up through the floor at left center. Operator unhooks work from this conveyor and either places it in temporary storage or hooks it onto conveyor No. 3 for passage through the washer on the second floor and then on up to the third floor for painting

Fig. 3—Conveyor No. 3 carries work to and from the dipping tanks on the third floor. See center illustration. The large table top was paint sprayed by hand in a booth near the tanks. Here an attendant is transferring paint-dipped chairs to the drying oven conveyor at the right

Fig. 4—This is the unloading end of the drying oven at left with conveyor No. 4 which carries the work to final assembly and packing department on the second floor below. The outdoor-furniture storage conveyor is shown in the foreground of the bottom photo

On LAND, on SEA

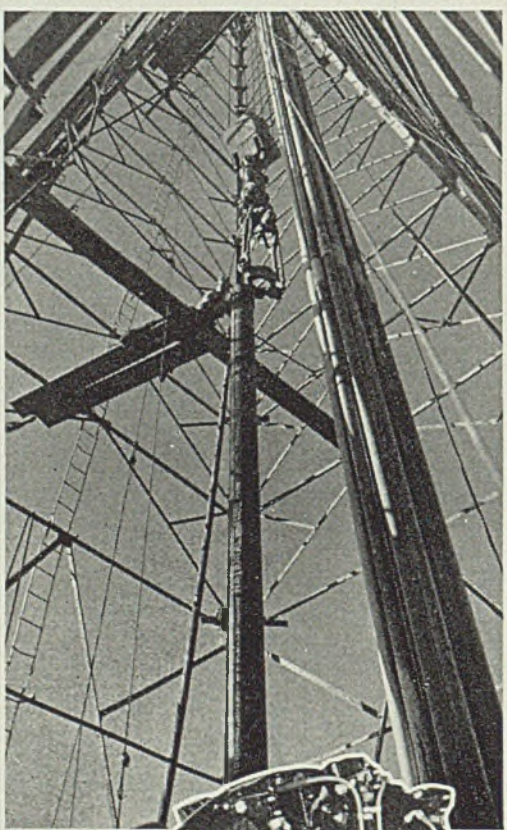




PIPING IN POWER PLANTS must be able to withstand the new high temperatures and pressures. To meet the need for the strongest and safest piping available, experienced engineers have unhesitatingly placed Seamless at the top of the list. For years, this strong, uniform pipe has remained in a class by itself. No other pipe has been able to offer a higher degree of safety and workability, or greater length of service than NATIONAL Seamless.

SPECTACULAR ADVANCES have been made in deep well drilling. Oil and gas wells extending down into the earth two miles and more are not unusual—largely attributed to NATIONAL Seamless. NATIONAL Seamless ably withstands the racking, jolting strains of such service, and has contributed materially to profitable oil production in every field in the country.

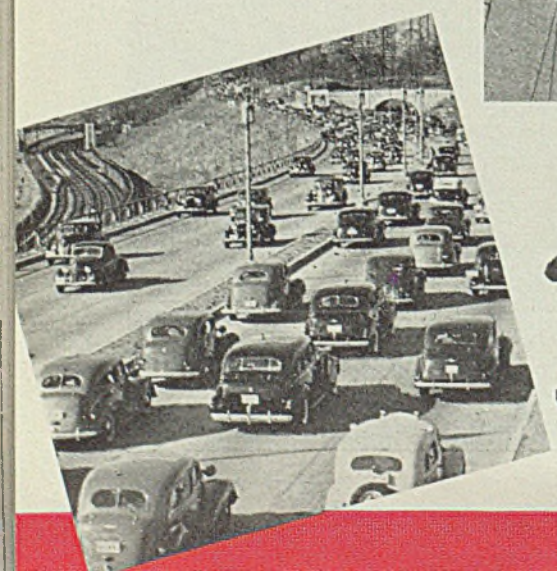
AUTOMOBILE MANUFACTURERS require tubing of unvarying quality and workability for axles, housings, steering columns, tie rods, torque tubes and other vital parts. SHELBY Seamless has long been the standby in the automotive industry because of its high uniformity of quality —this precision tubing makes possible the mass production of many types of machined parts.

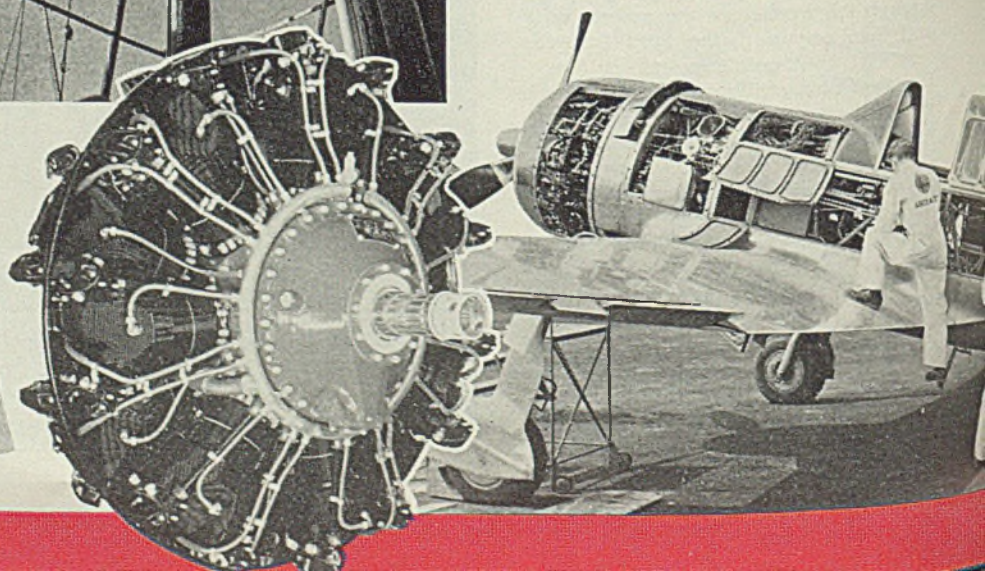


MARINE ENGINEERS and ARCHITECTS unhesitatingly specify NATIONAL Seamless—for the boilers, the high pressure steam lines—for booms, masts, and yardarms. No other pipe or tubing offers the same degree of safety, or has shown such consistently high records for length of service, and ease and economy of maintenance. NATIONAL is the favorite for hard service on the seas.

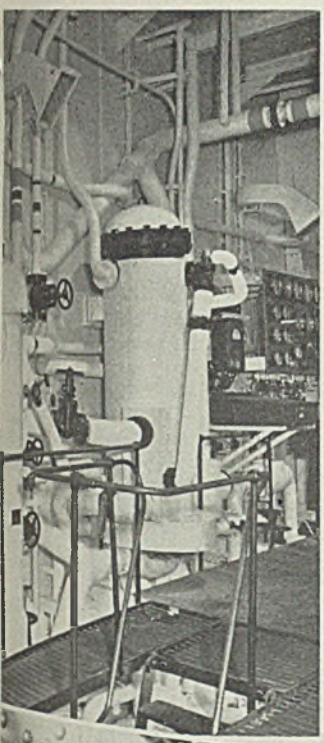
NATIONAL SEAMLESS BOILER TUBES are responsible in a large degree for the increased speeds and operating economy of the new type passenger and freight locomotives. They can save in labor costs and installation time because they're more ductile, easier to work with. And throughout the modern train, the added stresses and vibration of the new speeds require stronger, finer pipe in all steam, water, and air lines. NATIONAL Seamless is again the first choice.

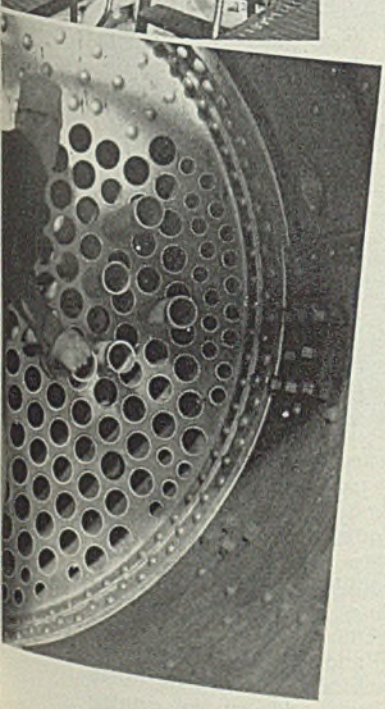
TODAY'S AIRCRAFT surpasses anything we've heretofore known, and many of the advances can be traced back to Seamless Tubing. Here again SHELBY Seamless is standard among the recognized materials that make possible the new fast fighters, commercial planes, and bombers. Fuselage struts, longerons, engine mounts, landing gear, wing spars and propellers are made lighter, stronger, more efficient and safer with SHELBY.





and in the AIR...





Wherever SAFETY is vitally importar
America confidently relies on

NATIONAL SEAMLESS

TODAY, more than ever before, industry is increasing its demands on pipe and tubing. The dual requirements of maintaining the utmost in safety while absorbing increasingly heavier loads in service, can be satisfied only with products that offer *maximum* dependability with *minimum* attention in operation. With these factors influencing selection, more and more industries in recent years very wisely assigned their toughest pipe and tubing jobs to NATIONAL Seamless—and today, this farsighted policy is paying rich dividends in smooth, uninterrupted performance.

NATIONAL Seamless means "Walls Without Welds." It stands for uniformly high wall strength, dimensional accuracy, and consistent workability—metallurgy's closest approach to the perfect tube. Power plant men say that it cannot be excelled in high pressure service. Marine engineers say it more than pays its way in increased efficiency and dependable operation. It adds to the speed and economy of modern locomotives, reports the railway industry. Oil well drillers bore deeper into the earth because of its high tensile strength. Aircraft and automobile manufacturers rely on it to reduce weight without sacrifice to strength—to lower machining costs and to provide the necessary continuous uniformity which makes possible mass production of "parts." In many other ways—on land, on sea, and in the air—wherever safety is vitally important, America's industry confidently relies on NATIONAL Seamless.

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

NATIONAL TUBE COMPANY

PITTSBURGH, PA.

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

UNITED STATES STEEL

riety of parts to the conveyor chain.

Conveyor No. 4, Assembly: The paint drying oven itself is equipped with a slow-moving endless conveyor consisting of two strands of Link-Belt chain with long cross bars for suspending the work to be dried between the two chains.

Alongside the unloading end of this conveyor are the loading points for both conveyors Nos. 4 and 5, the conveyor in the oven not being counted in this numbering. Conveyor No. 4 has come from the second floor and travels along the ceiling of the third floor only far enough to permit loading painted work for carrying down to the final assembly and packing department on the second floor.

Here the steel chairs are fitted with 5-ply veneer, padded upholstered seats and nickel plated floor glides which serve to prevent scratching. After this final assembly, the chairs are packed in cartons holding four each, tagged and sent down a chute to the shipping department. Of course, other types of furniture follow a similar path.

Conveyor No. 5: This unit follows a plain rectangular path and operates entirely within one department on third floor. It is used exclusively for handling paint-dried outdoor furniture, being loaded at the point alongside the unloading end of the drying oven. All outdoor furniture, shipped unassembled, is paint sprayed and dried at night and stored on the conveyor. The day shift applies a decorating decalcomania on the chair seats, following which the parts are packed into cartons and sent down a gravity chute to the shipping department.

Here the overhead conveyor is particularly advantageous because it allows storing material overhead and so leaves the floor space free for other operations such as packing or additional storage.

All five conveyors consist of power-propelled drop-forged steel rivetless conveyor chain suspended at intervals of up to 2 feet from ball-bearing trolleys running along the lower flange of a steel I-beam suspended from the ceiling. The conveyor chain is fitted with double carrying hooks below every supporting trolley as well as at intermediate points.

Speed of operation is quite slow. One conveyor runs at only 5 feet per minute, while others run up to 40 feet per minute. This slow speed keeps the wear on conveyor chain and track down to a minimum and also reduces the horsepower required to operate the conveyor. Even the longest of the five conveyors requires only ¾-horsepower for its operation.

The simplicity of this construction not only makes it easy to adapt the conveyors to almost any practical conditions, but also allows them to be modified or rearranged later, should some new production problem arise to make relocating desirable.

This conveyor equipment was furnished by Link-Belt Co., Chicago. The company states that, generally speaking, overhead transportation in the form of a continuous trolley conveyor will accomplish the following results:

Increase production and manpower.

Redeem valuable floor space.

Tie allied departments together.

Reduce inventory, insurance expense, manufacturing costs, rejections and accidents.

Save floor wear.

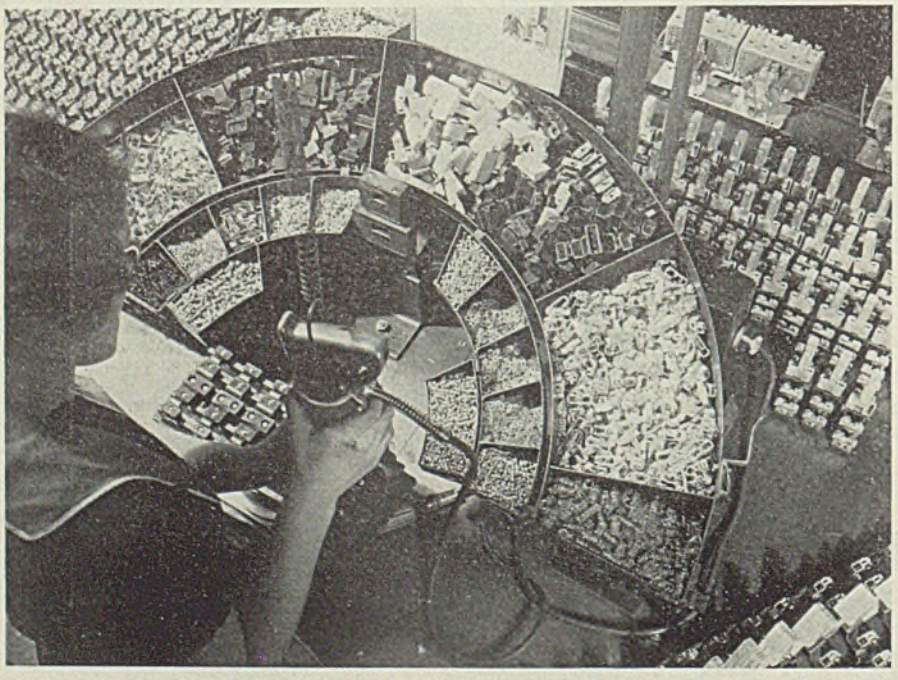
Eliminate damage to material.

Provide a steady and uniform flow of parts or finished products from one floor to another.

Displace floor trucks and freight elevators, as was done at this plant.

In this particular installation with only three-quarters of a mile of conveyor line, the production capacity of the plant has been doubled —merely by improving the materials handling facilities.

One Way To Save Handling Time



One way to increase materials handling efficiency is to place parts where they can be reached easily at the proper time. This fan-shaped arrangement at the East Pittsburgh Works of Westinghouse does just that—it is being used here to assemble De-ion line-starters involving more than 1000 parts and 75 different materials. The electrically operated nut driver shown, is suspended from a spring to remove it from point of application when not in use

Offers Booklets To Aid Screw Machine Men

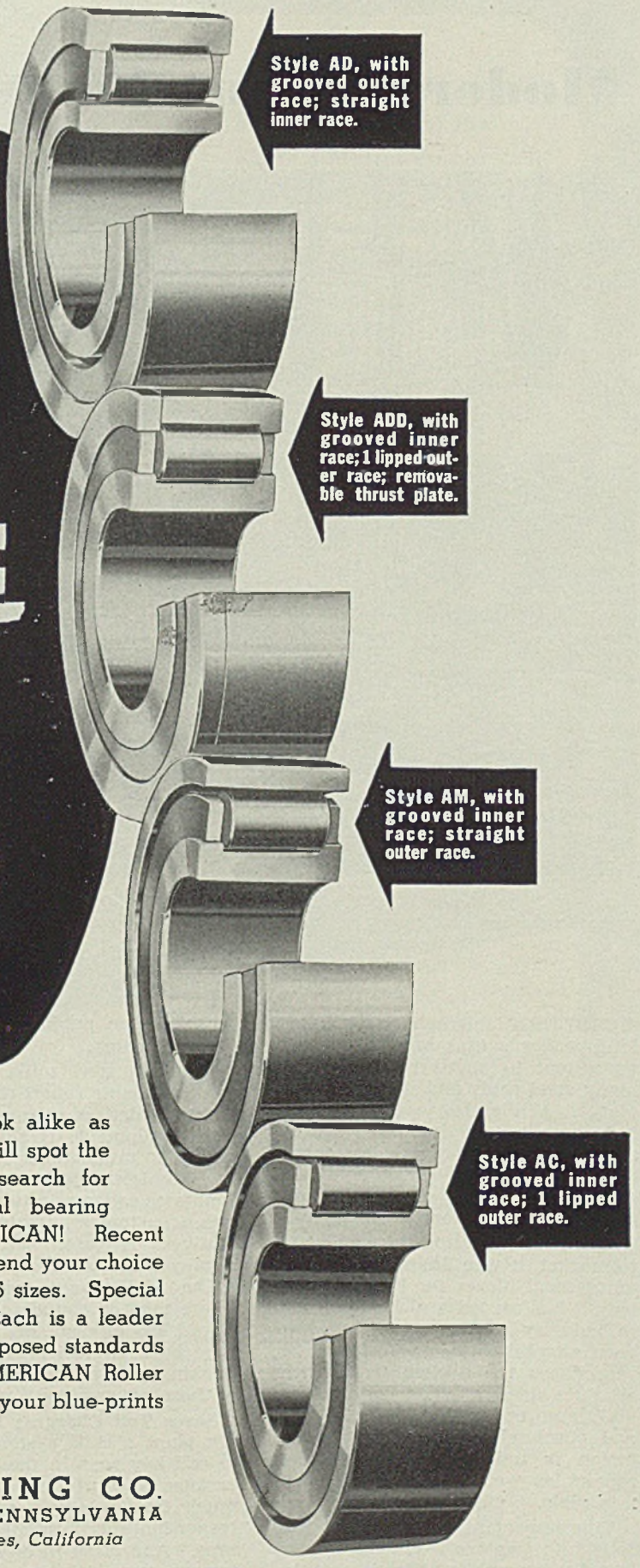
Brown & Sharpe Mfg. Co., Providence, R. I., is now offering a series of 14 booklets to aid beginners in screw machine operation. These contain general operating descriptions and useful tables for Nos. 00, 0 and 2 sizes of automatic screw machines, as well as hints and full instructions for sharpening and adjusting commonly used tools.

The series is adapted to lecture or school use, and to encourage this method of training the company is offering a "teaching kit" with orders for twelve or more sets of booklets. The kit consists of complete machine and attachment specifications entitled "Construction and Use of Automatic Screw Machines," booklet on screw machine tools and general catalog listing the company's equipment. Each set of 14 booklets is available to operators and others interested for 50 cents.

Offers New Light— Reflecting Wall Paint

A new water-thinned wall paint, called Reflect-O-Lite, which utilizes soybean protein as a binder is now being offered by the Glidden Co., Cleveland. Supplied in paste form, its outstanding feature is the high degree of light reflection it affords.

ONE SOURCE FOR A COMPLETE LINE OF RADIAL BEARINGS



These American Radial Roller Bearings may look alike as peas in a pod to some. But an engineer's eye will spot the differences instantly. He will know that his search for *ONE* dependable source for *ALL* your radial bearing requirements can begin and end with AMERICAN! Recent additions to the American Radial Bearing line extend your choice to 5 styles, in 4 S. A. E. series, with a total of 85 sizes. Special designs to order supplement this wide range. Each is a leader in its class—engineered to equal or better self-imposed standards of performance and quality that have made AMERICAN Roller Bearings preferred the world around. Send us your blue-prints for analysis and recommendations.

AMERICAN ROLLER BEARING CO.
PITTSBURGH PENNSYLVANIA
Pacific Coast Office: 1718 S. Flower St., Los Angeles, California

AMERICAN *HEAVY DUTY* ROLLER BEARINGS

A Modern Plant Communication Syste

"Amplified Voice"

With present cry for more and more production, the utmost in co-ordination between plant superintendent, supervisors, foremen and workmen is essential as well as between departments for controlling interdepartmental operations. If you are using a less speedy, less clear, less distinctive and serviceable method than the amplified voice for plant communication, it may pay you well to investigate its possibilities. Read here what it has already done for many companies

By FRED MERISH

Fig. 1—Imagine anything as convenient as getting your man simply by depressing a key and calling his name, no matter in what part of the plant or office he may be. Operadio equipment pictured

■ MODERN microphone-amplifier-loudspeaker setups are being used as a tool to speed production in many steel mills and metalworking plants. While the past few years have seen greatly increased use of such equipment, nevertheless there are still many plants well equipped otherwise but far behind times on plant communications.

When sound equipment first came to market, it was limited largely to amusement places for ballyhoo, but now it has carved a niche for itself in industry as the equipment has been simplified and perfected so it reproduces the spoken word with absolute fidelity, is as easy to install and operate as a radio set and absolutely dependable. Application is unlimited. Service and repairs as well as power cost are negligible.

This important aid to production falls into two main classifications: The PA or public address system, which amplifies and distributes speech, music or time signals—only one-way communication. The intercommunicating system for "talk-back" service, public or confidential communication.

Users in steel mills and metalworking plants report the following benefits derived from amplified voice equipment: It saves time. It speeds up production. It cuts costs. It minimizes rejects and waste. It facilitates communication service between customers, workers and executives. It fosters better employe-employer relations.

The following case histories where modern sound equipment replaced less efficient call systems or page boys in steel mills and metalworking plants illustrate graphically these advantages.

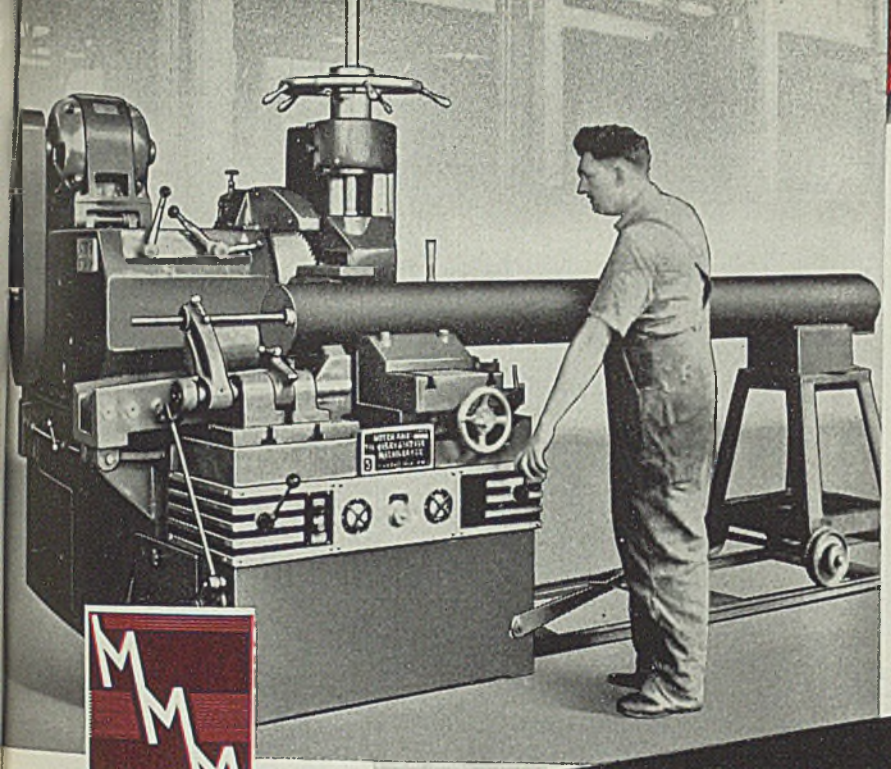
Saves Toll Charges: In one eastern plant a code system was used to call key men in the factory but because of confusion in de-coding, much time was lost and the men responded only a small part of the time. And often three or four customers came in from the outside about the same time yet only one man could be paged at a time. Often customers would hang up before the calls were answered.

Many of these outside calls were long-distance and had to be called back at considerable expense. In one month, this toll amounted to $92. A public address system was installed and now as many key men as are needed can be paged at one time. Communication delays no longer waste valuable time or cause customer dissatisfaction.

Keeps in Touch with Visitors: Another plant was frequently visited by customers inspecting their finished goods ready for delivery. The only office-to-plant contact was the telephone.

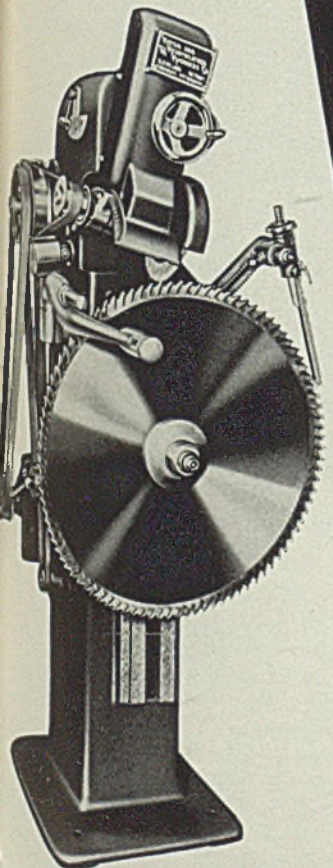
If, for instance, information was to be relayed to an executive in the plant with a customer, the switchboard operator might have to contact a half dozen departments to locate him. When he finally answered the plant extension phone, often quite a distance away, he would find that the message was not of great importance and could have waited until he was through with the customer. Since a modern PA system has been installed, an executive in the plant is paged via loud speaker and given particulars without leaving his task. If not urgent, we can disregard the call for the time being.

In combination with materials handling equipment, modern plant



Ask for our illustrated bulletin describing the Motch & Merryweather cold sawing combination (Cold Saw, Saw Grinder and Saw Blades).

Motch & Merryweather Cold Sawing Machines are cutting 1⅜" to 10½" shell steel with remarkable speed and precision . . . are eliminating scrap forgings . . . obtaining uniformity in shape and size . . . getting square ends without burr



There are the facts, as proven by every user of the Motch & Merryweather Cold Sawing Machine . . . Scrap forgings had been cutting production. Losses had been running up to 33⅓%, as compared with the 2% permitted by the government . . . The Motch & Merryweather Cold Saw went into action. Scrap forgings ceased. A new uniformity in size and shape appeared. Cuts now are square, the edges sheer and burrless. All this has been attained with a tremendous speed which contributes greatly to the profit of the operation.

The Motch & Merryweather Saw Grinder has an important part in the performance of the M. & M. Cold Saw. It insures fast, accurate sharpening, thanks particularly to rigid construction and automatic indexing . . . Motch & Merryweather Saw Blades have tool steel segments fitted to a heat-treated center. The closed ring formed by the segments stiffens the entire blade. Radially ground teeth allow the maximum amount to be consumed before renewing. The blade can be re-set with new segments without reducing the diameter. Get the facts.

THE MOTCH & MERRYWEATHER MACHINERY COMPANY
PENTON BUILDING — CLEVELAND, OHIO

MOTCH AND MERRYWEATHER MACHINERY CO
CLEVELAND DETROIT
CINCINNATI PITTSBURGH

Ask for our Illustrated story of the Motch & Merryweather Cold Sawing Combination

Built by **MOTCH & MERRYWEATHE**

communication devices are eliminating "bottle-necks" in sheet, tin, strip mills and metalworking plants where a consistent, non-stop flow from operation to operation is so necessary to maximum production, where hold-ups or speed-ups in one department can be quickly communicated to all other departments so foremen can gear operations accordingly or shift around men to equalize the flow of production.

Locates Work Stoppages: Costly waiting at machines for materials to arrive for processing was eliminated in some plants because instantaneous communication with storerooms is possible by means of loud speaker service and delivery to machines is made in minimum time with tractors, trailers, or trucks. On the other hand, when finished products stack up so high around machines that they impede production, immediate communication with the warehouse brings relief. Sound equipment is hooked up with direct lines between departments so that there is no time wasted going to the phone, getting the switchboard operator and then waiting for another department to answer. If the person called is far away from the phone, much time may be wasted making contact. Busy signals may cause further delays with older type systems. One plant kept a record and found that 35 per cent of the calls put through to the shipping department received a busy signal, resulting in many hours of lost time each month.

The shipping department in many plants is continually in contact with the general office or warehouse. If contact is delayed, errors result, goods are returned, customers dissatisfied, shipping costs mount. The areas in shipping rooms and warehouses are often large for easy talking or signalling and workers may be comparatively far apart. Much time is lost walking long distances to the point of call and sometimes where the noise is great the calls are not heard.

Contacts Workers Quickly: One eastern plant was found to have installed a modern conveyor system in the shipping room and warehouse. Often during the day, the shipper had to contact different floors in the warehouse to correct errors or make changes. The old communications system was a bell and a speaking tube. When the bell rang, a worker might have to walk from the extreme end of the floor to shout through the speaking tube. The advantage gained by installing a modern conveyor system between shipping room and warehouse was offset by an obsolete call system.

Finally, the management installed

Fig. 2—Incoming calls need not wait while men are located for the telephone operator can quickly page officials in any part of the plant via amplified voice systems. Here the operator is using microphone and controls forming part of a Stromberg-Carlson system

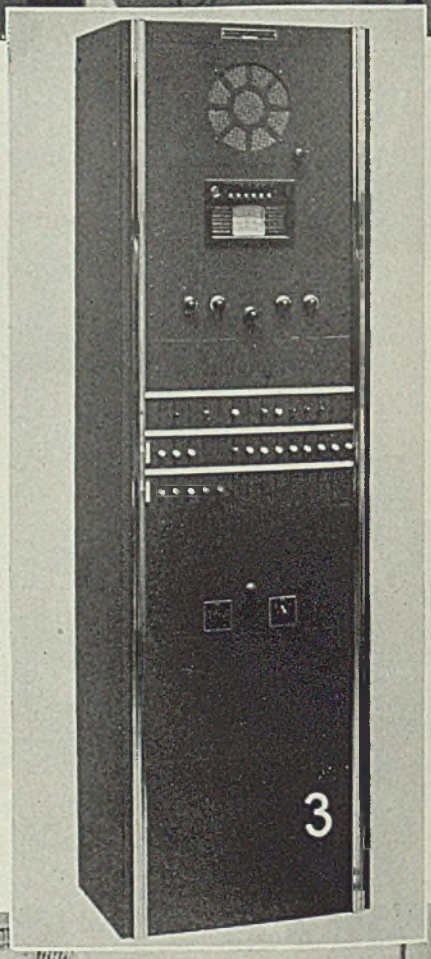
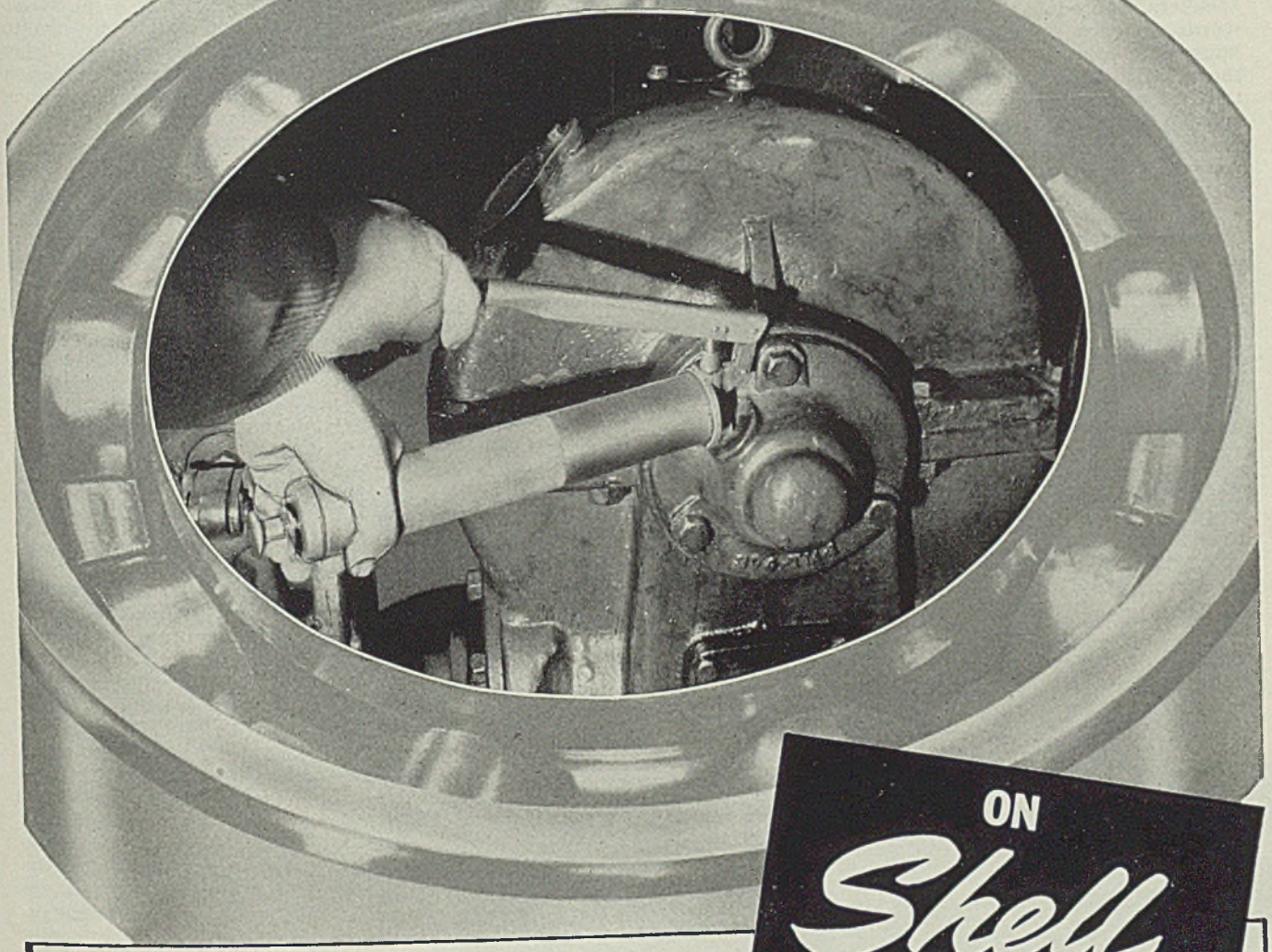


Fig. 3—Shows typical PA system, made by Stromberg-Carlson. This unit houses a monitoring speaker at top, a radio next for picking up news and music for entertainment with radio control knobs below, then rows of keys switching in different loudspeakers. At bottom are volume and tone controls for the amplifier, which is in lower section of cabinet. Of course, with this unit are used microphones for picking up the messages and loudspeakers to distribute them

Fig. 4—A talk-back unit like this Philco allows a person at other end to communicate back to the master station. Any number of outlying stations can be hooked up in such a system, or all can be selector-transmitters allowing a person to call and talk with any station from any other station in the system or all of them simultaneously

ANTI-FRICTION BEARINGS Run Cooler



ON

Shell E.X.L. Grease

—more lubrication per pound

SHELL

SHELL E. X. L. Grease is able to retain its superior lubrication characteristics under the most severe operating temperatures . . . readily dissipates the heat caused by deformation. Here's why. Shell E.X.L. Grease . . .

1—Has a high melting point.
2—Is of a smooth texture . . . lubricates adequately.
3—Resists bleeding . . . does not separate at high rotational speeds or at high temperatures.
4—Is non-corrosive.
5—Has outstanding resistance to breakdown even at high operating speeds.
6—Seals bearings against entrance of dirt, water, etc.

Call in the Shell man today. Give him the toughest bearing lubrication job you've got. Watch him lick it.

Perhaps your competitors are already using the amplified voice to speed production by quickly locating and ironing out work stoppages. It also helps to build up employer-employe relations through better understanding of policies made possible by personal explanation and through furnishing entertainment at lunch hour and before and after work. Many plants find it useful for announcements, time signals and similar services

a microphone, amplifier and loud speakers and now the shipper gives verbal instructions. Two loud speakers reproduce the shipper's words on each floor of the warehouse and one is hooked up with the general office. A switch above the microphone in the shipping room connects the amplifier to the desired speakers. If the shipper wants to talk to a worker on a certain floor, he switches to that loudspeaker and calls him by name, then gives particulars. Usually the worker need not leave his task. If a reply is required, he may use the old speaking tube, which was never disconnected. If information comes from warehouse to shipping room that requires executive action, the general office is switched in and if the executive is in the plant, the message is relayed via a public address system hooked up on all the floors. This management has saved many hours of time, many dollars and minimized errors by modernizing plant communications. In some plants, we found more than 20 loud speakers hooked up to a central point from which as many different departments could be reached individually or collectively. Obviously, such ease of communication is a time-saver, a cost-reducer and a production speeder-upper. If a factory superintendent wants to talk to a foreman at a distant point or the front office wishes to contact the plant management, it can be done faster with the amplified voice.

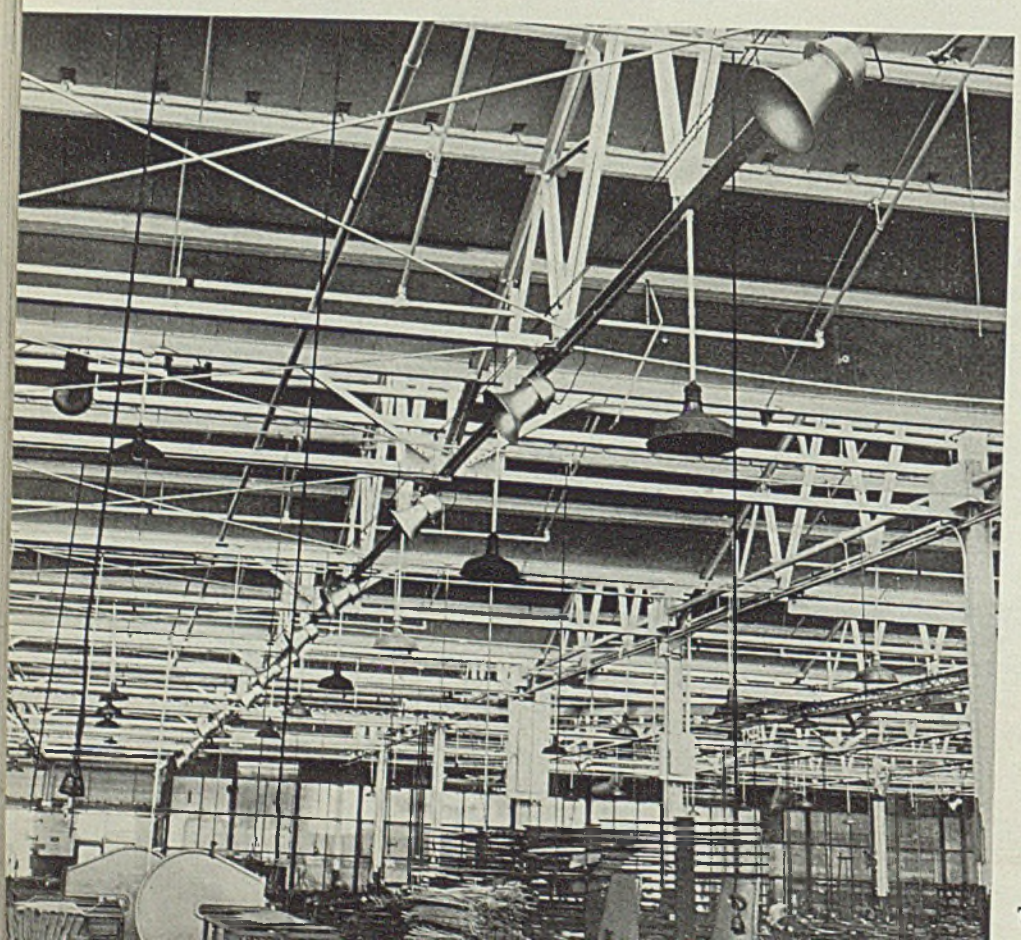
One plant experienced difficulty making contact with executives in a large yard. Operations connected with the hauling of raw materials and dies made it necessary for executives to check over yard work frequently. Yard searches by office boys and others caused many delays. Sometimes a worker had to be taken off a job to find a wandering executive. A few loud speakers hooked up to strategic points around the yard make instantaneous contact now.

Rides Over Noise: Many mill superintendents reported delay and confusion because the noise common to their plants prevented foreman and workers from hearing older type call systems distinctly. This difficulty was eliminated in many of these plants with sound equipment, which can be fitted with an amplifier of sufficient power to assure ample volume to overcome any processing clatter. Where overhead cranes are used, a public address system gets the message to the cranesman without the delay often experienced or the confusion of signals where communications are the gay-ninety type.

When breakdowns, accidents, fires or other emergencies occur, a modern installation of sound equipment may save its cost in a single hour.

Many plants operate a straight-line production unit more than 1000 feet long. Imagine trying to contact workers and executives over such a wide, noisy area with super-speed surety without the amplified voice. Modern sound equipment will aid the movement of raw materials all the way from the storage yard at one end of a mill to the other end of the line where the finished product is loaded on freight cars.

Fig. 5—A typical arrangement of loudspeakers to cover a factory area, part of a system furnished by Radio Corp. of America: Volume can be sufficient to ride easily over extremely high noise levels. And modern equipment transmits the voice as clearly as your new radio



Time Means Money

A loud speaker in a department will enable a foreman to inform headquarters promptly if production is coming through as it should or if any "bugs" are discovered in production so correctives can be applied immediately. Today, time means money. A few minutes saved here, a few minutes there, can save many dollars every month.

Where plant communication is obsolete, defects often slip by because of the difficulty in getting the ear of authority promptly. In these speed-days, foreman and supervisors need to be continually coached to keep production up to standard. Quality must be carefully watched. Sound equipment brings the supervisor and the worker closer to the plant superintendent's office. If the worker spots defects, he is more likely to report.

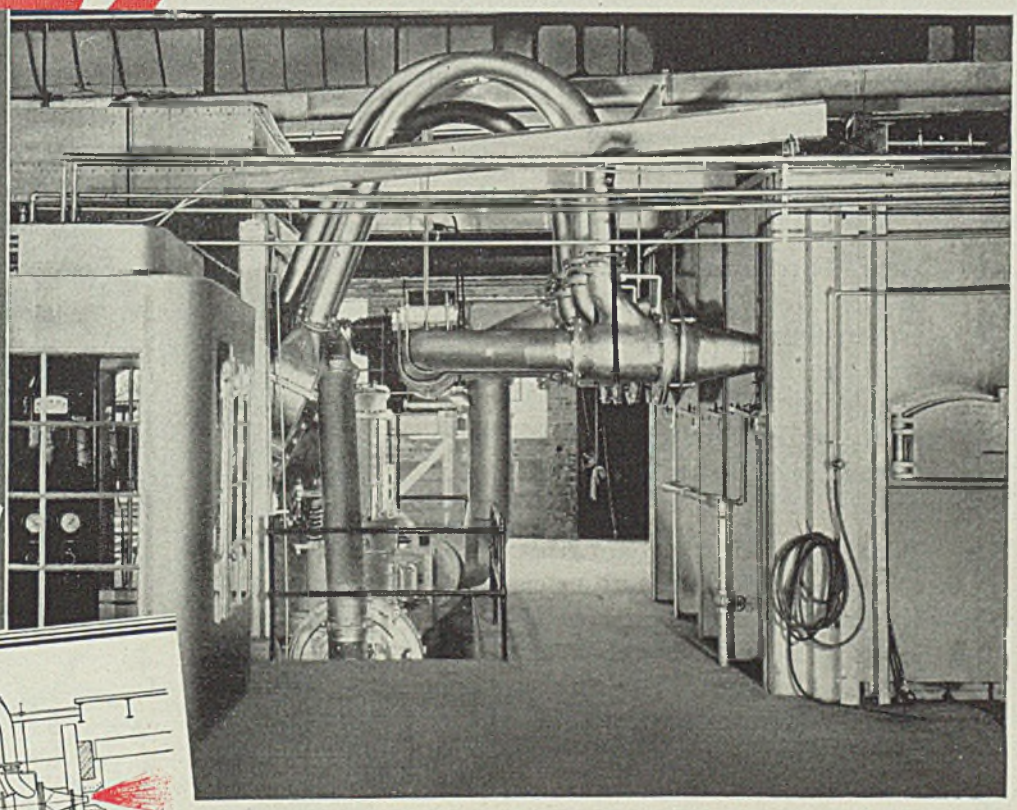
Cuts Cost 60 Per Cent: For example, metal failure was running up costs in one plant, reducing output and depressing quality. Too many formed and drawn parts were coming through with scratches on them. Rejections were high. The management was puzzled and via a public address system, the workers were asked to help solve the problem. In a few weeks, with their co-operation, different type forming dies were installed and found to have better wearing qualities, greater resistance to impact, fatigue and corrosion. Finishing costs dropped 60 per cent.

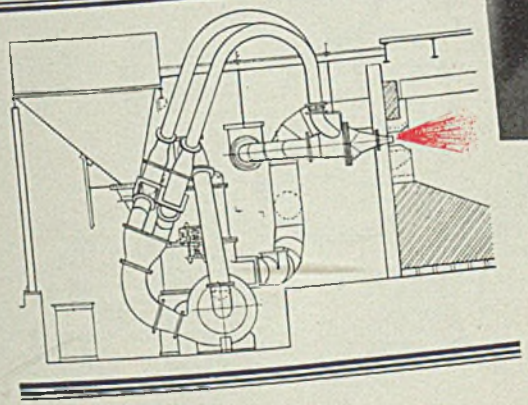
Another plant found that its cost of precision grinding was too high.

PULVERIZED COAL

... AMCO *makes it burn like natural gas!*

Begin now to replace natural gas and oil ... *to avoid delays!*





AMCO now provides installations with completely automatic furnace temperature and ratio controls, thus modernizing the use of pulverized coal for most heating and melting operations.

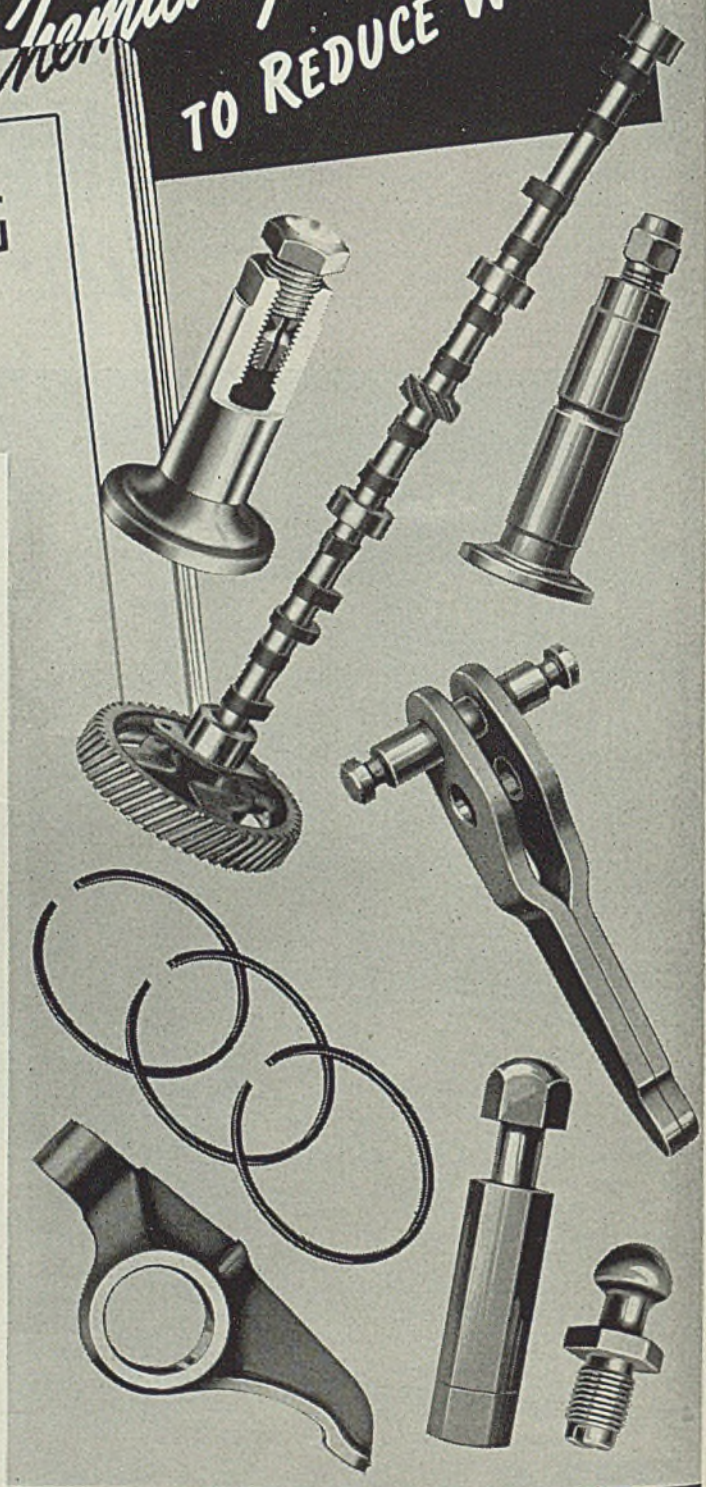
The AMSLER-MORTON COMPANY

FULTON BUILDING • PITTSBURGH, PA.

MILLIONS OF MOVING PARTS *Chemically Treated* TO REDUCE WEAR

PARCO LUBRIZING

A New Principle of Reducing Wear on Moving Parts



DURING the past two years more than 50 million moving parts have been chemically treated to reduce wear. Three million camshafts, eighteen million valve tappets, over twenty-four million rocker arms, as well as other millions of piston rings, transmission gear shifter forks, generator pulleys and other similar parts have been protected for extra miles of service.

Parco Lubrizing produces a microscopic phosphate coating on the metal that absorbs and retains oil. This assures an oil film on the wearing surface and prevents metal to metal contact. The non-metallic and absorptive quality of the phosphate coating affords added protection of moving parts during the break-in period.

Being produced chemically, the Parco Lubrite coating is integral with the metal and has positive adherence. It takes up oil, like a blotter absorbs ink, and affords protection from scoring. Wears in to a perfectly smooth surface.

A new technical paper, giving information on the methods of application and outstanding characteristics of the process, is ready for distribution. Send for your copy.

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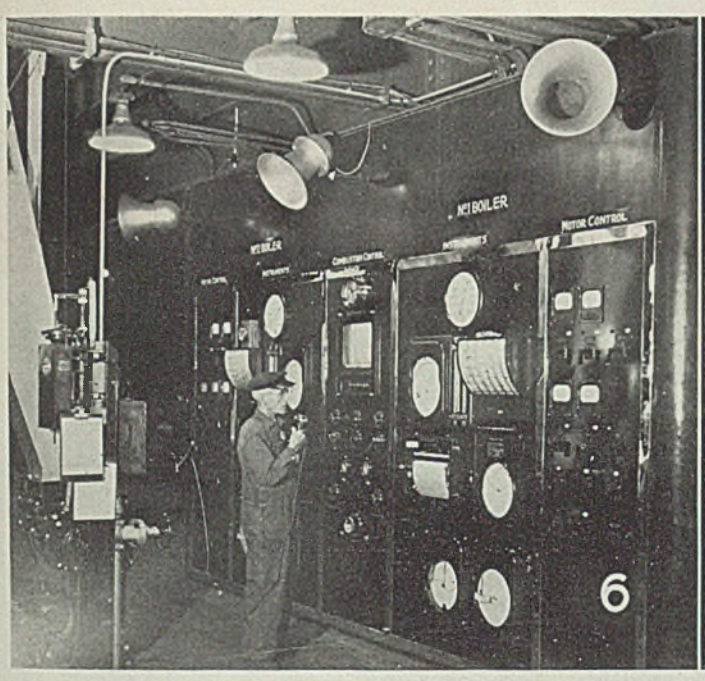
BONDERIZING • PARKERIZING • PARCO LUBRIZING



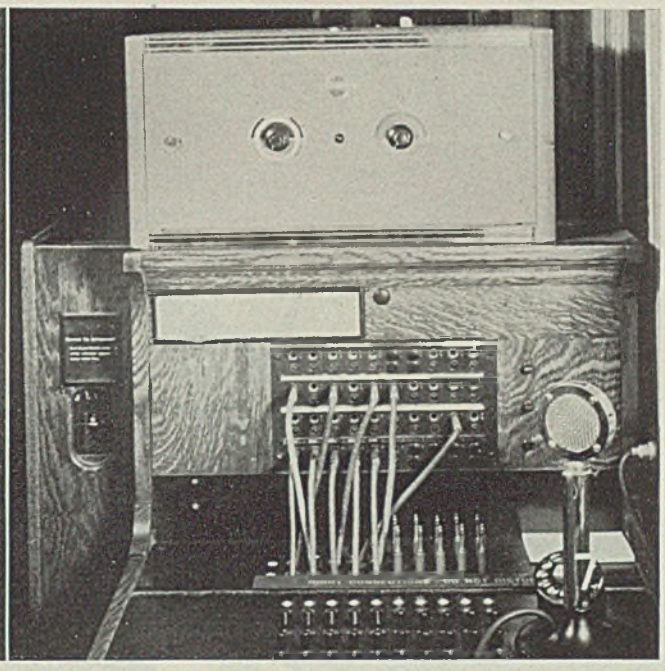


Fig. 6—This is an example of how an engineer can use the amplified voice to communicate instantly with all parts of a department or plant to transmit orders or ask for reports. Equipment by Radio Corp. of America

Fig. 7—Here amplifier for public address system is located directly on top of the telephone switchboard, where its controls are convenient for the operator. Note microphone at right of operator's position. This unit contains an automatic time clock which signals work periods, also incorporates provision for fire alarm and emergency signals. Equipment by Transformer Corp. of America

The grinding machines were okay but the men at times were not holding sizes to close enough limits, were not removing all surface defects properly. Rejects were high. A loud speaker in this department now keeps the workers advised of inspection results from time to time and rejects have dropped to less than one-fourth of the former average.

Today more than ever before, it is important to apply corrective measures to iron out "bugs" quickly. Prompt action must be taken to minimize production losses. A modern sound installation minimizes interruption to production when defects are found because consultations are more quickly arranged—the source of trouble found faster.

Affords "Personal" Touch: Labor relations loom important today. Often labor trouble springs from misunderstandings and it is seldom feasible for executives to discuss matters individually with workers, hence the men conceive erroneous ideas that may fester into strikes or costly disorders. The personal touch via sound equipment enables a company official to talk to the workers often, permits him to explain that economic or competitive conditions may compel or prevent certain actions. We were told that sound equipment is doing a good job where it is used to promote better employer-employe relations.

Another important use is for announcing changes in organization practice or operating schedules, to advise of the introduction of new methods, new policies, etc. Sound equipment minimizes misunderstandings concerning company policy or production routine, hence helps keep costs down.

Can Talk Back, Too: The intercommunicator, another classification of sound equipment, was found in many plants visited, executives carrying on inter-room conversations with secretaries or other stations on the system by merely flicking a switch. There are many different arrangements, from a 2-station setup where more than 50 stations may be interconnected. The intercommunicator is used more for confidential conversation, the PA unit for public address. Highly sensitive microphone can pick up voices 75 feet away, so that the user need not leave his task to use the device. No central clearing exchange is needed. Contact may be made direct with one or more stations.

The private interior telephone system is a sub-division of the intercommunicator. Instead of a cabinet, the conventional telephone is used, calls made direct or via automatic exchanges of many hundreds of lines. Intercommunicators and private telephone systems provide "talk-back" service. PA equipment operates only one way.

One of the important modern production essentials is means for fast internal co-ordination of plant superintendent, supervisors, foreman and workers. In all too many plants this vitally needed co-ordination is stymied by poor or inefficient communication. Why not check your own plant today to be sure it is not in this class?

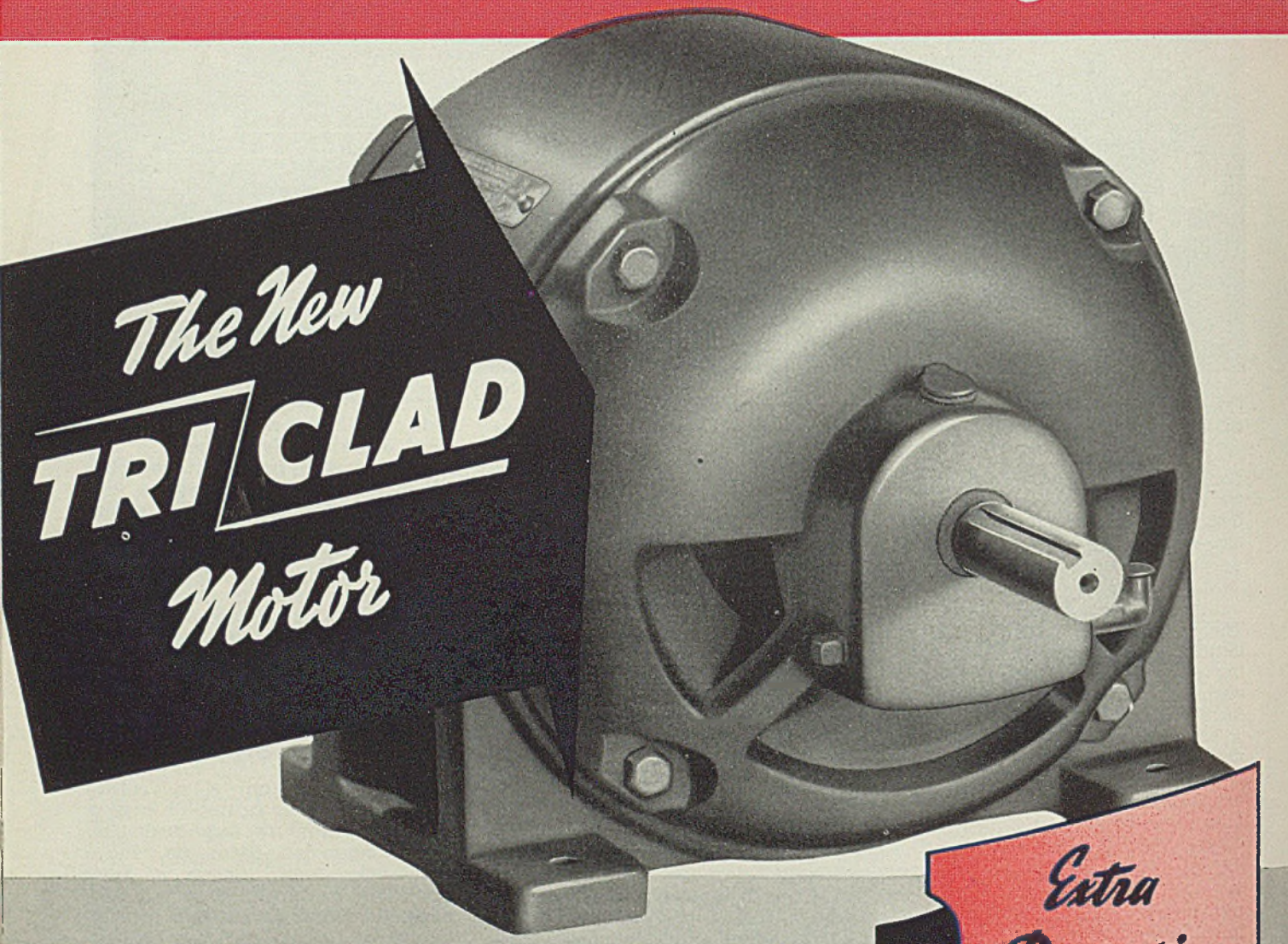
Offers Users New Width Shim Stock

■ Wider Laminum shim stock which permits the cutting of larger one-piece shims is now available from Laminated Shim Co. Inc., Glenbrook, Conn. Sheets of the stock can be furnished to 7 x 36-inch dimensions in addition to the 6 x 36-inch sheets produced heretofore. They are available in overall thicknesses from 0.006 to 0.125-inch. All of these thicknesses may be obtained in all-laminated sheets with choice of 0.002 or 0.003-inch thick laminations; or various thicknesses may be had partly laminated and partly solid.

Publishes Welding Data

■ A series of four articles embodied in a booklet entitled "Welding in National Defense" is being offered by the James F. Lincoln Arc Welding Foundation, P. O. box 5728, Cleveland. Data from industrial reports made by executives, engineers, designers and others which were subsequently released to newspapers as valuable information on the use of welding as an aid in production for national defense are included in the articles.

Inner Strength

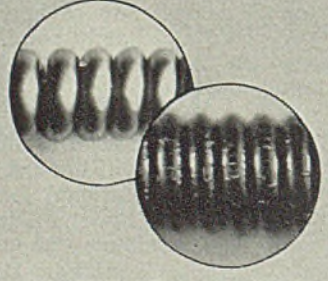


* New FORMEX WIRE maintains

ITS DIELECTRIC FILM UNDER SEVERE CONDITIONS

ABRASION

Formex wire is insulated with a vinylacetal-type plastic developed by G-E engineers after 10 years of research. Tests of resistance to abrasion show a 3-to-1 superiority of Formex wire over high-grade enameled wire. Formex wire in *your* motors gives added assurance of dependable, continuous operation.

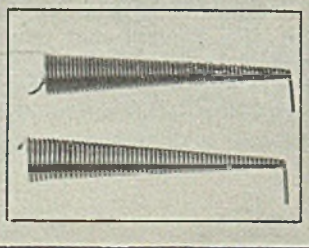


ELONGATION

Compare the two pictures above. The top photo shows Formex wire stretched 20 per cent and wound on its own diameter. The lower picture shows enameled wire stretched 10 per cent and wound on twice its diameter.

HEAT SHOCK

The top sample (below) shows what happens to good enameled wire when it is wound in a helix and heated to 150 C. Formex wire (shown at bottom) is unaffected by this heat shock. That is why it does not become brittle and crack away even after years of strenuous service.



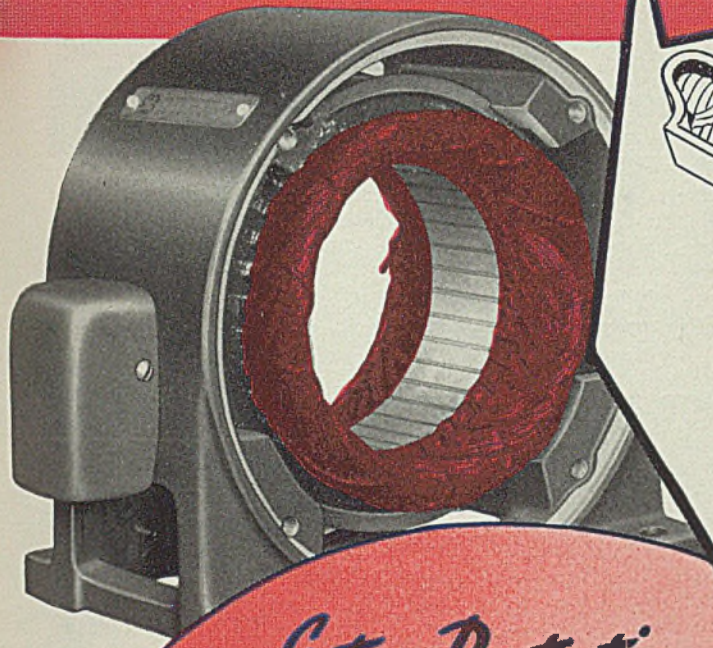
Extra Protection

against physical damage

Strong, one-piece, cast-iron frame and end shields, with upper portion completely enclosed, protect vital motor parts from external blows, flying chips, settling dust, dripping liquids.

...built for protection first ...to last!

Begins WITH FORMEX



NO "MUMMY INSULATION" HERE

With Formex wire, G-E engineers were able to "take off the wraps" on random-wound motors. Away went organic "mummy" coverings and heat-enclosing compounds. Having Formex wire, G-E engineers built a stronger, tougher motor insulation.

Extra Protection

against electrical breakdown

When you're looking for a longer-lasting motor—one that won't wilt and weaken after years of strenuous service, or fail you in an emergency—you want the Tri-Clad motor with its *inner strength.*

When G-E engineers designed the Tri-Clad motor, they saw that the toughness of Formex wire insulation opened up new opportunities for strengthening the entire coil assembly from the inside out. They utilized new G-E synthetic-resin bonding varnishes to give rigidity and extra resistance. They fortified the slot-cells. They welded internal connections.

Finally, they selected for application on end turns a coating of Glyptal No. 1201 Red as an additional armor against the many adverse operating conditions commonly found in industrial service.

Thus, in the Tri-Clad motor you get a more compact winding—one that dissipates heat quickly and keeps the motor young.

With double-end, "controlled-velocity" ventilation and advanced electrical design throughout, the Tri-Clad motor's tougher coil windings mean extra years of service. Next time you order induction motors . . . make sure they are Tri-Clad motors. General Electric, Schenectady, N. Y.

Integral-hp sizes up to 20 hp (at 3600 rpm), open or splashproof, are now available—also capacitor-motors in sizes up to 5 hp.

Write for our new Tri-Clad motor bulletin, GEA-3580

Extra Protection

against operating wear and tear

Sleeve bearings of new design have longer life, greater capacity, improved lubrication features. One-piece cast-aluminum rotor winding, with fans cast integrally, is practically indestructible. Sealed ball bearings retain lubrication, exclude dirt.

GENERAL ELECTRIC

750-50-B058

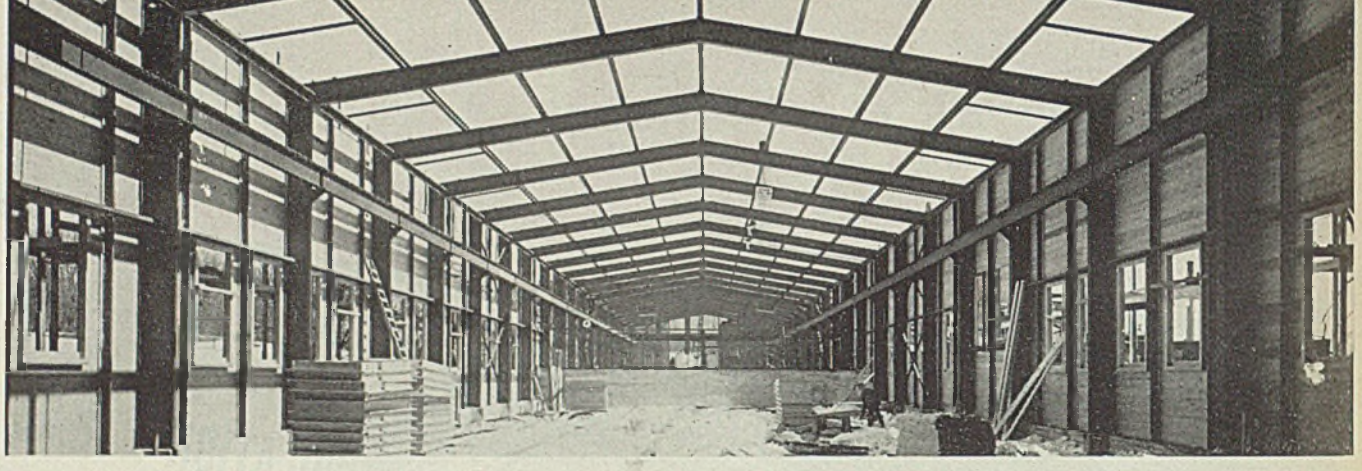


Fig. 1—The rigid-frame construction eliminates overhead obstructions and results in a clean-cut interior as shown here

New Rigid-Frame Building Uses

BUTT-WELDED FIELD SPLICES

The field splices used on this project are quite simple and inexpensive, seem entirely adequate for static loading conditions. Even when they occur in a bridge girder or some other member subject to dynamic loading, a splice that is completely butt welded seems entirely appropriate. The trend with regard to such all-butt-welded splices is to make the procedure more simple. Experience indicates this simplification can be made under most circumstances without sacrificing anything in the way of reliability

By LaMOTTE GROVER
Structural Welding Engineer
Air Reduction Sales Co.
New York

■ ARC-WELDED rigid frames were used by the Leach Steel Corp., Rochester, N. Y., in the new factory building at Peabody, Mass., built for the Eastman Gelatin Corp., subsidiary of Eastman Kodak Co. See Fig. 1. This type of framing provides wide floor areas at low cost. It affords maximum overhead clearance with no obstructions to light, ventilation and working operations or future changes in equipment. It results in clean-cut pleasing interior. Such a frame is easily cleaned and painted, collects less dust and exposes to corrosion a minimum area per ton of steel, especially when welded joints are used.

For resistance to lateral loads and for the support of crane girder loads, statically indeterminate structures of this kind require little additional steel over that required for gravity loads. Such structures also possess a larger factor of safety against unusual service conditions such as excessive crane and roof loads, high wind, earthquake and explosion forces from aerial bombardment. Welded joints are particularly appropriate and economical for rigid frames because they are inherently rigid and require little if any additional steel connection material.

Layout and Design: The main part of the building, 443 feet long, is of rigid-frame construction. On one side and near the front is a wing 70 x 179 feet with sloping roof carried by conventional-type flat roof trusses.

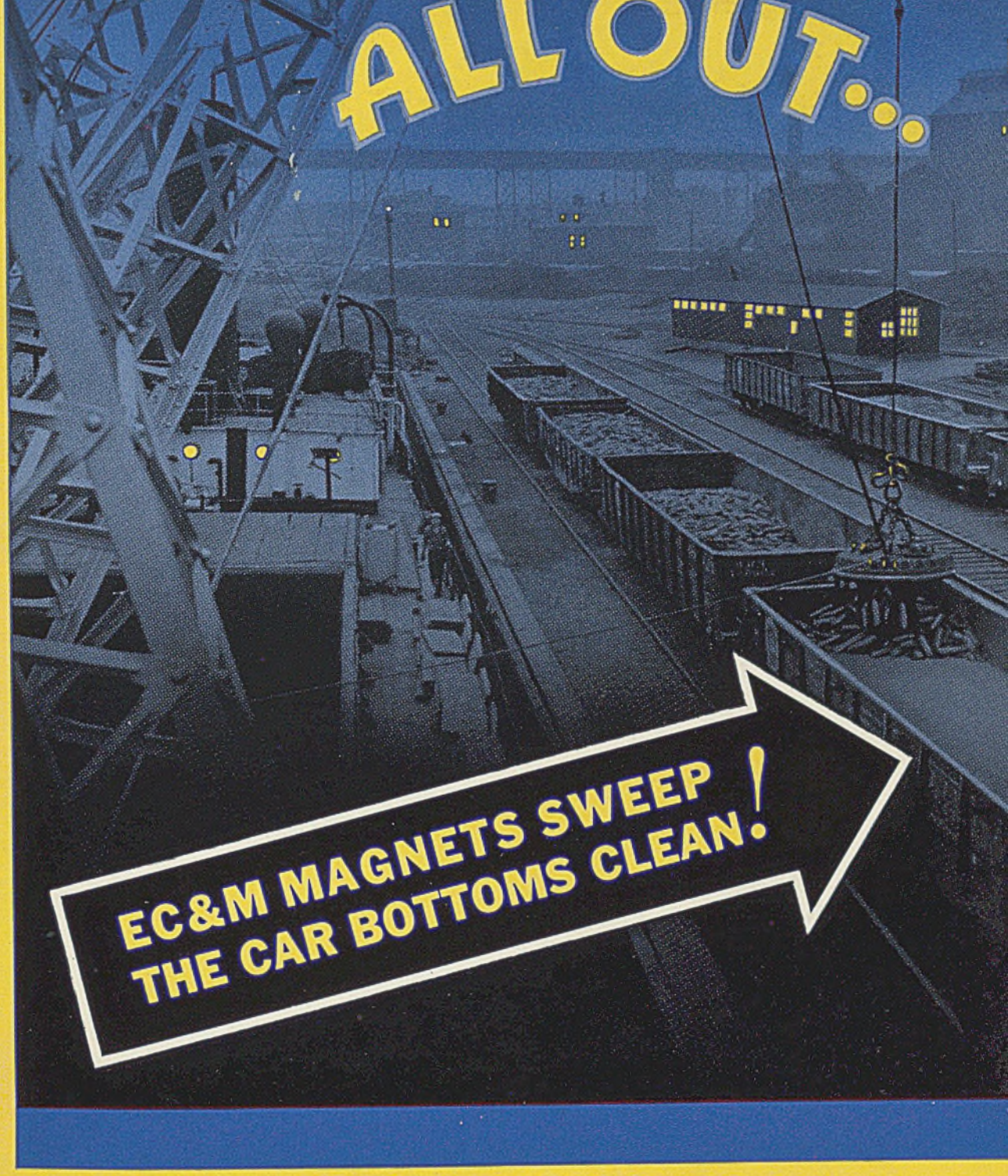
The rigid frames provide a 60-foot width center-to-center of crane-rails with a height of 20 2/3 feet to top of rails. Most of the frames are spaced at 20-foot centers. A rise of 2 inches per foot was found most economical for the rigid-frame rafters. The concrete floor slab is reinforced and the side walls are tied into it to insure against their displacement due to horizontal thrust from the frames. The eaves are about 25 feet above the bases of the longest columns. The side walls, floor and column bases are raised 6 feet through six interior bays near the front of the building.

Every sixth bay is provided with diagonal bracing, 1-inch round rods in the plane of the rafters and angle bracing between the columns. A line of longitudinal struts is run through on each side, just above the inner corners of the rigid-frame knees. These struts are composed of two 8-inch 11.5-pound channels, one flat and one vertical, welded together and connected at their ends to the vertical stiffeners of the knees. The sway bracing is connected on the center line of the column web, just below the knee.

Rigid Frames: This project represents a step in carefully made studies and development of economical industrial building construction which have been carried out over a number of years under the personal direction of Thomas Leach, president of the steel fabricating and erecting firm for this project. Various layouts, proportions and details of design and procedures of fabrication and erection have been compared for best economy. Particular attention has been focused recently upon the practical design of rigid-frame knees to conform to requirements indicated by research. The methods of proportioning the knees for this project, to withstand local shear and compression stresses, were patterned in general after the procedure outlined in "An Investigation of Steel Rigid Frames" by Inge Lyse and W. E. Black, *Proceedings of American Society of Civil Engineers*, November, 1940.

The rafters are 21-inch 59-pound wide-flange rolled beams and the columns 21-inch 68-pound. Field splices are provided in the rafters on each side of the frame, 10½ feet out from the knee, at points of minimum bending moment. The end section of the rafter runs through over the top of the column and is shop-welded to it to form the knee. Both of these joints are shown diagrammatically in Fig. 2. A splice plate connects the outer end of the rafter-piece to the tension-flange of the column. See closeup of this joint in Fig. 4.

At the inner corner of the knee, where compression stresses are con-



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EC&M LIFTING MAGNETS

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HEAVY DUTY MOTOR CONTROL FOR CRANES, MILL DRIVES AND MACHINERY • BRAKES • LIMIT STOPS • LIFTING MAGNETS AND AUTOMATIC WELD TIMERS.

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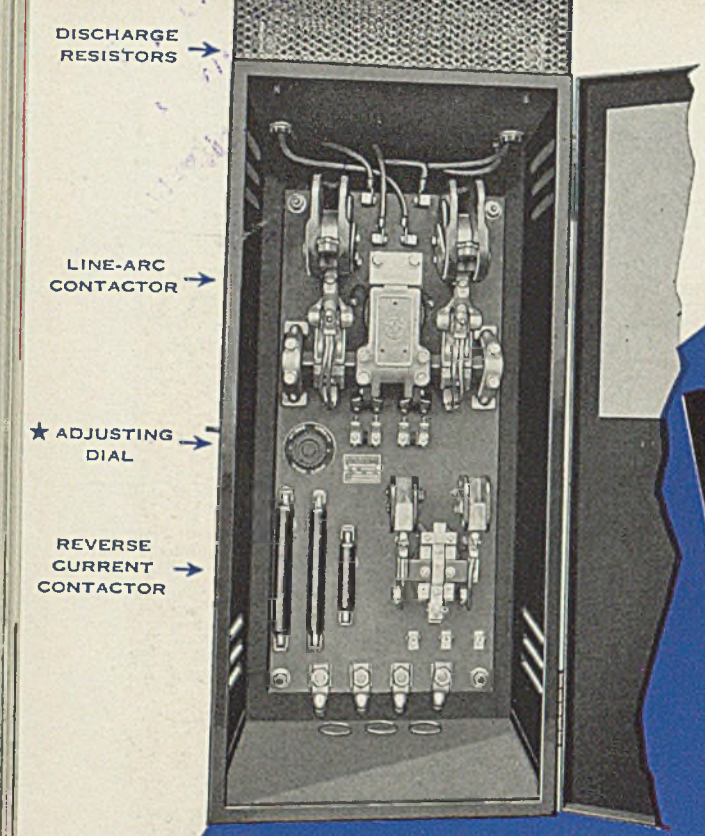


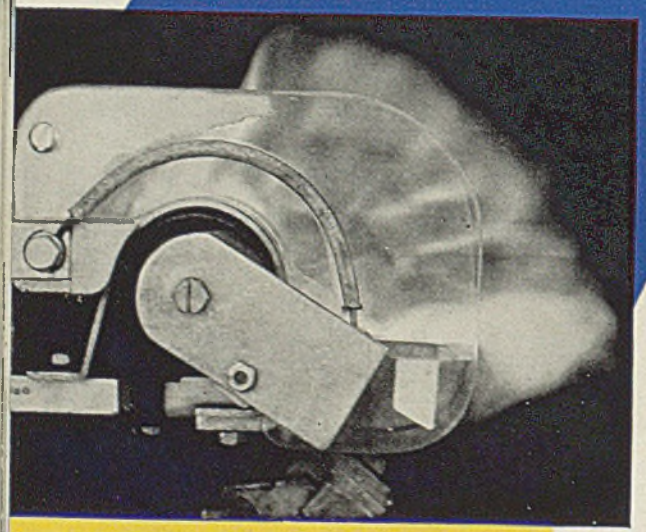
This Magnet Controller Has a REPUTATION for Low Up-keep Cost

Opening the current to a magnet is a tough assignment. No ordinary contactor could long stand up under the vicious arc — caused by the big coil and mass of steel — every time the magnet is deenergized. But the EC&M *Automatic-Discharge* Magnet Controller is especially designed for this service with main contactor of special LINE-ARC design.

This controller operates with less wear . . . less expense for up-keep than any previous type. There is no destructive burning which wears away arc shields; contacts, of unusually high Brinnell hardness throughout their entire thickness, last longer because they operate cooler due to the LINE-ARC principle.

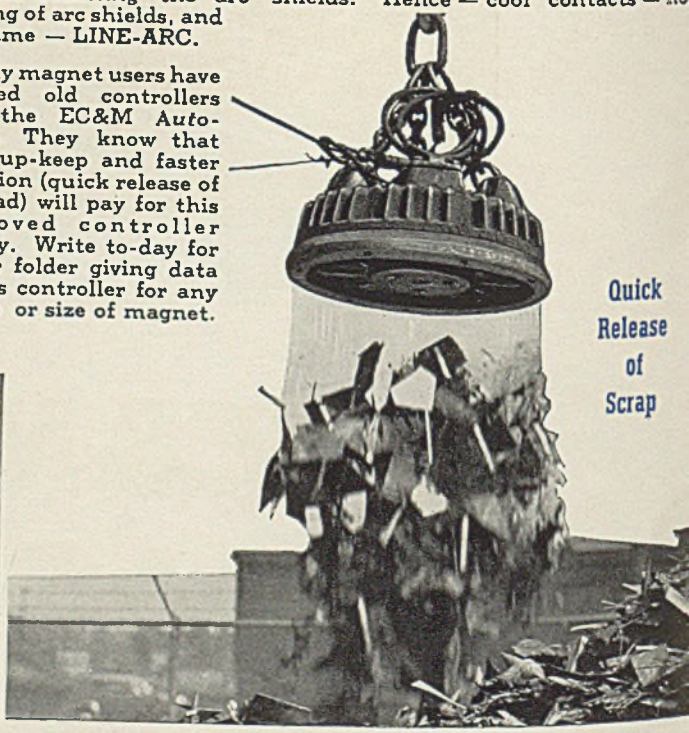
The LINE-ARC principle is simple . . . and automatic. There's nothing to adjust or wear out. At the instant the contacts start to separate, the arc is automatically transferred from the contacts to the arcing-plate and circular guard over the blow-out coil. Here, the arc can do no harm. It is stretched out in a line, centered *between* but *not touching* the arc shields. Hence — cool contacts — no burning of arc shields, and the name — LINE-ARC.

Many magnet users have replaced old controllers with the EC&M *Automatic*. They know that lower up-keep and faster operation (quick release of the load) will pay for this improved controller quickly. Write to-day for 2-color folder giving data on this controller for any make or size of magnet.



his shows a LINE-ARC ontactor, specially fitted ith glass arc shields, hand- ng a 300% load. The glass as neither harmed nor nudged and is still in rvice at the EC&M Factory here visitors may witness is convincing demonstra- on of the LINE-ARC inciple.

Quick Release of Brake Shoes.



Quick Release of Scrap

*An Exclusive EC&M Feature, assuring instantaneous release of ANY type of load—*one* setting for scrap—*one* setting for rails—*another* for baled scrap, etc. No compromise, but a fast release of every load.

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We've cured many a headache!

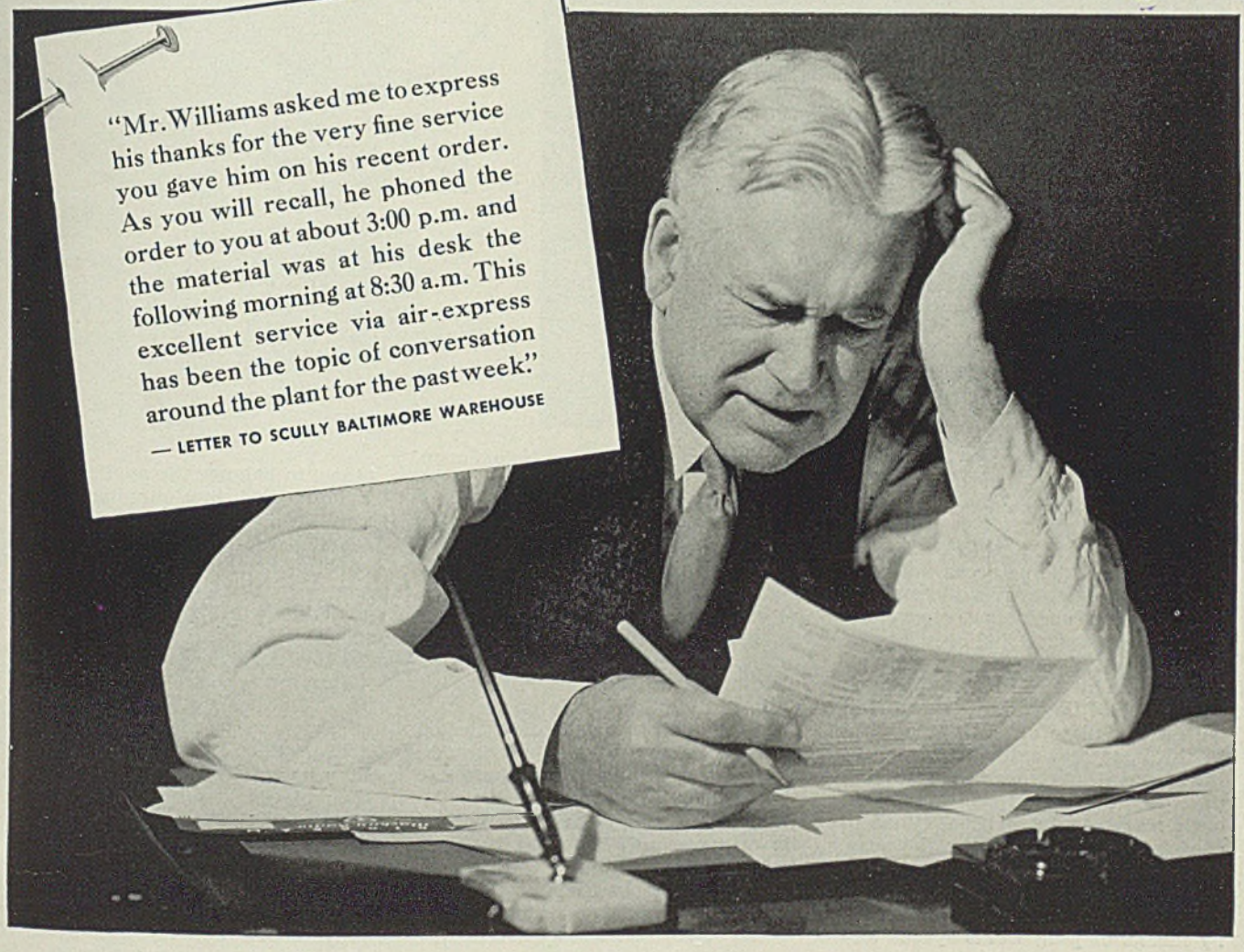

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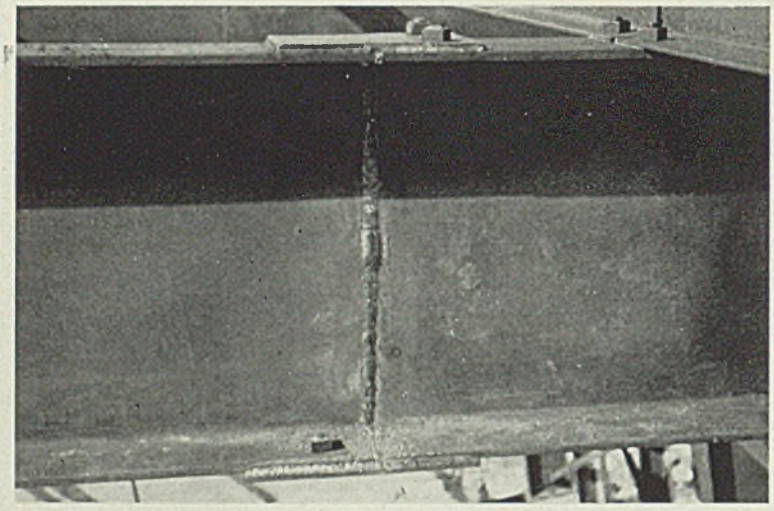
Fig. 2—These are details of the rigid frame showing plug welds on the knee reinforcements and the field-welded butt splice. Note how splice plates in diagram at right are arranged so rafter can be set down on knee to facilitate erection



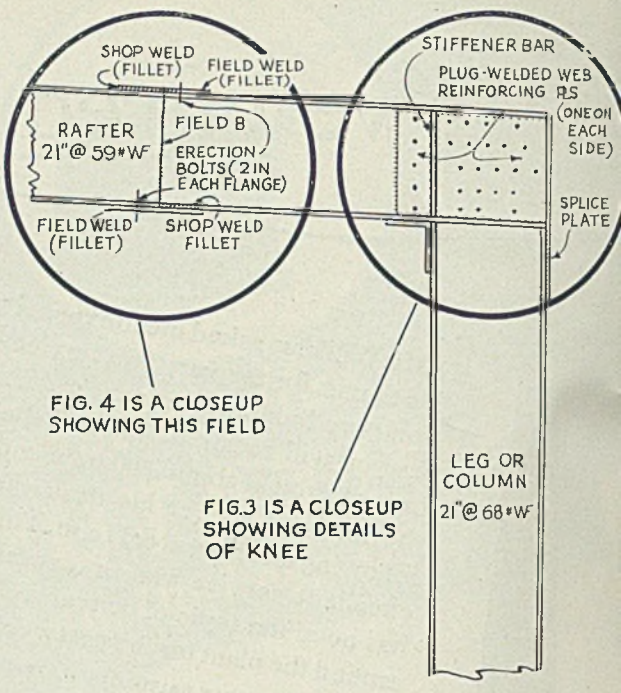


Fig. 4—Field splices shown above occur at points of low stress. Note flange splice plates provide temporary support for erection of center section of the frame, as mentioned and shown diagrammatically in Fig. 2

centrated the flange areas are reinforced with a bent cover plate. Vertical web-stiffener bars are provided on the rafter-piece in line with the compression flange of the column as is shown by the illustration Fig. 3.

The web of the rafter is reinforced with a flat plate on each side within the knee and extended out from the knee a short distance past the point beyond which the stresses in such members have been found to conform to the conventional theory of the beam design. These reinforcing plates are made to act integrally with the web of the rolled section by means of plug welds spaced and distributed to conform approximately to the distribution of shearing stress that has been observed in tests of such knees. See Fig. 3.

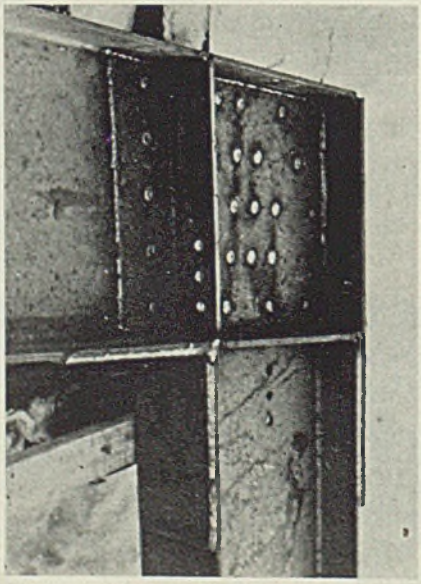
Thus the knees are designed to insure their adequacy in all respects, and the cost for their fabrication is reasonable. Whether or not this is the most practical and economical design for such a knee will be determined by further experience in fabricating alternative types of equal capacity and by a number of tests that have been planned.

Shop Fabrication and Welding: Each frame was fabricated and shipped in three pieces, two column-and-knee sections and one center section with a shop-welded ridge joint. This joint was made by cutting out a triangular segment of web and bottom flange, bending the piece about the top flange to close the gap, and butt welding the web and bottom flange together again. The bottom flange is also reinforced with a short bent cover plate at this point.

The various pieces to be welded were cut to correct mitre with an oxyacetylene torch; some of the edges were machine gas cut. During the shop welding of details such as crane girder supports and sway-bracing connection plates on the columns, the pieces were positioned for downhand welding.

In welding the column-and-knee sections, the parts were first tacked together securely. A pipe trunnion welded to a strut was then attached to the knee and the rafter piece so the whole section could be rotated about its center of gravity with little effort. In this way all of the welding could be done in the flat position, first on one side and then on the other, to balance the applied heat of welding and thus eliminate distortion. This improvised scheme was found exceptionally convenient and effective. A similar arrangement has been used efficiently even for girders where little duplication is involved.

Fig. 3—Plug-welded plates reinforce the webs of the rigid-frame knees where local shearing stresses are highest. This is closeup of section indicated in Fig. 2

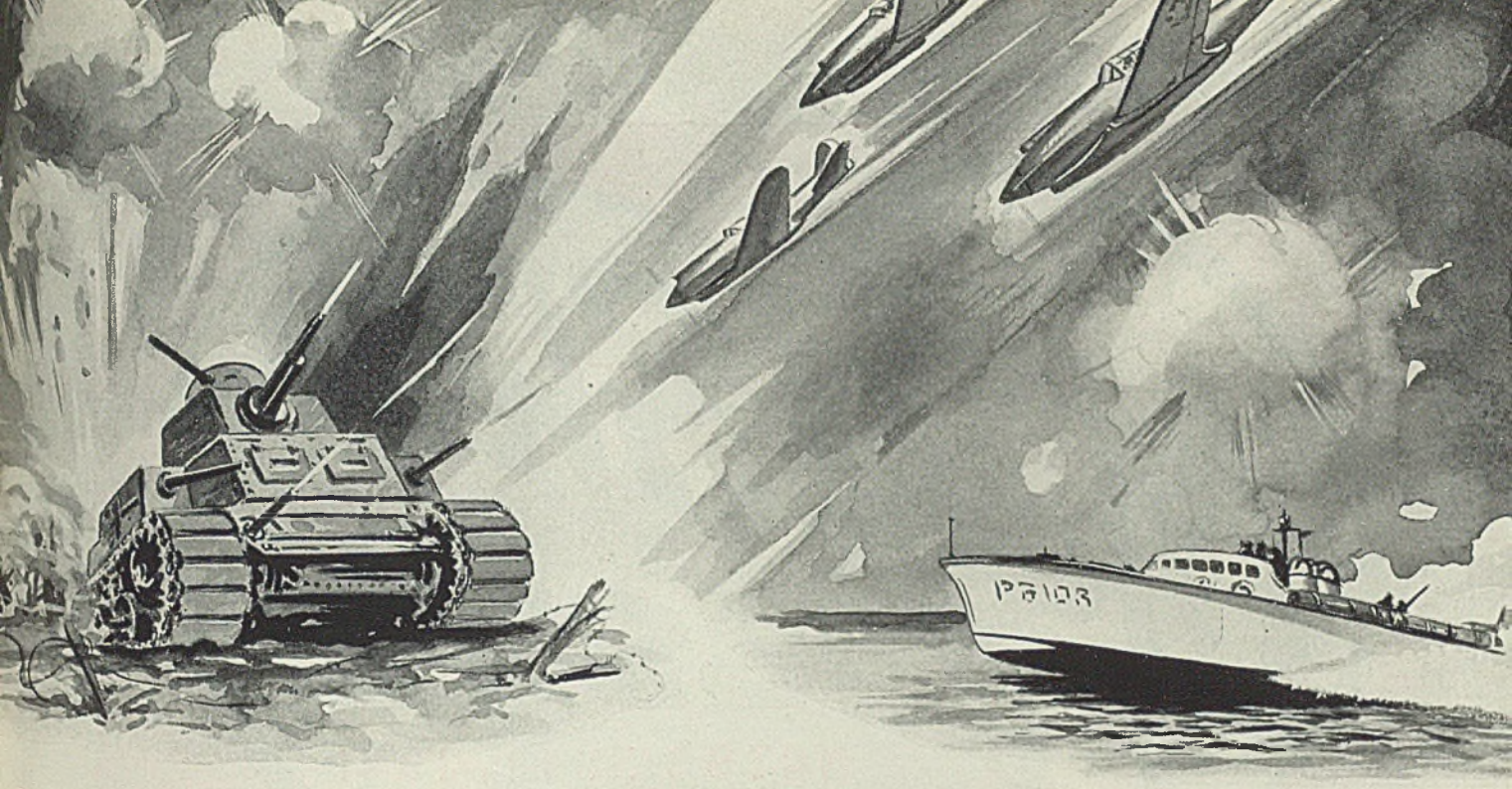


Erection: The steel was erected with a crane mounted on pneumatic tires. Both column-and-knee sections of a frame were set up first and held in place by their base-plate anchor bolts. The center section was then placed and secured with four erection bolts, two in each beam flange. Straps, shop welded to the top flange of the center section and to the bottom flange of the column-and-knee section (Fig. 4), provided convenient temporary support for the center section and allowed it to be lowered vertically into place. All purlins, struts, girts, diagonal and sway bracing were erected along with the frames in one trip of the rig.

Field welding the joints in the rigid frames was done using light-weight scaffolds hung from the purlins on either side. At time, wind breaks were provided for convenience and maximum efficiency as the welding was done during cold weather.

Although the bending stresses and shear at these field joints are quite low, the webs are butt-welded throughout. The flanges are butt-welded from the inside and the cover straps (appropriate in the case of a statically loaded structure) are fillet welded to the top and bottom flanges, the bottom strap being made wider than the beam flange to permit down-hand welding.

The fabrication was supervised by Sam Auld, shop superintendent of the Leach Steel Corp. and the field work by George Stein, erection superintendent.



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Metal Show ISSUE

OCTOBER 13, 1941

featuring:

NATIONAL METAL EXPOSITION

PHILADELPHIA, OCTOBER 20-24, 1941

STEEL's October 13, 1941 Metal Show issue will carry a combination editorial and advertising insert section devoted to the same interests as the National Metal Congress and Exposition.

This insert section, printed in red and black on special coated stock, will prevue the show for those who attend and will bring it to those who do not.

Additional copies of the issue and the insert section will be distributed at the show. Advertising in this issue will be very much worth while. Write for details.

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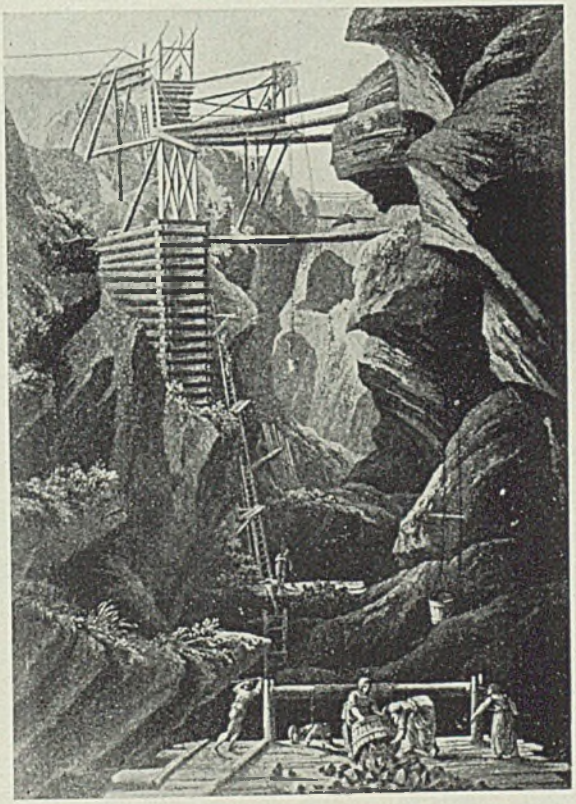


Fig. 1—Early method of mining which involved considerable labor

■ THE PROCESS of steelmaking although fundamentally scientific and in particular metallurgical, still remains an art, after many years of research and experimentation. Many operators believe that the various processes involved in steel manufacture will be realigned to technical control and supervision because the lack of training of sufficiently skilled furnace and other operatives, will compel further utilization of scientific and automatic control instruments and equipment. Then again the practice of using lower grade raw materials and of substituting one material for another and at the same time maintaining a predetermined quality is becoming more and more severe. Then, too, the policy of waste elimination, or that of producing steel of higher quality at lower cost, points to a keener supervision of personnel having the proper technical training and an extensive experience.

This procedure, however, is not within the province of one man or a single department, but only through the co-ordination of the several departments involved. The specific phase of steelmaking ought to be directly supervised for routine and/or current production; changes in practice; research and experimentation by the co-ordinate efforts of the open-hearth operatives, the engineering, the furnace designing, the masonry, the fuel and/or combustion engineering and the metallurgical departments. The metallurgical organization should function like a supreme court or doctor developing, establishing and improving practices, methods, specifications; safe guarding quality by diagnosing troubles and causes in making and/or processing, and prescribing cures or remedies; eliminating processes; assist in the reduction of production and processing costs and at the same time maintaining constant quality in each unit. Each departmental head is confined to a single phase or department and is fully occupied and concerned with operation and production.

Another important co-ordinator in the successful manufacture of steel is the chemical department. A steel plant could not exist without it though it often is neglected and condemned. The chemist guards all raw materials in order to prevent inferior grades entering the processes, to warrant rebates where unit values fall short of specifications and to keep the metallurgical department posted concerning the materials necessary to produce quality steel at lowest cost.

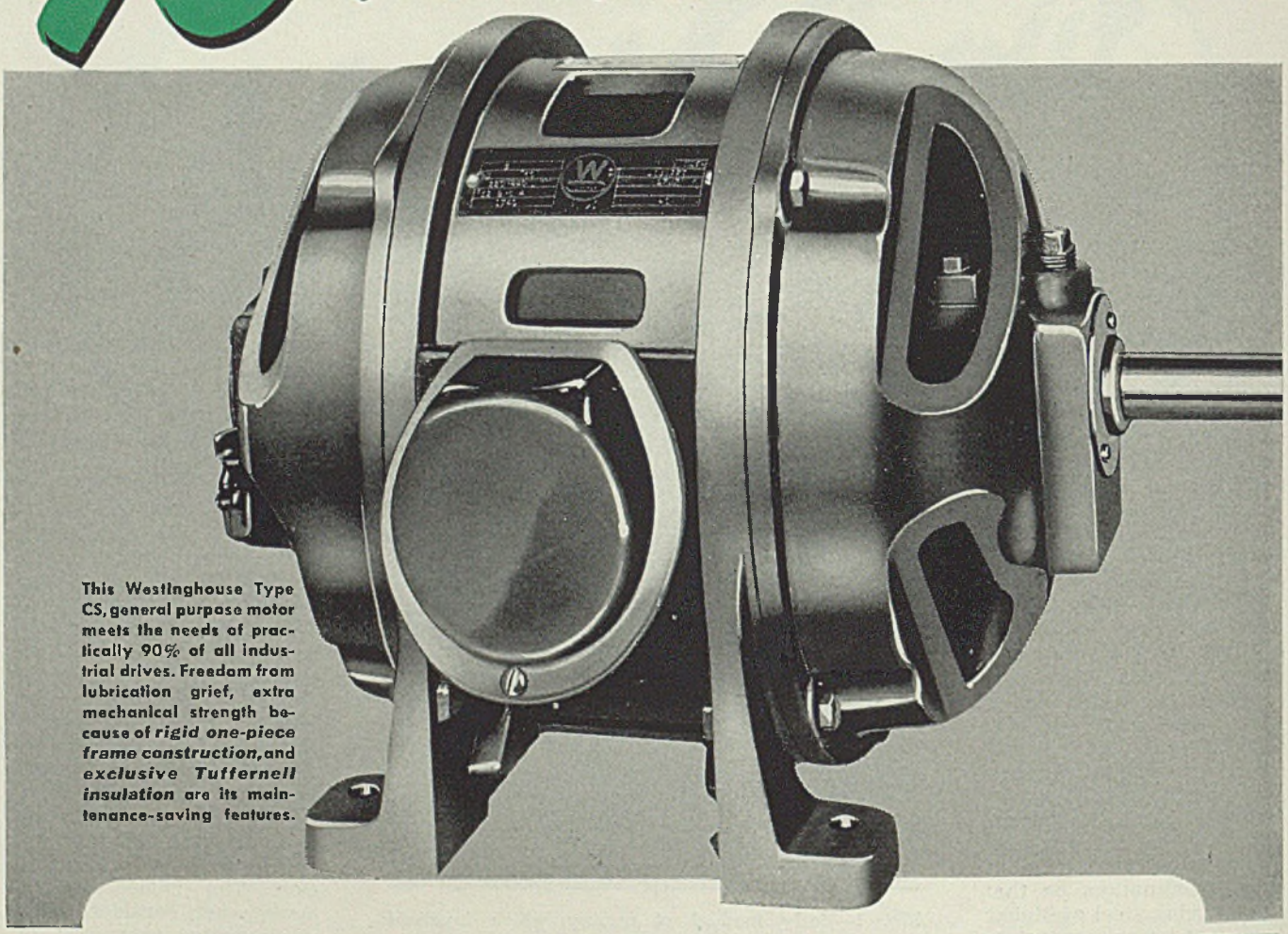
In the manufacture of steel the first and fundamental consideration should be economy and this necessarily begins with the design of open-hearth furnaces, plant layout and all auxiliary equipment; track layout for incoming raw materials, and for outgoing products. A predetermined value of tons per furnace hour should be established for a certain type of charge and series of fuels and yet be sufficiently flexible to change as economic conditions necessitate. This means for a given ingot output per furnace hour all factors of furnace design and construction, etc., must conform to this constant factor. Tons per hour should be from charge to charge, except for actual furnace repairs or rebuilds but should not include bottom dressing or patching because these are purely a function of furnace operation. The same features apply when considering re-engineering, enlarging or otherwise contemplating increased tonnage, efficiency or lowering cost of existing plants. Furthermore, all factors involved in steelmaking should be planned so that the most economical raw materials can be employed to maintain the highest quality, low-cost steels.

In planning for the production of high quality, low-cost steel several factors are of paramount importance, including flat-rolled products which cover a wide range of size and sectional dimensions and all ranges of low, medium and high carbons and the full range of S.A.E., alloy grades.

About 20 years ago as a matter of research, magneto tungsten steel was produced in a 65-ton open hearth successfully. Several grades of stainless steels, especially 18 and 8 are now produced in an open hearth furnace of special design known as the Bosshardt furnace. A few characteristics of this type furnace are the extremely high built up air-uptakes at each corner of the

By PAUL J. McKIMM
Cleveland, O.

40 YEARS ON ONE



This Westinghouse Type CS, general purpose motor meets the needs of practically 90% of all industrial drives. Freedom from lubrication grief, extra mechanical strength because of *rigid one-piece frame construction*, and *exclusive Tuffernell insulation* are its maintenance-saving features.

For Reduced Maintenance . . Increased Service, Put a Westinghouse on the Job!

No matter what the assignment may be—machine tool, rock crusher conveyor, hoist—you'll find there's a Westinghouse motor specially designed to do the job efficiently, at low power cost, and for minimum upkeep expense.

For general service there is a wide variety of sizes and types of open frame motors. For severe and hazardous operating conditions special enclosures are available, including drip and splash-proof, explosion resisting, and forced and self-ventilated motors.

Every Westinghouse motor gives you freedom from lubrication grief with specially designed ball and sleeve bearings that protect motor windings from excess lubricant . . . Extra mechanical strength because of *rigid one-piece frame* construction . . . Tuffernell insulation, a plus value at no extra cost.

And behind every Westinghouse motor that leaves the factory is the Westinghouse organization, ever ready and able to help you get the most in motor performance.

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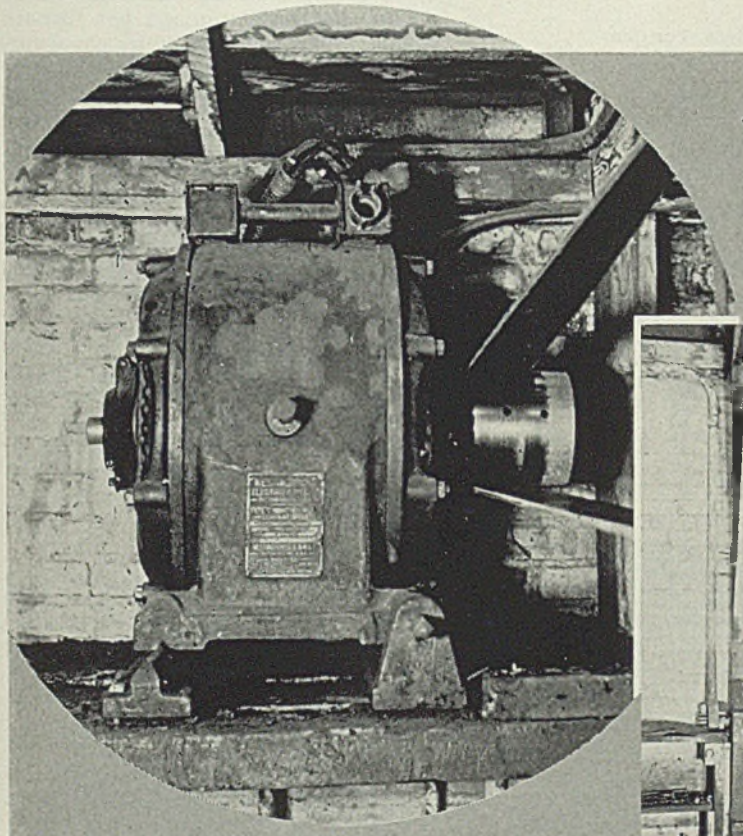
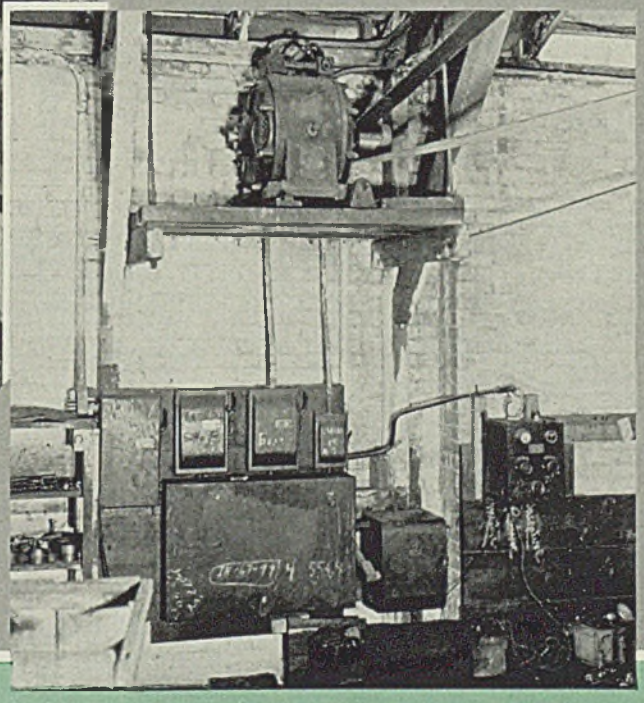
Westinghouse

JOB AND NOT ONE PENNY SPENT FOR REPAIRS



TOO GOOD TO BE TRUE but a fact, nevertheless. Here's the Westinghouse motor originally purchased by J. R. Coats in 1900... in continuous service ever since... and still on the job 15 to 20 hours per day in the Visalia Foundry, Machine Shops & Garage, in Visalia, Cal. No repairs have ever been necessary.



No repairs have ever been required by this motor. Bearings, windings and all other parts are those originally on the motor when purchased 40 years ago.

Out in Visalia, California, there's a Westinghouse motor that has been on the job for 40 years. This motor still has its original bearings, windings and all other parts and hasn't cost the owner a penny for repairs. You might think it would be ready for "honorable" retirement. But no . . . this motor is still going strong . . . still giving 15 to 20 hours a day of dependable, low cost service.

We'd cite this record as an example of the service you can expect from Westinghouse motors, but someone would say, "They don't build motors like they did in the old days."

Which is correct . . . today's Westinghouse motors *are different*. They're better! Very little remains of that old motor design except its good features. The rest is all changed . . . changed because of what we've learned about motors in the 40 years . . . changed by 40 years of motor research . . . changed by 40 years of improvement in Westinghouse manufacturing methods.

WESTINGHOUSE ELECTRIC & MANUFACTURING CO., EAST PITTSBURGH, PA.

Motors and Control

Table I—Data on Heats Made in a Bosshardt Furnace, Per Cent

	C	Mn	P	S	Ni	Cr	Si
Specification.	0.10	0.30/0.50	0.025	0.025	8.00/10.00	18.00/20.00	0.50 max.
Heat A	0.10	0.38	0.012	0.026	8.84	18.37	0.36
Heat B	0.105	0.34	0.011	0.011	8.78	18.61	0.30
Heat C	0.10	0.34	0.010	0.012	8.72	18.78	0.45
Heat D	0.09	0.41	0.014	0.014	8.98	18.12	0.35

The chromium loss was less than 2 per cent. There was no carbon pick-up.

Typical Atmospheric Analysis at Different Periods, Per Cent

CO_2	O_2	CO
11.5	7.2	0.0
13.0	5.7	0.0
16.8	0.1	0.0
15.3	2.2	0.0
14.0	3.8	0.0
13.5	5.0	0.0

Bath temperature taken with optical pyrometer was 2950 degrees Fahr.

Tapping Slag Analyses

	FeO	SO_2	MnO	CaO*	MgO
Heat A	4.21	21.96	9.60	39.10	9.70
Heat B	3.15	31.30	5.11	34.08	6.91
Heat C	1.80	41.60	4.64	33.85	7.24
Heat D	3.60	39.94	5.42	36.25	9.40

* Ca as CaO.

furnace, extremely high slope of the ports and complicated arrangement and layout of the four gas ports. An interesting feature is that a gas producer is connected to the furnace at each port end and their interconnection. These four characteristics affect and determine the furnace operation, its performance and atmosphere. Gas is produced from a high-volatile coal, with a sulphur content less than 1 per cent and an ash content ranging from 3 to 5 per cent. The air passes through the coal bed by natural draft; no steam is used. Considerable improvement in operation has more recently been accomplished. The characteristics of a few heats produced, processed and tested under the authors supervision are shown in Table I.

The ingots were heated in standard soaking pits and slabbed, hot rolled and cold reduced with standard tonnage equipment, while some ingots from each heat were processed into 5-inch rounds and pierced and some were up-set for tests. Samples of all sections were tested by commercial testing laboratories and the United States Navy Department, Inspector of Naval Material and fully met the physical requirements.

Besides diversification of product other co-ordinate units must be fully revaluated, such as both the quantity and physical condition of the iron, soaking pit and processing capacities, and scheduling. One phase is as important as another in order to attain a smooth flow of material with the least amount of transferring, handling and extra heating.

Furnace capacity is of little consideration other than to obtain the lowest conversion cost for the greatest tonnage per furnace hour regardless of whether the furnace is operated with a deep bath or a shallow bath. It has been definitely demonstrated that the smaller capacity furnaces maintain a greater tons-per-hour rate. The most economical open hearth is between 150 to 175 tons per heat and which affords a high tonnage per furnace hour operation. In many cases furnaces of large tonnage output have been re-engineered to a more shallow bath because with the deeper baths the time for melting down and refining is much longer. Most of the refining action occurs at the metal and slag interfaces. The greater the area of metal surface in contact with the slag, the quicker the reactions are completed. With deep baths the thicker slag layer increases the difficulty of heat transmission from frame to the metal, thus resulting in higher operating temperature and furnace maintenance cost and also a loss in production because of furnace repairs and early rebuilding.

William C. Buell, Jr., points out that a furnace, 200 to 350 tons with a bath depth of 42 to 48 inches, produces from 11.4 to 12.3 net tons of steel per 1000 cubic feet of steel volume per operating hour while a 150-ton furnace with a bath 20 to 32 inches affords from 15.3 to 17.2 net tons per hour.

Materials for furnace bottoms are marketed under a wide series of trade names. The technique of making-up and burning-in bottoms also covers a wide range, each shop having its own method. The most common bottoms until recently were made of imported dead-burned magnesite; now most magnesite for this purpose comes from the continent. Another commonly used material is a high iron refractory which has a lower MgO and a higher Fe_2O_3 content. In both cases open-hearth slag is added to the mixture.

(*Please turn to Page* 106)

Fig. 2—Photomicrograph (100X) of bottom material from furnace A. Material is the same as that used for bottom B

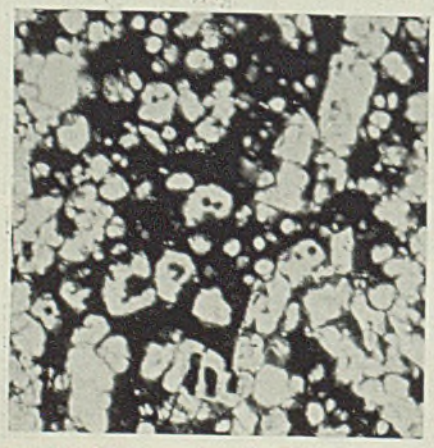


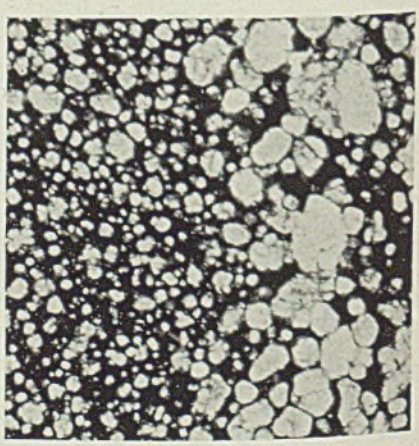
Table II—Comparison of Typical Analysis, Per Cent

Compound	Dead-burned magnesite	High iron	Typical slag
MgO	82.00	30.00	4.00
CaO	5.50	55.00	35.00
Fe_2O_3	4.00	11.00	20.00
Al_2O_3	1.00-2.00	1.00-2.00	trace
SiO_2	7.00	3.00-4.00	11.00

Table III—Weight of Various Grades of Scrap

Grade	Weight per buggy, pounds
Bushlings	2,500
No. 1 bundles	5,000 to 7,000
No. 2 bundles	3,500 to 4,000
Nos. 1 and 2 melting and road	3,500 to 4,500
Crop end, slabs	18,000
Loose	1,500 to 3,500
Punchings	20,000
Bar and rod ends	20,000
Blast fce. and mold, stools	1,200

Fig. 3—Photomicrograph (100X) of bottom material from furnace B. Material is the same as that used for bottom A



HOW TO AVOID.....

Specific Blemishes When Grinding

Ultra-Finish Rolls

After describing ultra-finish in section one. STEEL, June 30, 1941, p. 52, and explaining factors involved in grinding ultra-finished surfaces on rolls, section two, STEEL, July 21, 1941, p. 56, Mr. Wills gave step-by-step procedure recommendations in section three, STEEL, July 28, 1941, p. 78. Here he concludes this series by describing specific blemishes that are apt to be encountered. In every case, he points out what to do to prevent the occurrence of that particular difficulty

By H. J. WILLS
Engineer
The Carborundum Co.
Niagara Falls, N. Y.

■ SLIGHT surface faults permissible on many parts are intolerable on rolls for ultra-finish work. While chatter marks, slight scratches and the like are commonly blamed on the wrong wheel—and that occasionally is the trouble—more often the fault is due to poor manipulation, poor machine condition, dirty coolant, faulty wheel dressing, building vibration and so on.

It is important that the operator who is trying to produce an ultra-finish recognize the faults, understand the probable cause and know just what to do to eliminate the trouble. For this reason, typical difficulties will be described and their prevention detailed.

Chatter Marks: Short and evenly spaced chatter marks are usually caused by loose wheel spindle bearings. Sometimes all that is needed is to tighten the bearings; reduce the speed of the wheel; allow more time for the bearings to warm up before starting to grind; take up the thrust bearings; or use more or better oil. Often, however, it will be necessary to refit the bearings or to lap the bearings to the spindle.

Longer and more widely spaced chatter marks may be due to the wheel spindle being sprung or out-of-round. If sprung, the spindle must be replaced. If out-of-round, the trouble can be corrected by regrinding the spindle and lapping to new bushings.

Regularly spaced chatter marks may be from vibration. First, try various work speeds to determine whether a too-high speed may be causing the vibration. If this is not the cause, check the alignment and the couplings, and make sure that the motor and spindle are in balance. Regular, but widely spaced, marks are probably due to an uneven belt. Plane the belt to uniform thickness and width and take care to have all sections of the belt of uniform flexibility. Such chatter marks, however, may be caused by idlers that are out of balance or loose. They should be carefully rebalanced, rebushed and lapped to the shaft.

Long, regularly spaced chatter marks that form a checkerboard pattern may be caused either by a wheel that is out-of-round or out-of-balance. If the former, true the wheel both before and after balancing and true the sides to the face. If out-of-round, rebalance the wheel on its own mounting, and repeat after truing. If this does not eliminate the chatter, the cause is probably coolant which has been absorbed by the wheel. Run the wheel without coolant flow before balancing to throw off the moisture. To prevent moisture from gathering at edge of wheel, store the wheel on its side.

Chatter marks which are long and widely spaced, regular in pattern but varying around the work are probably due to backlash in the drive gears. Check the lubrication, replace the gears or use a belt drive.

Frequent regularly spaced marks of any width indicate a loose spindle pulley.

Either regular or irregular chatter marks may be due to faulty thrust bearings. Replace them. If such marks follow a regular pattern the trouble is apt to be due to metal belt lacings on the spindle drive. The cure is to use an endless belt.

Building Vibration: If the chatter marks appear to be synchronous with general building vibration, the trouble may be difficult to eliminate. If the roll grinder is a light one, it may be sufficient to loosen or tighten its anchor bolts, or vibration dampers may be of help. The best solution is often to move the machine to a better location. If the roll grinder is a heavy one, it will probably be necessary to provide a separate machine foundation which is independent of the surrounding floor.

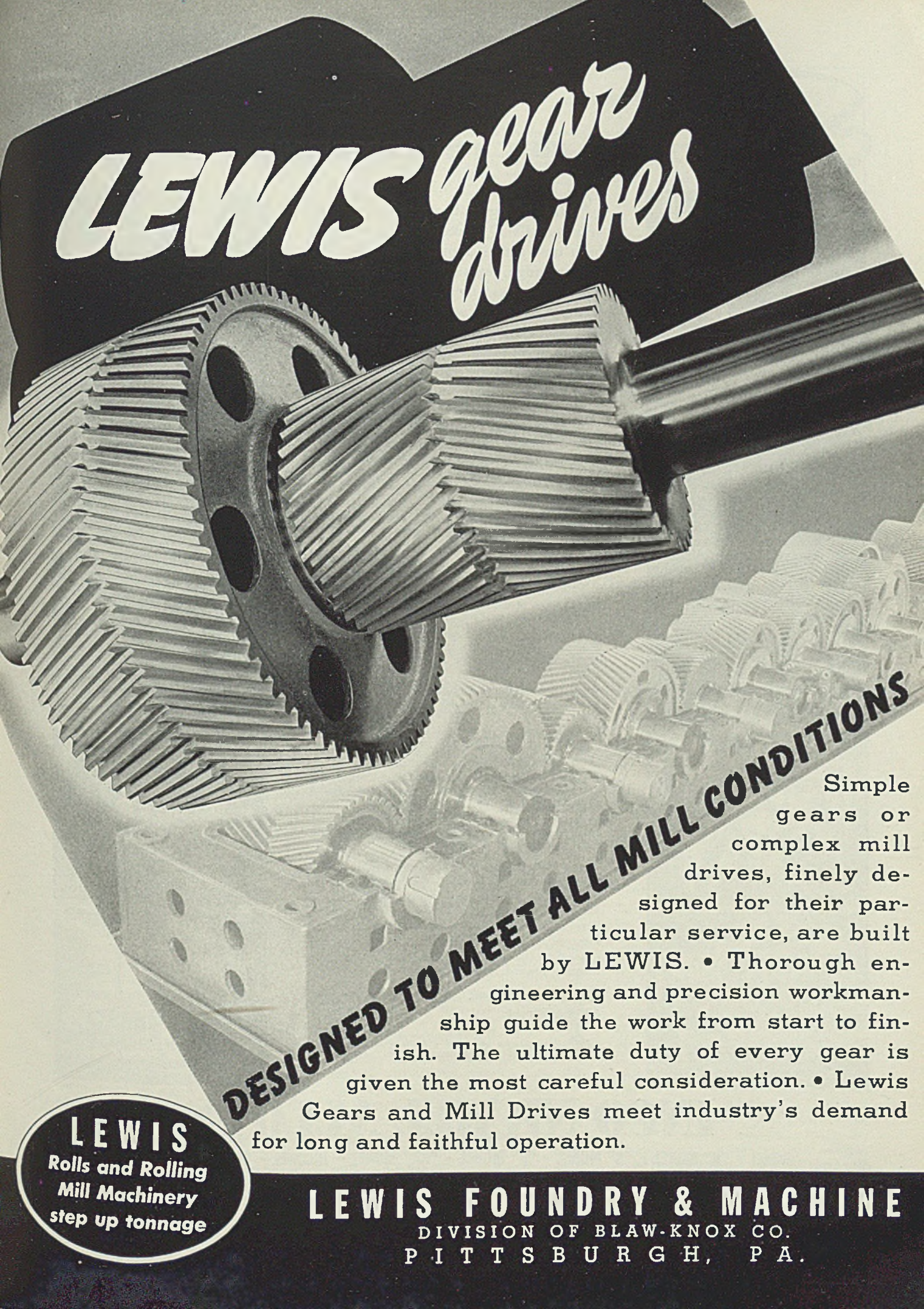
If the chatter marks are irregular, make certain that centers or rests fit correctly and provide even and constant lubrication of centers or rests. Provide adequately lubricated hold-down clamps on the roll necks.

If the chatter marks are long, wide, evenly spaced at wide intervals and discolored, and the wheel face glazed or loaded, the trouble is that the wheel is too hard for the job.

The cure here is to use a wheel of softer grade, more open structure or coarser grit.

Scratching: A wheel which is too soft will make wide irregular marks of varying depth; if too coarse, the scratches will be narrow, deep and regular. A wheel which is out of balance, in need of truing, or which has oil on its face will produce widely spaced spots on the work. Oil on the wheel face is often mistaken for "hard spots" in the wheel structure. Uneven marks indicate a whipping belt.

If the marks on the work are in the form of a regular spiral, the



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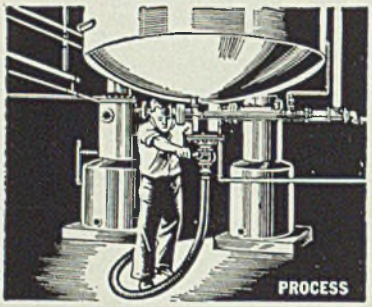

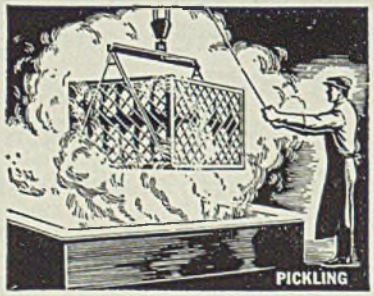

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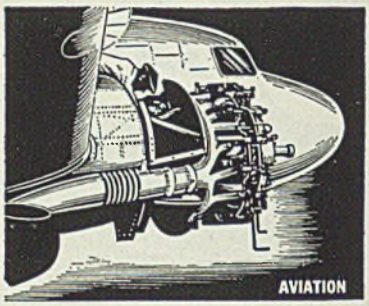

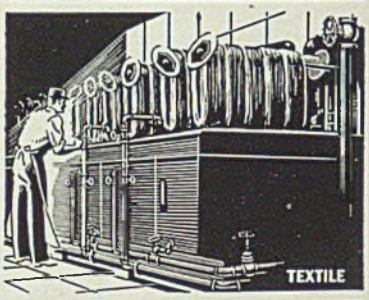

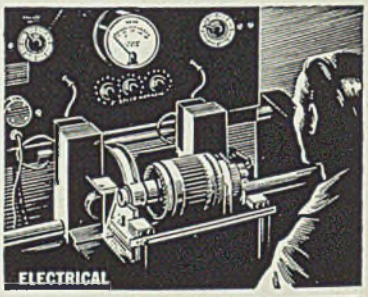

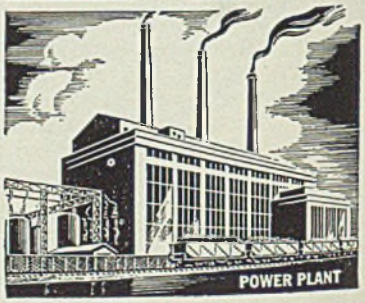

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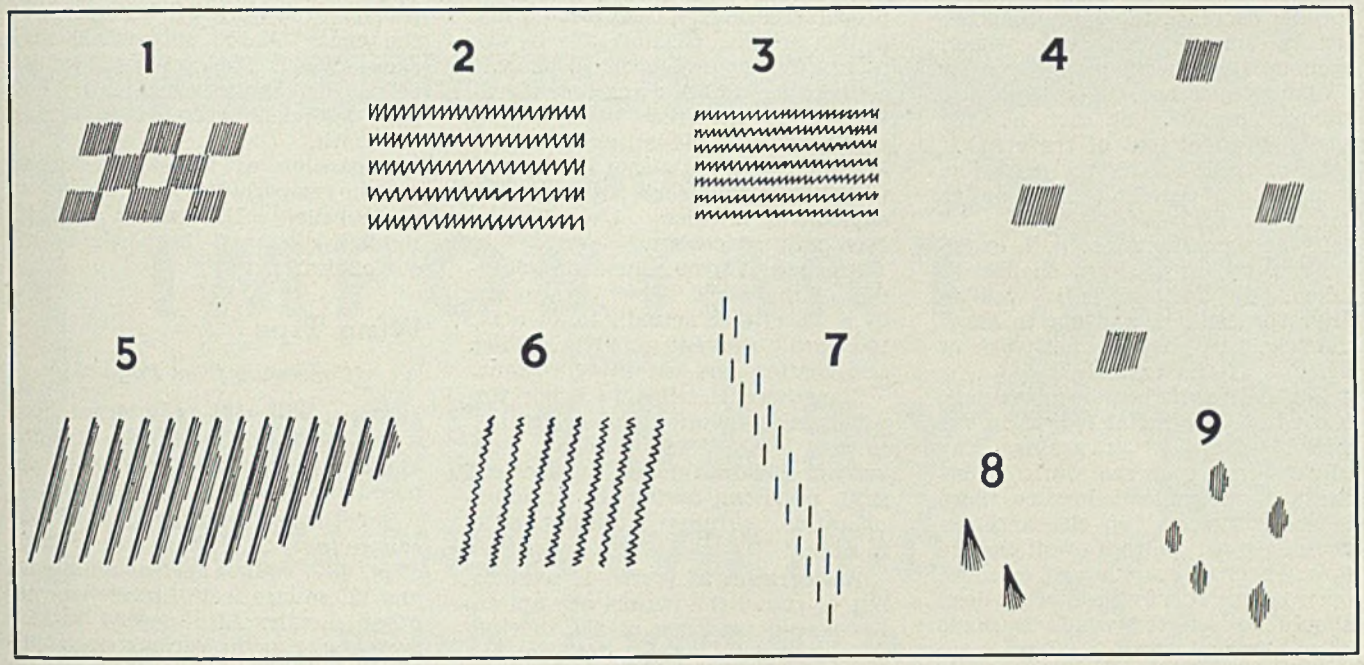


Fig. 1—"Checker board" blemish, caused by wheel out-of-balance or out-of-round
Fig. 2—Relative fineness of a chatter-type blemish as compared with Fig. 3 blemish. This is indicative of glazed or loaded wheel
Fig. 3—Relative fineness of a chatter-type blemish as compared with Fig. 2 blemish. It is indicative of "pin chatter" from spindle
Fig. 4—A chatter-type blemish caused by faulty belt, work drive, thrust bearing, belt splice, loose pulley, bumps from adjacent machines
Fig. 5—"Feed lines," a blemish from dragging edge of wheel. Lack of alignment of wheel and work
Fig. 6—Feed lines, irregular, caused as in Fig. 5, but here wheel edge wobbles or is ragged
Fig. 7—Coarse grit scratch, a blemish generally caused by foreign matter in face from careless handling of wheel
Fig. 8—"Fish tail" blemish indicates crumbling of wheel edges, or grain pulled from wheel
Fig. 9—Dirt in coolant or air causes this effect

trouble is either with the dressing or the operation of the wheel. Because this is so common a trouble we repeat a condensation of the detailed instructions given in preceding articles in this series on ultra-finish grinding.

Examine the diamond dressing tool to make certain that the stone is not broken or cracked. Try dressing with slower traverse. Set the dressing tool at an angle of 30 degrees in the horizontal plane and 5 degrees down in the vertical plane so that it will not gouge the wheel face.

The holder and diamond must be tight; too much penetration must be avoided; the diamond must not dwell in contact with the wheel; the diamond must be turned after every third dressing so that sharp edges will always be presented to the wheel. Dressing cuts should not be started on the face of the wheel. The tool may be *located* on the face, but the cut should start from the edge of the wheel. The final cut in dressing should be traversed in the direction opposite to that of the traverse that will be used in grinding, and the traverse rate of the diamond should be even. It is not enough to chamfer or dress back the sides of the wheel. The wheel edges must be rounded.

Care must be taken to dress the wheel face parallel to the work. If the wheel is tapered either the advancing or the following edge of the wheel will penetrate the work and cause spiral marks. Scratches are also caused by too great wheel pressure, worn parts which allow the wheel head to swivel, or insufficient steady rests. Spiral marks may sometimes be due to too rapid traverse in relation to work speed. Such patterns may often be broken up by slightly changing the traverse rate at each pass.

Wavy traverse lines are usually due to unrounded wheel edges. Uneven traverse lines are probably due to worn traverse drive parts. Eliminate play, or replace worn parts.

Isolated deep marks have several causes. Use sharper dressing tools and brush the wheel, after dressing, with a stiff bristle brush. They may be due to chatter which loosens the grains. Eliminate the chatter. If, due to careless handling, there are coarse grains or foreign matter in the wheel face, dress them out. Some organic bonds are apt to disintegrate to some extent under the action of strong coolants, thus releasing grits which cause scratches. The soda content of the coolant should be reduced.

Irregular scratches may be caused by loose dirt in the air. Cleanliness is the only cure. It may be necessary to install dust collectors.

Fish tail scratches are usually due to dirty coolant. The coolant should be filtered, the tank frequently cleaned and the wheel guards flushed after dressing and when changing to finer wheels. Very deep irregular marks may be caused by loose wheel flanges. Keep them tight and use blotters or lead washers.

Grit marks may be caused by using a wheel that is too soft or coarse, or too coarse a dressing. Another cause is that there is too much difference of grit size between the roughing and finishing wheel. A finer roughing wheel should be used, or the trouble may be overcome by finishing out more carefully with the roughing wheel. An improper cut with the finishing wheel may also cause these fish tails. The remedy is to start with high work speed and rapid traverse in order to remove wheel marks from the preceding operation, then finish out with a high work speed and slow traverse, allowing the wheel to "spark out" completely.

Wheel Grading Effects: A number of surface defects are due to the wheel acting either too soft or too hard. The causes of these troubles have been discussed in detail in previous articles in this series. Summed up: If the wheel acts too hard, try any of the following: Increase the work and traverse

speeds; decrease the spindle speed; use a smaller, narrower wheel; open up the wheel face by sharper dressing; increase the infeed; use thinner coolant; do not let the wheel dwell at end of traverse. If none of these rectify the condition, change to a coarser grit or softer bond.

If the wheel acts too soft, exactly the opposite steps should be taken. In addition it is well to filter the coolant, and not to allow the wheel to pass off the work at the end of the traverse.

Loading: A loaded wheel, that is, one which has metal lodged in the wheel pores or on grains, may cause burning of the work. Sometimes the wheel loads because there is not sufficient chip clearance between grains. In that event change to a wheel of coarser grit or more open bond. It may be that a wheel should be selected which is made of an abrasive which fractures more easily. A more copious supply of coolant may correct the condition.

Wheels sometimes load because of faulty dressing. Dress more rapidly with a sharper dressing tool, and clean the wheel face thoroughly after dressing.

Coolant should be fairly thin and always clean.

The trouble is often due to faulty manipulation. Use less infeed and by correct manipulation soften the wheel effect.

Glazing: A glazed wheel, also, may burn the work. The symptom is shiny appearance and slick feel. Too hard a wheel is apt to glaze. Use a softer wheel or manipulate it for a softer effect. A dull wheel is apt to glaze. Keep it sharp by proper dressing, as described earlier in this article. Glazing may be due to insufficient or too oily coolant.

Checking: Check marks are usually due to incorrect manipulation of the wheel. Avoid letting the wheel act too hard. Do not force the wheel into the work. Correct belt slippage if it exists. Use a large, even flow of coolant.

Burning: Burns cause discoloration of the work. They are caused by a wheel that actually is, or acts, too hard. Prevent glazing, loading and chatter, and use more coolant.

Sometimes it helps to bring the wheel to the work more gradually, to use less infeed, eliminate belt or wheel slippage. If the work stops revolving during the grinding operation, burning is nearly sure to result.

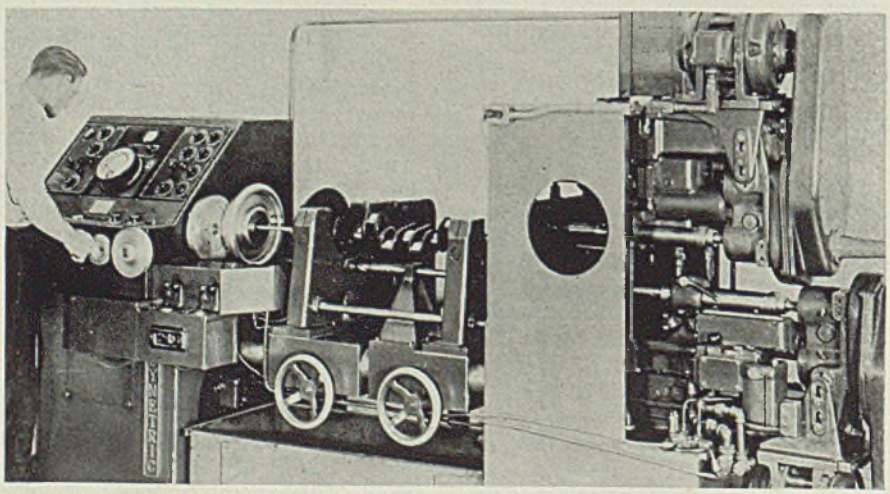
Inaccuracies in Work: If work is out of round the causes are apt to be uneven pressure of the driving points or the driving points not being parallel with the axis of the work. If the first, provide cushions between points and work and locate them equidistant from the work axis. If the second, true the face plate and the points.

If the work is tapered when it is supposed to be parallel, the spindle bearings may be loose, the ways worn, or the head and tail stocks not in line. These of course call for greater attention to the condition of the machine. If the condition of the machine at the point where the wheel is dressed is not the same as at the grinding point, the work may not be ground parallel.

If the wheel is allowed to pass off the work at the end of the traverse, the work will be tapered at the ends. A too soft wheel may cause taper. The work will be out of parallel if the wheel is applied with sufficient pressure to spring the work.

Expansion of the work due to rise in temperature may cause out of parallel. Use more coolant, lighter cuts and keep the work out of drafts.

Balancing Crankshaft Assemblies



■ Newest development in the automotive industry's research into problems of motor vibration and efficiency is this radio device for balancing Nash crankshaft assemblies. The assembly is placed in the radio balancer, which tunes in the most minute vibration and automatically corrects it by drilling away a tiny portion of metal from exactly the right spot. Three of these machines are now in use

Wing Tips

(*Concluded from Page 43*)

sections, as well as internal spar webs, ribs and bulkheads are duralumin, with some sections of exposed metal being of alclad.

Sheet metal used amounts to 4627 square feet—262 square feet of sheet steel, 4240 square feet of aluminum and 125 square feet of miscellaneous other metals. Also needed is 1550 feet of tubing in various sizes—910 feet steel, 910 duralumin and 330 feet miscellaneous. A total of 2285 feet of electrical cables and other wiring is required for each ship.

Connection between the 1150-horsepower engine and the three-blade propeller is through a driveshaft comprising two 60-inch sections, with a bearing just ahead of the pilot's compartment and a universal joint permitting free play between engine and propeller. Forward end of the shaft is keyed into a reduction gear unit with ratio of about 1.8 to 1 driving the propeller. Entire nose of the ship is covered with ¾-inch armor plate and the hollow hub of the propeller is of stainless steel with a sufficiently large hole to permit mounting a cannon in the nose which fires through the hub.

Control surfaces on ailerons, rudder and elevators are fabric covered, the only parts of the outer plane surfaces so covered. These surfaces are those which are moved in flight to adjust movement of the plane. They comprise aluminum alloy framework around which airplane fabric is wrapped, coated with a mixture known as "dope" and then painted. Formerly it was necessary to stitch this fabric onto the metal framework, but Bell engineers developed an ingenious new attachment method. Outer edges of the framework section are shaped to receive a narrow aluminum strip, the edges of which are locked into turned-up edges of the framework.

Once the fabric is applied, locking strips are slid into place over the fabric and a special roller tool forced along them to wedge the strips and fabric securely in place.

(Editor's note: The next installment will consider some of the unique metalworking operations involved in production of Bell Airacobras.)

MEETS A VITAL NEED

There has never been a greater need for the National Metal Exposition & Congress than in this year of gigantic defense preparations. This National Exhibit affords the quickest and most satisfactory way to show thousands of defense producers the newest materials, processes, and equipment for speeding defense work in the metal industry.

Many of the 35,000 men who will attend the Philadelphia Exposition have found in the present emergency that they must specify and use materials with which they are not too familiar. At the Exposition these men can see on display and in operation the products of 275 leading manufacturers in the metal industry. Five days at the Show may save five months production time for the companies these men represent.

GOVERNMENT EXECUTIVES TO TALK

Sessions at the Metal Congress held in conjunction with the Exposition by four leading technical societies will be pointed toward defense production. Each morning a leading Government executive will discuss progress and requirements in Army, Navy and Aircraft production. In the afternoon, round-table sessions on various aspects of defense production in the metal industries will be conducted by armament experts. Societies cooperating in the Metal Congress are: American Welding Society, American Society for Metals, Wire Association, Iron & Steel Division and Institute of Metals Division, American Institute of Mining and Metallurgical Engineers.

EXHIBITORS PLAN BUSY WEEK

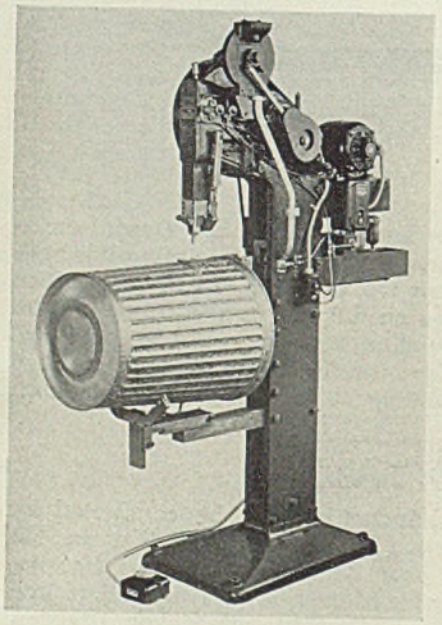
The records show that in 1941 more people than ever before are attending industrial expositions. Anticipating a crowd as large and influential as the 35,000 who attended last year's Metal Exposition, National Metal manufacturers plan an active and beneficial week during the Show.

Advance reservations are the heaviest in history; however, choice locations are still available at the regular $1.00 a square foot rate, so write, telephone or wire collect today for floor plan and full particulars. Address: W. H. Eisenman, Secretary, American Society for Metals, 7300 Euclid Avenue, Cleveland, Ohio.

Industrial Equipment

Riveting Machine

■ Tomkins-Johnson Co., Jackson, Mich., announces a new type RK automatic feed Rivet-Pierce Rivitor which feeds and sets up ¼-inch rivets ⅞-inch long on a production basis. Its speed, however, is determined by the speed with which work is handled. The machine underfeeds rivets to the work, one rivet being fed at every other stroke. This action is conducted

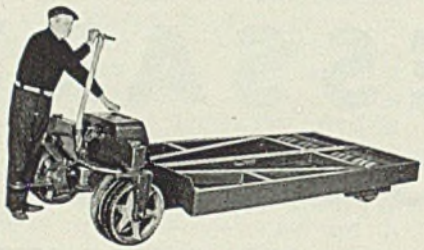


by means of a transfer ram cylinder which carries the rivet from the track leading from the hopper and leaves it in the fingers at the anvil of the machine. To facilitate work location, a spot light also is included on the machine. The job of this unit is to direct a spot of light on the work showing the location of the rivet underneath. When the machine trips for the first time, the ram descends and forces the work down over the unannealed rivet, punching a slug out of the work. The slug escapes through a hole in front of the head which reverses on the upstroke to bring the riveting head into position. Upon tripping for the second time, the ram descends and heads the rivet. On the upstroke, the head reverses again to bring the piercing die into position to punch out the next slug.

This machine is capable of handling rivets of the "coopers", "tinners" or flat-head type that can be readily underfed. It is controlled by a solenoid trip and is powered by a ½-horsepower, 1725-revolution-per-minute motor.

Hydraulic Lift Truck

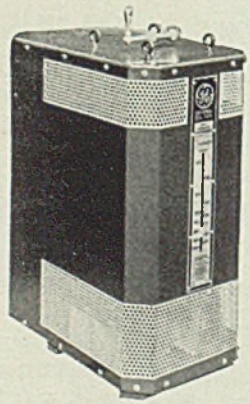
■ Lewis-Shepard Sales Corp., 245 Walnut street, Watertown, Mass., announces extra-large hydraulic hand-lift trucks for handling large machine tools. These can be fur-



nished in capacities up to 35,000 pounds. The truck shown is of the 35,000-pound capacity type having a platform length of 10 feet and a width of 5 feet. The lowered height of the platform is 15 inches. It has four rear wheels, 15 inches in diameter by 10-inch face. The rear wheels are mounted on heavy-duty roller bearings. The four front wheels, 20 inches in diameter by 5 inch-face, are mounted in an auto-type steel and also use heavy-duty roller bearings. The frame of this truck is arc-welded throughout and rigidly braced in every direction to prevent deflection and weaving. The lifting mechanism is enclosed.

Arc Welders

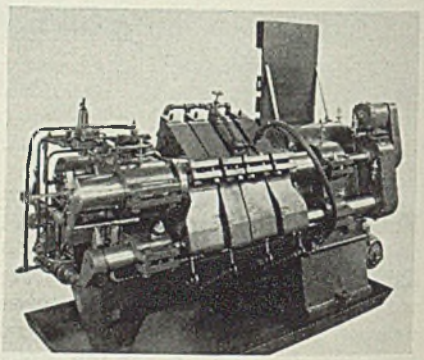
■ General Electric Co., Schenectady, N. Y., has introduced improved 35 and 75-ampere atomic-hydrogen arc welders generally used for tools and dies or for filling in flaws or blow-holes in steel and bronze castings. They are compact and self-



contained to reduce space requirements. Instead of the transformer and reactor used in previous units, the new welder has a specially designed reactive transformer which combines the functions of both the transformer and reactor. As a result, the weight of the welder has been reduced more than 30 per cent, and electrical characteristics improved. In addition, a built-in power-factor correction helps to reduce installation cost and avoid power-factor penalties. Units are cooled by fan-forced ventilation.

Shell Turning Machine

■ William K. Stamets, Jenkins Arcade building, Pittsburgh, has introduced a shell turning machine capable of rough and finish turning approximately twenty-five 155 millimeter shell per hour. Of single operation design, its spindle is mounted on antifriction bearings, being driven from a gear in the headstock. The shell is centered and driven by an air-operated internal expanding chuck. The tailstock is of spindle construction, and also is air-operated. Tools are carried on rocker arms mounted on rigid bars



at the rear of the machine. The latter feed as a single unit, the feed being pulled by a leadscrew operated from the headstock. A cam bar below the rocker arm carries a suitable cam to produce any desired contour. Machine is designed so the shell is presented from the conveyor in front of the operator. The shell is rolled forward from the conveyor onto a hand operated loading lever, the lever placing the shell in alignment with the centering jaws, the tailstock center. The machine arranged for facing the base end and cutting off consists of only two rocker arms actuated by cam plates carried on the rear of the machine. The operation of roughing the outside diameter of the shell is performed by four tools rocking in and traveling approximately one-quarter of the length of the shell. For finish turning, practically the same setup with cams arranged for machining the boattail, bourrelet and nose of the shell is used. A clamping lever locks the tailstock spindle and also operates an air valve controlling both the tailstock spindle and the expanding collet. At the rear of the machine bed are two shafts, the upper shaft carrying rocker arms, the lower shaft carry-

Every Fastening STRONG AND TIGHT!

Partial view of refrigerator assembly line at the Seeger Refrigerator Company plant.

Workman driving Shakeproof Thread-Cutting Screw in refrigerator door assembly.

SEEGER Provides Enduring Quality in Refrigerator Construction wi

SHAKEPROOF *Thread-Cutting Screws*

The Seeger Refrigerator Company, of St. Paul, Minnesota, a leading manufacturer of quality refrigerators, uses Shakeproof Thread-Cutting Screws for many vital fastenings. Because these screws actually cut their own threads, a snug, tight fit is always certain, and the parts they fasten stay tight under the hardest kind of service. Throughout the refrigerator industry, and in hundreds of other metal product plants, Shakeproof Thread-Cutting Screws assure smoother, faster production plus improved product quality.

***Special* TEST KIT**

SEE NEXT PAGE

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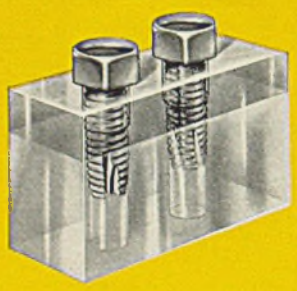

FOR PLASTICS, TOO!

Types 2 and 9 are specially designed for use in plastics. They eliminate the need for threaded inserts or separate tapping operations.

BETTER THREAD ENGAGEMENT PRODUCES STRONGER FASTENINGS!

Because Shakeproof Thread-Cutting Screws are made with standard machine screw threads, a maximum engagement with the work is assured. This fact is clearly illustrated in the above photo showing the cutaway section of a fastening made in thin metal.

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"Yes, we keep our equipment in excellent operating condition in spite of the severe demands we make on it," says this plant engineer.

This superintendent and this plant engineer agree on the benefits they have secured since a Gulf engineer helped them to install proper lubrication in their plant. They find that they get efficient *full-time* performance from their equipment, with no unnecessary delays to interfere with production schedules.

Hundreds of other plant operators who are striving to attain maximum production find that Gulf Engineering recommendations pay dividends. They all report increased output. Some ascribe this to less down-time of equipment. Others, to more efficient operation generally.

Ask the Gulf engineer who calls on you to recommend the proper application of the right lubricants in your plant. You'll get benefits which will show up quickly in your production and maintenance cost records.

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GULF INDUSTRIAL LUBRICATION

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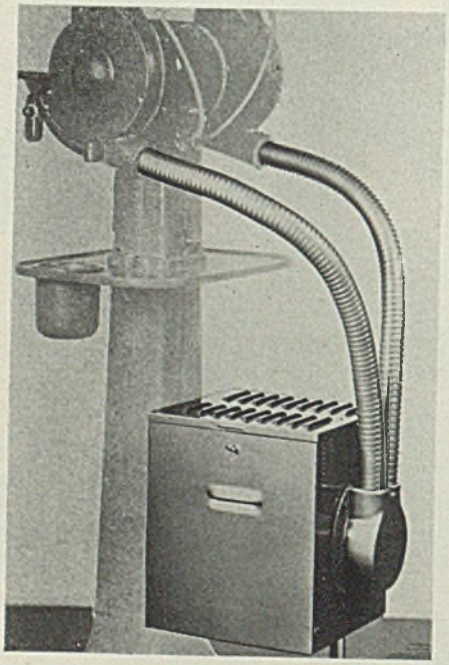
ing the templets of the required contour. The upper shaft is fed longitudinally by a screw which is driven by a worm and wheel geared to the spindle. Pickoff gears are provided for changing feed. Tools are automatically retracted and returned to the starting position at the end of the feed stroke.

Dust Collector

■ Aget Mfg. Co., 424 Book building, Detroit, has placed on the market a new unit-type Dustkop 600 dust collector having a 600-cubic foot per minute rating. It is designed to exhaust one or more pedestal or bench grinders, cut-off machines, polishers and buffers. Being entirely self-contained, it permits rapid



installation and even subsequent moving of the machine and collector as a unit. The collector is equipped with a ¼-horsepower, 3450-revolution per minute rubber-mounted 110-volt motor to provide a waterlift of approximately 3.3 inches. It can be mounted on a grinder, as in the illustration, or on the floor behind the machine. Two types of intake flanges are available to exhaust stations singly or in multiple when placed close together. Removal of dust and dirt is effected by lifting the louvered cover, taking out the filter assembly and lifting the pan. Filters are of the spun glass variety, said to stop over 99 per cent of the dust.

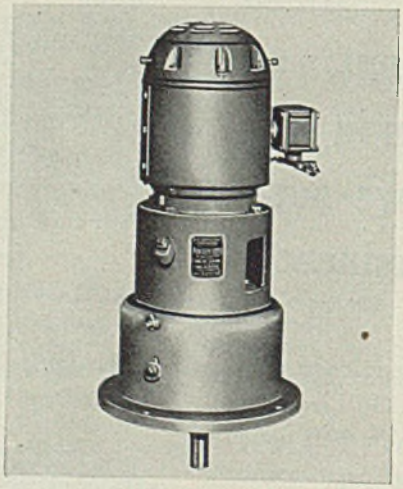
Electric Arc Welder

■ Ideal Commutator Dresser Co., 5076 Park avenue, Sycamore, Ill., announces a new Weld-Master alternating- current electric arc welder which can be operated with but a few minutes' practice. Its design includes a reactance winding on a separate core in addition to the transformer. This winding acts as a stabilizer, making it easy

to strike an arc and hold it. As the distance between the end of the welding rod varies, the winding causes the voltage to vary proportionately, so that the arc is always smooth. Fifteen different welding heats between 20 and 175 amperes give the operator accurate heat and penetration control. Penetration may be up to ¼-inch or more if desired. These heats are at two voltages—45 and 70 volts. The standard welder is for 230 volt, 60 cycle operation. Its overall dimensions are 17 x 15 x 26 inches. Accessories available include gound lead, electrode lead, electrode holder, welding rod, primary cord and plug.

Agitator Drive

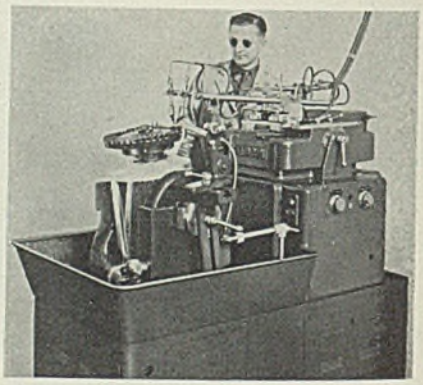
■ Process Equipment Division, H. K. Porter Co. Inc., 4975 Harrison street, Pittsburgh, has developed a new Portereducer agitator drive which features the planetary system of gearing. Because more teeth are in-



volved in this system, operation of this unit is smoother, and greater reduction can be accomplished in a given space. The entire driving power is transmitted through gear teeth alone. Smooth operation is effected by the use of helical gears. Another feature of the drive is that it is designed to use standard NEMA frame motors. This permits the use of any make of motors. The drive design permits an unlimited ratio of reduction, with efficiency of 90 per cent and greater. Consequently any speed may be obtained in a complete size range from ½ to 50 horsepower.

Automatic Surface Hardening Machine

■ Gleason Works, 1000 University avenue, Rochester, N. Y., has introduced a new automatic surface hardening machine which hardens both sides of a gear tooth simultaneously without distortion. Each tooth also is hardened in exactly the same length of time and to the same depth as every other tooth. The machine has a capacity for bevel gears up to 33 inches pitch diameter and is fully automatic in operation. It consists of a base,



a work holding unit, and a column on which is mounted the burner slide. The burner column is stationary on the base, the work head being adjustable to and away from the column to accommodate various sizes and types of gears. The base contains the coolant tank and pump, cooling unit, hydraulic oil reservoir, hydraulic pump, and the pump motor and controls. The burner column contains the mechanism which imparts the motion required for operation. The burner arms are mounted on a slide which in turn is mounted on a swivel base. The work head swings in trunnions and can be adjusted to any desired angle. Indexing is entirely automatic. Change gears are provided for indexing any number of teeth from 5 to 100 and most numbers up to 200. A change gear actuated roll motion of the work head causes the burners to follow the curved teeth on spiral bevel and helical gears. The necessary change gears required to obtain any desired roll within the range of the machine are furnished as part of the equip-

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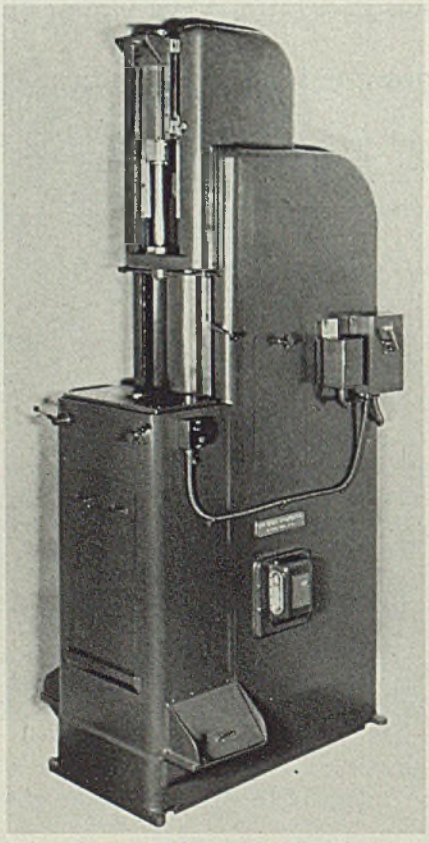
STEEL CASTINGS

ment. When hardening straight teeth, the roll motion is locked out of action.

Pull-Down Type Broaching Machines

■ Colonial Broach Co., 147 Jos. Campau avenue, Detroit, announces a complete line of standard size pull-down broaching machines ranging from 3 to 20 tons capacity and from 24 to 60-inch stroke. Units in the line provide completely automatic handling of the broach, through the use of a hydraulic handling mechanism located at the top of the column. In the operating



cycle the broach is held at the top of its stroke by the handling mechanism and is uncoupled at the bottom to permit placing the part in position on the platen. Length of stroke is adjusted by means of stops on the column. Manual operation is standard. The drive is hydraulic, fully enclosed. Speeds are variable, normally 30 feet per minute down and 60 feet per minute on the return stroke.

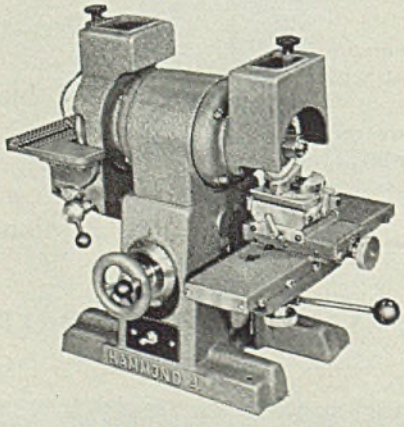
Material Tank

■ Paasche Airbrush Co., 1909 Diversey Parkway, Chicago, has introduced a new light duty special feed material tank capable of holding a pressure up to 50 pounds. It utilizes the same safety valve used on high pressure tanks. All fittings have standard ¼-inch pipe thread. For the time, this unit is supplied only in a 2-gallon capacity. Other features include a full size 6-inch opening that makes cleaning easy, a Clamptight cover which is

easily taken off and placed back on the tank in less than 15 seconds, an accurate pressure regulator with large easy-to-read gage and a large fluid tube with strainer.

Chip-Breaker Grinder

■ Hammond Machinery Builders Inc., 1611 Douglas avenue, Kalamazoo, Mich., announces a new machine for grinding chip-breaker grooves in carbide tools. It has a 4-inch peripheral diamond wheel and is built around a new type universal angle tool vise. The latter provides three separate planes of adjustment in setting the grinding angle. It consists of two closely machined steel blocks rounded on the bottom, cradled into each other at right angles and "frozen" together after adjustment by cam locks operating in segments located on ends of the respective blocks. Mounted on top of these blocks is a flat, circular piece which swivels 90 degrees from center of any of the four sides of the block below. This carries the vise jaws, holding tools firmly with screws. After the tool has been mounted in the vise, the entire unit is cranked upward into contact with the grinding wheel by a calibrated hand wheel at front of the machine. The vise is mounted onto the re-



ciprocating table below and cross-feeds in and out from the machine base. The table reciprocates at right angles to base of the machine, actuated by the lever directly below to accomplish desired grooving. For wet grinding, a coolant tank is mounted over the wheel with flow controlled by a needle valve. The grinding assembly on the left side of the machine may be used for rough or finish grinding using a 6-inch silicon carbide or diamond cup wheel mounted on the machine's left hand spindle. An integral wheel guard and coolant tank is mounted over the wheel. Also, a tilting work table, slotted for protractor angle-guide and fitted with sludge pan underneath, is mounted on a heavy 1¾-inch machined shaft extending from left side of the machine base. To change wheels, the entire unit may be slid off supporting shaft by loosening one clamp. The grinder is powered with a ball-bearing, ½-horsepower motor developing 3450 revolutions per minute. It is furnished either as a bench or floor type.

Circular Chart Potentiometer Pyrometer

■ Brown Instrument Co., Wayne and Roberts avenues, Philadelphia, announces a new circular chart

potentiometer—a new type of self-balancing instrument for indicating and recording temperature. Although it employs the null-point potentiometer measuring circuit, its balancing system is entirely new. The system is continuous, has no galvanometer and is extremely sensitive to minute temperature changes. All of its live parts are enclosed. Its sensitivity may be adjusted for correct operation on any standard pyrometer range, thus making all amplifiers interchangeable. Its balancing motor is a brushless, reversible induction unit having ample power to drive pen, pointer and slide wire. The instrument is enclosed in a rectangular case fitted with rigid die-case door.

High Quality Steel

(*Continued from Page* 90)

The main variances are the high magnesia and the low lime and iron content of the dead burned magnesite while the high iron refractory has a lower magnesia content and much higher lime and iron content, as shown in Table II. Slag additions equalize these differences somewhat in the actual bottom composition.

In the original refractories the main differences are that the dead burned magnesite is composed almost entirely of periclase, forsterite and monticellite, whereas the high iron material is of periclase, crystallized lime and calcium ferrite in large amounts, and small amount of di-calcium silicate. The fusion points of both bottoms when properly installed are well above that of open-hearth temperature, hence there appears no practical difference in the refractoriness under current open-hearth conditions. Figs. 2 and 3 are photomicrographs at 100X of samples obtained from two different furnace bottoms made-up of identical material.

In actual furnace operation the care and maintenance of furnace bottoms is more important than its initial installation. After tapping a heat the bottom must be thoroughly drained and dried before charging another heat. If any holes, etc., are present they must be filled while making up the bottom and banks regardless of the time element. A few minutes may be saved by poor workmanship on the bottom dressing but a more severe condition will develop on a later heat of steel which may result in a greater loss of time or even develop into a bad boil, bottom action or even breaking through.

Melting time is definitely controlled by speed of charging. Many operators endeavor to shorten time of heat by saving time during the finishing and refining periods. This is undesirable because only 10 to 20 minutes could be saved. So within the jurisdiction of the open-hearth operator's control the greatest source of economy lies in the efficiency of charging.

Entails Various Factors

Factors involved in charging include the type of charge; time to tons per furnace hour; high metal heats where all iron is charge molten, or part molten and part pig; medium iron charge, or scrap and carburized charge; condition of the scrap; working schedule for furnace; and, the grades and quality per grade of steel to be made. Productive capacity, however, fluctuates with operating conditions and age of the individual furnace.

Condition of the scrap charge is of paramount importance in the economical production of high-quality, low-cost steel.*

Weights per buggy of four charging boxes are presented in Table III. It is evident that the number of boxes necessary for the different grades of scrap varies. Each increase in the number of boxes prolongs the charging time and thus decreases the tons per furnace hour and readily reflects in ingot cost per ton. With one type of scrap the charging time increased 48 minutes the melting time 43 minutes. Another type extended the charging time of 37 minutes and melting time 46 minutes. This comparison merely indicates the relation of tons per hour on the ultimate ingot cost. In many instances charging time may warrant extra labor in the scrap yard in order that greater weight can be put in each box.

In producing a specified grade of steel at the most economical cost, the first step is to establish a mix of scrap based on the cost of the different grades to attain the lowest composite cost but not to prolong the charging time to the extent of offsetting this saving. This feature of steelmaking is vital under normal operating conditions

* See STEEL, June 28, p.62 and July 7, p. 68.

The NEWS DEFENSE EDITION

VOLUME X NUMBER X JULY 1941 CLEVELAND, OHIO

NORTH AMERICAN FIRES GAS OR OIL IN SAME EQUIPMENT

FOR DIFFERENT TEMPERATURES ON SAME FURNACE

The system will burn gas during low temperature operations and oil during high temperature operations on the same furnace. This change can be made by simply opening and closing valves.

FOR DIFFERENT SEASONS

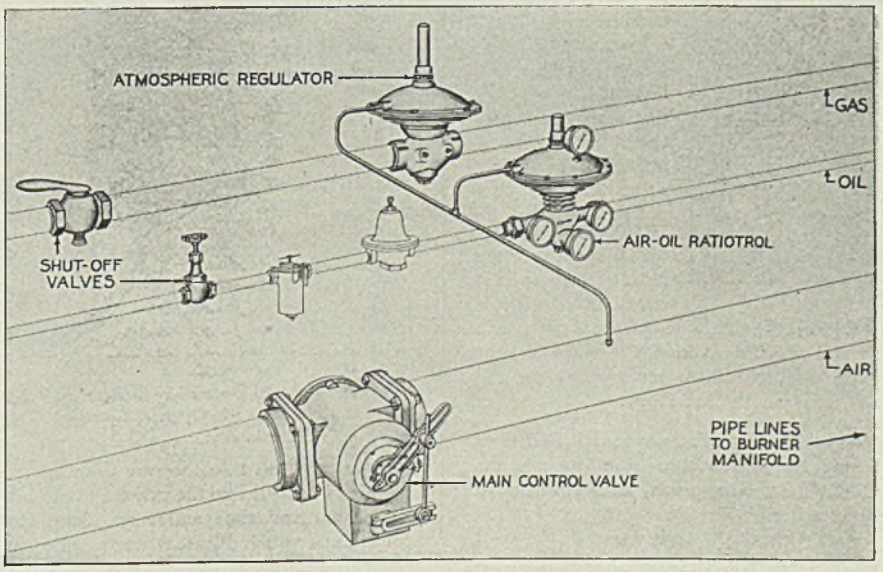
Many Gas Companies furnish gas at an especially attractive rate when used on an off-peak contract. The above system fills the requirements of standby equipment and simplicity of changeover. It is also being used by farsighted plant managers who fear that world conditions may change their fuel position.

SIMILAR FLAME CHARACTERISTICS WITH EITHER FUEL POSSIBLE

By changing the insert of the standard Luminous Flame gas burners, a low pressure air atomizing oil burner can be provided. The same air valve controls the air and gas or oil supplied to the burners.

One Air Valve Controls Fire For Any Number Burners Either Gas or Oil

Fuel-Air Ratio Automatically Controlled By Pressures



In the North American pressure system of proportioning, the oil or gas is directly proportional to the air pressure on the downstream side of the main air control valve. Thus, air or fuel pressure variation, or number of burners in operation have no effect on fuel-air ratio, and thus maximum efficiencies are maintained.

Furthermore, the firing rate or fuel-air ratio of any burner can be changed in respect to the other burners without affecting their fuel-air ratio.

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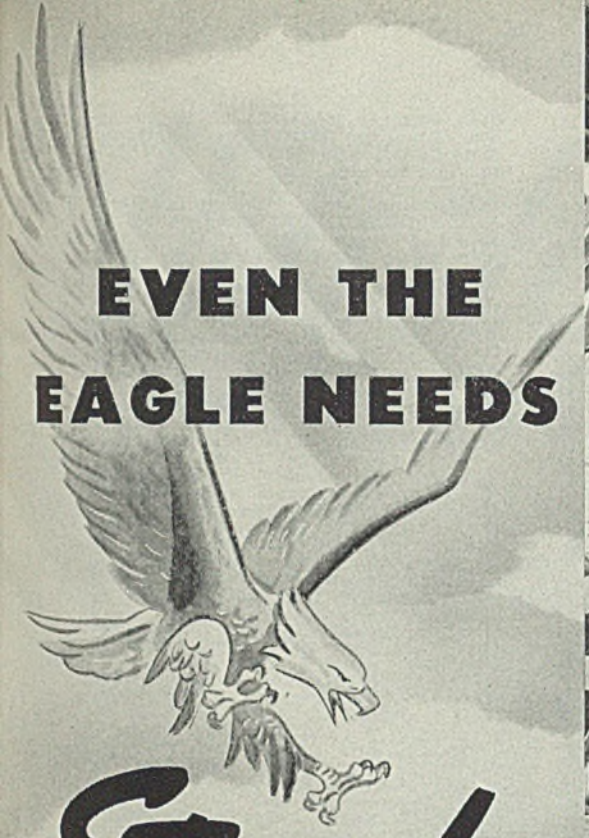
EVEN THE EAGLE NEEDS



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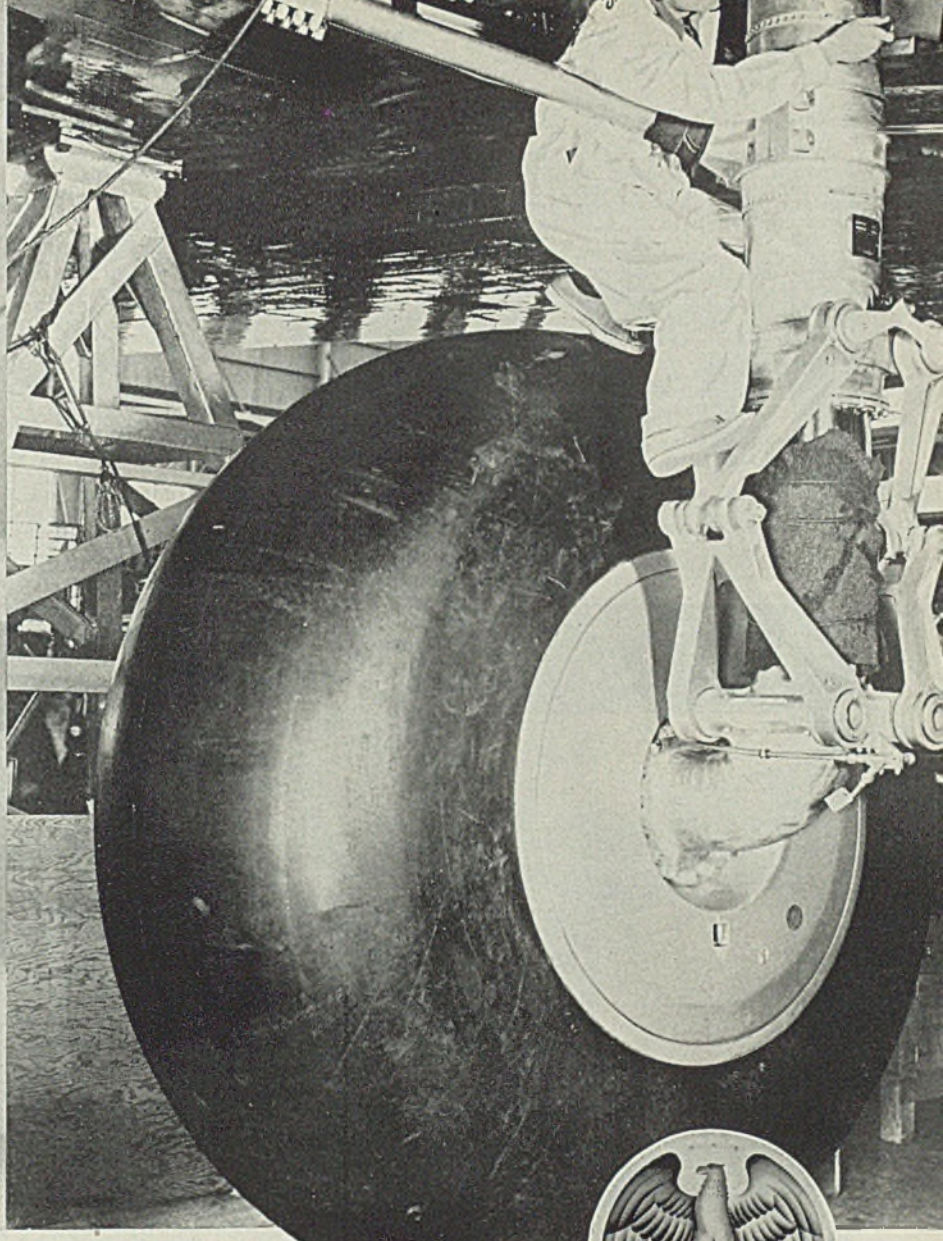

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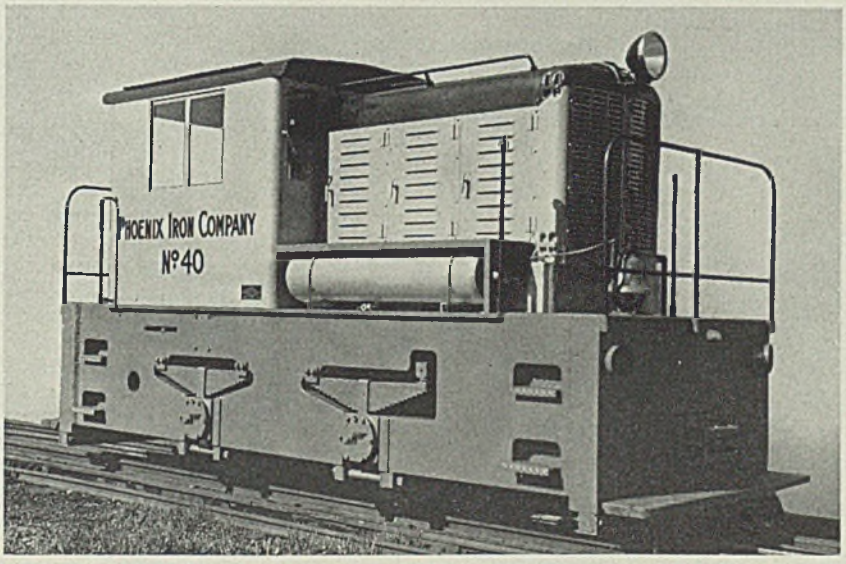

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Reconditioned Machines

(*Continued from Page* 55)

their delicate sense of touch. Most of the others have to go through concentrated courses of training to fit them for their new duties and increased responsibilities. In other words, members of both these groups have to be put through a mental and physical reconditioning process which involves considerable expenditure of time and money, but which is well worth the cost under existing circumstances.

All the while that these highly commendable personnel reconditioning activities are going on, some of these same companies undoubtedly have at their command two classes of machine tools comparable in a way to the two classes of men just mentioned, but of which they are not making effective use, as they are in the case of the men.

Old Machines Needed Now

One class—which can be compared to the elderly craftsmen who have been in retirement—is represented by those older tools which also were retired during less hectic times and put in storage. In normal times these machines probably never would go back into active service on production, having been replaced by newer, faster and usually fewer machines of improved design. However, these are not normal times. The services of those older machines are sorely needed for the time being at least. Why then are they still in storage?

One answer is that too casual study of the governmental plan for limiting prices of used machine tools gives owners of the stored machines an entirely wrong slant on the "as is" value of this inactive equipment. They fail to take into account the fact that in terms of modern manufacturing demands, these stored machines seldom are even in "usable condition." Otherwise it would be perfectly obvious that before they deserve anything like the peak price within the legal ceiling, they must be thoroughly reconditioned.

When professional machine tool rebuilding organizations have approached certain companies with the idea of purchasing such stored or inactive machines for thorough reconditioning and resale, the owners of the machines have taken a look at the OPACS price schedule and thereupon have set prices on the machines which allow entirely insufficient room between the "floor" and the "ceiling" for the rebuilder to do any kind of a worthwhile job on them and then resell them at a fair profit. The result has been either that the machines continue to gather rust and dust or that they fall into the hands of those who will not do a proper reconditioning job on them.

In either case a false idea of the value of these machines in the mind of their owner—an idea based upon a wholly wrong interpretation of the OPACS price schedule—

keeps him or someone else from getting the benefit of these machines at a time when they are so critically needed. One of these days the owner who hoards used machines will find himself with a storehouse full of trouble instead of a storehouse full of speculative assets. Uncle Sam has uncanny ability to seek out those who misunderstand or misinterpret his rules and regulations—especially those who twist them around to ends of personal gain at a time of national emergency.

It is in order at this point to quote briefly from the official statement released at the time when the rules and regulations in question originally were announced:

Says Prices Are Liberal

"Mr. Henderson explains that his action initiates a program which will be extended where necessary to assert the full force of the federal government, including the power of commandeering and requisitioning, to protect the public interests against those seeking to profit exorbitantly on defense requirements. It will also serve, he says, to expose their activities to the congress and to the public in general.

"Mr. Henderson emphasizes that the prices set forth in the directive are 'ceiling' or maximum prices; that they not only are reasonable but liberal, and that sales may and should be made below the ceiling.

"The underlying purposes of this schedule," according to Mr. Henderson, "are to establish fair price standards which will enable the great bulk of industry to co-operate with the government in maintaining price stability, and to single out those who wish to grow fat on the defense program."

The safe and sensible thing to do—and certainly the patriotic thing to do—is to get stored or inactive machines "back into circulation" as soon as possible by setting prices upon them which will enable reputable rebuilders—after reconditioning them—to resell them within OPACS limits, at a fair profit. Either that, or let the owner himself make a deal with a rebuilding organization to put these machines into first-class shape for active use in his own shop—if that is the quickest way to get them going on defense work.

Another class of used machine tools—which can be compared to that class of workmen who have been on the payroll right along on routine work, but who have within them what it takes to handle larger responsibilities—is represented by machines now actively in use on ordinary work, but which could be "upgraded" through rebuilding to do out-of-the-ordinary work associated with temporarily unobtainable new machines of latest model. This is true particularly in the case horizontal boring mills, large lath planers and certain other vital m chine tools of which the prese scarcity is serious and growi more so day by day.

For example, through the mi istrations of competent rebuilder the original accuracy of such m chines not only can be restored o even improved upon, but also thei capacities in many instances ca be increased to handle work large than that for which they originall were designed. Planers can be en larged by blocking out the hous ings to permit wider work to pas between them and lathes can b given increased swing by raising head and tailstocks and rebuilding carriage and feed works to suit this increased swing.

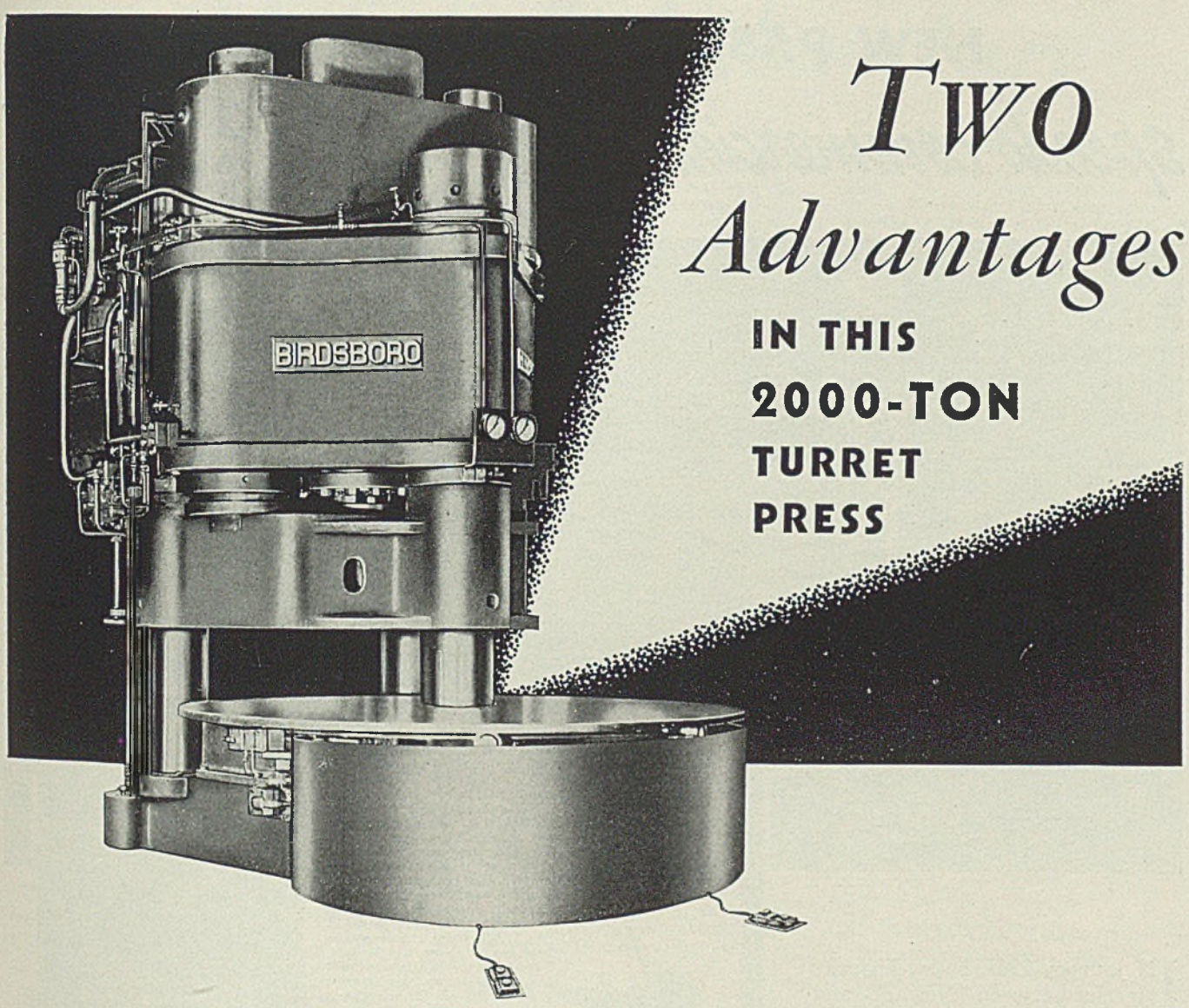
Changes such as these require engineering ingenuity and skill in the shop comparable to that of engineers and craftsmen engaged in designing and building new machine tools. Obviously such work should be entrusted only to rebuilding organizations known to have that kind of talent and skill, and shop equipment to make it effective. In ordinary times elaborate jobs of this kind are not very often justified. They are so costly that it usually is better to invest the money in a new machine of the size and type required. However, as we have said before these are no ordinary times.

Wishful thinking today about new tools which cannot be obtained until next year or the year after is no substitute for immediate action which—through co-operation of a smart rebuilder—will make available, within say two or three weeks, "upgraded" machines which will deliver the goods without further ado and so eliminate another of those much talked of bottlenecks in the defense program.

Develops Fast Finish For Machine Tools

■ A new and faster synthetic enamel developed recently by Sherwin-Williams Co., 101 Prospect avenue, Cleveland, is said to cut hours and even days from the finishing time formerly required on large machine tools, giving far greater resistance to cutting compounds.

Known as Kem machine tool enamel, the finish can be applied in 5¾ to 8½ hours, permitting work to be shipped the same day it is finished and assembled. A typical drying schedule is as follows. First: spray or brush coat zinc chromate primer, 15 to 30 minutes; second: machine filler, 4 to 5 hours; third: Kem sealer gray, 15 to 30 minutes; fourth: Kem machine tool gray, 15 to 30 minutes; dry and crated 1 to 2 hours.



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Like so many Birdsboro presses, this press was built to meet the demands of National Defense. When the emergency is over, it will be equally suited to economical production of domestic products.

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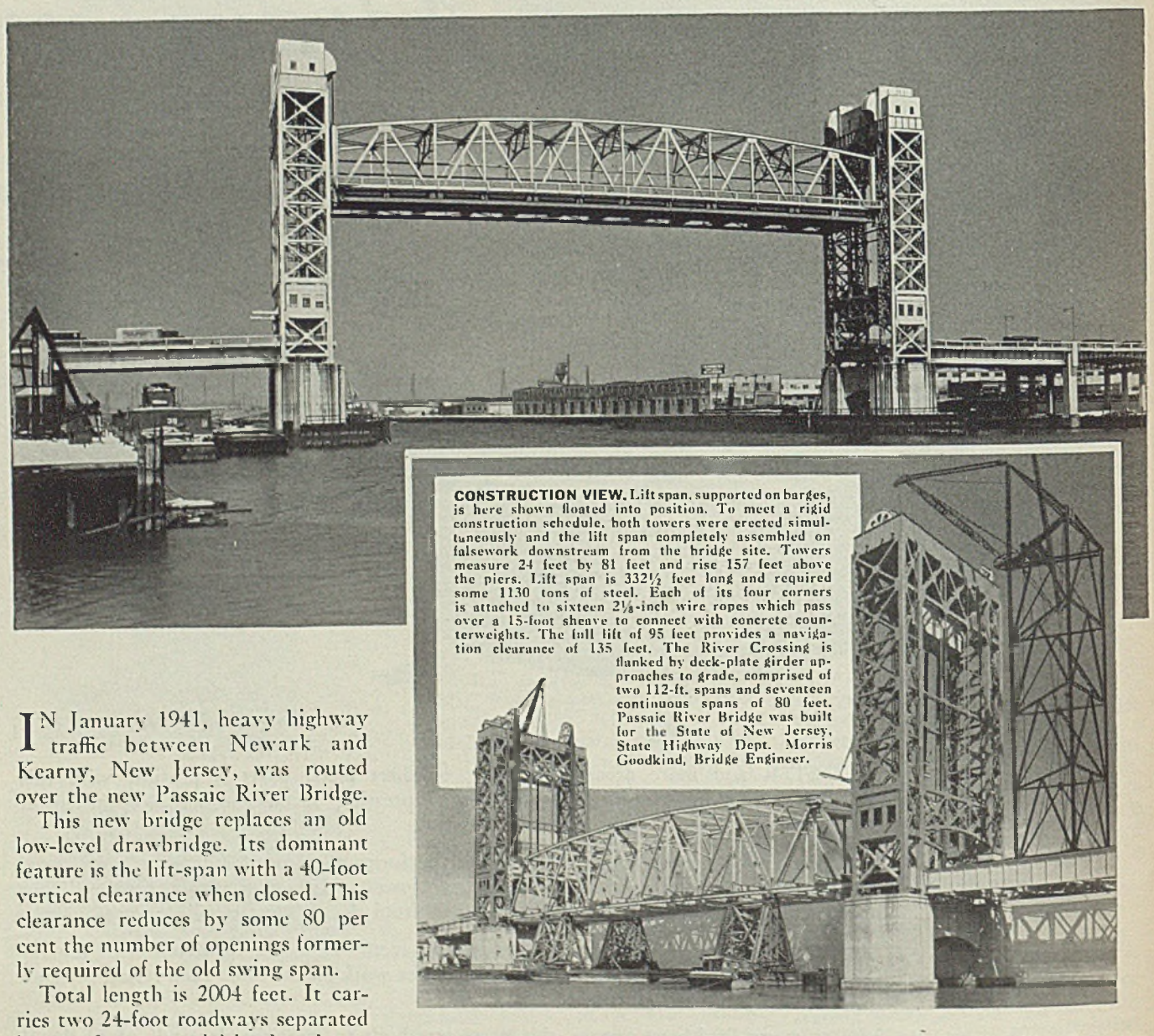

CONSTRUCTION VIEW. Lift span, supported on barges, is here shown floated into position. To meet a rigid construction schedule, both towers were erected simultaneously and the lift span completely assembled on falsework downstream from the bridge site. Towers measure 24 feet by 81 feet and rise 157 feet above the piers. Lift span is 332½ feet long and required some 1130 tons of steel. Each of its four corners is attached to sixteen 2⅛-inch wire ropes which pass over a 15-foot sheave to connect with concrete counterweights. The full lift of 95 feet provides a navigation clearance of 135 feet. The River Crossing is flanked by deck-plate girder approaches to grade, comprised of two 112-ft. spans and seventeen continuous spans of 80 feet. Passaic River Bridge was built for the State of New Jersey, State Highway Dept. Morris Goodkind, Bridge Engineer.

IN January 1941, heavy highway traffic between Newark and Kearny, New Jersey, was routed over the new Passaic River Bridge.

This new bridge replaces an old low-level drawbridge. Its dominant feature is the lift-span with a 40-foot vertical clearance when closed. This clearance reduces by some 80 per cent the number of openings formerly required of the old swing span.

Total length is 2004 feet. It carries two 24-foot roadways separated by a 4-foot central island and two 2½-foot sidewalks. The lift-span roadways are of the open-type steel grating.

American Bridge Company contracted for the completed superstructure exclusive of concrete roadways but including sheaves, ropes, counterweights, operating machinery, electrical equipment, railings, housings and access elevators. It also took care of the removal and disposal of the steelwork in the old swing span and its approaches.

However large or small or difficult the construction undertaking, American Bridge Company welcomes the opportunity to serve.

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Helpful Literature

1. Solenoid

John S. Barnes Corp.—Data sheet gives information on improved solenoid designed primarily for machine tool use. List of features is tabulated together with engineering data, dimensional drawings, and current and pull curve.

2. Flexible Bearings

Harris Products Co.—8-page illustrated bulletin on "Torflex" flexible bearings includes general engineering data and gives operating characteristics for standard size units. Typical applications of these bearings are shown for compensation of radial and axial deflections and for elimination of vibration.

3. Concrete Patch

Smooth-On Manufacturing Co.—Illustrated folder explains how to waterproof and patch concrete walls and floors with "Smooth-On". How to stop seepage on inside of cellars and cisterns is shown. Method of dust proofing and waterproofing floors is explained, as is repairing of cracks and holes in concrete.

4. Wire Cloth

Buffalo Wire Works Co.—48-page "Stock List of Wire Cloth" is issued monthly and lists stock of complete line of wire cloth. Aluminum, brass, bronze, copper, tinned, galvanized, monel, nichrome, phosphor, steel, stainless steel and strainer wire cloth are some of types available.

5. Clutches

Carlyle Johnson Machine Co.—6-page bulletin comprises 12 line drawings showing design of "Maxitorq" single multi-disc clutches. Dimensions, construction features and other information are indicated.

6. Electric Heating

General Electric Co.—8-page illustrated bulletin is quarterly publication devoted to applications of electric heat in industry. Current issue covers features, composition and uses of "Drycolene" protective furnace atmosphere, and several applications of electric strip heaters. Action photographs and flowsheets amplify text.

7. Fans

Emerson Electric Manufacturing Co.—28-page illustrated catalog No. X4049 describes complete line of fans for every purpose. Desk and stand fans, ceiling fans, window ventilating fans and air circulators are shown. Construction features, performance data and prices are given for all models.

8. Ferro-Alloys

Electro Metallurgical Co.—24-page pocket size booklet contains descriptions and suggestions for uses of recently developed "Electromet" ferro-alloys and metals as well as those already in extensive use. It also contains data on chromium, manganese, silicon, calcium, vanadium, tungsten, zirconium, columbium and boron.

9. Master Feed Fingers

Hardinge Brothers, Inc.—4-page illustrated bulletin on "Morrison" style B master feed fingers and pads describes these units which have interchangeable pads to suit all materials and classes of screw machine work. Advantages of these devices are explained.

10. Temperature Controls

Brown Instrument Co.—Three-fold broadside, "All-out Production," is descriptive of general line of indicating, recording, electric and air-operated controllers. Instruments, control valves, and miscellaneous temperature equipment is covered briefly.

11. Magnetic Minerology

Dings Magnetic Separator Co.—8-page illustrated bulletin covers cobbing, crusher protection, concentration, purification and other applications of magnetic equipment in ore treating. Line drawings, installation photographs and tables supplement text in describing these operations.

12. Titanium Alloys

Titanium Alloy Manufacturing Co.—113-page illustrated handbook, "Titanium and Its Use in Steel," is guide to properties of titanium, its effect as compared with other deoxidizers, and its use in all types of steels. Available alloys are listed. Function of titanium in steel is explained.

13. Diesel Engine

Caterpillar Tractor Co.—8-page illustrated bulletin No. 6537 tells how problem of low-cost dependable standby power has been solved by medium-speed heavy-duty diesel engine. Several successful installations are described briefly and illustrated.

14. Hydraulic Lift Truck

Lyon Iron Works—4-page illustrated bulletin No. 123 gives specifications and outlines features of hydraulic lift trucks which handle material fast and easily. Four capacities, ranging from 2500 to 6000 pounds, are available with standard 3-inch lift. Higher capacities and greater lifts are available on order.

15. Process Equipment

H. K. Porter Co.—28-page illustrated catalog No. 101 lists complete line of process equipment, including agitators, blenders, mixers, digesters, kettles, ball mills and pebble mills. Each unit is described and complete specifications given on available sizes.

16. Coal Preparation

Koppers-Rheolaveur Co.—8-page illustrated bulletin No. E-7616 describes "Koppers-Rheolaveur" coarse coal preparation equipment for improving quality and uniformity of coal. Operating principle, technical data and typical applications are included.

17. Industrial Brakes

Wagner Electric Corp.—24-page illustrated bulletin No. LU-20 contains complete data on hydraulic bridge braking systems, including straight hydraulic type and type HM which, in addition to being hydraulically actuated, has spring applied magnetic release parking brake attachment. Devices are applicable to traveling cranes, coke pushers, door machines, transfer cars and similar equipment.

18. Concrete Refractory

Atlas Lumnite Cement Co.—18-page article is a reprint from trade journal on subject of "Structural Design of Refractory Concrete." Product differs from structural concrete in that calcium aluminate cement and refractory aggregates are used instead of portland cement, sand and gravel or stone. It is used for continuous exposure to temperature as high as 3000 degrees Fahr. Charts, drawings and photographs accompany article.

19. Laminated Plastics

Continental-Diamond Fibre Co.—8-page illustrated bulletin, "What Material?" lists and describes in detail five laminated materials which combine high mechanical, electrical and thermal properties. "Dilecto," "Vulcanized Fibre," "Micabond," "Celeron" and "Vulcoid" are shown being fabricated, machined and used for variety of purposes. Tables list standard forms and sizes.

20. Electric Welder

Lincoln Electric Co.—4-page illustrated welder specification bulletin No. 338 is descriptive of "Shield-Arc Jr." aircraft welders with dual continuous control in ratings of 150 and 200 amperes. This unit provides accurate arc control for welding all thicknesses of alloys and is highly adaptable for aircraft work.

STEEL *Readers' Service Dept.*

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21. Honing Machine

Sunnen Products Co.—12-page illustrated bulletin describes precision honing equipment for internal honing. Equipment is pictured, and features and operation outlined. Line drawings, photomicrographs, profilographs, and tables supplement text. Several pages are devoted to descriptions of typical applications in industry.

22. Power Shovel Dippers

American Manganese Steel division of American Brake Shoe & Foundry Co.—22-page illustrated bulletin No. 641-D is devoted to power shovel dippers and dipper lips made of manganese steel. Evolution of design, features and construction are discussed. Many of standard and special types of shovels are pictured with brief explanations of each. One section is devoted to manganese steel—its properties, composition and physical properties.

23. Air Cleaning

Westinghouse Electric & Manufacturing Co.—4-page illustrated bulletin No. F-8501 explains operating principle and application of "Precipitron" electrostatic air cleaner which has guaranteed efficiency of 85 to 90 per cent on installations cleaning normal atmospheric air. It finds wide application wherever dirt and dust is problem and where ventilating or air conditioning systems circulate air.

24. Oil Burners

Fisher Furnace Co.—4-page illustrated bulletin No. 200 is entitled, "Oil Burners for Industrial Applications." Burner and blower ratings are given for units firing from 1 to 40 gallons per hour. Burners feature simplified construction and are said to handle heavy and light fuel oils with equal facility. Units are applicable to heat treating furnaces, annealing ovens, forging furnaces, kilns and boilers.

25. Piping Pointers

Crane Co.—6-page illustrated bulletin No. AD-1482 is first of series on how to keep plants going without interruption. It tells, in series of line drawings, how to handle pipe, how to make up valve and nipple, correct sizes of wrenches to use, correct sequence for tightening valve bolts, and other hints on piping.

26. High Speed Steel

Allegheny Ludlum Steel Corp.—4-page bulletin No. B-33 covers "DBL" high speed steel. General description, data on hardening and tempering with general instructions, specific gravity, critical points and other information on properties are given. Two photomicrographs show typical hardened structure and typical hardened and drawn structure.

27. Truck Batteries

Electric Storage Battery Co.—4-page illustrated bulletin No. 4100 is entitled, "The Exide System for Better Material Handling." Analysis of material handling and means for improving industrial truck performance are explained. Use of discharge indicator and charge control unit are shown.

28. Vibration Isolation

Lord Manufacturing Co.—Colored vibration isolation chart illustrates percentage of vibration isolation it is possible to obtain in flexibly mounted assembly with any combination of static deflection and disturbing frequencies. Typical bonded rubber mountings and products are shown.

29. Fuses

Monarch Fuse Co.—Illustrated folder on "Monarch" renewable fuses shows construction features of these units. "Mon-O-Lag" links are available with label service up to 600 amperes at 250 to 600 volts. Knife blade members are assembled to fiber bar, thus providing rigid blade alignment.

30. Rotary Shears

Quickwork Whiting division, Whiting Corp.—8-page illustrated bulletin on "Quickwork Whiting" rotary shears describes machines, with capacities up to 1-inch mild steel, which will cut straight lines, openings, odd shapes, narrow strips, bevels, circles, and will form flanges and joggle.

31. Compressors

Worthington Pump & Machinery Corp.—18-page illustrated bulletin No. S-550 B19 is descriptive of angle engine-compressor for refineries, gas transportation, gas or air lift pumping, repressuring, refrigeration plants, pressure maintenance and general air supply. Nine sizes of these type LTC units are available, ranging from 150 to 1000 brake horsepower.

32. Materials Handling

American MonoRail Co.—48-page illustrated catalog, "How Handling Problems Have Been Solved With American Monorail," contains numerous action photographs depicting typical monorail installations. Construction and design of rails, truss and girder rails, switches, trolleys and load suspension are discussed in detail.

33. Band Saw

Wells Manufacturing Corp.—4-page illustrated bulletin No. 175 presents complete information on two sizes of metal cutting band saws. No. 8 has capacity of 8 x 16-inch rectangular stock, 8-inch diameter rounds or 5 x 24-inch stock with special bowed guides. No. 5 will accommodate 5 x 10-inch rectangular stock or 5-inch diameter rounds.

34. Carbon Steels

Peter A. Frasse & Co.—File card size cardboard chart shows government specifications for carbon steels. It is digest of 17 Army and Navy specifications showing class, chemical analysis, form and corresponding SAE grade for each specification number.

35. Polarizing Microscopes

Spencer Lens Co.—26-page illustrated bulletin announces new series of polarizing microscopes. Six instruments ranging from usual chemical microscopes to large research instruments for petrography are described and illustrated with full page photographs. Details of construction and operation are given together with prices and lists of available accessories.

36. Honing Machine

Micromatic Hone Corp.—16-page illustrated bulletin No. AR-60 is descriptive of new "Micromatic Hydrohoners" with automatic microsize control for microfinishing parts ¼ to 2 inches in diameter in high production. Typical parts handled, design features and application data are given.

37. Switchgear

Allis-Chalmers Mfg. Co.—24-page illustrated bulletin No. B6012A deals with modern switchgear equipment for application wherever electricity is used or produced. It portrays special construction features, advantages, installation views, outline drawings, circuit diagrams and dimensions.

38. Open Steel Floors

Open Steel Flooring Institute, Inc.—12-page illustrated handbook, "New Ideas in Functional Floor Design," is written for architects and engineers. It is guide to uses and properties of open steel grating for floor, stair tread, walkway, ventilator, sidewalk grating and platform construction.

39. Hydraulic Presses

A. B. Farquhar Co.—16-page illustrated bulletin No. 41-H-02 presents specifications and application information on hydraulic presses. Types covered include bench type, powder presses, general purpose units, special presses, metal forming machines and straightening presses.

40. Fluorescent Lighting

Hygrade Sylvania Corp.—4-page illustrated bulletin on "Hygrade Miralumes" describes various types of these fluorescent lighting fixtures for continuous row industrial lighting. Complete specifications are given and application information is included for guidance in selecting proper units.

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Some Steel Consuming Plants Are Pinched

However most continue to receive adequate supplies. Scrap collection is in the making. Pool and priorities are ruled for pig iron.

MARKET IN TABLOID ★

Demand
Brisk but tapering in some commodities.

Prices
Revisions upward in certain scrap ceiling prices.

Production
Down ½ point at 98.

■ WHILE MANY manufacturers continue to live in fear of a curtailment of steel for production of civilian goods, that evil day has not yet arrived. Pinches are reported here and there but in only a few cases have they resulted in real distress. With defense needs rapidly mounting some interference with nondefense supply may be just around the corner. In the meantime some automobile builders plan to maintain output at substantially the present rate through September, and they are receiving steel in required volume.

Gravest factor in reference to the steel supply is the scrap shortage. Efforts are being made to organize scrap collection campaign, somewhat similar to the recent aluminum drive; large quantities are known to exist and it is believed that considerable tonnage could be brought to market simply by making the public scrap-conscious. In many cases it would be necessary to pay higher prices than now permissible. In the meantime scrap inventories continue to shrink. Some steel companies continue to operate full in the hope that somehow more scrap will become available. Unless more scrap materializes it is but a matter of time when the steel production rate will drop.

Current pinches appear worse in some regions than in others. Numerous consumers at Pacific Coast points where defense requirements are large complain of inability to get steel. Similar complaints are heard from consumers located in Southern Wisconsin. Contributory factor is that warehouse distributors who usually supply these consumers have much lower stocks than normal, averaging 2 to 3 months' instead of the 5 to 7 months' supply on hand at the beginning of the year. More and more is it necessary to obtain priority ratings to obtain shipment. Warehouse distributors continually study their stocks and in many cases fill needs through substitutions, as over-sized bars, which users machine down to smaller sizes, or floor plates in place of regular plates.

In many cases claims of steel shortages at consuming plants are found to be exaggerated. Important defense manufacturers complaining of plate shortages, for example, are found to have adequate plate stocks and their complaints have been based more on fears of the future than of the present.

Opening of books for 1942 has virtually been abandoned because of the many uncertainties and prospects of priorities upsetting schedules. In numerous cases where steelmakers had ostensibly opened next year's books they found consumers taking advantage, such as by ordering duplicates and triplicates of what had already been entered on books.

The most drastic government regulation so far affecting pig iron is M-17, "to conserve the supply and direct distribution." By this all iron consumers are to list for the coming month their contemplated distribution with respect to defense and nondefense. One of the features is the laying aside in a pool of a certain percentage of production, perhaps 5, for defense hot spots, or those which may arise at the last minute after formal allocations have been arranged, similar to that long prevailing in zinc and more recently copper. It is conceivable that final allocations may cut off supply of some of the lower priority ratings as well as nondefense, the pig iron shortage for the year being estimated by OPM as 5,000,000. Iron producers are inclined to lay this shortage to substitution of pig iron for scrap.

Edgemoor Iron Co., Delaware, inquires for up to 50,000 tons of shell bars in addition to 20,000 tons in the recent past. Edward G. Budd has ordered 6000 tons of cold drawn bars for 37-mm shells.

July pig iron production was a new high record for any month at 4,766,216 tons as against 4,551,040 tons in June. Average daily output was 153,749 tons. Furnaces in blast on July 31 were 212, a gain of 1.

Automobile production scheduled for the week Aug. 9 was 41,795 down 20,351, comparing with 12,635 in the like 1940 week.

Steel ingot output lost ½-point last week to 98 per cent of capacity. Declines set in as follows: Chicago ½-point to 100½ per cent, New England 1 point to 87, Cincinnati 4½ points to 87 and Cleveland 3½ points to 92½. Detroit gained 2 points to 89. The following districts were unchanged: St. Louis at 98, Eastern Pennsylvania at 95½, Pittsburgh at 100, Wheeling at 93, Buffalo at 90½, Birmingham at 90, and Youngstown at 98.

STEEL'S three composite price groups for last week were unchanged: iron and steel at $38.15, finished steel at $56.60 and steelworks scrap at $19.16.

COMPOSITE MARKET AVERAGES

	Aug. 9	Aug. 2	July 26	One Month Ago July, 1941	Three Months Ago May, 1941	One Year Ago Aug., 1940	Five Years Ago Aug., 1936
Iron and Steel	$38.15	$38.15	$38.15	$38.15	$38.15	$37.70	$33.88
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.60	53.40
Steelworks Scrap..	19.16	19.16	19.16	19.16	19.16	18.71	14.66

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

	Aug. 9, 1941	July 1941	May 1941	Aug. 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
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv. Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to $\frac{5}{16}$-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	Aug. 9, 1941	July 1941	May 1941	Aug. 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	31.34	31.09	30.34
Gray forge, del. Pittsburgh	24.19	24.19	24.19	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	125.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.00	$18.75
Heavy melt. steel, No. 2, E. Pa.	17.75	17.75	17.75	18.35
Heavy melting steel, Chicago	18.75	18.75	18.75	18.10
Rails for rolling, Chicago	22.25	22.25	22.25	22.00
No. 1 Cast, Chicago	20.00	21.50	21.50	16.75

Coke

Connellsville, furnace, ovens	$6.25	$6.25	$5.70	$4.75
Connellsville, foundry, ovens	7.25	7.25	6.30	5.75
Chicago, by-product fdry., del.	12.25	12.25	12.25	11.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. mill, carloads.

Sheets, Strip

Hot-Rolled Sheets

Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 2.10c
Granite City base 2.20c
Detroit, del. 2.20c
Pacific ports 2.65c

Cold-Rolled Sheets

Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base 3.05c
Granite City, base 3.15c
Detroit, del. 3.15c
Pacific ports 3.70c

Galvanized Sheets, No. 24

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c
Granite City, base 3.60c
Pacific ports 4.05c

Corrugated Galv. Sheets

Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c

Culvert Sheets

Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c
Copper iron 3.90c
Pure iron 3.95c
Zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c

Enameling Sheets

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage, base 2.75c
Granite City, base 2.85c
Pacific ports 3.40c
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c
Granite City, base 3.45c
Pacific ports 4.00c

Electrical Sheets, No. 24

	Pittsburgh Base	Pacific Ports	Granite City	Base Deliv. Mahoning Valley Points
Field gr.	3.20c	3.95c	3.30c	3.275c
Armat.	3.55c	4.30c	3.65c	3.625c
Elect.	4.05c	4.80c	4.15c	4.125c
Motor	4.95c	5.70c	5.05c	5.025c
Dynamo	5.65c	6.40c	5.75c	5.725c
Transformer				
72	6.15c	6.90c	.....	6.225c
65	7.15c	7.90c	.....	7.225c
58	7.65c	8.40c	.....	7.725c
52	8.45c	9.20c	.....	.....

Hot-Rolled Strip

Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c
Detroit, del. 2.20c
Pacific ports 2.75c

Cold-Rolled Strip

Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c
Chicago, base 2.90c
Worcester, base 3.00c
Detroit, del. 2.90c

Commodity C.R. Strip

Pittsburgh, Cleveland, Youngstown, base 3 tons and over 2.95c
Chicago, base 3.05c
Worcester, base 3.35c

Cold-Finished Spring Steel

Pittsburgh, Cleveland, base; add $4 for Worcester.
.26-.50 Carbon 2.80c
.51-.75 Carbon 4.30c
.76-1.00 Carbon 6.15c
Over 1.00 Carbon 8.35c

Chromium-Nickel Steels

Pittsburgh base, cents per lb.

No.	302	303	304	20% Clad 304
Bars	24.00	26.00	25.00	.....
Plates	27.00	29.00	29.00	*18.00
Sheets	34.00	36.00	36.00	19.00
H. R. strip	21.50	27.00	23.50	.....
C. R. strip	28.00	33.00	30.00	.....

Straight Chromium Steels

Pittsburgh base, cents per lb.

No.	410	416	430	442	446
Bars	18.50	19.00	19.00	22.50	27.50
Plates	21.50	22.00	22.00	25.50	30.50
Sheets	26.50	27.00	29.00	32.50	36.50
H. R. Strip	17.00	18.25	17.50-	24.00	35.00
C. R. strip	22.00	23.50	22.50	32.00	52.00

*Includes annealing and pickling.

Tin, Terne Plate

Tin Plate

Pittsburgh, Chicago, Gary, 100-lb. base box $5.00
Granite City $5.10

Tin Mill Black Plate

Pittsburgh, Chicago, Gary, base 29 gage and lighter 3.05c
Granite City 3.15c
Pacific ports, boxed 4.05c

Long Ternes

Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c

Manufacturing Ternes

Pittsburgh, Chicago, Gary, 100-base box $4.30
Granite City $4.40

Roofing Ternes

Pittsburgh base per 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

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c-2.54c
Philadelphia, del.	2.15c
Boston, delivered	2.42c-2.57c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.10c-2.35c
Sparrows Point, Md.	2.10c-2.35c
Claymont, Del.	2.10c-2.35c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast ports	2.65c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c

Gulf ports 3.70c
Pacific Coast ports 4.00c

Structural Shapes

Pittsburgh 2.10c
Philadelphia, del. 2.21½c
New York, del. 2.27c
Boston, delivered 2.41c
Bethlehem 2.10c
Chicago 2.10c
Cleveland, del. 2.30c
Buffalo 2.10c
Gulf ports 2.45c
Birmingham 2.10c
St. Louis, del. 2.34c
Pacific Coast ports ... 2.75c

Bars

Hot-Rolled Carbon Bars

Pittsburgh, Chicago, Gary, Cleve., Birm., base 20 tons one size..... 2.15c
Detroit, del. 2.25c
New York, del. 2.49c
Duluth, base 2.25c
Philadelphia, del. 2.47c
Gulf ports, dock..... 2.50c
All-rail 2.59c
Pac. ports, dock 2.80c
All-rail 3.25c

Rail Steel Bars

Pitts., Chicago, Gary, Cleveland, Birm., base 5 tons 2.15c
Detroit, del. 2.25c
New York, del. 2.49c
Philadelphia, del. 2.47c
Gulf ports, dock 2.50c
All-rail 2.59c
Pac. ports, dock 2.80c
All-rail 3.25c

Hot-Rolled Alloy Bars

Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size 2.70c
Detroit 2.80c

Alloy S.A.E.	Diff.	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 .15-25 Mo			0.55
4600 0.20-0.30 Mo.; 1.50-2.00 Ni.			1.20
5100 80-1.10 Cr.			0.45
5100 Spr. flats			0.15
6100 Bars			1.20
6100 Spr. flats			0.85
Carb., Van.			0.85
9200 Spr. flats			0.15
9200 Spr. rounds, squares			0.40
T1300, Mn, mean 1.51-2.00			0.10
Do., carbon under 0.20 max.			0.35

Cold-Finished Carbon Bars

Pitts., Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs. 2.65c
Detroit 2.70c

Cold-Finished Alloy Bars

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c
Detroit 3.45c
Galveston, add $0.25; Pacific Coast, $0.50.

Turned, Ground Shafting

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c
Detroit 2.70c

Reinforcing Bars (*New Billet*)

Pittsburgh, Chicago, Gary, Cleveland, Birm., Sparrows Point, Buffalo, Youngstown, base..... 2.15c
Gulf ports, dock..... 2.50c
All-rail 2.59c
Pacific ports, dock 2.80c
All-rail 3.25c
Detroit, del. 2.25c

Reinforcing Bars (*Rail Steel*)

Pittsburgh, Chicago, Gary, Cleveland, Birm., base. 2.15c
Gulf ports, dock 2.50c
All-rail 2.59c
Pac. ports, dock 2.80c
All-rail 3.25c

Iron Bars

Philadelphia, com. del. 3.06-3.50c
Pittsburgh, muck bar, .. 5.00c
Pittsburgh, staybolt 8.00c
Terre Haute com., f.o.b. mill 2.15c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails $2.55
(Per Pound)
Polished fence staples .. 2.55c
Annealed fence wire.... 3.05c
Galv. fence wire 3.40c
Woven wire fencing (base C. L. column) 67
Single loop bale ties, (base C.L. column) ... 59
Galv. barbed wire, 80-rod spools, base column . 70
Twisted barbless wire, column 70

To Manufacturing Trade

Base, Pitts.-Cleve.-Chicago Birmingham (except spring wire)

Bright bess., basic wire . 2.60c
Galvanized wire 2.60c
Spring wire 3.20c
Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh, keg $3.85

Alloy Plates (Hot)

Pittsburgh, Chicago, Coatesville, Pa. 3.50c

Rails, Fastenings

(Gross Tons)

Standard rails, mill $40.00
Relay rails, Pittsburgh 20—100 lbs. 32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham. $40.00
Do., rerolling quality .. 39.00

Cents per pound

Angle bars, billet, mills. 2.70c
Do., axle steel 2.35c
Spikes, R. R. base 3.00c
Track bolts, base 4.75c
Do., heat treated..... 5.00c
Car axles forged, Pitts., Chicago, Birmingham. 3.15c
Tie plates, base 2.15c
Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller.....65½ off
Do., ⅞ and ⅝ x 6-in. and shorter.....63½ off
Do., ¾ to 1 x 6-in. and shorter .....61 off
1⅛ and larger, all lengths 59 off
All diameters, over 6-in. long .....59 off
Tire bolts .....50 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.
Step bolts .....56 off
Plow bolts .....65 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
⅝-inch and less.	62	64
⅞ 1-inch	59	60
1⅛ 1½-inch	57	58
1⅝ and larger..	56	..

Hexagon Cap Screws

Upset 1-in., smaller .....64 off

Square Head Set Screws

Upset, 1-in., smaller.....71 off
Headless set screws.....60 off

Piling

Pitts., Chgo., Buffalo .. 2.40c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural 3.75c
⅞ inch and under.....65-5 off
Wrought wasners, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. .....$4.00 off

Tool Steels

Pittsburgh base, cents per lb.

Carb. Std.. 10.50 Oil-hardening .. 24.00
Carb. Reg. 14.00
Carb. Ext. 18.00 High car.-chr. 43.00
Carb. Spec. 22.00

High Speed Tool Steels

Tung.	Chr.	Van.	Moly.	
18.00	4	1	...	67.00
18.00	4	2	1	77.00
18.00	4	3	1	87.00
1.50	4	1	8.50	54.00
...	4	2	8	54.00
5.50-6.00	4	1.50	4-5.50	57.50

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut-lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O.D.	13	$ 9.72	$23.71
1¾" O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼" O.D.	13	13.79	21.68
2¼" O.D.	12	15.16	
2½" O.D.	12	16.58	26.57
2¾" O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½" O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O.D.	13	$ 7.82	$ 9.01
1¼" O.D.	13	9.26	10.67
1½" O.D.	13	10.23	11.79
1¾" O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼" O.D.	13	14.54	16.76
2½" 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

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.	Steel Blk.	Steel Galv.
⅛	63½	51
¼	66½	55
1—3	68½	57½
	Iron	
¼	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, Plain Ends

	Steel
1 to 3, butt weld.....	71½
2, lap weld	64
2½ to 3, lap weld.....	67
3½ to 6, lap weld.....	69
7 and 8, lap weld.....	68

Seamless, 3 pts. lower discount.

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 ⅞-in. incl. 2.15
Worcester up $0.10; Galveston up $0.25; Pacific Coast up $0.50.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt. 1.90c

Shell Steel

Pittsburgh, Chicago, base, 1000 tons of one size, open hearth

3-12-inch $52.00
12-18-inch 54.00
18-inch and over 56.00

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur... $6.00- 6.25
Connellsville, fdry.. 7.00- 7.50
Connell. prem. fdry. 7.25- 7.60
New River fdry. ... 8.00- 8.25
Wise county fdry. .. 7.50
Wise county fur. .. 6.50

By-Product Foundry

Newark, N. J., del... 12.60-13.05
Chicago, outside del. 11.50
Chicago, delivered . 12.25
Terre Haute, del. .. 11.75
Milwaukee, ovens.. 12.25
New England, del... 13.75
St. Louis, del. 12.25
Birmingham, ovens. 8.50
Indianapolis, del. .. 12.00
Cincinnati, del. ... 11.75
Cleveland, del. 12.30
Buffalo, del. 12.50
Detroit, del. 12.25
Philadelphia, del. .. 12.38

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol... 14.00c
Toluol, two degree 27.00c
Solvent naphtha 26.00c
Industrial xylol 26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.) 14.25c
Do. (1000 lbs. or over) 13.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers 7.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia ...$30.00

Pig Iron

No. 2 foundry is 1.75-2.25 sil.; 50c diff. for each 0.25 sil. above 2.25 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$25.00	$25.50	$24.50	$26.00
Birmingham, Ala.§	20.38	.....	19.38	25.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.00	25.50	24.50	26.00
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	.....	.....	.....
Sharpsville, Pa.	24.00–24.50	24.00–24.50	23.50–24.50	24.50–25.00
Sparrow's Point, Md.	25.00	.....	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00–24.50	24.00–24.50	23.50–24.50	24.50–25.00

§Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham†	25.61	.....	25.11	.....
Boston from Birmingham†	25.12	.....	.....	.....
Boston from Everett, Mass.	25.50	26.00	25.00	26.50
Boston from Buffalo	25.50	26.00	25.00	26.50
Brooklyn, N. Y., from Bethlehem	27.50	28.00	.....	.....
Canton, O. from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†24.22	.....	.....	.....
Cincinnati from Hamilton, O.	24.44	25.11	24.61	.....
Cincinnati from Birmingham†	24.06	.....	23.06	.....
Cleveland from Birmingham†	24.12	.....	23.12	.....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	.....
Milwaukee from Chicago	25.10	25.10	24.60	25.60
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	.....	.....
Newark, N. J., from Birmingham†	26.15	.....	.....	.....
Newark, N. J., from Bethlehem	26.53	27.03	.....	.....
Philadelphia from Birmingham†	25.46	.....	24.96	.....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....

Pittsburgh dist.: Add to Neville Island base, North and South Sides, 69c; McKees Rocks, 55c; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, 84c; Monessen, Monongahela City, $1.07; Oakmont, Verona, $1.11; Brackenridge, $1.24.

	No. 2 Fdry.	Malleable	Basic	Bessemer
Saginaw, Mich., from Detroit	26.31	26.31	25.81	26.81
St. Louis, northern	24.50	24.50	24.00	.....
St. Louis from Birmingham	†24.50	.....	23.62	.....
St. Paul from Duluth	26.63	26.63	.....	27.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50, base; $30.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$28.00
Pitts. dist. fur.	23.50	do., del. Chicago	31.34
		Lyles, Tenn., high phos.	28.50

Silvery

Jackson county, O., base, 6.00 to 6.50 per cent $29.50. Add 50 cents for each additional 0.25 per cent of silicon. Buffalo base $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

Manganese differentials in silvery iron and ferrosilicon not to exceed 50 cents per 0.50 per cent manganese in excess of 1 per cent.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00

Second Quality

Pa., Ill., Ky., Md., Mo.	46.55
Georgia, Alabama	38.00
New Jersey	49.00

Ohio

First quality	43.00
Intermediate	36.10
Second quality	36.00

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$31.00
Wire cut	29.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$25.00-$26.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	21.00
Do. barge	21.00
No. 2 lump	21.00

Ferroalloy Prices

Ferromanganese, 78-82%.
Carlots, duty paid, sbd. $120.00
Carlots, del. Pitts. 125.33
Carlots, f.o.b. Southern furn. 145.00
For ton lots add $10, for less-than-ton lots $13.50, for less than 200-lb. lots $18.

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 36.00

Ferrosilicon, 50%, freight allowed, c.l. 74.50
Do., ton lot 87.00
Do., 75 per cent 135.00
Do., ton lots 151.00
Spot, $5 a ton higher.

Silicomanganese, c.l., 2¼ per cent carbon 118.00
1¼% 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%, $8 unitage, 38.50; electric furn., per ton, c. l., 23-26% f.o.b. Mt. Pleasant, Tenn., 24% $8 unitage 75.00

Ferrochrome, 68-70 chromium, 4-6 carbon, cts, lb., contained cr., del. carlots 11.00c
Do., ton lots 11.75c
Do., less-ton lots 12.00c
less than 200 lb. lots 12.25c

67-72% low carbon:

	Carloads	Ton lots	Less ton
2% carb.	17.50c	18.25c	18.75c
1% carb.	18.50c	19.25c	19.75c
0.10% carb.	20.50c	21.25c	21.75c
0.20% carb.	19.50c	20.25c	20.75c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Molybdenum Oxide, lb. Molyb. cont., 5-20-lb. containers, f. o. b., Washington, Pa., lb. 0.80

Ferrotitanium, 40-45%, lb., con. tl., f.o.b. Niagara Falls, ton lots $1.28
Do., less-ton lots 1.33
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, 58 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, tl., 6-8% carb., carlots, contr., net ton $142.50
Do., spot 145.00
Do., contract, ton lots 145.00
Do., spot, ton lots 150.00

15-18% tl., 3-5% carbon, carlots, contr., net ton 157.50
Do., spot 160.00
Do., contract, ton lots 160.00
Do., spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do., ton lots 8.00c
Do., less-ton lots 8.50c
Spot ¼c lb. higher

Chromium Briquets, contract, freight allowed, lb. carlots, bulk 7.00c
Do., ton lots 7.50c
Do., less-ton lots 7.75c
Do., less 200 lbs. 8.00c
Spot ¼c lb. higher

Tungsten Metal Powder, 98-99 per cent, per lb., depending upon quantity $2.50-2.60

Vanadium Pentoxide, contract, lb. contained $1.10
Do., spot 1.15

Chromium Metal, 98% cr., contract, lb. con. chrome, ton lots 80.00c
Do., spot 85.00c

88% chrome, cent. 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	Struc-tural Shapes	Floor Plates	Sheets—Hot Rolled	Sheets—Cold Rolled	Sheets—Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars—Carbon	Cold Drawn Bars—S.A.E. 2300	Cold Drawn Bars—S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.48	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	5.26	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.05	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.52	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	5.50	....	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.00	4.92	3.47	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.30	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.85	5.25	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.18	4.23	4.73	3.54	3.88	8.38	6.98
St. Louis	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.24	4.99	3.61	4.02	8.77	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.80	3.75	....	4.50	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.49	4.49	6.09	4.19	....	5.79	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.93	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	3.75	5.95	5.95	4.10	4.10	5.50	4.20	....	5.25	....	7.15	....	....
Seattle	4.00	4.00	5.20	4.75	4.75	6.50	4.75	7.25	6.00	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	5.00	....	5.75	....	....
Los Angeles	4.15	5.45	7.25	4.95	4.95	7.20	5.10	7.30	6.30	....	6.60	11.35	10.35
San Francisco	4.00	5.20	6.80	4.70	4.70	6.40	4.70	7.20	6.45	....	7.05	11.60	10.60

	S.A.E. Hot-rolled Bars (Unannealed)—1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	6.65	....	8.75	8.60	9.40
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	9.05
San Francisco	6.05	10.60	9.60	9.45	10.10

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300 pounds and over, Portland, Seattle; 400-14,999 Twin Cities; 400-3999 Birmingham; 400 pounds and over in Memphis; Los Angeles, bars over 4-in. wide, 1-in. thick, 4.95c.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Omaha, Kansas City, St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 1 to 10 bun. in Los Angeles; 300 and over in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; any quantity in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle, 1 to 99 pounds in Los Angeles; 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

	Gross Tons	BRITISH U.K. Ports £	s	d
Merchant bars, 3-inch and over	366.50	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	$ 6.20	1	10	9

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

		£	s	d
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$25.79	6	8	0(a)
Basic pig iron	24.28	6	0	6(a)
Furnace coke, f.o.t. ovens	7.40	1	15	9
Billets, basic soft, 100-ton lots and over	49.37	12	5	0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14	10	6
Merchant bars, rounds and squares, under 3-inch	3.17c	17	12	0††
Shapes	2.77c	15	8	0††
Ship plates	2.91c	16	3	0††
Boiler plates	3.06c	17	0	6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22	15	0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26	2	6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	23	15	0
Bands and strips, hot-rolled	3.30c	18	7	0

(a) del. Middlesbrough 5s rebate to approved customers. ††Rebate 15s on certain conditions.

Ores

Lake Superior Iron Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	10.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Chinese wolframite, net ton, duty pd.	$24.00-25.00
Brazil iron ore, 68-69%, ord.	7.50c
Low phos. (.02 max.)	8.00c

F.O.B. Rio Janeiro.

Scheelite, imp.	23.50-24.00
Chrome ore, Indian, 48% gross ton	....

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	....
So. African, 48%	70.00-72.00
Brazilian, 46%	69.00-71.00
Chilean, 47%	65.00-70.00
Cuban, 50-51%, duty free	....

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

IRON AND STEEL SCRAP PRICES

Maximum Prices Announced June 18 by Office of Price Administration and Civilian Supply (Gross Tons)

	Pittsburgh, Weirton, Steubenville(a)	Youngstown, Canton, Warren, Sharon	Chicago	Bethlehem	*East. Pa.	Sparrows Pt.	Cleveland	Buffalo	Ashland, Ky., Portsmouth, Middletown, O.	Kokomo, Ind.
No. 1 heavy melting	$20.00	$20.00	$18.75	$18.25	$18.75	$18.75	$19.50	$19.25	$19.50	$18.25
No. 1 hyd. comp. black sheets	20.00	20.00	18.75	18.25	18.75	18.75	19.50	19.25	19.50	18.25
No. 2 heavy melting	19.00	19.00	17.75	17.25	17.75	17.75	18.50	18.25	18.50	17.25
Dealer No. 1 bundles	19.00	19.00	17.75	17.25	17.75	17.75	18.50	18.25	18.50	17.25
Dealer No. 2 bundles	18.00	18.00	16.75	16.25	16.75	16.75	17.50	17.25	17.50	16.25
Mixed borings and turnings	15.25	15.25	14.00	13.50	14.00	14.00	14.75	14.50	14.75	14.25
Machine shop turnings**	15.50	15.50	14.25	13.75	14.25	14.25	15.00	14.75	15.00	14.50
Shovel turnings	16.50	16.50	15.25	14.75	15.25	15.25	16.00	15.75	16.00	15.50
No. 1 busheling	19.50	19.50	18.25	17.75	18.25	18.25	19.00	18.75	19.00	17.75
No. 2 busheling	15.50	15.50	14.25	13.75	14.25	14.25	15.00	14.75	15.00	13.75
Cast iron borings	15.75	15.75	14.50	14.00	14.50	14.50	15.25	15.00	†15.25	14.00
Uncut structurals and plate	19.00	19.00	17.75	17.25	17.75	17.75	18.50	18.25	18.50	17.25
No. 1 cupola	21.00	21.00	20.00	22.50	23.00	22.00	22.00	20.00	21.00	20.00
Heavy breakable cast	19.50	19.50	18.50	21.00	21.50	21.00	20.50	18.50	19.50	18.50
Stove plate	19.00	....	17.00	18.00	18.50	18.00	18.00	19.00	17.50	16.00
Low phos. billet, bloom crops	25.00	25.00	23.75	23.25	23.75	23.75	24.50	24.25	23.50	23.75
Low phos. bar crops and smaller	23.00	23.00	21.75	21.25	21.75	21.75	22.50	22.25	21.50	21.75
Low phos. punch., plate scrap***	[1]23.00	23.00	21.75	21.25	21.75	21.75	22.50	22.25	21.50	21.75
Machinery cast cupola size††	22.00	22.00	21.00	23.50	24.00	23.50	23.00	21.00	22.00	21.00
No. 1 machine cast, drop broken, 150 pounds and under	22.50	22.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50	21.50
Clean auto cast	22.50	22.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50	21.50
Punchings and plate scrap†‡	[1]22.00	22.00	20.75	20.25	20.75	20.75	21.50	21.25	20.50	20.75
Punchings and plate scrap§§	[1]21.00	21.00	19.75	19.25	19.75	19.75	20.50	20.25	19.50	19.75
Heavy axle and forge turnings	[1]19.50	19.50	18.25	17.75	18.25	18.25	19.00	18.75	18.00	18.25
Med. heavy elec. furnace turnings	[1]18.00	18.00	16.75	16.25	16.75	16.75	17.50	17.25	16.50	16.75

	St. Louis	Toledo, O.	Detroit	Duluth	Birmingham	[2]Alabama City, Ala., Atlanta	Chattanooga	Radford, Va.	New England‡	Pacific Coast§
No. 1 heavy melting	$17.50	$.....	$17.85	$18.00	$17.00	$17.00	$.....	$ ...	$16.50	[4]$14.50
No. 1 hyd. comp. black sheets	17.50	.....	17.85	18.00	17.00	17.00	.....	.....	.....	[4]14.50
No. 2 heavy melting	16.50	.....	16.85	17.00	16.00	16.00	.....	.....	.....	[4]13.50
Dealer No. 1 bundles	16.50	.....	16.85	17.00	16.00	16.00	.....	.....	.....	[4]13.50
Dealer No. 2 bundles	15.50	.....	15.85	16.00	15.00	15.00	.....	.....	.....	[4]12.50
Mixed borings and turnings	12.75	13.10	13.10	.....	12.25	12.25	.....	.....	.....	[4]9.75
Machine shop turnings	13.00	13.35	13.35	15.50	15.00	15.00	.....	.....	.....	[4]10.00
Shoveling turnings	14.00	14.35	14.35	16.50	16.00	16.00	.....	.....	.....	[4]11.00
No. 1 busheling	17.00	.....	17.35	17.50	16.50	16.50	.....	.....	.....	[4]14.00
No. 2 busheling	13.00	.....	13.35	13.50	12.50	12.50	.....	.....	.....	[4]10.00
Cast iron borings	13.25	13.60	13.60	13.75	12.75	12.75	.....	.....	.....	[4]10.25
Uncut structurals and plate	18.50	.....	16.85	17.00	16.00	16.00	...	....	...	[4]13.50
No. 1 cupola	20.00	.....	20.35	[3]19.00	20.00	.....	20.50	21.00	22.00	18.00
Heavy breakable cast	18.50	.....	18.85	[3]17.50	18.50	.....	.	.	20.50	17.00
Stove plate	17.00	15.60	14.10	[3]16.00	17.00	.....	17.50	18.00	17.50	14.00
Low phos. billet and bloom crops	22.50	.....	22.85	23.00	22.00	.....	.....	.....	.....	19.50
Low phos. bar crops and smaller	20.50	.....	20.85	21.00	20.00	.....	.....	.....	.....	19.50
Low phos. punch. and plate scrap***	20.50	.....	20.85	21.00	20.00	.....	.....	.....	.....	17.50
Machinery cast cupola size††	21.00	.....	21.35	[3]20.00	21.00	.....	21.50	22.00	23.00	19.00
No. 1 machine cast, drop broken, 150 pounds and under	21.50	.....	21.85	19.50	21.50	.....	22.00	22.50	23.50	19.50
Clean auto cast	21.50	.....	21.85	19.50	21.50	.....	22.00	22.50	23.50	19.50
Punchings and plate scrap†‡	19.50	.....	19.85	20.00	19.00	.....	.....	...	.....	16.50
Punchings and plate scrap§§	18.50	.....	18.85	19.00	18.00	.....	.....	.....	.....	15.50
Heavy axle and forge turnings	17.00	.....	17.35	17.50	16.50	.....	.....	.....	.....	14.00
Medium heavy elec. furnace turnings	15.50	.....	15.85	16.00	15.00	.....	.....	.....	.....	12.50

*Claymont, Del., Coatesville, Conshohocken, Phoenixville, Harrisburg, Pa. ‡Worcester, Mass.; Bridgeport, Conn.; Phillipsdale, R. I. §Los Angeles, San Francisco, Portland, Seattle; *** ¾-inch and heavier, cut 12 inches and under; ††may include clean agricultural cast; ‡‡under ⅝-inch to ¼-inch, cut 12 inches and under; §§under ¼-inch to No. 12 gage, cut 12 inches and under. **Alloy, W. Va., base $17.60. †Base price at Portsmouth and Ashland; Middletown 25 cents less. [1]Add $1.75 at Pittsburgh. [2]Atlanta base only on Nos. 1 and 2 H.M. steel, No. 1 comp. sheets and Nos. 1 and 2 dealer bundles. [3]Also base prices at Minneapolis and St. Paul. [4]Add $2 at Minnequa, Colo.

Maximum Prices for Iron and Steel Scrap Originating from Railroads

	Pittsburgh, Wheeling, Johnstown, Steubenville	Youngstown, Canton, Sharon	Chicago	Kokomo, Ind.	*East. Pa.	Sparrows Pt.	Cleveland	Buffalo	Ashland, Ky., Portsmouth, Middletown, O.
No. 1 Railroad grade heavy melting steel	$21.00	$21.00	$19.75	$19.25	$19.75	$19.75	$20.50	$20.25	$20.50
Scrap rails	22.00	22.00	20.75	20.25	20.75	20.75	21.50	21.25	21.50
Rerolling quality rails	23.50	23.50	22.25	21.75	22.25	22.25	23.00	22.75	23.00
Scrap rails 3 feet and under	24.00	24.00	22.75	22.25	22.75	22.75	23.50	23.25	23.50
Scrap rails 2 feet and under	24.25	24.25	23.00	22.50	23.00	23.00	23.75	23.50	23.75
Scrap rails 18 inches and under	24.50	24.50	23.25	22.75	23.25	23.25	24.00	23.75	24.00

	St. Louis	Kansas City	Detroit	Duluth	Birmingham	Minnequa, Colo.	Radford, Va.	New England‡	Pacific Coast§
No. 1 Railroad grade heavy melting steel	$18.50	$17.00	$18.85	$19.00	$18.00	$	$ ...	$ ...	$15.50
Scrap rails	19.50	18.00	19.85	20.00	19.00	.....	.....	...	16.50
Rerolling quality rails (a)	21.00	19.50	21.35	21.50	20.50	.....	.....	...	18.00
Scrap rails 3 feet and under	21.50	20.00	21.85	22.00	21.00	.....	.....	...	18.50
Scrap rails 2 feet and under	21.75	20.25	22.10	22.25	21.25	.....	.....	...	18.75
Scrap rails 18 inches and under	22.00	20.50	22.35	22.50	21.50	.....	.....	...	19.00

*Philadelphia, Wilmington, Del.; §Los Angeles, San Francisco, Portland, Seattle.

NOTE: Where the railroad maker of scrap operates in two or more of the consuming points named above, the highest of the maximum prices set out above for such basing points shall be the maximum price at consumer's plant at any point on the railroad's line. (a) Re-laying quality $5 higher.

Sheets, Strip

Sheet & Strip Prices, Page 120

Manufacturers of non-defense products are curtailing production in some lines, partially seasonally and also because of difficulty in obtaining steel sheets. In some lines of household appliances production has been continued beyond the usual peak period but stocks of finished products have been built up substantially and they find continued operation difficult in view of depleted steel stocks.

Washington has given warning that production in these lines must be curtailed but no definite order covering the extent of the cut has been issued. This is looked for as imminent by many manufacturers.

Most sheet tonnage now booked is for defense purposes, carrying definite priority ratings. Uncertainty as to what the government may permit non-defense buyers to purchase, warehouses in particular, is causing some sellers to delay formal entry of business for fourth quarter. Heavy orders are on file, not yet officially scheduled, on which no delivery promise has been made. Some mills have entered orders for fourth quarter and well into 1942, contingent on ability to produce beyond priority requirements. Increasing number of priorities is setting back many schedules.

Sheetmakers are awaiting the pending all-steel priorities order with some apprehension as it probably will mean the end of deliveries for the time being on many orders now booked. It is believed once the present bulge of defense work is off the books the flow of steel will be reasonably smooth. It appears that the defense program will require about 50 per cent of production, allowing the remainder for commercial use. Inventory control is a matter of some conjecture, producers fearing they will be forced to build up defense inventories before being allowed to ship to regular customers.

In New England some large consumers who bought well ahead are getting some tonnage but stocks of galvanized are depleted, with replacements uncertain. Operations of some small stamping shops without defense contracts are threatened with curtailment. A razor-blade manufacturer has taken on defense lines, including a contract for percussion primers, and other strip fabricators are seeking similar business.

Cold-rolled strip manufacturers generally are unable to book non-defense tonnage for delivery before late first quarter, without definite promise. Undoubtedly there will be a heavy carryover into next year as priorities increase.

Sheet sellers have not received orders governing allocation of chrome-bearing sheets, though limitations on distribution of chromium were announced early in July.

Tin Plate

Tin Plate Prices, Page 120

Pressure for delivery of tin plate continues and it is not yet possible

to see whether supplies will be adequate to pack all crops and meet export demand as well. Shipments are running ahead of production, the excess coming from stock held by steel companies and can companies.

Output is up two points to 96 per cent of capacity. There is some question as to whether this top rate can be held, but it is believed supplies of steel and tin will be adequate at least through this quarter.

With resumption of ten hot tin mills at Shenango works of Carnegie-Illinois Steel Corp. Aug. 18, all mills in the Pittsburgh district will be operating. The only remaining hot tin mills in that area are those at the Standard works of Carnegie at Canonsburg, Pa., and the Washington Tin Plate Co., Washington, Pa. All other hot mills have been dismantled.

Plates

Plate Prices, Page 120

Plate inquiry is heavy, defense using them in many ways, and civilian uses also pressing for supply. Storage tanks at military bases are furnishing considerable tonnage and armor plate for tanks and in light gages for airplane amounts to a heavy total. Delivery on the latter, because of extra processing, is delayed, at best.

Many producers are taking only priority material and there is keen competition among various government units for preference where priorities are equal. Ship plates are being delivered as rapidly as they are needed, in most cases, keeping pace with advance of construction. Since car builders have been given some preferred standing better supplies are available for that use. Some builders forced to curtail production have been supplied sufficient to allow a better rate of operation.

In some cases diamond floor plates have been substituted for ordinary plates, used with the patterned side concealed. Some producers of this type can make fairly prompt delivery and the mill price is lower than warehouse price on plain plates, which also are difficult to obtain from distributors.

Delivery of 3600 tons for the Portland, Me., terminal of the Montreal pipe line is scheduled for Oct. 1.

In some cases warehouses are besieging mills for plate ends, off grades and any size available, but with little success. Shipbuilders in the East are laying more keels, increasing specifications for ship plates. Manufacturers of small, light tanks for commercial use have heavy orders for their product and have difficulty in obtaining material.

Eastern mills are accepting little tonnage except for defense with top rating and efforts of consumers to place orders further west on an f. o. b. mill basis have met little success.

Most sorely pressed for plate are builders of electrical equipment and contractors sharing in steelworks expansion programs. As yet they have been unable to get satisfactory priorities in a world where A-2 means next year. Construction has been held up on power equipment for such vital needs as aluminum producing plants and steelworks, and at least one blast furnace now under construction is behind schedule because of the tight plate situation.

This has created some speculation as to what priorities will be accorded builders of the new mill facilities, contained in the steelworks and pig iron expansion program. Considerable quantities of plate will be required, and there have been no assurances that this program will take priority over tanks or ships. If such priorities are not forthcoming, it is doubtful if the new steelmaking facilities will be ready as scheduled.

PLATE CONTRACTS PENDING

200 tons, 51½-inch water pipe, 5/16 to 9/16"; bids in at Seattle.

Unstated, 500,000-gallon elliptical water storage tank; bids to city clerk, Nampa, Idaho, soon.

Bars

Bar Prices, Page 121

Bar mill backlogs continue to mount, mainly because of increasing non-defense buying. Production of defense material is about equal to incoming orders, accounting for well over half capacity of most bar mills. Remaining capacity for civilian needs is much less than required and orders pile up. Delivery promises are not being made for most part and few previous promises can be met.

Many bar consumers, such as hand tool makers, find stocks dwindling, due to inability to obtain replacements. Much of their product they believe is going into defense but they are unable to determine the percentage for this purpose. They feel they should be given some preference rating under these circumstances.

Their situation, with that of bolt and nut manufacturers, some implement manufacturers and others, indicates the caution used by bar producers in accepting non-defense work. As a rule bar sellers are not as rigid in priority requirements as producers of other steel products, as their capacity is large.

In alloy and specially heat-treated bars delivery is tight and even in plain carbon bars deliveries are well extended and are becoming more so. One large producer in the East is booked well into second half next year, allowing for tentative allocations for regular commercial customers.

Shell work is expected to expand much more rapidly in the next few weeks, which will be reflected mainly in hot-rolled bar production and cold-drawn bar processing. Heavy pressure is being exerted on cold-drawn bars, principally alloy. Edgemoor Iron Co., Edgemoor, Del., is inquiring for 40,000 to 50,000 tons of shell bars for an army shell contract. This is in addition to about 20,000 tons recently noted and still pending for this company for a navy order. Edward G. Budd Mfg. Co., Philadelphia, has distributed 6000 tons of cold-drawn bars for a 37-mm. shell order, shipments to begin in about 60 days.

Bar buying in New England includes 1000 tons of chrome-molybdenum stock for the Springfield, Mass., arsenal. A buyer in that area placed a bar order with a Pittsburgh mill on which delivery was promised late in 1942. Capacity operations in forging shops is keeping inventories down in spite of fairly heavy deliveries of bars.

Pipe

Pipe Prices, Page 121

Demand for pipe continues heavy and distributors' stocks are being depleted by continued sales. To discourage accumulation of galvanized pipe stocks mills in most cases are following through to keep a record of inventories. Galvanized pipe is being rationed in proportion to needs.

Substantial inquiries for cast pipe are coming out for military bases along the eastern seaboard. Early delivery is asked and pipemakers have difficulty in meeting requirements, in view of shortage of pig iron and scrap. Municipal demand also is active, due to new industrial areas being opened up and priorities are furnished some of these projects. New York City is about to enter the market for several thousand tons for maintenance work.

A substantial purchase of black steel pipe has been made for the Quonset Point, R. I., base. New England prices on resale pipe are strong, contrary to the weakness prevailing in recent years.

Boiler tubes are in good demand, especially for railroad use.

A natural gas line from West Virginia to Louisiana, 880 miles, has been approved by government agencies, construction to be started in March. It will be of 12-inch pipe. No allocation has been made yet.

CAST PIPE PENDING

150 tons, 8 inch, Class 150, for replacements; bids to Seattle, Aug. 14.

145 tons, 12 inch and accessories, Sand Point improvement, Seattle; bids Aug. 14.

100 tons, 8-inch and fittings, Forty-fourth Avenue N. E., Seattle; bids Aug. 14.

Wire

Wire Prices, Page 121

Demand for wire and wire products is heavy, some slackening in commercial demand being more than offset by increased defense needs. As a rule orders exceed shipments. Manufacturers using wire in their products have small stocks and warehouses are short in many lines.

So many high priority orders are being received that wire mills are constantly revising schedules, forcing considerable tonnage further back in finishing departments. Long processing of specialties and limited rod supplies tend to slow schedules. Bessemer and screw machine stock are in strong demand in New England and some, but not much, rod tonnage is being bought in the

Pittsburgh district on an f. o. b. mill basis, the consumer absorbing the freight.

Priorities continue to cut in on commercial needs of many forms of wire products. Wire rods have long been among the most affected, although the situation in cable is fast becoming closed as far as general commercial requirements are concerned. Allotments of manufacturers' wire for commercial customers have long since been laid out for the remainder of this year in many cases, but as defense work expands these allotments are being reduced.

Rails, Cars

Track Material Prices, Page 121

Following exceptionally heavy buying in June when 32,749 freight cars were placed for domestic account, car buying in July dropped to 6459 units, the second smallest monthly total so far this year.

The total for seven months was 101,234, compared with 22,019 in the corresponding period in 1940. 9642 in the same period in 1939 and 8121 in the first seven months of 1938.

Further comparisons follow:

	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.....	18,630	2,010	2,051	6,014
June	32,749	7,475	1,324	1,178
July.....	6,459	5,846	110	0
7 mos....	101,234	22,019	9,642	8,121
Aug.....	.....	7,525	2,814	182
Sept.....	.....	9,735	23,000	1,750
Oct.....	.....	12,195	19,634	2,587
Nov.....	.....	8,234	2,650	1,232
Dec.....	.....	7,181	35	2,581
Total ..	.....	66,889	57,775	16,303

Burlington Refrigerator Express Co., wholly-owned subsidiary of the Chicago, Burlington & Quincy railroad, will build 300 refrigerator cars at a cost of $1,200,000 in its shops at Plattsmouth, Neb.

Shipments of railroad locomotives in first half this year were much greater than in the corresponding 1940 period, according to the Census Bureau. Total shipments were 430 locomotives, compared with 243 in first half last year. Shipments this year included 301 diesel-electric, 87 steam, 14 electric and 28 miscellaneous. Unfilled orders at the end of June totaled 882, of which 565 were diesel-electric, 255 steam, 42 electric and 20 miscellaneous.

LOCOMOTIVES PLACED

Crucible Steel Co. of America, one 58-ton fireless locomotive, to Heisler Locomotive Works, Erie, Pa.

Louisville & Nashville, fourteen 2-8-4 type locomotives, to Baldwin Locomotive Works, Eddystone, Pa.

New York, Susquehanna & Western, two 1000-horsepower diesel-electric locomotives, to American Locomotive Co., New York.

Richmond, Fredericksburg & Potomac, six 4-8-4 type locomotives, to Baldwin Locomotive Works, Eddystone, Pa.

St. Louis-San Francisco, five diesel-electric switch engines of 1000 horsepower, to Baldwin Locomotive Works, Eddystone, Pa.

Sorocabance Railway, Brazil, ten 143-ton electric locomotives, to Westinghouse Electric & Mfg. Co., Pittsburgh.

Terminal Railroad Association of St. Louis, ten diesel-electric locomotives, placed as follows: three 1000-horsepower and two 660-horsepower units to American Locomotive Co., New York; and three 1000-horsepower and two 660-horsepower units, to Baldwin Locomotive Works, Eddystone, Pa.

CAR ORDERS PLACED

Denver & Rio Grande Western, ten cabooses, to Bethlehem Steel Co., Bethlehem, Pa.

Lehigh Valley, 12 cabooses, to own shops.

Pullman Co., six sleeping cars, to Pullman-Standard Car Mfg. Co., Chicago.

CAR ORDERS PENDING

National Railways of Mexico, 1000 fifty-ton box cars, bids asked; also plans the purchase of 120 all-steel, lightweight passenger cars.

RAIL ORDERS PLACED

Southern Pacific, 6226 tons, to Tennessee Coal, Iron & Railroad Co., Ensley, Ala.

Structural Shapes

Structural Shape Prices, Page 121

Often when the wave of defense buying seems about over new projects appear and veteran fabricators are still confident that hundreds of thousands of tons are yet to be placed. Some peace plants which have turned to defense are negotiating for their fourth or fifth additions, one such plant in Ohio figuring on an addition taking 6000 tons, for airplane engine parts. Draper Corp., Massachusetts textile machine maker, has obtained top priority for 1150 tons of structurals for building tools for bomber engine construction. Four to five months delivery are usually quoted. Shipyards are absorbing an increasing volume of plain shapes.

Prices of fabricated structural steel are better stabilized, following sharp advances over a year ago. Then competition held prices below true levels and increased costs have exaggerated prices, which now are not considered exorbitant. Present defense activities are apparently far beyond what had been foreseen ten months ago.

Bids will be opened Sept. 4 by the New York tunnel commission on a section of the Battery-Brooklyn tunnel, requiring either about 40,000 tons of light cast iron lining or about 25,000 tons of rolled steel.

SHAPE CONTRACTS PLACED

1750 tons, building, airport, Rome, N. to Bethlehem Steel Co., Bethlehem, through Turner Construction Co.

1400 tons, plant building, Walter Ki Co., Belleville, N. J., to Lehigh Str tural Steel Co., Allentown, Pa.

1230 tons, stockhouse, Schaefer Brew Co., Brooklyn, N. Y., to Ameri Bridge Co., Pittsburgh.

1150 tons, machine tool plant, Dra Corp., Hopedale, Mass., to Bethleh Steel Co., Bethlehem, Pa.

650 tons, power house, Pennsylva Power & Light Co., Hauto, Pa., throu Combustion Engineering Co., to Lehi Structural Steel Co., Allentown, Pa

600 tons, drydock, Todd Shipyards Cor Brooklyn, N. Y., to Harris Structu Steel Co., New York.

502 tons, beam bridge, route FA-5, se tion 23XIF, Lincoln, Logan count Illinois, for state, to Mississippi Va ley Structural Co., Decatur, Ill.; bi July 15.

500 tons, addition, brake and whe plant, Goodyear Tire & Rubber C Akron, O., to Bethlehem Steel C Bethlehem, Pa.

375 tons, Fort Rodman, New Bedfor Mass., to Bethlehem Steel Co., Bet lehem, Pa.

335 tons, state highway bridge, Fayett ville, Ark., to Vincennes Steel Corp Vincennes, Ind.; bids July 31.

300 tons, shipyard, South Portland, Me to American Bridge Co., Pittsburgh.

300 tons, three bridges for Seattle ligh department, using old material; M P. Munter, Seattle, low $108,600 fo erection.

297 tons, galvanized towers, 132-kilovol line, Public Service Co. of Northern Illinois, Joliet, Ill., to American Bridg Co., Pittsburgh.

250 tons, addition, Heald Machine Co. Worcester, Mass., to R. C. Mahon Co. Detroit; E. J. Cross Co., Worcester contractor.

242 tons, state highway bridge, Cut bank, Mont., to Missouri Valley Bridge & Iron Co., Leavenworth, Kans.

200 tons, state bridge R-6-3 over Bangor & Aroostook railroad, Richmond, Mass., to American Bridge Co., Pittsburgh.

190 tons, bridge 981.01 over Weber river, Wyoming, for Union Pacific railroad, to American Bridge Co., Pittsburgh.

184 tons, state bridge, Redfield, Spink county, South Dakota, to Hassenstein Steel Co., Rapid City, S. Dak.; J. C. Sorenson Co., Sioux Falls, S. Dak., contractor; bids July 8.

170 tons, for Puget Sound navy yard buildings, to Pacific Car & Foundry Co., Seattle; Howard S. Wright, Seattle, contractor.

160 tons, building, Westinghouse Electric & Mfg. Co., Springfield, Mass., to Haarmann Steel Co., Holyoke, Mass.

110 tons, New York state bridge, Nassau county, to American Bridge Co., Pittsburgh.

100 tons, addition, Frontier Bronze Corporation, Niagara Falls, N. Y. to Ernst Iron Works, Buffalo.

SHAPE AWARDS COMPARED

	Tons
Week ended Aug. 9	11,195
Week ended Aug. 2	26,732
Week ended July 26	34,155
This week, 1940	24,101
Weekly average, 1941	29,723
Weekly average, 1940	28,414
Weekly average, July, 1941	26,273
Total to date, 1940	681,785
Total to date, 1941	980,871

Includes awards of 100 tons or more.

100 tons, third echelon shops, Fort Lewis, Wash., to Isaacson Iron Works, Seattle; Sound Construction & Engineering Co., Seattle, contractor.

100 tons, state bridge, Route FA-12, section Y-2-VF, Mulberry Grove, Fayette county, Illinois, to Bethlehem Steel Co., Bethlehem, Pa.; bids July 29.

SHAPE CONTRACTS PENDING

11,000 tons, assembly building, Boeing Airplane Co., Wichita, Kans.

8000 tons, sub-assembly shop, Navy yard, Brooklyn, N. Y.

5000 to 7000 tons, addition, Thompson Aircraft Products Inc., Cleveland.

3300 tons, bomber plant hangar, through Defense Plant Corp., Ypsilanti, Mich.

2000 tons, inert storage buildings, Burns City, Ind., for navy.

1900 tons, depot supply building, unit 1, Rome, N. Y., for army.

1600 tons, parts assembly building, Frigidaire division, General Motors Corp., Moraine City, O.

1575 tons, Cheesequake creek bridge; bids Aug. 22, New Jersey state highway department; also 320 tons, reinforcing bars.

1500 to 2000 tons, power house and other buildings, Sperry Gyroscope Co., Brooklyn, N. Y.; bids through Stone & Webster, New York.

1300 tons, building 3, through Defense Plant Corp., Belleville, N. J.

1200 tons, three buildings, Westinghouse Electric & Mfg. Co., Trafford, Pa.

700 tons, gear and axle plant No. 6, Chevrolet Motor division, Detroit.

550 tons, bridge contract 2204, Indianapolis, Ind., for state.

425 tons, transfer bridge, D. D. 5 and 6, Navy yard, Brooklyn, N. Y.

400 tons, state industrial school, Camp Hill, near Harrisburg, Pa.

400 tons, bridges, Sinsinawa river, Menominee, Ill., for Illinois Central System.

350 tons, intake gates, Kentucky dam, Gilbertsville, Ky., for Tennessee Valley authority.

325 tons, addition to propeller plant, Aeroproducts division, General Motors Corp., Vandalia, O.

250 tons, crane runway, Wellman Engineering Co., Akron, O.; bids Aug. 4.

225 tons, bridge and underpass, quartermaster's depot; Wark Co., Philadelphia, general contractor.

225 tons, concentrating plant, Weldon Springs, Mo., for government.

200 tons, plant addition, Buffalo Bolt Company, North Tonawanda, N. Y.

200 tons, building addition, Vickers Inc., Detroit.

175 tons, underpass bridge 76.2, Towner, N. Dak., for state.

165 tons, shipways U-3 and 4, contract 5, New York Shipbuilding Corp., Camden, N. J.

163 tons, underpass, Woodbury, N. J.; bids Aug. 22, New Jersey state highway department.

160 tons, building, Remington Rand Co., Bridgeport, Conn.

150 tons, state bridge PSC-9778, Mineola, N. Y.

140 tons, state bridge, contract 2212, Ladoga, Ind.

135 tons, extension to main building, Naval hospital, Chelsea, Mass.

120 tons, subway, North Noble road, Cleveland, New York, Chicago & St. Louis railroad.

115 tons, sewage treatment works, Stickney, Ill., Chicago Sanitary district.

110 tons, extension to engine house, stalls 12 and 20, Ogden, Utah, Union Pacific railroad.

Unstated, 16 intake gates for Bonneville powerhouse; bids to U. S. engineer, Portland; No. 698-42-59.

Unstated, materials for rebuilding Morrison street bridge, Portland, Oreg; bids to Oregon highway commission, Portland, Aug. 14.

Unstated, 17 portable magazines; bids in at Fort Lewis, Wash.

Reinforcing Bars

Reinforcing Bar Prices, Page 121

Reinforcing bars have become among the more difficult steel items to obtain. For as important a project as an ordnance plant at Shreveport, La., requiring 1875 tons, builders have repeatedly and persistently sought to place the order. There is a virtual cessation, too, in redesigning structural jobs into reinforced concrete because of scarcity. At Boston new inquiry has slackened, though highway needs are up slightly.

REINFORCING STEEL AWARDS

3000 tons, military base, Jamaica, West Indies, to Jones & Laughlin Steel Corp., Pittsburgh.

1800 tons, project in Puerto Rico, divided equally between Youngstown Sheet & Tube Co., Youngstown, O. and Capitol Steel Co., Brooklyn, N. Y.; McCloskey & Co., Philadelphia, contractors.

500 tons, navy base, Panama Canal zone, to Jones & Laughlin Steel Corp., Pittsburgh; Frederick Snare Inc., contractor.

400 tons, tractor warehouse, J. I. Case Co., Racine, Wis.; to W. H. Pipkorn Co., Milwaukee; bids July 17.

331 tons, Texas highway projects, including 119 tons for McCullough county, 125 tons for Stephens county and 87 tons for Milam county; also structurals, cast steel, bridge railings, piling and plates, to North Texas Iron and Steel Co., Fort Worth, Tex.

220 tons, Barren river bridge, Warren county, Kentucky, to Truscon Steel Co., Youngstown, O.; Foster & Creighton, contractors.

200 tons, army Alaska projects, to Bethlehem Steel Co., Seattle.

200 tons, construction projects at Fort Lewis, to Bethlehem Steel Co., Seattle.

200 tons, building, Linde Air Products Co., Tonawanda, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; John W. Cowper Co., contractor.

110 tons, new building, Hewitt Rubber Company, Buffalo, to J. T. Ryerson & Son Inc., Buffalo, through Shirley Herman Construction Company, same city.

100 tons, construction at Fort Lewis base, to Northwest Steel Rolling Mills, Seattle.

REINFORCING STEEL PENDING

5000 tons warehouse superstructure, Philadelphia navy yard; bids Aug. 27.

4000 tons, Central ordnance store depot, Momence, Ill., for government; Henry Ericsson Co., Chicago, contractor

2000 tons, addition, naval ordnance plant, Burns City, Ind.

1000 tons, Boeing aircraft plant, Wichita, Kans.

1000 tons, supercharger plant, Allis-Chalmers Co., Milwaukee.

800 tons, Glen Hazel Heights defense housing, Pittsburgh; bids Aug. 5.

600 tons, grain elevator, Minneapolis.

600 tons, addition, Abbott Laboratories, North Chicago, Ill.; bids Aug. 7.

500 tons, engineering board equipment depot building, Ft. Belvoir, Va., through Charles H. Tompkins.

450 tons, workers' building, Byberry state hospital, Philadelphia; bids Aug. 19.

400 tons, state highway bridge, Salem, Mass.; bids Aug. 12.

200 tons, Broadlawn hospital, Des Moines, Iowa; A. H. Newmann & Bros., Des Moines, general contractors; bids July 15.

170 tons, building, American Blower Co., Detroit.

160 tons, stadium, Moline, Ill.

150 tons, Cowles dormitory, Grinnell college, Grinnell, Iowa.

150 tons, three roadway projects, Connecticut, bids opened by State Highway Commission, Aug. 11.

120 tons, army airport, Pine Camp, Great Bend, N. Y.

100 tons, A. O. Smith Corp., Milwaukee.

100 tons, building, Publicker Alcohol Co., Philadelphia.

100 tons, depot and general offices, Alaska Railroad, Anchorage, Alaska; J. B. Warrack Co., Seattle, low, $267,500.

100 tons, 170-foot girder bridge, Chelan county, Washington; bids to commissioners, Aug. 11, J. F. Lester, chairman.

Pig Iron

Pig Iron Prices, Page 122

The pig iron trade is endeavoring to adjust itself to the new ruling governing distribution of its product, but is still in the dark as to numerous points, which will require time to clarify. Forms to be filled out before orders can be placed were not available to many melters last week and sellers were able to accept orders only tentatively, pending filing of forms later.

In most cases trade was practically stopped, as the order was effective from Aug. 1, but in absence of forms it was impossible to comply at once. Buyers without priority apparently will be unable to get iron and where stocks are low almost immediate shutdown is expected. This applies almost entirely to foundries as steel producers all have priority. The latter expect to benefit from the new order.

Expectation of the pig iron order had caused consumers to hesitate in placing orders and producers to delay bookings for fear of transgressing the rules. July deliveries were high, probably a peak, and

CONCRETE BARS COMPARED

	Tons
Week ended Aug. 9	7,061
Week ended Aug. 2	21,392
Week ended July 26	25,653
This week, 1940	10,935
Weekly average, 1941	11,929
Weekly average, 1940	9,661
Weekly average, July, 1941	16,563
Total to date, 1940	282,025
Total to date, 1941	393,655

Includes awards of 100 tons or more.

August shipments are expected to exceed those of July, in spite of the slack period now prevailing.

Expansion in blast furnace capacity continues. Work is progressing on the new blast furnace at Weirton, W. Va. Engineering work on new stacks at Edgar Thomson works, Pittsburgh, has been started. The Colonial Iron Co. stack at Riddlesburg, Pa., recently taken over by the United States Cast Iron Pipe Co., will be ready to light soon.

Pig iron consumers are beginning to receive two forms which they are expected to make out monthly. Form PD-69 calls for a statement as to amount and kind of iron desired, delivery date and whatever priority may be involved. This is to be filed with suppliers before the fifth of each month for application in the succeeding month. Suppliers in turn are to file them with OPM by the fifteenth, and OPM is supposed to pass on them by the twenty-third.

The second form—PD-70—is said to be primarily an inventory statement, covering supplies, if any, of pig iron and scrap. This form is to be filed with OPM by the fifteenth of each month.

Meanwhile, no new orders are permitted to be placed. Consumers in some cases are trying to get in shipments on standing contracts for the quarter by the end of this month, fearing that their supply will be cut after Sept. 1. However, this is meeting with little success.

Because of a wave of protest from foundrymen a delegation headed by W. W. Rose, executive vice president of Gray Iron Founders Society Inc., Cleveland, will meet with OPM officials Aug. 11 to outline a basis for protests.

The point of disagreement is the requirement to file on blanks PD-69 and PD 70 on Aug. 5 the foundryman's pig iron requirements for September, a report to be repeated each month. Foundrymen, particularly jobbing foundrymen, state that the character of their business is hand-to-mouth and that by the fifth of a month they have no idea of pig iron needs for the subsequent month.

Scrap

Scrap Prices, Page 124

Amendments to price schedule No. 4, fixing ceiling prices on steel and iron scrap were announced August 8 by the Office of Price Administration and Civilian Supply. The changes establish for Gulf ports the same export ceiling prices as those previously arrived at for the eastern seaboard, and more basing points and modify existing shipping point prices for dealers' yards located within basing points.

The three important changes are summarized as follows:

(1) The $15 per ton maximum export price for No. 1 heavy melting scrap and the $16 maximum export price for No. 1 railroad grade heavy melting scrap (with customary differentials for other grades in each classification), f.a.s. at all ports on the Gulf of Mexico are eliminated. Instead, the maximum export price f.a.s. at all United States ports for heavy melting scrap (other than railroad) is made the domestic shipping point price, plus the lowest necessary charge for transporting scrap from the shipping point to the point of export. In the case of railroad grade heavy melting scrap, the ceiling price, f.a.s. at all United States ports, is made the maximum price for a consumer located on the line of the originating railroad, plus actual transportation charges from the line to the point of export. No such transportation charges, however, are allowed to be added in computing the ceiling export price for scrap originating from a railroad not operating at a basing point. Actual costs incident to shipment for export and a maximum broker's commission of 50 cents per ton may be added if shown as a separate charge on the invoice.

(2) Conshohocken, Pa.; Minneapolis and St. Paul, Minn.; Atlanta, Ga.; Alabama City, Ala.; and Portland, Oreg., are added as basing points. Minnequa, Colo., is eliminated as a basing point for scrap of railroad origin.

Basing point prices at Pittsburgh, Pa.; Ashland, Ky.; Toledo, O.; Duluth, Minn.; Worcester, Mass.; Bridgeport, Conn.; Phillipsdale, R. I.; Birmingham,, Ala.; Minnequa, Colo.; Los Angeles, San Francisco

and Seattle are changed in the amended schedule.

(3) Paragraph II of the schedule, establishing maximum prices at a shipping point, has been divided into two sections: Shipping point prices (a) at shipping points located within basing points and (b) at shipping points located outside basing points.

In the case of shipping points within basing points, the price is the basing point price, minus actual transportation costs from the shipping point to the nearest consumer's plant within the basing point. For shipping points located outside basing points, the computation of the shipping point price remains unchanged, except that such price at all shipping points in New York City, Brooklyn, and New Jersey which, by reason of barge rates, are nearest in terms of transportation charges to the Buffalo, N. Y., basing point, shall hereafter be computed from the Bethlehem, Pa., basing point.

These changes are designed to increase supplies of scrap but their effect can not be determined in advance and time will be required to work out details. Previous to this announcement scarcity continued and melters, especially foundries, had difficulty in obtaining their requirements. The latter have been expanding operations as defense contracts are more widely distributed and their needs are increasing. One eastern steelmaker claims scrap receipts are equal to only 50 per cent of requirements for its present rate of steel production. In most cases scrap melt exceeds receipts and reserves in many cases are close to extinction.

Pacific Coast

Seattle—Industrial plant expansion and large defense and shipyard contracts feature the situation. Announcement is made that a 15-acre site has been acquired and funds made available for immediate construction here by Isaacson Iron Works of a $2,600,000 forge plant, buildings to cover four acres, and additional $900,000 if necessary to increase the first unit. Plant will specialize in shafting and other heavy forgings for Navy and Maritime Commission. Western Gear Works, Seattle, is low at $847,248 for furnishing crane and hoist machinery for naval vessels.

The proposed $10,000,000 power and irrigation project on Rogue river, Oregon, is under survey by army and reclamation engineers. Bids for the Payette river dam, $3,000,000 Cascade reclamation project, Idaho, are expected to be called in 60 days.

American Bridge Co. will furnish 10,800 tons of steel for transmission towers for the Bonneville Project. A separate award will be made for 7600 tons for Coulee-Spokane and Covington-Chehalis lines, included in original estimate. Same supplier was awarded 5000 tons for Rock Island-Grand Coulee and Covington-Rock Island sections several months ago.

Increasing scarcity of scrap features the market, particularly of cast iron, for which foundries and other users are competing strongly although the price is pegged. Supplies are far below demand. Steel scrap receipts are less than current consumption at rolling mills, which have reduced their large stocks and are active buyers. Present prices do not attract country shipments.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 121

Many bolt, nut and rivet manufacturers had more orders in July than in June, repeating the suc-

Tool Steel Scrap

Cents per pound, to consumers f.o.b. shipping point

Tungsten types

For each 1% tungsten contained	
Solid scrap containing over 12%	1.80c
Solid scrap containing 5 to 12%	1.60
Turnings, millings containing over 12%	1.40
Turnings, millings, solids under 5%	1.25

Molybdenum Types

Solid scrap, not less than 7% molybdenum, 0.50 vanadium	12.50
Turnings, millings, same basis	10.50
Solid scrap, not less than 3% molybdenum, 4% tungsten, 0.50 vanadium	13.50
Turnings, millings, same basis	11.50

cessive gains of previous months. Proportion of defense orders is increasing and commercial users have little opportunity to get on books.

In addition to revisions of extras noted last week packing charges on 100-pound kegs have been increased from 10 to 25 cents.

Canada

Toronto, Ont.—With defense buying growing and absorbing about 80 per cent of Canada's production of iron and steel, supplies for domestic needs are more difficult to obtain. While some warehouse operators report fairly good stocks the government may freeze these supplies for war needs. Warehouse interests have difficulty in replenishing stocks and building up inventories. The London Rolling Mills, London, Ont., which recently resumed operations, made several shipments of merchant bars to local warehouses during the process of running in, but it now is stated that this plant has swung over to special steel for war purposes. Atlas Steels Ltd., Welland, Ont., and Dominion Foundries and Steel Ltd., Hamilton, Ont., have received orders for special steel from the Department of Munitions and Supply, for ordnance production, totaling approximately $2,000,000, about evenly divided. Through tightening of war priorities supplies for non-defense industries are disappearing. Canadian mills now are almost fully booked to the end of the year and on most materials decline further contracts.

Increasing pressure is being placed on Canadian plate mills for ship construction and shipments are being allocated. Steel Co. of Canada, Ltd., is operating its new plate mill at about two-thirds capacity, which is close to the limit with its present available supply of steel. All plate from this mill is being delivered against government order. Additional heavy buying is expected soon in connection with the new Canadian National Railways rolling stock purchase involving some $20 000,000, and additional merchant ship contracts have just been awarded to a British Columbia builder which will involve early needs for several thousand tons of plates.

While inquiries for sheets and strip are large, no change is reported in conditions. Producers here are out of the market and are not accepting further contracts. Backlogs will absorb all Canada's output to the end of the year.

Heavy volume booking is reported in structural shapes and orders are well in excess of capacity. Structural lettings during the past week totaled approximately 15,000 tons, most of which was in connection with war plant additions and defense projects.

Heavy demand and limited supply rule in scrap. While supplies of steel scrap are sufficient for current needs a general shortage exists in iron grades. Foundries have more difficulty in obtaining cast scrap and stove plate.

Semifinished Steel

Semifinished Prices, Page 121

Problem of obtaining semifinished steel has become so difficult that some forge shops have been obtaining billets by having steel foundries cast them. Some nonintegrated steel plants expect their steel supplies, already nearly at the vanishing point, to be further diminished by additional diversion of semifinished steel to Britain, as well as the expected mandatory priorities order.

There is considerable opposition in some cases to increased shipments of semifinished material to Britain. Primarily, the opposition arises from buyers of semifinished steel who argue that we would be better off to ship the finished product instead of penalizing our own finishing facilities.

There is also considerable argument that with this semifinished material goes a considerable quantity of scrap, since the finishing process is one of the largest sources of scrap produced within the steel mill.

There have been a few cases recently of delay in pipe mills because

of skelp shortages, and the situation in wire rods has become worse, with delays more prevalent.

Use Lake Superior Iron Ore at Granite City

St. Louis — Iron ore from the Great Lakes region, the first to appear in this area in more than a decade, has begun to arrive on the grounds of the old Granite City Pig Iron Co. at Granite City, Ill., where rehabilitation work is being rushed on one of the company's stacks, in order to start pig iron production within the next 30 days.

More than 400 cars of ore have been dumped during the past several days, part of a consignment of 6000 cars.

One of the two blast furnaces purchased last May by the Koppers interests, is scheduled to be blown in by Sept. 1, thereby reviving an in-industry idle here since the late '20s. The stack has a capacity of 600 tons daily. Coke for the operation will be from ovens of the Laclede Gas Light Co.

About half the hot metal produced will be taken by the Granite City Stteel Co., currently running at full capacity on defense and civilian orders. The hot metal will be transported about a mile over Granite City Steel Co. tracks, thereby effecting considerable saving in time in steel production.

Ore Shipments in July Record; 11,390,488 Tons

■ Lake Superior iron ore shipments in July were 11,390,488 gross tons, an increase of 957,000 tons over July of last year, according to the Lake Superior Iron Ore Association, Cleveland. Total shipments for the season to Aug. 1 this year have been 40,216,408 tons, compared with 27,702,178 tons for the corresponding span of last year, an increase of 12,514,230 tons. These are new records, both for a month and for the cumulative for the season to date.

Shipments by ports in July were in gross tons as follows:

Table 1

	July 1941	July 1940
Escanaba	634,972	559,070
Marquette	679,616	916,473
Ashland	841,460	955,584
Superior	4,133,469	3,713,402
Duluth	2,855,526	2,423,757
Two Harbors	2,185,966	1,815,145
U. S. ports	11,331,009	10,383,431
Michipicoten	59,479	50,057
Grand total	11,390,488	10,433,488
Increase from year ago	957,000	

Shipments for the season to Aug. 1 have been:

Table 2

	To Aug. 1, 1941	To Aug. 1, 1940
Escanaba	2,440,053	1,469,976
Marquette	2,961,227	2,521,722
Ashland	3,578,747	2,595,045
Superior	14,019,343	9,731,157
Duluth	9,951,137	6,237,061
Two Harbors	7,037,991	5,024,508
U. S. ports	39,988,498	27,579,469
Michipicoten	227,910	122,709
Grand total	40,216,408	27,702,178
Increase from year ago	12,514,230	

U. S. Steel's Iron Ore Output To Total 40,800,000 Tons

Combined ore production by all United States Steel Corp. subsidiaries this year will be about 40,800,000 net tons, according to the *U. S. Steel News*. Oliver Iron Mining Co., operating on the Lake Superior ranges, expects to ship a record total of 35,800,000 net tons. Its prior record of 34,803,210 net tons was established in 1916.

Of the Oliver production this year, Pittsburgh Steamship Co., another U. S. Steel subsidiary utilizing its entire fleet of 68 steamers and two barges, will transport 24,640,000 tons. The Pittsburgh company is planning to have its five new bulk freighters ready for service next summer.

Coal production by U. S. Steel subsidiaries this year is estimated

at 30,000,000 net tons. Limestone and dolomite output will approximate 16,800,000 net tons, of which about half will be produced by the Michigan Limestone & Chemical Co. at Calcite, near Rogers City, Mich.

Four thousand beehive coke ovens have been put back into service to meet demand for blast furnace fuel, which exceeds capacity of available by-product coke ovens. Besides the production of these beehive ovens U. S. Steel furnaces are consuming the coke output of 4500 additional beehive ovens not operated by its coal subsidiaries.

Of this year's production of iron ore, coal and limestone, the northern subsidiaries alone will require approximately 79,000,000 net tons at their present rate of steel production.

Scrap Institute's Reply to Henderson

(*Concluded from Page* 23)

became price administrator, a national survey was made to locate scrap. When the President created the Office of Price Administration, instead of calling in men of training and experience the scrap situation was placed in the hands of neophytes who have attempted to keep the mills going with theories instead of scrap.

"Last January the industry called attention to tonnages of scrap in remote areas which could not move at prices set by OPACS. The tapping of this reserve, estimated at 750,000 to 2,500,000 tons, is still under discussion.

"In the past six months attention has been called to dormant scrap, but no action has been taken.

"In April an auto wrecker campaign to develop at least 1,000,000 tons more scrap was proposed by the Institute, but this was blocked by one of Mr. Henderson's assistants because he wanted to wait until OPACS could create regional offices. In desperation the Institute appealed to OPM, which two weeks ago started the ball rolling.

"Also in April the Institute called attention to impending shortages of scrap and advocated a national salvage week to collect all waste materials. An assistant to Mr. Henderson opposed the idea because it would disrupt 'their price economy.'

"The Institute is not defending any violations of law, but the recent attack can only be interpreted as a smear against the entire industry since Mr. Henderson has been taking evident delight in making it his whipping boy. While the Institute is not accused of anything, yet as spokesman for its members it believes the following facts should be made public.

"The institute has never advocated an over-all increase in price but has proposed that glaring inconsistencies be corrected. Beginning in April, three price schedules have been issued, which have progressively confused the situation. Obvious adjustments promised on July 11 have not yet been promulgated because the lawyers at OPACS disagree with the economists.

"Does Mr. Henderson know that the Institute has been compelled to recall interpretations issued by his legal division because the price economists and lawyers couldn't agree?

"Does Mr. Henderson know that his own staff has given special rights and privileges to some of the 15 brokers of whom he now complains, to pay higher prices for scrap in certain localities? Why doesn't Mr. Henderson state that the Institute has protested such special dispensations and has urged that they be stopped?

"Does Mr. Henderson know that the Institute has complained because mills, in dealing directly with producers of scrap, have wasted transportation facilities through cross-hauling and generally disrupted the regular channels of trade?

"Does Mr. Henderson know that

his price levels, with their geographic and grade differentials, have set such low prices for scrap in many localities that thousands of small peddlers and scrap dealers have been forced into other fields of endeavor, thereby seriously hampering the collection of much-needed scrap?

"Does Mr. Henderson know that his prices have been set in such a way that an important grade of scrap can bring only $1.97 per ton at Butte, Montana, when the cost of preparing this grade is almost $3 per ton?

"Does Mr. Henderson know that the very manner in which he releases his regulations handicaps the collection of scrap? Why does he not explain that the much publicized level of $20, Pittsburgh, is only for 10 per cent of the total consumption and that in most areas scrap sells for much less and that the freight to the mill and the cost of preparation must be subtracted?

"Why doesn't Mr. Henderson tell the public that the reduced prices, to which the industry does not object, have in the main taken money out of the pockets of producers of scrap, the farmer, the manufacturer, the housewife, etc., and given it to the mills? The scrap dealer can only pay the farmer, the manufacturer, the housewife what is left after deducting the cost of collection, preparation, and freight from the OPACS price.

"Mr. Henderson's words and threats have not helped move one ton of scrap. That can be accomplished only by toil and sweat. Mr. Henderson's utterances are only a smoke screen by which he seeks to hide from public view the dismal failure of his department as it affects the moving of raw materials to steel mills and foundries. Any curtailment or shutdown of operations now rests squarely upon Mr. Henderson."

To Get Subcontracts By Professional Aid

■ To facilitate more small manufacturers securing subcontracts for defense work the Canton (Ohio) Defense Production Association has engaged a professional engineering concern, Designers for Industry Inc., Cleveland, which is perhaps the first time that a community has called on outside and professional help for such purpose.

Canton realizes that many small manufacturers may have to close down unless they can get defense contracts from prime producers. Results through community efforts at securing such contracts did not prove efficient and hence professional services have been engaged.

It is believed that the service will be able to give the individual study and advice which more public services have failed in. Not only does Canton realize the need for defense work for survival of small manufacturers but the community is anxious for close to 100 per cent manufacture in the community for defense for patriotic reasons.

Studebaker Machine Co. Organizes in Chicago

■ J. M. Studebaker and J. M. Studebaker III have formed the Studebaker Machine Co., to market hydraulic machines for industrial use. The two, son and grandson of one of the five Studebaker brothers who founded the Studebaker Automobile Co., South Bend, Ind., will head the new organization as president and vice president, respectively. Other officers are: C. A. Baxter, vice president in charge of sales; James Peticolas, vice president; Marion T. Martin, secretary and general counsel; and Frank L. Stebbins, treasurer and manager of the Chicago office. Sales offices will be located in Chicago and executive offices in South Bend. The new company will operate under an exclusive license agreement with Bryant Engineering Corp., Cicero, Ill.

Britain Reorganizing Its Steel Industry

(*Concluded from Page 27*)

guns, tanks, and other munitions. The restriction on imports of scrap, iron ore and pig iron, as well as on billets and other semis, made it imperative that steel production should be concentrated not only on the most urgent and important war materials but also in the most efficient plants. This explanation covers the scheme which has been designated 'Concentration of Industry,' a plan which, of course, is not confined to the steel industry and has, as its primary consideration, the utmost economy in the use of man power.

"The details of the 'Concentration of Industry' scheme have been engaging the attention of the steelmaking and steel rerolling industries for some weeks, and, at the moment of writing, have not yet been finally settled. It is a difficult and thorny problem. Everyone agrees that the principle is sound, that, say, 80 per cent of the industry should operate at 100 per cent capacity rather than 100 per cent work at 80 per cent capacity, especially as thereby redundant man power will be released for even more important work.

Plant Location a Factor

"Which plants will be closed down, and which will assume the additional responsibilities of the idle units? There are so many factors to consider apart from the obvious one of plant efficiency. There is, for example, geographical position in relation to: (1) Vulnerability or liability to bombing attacks; (2) proximity to raw materials, and/or ports; (3) proximity to the largest consuming centers.

"This matter has been discussed at some length because of its great importance, but even when this last explanation is taken into consideration, the falling-off in demand is rather baffling. The need for more ships, naval and mercantile, and consequently for more shipbuilding materials, was surely never greater, the need for more tanks, guns, shells, mines and depth-charges, of torpedoes and bombs, of mechanical transport and 'tin' helmets is beyond question, and the plain man, who does not, of course, know the facts as those in authority do, asks why we should not continue to make all these essential things to the limit of our capacity rather than try to conserve steel in the form of ingots and semis."

Kerber Goes to OPM

William Kerber, eastern sales manager for the Hanna Furnace Corp., Buffalo, has been appointed special consultant in the pig iron subdivision of the iron and steel branch of the production division of the Office of Production Management. His work will have to do with the allocation of pig iron.

Nonferrous Metals

New York—Control of nonferrous metal distribution and prices by OPM and OPACS is now practically complete, with only some of the details remaining to be worked out. Shortage of copper has forced curtailment of operations in some brass mills, even those working on defense orders in some instances. The nonferrous trade in general is disturbed by the delays in allocations and by uncertainties concerning the probable amount of metal which will be available to various classes of non-defense users.

Copper—Maximum price of 12 cents, as of Aug. 5, applies to all domestic production that is unsold. In some quarters it is believed that the net effect of the official OPACS order will be to have 95 per cent of the new copper sold at 12.00c instead of the present 90 per cent. The other 5 per cent being bought at subsidized prices in excess of 12.00c by the MRC. Producers say they have been producing for a year all the copper they can at the prices unofficially set by Mr. Henderson. Shut down of mills or cer-

Nonferrous Metal Prices

Aug.	Copper Electro, del. Conn.	Copper Lake, del. Midwest	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
2	12.00	12.00	12.25	52.75	51.87½	5.85	5.70	7.25	17.00	14.00	35.00
4	12.00	12.00	12.25	52.75	51.87½	5.85	5.70	7.25	17.00	14.00	35.00
5	12.00	12.00	12.25	52.25	51.25	5.85	5.70	7.25	17.00	14.00	35.00
6	12.00	12.00	12.25	52.50	51.50	5.85	5.70	7.25	17.00	14.00	35.00
7	12.00	12.00	12.25	53.00	51.25	5.85	5.70	7.25	17.00	14.00	35.00
8	12.00	12.00	12.25	53.00	51.25	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	10.00-10.25
Cleveland	10.50-10.75
Chicago	9.25-9.50
St. Louis	9.50

Heavy Copper and Wire

New York, No. 1	11.25-11.50
Cleveland, No. 1	11.00-11.50
Chicago, No. 1	10.50-10.75
St. Louis	10.00-10.50

Composition Brass Turnings

New York	9.75-10.00

Light Copper

New York	9.25-9.50
Cleveland	9.00-9.25
Chicago	8.50-8.75
St. Louis	8.00

Light Brass

Cleveland	6.00-6.50
Chicago	6.50-6.75
St. Louis	5.75-6.00

Lead

New York	5.00-5.25
Cleveland	4.75-5.00
Chicago	4.75-5.00
St. Louis	4.50

Old Zinc

New York	4.50
Cleveland	4.00-4.12½
St. Louis	5.00

Aluminum

Mls., 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

tain departments for a day or several days are becoming more frequent.

Lead—By the first of this week the second allocation certificates for the Metals Reserve Co.'s Mexican and Canadian refined lead should be in consumers' hands. Shipments should start immediately. Between 45,000 and 50,000 tons is to be available, although OPM has not stated how much of this will be allocated. Not all the foreign lead will be allocated.

Zinc—For the first time in a year consumers added to their stocks, according to the June figures compiled by the Bureau of Mines, which showed a gain of 6 per cent.

Tin—Maximum prices for tin will be out shortly. So far OPACS seeks to control domestic prices but apparently is not seeking to control the base prices set by the British smelters in Singapore. The manner OPM will handle the distribution of tin is still undetermined.

CONSTRUCTION and ENTERPRISE

Michigan

ADRIAN, MICH.—American Chain & Cable Co., W. J. Wisner, manager, will build a one-story plant addition costing about $50,000.

ANN ARBOR, MICH.—Metrical Laboratories Inc. has been incorporated with $20,000 capital to manufacture gages and micrometers, by Walter Graves, 417 Detroit street, Ann Arbor.

DETROIT—St. Claire Tool Co. has let contract to Cooper Construction Co. for a tool and die shop. H. E. Beyster Corp., Detroit, is architect.

DETROIT—Lyon Inc., 197 South Waterman street, will build a one-story 200

Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 129 and Reinforcing Bars Pending on page 130 in this issue.

x 500-foot metal plant. Smith, Hinchman & Grylls, 800 Marquette building, are engineers.

DETROIT—Crucible Brass Foundry Co., 1070 Shipherd avenue, has been incorporated with $50,000 capital to manufacture brass, alloy and metal patterns, by Edward J. Colton, 2375 Cadillac boulevard, Detroit.

DETROIT—General Motors Corp. diesel division will build an addition to its heat treating department, general contract to E. F. Elserman & Co., Detroit.

GREENVILLE, MICH.—Federal Mogul Corp., Detroit, has let contract to Earl H. Beckering, Grand Rapids, Mich., for a foundry here. Robinson, Campau & Crowe, Grand Rapids, Mich., are architects.

Connecticut

BRIDGEPORT, CONN.—Remington-Rand Inc., 1087 Railway avenue, is having plans prepared for a plant addition to cost about $100,000.

STRATFORD, CONN.—W. Shea, town manager, Town Hall, is having plans prepared for a garbage disposal plant to cost about $200,000. M. J. Jankowsky is town engineer.

WATERBURY, CONN.—Chromium Corp. of America Inc., Brown road, has let contract to Oscar Stroberg & Son, 649 Watertown avenue, for a one-story 50 x 180-foot addition to cost over $40,000.

Maine

PORTLAND, ME.—Cumberland County Power & Light Co., 443 Congress street, is having plans made for a power plant addition on Knightville street, including steam generating system, and transformer station, on Highland avenue, to cost over $40,000.

Massachusetts

CAMBRIDGE, MASS.—Blanchard Machine Co., 64 State street, Boston, will build a one-story 45 x 78 x 90-foot plant addition on Osborne street. General contract has been given to J. W. Bishop Co., 100 Erie street, at about $45,000.

HYDE PARK, MASS.—B. F. Sturtevant Co., 89 Broad street, Boston, will build a three-story, 45 x 62 and 15 x 30-foot

addition, general contract to R. R. Jacobucci Inc., 16 Greenwood avenue, Quincy, Mass., at about $40,000. (Noted April, 28).

New York

WELLSVILLE, N. Y.—Moore Steam Turbine Corp., Harrison, N. J., will build a two-story 36 x 75-foot addition. Vossler & Vossler, Wellsville, are low bidders. Cost is estimated at about $40,000, with equipment.

Ohio

CLEVELAND—National Bronze & Aluminum Foundry Co., John L. Schmeller, vice president, will start work soon on two large defense orders. Airplane fuselage castings valued at $5,000,000 will be furnished to North American Aviation Co. and aluminum castings to Packard Motor Co. for Rolls Royce Merlin aircraft engines.

CLEVELAND—J. C. Ulmer Co., 1781 East Thirty-eighth street, manufacturer of special machinery, dies, gages, etc., John C. Ulmer, president, will build an addition of 9000 square feet floor space, at cost of $30,000.

CLEVELAND—Pipe Machinery Co., 930 East Seventieth street, W. L. Benninghoff, president, has arrangement with Defense Plant Corp. to finance purchase of $200,000 worth of equipment for manufacture of machine tools to be housed in $40,000 addition.

CLEVELAND—Howden & Pierce, 3051 St. Clair avenue, machine shop, will build plant 31 x 35 feet 1440 East Fortieth street. E. P. Pierce is owner.

DEFIANCE, O.—Defiance Automatic Screw Co., R. C. Zellner, manager, will build an addition 100 x 100 feet, to house toolroom and storage space. Baker & Shindlay Co., Defiance, has the contract.

Pennsylvania

BLAWKNOX, PA.—National Alloy Steel Co., N. B. Ornitz, president, will build a one-story plant. Contract has been let to George M. Seaman Co., 6338 Penn avenue, Pittsburgh, at about $40,000.

BRADDOCK, PA.—Standard Metal Products Co., M. Pfaff, president, Ninth street, will build a one-story plant 40 x 256 feet and office building 40 x 40 feet. Contract has been let to J. A. Romano, 6399 Morrowfield avenue. Cost estimated at more than $40,000.

BRADFORD, PA.—Forest Oil Corp., Forest Oil building, Bradford, plans to develop crude oil property with wells, pressure plants, pipe lines, steel storage tanks and water purification plants, near Marshburgh, Pa., at cost of about $75,000.

Illinois

CHICAGO—C. E. Niehoff & Co., 4925 West Lawrence avenue, manufacturer of automobile ignition and brake equipment, is building a 10,000-foot addition to its plant.

CHICAGO — Chicago Cutting Die Co., 2333 West Nelson street, plans an addition to double present capacity, to cost $20,000 for building and $10,000 for equipment. Company has large defense orders.

PEORIA, ILL.—Caterpillar Tractor Co., 600 West Washington street, plans additions to its tractor plant at East Peoria, to cost about $592,000.

Maryland

BALTIMORE—Revere Copper & Brass Inc., 230 Park avenue, New York, has agreed with Defense Plant Corp. for building and equipping $3,100,000 plant for production of naval equipment.

Missouri

COLUMBIA, MO.—City will receive bids until Aug. 18 on a steam generating unit to provide 75,000 pounds of steam per hour and other power plant improvements. Cost is estimated at $100,000. Burns & McDonnell, 107 West Linwood boulevard, Kansas City, Mo., are engineers.

KANSAS CITY, MO.—Aircraft Accessories Inc., 410 West Sixth street, Donald M. Stoner, vice president, plans enlargement of plant facilities.

ST. LOUIS—Scullin Steel Co., 6700 Manchester avenue, is building a two-story toolroom and foreman's office 13 x 39 feet, costing $7000.

Wisconsin

KENOSHA, WIS.—Simmons Co., manufacturer of metal beds, will build fourth story addition to building 85, 20 x 60 feet, to cost $4000.

MILWAUKEE—Stokerunit Corp. will build a one-story machine shop at 4548 West Mitchell street, to cost about $15,000. Contract has been given to Pfeifer Construction Co.

MILWAUKEE—Crucible Steel Casting Co. will build a one-story factory building at 2850 South Austin street, to cost $3000.

WEST ALLIS, WIS.—Gerlinger Brass & Aluminum Foundry Co., 1928 South Sixty-second street, has taken out a building permit for a one-story foundry addition to cost about $1300. (Noted March 31.)

WEST ALLIS, WIS.—North End Foundry Co., 1818 South Sixty-eighth street, will build a pattern storage building to cost about $10,000. W. O. Krahn Inc. has the contract.

Texas

ABERNATHY, TEX.—Texas-New Mexico Utilities Co., Abernathy, plans erection of a 20,000-kw steam power plant to cost about $3,500,000.

BORGER, TEX.—Panhandle Light Co. plans erection of a 20,000-kw. steam power plant to cost about $2,640,000.

DALLAS, TEX.—Dallas Power & Light Co. is considering enlargement of its Mountain Creek generating station to twice present capacity, at cost of $2,250,000.

FORT WORTH, TEX.—Stanolind Pipe

Line Co., Fair building, plans crude oil line into West Texas Permian basin from Ranger to Midland, Tex., 225 miles.

FORT WORTH, TEX.—Texas Steel Mfg. Co., A. J. Armstrong, vice president, 3901 Hamphill street, will expand its productive capacity at cost of about $275,000.

HOUSTON, TEX.—A bond election will be held soon to finance a sewage disposal plant to cost about $3,000,000 and storm sewers about $2,500,000.

TEXARKANA, TEX.—Lone Star Defense Corp., subsidiary of B. F. Goodrich Co., 400 South Main street, Akron, O., will construct and operate a $35,000,000 government ordinance plant on tract of 24,300 acres near here. Prack & Prack and Chester Engineers, Pittsburgh, are architects and engineers.

WINTERS, TEX.—City, T. A. Smith, mayor, has voted $175,000 bonds for construction of a municipal light plant.

Iowa

CEDAR RAPIDS, IOWA—Collins Radio Co. is building a $500,000 addition to its plant, adding 67,000 square feet to present 57,000 square feet. Company is engaged in defense work.

DES MOINES, IOWA—Marquette Cement Mfg. Co. has let contract to Kucharo Construction Co. for second unit of its plant, a project costing over $350,000, including raw mill, feed building and cooler building.

WAVERLY, IOWA—City, R. O. Clark, city clerk, will take bids Aug. 26 on improvements to municipal light and power plant, including new diesel engine generating unit and auxiliaries, to cost about $87,000. Stanley Engineering Co., Muscatine, Iowa, is engineer.

Idaho

NAMPA, IDAHO—City clerk will take bids soon for proposed elliptical 500,000-gallon water storage tank.

California

HUNTINGTON PARK, CALIF.—Pacific Pump Works, 5715 Bickett street, is building an addition to its factory building.

LOS ANGELES—American Can Co. will build warehouse with 25,000 square feet floor space, between Crosby and Colton streets, on the waterfront, to cost about $70,000.

LOS ANGELES—Phillips Bronze Corp. has been incorporated with $50,000 capital by J. P. Hoxie and associates. Freston & Files, 950 South Spring street, are representatives.

LOS ANGELES—Westcraft Machine & Engineering Co. has been incorporated with $50,000 capital by L. L. Armentrout, Long Beach, Calif., and associates. L. R. Seaman, Pacific Mutual building, Los Angeles, is representative.

LOS ANGELES—Acro Metals Corp. has been incorporated with $25,000 capital by J. G. Hiestand, Los Angeles, and associates. Lon R. McIntyre, 311 South Spring street, Los Angeles, is representative.

LOS ANGELES—American Metal Bearing Co., 2277 East Sixteenth street, is building a plant addition containing 2200 square feet floor space, at cost of $8400.

SOUTH GATE, CALIF.—Pacific Screw Products Co., 5211 Southern avenue, is building an addition to its plant at cost of $8000.

Washington

SEATTLE—Doran Co., 63 Horton street, manufacturer of ship propellers, is building two plant additions costing $60,000, to foundry and machine shop, each 70 x 235 feet. General Construction Co. has contract.

SEATTLE—Colcock Furnace Co. has purchased a site adjacent to its plant on Rainier avenue and plans expansion.

SEATTLE—Coolidge Propeller Co., 1608 Fairview avenue, will build an addition 34 x 74 feet.

SEATTLE—Western Gear Works is low at $847,248, to the navy, for crane and hoist machinery for six battleships at Brooklyn, Philadelphia and Norfolk yards.

TACOMA, WASH.—Philadelphia Quartz Co., Fred W. Elkinton, manager, is building a plant for production of sodium silicate and sodium carbonate. Hart Construction Co. has the contract.

Canada

CALGARY, ALTA.—McColl Frontenac Oil Co. Ltd. will build an oil refinery costing $1,000,000 and has bought a 60-acre site in East Calgary.

EAST SAINT JOHN, N. B.—St. John Dry Dock & Shipbuilding Co. Ltd. plans plant addition to cost $200,000 including two building berths for 4700-ton ships.

HAMILTON, ONT. — United Car Fastener Co. of Canada Ltd., Gage avenue, will build a plant addition to cost about $15,000, without equipment, to manufacture leather and sporting

goods fasteners.

KITCHENER, ONT.—Dominion Electro Homes Ltd., Edward street, will build a machine shop costing $25,000, and is asking bids. J. C. Klaehn, 49 King street East, is architect.

NORTH YORK TOWNSHIP (Toronto), ONT.—DeHavilland Aircraft Co. Ltd. will award contracts immediately for repair plant and other additions costing $250,000, with equipment. H. A. Angus, 1221 Bay street, Toronto, is construction engineer.

PORT COLBORNE, ONT.—International Nickel Co. of Canada Ltd. will build a plant addition here, including electrolytic unit, to cost about $100,000, with equipment. General contract has been given to Nordale Construction Co., a subsidiary.

SARNIA, ONT.—Union Gas Co. of Canada Ltd., Chatham, Ont., is having plans made for erection of gas plant here to cost $1,000,000. J. J. Barrm, 227 Front street, Sarnia, is manager.

ST. CATHARINES, ONT. — Packard Electric Co. Ltd., 13 Race street, manufacturer of electric equipment, has let contract to C. F. Monk, 399 St. Paul street, for addition to No. 2 plant and will ask bids immediately for an addition to No. 1 plant. Cost with equipment estimated at $200,000.

SUDBURY, ONT.—Sudbury Construction & Machinery Co. Ltd., 139 Lorne street, is taking bids for molding shop costing about $35,000. J. P. O'Gorman, 4 Durham street, is architect.

TORONTO, ONT.—Coulter Copper & Brass Co. Ltd., 15 Sumach street, will build plant addition costing $30,000, exclusive of equipment.

TORONTO, ONT.—Dearborn Chemical Co., 2454 Dundas street West, will build a plant addition costing $35,000. General contract has been given to Harry Jennings & Son, 49 St. Clair avenue West.

WINDSOR, ONT.—Ford Motor Co. of Canada Ltd. will build plant addition on Sandwich avenue, costing $65,000 Wallace R. Campbell is president.

DARTMOUTH, N. S.—Halifax Shipyards Ltd., Halifax, N. S., is having plans made for a machine shop and equipment here, to cost about $50,000.

ARVIDA, QUE.—Abrasive Co. of Canada Ltd., Drake avenue, is having plans made by Lamontagne & Gravel, architects, Racine street, Chicoutimi, Que., for an addition to its plant for lump abrasive production, to cost $56,000, with equipment.

LACHINE, QUE.—Dominion Engineering Works Ltd. will build an addition and make repairs to plant to increase war production, costing about $100,000, with equipment.

LAUZON, QUE.—Davie Shipbuilding & Repairing Co. Ltd., 25 Davie street, is planning addition to its shipyards to cost about $125,000.

MAGOG, QUE.—Industrial Specialty Mfg. Co. Ltd., 1 John street, is having plans prepared for a plant addition costing about $40,000, with equipment. Metal bobbins, spools, etc., will be produced.

MONTREAL, QUE.—Canadian Vickers Ltd., 5136 Notre Dame street East, builder of marine engines, aircraft, etc., plans a plant addition and equipment to cost about $100,000.

MONTREAL, QUE.—Canadian Wright Ltd., 6259 Notre Dame street East, builder of aircraft and marine engines, has let general contract to E. G. M. Cape & Co. Ltd., 630 Cathcart street, for a plant addition to cost about $50,000, with equipment.

MONTREAL, QUE.—Canadian Propellers Ltd., manufacturer of aircraft equipment, 1010 St. Catharine street West, will build plant addition costing $350,000. General contract has been given to Collet Freres Ltd., 1978 Parthenias street, for superstructure.

QUEBEC, QUE.—Department of munitions and supply, Ottawa, Ont., G. K. Sheils, deputy minister, will build immediately a $500,000 addition and improvements to old Canadian National railway shops here. General contract has been given to Anglin Norcross Corp. Ltd., 892 Sherbrooke street West, Montreal, Que.

SHERBROOKE, QUE.—Canadian Ingersoll-Rand Co. Ltd., Des Forges street, is making additions and repairs to plant to increase production for defense, at cost of about $70,000, with equipment.

ST. JOHN, QUE.—Department of munitions and supply, Ottawa, Ont., G. K. Shiels, deputy minister, will erect repair depot here, including 22 buildings, to cost about $400,000, without equipment. General contract has been given to L. G. Ogilvie & Co. Ltd., 1440 St. Catharine street West, Montreal, Que.

ST. LAURENT, QUE.—Noorduyn Aviation Ltd., aircraft manufacturer, will build repair and assembly plant costing $50,000, financed by department of munitions and supply, Ottawa, Ont., G. K. Shiels, deputy minister.

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PATTERN RIGGER for foundry in Massachusetts, familiar with rigging patterns for Tabor, Johnson-Jennings and SPO molding machines. Excellent opportunity for man who knows his business. State all qualifications—former connections—and salary in reply. Address Box 529, STEEL, Penton Bldg., Cleveland.

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GEAR CUTTER, Spur, 84" Newark, M.D.
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HORIZ. MILL, Fl. Type, 3½" bar D & H
VERTICAL MILL, 8' Betts, 2 Hds., Grd. Fds.
LATHES, 48"x22-1/2' & 48"x26-1/2' Johnson,
TURRET LATHE, 26" Libby, H.S. 7-1/2", S.P.D.
TURRET LATHE, 18" Libby, H.S. 3-9/16", M.D.
PLANERS, 30"x30"x8', 36"x36"x11', 54"x54"x10'
SHEAR, 10'x3/16" Obi Squaring, M.D.

LANG MACHINERY COMPANY
28th Street & A. V. R.R. Pittsburgh, Pa.

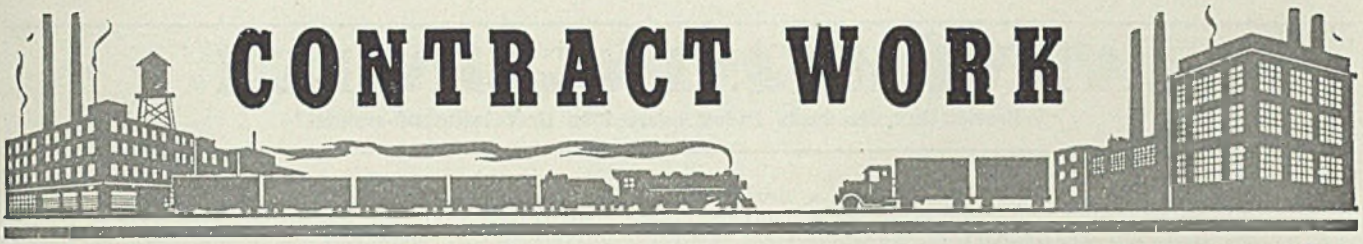
LOOKING FOR USED OR SURplus machinery? STEEL readers may have the equipment you want. Place an advertisement in this section. Rates are moderate. Write today.

FOR SALE AT BARGAIN

50" Special horizontal facing machine. Suiting for a variety of facing operations. This piece of used equipment is a useful tool to a manufacturer needing this type of operation. Address Box 539, STEEL, Penton Bldg., Cleveland.

NEED EQUIPMENT IN A HURRY? . . .

Read the above advertisements—they list a lot of good serviceable machinery and accessories which may just fill the bill. And if you don't see what you need—ask these advertisers—they'll get it for you.



Positions Wanted

ADVERTISING MANAGER
now and for past 15 years manager of advertising department of $13,000,000 manufacturer of machinery and tools, is available for similar position preferably in New York City or nearby locality. Has complete charge of trade paper advertising, preparation and production of catalogues, booklets, sales material, etc. Address Box 536, STEEL, 110 E. 42nd St., New York, N. Y.

SALESMAN, 20 YEARS' EXPERIENCE. Now employed by large steel mill. Know tool steel. Also sold and understand machinery, small parts, etc. Executive experience, handle salesmen. Now travelling middle east, but willing move anywhere. Know Pacific Coast well, also Eastern seaboard and Canada. Can and will show real production record. Excellent reasons for change. Address Box 534, STEEL, Penton Bldg., Cleveland.

WANTED—HEATING JOB ON CONTINUOUS FURNACE. American, 38 years. Best reference. Address Box 533, STEEL, Penton Bldg., Cleveland.

STEEL PLANT EXECUTIVE — METALLURGICAL ENGINEER—training in purchase and inspection of raw materials—melting supervisor—experience acid and basic open hearth—all grades steel—large experience alloy grades—large ingots—ordnance work etc. Considerable research coordinating mill and laboratory. Wide acquaintance among open hearth men. Will consider sales work—particularly ferro alloys where practical melting experience is of value. Reply Box 538, STEEL, Penton Bldg., Cleveland.

SET UP AND MANAGE BRANCH OFFICE of expanding firm, in Dayton, Ohio. Experienced accountant. Address Box 527, STEEL, Penton Bldg., Cleveland.

WANTED POSITION AS CHIEF OF POLICE. Have 20 years experience of Army, State Police and Industrial Police. Have held executive police positions with leading corporations. Thoroughly understand Industrial Policing, and qualified by experience to give management type of protection and policing that they may desire. Address Box 525, STEEL, Penton Bldg., Cleveland.

CLASSIFIED RATES

All classifications other than "Positions Wanted," set solid, minimum 50 words, 5.00, each additional word .10; all capitals, minimum 50 words, 6.50, each additional word .13; all capitals, leaded, minimum 50 words 7.50, each additional word .15. "Positions Wanted," set solid, minimum 25 words 1.25, each additional word .05; all capitals, minimum 25 words 1.75, each additional word .07; all capitals, leaded, minimum 25 words 2.50, each additional word .10. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge.

Displayed classified rates on request.

Address your copy and instructions to STEEL, Penton Bldg., Cleveland.

Accounts Wanted

STEEL CASTINGS ACCOUNT

Representation in Detroit, Michigan territory for Steel Castings foundry. Wide personal acquaintance with plants requiring steel castings. Financially responsible and aggressive. Experienced in service needs of plant and foundry. Address Box 530, STEEL, Penton Bldg., Cleveland.

YOUNG MAN NOW CALLING ON INDUSTRIAL concerns in Northern Ohio and Western New York desires additional account. Address Box 532, STEEL, Penton Bldg., Cleveland.

EXPERIENCED WISCONSIN REPRESENTATIVE with well established contacts in the foundry and metal manufacturing industries desires additional lines. Address your proposition to: Fred H. Prescott, 225 E. Michigan St., Milwaukee, Wisconsin.

ARE YOU SEEKING SALES AND SERVICE representation in the New York vicinity or Eastern Seaboard? A thoroughly competent sales engineer is available (on a commission basis) to represent concerns manufacturing equipment or fabricated steel products for industrial and chemical plants.

A. H. Goode
112 W. 44th St., New York, N. Y.

Help Wanted

SALESMEN: NEW SPECIAL ALLOYS for production and maintenance field. High class repeat business with proven success. Attractive commission. Good territories open. Qualified and introduced hard workers with technical background (only replies with complete details considered). Address Box 508, STEEL, Penton Bldg., Cleveland.

WANTED

METALLURGIST WITH IRON AND STEEL casting experience. Good opportunity for right party. Address Box 537, STEEL, Penton Bldg., Cleveland.

Employment Service

SALARIED POSITIONS
$2,500 to $25,000

This thoroughly organized advertising service of 31 years' recognized standing and reputation, carries on preliminary negotiations for positions of the caliber indicated above, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If your salary has been $2,500 or more, send only name and address for details. R. W. Bixby, Inc., 110 Delward Bldg., Buffalo, N. Y.

Castings

OHIO

THE WEST STEEL CASTING CO., Cleveland. Fully equipped for any production problem. Two 1½ ton Elec. Furnaces. Makers of high grade light steel castings, also alloy castings subject to wear or high heat.

PENNSYLVANIA

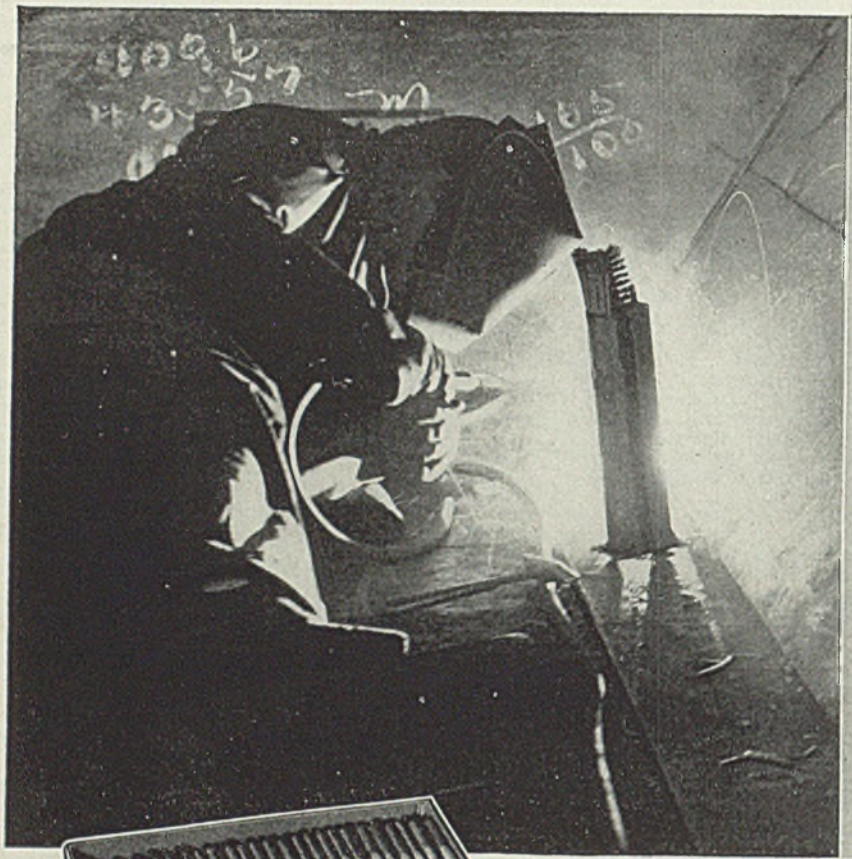
NORTH WALES MACHINE CO., INC., North Wales. Grey Iron, Nickel, Chrome, Molybdenum Alloys, Semi-steel. Superior quality machine and hand molded sand blast and tumbled.

ADVERTISING INDEX

Where-to-Buy Products Index carried in first issue of month.

◆ ◆ ADVERTISING INDEX ◆ ◆

Where-to-Buy Products Index carried in first issue of month.



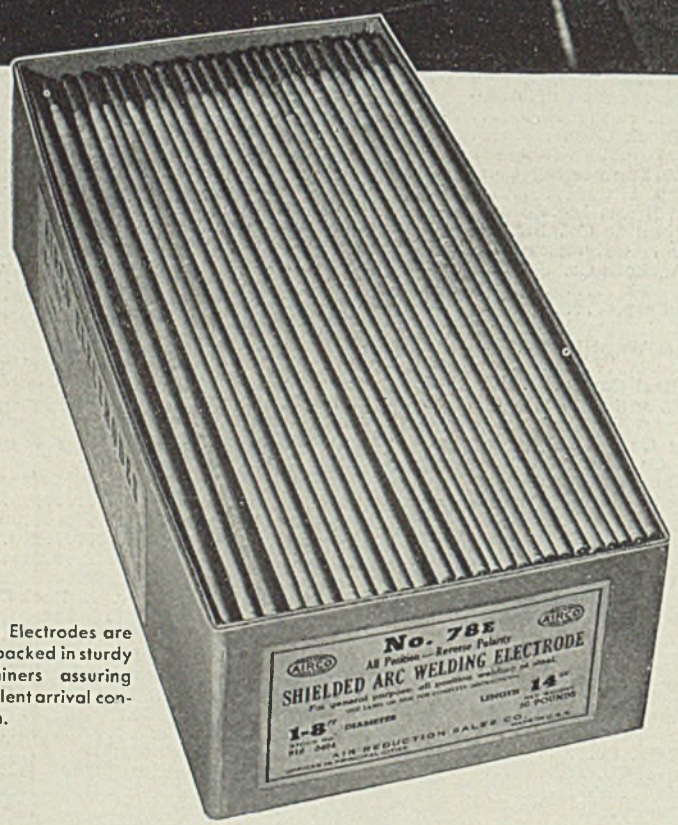
WELD FOR HIGH STRENGTH ON MILD STEEL WITH

AIRCO

No. 78E ELECTRODES

When high quality welds are of major importance, this shielded arc electrode has no superior for all position, high strength welding of mild steel. It is being used with great success for fabricating steel plate, rolled sections and castings, for pipe lines, storage tanks, frames, bridges, for all classes of marine work and for welded fittings on unfired pressure vessels.

Airco No. 78E meets the requirements of A. S. M. E. Boiler Code paragraphs U-68, U-69 and U-70. It has the approval of Lloyds Register of Shipping Class I welding and of the Board of Standards and Appeals of the City of New York, Grade 10, for structural steel welding. Available in all diameters this electrode produces welds developing tensile strengths ranging from 65,000 — 75,000 p.s.i. and has an elongation in 2 inches of 22-28%. This electrode conforms to classification E6010 of A. W. S. and A. S. T. M. Filler Metal Spec. No. A233-407. Ask your nearest Airco representative for full details.



Airco Electrodes are well packed in sturdy containers assuring excellent arrival condition.

Air Reduction

General Offices: 60 EAST 42nd ST., NEW YORK, N. Y.

DISTRICT OFFICES IN PRINCIPAL CITIES

AIRCO — WILSON

Anything and Everything for **GAS WELDING or CUTTING and ARC WELDING**